

7A COMMUNICATION SYSTEM

88-011

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1. GENERAL

1.01 This section contains identification, installation, connection, operation and maintenance information for the 7A Communication System.

1.02 The 7A Communication System (Fig. 1) will accommodate a maximum of 7 CO/PBX lines and 18 stations. Switching apparatus for the system is housed in a 570A KSU. Telephone sets (832A and 2832A) are special 10-button sets providing basic services such as pickup, hold and illumination, two path intercom, voice and tone signaling, multiline conferencing and button restoration. Available optional features are privacy (lockout), privacy release, station restriction, paging (with or without background music), power failure transfer, night transfer, music on hold (utilizing customer provided music source), intercom preset conference, station busy console with DSS, station busy console with message waiting, TOUCH-TONE® dialing and speakerphone.

1.03 All incoming CO/PBX calls are routed to one of the 18 stations which is designated as the attendant station (code 0). *ONLY* The attendant station is the only station factory-wired for CO/PBX ringing. The attendant answers incoming CO/PBX calls then notifies the called parties via intercom voice signaling. The called party performs the action required. All stations have access to all lines in the system, and any station may be optionally wired for CO/PBX ringing on a one station per line basis.

1.04 This issue of the section is based on:

CD and SD-69652-01, Issue 1—Packaged Key Telephone Systems

CD and SD-69654-01, Issue 1—832A and 2832A Telephone Circuit for Use with 7A Communications System

CD and SD-69656-01, Issue 1—6A1 and 6B1 Selector Console Circuit for Use with 7A Communications System

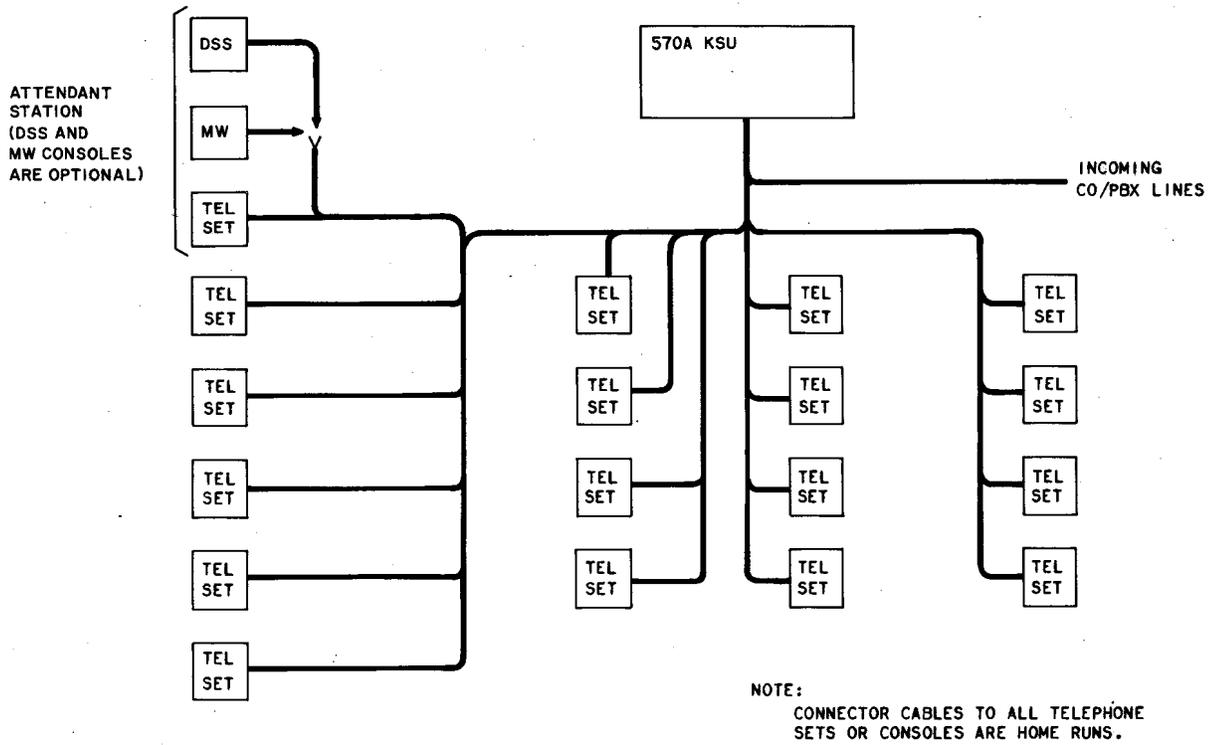


Fig. 1—Block Diagram of 7A Communication System

If this section is to be used with equipment or apparatus reflecting a later issue of the drawing(s), reference should be made to the CDs and SDs to determine the extent of the changes and the manner in which the section may be affected.

