

F-59796, F-59797, F-59798, F-59799, F-60208, F-60209, F-60210, AND F-60211

TELEPHONE SETS

(TOUCH-A-MATIC® AUTOMATIC DIALER)

CONTENTS	PAGE	CONTENTS	PAGE
1. GENERAL	2	10-Button Key Removal	12
2. IDENTIFICATION	2	Faceplate Removal	12
Design Features	2	Handset Cradle Removal	13
Optional Features	3	Housing Removal	13
Ordering Guide	4	4. CONNECTIONS	13
Operating Features	5	5. OPERATION	14
3. INSTALLATION	5	Record A Number Into Memory	14
STANDARD INSTALLATION	5	Change A Number In Memory	17
Installation Check Procedure	7	Delete A Number From Memory	17
OPTIONAL APPARATUS INSTALLATION	7	Automatically Dial A Number From Memory	17
4A Speakerphone	7	LAST NUMBER DIALED Feature	19
3B Speakerphone	7	End-to-End Signaling	19
2C PICTUREPHONE® Service	7	6. MAINTENANCE	20
D-180818 Kit of Parts (Record Disable and Dial Intermix Feature)	7	Trouble Analysis	20
COMPONENT LOCATION AND ACCESS INFORMATION	9	Battery	20
Location Of Components	9	Memory	20
Mounting Cord	10	Dial	21
Network Terminals	10	10-Button Key	21
Power Supply (PSB) Terminals	11	Ringer	21
		Buzzer	21

NOTICE

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CONTENTS	PAGE
Handset Jack	21
Handset	22
Kit of Parts	22
Faceplate	22
Speakerphone	23

1. GENERAL

1.01 This section contains identification, installation, connection, operation, and maintenance information for the F-59796 through F-59799 (MD) or F-60208 through F-60211 telephone sets (TOUCH-A-MATIC® service), Fig. 1.

1.02 This section is reissued to:

- Revise Figures
- Revise Tables B and D
- Add Table C
- Add D-180818 Kit of Parts
- Provide information on new faceplate and upper housing

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

1.03 The F-59797 through F-59799 telephone sets use a KS-20390L2 battery only.

1.04 A KS-20390L4 battery is furnished with the F-60208 through F-60211 telephone sets. If necessary these sets can use the KS-20390L2 battery.

1.05 The F-60208 through F-60211 telephone sets have a battery interlock feature whereby the automatic dialing functions are inoperative if the battery is not plugged in.

1.06 These sets are factory-wired for use with the 1A1, 1A2, or 6A key telephone systems (KTS).

2. IDENTIFICATION

2.01 These telephone sets (Fig. 1) provide the standard features of a 10 button key telephone set plus (manual) TOUCH-TONE® dialing, automatic dialing of 31 frequently called numbers, and a LAST NUMBER DIALED scratch pad memory.

2.02 *Design Features:*

- Modular key telephone set
- Integrated circuit RC TOUCH-TONE oscillator
- Integrated circuit memory
- Surge protector
- Polarity guard (removable for dry circuit application)
- Common audible ringing
- Buzzer
- Busy lamp diode
- Line pickup buttons convertible to nonlocking signal buttons
- 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 tone during automatic dialing (WAIT input)
- End-to-end signaling for data application
- Dial Tone Detector—automatically starts dialer when precise (350 Hz and 440 Hz) TOUCH-TONE dial tone is present
- Set is prewired for use with speakerphone. If speakerphone is provided, set is capable of one-touch calling—depressing a memory

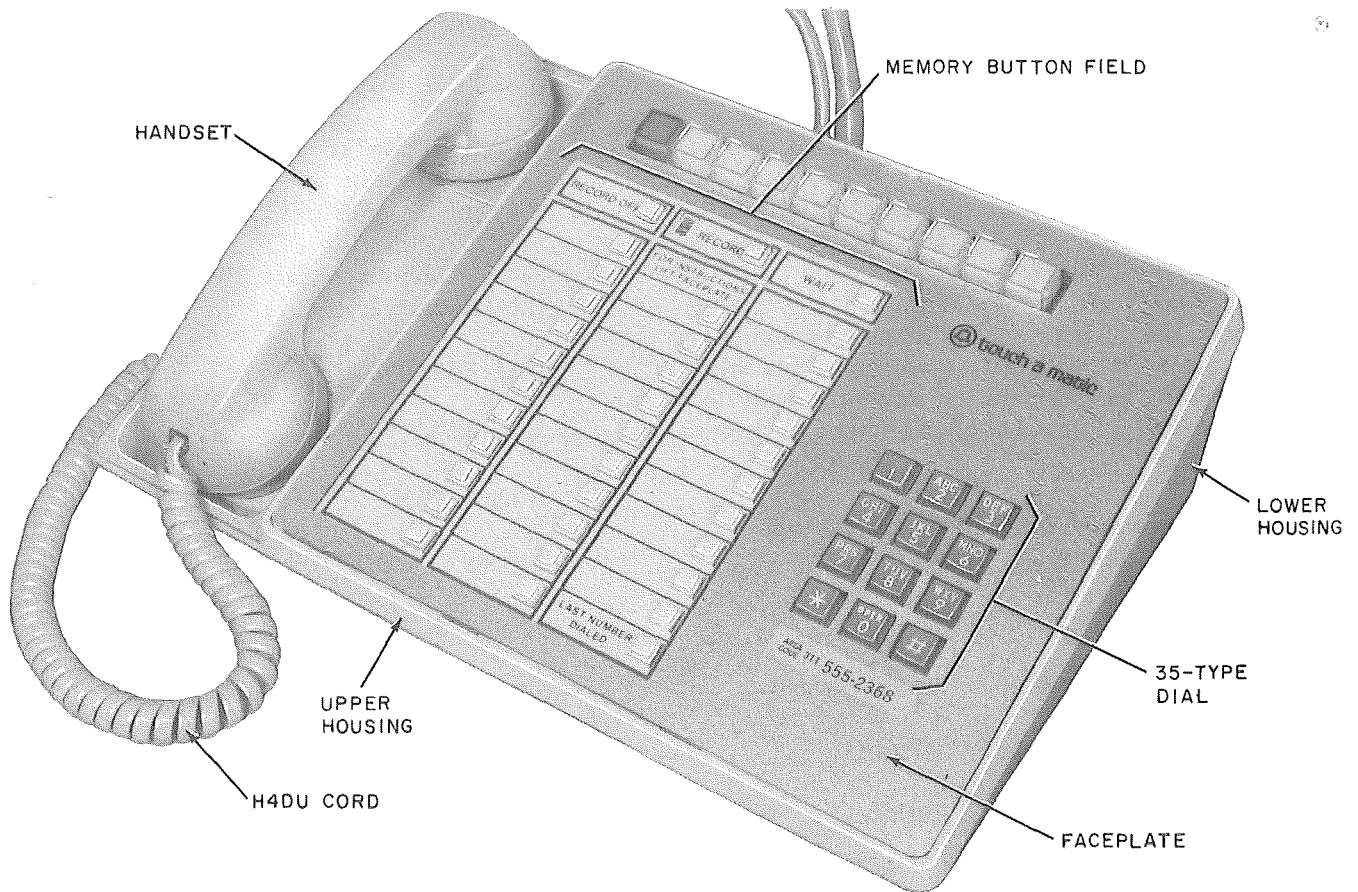


Fig. 1—F-59796, F-59797, F-59798, F-59799, F-60208, F-60209, F-60210, and F-60211 Telephone Set

button will automatically turn on speakerphone and dial number.

2.03 *Optional Features.*

- Speakerphone—either 3B or 4A speakerphone may be added to stations.
- Decorative Faceplate.
- Station Busy Lamp (busy lamp diode wired in set).
- Add-On-Conference.
- Record Disable—turn off the recording feature to prevent accidental erasures of previously stored numbers.
- Dial Intermix—same as Record Disable feature plus.
 - (a) Allows entries from manual dial and from memory to be intermixed without having to depress the RECORD OFF button (see 5.07).
 - (b) Disables the LAST NUMBER DIALED feature.
- Exclusion (Multiline)
- I Hold.
- Signaling.
- 2C PICTUREPHONE® service.
- Amplifying Handset.

- Restricted Dialing.
- Bridged Ringing.

2.04 All options are implemented by:

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

2.05 Ordering Guide:

Note: Modular components for the telephone sets are installed and the telephone sets will be shipped as complete instruments, ready to install with a 3B or 4A speakerphone (ordered separately).

(a) These are modular type telephone sets and may be ordered as:

- Set, Telephone, F-60208 (Black)
- Set, Telephone, F-60209 (Light Beige)
- Set, Telephone, F-60210 (Green)
- Set, Telephone, F-60211 (White)

(b) **Modular Components:** Sets may also be ordered by their component parts as follows:

- Housing, 870A1-* (Lower)
- Housing, Upper, 870AIU-*
- Faceplate, 841393291 (Matte Aluminum)
- Collar, 812361012 (P-23F101)
- Handset, G15A-*
- Cord, Handset, H4DU-*
- Unit, Power, 95B1 or 95B2
- Directory Sheet Set, 840393672
- Booklet, Instruction, Subscriber, SIB-2455B
- Cord, F-59336 (Power)

- Interface adapter, (used when connecting 3B or 4A Speakerphone and consists of the following):

Base, 841635766

Cover, 841635741

Screw (2), 840390371

- Base, Telephone Set, 841385966 (includes the following):

Dial, 35AG3A

Key, 652K5

Ringer, P1B

Network, 4228T

Buzzer, KS-20419L1

Cord, Mounting, D50BA-87

Cord, F-59337

Battery, KS-20390L4

Jack, Handset, 616B

Memory, 2870B (includes button field)

D-180492 Kit of Parts (Speakerphone Relay)

D-180493 Kit of Parts (Dial Tone Detector)

*For component parts, add appropriate color suffix:

- Black (-03)
- Green (-51)
- White (-58)
- Light Beige (-60)

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

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

Note: This kit of parts may be used only with sets equipped with a 2870B memory.

- Faceplate, 841393275 (Teak Woodgrain) or 841393283 (Walnut Woodgrain)

Note: These faceplates are directly interchangeable with the 841393291 faceplate, but not with the 840397186 (MD) faceplate (see 6.13).

2.06 Operating Features (Fig. 2).

- Dial (TOUCH-TONE dial).
- Line Key, 10-button key. Hold with eight line pickup buttons which are convertible to nonlocking. Button 10 is nonlocking and factory wired for signaling. An additional momentary contact (logic reset switch) is attached to the hold side of line key to reset the logic circuit anytime a key button is depressed. There is no lamp indication for the Hold or signaling buttons.
- 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) required].

3. INSTALLATION

STANDARD INSTALLATION

3.01 Make all wiring changes and telephone set modifications before external connections are made to the set (4.01).

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.*

Note: Sets are factory-wired for use with 3B or 4A speakerphone. If set is to be installed without speakerphone, check to insure that the one-touch calling switch (of the D-180493 Kit of Parts) is in the OFF position and make the following changes.

- (a) Mount a 66E3-25 connecting block and plug in the F-59337 cord.
- (b) To provide ringer connections, strap terminals 38 to 40 and 44 to 46 on the connecting block.
- (c) To provide power to the set, connect the cord from the 95B-type power unit to terminals 23 and 24 of connecting block.
- (d) Connect the 50-conductor mounting cord to connector cable from the key equipment.

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 (Fig. 6), by tilting the set up, and inserting the battery plug into the mating jack.

Note: Write date of installation on label provided on battery.

3.03 Install the 95B-type power unit within 150 feet (24 gauge conductors) of the telephone set and plug into an ac outlet not controlled by a switch (continuous ac power is required) (Fig. 9, 12, or 13). 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.

