TELEPHONE SETS—851- AND 2851-TYPE

IDENTIFICATION, INSTALLATION, CONNECTIONS, AND MAINTENANCE

1. GENERAL

1.01 This section is reissued to:

- Show 851BT-* and 2851BT-* telephone sets rated MD and replaced by 851B and 2851B telephone sets, respectively

- Show 851BT and 2851BT telephone set bases rated MD and replaced by 851BM and 2851BM telephone set bases, respectively

- Show 1A housing rated MD and replaced by 851A housing

- Show G12A handset replaced by G3A6 handset

- Include information on 4-type speakerphone

- Revise Table A

1.02 The 851A1M, B1M, ⬥BT⬥ and 2851A1M, B1M, ⬥BT⬥ telephone sets are rated MD.

2. IDENTIFICATION

2.10 The 851- (rotary dial) and 2851- (TOUCH-TONE®) dial) type sets are available completely assembled. Their basic modules are also available.

2.02 *Purpose:* Provides features of a 6-button key station (5-line pickup and hold) at wall installations.

2.03 *Application:* Used with central office or PBX line circuits in 1A, 1A1, 1A2, or 6A Key Telephone Systems. Both the 851-type and 2851-type sets are wired for 1A1, 1A2, and 6A systems. For 1A Key Telephone System, internal wiring changes must be made.

2.04 *Ordering Guide:*

Note: The 851- and 2851-type telephone sets can be ordered completely assembled (851B-* or 2851B-*, Fig. 6 and 7) or modular (851BM or 2851BM, Fig. 3 or 4) telephone set bases.
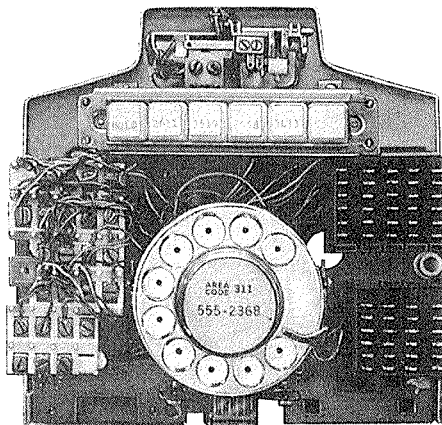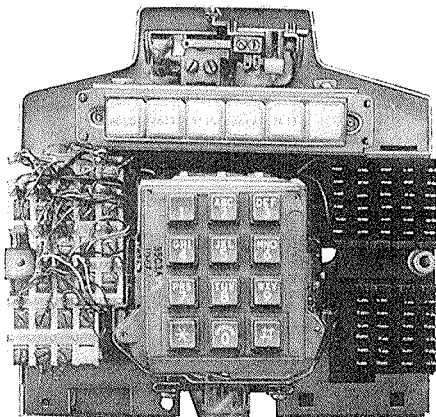