2. IDENTIFICATION

2.01 The 7A Communications System provides 7 CO/PBX lines, up to 18 stations and 2 intercom paths. A brief description of the system features is listed:

Basic Features

- (a) **Pickup, Hold and Illumination**—Standard key system pickup, hold and illumination including wink hold.
- (b) **Two Path Dial Intercom**—Each intercom path is associated with an individual button and lamp on each telephone set.
- (c) **Multiline Conferencing**—Two or more CO/PBX lines may be conferenced by *simultaneously* depressing the line buttons of the lines to be conferenced.

Note: Intercom and CO/PBX lines cannot be conferenced together.

- (d) **Tone and Voice Signaling**—CO/PBX line alerting signal will be via a tone source rather than a conventional ringer. Intercom alerting signal is a spurt of tone audible to both called and calling stations. Calling station may then voice page the called party.
- (e) **Button Restoration**—Returns all depressed buttons to the unoperated position when the handset is replaced.

Optional Features



The following features should be implemented only when specifically covered in the service order.

- (f) **Privacy (Lockout Circuit)**—Prevents a station from bridging into a CO/PBX call in progress. Intercom lines have no privacy.
- (g) **Privacy Release**—Allows a station (lockout equipped) to permit other stations (lockout equipped) that have been locked out of a call to bridge into the conversation.
- (h) **Station Restriction**—Prevents selected stations from dialing outgoing calls on CO/PBX lines.
- (i) **Paging**—By dialing the digit "2" on the intercom, up to seven loudspeakers in the system may be activated. Background music may be provided over paging system utilizing customer-provided music source.
- (j) **Power Failure Transfer**—In the event of power failure, ringing is cut through to line ringers at selected locations. External ringers must be installed at the selected locations on a one per line basis.
- (k) **Night Transfer**—Transfers CO/PBX ringing signal from the attendant station (code 0) to a designated secondary station.
- (l) **Music-On-Hold**—Provides music from customer-provided music source to calls placed on hold.
- (m) **Intercom Preset Conference**—Permits up to five preselected stations to be signaled simultaneously over the intercom by tone and voice signaling. When preset conference is furnished, code 19 is forfeited for intercom use.
- (n) **Station Busy Selector Console (6A1) with DSS**—Provides station busy indication and direct station selection on an intercom path.
- (o) **Station Busy Selector Console (6B1) with Message Waiting**—Provides station busy indication and message waiting feature.
- (p) **TOUCH-TONE[®] Set**—Provides TOUCH-TONE dialing. Rotary and TOUCH-TONE dial sets may be intermixed in the system.
- (q) **Speakerphone**—May be added to stations to provide standard speakerphone service.
- (r) **CO/PBX Ringing**—One or more stations may be optionally wired for audible signal on incoming CO/PBX calls on a one per line

basis. This is in addition to the attendant station (code 0).

2.02 All options are implemented by:

- Plugging in appropriate KTU's
- Connecting or removing straps
- Terminating connector cables from telephone sets on designated connecting blocks in the KSU
- Wiring changes in the telephone set.

2.03 The KTU's and power unit are mounted in the 570A KSU (Fig. 2).

2.04 All wiring connections are made on the connecting blocks located in the KTU (Fig. 3) with the exception of the terminal block for connecting the customer-provided music source. Since all stations pick up all lines on the same button at each telephone set, all equipment connections are factory-wired to the connecting blocks.



All station connections are made on the station connection field blocks using standard color code cut down. This eliminates the need for an external cross-connection field.

2.05 The column on which a station is cut down determines the intercom code assigned to that station. Intercom codes available are codes 0 and 3 through 19. Code 1 is used as the transfer digit, and code 2 is used for paging.

2.06 832A and 2832A telephone sets are special 10-button sets that are required for this system and cannot be used with other systems.