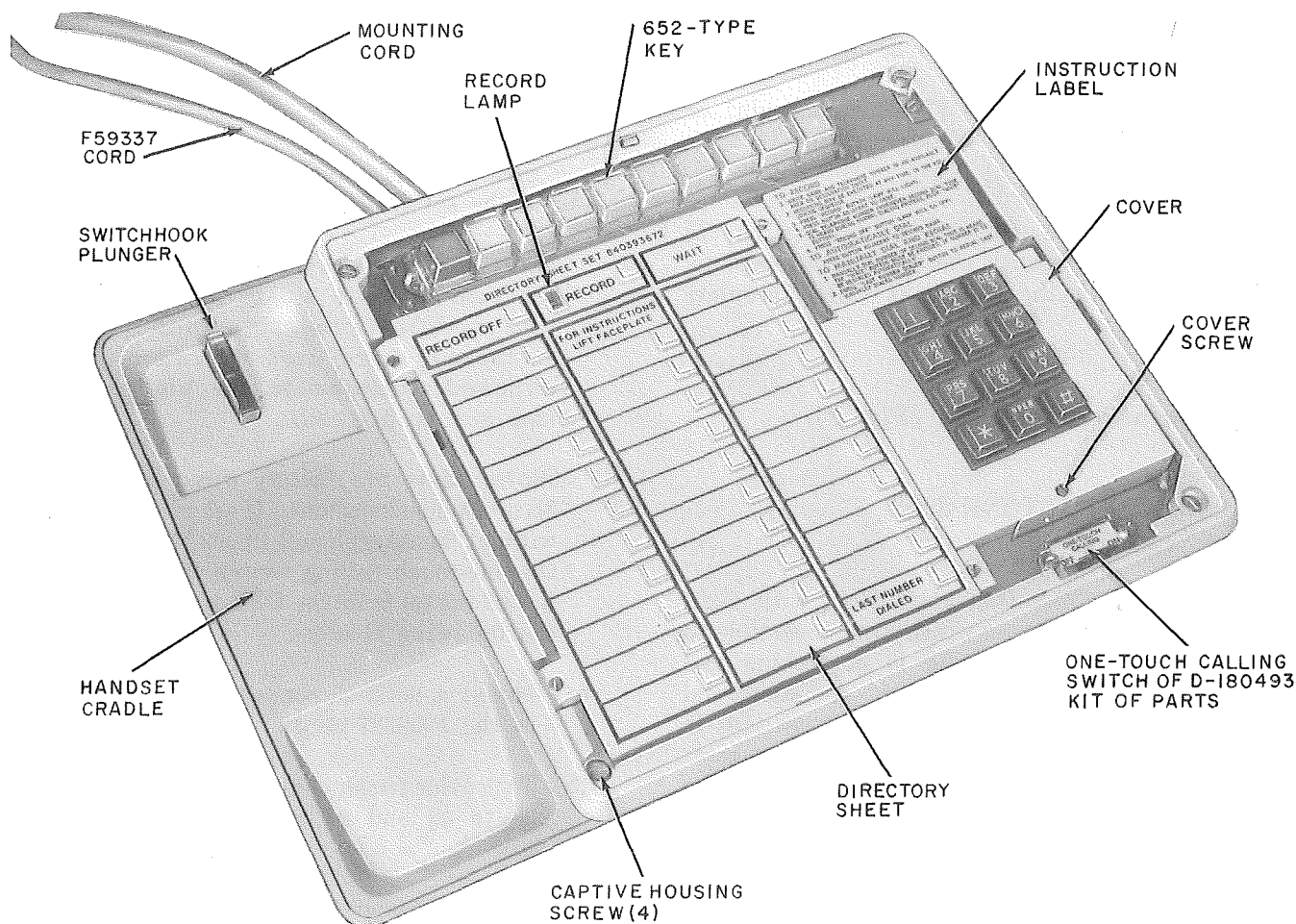


Fig. 2—Telephone Set With Handset and Faceplate Removed

Danger: Securely attach retaining clamp to ac outlet using outlet cover screw *BEFORE* attempting to install 95B-type power unit. When removing power unit, always unplug it completely from the outlet *BEFORE* attempting to remove the retaining clamp. This will prevent the possibility of a loosened retainer clamp or metallic outlet cover making contact with the ac prongs of the power unit when partially withdrawn from outlet. Do not use 841050818 or similar retaining clamps on outlets where the cover mounting screw holds the duplex outlet in the box.

3.04 The station number card retainer 812558039 (P-25E803) snaps into the faceplate below the dial.

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.

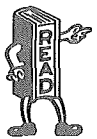
3.06 To designate the buttons of the 10-button key.

- (1) Use tabs (Form 5837).
- (2) Squeeze the key button caps gently and remove.
- (3) Insert the tabs.
- (4) Replace the caps so that small bumps on side of caps fit into small holes on side of button.

Installation Check Procedure

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

- (1) Disconnect the power unit and manually dial a known telephone number to check that telephone operates correctly in the absence of commercial power.
- (2) Reconnect power unit to ac outlet.
- (3) With the handset on-hook, record digits 1 through 0 into consecutive memory locations, storing one digit per memory. Fill all memory locations except LAST NUMBER DIALED and button immediately above it [5.01 (4) through (7)].
- (4) Manually dial CO dial test and ringer circuit and simultaneously record into memory location immediately above LAST NUMBER DIALED button [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 button immediately above LAST NUMBER DIALED button and proceed as follows.
 - (a) Depress LAST NUMBER DIALED button. Digits 1 through 0 will be automatically dialed into test circuit. Verify that correct signal is returned from test circuit.
 - (b) Momentarily depress the memory buttons used in Step (3) in the same sequence in which the digits were recorded. Verify that correct signal is returned from test circuit each time.



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

- (c) Momentarily disconnect the power unit (for 5 to 10 seconds). After reconnecting

power unit, depress a memory button of a memory location used in Step (3), to verify retention of memory.

- (6) Dial the appropriate code for ring-back to test the ringer.
- (7) Check operation of the logic reset switch by pressing the RECORD button (RECORD lamp will come on), and subsequently pressing an unoperated line button. The RECORD lamp must go out.
- (8) If equipped with speakerphone and with one-touch calling switch in ON position, and with set in on-hook condition, depress the memory button used in Step (4). The speakerphone should turn on, dial tone should automatically be detected, and the stored number should be automatically dialed.

OPTIONAL APPARATUS INSTALLATION**4A Speakerphone**

3.08 Connections for interfacing with the 4A speakerphone are shown in Fig. 8 and 9. All speakerphone components and power unit must be ordered separately. For additional information on the 4A speakerphone, refer to Section 512-700-100.

3B Speakerphone

3.09 Sets may be used with 3B speakerphone system. Fig. 12 shows block diagram, and connections are shown in Table B. For additional information on 3B speakerphone, refer to Section 512-620-100.

2C PICTUREPHONE Service

3.10 Sets may be used with 2C PICTUREPHONE service, refer to Fig. 13. For additional information on 2C PICTUREPHONE service, refer to Section 518-800-110.

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

3.11 To install.

- (1) Remove faceplate (3.19).

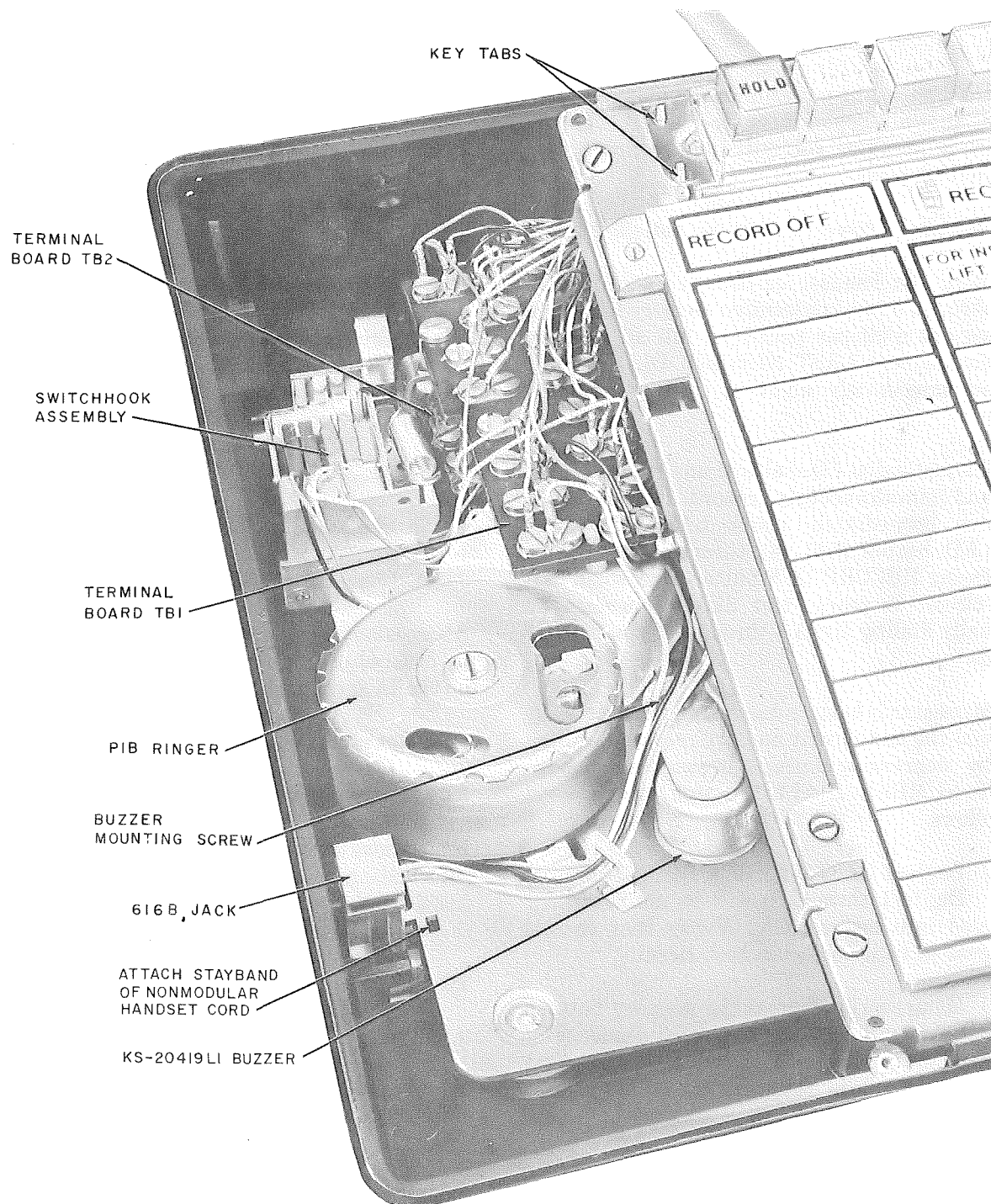


Fig. 3—Telephone Set With Faceplate, Upper Housing, Handset, and Handset Cradle Removed

- (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) Disengage the two captive dial mounting screws and move dial aside.
- (5) Rotate left edge of memory upward as shown in Fig. 5.

Note: If set is equipped with a 2870A Memory, replace it with a 2870B Memory and carefully pack and return the old Memory according to local procedures.

- (6) Remove the one-touch calling switch and strap together the PSB terminals to which it was connected. (The one-touch calling feature can no longer be turned off by the subscriber.)
- (7) Mount the D-180818 switch below the dial using the screws provided.
- (8) Connect switch lead connectors to post terminals on memory board per Table C.
- (9) 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.
- (10) Set feature 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 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.
- (d) Manually and automatically dialed digits may be intermixed (5.07).

(11) Reassemble set.

COMPONENT LOCATION AND ACCESS INFORMATION

Location of Components

3.12 The components are located in three areas as follows.

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

- Buzzer
- Ringer
- Switchhook assembly
- Handset jack
- Terminal boards (TB1 and TB2).

(b) Under the faceplate, inside the set (Fig. 4 and 5):

- Battery jack (Fig. 5)
- Power supply (PSB) terminal area (Fig. 4)
- Network (Fig. 4)
- D-180492 (relay kit for speakerphone)
- D-180493 (dial tone detector kit)
- D-180818 (Record disable and dial intermix feature switch)

(c) Under the telephone set (Fig. 6):

- Battery.

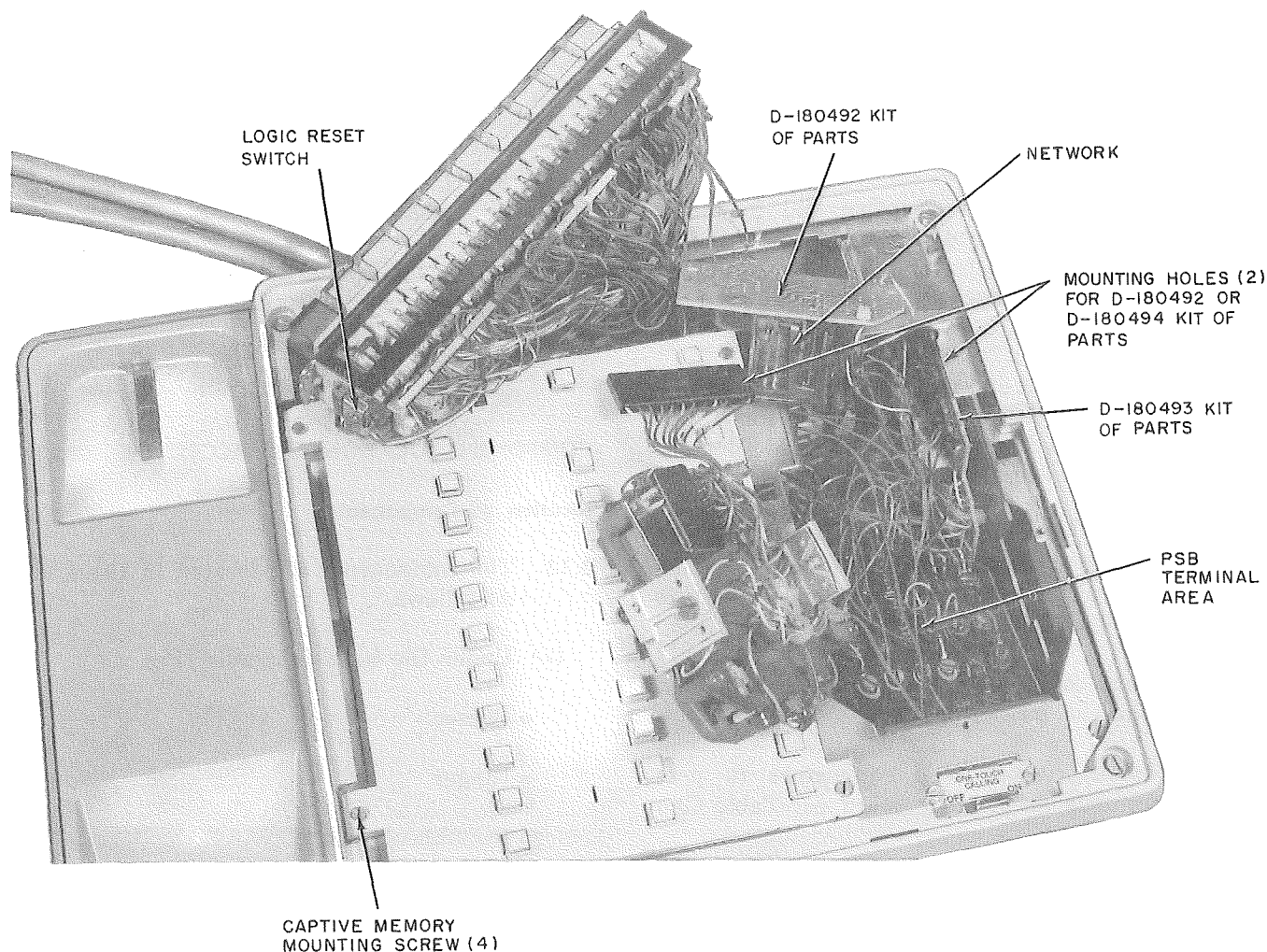


Fig. 4—Telephone Set With Dial Removed to Show Terminal Area

Mounting Cord

3.13 The D50BA-87 mounting cord is amphenol ended at the equipment end and equipped with 508-type plugs for terminating on the back of the key module at the telephone set end. The conductors terminated in the 508-type plugs provide the major line service requirements. Spade-tipped conductors are provided for auxiliary control functions or options and are terminated directly on associated equipment, terminal boards, or stored.