Fig. 1—851-Type Telephone Set Base

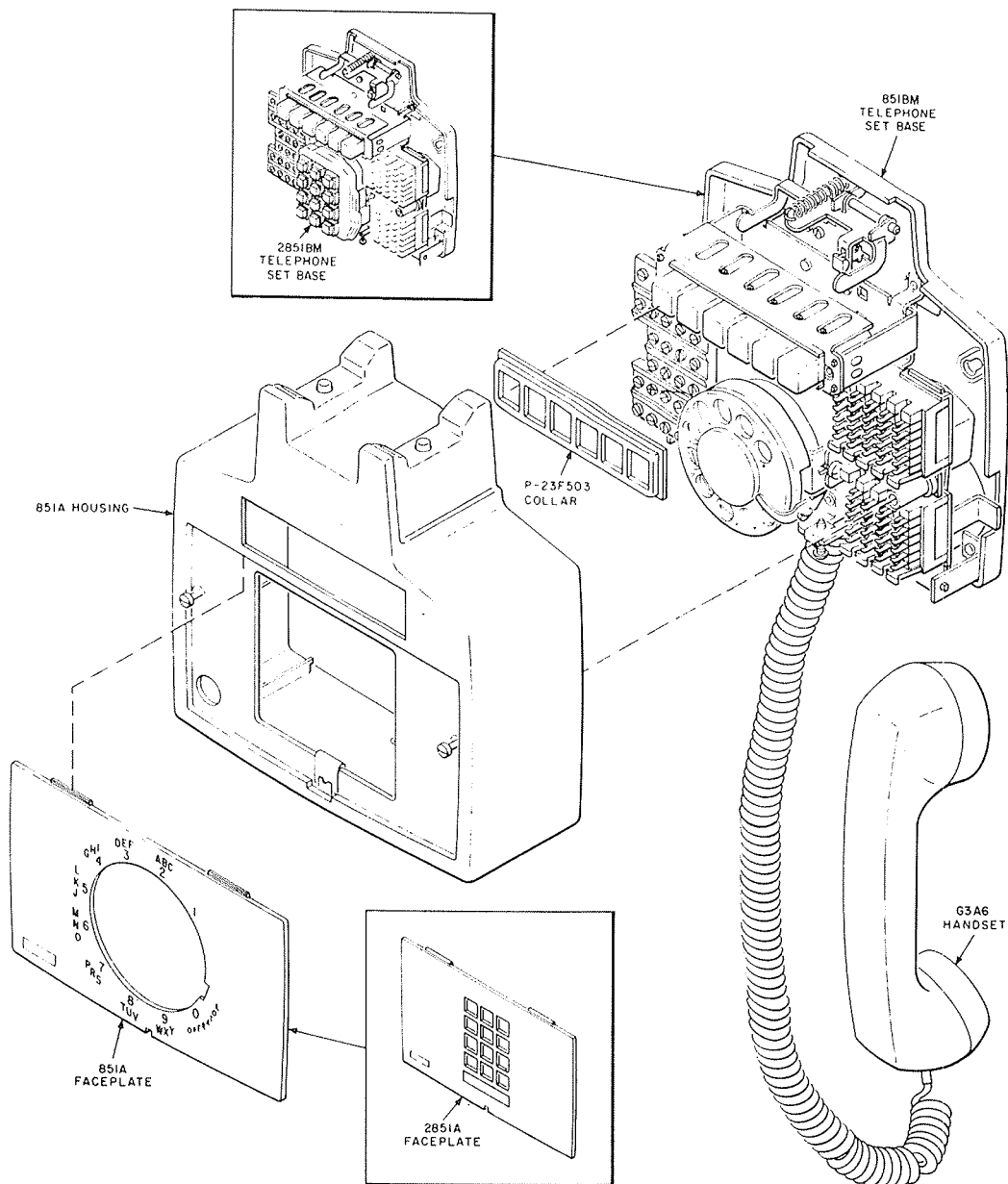

Fig. 2—2851-Type Telephone Set Base

Fig. 3—▸Station Modular Arrangement, 851B and 2851B Telephone Set Showing Current 851A Housing and Baseplate◂
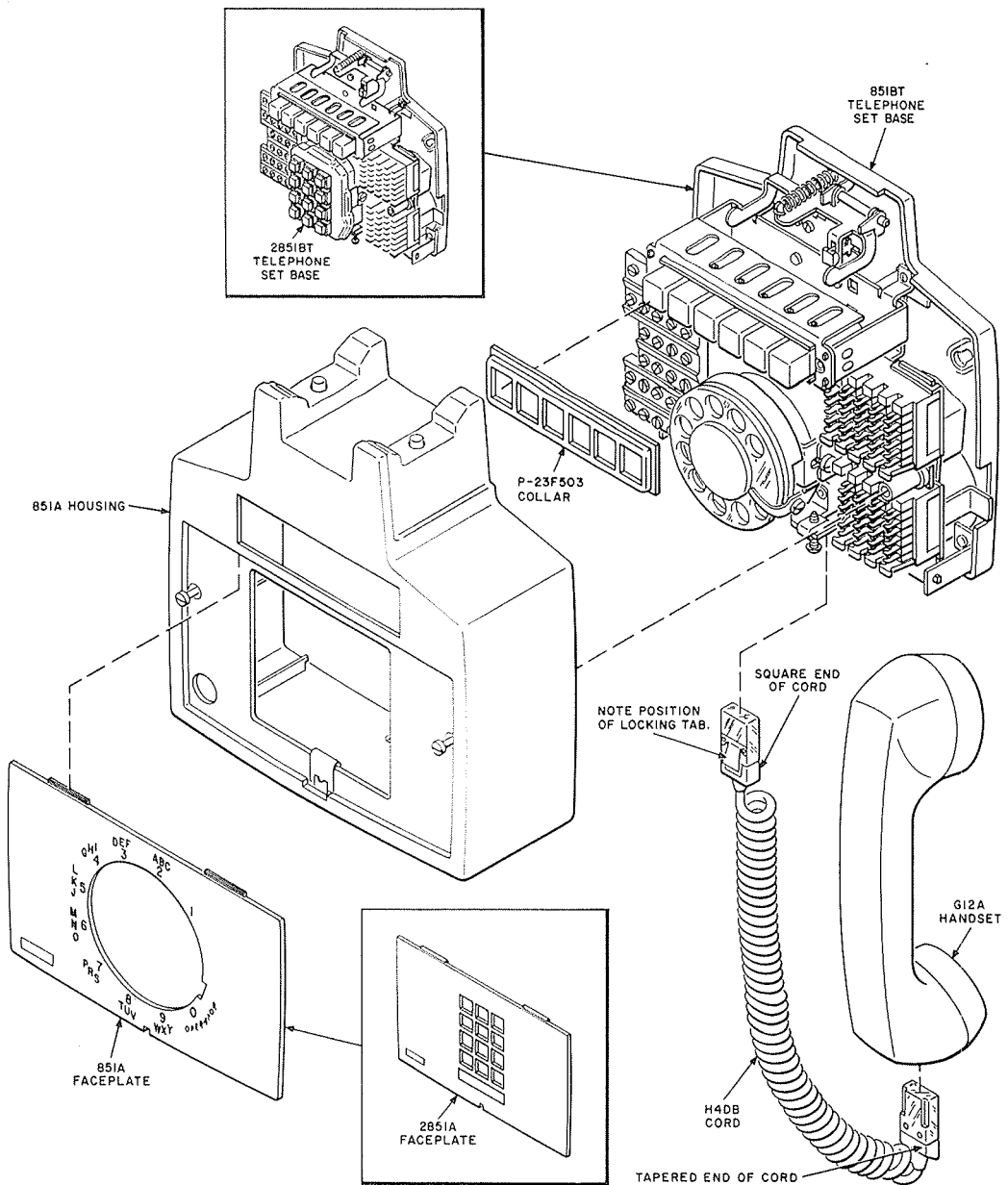
Fig. 4—Station Modular Arrangement, Early Production 851- and 2851-Type Telephone Set Showing Current 851A Housing and Baseplate

If the telephone set base is ordered, the remaining coded apparatus must be ordered separately and installed to furnish a complete 851B-* or 2851B-* telephone set (Fig. 6 and 7).

*Complete code by adding color suffix from Table A.

TABLE A

COLOR ORDERING GUIDE

HOUSING, CORDS AND HANDSET		COORDINATED FACEPLATE	
COLOR	SUFFIX	COLOR	SUFFIX
Black	—03	Charcoal	—70
Ivory	—50	Muted Ivory	—80
Green	—51	Light Green	—71
Red	—53	Muted Red	—69
Yellow	—56	Light Yellow	—72
White	—58	Light Gray	—73
Light Beige	—60	Muted Beige	—75
Aqua Blue	—62	Muted Blue	—76

(a) *Telephone Sets:*

Set, Telephone, 851B-*—Completely assembled set consisting of an 851BM telephone set base [equipped with an 8R dial (rotary), 635A5 key, P1B ringer, KS-20419L1 buzzer, network, quick-connect connecting blocks, and screw type terminal field], 851A housing, 851A faceplate, and G3A6 handset.

Set, Telephone, 2851B-*—Same as the 851B-* telephone set except equipped with a 35C3A (TOUCH-TONE dial) and 2851A-* faceplate.

A supply of E-5837 Forms (key button designation tabs) is furnished with the sets.

(b) *Modular Items:*

• Base, Telephone Set, 851BM

• Base, Telephone Set, 2851BM

• Housing, 851A-*

• Faceplate:

851A-* (851-type telephone set)

2851A-* (2851-type telephone set)

• Handset, G12A-* (early sets)

• Handset, G3A6-* (current sets)

• Cord, H4DB-* (early sets)

(c) *Options:*

• Buzzer, KS-8109L2 (AC or DC)

• P-21F938 Switch, Exclusion Switch Assembly

• P-90D170 Polarity Guard Assembly (for 2851-type telephone set)

• Diode, KS-15724L1 (station busy lamp)

• Speakerphone, 3-type:

Dial, 8C
Unit, Control, 55-type
Transmitter, 666-type
Loudspeaker, 760A
Transformer, 2012B

Speakerphone, 4A:

Dial, 8C
Set, Loudspeaker, 108-Type
Transmitter, 680-Type
Unit, Power, 85B1-49 or
  Transformer, 2012B
Adapter, 223-49

• D-180375 Kit of Parts (adapter cable assembly for installations utilizing A25B connector cable)

• Amplifier-type handsets

Handset, G6AR (MD) or G6B
Handset, G7AR (MD) or G7B
Handset, G8A (MD) or G8B
Handset, D-180413
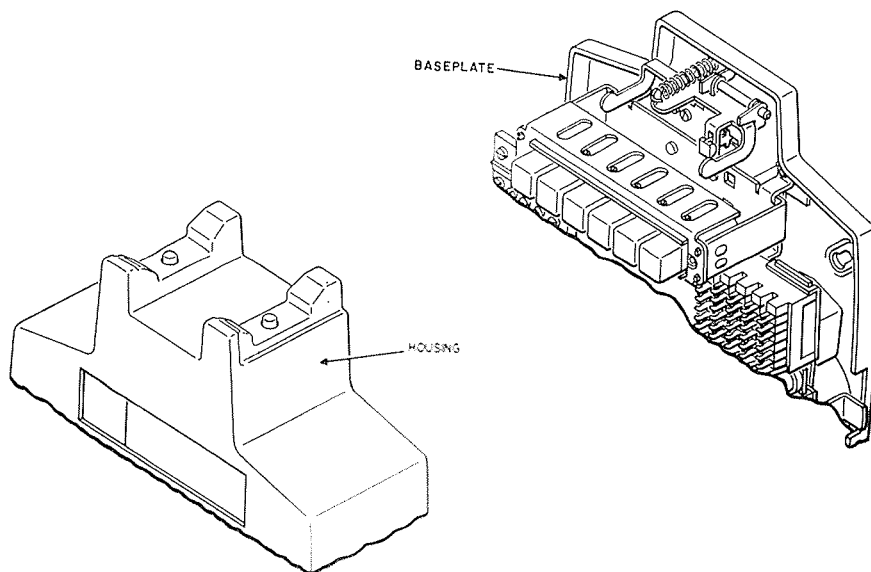
• Hold Lamp