570A KSU

2.07 The 570A KSU (Fig. 2) provides the following features:

- Arranged for wall mounting
- Removable fiberglass cover
- Internally mounted 66-type connecting blocks for option and station connections

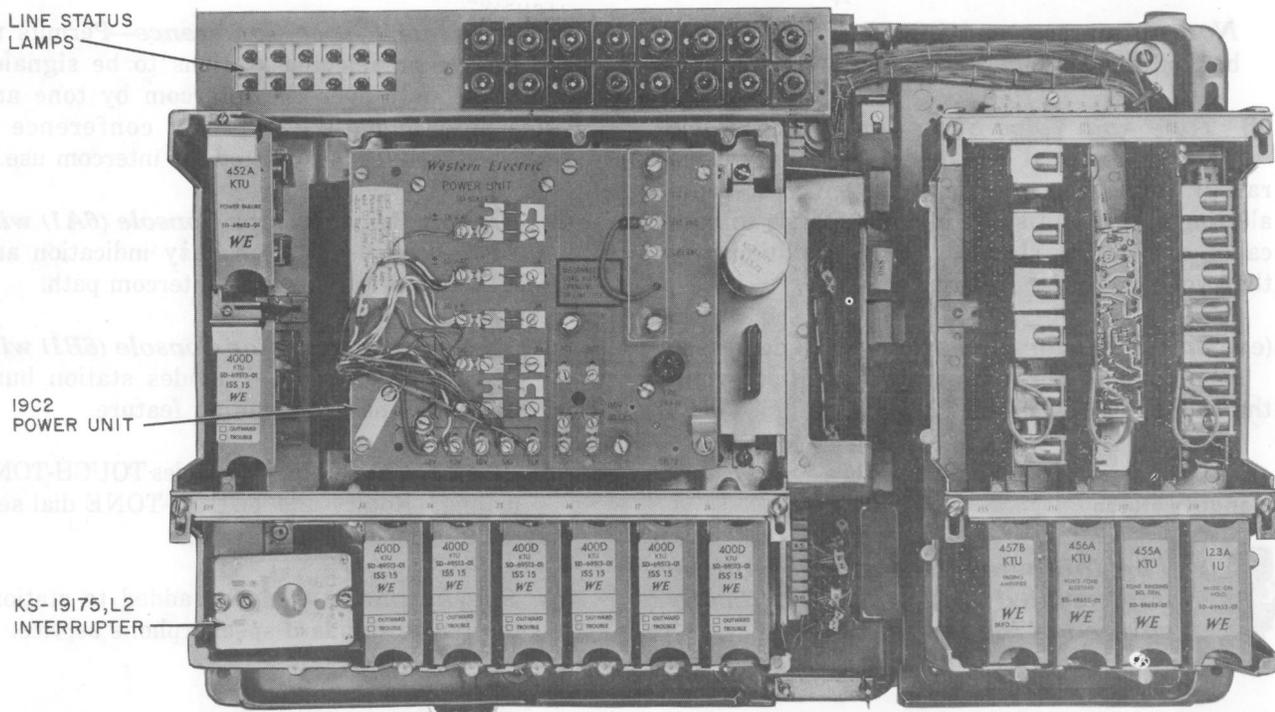


Fig. 2—570A KSU (Cover Removed)