Note: Sets manufactured prior to fourth quarter 1976 were equipped with D50AK-87 mounting cords. The major difference in the cords is that contact strips were required with the D50AK-87, whereas individual conductor

of the D50BA-87 connect to the TIP and RING contacts of the 652-type key.

3.14 The F-59337 cord is used for speakerphone connections and is factory-wired in the set.

3.15 The F-59336 cord is used to supply ac power to the telephone set and the speakerphone. It is shipped loose with the set.

Network Terminals

3.16 For access to the network terminals.

- (1) Remove the faceplate (3.19).

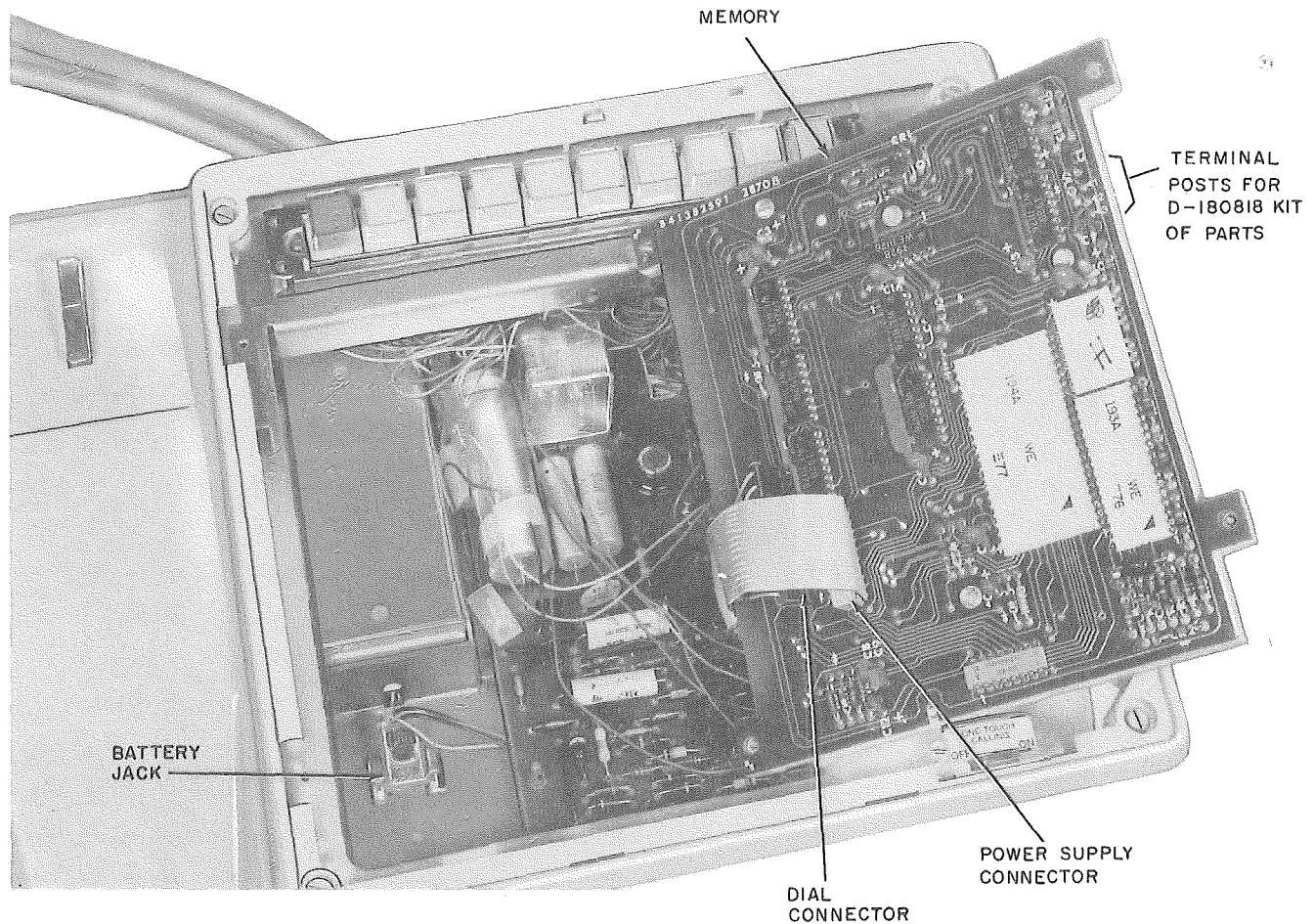


Fig. 5—Telephone Set, Overall Internal View

- (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 key (3.18).
- (5) To replace the cover, the two tabs of the cover (one at each side just above the opening for 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 (PSB) Terminals

3.17 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) Loosen the two captive screws that hold the dial in place.
- Note:** On sets with metal dial brackets, the screws will have to be removed.
- (5) Gently raise the dial and disconnect 12 position plug from terminal board.
 - (6) Rotate dial over onto the Memory.
 - (7) To reassemble; reverse procedure.

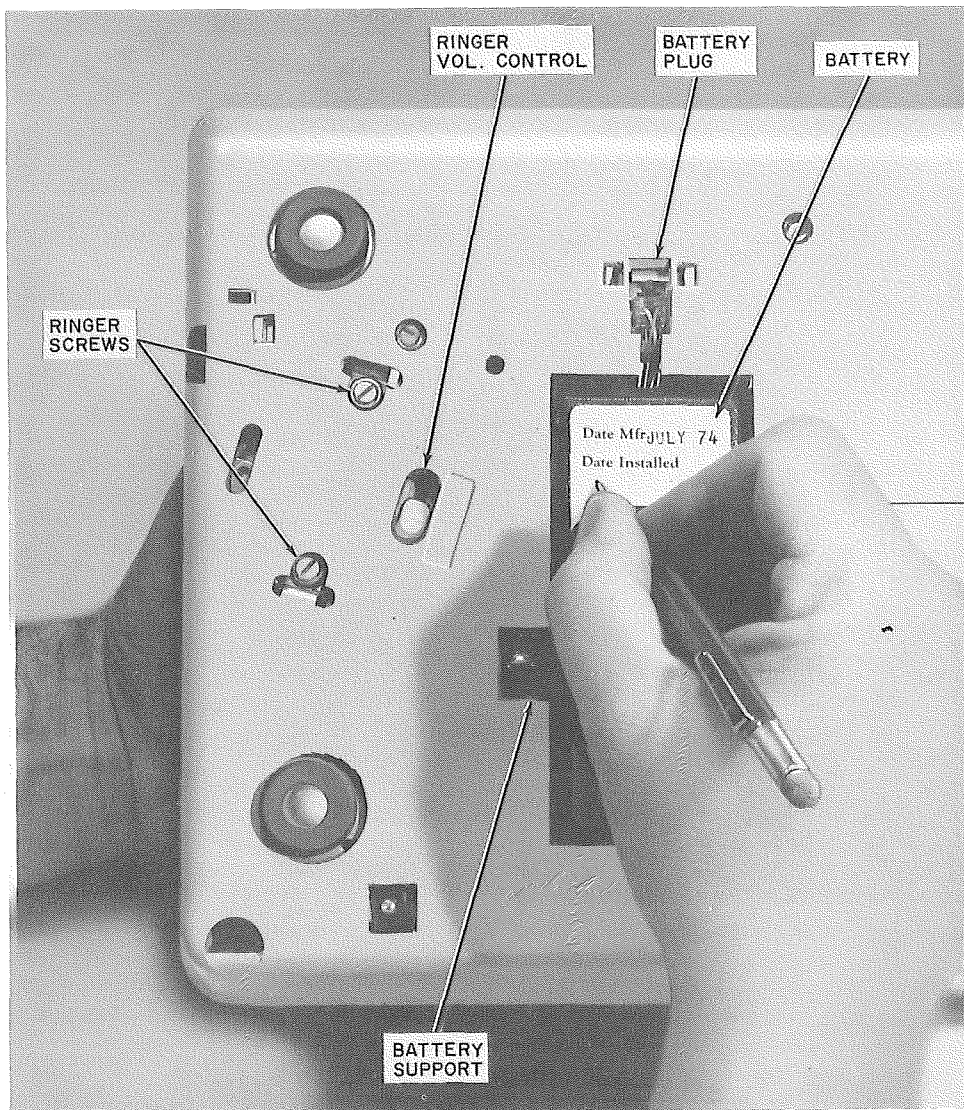


Fig. 6—Telephone Set, Bottom View

10-Button Key Removal

3.18 To remove, use the following procedure.

- (1) Remove faceplate (3.19).
- (2) Push the key toward the rear of the set to unlock it from the tabs.
- (3) Raise the metal plate of the key just above the tabs and move the key toward the left, then raise the right end of the key until it clears the chassis.

Caution: Do not damage contact strips which protrude from bottom right side of key or logic reset switch attached on **HOLD** side of key.

- (4) Lift the key completely out of the set.
- (5) Replace key by reverse procedure.

Faceplate Removal

3.19 Removal will differ depending on faceplate provided.

- (a) The 841393291 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 841393291 faceplate is not a direct replacement for the 840397186 (MD) faceplate. An 870A1U upper housing is also required with the 841393291 faceplate (see 6.13).

- (b) The 840397186 (MD) 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 the upper housing, if provided [3.21 (b)].
- (3) Disengage the captive cradle screws located in the two tabs on the cradle (Fig. 2).
- (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 topside 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.

(a) *Lower housing.*

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

- (2) Remove the faceplate (3.19).

- (3) Remove the handset cradle (3.20).

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

- (4) Disengage the captive housing screws (Fig. 2), one is located in each corner of the upper housing.

- (5) Separate the housing from the telephone set base.

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

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

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

(h) *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. 10 and Table A.

Caution: *Some conductor assignments are not standard (Table A).*

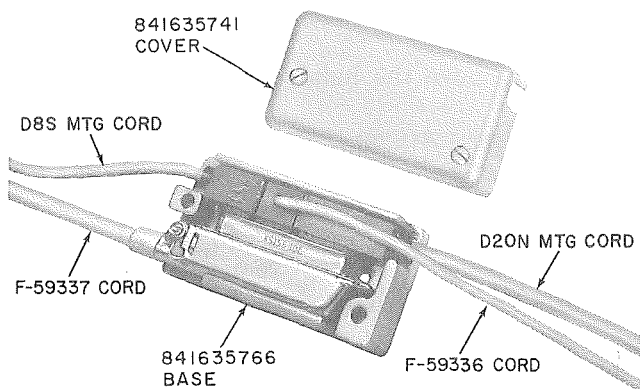


Fig. 7—Interface Adapter

- 4.02 Connections for interfacing with 4A speakerphone are shown in Fig. 8.
- 4.03 Connections for interfacing with 3B speakerphone are shown in Table B.
- 4.04 Connections for *I* Hold, Exclusion (multiline only), station busy lamp, and add-on conferencing are shown on Fig. 11.
- 4.05 Connections for interfacing with the 2C PICTUREPHONE service are shown in Fig. 13.
- 4.06 Connections for dry circuits where the polarity guard is not used are indicated on Fig. 10B. When this option is used, the tip of any line must be positive with respect to ring for proper operation.
- 4.07 Connections for restricted dialing are shown in Fig. 15.
- 4.08 Connections for ringer are shown in Fig. 16.
- 4.09 Connections for the D-180818 Kit of Parts are shown in Table C.
- 4.10 A partial functional schematic is shown in Fig. 14.

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 the D-180818 Kit of Parts, feature switch must be placed in 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. If an access code and a pause for second dial tone is required.
 - (a) Dial the access digit(s) for the outside line.
 - (b) Push the WAIT button whenever dial tone is heard during normal dialing process. (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 can also be reset by a switchhook, line key, or speakerphone operation.