BASEPLATE

HOUSING

Fig. 5—Early Version Baseplate and Housing

(d) *Replaceable Components:*

- Dial, 8R or 35C3A
- Ringer, P1B
- Key, 635A5
- Buzzer, KS-20419L1
- P-23F503 Collar
- Lamp, 51A (10V) for all keys
- All items listed as modular

2.05 Design Features:

- Sets are surface mounted on wall or vertical surface using holes for standard outlet box or keyhole slots.
- Handset is cradled on top, permitting on-hook dialing when speakerphone is furnished.

- All key buttons including hold can be illuminated (lamps are furnished).
- All pickup buttons convertible to signaling.
- Provision made for addition of the following optional features:

  (1) Exclusion

  (2) Polarity guard

  (3) Buzzer, KS-8109L2

  (4) Busy lamp

  (5) Speakerphone

  (6) Amplifier-type handsets

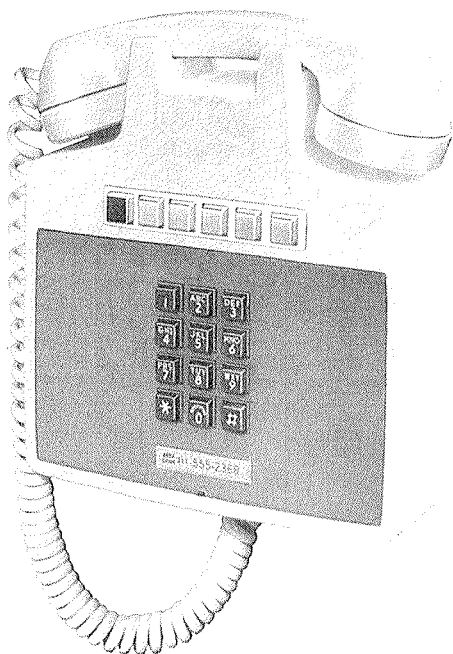- An access hole is provided in the P1-type ringer for ringer biasing spring adjustment. Refer to Section 501-259-101.
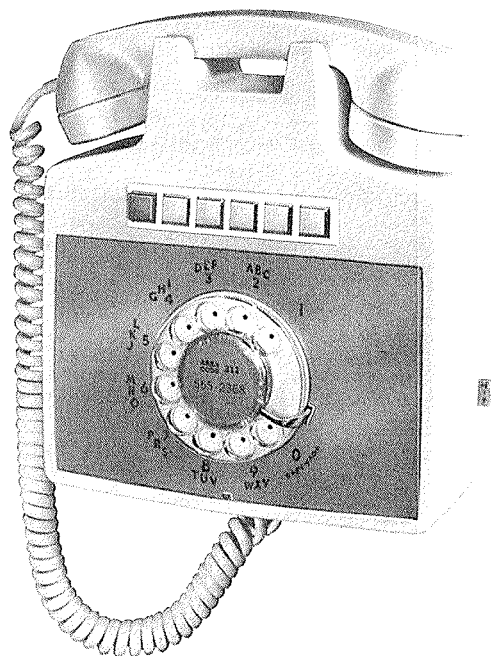
Fig. 6—851-Type Telephone Set, Assembled Station

Fig. 7—2851-Type Telephone Set, Assembled Station

3. INSTALLATION

3.01   When mounting the 851- or 2851-type telephone set, select a location which provides at least 6 inches of clearance on all sides to permit removal of the handset and for maintenance.

3.02   The telephone set should be mounted before installing the modular items. To expose the mounting holes, the hinged chassis assembly must be lowered by loosening the captive screws (Fig. 13) holding the top of the chassis. Where desired, the chassis assembly can be removed by springing the hinge brackets sufficiently to clear the pins. The base pan can be mounted directly to the wall using the keyhole slots, or holes are provided for mounting over an electrical outlet box.

Caution: Avoid damage to wall or telephone set whenever chassis is in lowered position.

3.03   Sets can be wired using either inside wiring cable or connector cable. When mounted over an outlet box, bring wiring through opening in base pan before mounting. When exposed, bring wiring up from bottom (right side of handset cord jack). Allow 20-22 inches of cable inside set for routing and terminating.

3.04   With wiring brought into set, and base pan mounted, replace chassis assembly if previously removed, but leave in lowered position.

3.05   Where IW cable is used, prepare and route as follows:

(1)   Remove sheath to surface of outlet box or bottom of hole in base pan, depending on method of wiring.

(2)   Remove cable clamps. Pinch legs of clamp from front of chassis (Fig. 8).

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(3) Slip one of the clamps provided with set around conductors approximately 9 inches from end of sheath. Add second clamp 2 inches above first.

(4) Form slack loop as shown in Fig. 9 or 10 and install first clamp in hole to left of cord jack.

(5) Route cable below jack and install second clamp in hole to left of ringer.

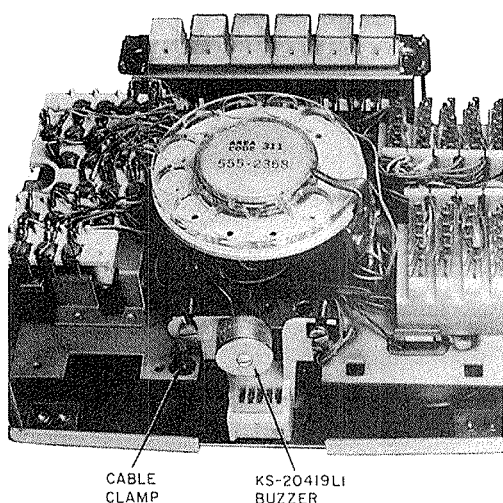(6) Twist ends of conductors together and feed through opening between dial, ringer, and connecting blocks.