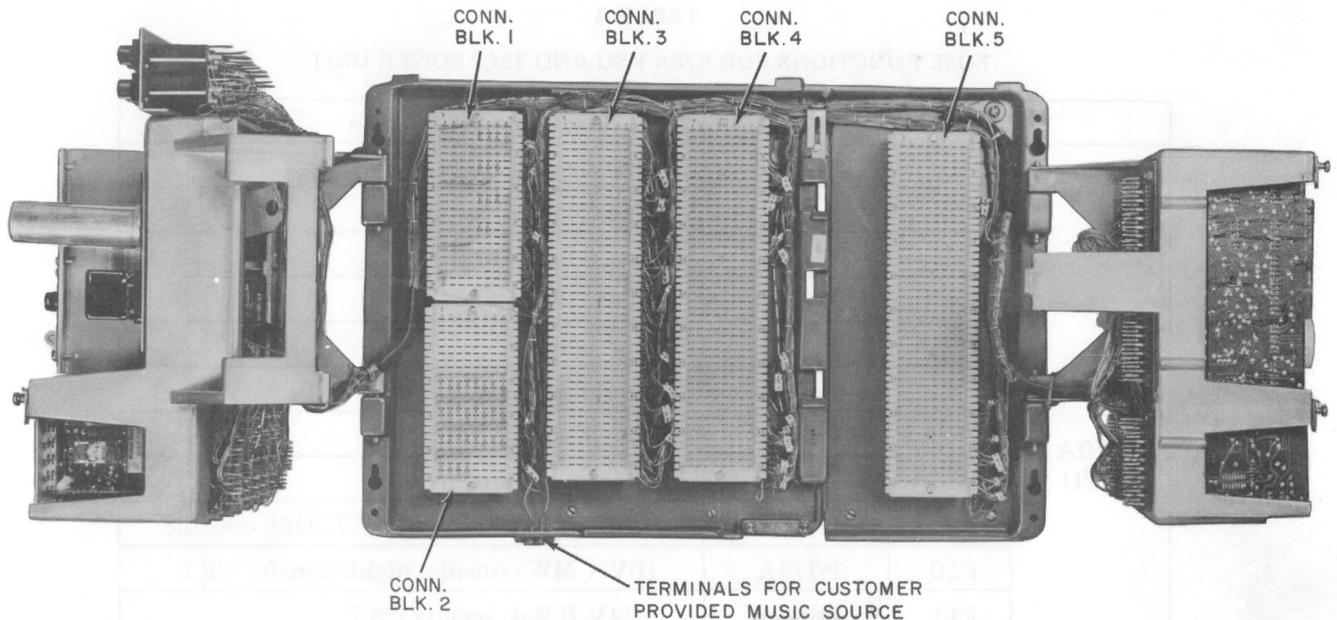


Fig. 3—570A KSU (Carriers Open)

- Internally mounted power supply (19C2) and interrupter (KS-19175, L2)
 - Mounts twelve 4-inch and three 8-inch KTUs
 - 424A, 455A, 456A, and 460A KTUs are shipped with KSU.
 - Designation strip holder and tab assembly serves as a retainer to lock KTUs in the connectors.
 - Fuse panel (Table A) provides power distribution to connectors and station blocks for lamp and fusing functions.
 - Status lamps indicate status of CO/PBX and intercom lines.
- 2.08** Five 66-type connecting blocks are mounted in the KSU (Fig. 3).

(a) Connecting block 1 (Fig. 4) contains the diode arrangement for preset conference and common audible signaling. Terminals are provided for terminating power failure transfer,

CO ringing, preset conference, paging and night transfer.

(b) Connecting block 2 (Fig. 5) contains the polarity guard diodes for the CO/PBX lines.

(c) Connecting block 3 (Fig. 6) provides terminals for connecting station codes 0 (attendant station) and 3, the incoming CO/PBX lines, and the optional message waiting or DSS consoles.

(d) Connecting blocks 4 and 5 (Fig. 6) provide terminals for connecting station codes 4 through 19.

KEY TELEPHONE UNITS

2.09 The following units provide the circuitry for the 7A Communications System.

123A INTERCONNECTING UNIT (MUSIC-ON-HOLD CIRCUIT)

2.10 The 123A IU (Fig. 7) is a 4-inch unit that connects a customer-provided source of music to up-to-seven lines placed on hold.

TABLE A
 FUSE FUNCTIONS FOR 570A KSU AND 19C2 POWER UNIT

	FUSE	CAPACITY	FUNCTION
570A KTU	F1	1-1/3A	Line 1 lamp
	F2	1-1/3A	Line 2 lamp
	F3	1-1/3A	Line 3 lamp
	F4	1-1/3A	Line 4 lamp
	F5	1-1/3A	Line 5 lamp
	F6	1-1/3A	Line 6 lamp
	F7	1-1/3A	Line 7 lamp
	F8	1/2A	Interrupter motor
	F9	1-1/3A	-24V B Bat, lockout CKT, DSS console
	F10	1-1/3A	10V±, MW console, night transfer CKT
	F11	1-1/3A	-24V B Bat, paging CKT
	F12	3/4	-24V C Bat.
	F13	1-1/3A	Intercom 1 lamp
	F14	1-1/3A	Intercom 2 lamp
	F15	1/4A	Music Input
	F16	1/2A	Music Input
19C2 Power Unit*	F1	2A	18V±, Console connecting blocks
	F2	5A	10V±, Lamp flash, lamp steady,
	F3	5A	Lamp wink
	F4	3A	-24V, B Bat
	F5	2A	-24V, A Bat

* Caution: 19C2 Power Unit must be equipped with (2) 5 AMP fuses in the 10V± output circuit and (1) 3 AMP fuse in the -24V B Bat output circuit.

fuses
 1/2 - Red
 1 1/3 - White
 3/4 - Brown

400-TYPE KTU (CO OR PBX LINE CIRCUIT)

2.11 The 400-type KTU (Fig. 8) is a 4-inch unit which provides a key telephone set with CO or PBX line service.

424A KTU (DIAL INTERCOM, 19-CODE SELECTOR CIRCUIT)

2.12 The 424A KTU (Fig. 9) is an 8-inch dial selective intercom unit. In this system, it provides the following operating features:

- Nineteen dial codes (nine single-digit and ten 2-digit codes)
- Rotary dial selection.