TABLE A
MOUNTING CORD AND 508 PLUG CONNECTIONS

AMPHENOL PLUG			INSIDE TELEPHONE SET						
DESIG	PIN NO.	COLOR	MTG CD TERMINATIONS			SPADE TIP CONDUCTORS FROM 508 PLUGS			
			SPADE TIP COND. IN MTG. CD	508 PLUGS		PLUG COLOR	PLUG PIN NO.	COLOR	TERM.
				COLOR	PIN NO.				
R(1)	1	BL-W		BL	6				
T(1)	26	W-BL		BL	3				
A1	2	O-W	TB1-12						
A(1)	27	W-O		BL	1				
L(1)	3	G-W		BL	L				
LG(1)	28	W-G		BL	LG				
R(2)	4	BR-W		O	6				
T(2)	29	W-BR		O	3				
S(9)	5	S-W		Y	1				
A(2)	30	W-S		O	1				
L(2)	6	BL-R		O	L				
LG(2)	31	R-BL		O	LG				
R(3)	7	O-R		G	6				
T(3)	32	R-O		G	3				
A(8)	8	G-R		BK	1				
A(3)	33	R-G		G	1				
L(3)	9	BR-R		G	L				
LG(3)	34	R-BR		G	LG				
R(4)	10	S-R		BR	6				
T(4)	35	R-S		BR	3				
A(7)	11	BL-BK		R	1				
A(4)	36	BK-BL		BR	1				
L(4)	12	O-BK		BR	L				
LG(4)	37	BK-O		BR	LG				
R(5)	13	G-BK		S	6				

TABLE A (CONT)

MOUNTING CORD AND 508 PLUG CONNECTIONS

AMPHENOL PLUG			INSIDE TELEPHONE SET						
DESIG	PIN. NO.	COLOR	MTG CD TERMINATIONS			SPADE TIP CONDUCTORS FROM 508 PLUGS			
			SPADE TIP COND. IN MTG. CD	COLOR	PIN NO.	PLUG COLOR	PLUG PIN NO.	COLOR	TERM
T(5)	38	BK-G		S	3				
A(6)	14	BR-BK		W	1				
A(5)	39	BK-BR		S	1				
L(5)	15	S-BK		S	L				
LG(5)	40	BK-S		S	LG				
R(6)	16	BL-Y		W	6				
T(6)	41	Y-BL		W	3				
SG	17	O-Y	TB1-5						
BL	42	Y-O	TB1-6						
L(6)	18	G-Y		W	L				
LG(6)	43	Y-G		W	LG				
R(7)	19	BR-Y		R	6				
T(7)	44	Y-BR		R	3				
R or R1	20	S-Y	NET T						
B or B1	45	Y-S	NET S						
L(7)	21	BL-V		R	L				
LG(7)	46	V-BL		R	LG				
R(8)	22	O-V		BK	6				
T(8)	47	V-O		BK	3				
BZ	23	G-V	TB1-15						
BZ1	48	V-G	TB1-16						
L(8)	24	BR-V	PSB-32			BK	L	BR-V	PSB-32
LG(8)	49	V-BR	PSB-33			BK	LG	Y-BR	PSB-33
R(9)	25	S-V		Y	6				
T(9)	50	V-S		Y	3				

TABLE A (CONT)

MOUNTING CORD AND 508 PLUG CONNECTIONS

AMPHENOL PLUG			INSIDE TELEPHONE SET						
DESIG	PIN NO.	COLOR	MTD CD TERMINATIONS			SPADE TIP CONDUCTORS FROM 508 PLUGS.			
			SPADE TIP COND. IN MTG. CD	508 PLUGS		PLUG COLOR	PLUG PIN NO.	COLOR	TERM.
				COLOR	PIN NO.				
Tip						Y	4	G	TB1-8
Ring						Y	5	R	PSB-12
						Pink	HL	G-Y	*
						Pink	HLG	Y-G	*
						Pink	3	O-BK	*
						Pink	2	BK-BL	TB1-1
						Pink	1	G-W	TB1-3
*Insulate and store.						BL	2	O-W	TB1-3
						O	2	S-W	TB1-2
						G	2	G-R	TB1-2
						BR	2	BL-BK	TB1-2
						S	2-	BR-BK	TB1-2
						W	2	BK-BR	TB1-2
						R	2	BK-BL	TB1-3
						BK	2	R-G	TB1-3
						Y	L	G-V	TB1-4
						Y	LG	V-G	TB1-7
						Y	2	W-S	TB1-5

Change A Number In Memory

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

Delete A Number From Memory

5.03 Complete the following operations in succession.

(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 Number From Memory

5.04 To automatically dial a number.

TABLE B

CONNECTIONS, TELEPHONE SET WITH ONE-TOUCH CALLING USING 3B SPEAKERPHONE

APPARATUS	LEAD		APPARATUS TERMINAL	CONNECT			
	DESIG	COLOR		FROM	TO		66E3-25 BLOCK
				TERM. ON 66E3-25 BLOCK (NOTE 1)	CONTROL UNIT (NOTE 3)		
					55A (NOTE 4)	55B	
TEL SET F-59337 Cord)	T1	W-BL	PSB-2	39	19	1	
	R1	BL-W	PSB-11	47	28	10	
	A1	W-BR	TB1-12	49	12	2	
	AG	W-O	Net. F	43	5	11	
	LK	O-W	PSB-17	2	11	35	
	SPO	R-O	PSB-34	31	3	18	
	R or R1	R-BL	Net. S	44	18	34	
	R or R1	W-S	Net. K	46	9	25	
	B or B1	BL-R	Net. T	38	17	33	
	B or B1	S-W	Net. L2	40	8	24	
D-180492 Kit of Parts (Factory Wired)	CE	BL-BK	PSB-10	(Note 3)			
	B+	BK-BL	PSB-15				
	SH _a	R-BL	PSB-16				
	LK	BL-R	PSB-17				
	SH _i	G-W	PSB-18				
	PFR	BL-Y	PSB-20				
VDD	W-G	PSB-21					
D-180493 Kit of Parts (Factory Wired)	Input	G-R	PSB-2				
	PB	O-EK	PSB-9				
	Input	G-R	PSB-11				
	LK	Y-G	PSB-17				
	DT	O-Y	PSB-19				
	VDD	R-O	PSB-21				
	DR	Y-O	PSB-24				
	PL	O-R	PSB-25				
	DTT	BL-V	PSB-26				
	SPR	Y-BL	PSB-27				
	COM	BK-O	PSB-29				
	SPO	G-Y	PSB-34				
	Switch	S	PSB-28				
		S	PSB-29				
	666B TRMTR (T7A Cord)	M1	S-BK	1		4	7
P1		BL-R	2		13	8	
M2		BK-S	3		14	16	
S		O-BK	5		3	18	
A1		Y-O	6		29	19	
F1		G-Y	7		2	17	
LK		BK-O	8		11	35	
760A LSPK (R2FK Cord)	SP1	G			34	20	
	SP2	R			33*	29*	
95B-type PWR UNIT (Note 2)	AC1						24 23
	AC2						
2012B TRNSF (Note 2)	AC1				27	27	
	AC2				36	36	

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

Notes:

1. Plug F-59337 cord of telephone set into 66E3-25 block.
2. Both 95B-type power unit and 2012B transformer must be connected for speakerphone operation.
3. Place strap between terminals 20 and 21 (55A) or between terminals 4 and 5 (55B).
4. When 55A control unit is used it must be the type modified for TOUCH-TONE service. Control units having this modification are stamped 55* (modified).

TABLE C

CONNECTIONS FOR D-180818 KIT OF PARTS

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

* Insulate and store.

† Single pin connector.

Notes:

- These are connectors attached to the switch leads. A single pin connector with a (BK) lead and a double pin connector with a (R) and (BK) lead.
- When this option is provided, the LAST NUMBER DIALED (LND) feature is disabled and the 32rd memory may be used just as any other memory.

- Go off-hook and depress the memory button.
- For sets equipped with speakerphone simply depress the memory button.

LAST NUMBER DIALED Feature

5.05 The TOUCH-A-MATIC telephone set automatically records into the LAST NUMBER DIALED memory any number dialed using the standard telephone dial. Each number in the LAST NUMBER DIALED memory 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.

- With no access digit(s) required.
 - Go off-hook.
 - Listen for dial tone.
 - Manually dial telephone number.

- To redial same number automatically.

- Go off-hook, and depress LAST NUMBER DIALED button.
- For sets equipped with sepakerphone, simply depress the LAST NUMBER DIALED button.

- When access code and pause for second dial tone is required.

- Go off-hook.
- Listen for dial tone.
- Dial access digit(s).
- Depress WAIT button.
- Manually dial telephone number.
- To redial same number automatically.

- Go off-hook, and depress LAST NUMBER DIALED button.

- For sets equipped with speakerphone, simply depress the LAST NUMBER DIALED button.

End-to-End Signaling

5.07 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 rules are observed.

Note: If the telephone set is to be used for end-to-end signaling, V option (with polarity guard) shall be used. (Fig. 10B).

- If the telephone set is equipped with the one-touch calling option the initial number must be dialed automatically (even if the one-touch calling switch is in the OFF position). This allows the dial tone detector to complete its function. Additional numbers may then be dialed manually or automatically.

- Standard Operation:** If at any time, digits are keyed 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) ***Dial Intermix (D-180818 Kit of Parts):***

With the feature 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.

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 as a basic telephone set or as automatic dialer (Part 5).
- (2) Check for improper connections.
- (3) Refer to Table D, and the following paragraphs.
- (4) If removal of the set is required, proceed as follows.
 - (a) Disconnect telephone set.
 - (b) Unplug battery.
 - (c) Place battery plug sideways in housing slot below battery jack and tape into place.

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

Battery

6.03 The KS-20390L2 and L4 batteries are not completely interchangeable. The List 2 battery may be used in all sets, but the List 4 should only be used in the F-60208 through F-60211 telephone sets. Either battery has an expected life of about 4 years. It can be replaced without loss of memory providing that commercial ac power to the set is continuously maintained. To replace the battery, proceed as follows (Fig. 6).

- (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 and check new battery, [3.07(5)].

Memory

6.04 The Memory may be replaced in the following manner.

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

- (1) Remove the faceplate (3.19).
- (2) Loosen the four captive Memory mounting screws (Fig. 4).
- (3) Rotate the left edge of the Memory upward (Fig. 5).
- (4) Disengage the two connectors by pulling on them perpendicular to the printed wiring board.
- (5) Replace the Memory by engaging the dial connector first. The connectors are keyed, one position is filled and should fit over the vacant position in the row of pins. The flat power supply cable should not be twisted. It should form a loop as shown in Fig. 5 when connected to the board.
- (6) Reassemble set.

- (7) Test per 3.07.

Dial

6.05 To replace.

- (1) Proceed per 3.17 (1) through (5).
- (2) Loosen the four mounting screws of the Memory (Fig. 4).
- (3) Gently raise the left side of the Memory and rotate to position shown in Fig. 5. This will expose the 10-position dial connector.

Caution: *Do not remove the power supply connector in the process of changing the dial, since this will result in complete loss of stored telephone numbers.*

- (4) Carefully disengage the dial connector by pulling on it perpendicular to the printed wiring board.
- (5) Lift the dial out.
- (6) To add new dial, reverse the previous steps. The connectors are keyed to orient them relative to the pins. Observe the correct orientation and do not force the connection.

10-Button Key

6.06 To replace.

- (1) Remove key per 3.18.
- (2) Access PSB terminal area per 3.17.
- (3) Disconnect logic reset switch leads from PSB terminals 14 and 29.
- (4) Remove the 508-type plugs and (if provided) the two contact strips from the back of the key.
- (5) Install new key.
- (6) Reassemble the set.
- (7) Test for operation of the LOGIC RESET switch by pressing the RECORD button, RECORD lamp will be lighted, then by pressing a line button, RECORD lamp will be extinguished.

Ringer

6.07 To replace.

- (1) Remove the faceplate (3.19) and place handset aside.
- (2) Remove upper housing, if provided [3.21(b)].
- (3) Remove the cradle (3.20).
- (4) Disconnect the ringer leads.
- (5) Tilt the front of the set up.
- (6) Unfasten ringer mounting screws (Fig. 6).
- (7) Remove ringer.
- (8) Install new ringer and assemble in reverse order. The leads should be routed as shown in Fig. 3 to prevent contact with the gong and subsequent damping to the ringer output. Dial ringback code to test ringer.
- (9) Reassemble set.

Buzzer

6.08 To replace buzzer.

- (1) Remove the faceplate (3.19), and place handset aside.
- (2) Remove upper housing, if provided [3.21(b)].
- (3) Remove the cradle (3.20).
- (4) Remove the buzzer mounting screw.
- (5) Remove appropriate leads (Fig. 10I).
- (6) Install new buzzer.
- (7) Reassemble set.

Handset Jack

6.09 To replace the 616B handset jack.

- (1) Remove the faceplate (3.19), and place handset aside.
- (2) Remove upper housing, if provided [3.21(b)].

- (3) Remove the cradle (3.20).
- (4) Remove the mounting screw and spacer for TB1 (Fig. 3).
- (5) Move board TB1 to gain access to the appropriate terminals on TB2.
- (6) Remove the appropriate leads (Fig. 10H).
- (7) Install new jack.
- (8) Reassemble. When replacing TB1, locate its tabs in the slots of the chassis before refastening the TB1 mounting screw.

Handset

6.10 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, and place handset aside.
- (2) Remove faceplate (3.19).
- (3) Remove upper housing, if provided [3.21(b)].
- (4) Remove handset cradle (3.20).
- (5) Disconnect 616B handset jack (6.09). (Jack may be removed or stored just to right of ringer.)
- (6) Insert spade-tipped end of handset cord through hold in the side of the housing.
- (7) Attach stayband hook to chassis (Fig. 3).
- (8) Route leads as shown in Fig. 3.
- (9) Make connections (Fig. 10H).
- (10) Reassemble set.

Kit of Parts

6.11 To replace D-180492 Kit of Parts.

- (1) Proceed as described in 3.17.
- (2) Remove the screws securing the kit assembly to the chassis (Fig. 4), and disconnect leads from the terminals on PSB.
- (3) Make connections of new kit of parts per Table B and mount assembly.
- (4) Reassemble set.