Fig. 8—KS-20419L1 Buzzer Mounted on 851-Type Telephone Set

CABLE CLAMP   KS-20419L1 BUZZER

3.06 If the set is served by the connector equipped end of an A25B connector cable, a D-180375 Kit of Parts must be used to obtain raw-ended conductors for termination. The mated connector and plug should be located as shown in Fig. 11. Check that connector and plug do not interfere with operation of line switch. Cable is routed and fastened in same manner as IW cable (Fig. 9 and 10).
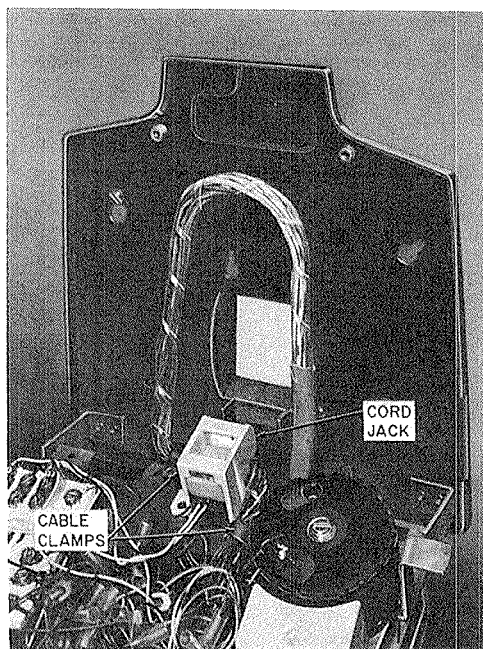

CORD JACK

CABLE CLAMPS

Fig. 9—Inside Wiring Cable, Exposed Wiring

3.07 Check before terminating that sufficient slack is provided to permit hinging action of chassis assembly.

Cable slack must be in area behind dial and not touching ringer. Chassis cannot be secured if slack lies between base pan and network or base pan and cord jack.

3.08 Since individual terminals are not designated on the quick-connect blocks, a label is provided on the inside of the housing as a wiring guide (Fig. 12). Terminals 1-30 are on the upper block and 31-54 are on the lower block. Terminals 51-54 are spare. Use a 714B tool to terminate conductors.
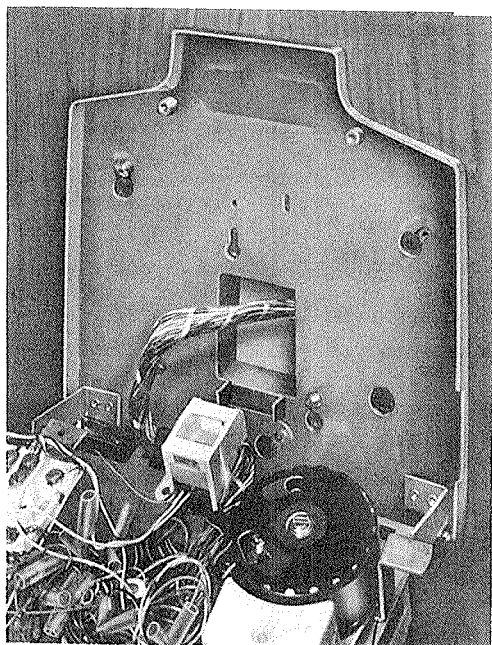
Fig. 10—Inside Wiring Cable, From Outlet Box

Fig. 11—Connector Cable and D-180375 Kit of Parts

3.09 *Exclusion Switch:* To provide exclusion, install the P-21F938 exclusion switch assembly as follows:

(1) With chassis in lowered position, fasten switch assembly to line switch bracket using screw provided in kit. Screw must be inserted in hole from rear of bracket.

(2) Position switch assembly horizontally (Fig. 13) and fasten securely.

3.10 *Polarity Guard:* When required with the 2851-type telephone set, install the P-90D170 Guard Assembly as follows:

(1) Remove the 635A5 key by springing the support brackets inward until key can be removed from pins. It is not necessary to disconnect the line plugs on the rear of the key.

(2) Mount the guard assembly to the left-hand bracket in the position shown in Fig. 14 using the screw provided with the assembly. Screw must be inserted through hole from inside of key support bracket.

(3) Replace key in brackets.

3.11 *Speakerphone:* These sets are factory-wired for 3-type speakerphone except that the 851-type telephone set requires the replacement of the 8R dial with an 8C dial to provide a second set of off-normal contacts (P3 and P4 leads). When replacing the dial the adapter brackets must be removed from the 8R dial and added to the 8C dial (Fig. 16). Terminate the additional leads as shown in Fig. 22. With both the rotary and the TOUCH-TONE sets, a loudspeaker and transmitter must be installed external to the set and wired to the 55-type control unit. The control unit can be located near the telephone set (Fig. 18) or at the KTS equipment (Fig. 19).
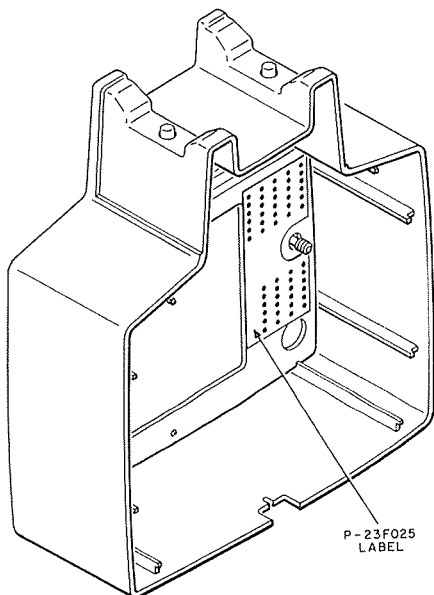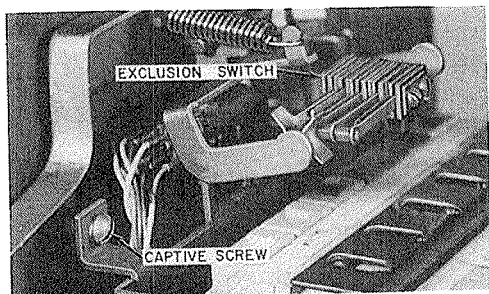
Fig. 12—Connecting Block Wiring Label

**Fig. 13—Exclusion Switch Installed and Hinged
Chassis Mounting Screws**

3.12 If 4-type speakerphone is provided, the 223A adapter is used to interconnect the 4-type speakerphone system (680-type transmitter, 108-type loudspeaker set, and the 85B1 power unit or 2012B transformer).
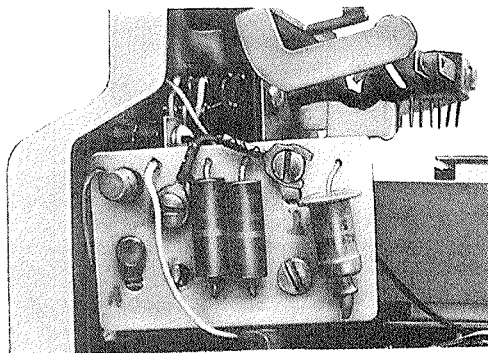

Fig. 14—Polarity Guard Position

3.13 For connections to the 3- or 4-type speakerphone system, refer to the appropriate section in Division 512.

3.14 When an 851- or 2851-type telephone set is multipled with sets furnishing speakerphone features, certain leads must be disconnected, insulated, and stored to avoid interference with working circuits. The designation of leads to be removed are as follows: T1, R1, P3, P4, AG, and LK.

3.15 *Buzzer:* The KS-20419L1 buzzer is mounted on an insulated bracket below the dial (Fig. 8). If required, the KS-20419L1 may be replaced by the KS-8109L2 buzzer (14-30 volt ac or dc) which would be mounted using both screws.

3.16 *Key Features:*

- All pickup positions of the 635A5 key are convertible to signaling by the removal of the P-28E773 locking pins from the positions involved and making the necessary wiring changes (Table C).

- Lamp and set wiring are provided for illuminating all key positions, except in the hold position where the associated lamp leads are insulated and stored.