Note: In the 7A Communications System, the first digit of the 2-digit code is "1"; therefore, "1" is not available as a single-digit code. Code "2" is dedicated to paging which leaves codes 0 (attendant station) and 3 through 19 available for station codes.

440A KTU (TOUCH-TONE ADAPTER CIRCUIT)

2.13 The 440A KTU (Fig. 10) is an 8-inch unit that provides TOUCH-TONE dialing when used in conjunction with the 424A KTU.

452A KTU (POWER FAILURE TRANSFER CIRCUIT)

2.14 The 452A KTU (Fig. 11) is a 4-inch unit that automatically cuts through up to seven CO/PBX lines to external line ringers in the event of power failure.

455A KTU (TONE RINGING SIGNAL GENERATOR CIRCUIT)

2.15 The 455A KTU (Fig. 12) is a 4-inch unit that contains the tone ringing generator for CO/PBX signaling.

456A KTU (VOICE AND TONE ALERTING CIRCUIT)

2.16 The 456A KTU (Fig. 13) is a 4-inch unit that provides the following features on intercom calls:

- Ringing tone to calling party

- Tone alerting signal to called party
- Voice signaling to called party
- Input signal to paging amplifier.

457B KTU (PAGING AMPLIFIER CIRCUIT)

2.17 The 457B KTU (Fig. 14) is a 4-inch unit that contains the paging amplifier circuitry and the background music circuit. The background music circuit connects the customer-provided music source to the paging speakers when the paging circuit is not in use.

460A KTU (2-PATH INTERCOM ACCESS CIRCUIT)

2.18 The 460A KTU (Fig. 15) is an 8-inch unit that contains two separate intercom paths. Path selection is based on operation of the associated intercom button on the key telephone set. The unit also provides dial tone, seizes the selector, and provides flashing lamp signal during selection and steady lamp during busy mode.

TELEPHONE SETS**832A Telephone Set**

2.19 The 832A telephone set (Fig. 16) is a rotary dial, 10-button key telephone set designed for use with the 7A Communications System. The set is equipped with a loudspeaker (Fig. 17) to provide tone and voice signaling. A volume control (Fig. 17) controls the level of the tone and voice signaling. A multibutton depression feature allows conferencing two or more CO/PBX lines by simultaneously depressing the buttons associated with the lines to be conferenced. Button restoration restores all depressed buttons to the unoperated position when the handset is replaced.

2832A Telephone Set

2.20 The 2832A telephone set is the same as the 832A telephone set except it is equipped with a "TOUCH-TONE" dial.

2.21 The telephone sets may be equipped with the following optional features:

- (a) **Privacy (Lockout)**—requires installation of a privacy circuit (D-180486).

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(b) **Privacy Release**—Requires installation of a privacy release key (D-180488) in conjunction with the privacy (lockout) circuit (D-180486).

(c) **Station Restriction**—Accomplished by adding a diode and reversing two leads in a rotary dial set. If station is TOUCH-TONE dial equipped, only two leads in the set must be reversed.

(d) **Night Transfer**—Requires installation of a night transfer key (D-180487) at the attendant station.

Note: When night transfer is used, privacy release may not be used and vice-versa.

CONSOLES

6A1 Selector Console (Station Busy Console with DSS)

2.22 The 6A1 selector console (Fig. 18) provides a 17-button DSS field with station busy lamps. Two other buttons in the key field are used: one as a page button and the other as an intercom recall button and one button is not used. The console is normally used in addition to the attendants set to provide DSS on the intercom.

6B1 Selector Console (Station Busy Console with Message Waiting)

2.23 The 6B1 selector console (Fig. 19) has a 17-button message waiting field with station busy lamps. Seventeen buttons are used and three are not used. The console is normally used in addition to the attendants set to provide the message waiting feature.