6.12 To replace D-180493 Kit of Parts dial tone detector and one-touch calling switch.

- (1) Remove housing (3.21) and access PSB terminal board (3.17).
- (2) Remove locking screw from side of chassis.
- (3) Disconnect leads and remove board assembly from the back of the set. The one-touch calling switch is mounted below the dial and may be replaced if necessary.
- (4) Insert new 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 of the bottom chassis.
- (5) Lock the board into position by inserting screw from the side of chassis.
- (6) Make connections to kit of parts per Table B.

Faceplate

6.13 To replace a 840397186 (MD) faceplate with a 841393291 faceplate.

- (1) Remove the 840397186 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 tightly together as the screws are driven.
- (4) Place the two tabs located along the lower edge of the 841393291 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 at the top center of the upper housing should retain the faceplate.

Speakerphone

- 6.14** For maintenance information on the 3B or 4A speakerphone systems, refer to Sections 512-620-100 or 512-700-100, respectively.

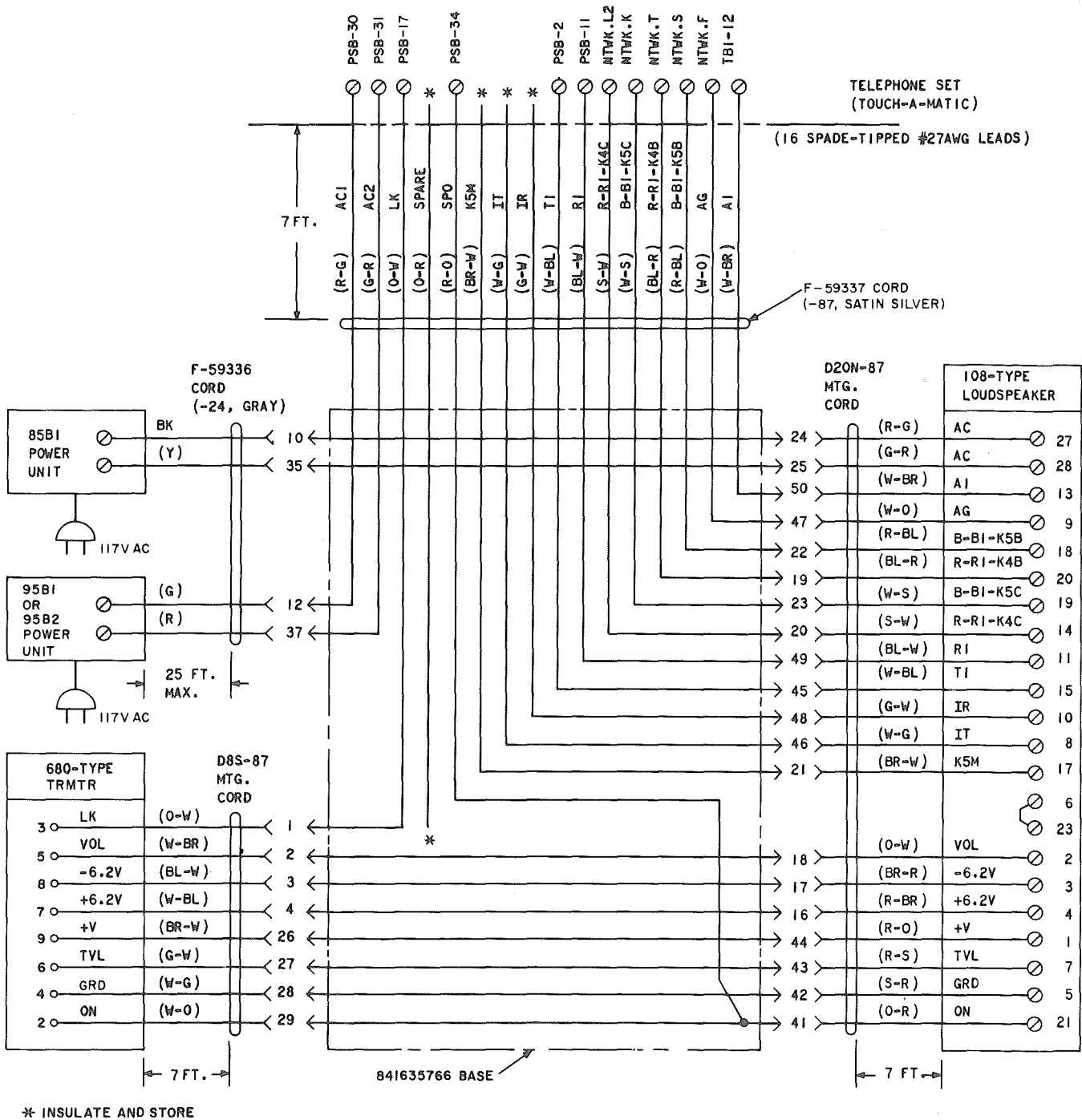


Fig. 8—Interface Connections for Telephone Set With 4A Speakerphone

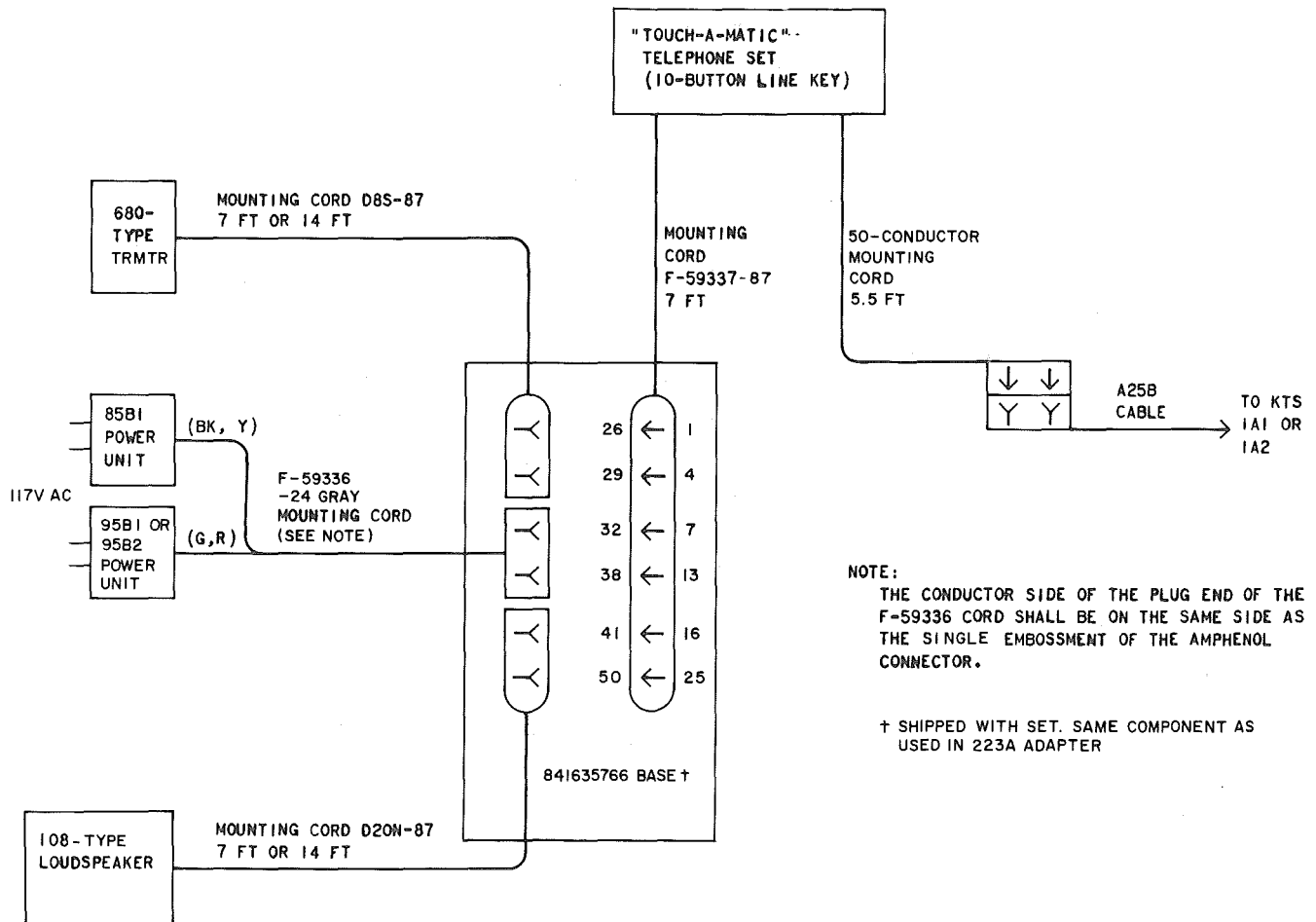


Fig. 9—Telephone Set With 4A Speakerphone, Block Diagram

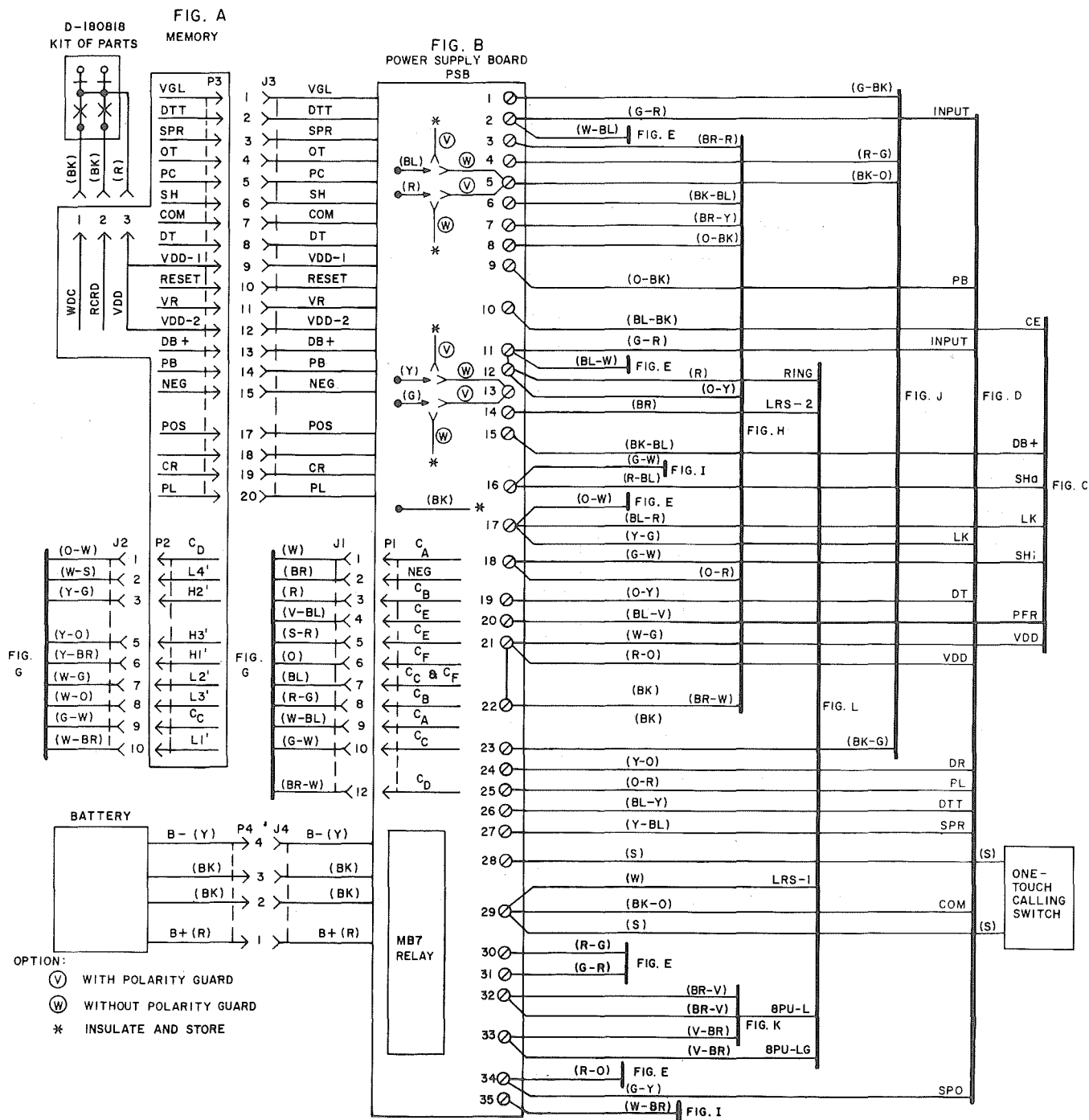
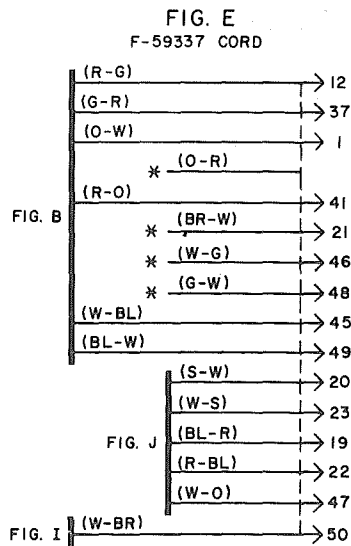
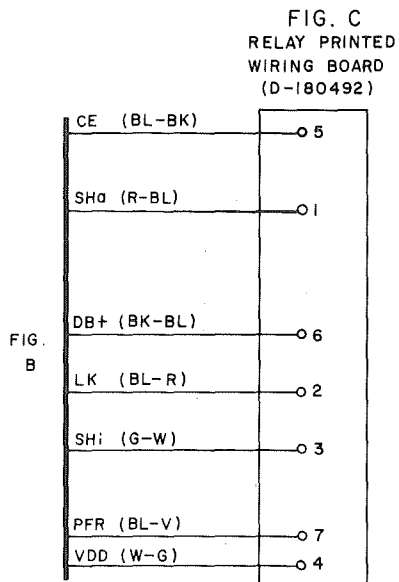