- Line appearances on the key can be rearranged by switching the color coded plugs on the rear of the key or rearrangement of the cross connections at the key equipment.

3.17 Install H4DB handset cord by inserting end of cord having tapered plug into handset and square end into jack on bottom of set. Spring locking tab should face away from wall at bottom of set (Fig. 4).

Care should be taken that contact surfaces of plugs on cord mate with those of handset and telephone set jacks since the plugs can be inserted in the reverse position.

Caution: Cord should be removed from jack in bottom of set anytime chassis assembly must be put in lowered position.

3.18 Where conditions warrant, the G3A6 or G12A handset supplied with these sets can be replaced with other types as follows:

- For impaired hearing—G6-type

- For weak speech—G7-type

- For noisy location—G8-type or D-180413

Refer to Division 501 for connections of these handsets. When either of these handsets is used, an H4CJ or equivalent handset cord must be used.

3.17 *Installation of Spade-Tipped Handset Cords In Early Production Set Equipped With G12A Handset (Fig. 17):* To install spade-tipped handset cord (H4CJ or equivalent) remove P-376819 J Hook Stayband from the cord. Cut back and remove cord sheath to stayband marks. Thread spade-tipped conductors through plug 840217590 (ordered separately) (spade tips must be bent to clear cord entrance). Pull cord until about 1/4-inch of cord sheath is in the central cavity of the plug. Separate the conductors into two groups and tie an overhand knot, pulling the knot to the cord sheath. Pull cord from plug until strain relief position is attained by knot entering sheath and resting against plug. Feed spade-tipped conductors straight through jack P-22F620 and connect to proper terminals. Insert plug in jack.

3.20 *To install housing:*

(1) Refer to 5.05.

(2) If chassis assembly is in lowered position, raise and fasten in place with two captive screws.

(3) Install collar on key.

(4) Withdraw the two mounting screws until they are held in the housing by their threads. With both line switch plungers fully lifted, move the housing directly into position around the telephone set (if an exclusion switch is installed, the left plunger will be felt to touch the exclusion switch when the housing is about 3/8-inch from the base). Depress both plungers to their on-hook position. Continue moving the housing into position against the base. Release plungers.

(5) Fasten housing in place with two captive screws.

(6) Check complete operation of line switch and exclusion feature.

3.21 Use a Form E-5002-A or E-5002-B as a station number card for a TOUCH-TONE station and Form E-4203-G or E-4204-G for rotary sets.

3.22 *To install faceplate:*

(1) If installing 2851A faceplate (2851-type telephone set) place station number card in from front of faceplate in standard manner.

(2) Insert tabs on faceplate into slots of housing. Use a KS-16750 type releaser or equivalent to depress the tab of the faceplate retainer clip while seating the faceplate. To insure proper positioning of the retainer clip, raise the handle of the releaser well above horizontal, as shown in Fig. 15, before withdrawing the tool.

(3) If the latching characteristic of the P-269524 retainer clip is inadequate, replace with a 840155618 clip.

3.23 The 635A5 key uses a E-5837 form (key button designation tabs). To install, squeeze sides of cap to remove from key button and insert

designation tab. When replacing cap or key button make sure assembly snaps into place. If cap does not snap in place properly, rotate 90 degrees.
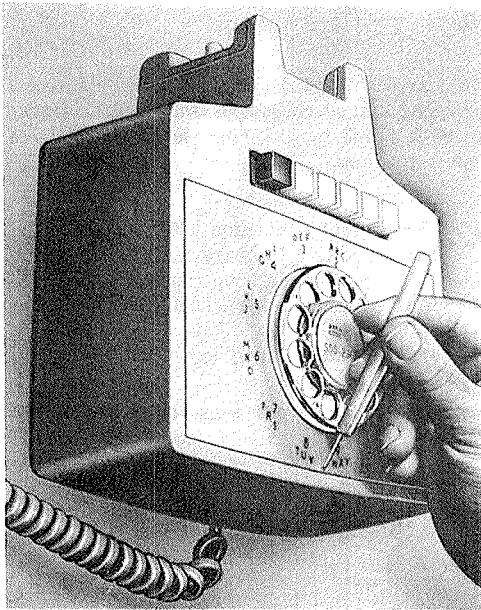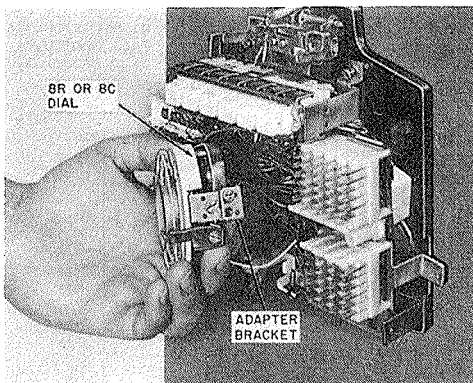

Fig. 15—Installation 851A Faceplate
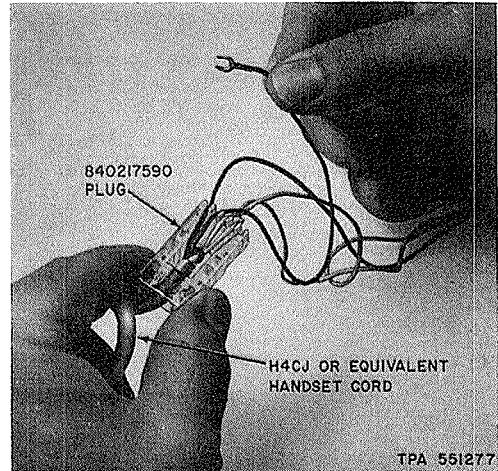

Fig. 16—Dial Adapter Bracket

Fig. 17—Installing Spade-Tipped Handset Cords in Early Production Sets

4. CONNECTIONS

4.01 All incoming connections are made on the quick-connect connecting blocks. Terminate IW cable as shown in Fig. 22 and 23, using the label inside the housing as a guide in locating terminal numbers.

4.02 All leads or straps involved in service or option changes are equipped with spade tips. If not factory terminated, leads are insulated and stored.

4.03 *Connection Index:*

Table B—Connections For 1A KTS and/or Station Busy Lamp

Table C—Pickup-Signal Key Conversions

Table D—Polarity Guard Connections For 2851-type Telephone Set (P-90D170 Guard Assembly)

Fig. 20—Exclusion Switch Connections

Fig. 21—Hold Lamp Connections

Fig. 22—851-Type Telephone Set, Connections

Fig. 23—2851-Type Telephone Set, Connections

5. MAINTENANCE

5.01 Maintenance replacement should be limited to the following:

● Complete telephone sets

● Modular items

● Optional items

● Replaceable components

5.02 When dial replacement is necessary in the 851-type telephone set, use an 8R dial for nonspeakerphone sets and an 8C dial for sets with speakerphone. Remove dial by loosening mounting screws and springing dial brackets sufficiently to release dial from locating pins. Left hand bracket may have to be moved slightly toward right side of set to permit dial to clear screw terminal field (or loosen and move screw terminal field). Transfer adapter brackets from dial being replaced to new dial (Fig. 16).

5.03 Maintenance of the 35C3A (TOUCH-TONE dial) dial is not recommended and the dial should be replaced. Adapter brackets are not involved when replacing the TOUCH-TONE dial.