Note: Only one selector console may be used in the system.

ORDERING GUIDE

Cable, Connector, A25B (order one per station; length must be specified)

Set, Telephone, 832A-or 2832A* (order as required)

Unit, Key Service, 570A

- P-40J328 (4 ft) Cord, Power (order desired length)

- P-40J329 (6 ft)

- P-40J099 (12 ft)

Unit, Key Telephone, 400D (CO/PBX Line Circuit) (order as required)

(a) **Optional Apparatus (order as required)**

- Console, Selector, 6A1-* (Station Busy Console with DSS)

- Console, Selector, 6B1-* (Station Busy Console with Message Waiting)

- Diode, KS-15724, L1 (order one for each rotary dial station to be restricted)

- Kit of Parts, D-180487 (Night Transfer)

- Kit of Parts, D-180486 [Privacy (lockout) Circuit, order one for each station to be locked out]

- Kit of Parts, D-180488 (Privacy Release) [order one for each station to be equipped with privacy release. The station must also be equipped with the privacy (lockout) circuit]

- Ringer, E1C (order one for each line to be wired for power failure ringing)

- Speaker, Horn, KS-16846, L1 (order as required for outside paging)

- Speaker, Indoor (order for 7A Communications System)

- Speakerphone (order one of each for each station to be equipped with speakerphone. Cord, D10R-* (Specify length 1 ft 4 in., 9 ft, 12 ft or 25 ft)

Loudspeaker, 760A-*

Transformer, 2012B

Transmitter, 666B-*

Unit, Control, 55B

- Unit, Interconnecting, 123A (Music-on-Hold Circuit)

- Unit, Key Telephone, 440A (TOUCH-TONE Adapter Circuit)
- Unit, Key Telephone, 452A (Power Failure Transfer Circuit)
- Unit, Key Telephone, 457B (Paging Amplifier Circuit)

(b) **Replaceable Components**

570A KSU

- Fuse, 24B (3A)
- Fuse, 24C (2A)
- Fuse, 24F (5A)
- Fuse, 70A (1-1/3A)
- Fuse, 70G (1/2A)
- Fuse, 70H (3/4A)
- Interrupter, KS-19175, L2
- Lamp, 51A
- Unit, Key Telephone, 424A (Dial Intercom, 19-Code Selector Circuit)
- Unit, Key Telephone, 455A (Tone Ringing Signal Generator Circuit)
- Unit, Key Telephone, 456A (Voice and Tone Alerting Circuit)
- Unit, Key Telephone, 460A (2-Path Intercom Access Circuit)
- Unit, Power, 19C2

832A and 2832A Telephone Sets

- Base, Set, Telephone, 832A (for 832A telephone set)
- Base, Set, Telephone, 2832A (for 2832A telephone set)
- Cord, Handset, H4CJ-*
- Cord, Mounting, D50AL-87

- Dial, 8C (for 832A telephone set)
- Dial, 35AF3A (for 2832A telephone set)
- Housing, 832A-*
- Key, 647G5
- Lamp, 51A
- Plate, Face, 832A-* (for 832A telephone set)
- Plate, Face, 2832A-* (for 2832A telephone set)
- Set, Hand, G3A6-*

6A1 and 6B1 Selector Consoles

- Base, 6A1 (for 6A1 selector console)
- Base, 6B1 (for 6B1 selector console)
- Cord, Mounting, D50AD-87
- Housing, 6A1-*
- Key, 647J5 (for 6A1 selector console)
- Key, 647J5C (for 6A1 selector console)
- Key, 647C5 (for 6B1 selector console)
- Lamp, 51A
- Plate, Face, 6A1-*

* Refer to Table B for color suffix.

3. INSTALLATION

Planning

3.01 Select a wall location for the KSU in accordance with the following:

- Customers approval and best interest
- Accessibility with adequate illumination for maintenance
- Wall offering adequate support and stability

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- As close as practicable to stations being served
- Near commercial ac power receptacle
- Sufficient clearance above the floor to avoid damage from water or blows incidental to cleaning
- Clean, dry, well ventilated and free from flammable or corrosive fumes
- Avoid locations which would subject the equipment to extreme temperatures.

3.02 Customer should provide a commercial ac power receptacle in accordance with the following:

- Not under control of a switch
- Separately fused
- Receptacle must be grounded 3-wire type.