Fig. 10—Telephone Set Connections, (Sheet 1 of 5)



* INSULATE AND STORE

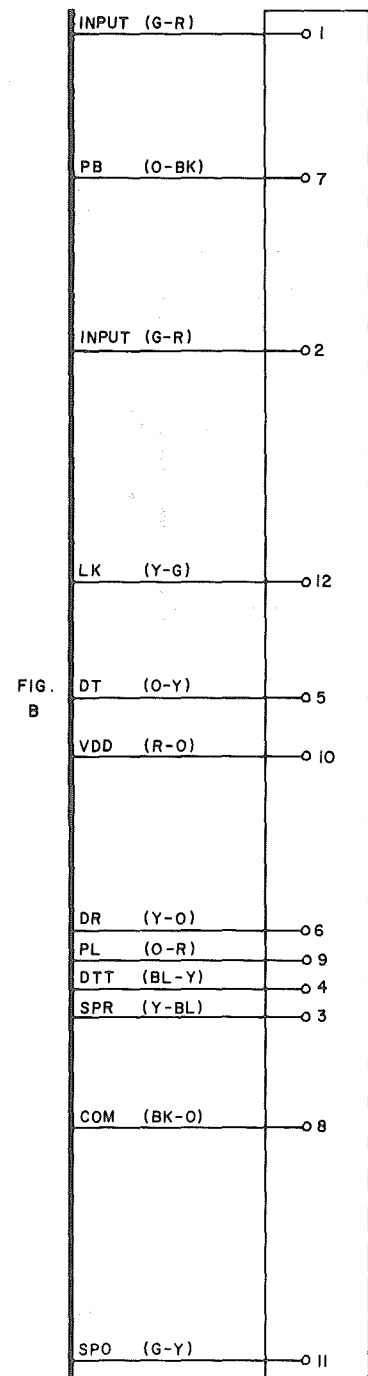
FIG. D
DIAL TONE DETECTOR
(D-180493)

Fig. 10—Telephone Set Connections, (Sheet 2 of 5)

FIG. F
SWITCHHOOK

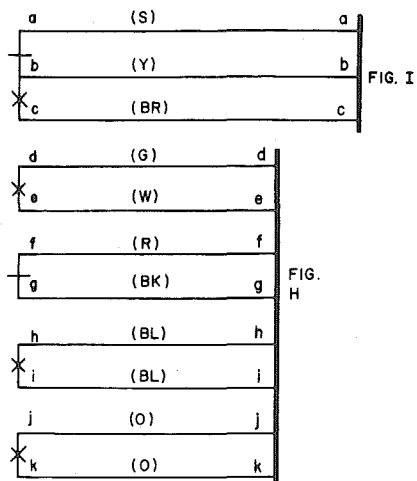
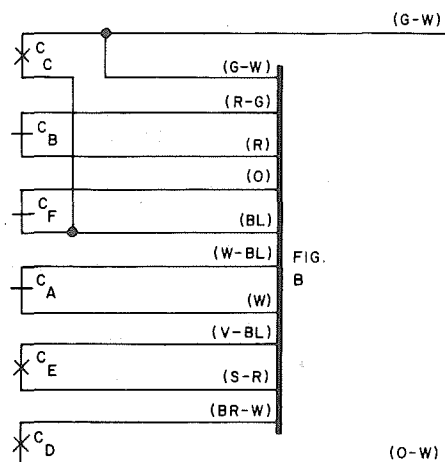


FIG. G
DIAL
COMMON SWITCH



DIAL
FREQUENCY SWITCHES

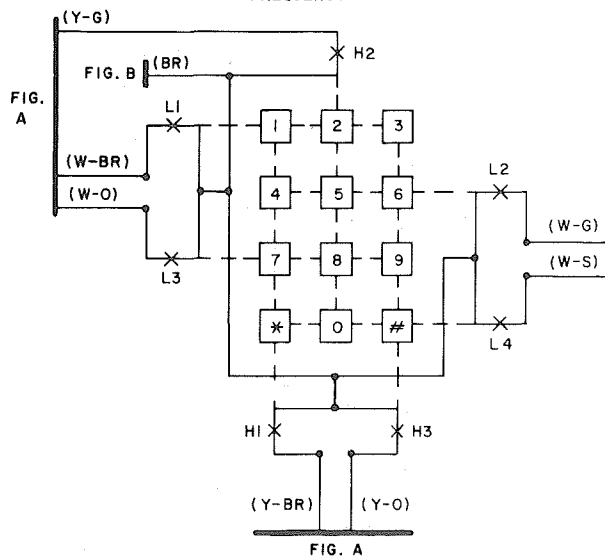


Fig. 10—Telephone Set Connections, (Sheet 3 of 5)

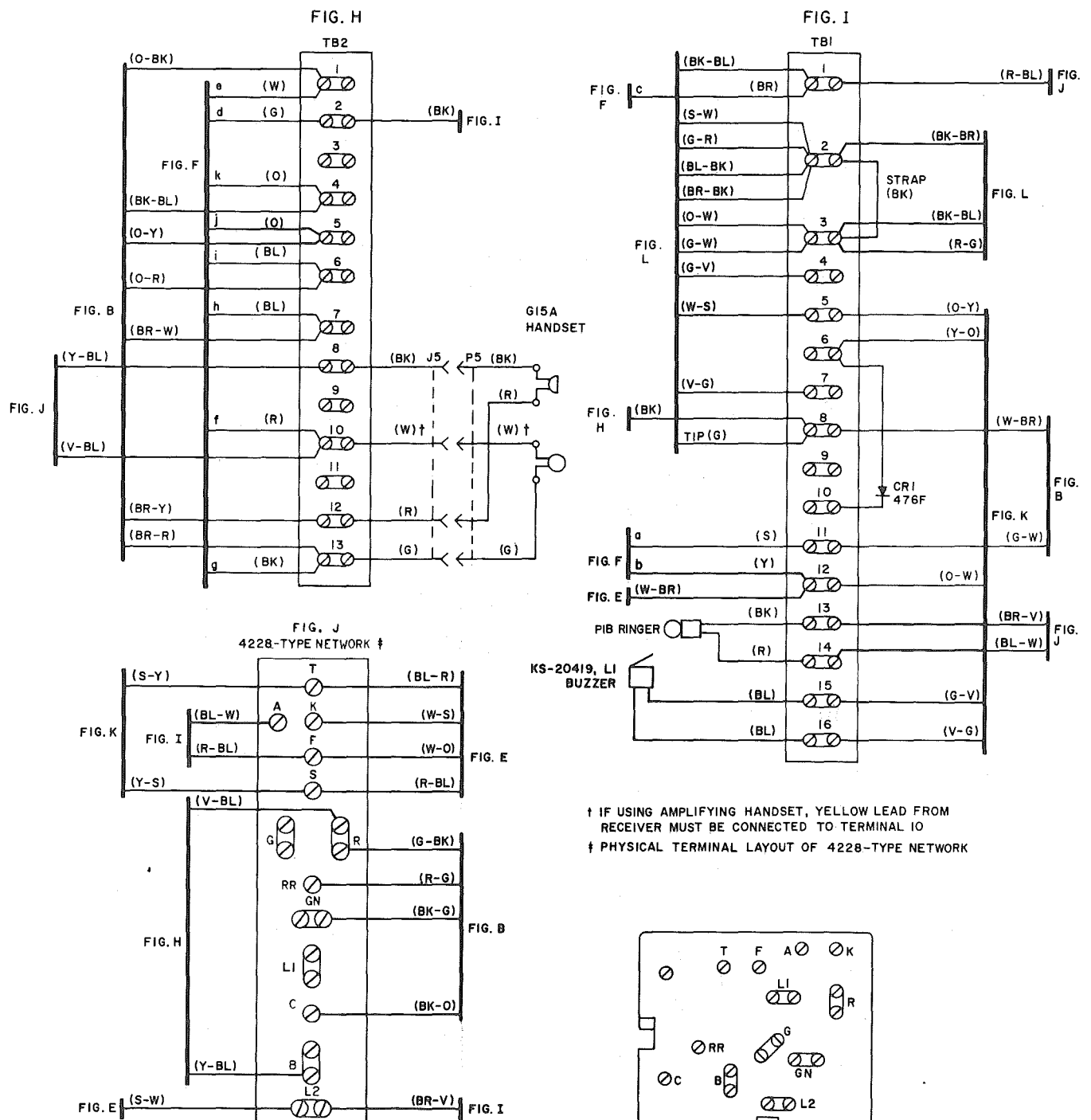


Fig. 10—Telephone Set Connections, (Sheet 4 of 5)

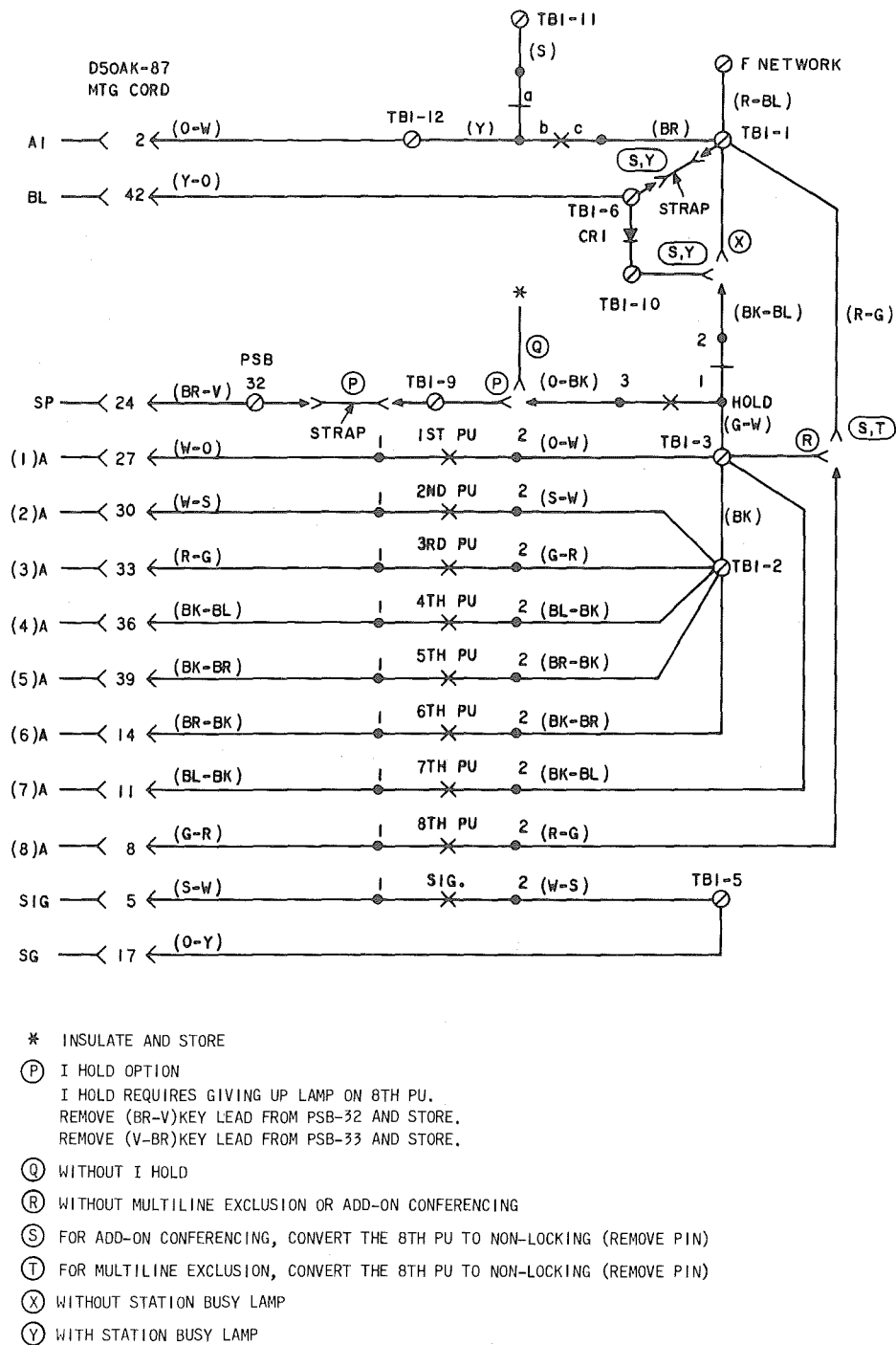


Fig. 11—I Hold, Exclusion, Station Busy Lamp, and Add-on Conferencing—1A1 and 1A2 KTS