5.04 When necessary to remove housing, the faceplate must first be removed by using a KS-16750 type releaser or equivalent in catch in bottom of faceplate. Housing can then be removed by loosening two captive screws under faceplate area.

5.05 For field replacement of 851A housing—early version of housing (Fig. 5) can be used with sets equipped with either the early or current baseplate (Fig. 3, 4, and 5). The current housing (Fig. 3 or 4) can be used with the current baseplate only.

5.06 Access to the ringer is obtained by lowering the hinged chassis assembly. The ringer can be removed by loosening the two shouldered mounting screws.

5.07 The current production 635-type keys have been modified for easy lamp replacement by merely removing the lamp cap and inserting a 553-type tool through the hole in the top of the button. In early production keys it was necessary to remove faceplate, housing, key collar, and button for lamp replacement.
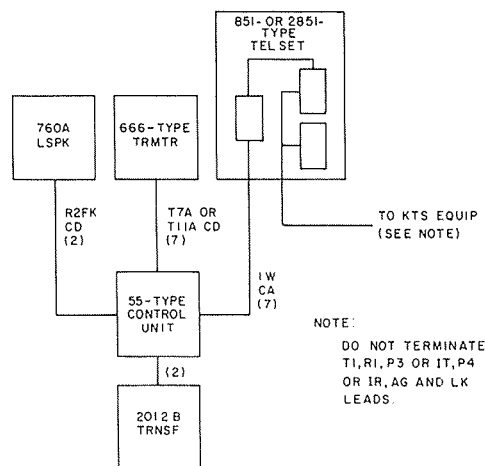

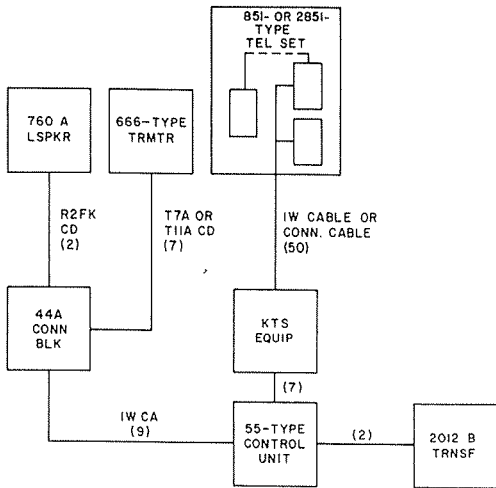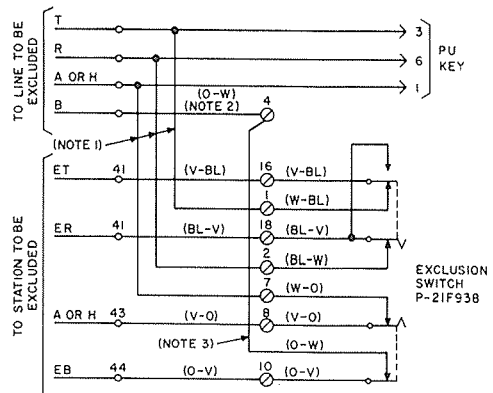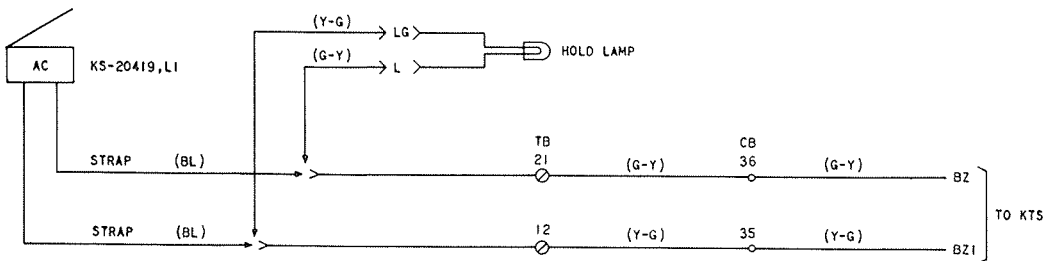**Fig. 18—Block Diagram, Control Unit Located Near Station**

Fig. 19—Block Diagram, Control Unit Located at KTS Equipment

Fig. 20—Exclusion Switch Connections

NOTES:

1. STORED SPADE-TIPPED LEADS OF LINE TO BE EXCLUDED.

2. WHEN OTHER THAN LINE 1 IS EXCLUDED ON IA KTS, DISCONNECT, INSULATE AND STORE (O-W) LEAD FROM TERMINAL 4. CONNECT BALANCE LEAD OF LINE INVOLVED TO TERMINAL 4.

3. FOR IAI OR IA2 KTS, CONNECT (O-W) EXCLUSION LEAD TO TERMINAL 10. AI GROUND MUST BE SUPPLIED DIRECTLY TO EXCLUDED STATION.

NOTE:

IF HOLD LAMP OPERATION IS REQUIRED; REMOVE, INSULATE, AND STORE BUZZER LEADS.

Fig. 21—Hold Lamp Connections

Fig. 22—851-Type Telephone Set, Connections (Sheet 1 of 2)

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NOTES:

1. CONNECTIONS FOR P1B RINGER SHOWN. RINGER CONNECTIONS FOR SETS EQUIPPED WITH P1A RINGER SAME AS P1B EXCEPT (S) AND (S-R) LEADS ARE INSULATED AND STORED. (BL) LEAD REMOVED FROM CURRENT MODEL P1A RINGERS.

2. LINE SWITCH OPERATING SEQUENCE:
   bc   MAKES
   de   MAKES
   ob   BREAKS
   fg   BREAKS

3. CONTACT AND LEADS FURNISHED ON 8C DIAL ONLY.

4. CURRENT 851-B TELEPHONE SETS ARE EQUIPPED WITH G3A6 HANDSET WHICH IS WIRED DIRECTLY TO THE TELEPHONE SET. EARLY PRODUCTION 851-TYPE TELEPHONE SETS WERE EQUIPPED WITH A G12A HANDSET USING A PLUG-ENDED CORD.