3.03 Refer to the following sections for additional information required to plan the installation of this system.

- 518-010-105, KTS, Grounding and Special Protection Requirements
- 512-620-100, Speakerphone System—3-Type

3.04 Select appropriate apparatus (see Ordering Guide, Section 2) according to job requirements.

Installing

- 3.05** Use care when unpacking to prevent damage to components.
- 3.06** Install the 7A Communications System as follows:

570A KSU

- (1) Remove cover from KSU.
- (2) Use the template provided to locate the fastener holes at the selected location.
- (3) Install appropriate fasteners.

(4) Hang KSU on fasteners.

(5) Connect the circuit ground to an approved ground. For circuit ground a No. 14 gauge wire should be attached from the LOC GRD terminal of the power unit to an approved local ground. If a 3-wire grounded receptacle is not available, a **frame ground** (No. 14 gauge wire) must be connected from the case or frame of the power unit to an approved local ground. **Do not strap the circuit ground to the frame or case of the power unit. The susceptibility of surge damage to semiconductor components used in 400-series KTUs require that grounding procedures be followed. Properly grounded installations will minimize service failures that can result from surge voltages or differences between dissimilar grounds.**

(6) Unlatch and open carrier assemblies.

(7) Terminate incoming CO/PBX lines. See 4.01.

(8) Terminate station cables. See 4.02.

(9) Place option straps (if required).

(10) Install power cord. Do not connect to ac source at this time.

(11) Close and latch carrier assembly.

(12) Install KTUs necessary to provide required services. See Fig. 20 for KTU connector arrangement.

832A and 2832A Telephone Sets

3.07 Install telephone sets at desired locations.

3.08 Install any telephone set options at this time. See Fig. 21 and 22 for schematics of 832A and 2832A telephone sets, respectively.



On telephone set to be used at attendant station (code 0), move G-V lead from terminal 8 to 16 and move V-BR lead from terminal 28 to 14. Otherwise the lamp under the hold key will be lit at all times.

3.09 The faceplate must be removed to install telephone set options. Options are installed as follows:

(a) **External Ringer:**

(1) Connect ringer leads to telephone set as shown in Table C.

(b) **Privacy (Lockout) Circuit (D-180486, Kit of Parts):**

(1) Mount lockout circuit board on the two standoffs located at the left front of the telephone set base (Fig. 23).

(2) Fasten lockout circuit board to standoffs using mounting screws furnished with the telephone set.

(3) Connect leads according to Table D.

(c) **Privacy Release (D-180488, Kit of Parts):**

(1) Pry apparatus blank off locating pins (Fig. 17).

(2) Press privacy release key on locating pins.

(3) Connect leads according to Table E.

(d) **Night Transfer (D-180487 Kit of Parts):**

(1) Pry apparatus blank off locating pins (Fig. 17).

(2) Press night transfer key on locating pins.

(3) Connect leads according to Fig. 32.

(e) **Station Restriction (Rotary Dial Telephone Set):**

(1) Install KS-15724, L1 diode between network terminals RR and F. Terminate negative lead of diode on terminal F with positive lead on terminal RR.

(2) On telephone set terminal board, move **Green** lead from terminal 22 to 4 and move **Red** lead from terminal 4 to 22.

(f) **Station Restriction (TOUCH-TONE Telephone Sets):**

(1) On telephone set terminal board, move **Green** lead from terminal 22 to 4 and move **red** lead from terminal 4 to 22.

3.10 Install designation strips in key caps.

6A1 and 6B1 Selector Consoles

3.11 Install DSS or MW consoles (if required) at the attendants station. See Fig. 24 and 25 for schematics of 6A1 and 6B1 selector consoles, respectively.

4. CONNECTIONS

4.01 Terminate the incoming CO/PBX lines on connecting block 3 as shown in Fig. 26.

4.02 Cut down the A25B connector cables on connecting blocks 3, 4 and 5 as shown in Fig. 27. Intercom station code 0 (attendant station) is terminated on column G of connecting block 3. Intercom station code 3 is terminated on column H of connecting block 3 and station codes 4 through 19 are terminated on columns A through H on connecting blocks 4 and 5 as shown in Fig. 27.