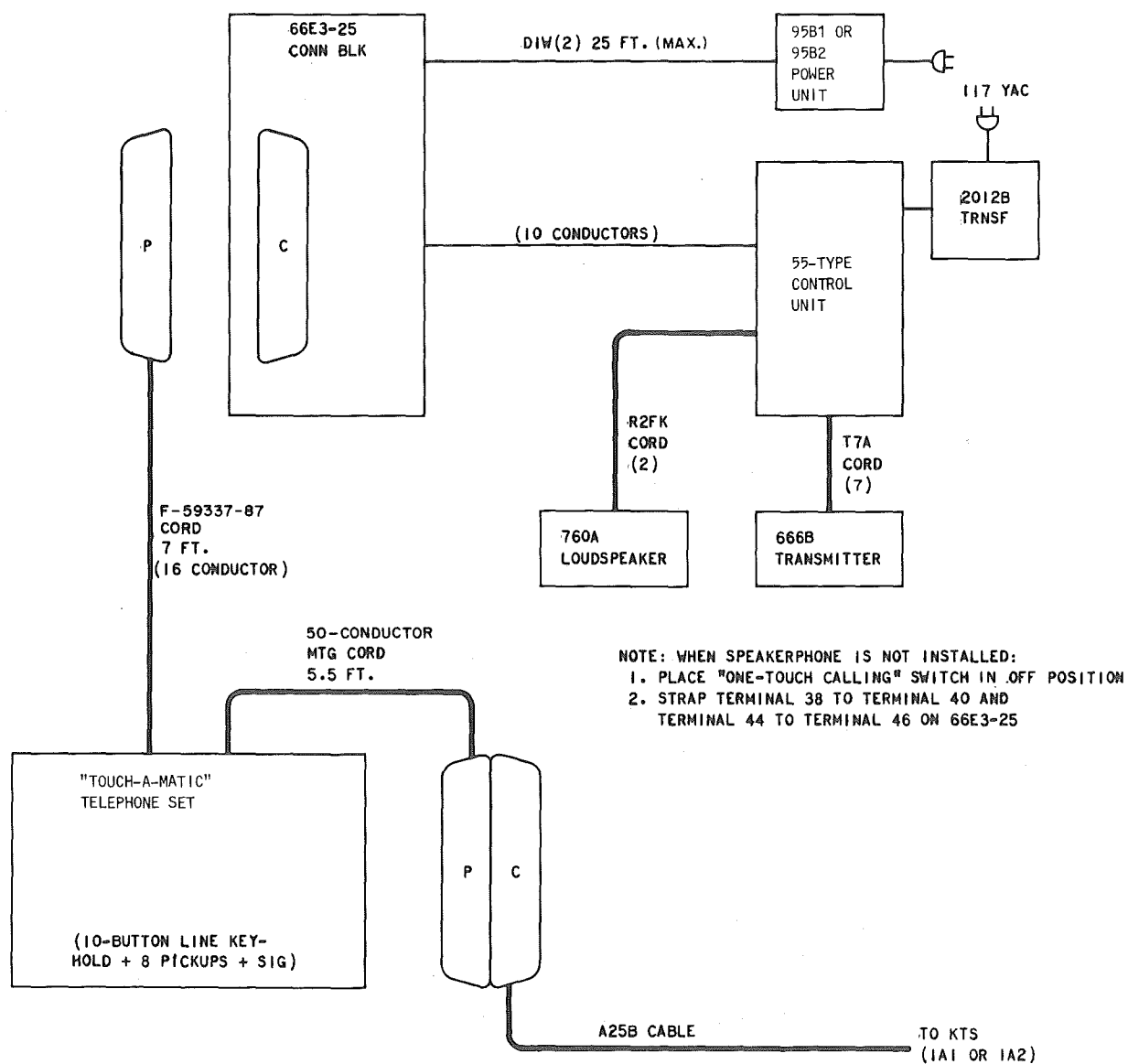


Fig. 12—Block Diagram—Telephone Set With 3B Speakerphone and 1A1 or 1A2 KTS

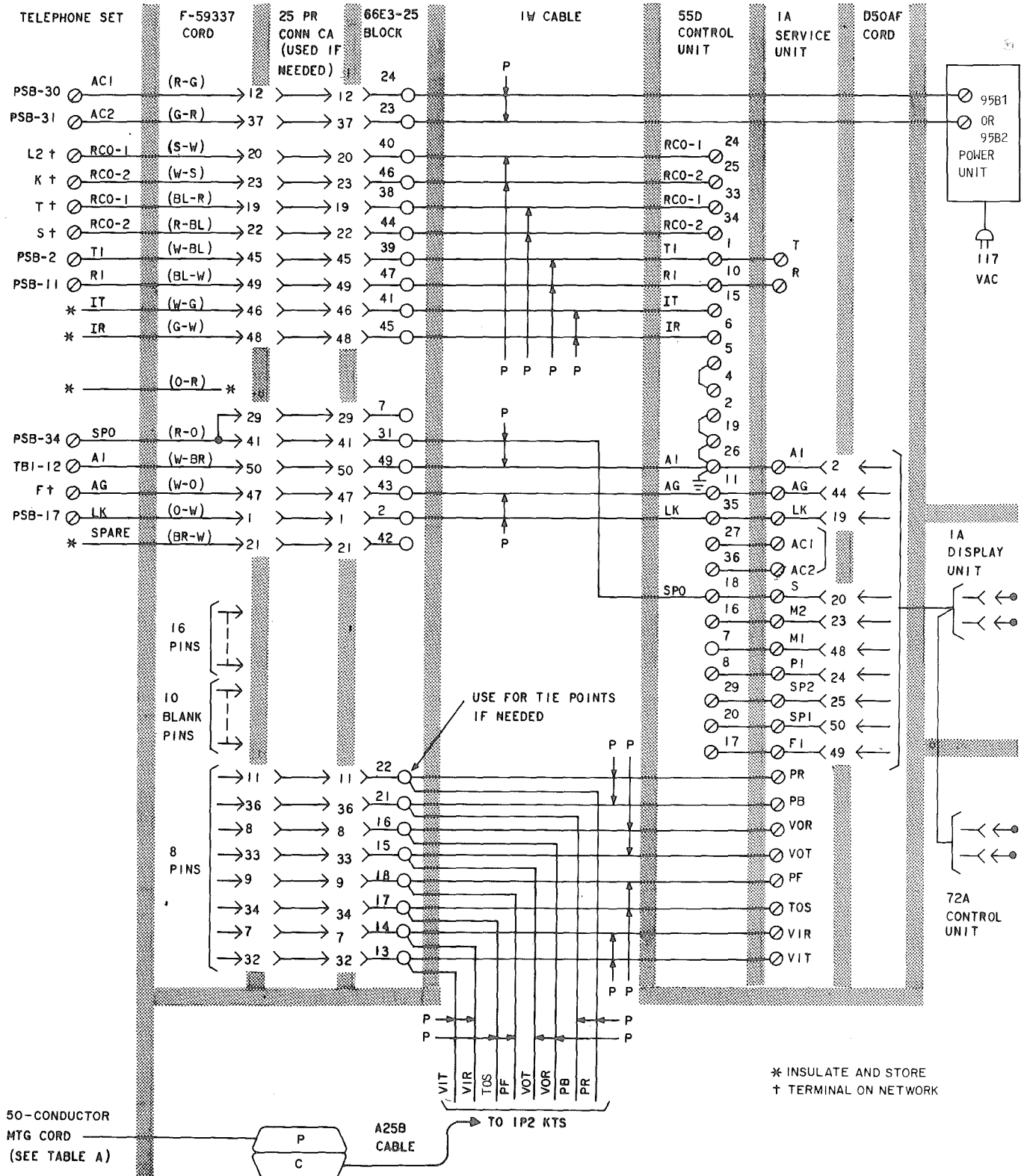
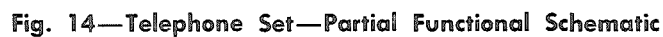


Fig. 13—Interface Connections for Telephone Set With 2C PICTUREPHONE® Service



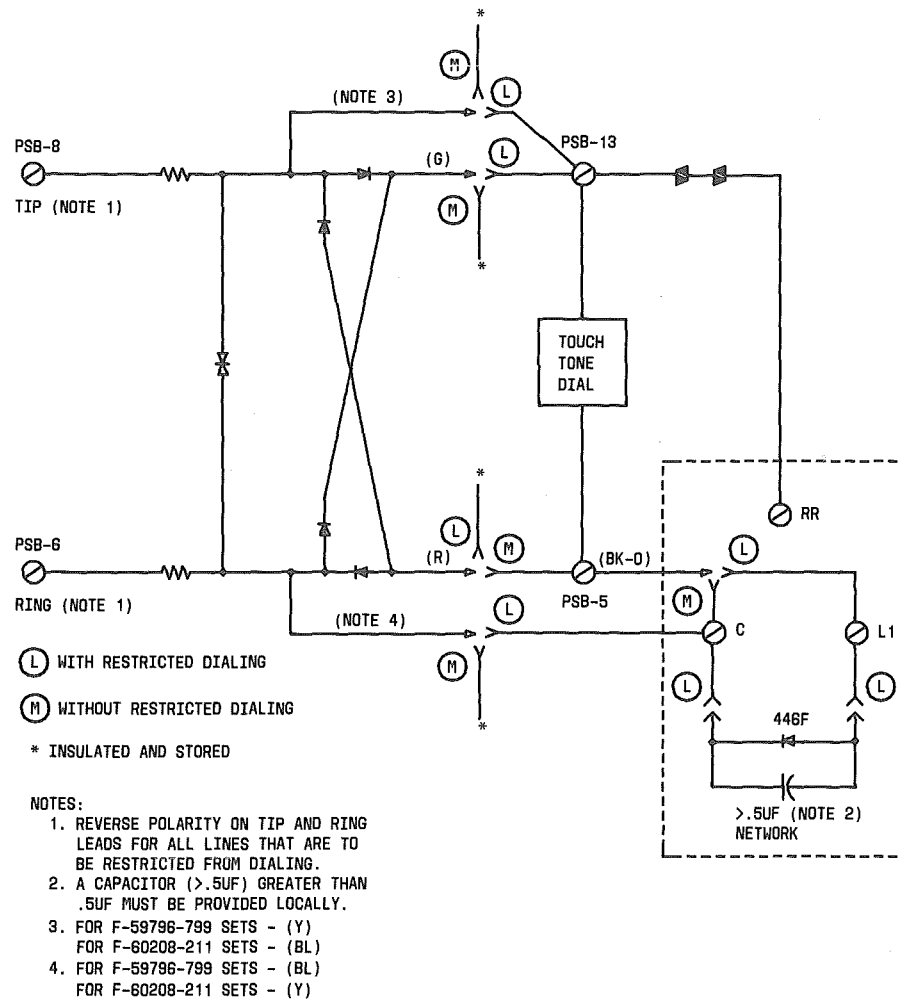


Fig. 15—Restricted Dialing, Connections for Unrestricted Lines

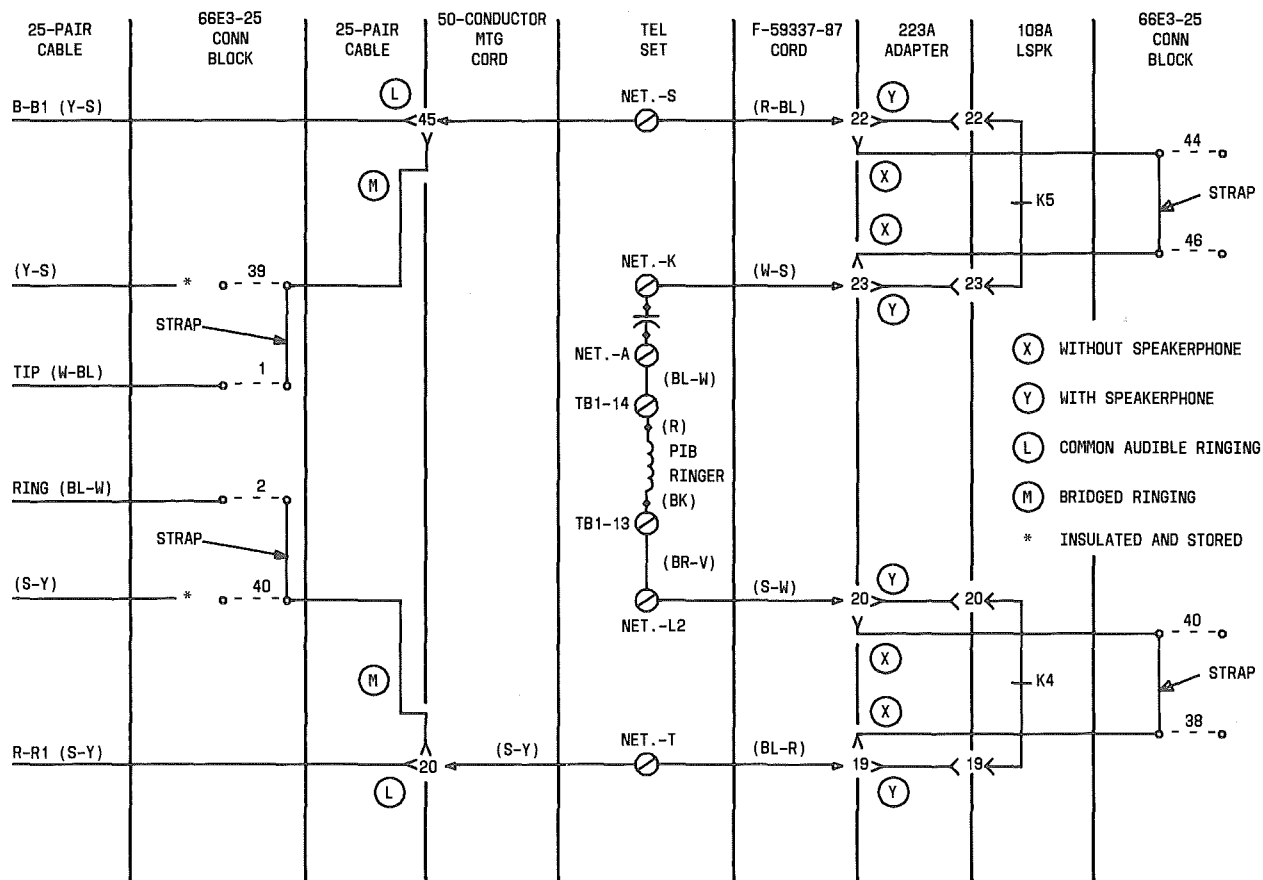


Fig. 16—Ringer Connections

TABLE D
TROUBLE ANALYSIS

TRouble NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
1	Dead set on all lines	Line lamp does not come on when handset is taken off-hook	Mounting cord improperly inserted at equipment end	Check cord insertion and connections
		Line lamp comes on when handset is taken off-hook	Bad connection between handset and telephone set	1. Check handset cord connections 2. Check handset jack connections
			Defective receiver	Check handset
			Unknown	Replace telephone set*
		Dial tone is not present when speakerphone is on	Open tip or ring lead at line key	Check leads and connections from contact strips
		Dial tone is present when speakerphone is on	Defective switchhook d-e or j-k contacts	Replace telephone set*
2	Cannot transmit or receive when off-hook using handset	Line lamp comes on	Handset cord improperly inserted into handset or jack in telephone set	Check handset cord and/or handset
		Dial tone present, but sidetone absent. No audible TOUCH-TONE [®] signal	12-pin connector of dial not properly inserted on pins on power supply board	1. Check connector insertion 2. Replace dial
			Defective 616B jack	Replace 616B jack
			Defective network	Replace telephone set*
3	Cannot manually dial	Clicking sounds or damped TOUCH-TONE signals heard when dial buttons are depressed. Cannot hang up set	Bridged set off-hook	Place bridged set on-hook
		No audible TOUCH-TONE signal	20-pin power supply connector not properly inserted on pins on Memory PWB	Check connector insertion
			Dial connectors not properly inserted	1. Check connector insertion 2. Replace dial
			Defective Memory PWB	Replace Memory
			Unknown	Replace telephone set*

* Refer to 6.02(4).