* INSULATED AND STORED

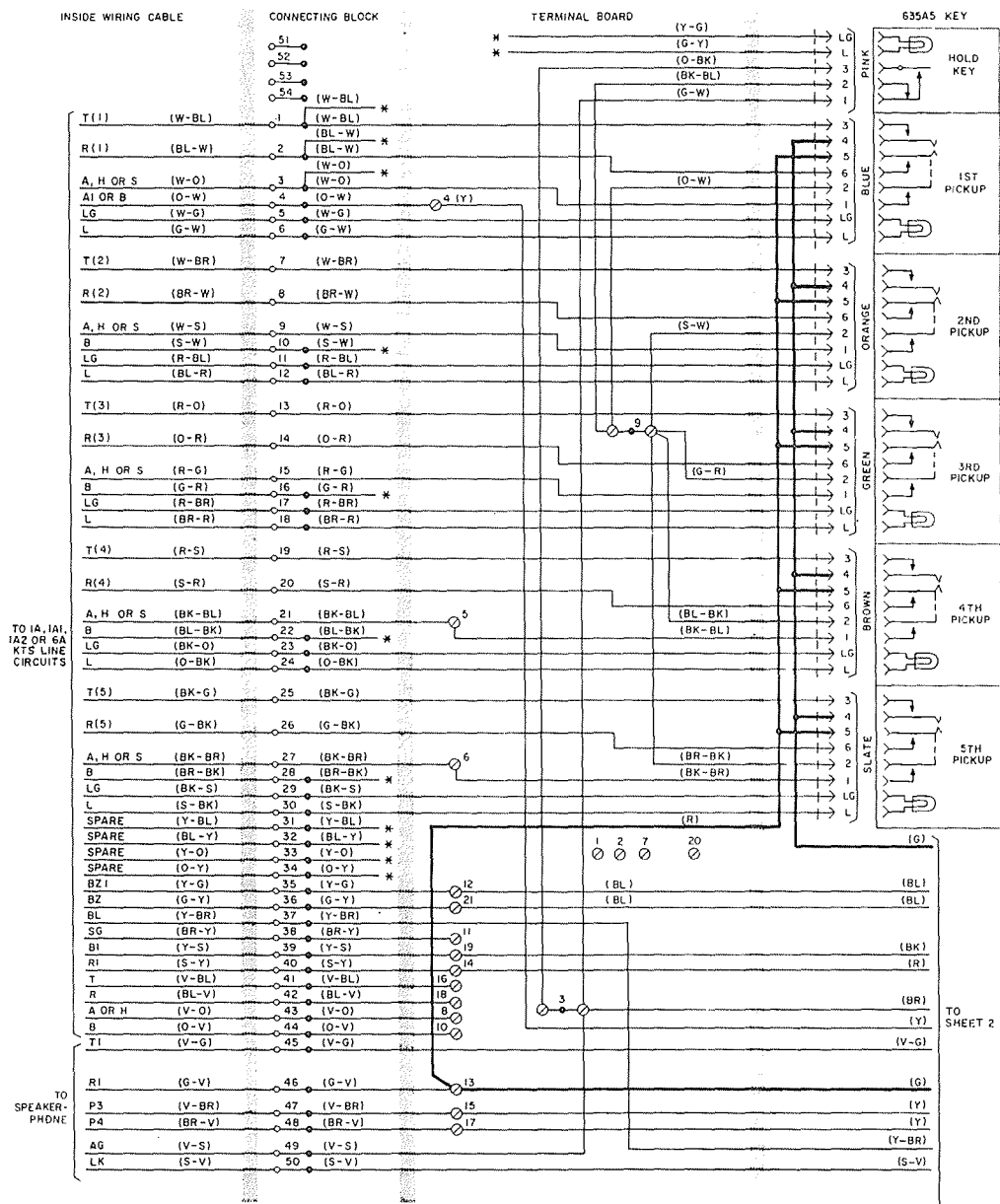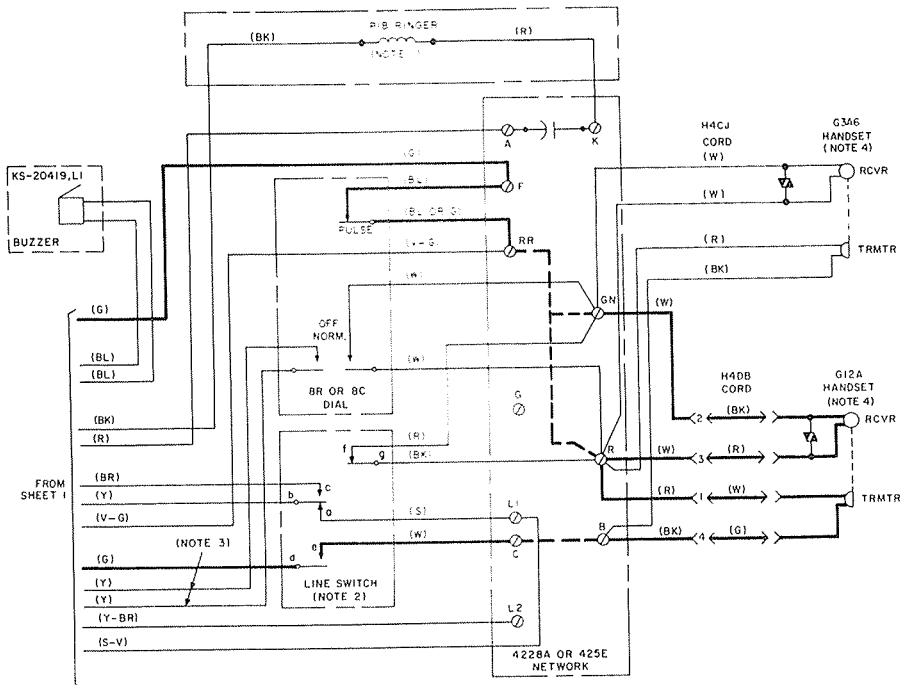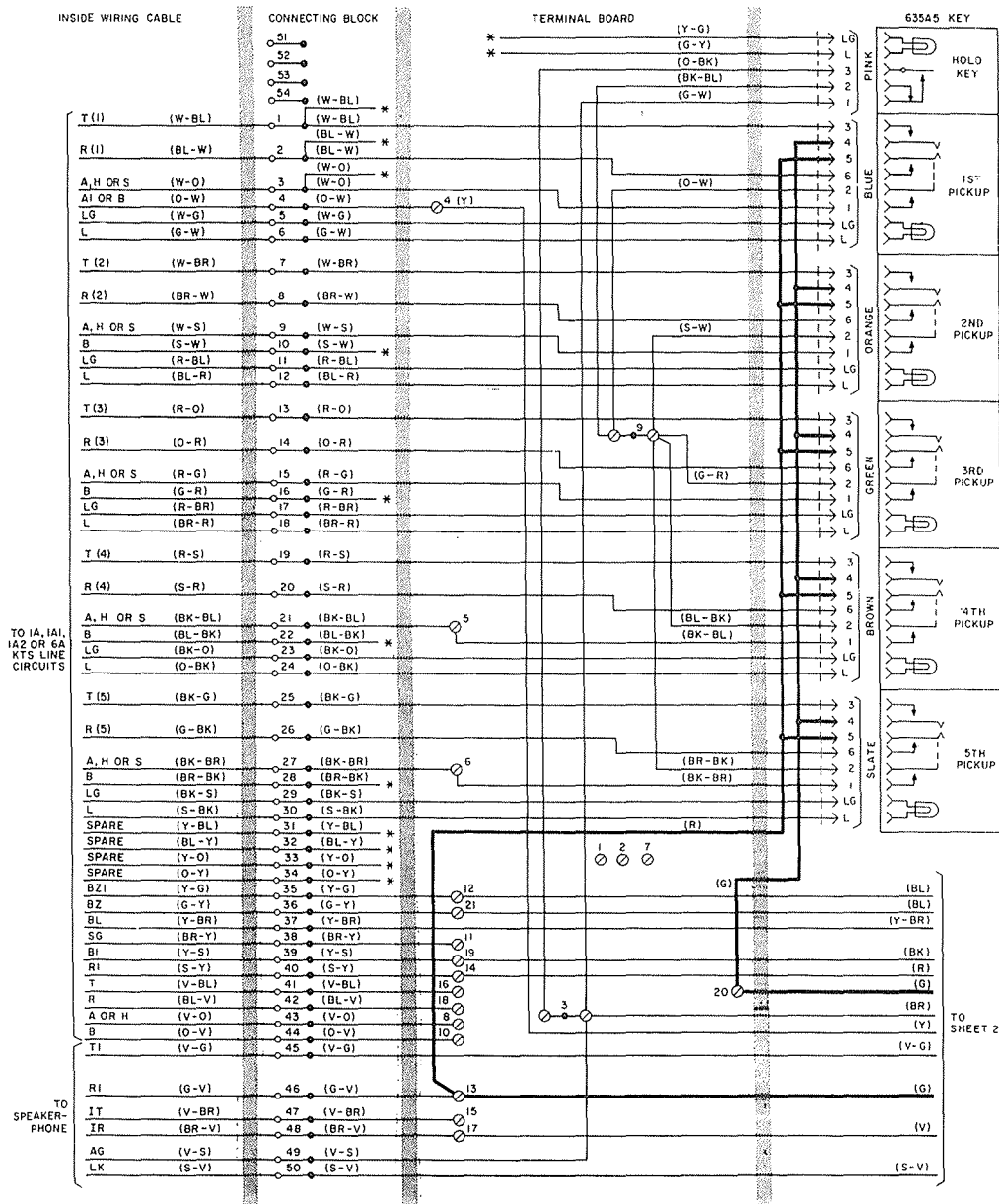**Fig. 22—851-Type Telephone Set, Connections (Sheet 2 of 2)**

Fig. 23—2851-Type Telephone Set, Connections (Sheet 1 of 2)

NOTES:

1. CONNECTIONS FOR PIB RINGER SHOWN. RINGER CONNECTIONS FOR SETS EQUIPPED WITH PIA RINGER SAME AS PIB EXCEPT (BL),(S), AND (S-R) LEADS ARE INSULATED AND STORED. (CURRENT MODEL PIA RINGERS DO NOT HAVE (BL) LEAD).

2. LINE SWITCH OPERATING SEQUENCE:
   bc MAKES
   da MAKES
   ob BREAKS
   fg BREAKS

3. CURRENT 2851B TELEPHONE SETS ARE EQUIPPED WITH G3A6 HANDSET WHICH IS WIRED DIRECTLY TO TELEPHONE SET. EARLY PRODUCTION 2851-TYPE TELEPHONE SETS WERE EQUIPPED WITH A G12A HANDSET USING A PLUG-ENDED CORD.
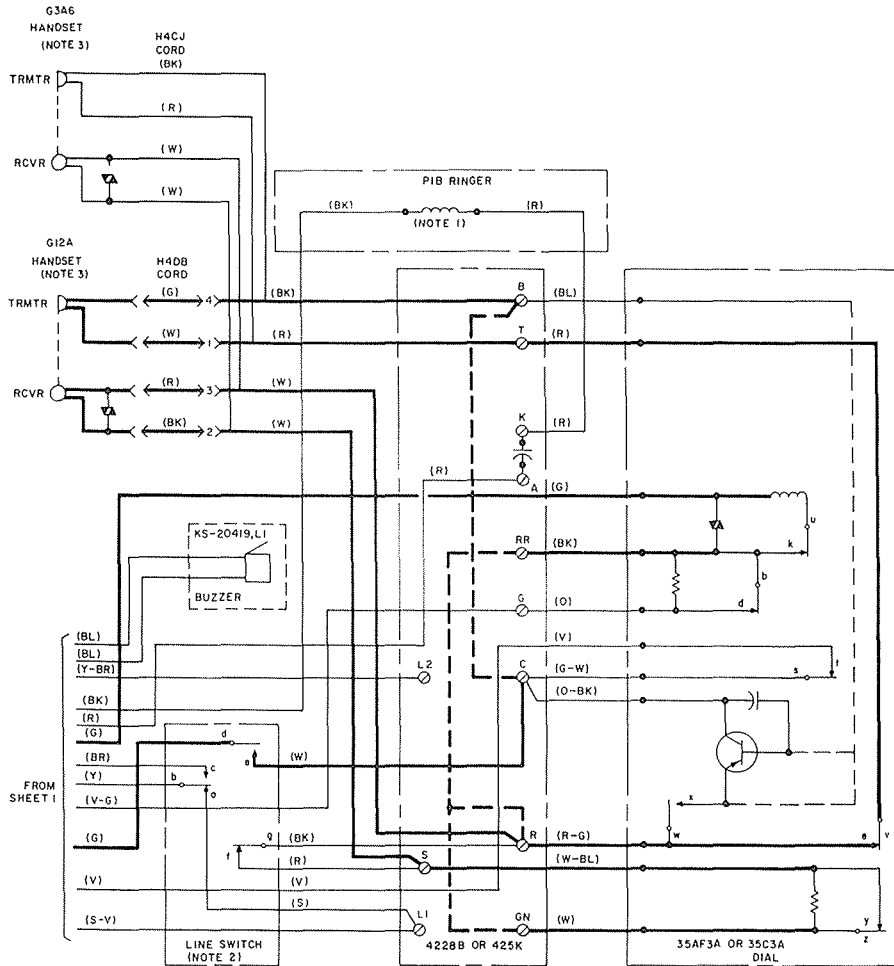
* INSULATED AND STORED.

Fig. 23—2851-Type Telephone Set, Connections (Sheet 2 of 2)

◊ TABLE B ◊

CONNECTIONS FOR 1A KTS AND/OR STATION BUSY LAMP

STATION BUSY LAMP		WIRE OR LEAD								KS-15724,L1 DIODE
		LINE SWITCH			HOLD KEY		STRAP			
		Y	BR	G	O-BK	BK-BL	V-S	G-V	Y-BR	
With-	1A	11	*	3	9	13	*	3	L2†	
out	1A1-1A2	4	3	13	3	9	3	13	L2†	
With	1A	11	L2†	3	9	13	L2†	3	L2†	
	1A1-1A2	4	L2†	13	3	9	L2†	13	L2†	L2† —▷|— 3

* Insulate and store.

† Network terminal, undesignated terminals are on terminal board.

TABLE C
PICKUP-SIGNAL KEY CONVERSIONS

TELEPHONE SET	KEY OPTION	KEY LEAD				
		O-W	S-W	G-R	BL-BK	BR-BK
851- or 2851-Type	HPPPPP	9	9	9	9	9
	HPPPPS	9	9	9	9	11
	HPPPSS	9	9	9	11	11
	HPPSSS	9	9	11	11	11
	HPSSSS	9	11	11	11	11
	HPPP*P*S*	9	9	6	6	3
	HPP*P*P*S*	9	6	6	6	3

* For common signaling with intercommunicating or private lines with signaling under line switch control. For 1A KTS, move (Y) line switch lead from terminal 4 to 11.

TABLE D
POLARITY GUARD CONNECTIONS FOR 2851-TYPE TELEPHONE SET (P-90D170 GUARD ASSEMBLY)

WIRE OR LEAD	COLOR	REMOVE FROM	CONNECT TO	
		NET.	GUARD ASSY	NET.
Dial	BK	RR	T	
	G-W	C	S	
Line Switch	W	C	S	
Guard Assembly	G			RR
	W			C

Note: For use when specified by local instructions for end-to-end signaling installations.