TABEL D (Cont)
TROUBLE ANALYSIS

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
4	Cannot manually dial some digits	Some TOUCH-TONE dial frequencies incorrect	Static discharge damage	1. Consult Telco Engineer for proper grounding procedure 2. Replace memory
			Open or loose leads to dial contacts	Check for proper insertion of leads into 10-position dial connector
			Defective frequency contacts on dial	Replace dial
			Defective Memory PWB	Replace Memory
			Unknown	Replace telephone set*
5	Cannot manually dial with ac power off	Can manually dial with ac power on	Defective dial	Replace dial
			Open path on PSB	Replace telephone set*
		Same as above but can manually dial with ac power off when strap lead is connected between terminals PSB-10 and PSB-15	Defective circuit or connections on D-180492 Kit of Parts	1. Check connections per Table B and Fig. 8 or 10 2. Replace D-180492 Kit of Parts
6	RECORD lamp does not	RECORD lamp does not turn on when RECORD button is depressed, or RECORD lamp is on and cannot be turned off	Battery not plugged in or defective (F-60208 thru 211 telephone set) see 3.07	Connect or replace battery
		RECORD lamp does not turn on when RECORD button is depressed	Switch of D-180818 Kit of Parts in ON position	Change switch position to OFF
			AC power not present	Check for commercial power
			AC power unit not plugged in or defective	Check or replace power unit (should read 13.4 to 18 Vac across screw terminals 30 and 31 of PSB)
			Open in IW	Check IW and connections
			Memory, RECORD OFF, or WAIT button stuck down	Clear stuck button

* Refer to 6.02(4).

TABLE D (Cont)
TROUBLE ANALYSIS

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
6 (Cont)	RECORD lamp does not function properly	RECORD lamp does not turn on when RECORD button is depressed	Defective logic reset switch on line key	Replace line key
			Defective lamp or lamp driver circuit	Replace Memory
			Unknown	Replace telephone set*
		RECORD lamp sometimes does not turn on when RECORD button is depressed	Memory not securely mounted	Tighten Memory mounting screws
		Lamp turns off when any memory button is depressed or Lamp does not momentarily turn off when a dial button is depressed	Defective logic	Replace Memory
			Unknown	Replace telephone set*
7	Cannot record into memory	RECORD lamp momentarily flashes when RECORD button is depressed	Refer to trouble number 6	Refer to trouble number 6
			Stuck RECORD OFF button	Check RECORD OFF button
			WAIT contacts closed even when WAIT button is not depressed	1. Check WAIT button 2. Replace Memory
8	Cannot record properly into the 31 memory positions or into LAST NUMBER	Warble tones heard when automatically dialing. Get "cannot complete" intercept for automatic or manual dialing	WAIT contacts closed even when WAIT button is not depressed	Replace Memory
			Switch of D-180818 Kit of Parts in ON position	Change switch position to OFF
		Party is reached when number is recorded as it is manually dialed. However, when number is subsequently dialed from memory, party is not reached wrong number is dialed from memory	Incorrect dial contact sequence	Replace dial
			Defective logic	Replace Memory
			Open circuit on PSB	Replace telephone set*
9	Cannot dial properly from memory		Did not record properly	1. Record per 5.01 2. Refer to trouble number 7
		RECORD lamp does not turn on when RECORD button is depressed	Battery not plugged in or defective (F-60208 thru F-60211 telephone set) see 3.07	Connect or replace battery

* Refer to 6.02(4).

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TABLE D (Cont)
TROUBLE ANALYSIS

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
9 (Cont)		MB7 relay does not operate (no clicking sound heard) when memory button is depressed. No audible TOUCH-TONE signal present	Memory not securely mounted	Tighten Memory mounting screws
			Open circuit in power path	Check for proper strap lead connections on PSB. See Fig. 10B
			Defective logic	Replace Memory
			Defective switchhook h-i contacts	Replace telephone set*
		Same as above — with addition of strap lead between PSB terminals 26 and 29, set automatically dials from Memory	Precise dial tone not present and/or defective dial tone detector	1. Check CO line for presence of precise 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
		With addition of strap lead between PSB terminals 26 and 29, set does not automatically dial	Defective logic	Replace Memory
		MB7 relay operates (clicking sound heard) but holds for less than 0.1 second for a 15 digit number	Incorrect dial sequence	Replace dial
		No audible TOUCH-TONE signal present		
		Audible gap in train of digits being dialed		
		Digits dialed too rapidly (fast dialer)	Noise on ac power line (F-59796 thru F-59799)	1. Minimize wire length between power unit and telephone set 2. Connect ac power to set via isolated pair of wires
			Detective power supply PWB assembly (F-60208 thru F-60211)	Replace telephone set*

* Refer to 6.02(4).

TABLE D (Cont)
TROUBLE ANALYSIS

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
9 (Cont)		No digits or random digits in Memory	AC power outage for longer than 24 hours	Reestablish ac power and rerecord numbers into memory
			Disconnected or defective battery	<ol style="list-style-type: none"> 1. Plug in battery 2. Allow the battery to be charged for a minimum of 5 minutes. Then momentarily remove the power unit from the ac power outlet 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*
		No digits or all the same digits in random memory locations	Defective Memory	Replace Memory
		Two or more memory locations have same digits which are usually different from original recorded digits	Static discharge damage	<ol style="list-style-type: none"> 1. Consult Telco Engineer for proper grounding procedure 2. Replace Memory
		Automatically dials through a "wait" after pausing momentarily at the "wait" space on a train of recorded digits	Defective WAIT contacts or defective circuit components	<ol style="list-style-type: none"> 1. Replace Memory 2. Replace dial tone detector PWB assembly of D-180493 Kit of Parts
10	Cannot turn speakerphone on when ON button is depressed (With speakerphone option)	Speakerphone indicator lamp does not turn on, but line lamp is lit.	Handset off-hook	Depress line button
		No dial tone heard, but indicator lamp turns on	Line button not depressed	Depress line button
		Speakerphone indicator lamp does not turn on and neither does line lamp	Improper connections or defective 85B1 power unit	<ol style="list-style-type: none"> 1. Check connections per Table B and Fig. 8 and 9 or 12 2. Check for commercial power 3. Check that 85B1 power unit is plugged into commercial ac power outlet 4. Check or replace 85B1 power unit (should read 18 to 25 Vac across secondary screw terminals)

* Refer to 6.02(4)

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TABLE D (Cont)

TROUBLE ANALYSIS

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
10 (Cont)		Speakerphone indicator lamp does not turn on but line lamp lights	Improper connections or defective 95B-type power unit	1. Check connections 2. Check or replace 95B-type unit (should read 13.4 to 18 Vac across open circuited screw terminals 30 and 31 on power supply)
		With temporary strap lead added between power supply screw terminals 16 and 17, speakerphone turns on when ON button is depressed	Defective 327A relay. MA3 relay or connecting leads on D-180492 Kit of Parts	Replace D-180492 Kit of Parts
		When temporary strap lead added between screw terminals 11 and 12 on TB1, speakerphone turns on when ON button is depressed	Defective switchhook a-b contacts or connecting lead to PSB	1. Check (G-W) harness lead bwtween screw terminals 11 on TB1 and terminal 16 on power supply 2. Replace telephone set*
			Defective speakerphone	See appropriate speakerphone BSP
11	Cannot turn speakerphone off when handset is lifted off-hook (With speakerphone options)	Speakerphone turns off when OFF button is depressed but turns back on when OFF buttons is released	Short circuit between screw terminals 11 and 12 on TB1	Clear short
			Defective switchhook a-b contacts	Replace telephone set*
12	RECORD lamp does not turn off when speakerphone ON button is depressed (With speakerphone option)	Speakerphone indicator lamp does not turn on. Line lamp is lit.	Handset off-hook	Place handset on-hook
		With temporary strap lead added between screw terminals 16 and 17 on power supply, speakerphone turns on when ON button is depressed and RECORD lamp goes off	LK relay circuit defective on D-180492 Kit of Parts	Replace D-180492 Kit of Parts
		Operations of RECORD OFF button or line key buttons turns RECORD lamp off	Defective switchhook h-i contacts	Replace telephone set*

* Refer to 6.02(4).

TABLE D (Cont)

TROUBLE ANALYSIS

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
13	Cannot break dial tone when dialing with speakerphone phone on (With speakerphone option)	Cannot manually dial when off-hook	Refer to trouble number 3	Refer to trouble number 3
		When dial button is depressed, audible level of TOUCH-TONE signal is high on speakerphone	Defective muting circuit on PSB	Replace telephone set*
14	Cannot hear tones when dialing with speakerphone on (With speakerphone option)	With the speakerphone ON button depressed, the audible tone level is normal	Physical spacing between speakerphone loudspeaker and transmitter units is too close	See appropriate speakerphone BSP for proper placement of units
		Normal conversational level on speakerphone	Defective muting circuit on PSB	Replace telephone set*
15	Cannot turn speakerphone off (With speakerphone option)	Speakerphone turns off and stays off when (Y-BL) lead is disconnected from terminal 27 and PSB and OFF button is depressed	Defective output logic level from Memory PWB	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
16	Speakerphone does not turn on when a memory button is momentarily depressed in the automatic dialing mode (With speakerphone option)	MB7 relay does not operate (no clicking sound heard) when memory button is depressed	Battery not plugged in or defective (F-60208 thru 211 telephone set) (see 3.07)	Connect or replace battery
		With temporary strap between screw terminals 28 and 29 on PSB, 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 screw terminals 17 and 34 on PSB, 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 17 and 34, respectively
			Defective dial tone detector D-180493 Kit of Parts	Replace dial tone detector PWB assembly of D-180493 Kit of Parts

* Refer to 6.02(4).

TABLE D (Cont)
TROUBLE ANALYSIS

TROUBLE NUMBER	FAILURE	ADDITIONAL SYMPTOM	POSSIBLE CAUSE	REMEDIAL ACTION
17	Delay time between depression of a memory button and initiation of automatic dialing exceeds 3 seconds (With speakerphone option)		Defective timing circuit	1. Replace Memory 2. Replace dial tone detector PWB assembly of D-180493 Kit of Parts
18	Speakerphone turns on but set does not automatically dial when memory button depressed (With speakerphone option)	Set dials when screw terminals 26 and 29 on PSB are temporarily shorted	Precise TOUCH-TONE dial tone not present	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
		Set does not dial from memory when screw terminals 26 and 29 on PSB are temporarily shorted	Defective logic	Replace Memory
19	Calls not completed if handset is quickly taken off-hook while automatically dialing on a speakerphone	Automatic dialing is terminated before all digits are dialed	Marginal switchhook sequence between a-b and h-i contacts	Remove handset more slowly from handset cradle
20	At termination of non-speakerphone call, speakerphone turns on when handset is placed on hook	When SPR (Y-BL) lead of D-180493 Kit of Parts is removed from PSB-27 and connected to PSB-21, failure is not corrected	Defective dial tone detector	Replace dial tone detector portion of D-180493 Kit of Parts
		Same as above, except failure is corrected	Defective logic	Replace Memory
			Defective switchhook	Replace telephone set*
21	Automatic dialing commence for no apparent reason (With speakerphone option)		Static discharge damage	1. Consult Telco Engineer for proper grounding procedure 2. Replace Memory

* Refer to 6.02(4).

TABLE D (Cont)

TROUBLE ANALYSIS

TROUBLE NUMBER	FAILURE	ADDITIONAL ANALYSIS	POSSIBLE CAUSE	REMEDIAL ACTION
22	Set dials automatically but does not wait for dial tone		Noise on line	<ol style="list-style-type: none">1. Add .05 μf capacitor between PSB-21 and PSB-262. Remove capacitor and add resistor (10KΩ — 50KΩ) in series with (G-R) dial tone detector input lead

* Refer to 6.02(4).