OPTION CONNECTIONS

Power Failure Transfer

4.03 For the power failure transfer option, the tip and ring from each incoming CO/PBX line is brought out on connecting block 1 (Fig. 28) during power failure. The tip and ring of the desired CO/PBX line may be strapped to the V-S and S-V pair of the desired station by cross connection as shown in Fig. 28. In this instance the tip and ring of the first CO/PBX line is strapped to the V-S and S-V pair of station 3. This puts line ringing at station 3 if power failure should occur. The tip and ring may also be connected to the external ringer by an auxiliary cable.

4.04 Install 452A KTU. See Fig. 20 for KTU location.

4.05 For each location to be equipped with power failure transfer, an external ringer (E1C) must be installed at that location. See 3.09(a).

CO Ringing

4.06 For CO ringing, a terminal representing each CO/PBX line is brought out on connecting block 1 (Fig. 29). To connect CO ringing, run a strap (RC) from the terminal representing the desired CO/PBX line to the terminal in column C that represents the station code selected for CO ringing. See Fig. 29. In this instance, the first CO/PBX line will ring at station 3 and the second CO/PBX line will ring at station 16.

4.07 Each CO/PBX line can be arranged to ring in the common audible group and at only one other station.

Common Audible

4.08 Common audible ringing on CO/PBX lines is factory-strapped to code 0 (attendant station). The common audible terminal is brought out on connecting block 1 (Fig. 4). To connect common audible ringing to a different station code, remove the strap from terminal 1, column C, connecting block 1, and connect it to the terminal in column C that represents the code selected for common audible ringing. Only one station may receive common audible ringing. A CO/PBX line may be removed from the column audible group by removing the corresponding common audible diode from connecting block 1 (Fig. 4).



When the common ringing is moved to another station, the new attendant station cannot have the night transfer option.

Intercom Preset Conference

4.09 Preset conference allows up to five preselected stations to be alerted simultaneously. When preset conference is used, station code 19 is forfeited.

4.10 To connect preset conference, strap the terminals in the preset conference row to the desired stations in column D connecting block 1 (Fig. 30). For example, Fig. 30 shows stations 5, 10, and 15 are wired for preset conference.

Paging, Background Music, and Music-on-Hold

4.11 Paging may be provided for up to seven indoor or outdoor speakers. Connections are

made to the paging terminals in column H, connecting block 1. See Fig. 31 for connections.

4.12 For paging install 457B KTU. See Fig. 20 for KTU location.

4.13 For background music and music-on-hold, connect customer-provided music source to 570A KSU. See Fig. 3 for terminal location.

4.14 Install 123A IU. See Fig. 20 for IU location.

4.15 Music input impedance presents an 8-ohm load to the customer-provided music source. This impedance is between the input terminals of the customer-provided music source.



Adjust volume level for paging, background music, and music-on-hold as follows:

- (1) Adjust speaker controls for paging volume.*
- (2) Adjust customer-provided source for music-on-hold.*
- (3) Adjust control on 457B KTU for background music.*

If customer has paging and music-on-hold, but does not want background music, the control on the 457B KTU must be turned off.

Night Transfer

4.16 For night transfer, a kit of parts (D-180487) must be installed in the attendants telephone set (code 0). In the KSU, a strap must be run from the NT terminal (column F, terminal 24) on connecting block 1 to the station code (column C, connecting block 1) selected for night transfer. For example, Fig. 32 shows station 12 wired for night transfer.

6A1 Selector Console (Station Busy Console with DSS)

4.17 The A25B connector cable from the station busy console is cut down on connecting block 3, column E using standard cut down. See Fig. 33 for connections.

6B1 Selector Console (Station Busy Console with MW)

4.18 The A25B connector cable from the message waiting console is cut down on connecting block 3, column D using standard cut down. See Fig. 34 for connections.

TOUCH-TONE Dialing

4.19 When TOUCH-TONE dialing is provided, the RS1 to CG strap (column A, terminal 23 to 24 connecting block 1) must be removed and 440A KTU must be inserted in proper slot. See Fig. 4.

Speakerphone

4.20 Connect the D10R cord between the telephone set and 55B control unit. Connect the 666B transmitter, 760A loudspeaker and 2012B transformer to the 55B control unit. See Table F for connections.

Testing

4.21 Apply power and test operation of system. When satisfied that system is operating satisfactorily, replace and secure cover on KSU.

5. METHOD OF OPERATION**ANSWERING CALLS****Incoming Call on CO/PBX Lines (Attendant Station)**

5.01 When an audible tone signal sounds and lamp under associated CO/PBX button flashes, answer call as follows:

- (1) Lift handset.
- (2) Depress CO/PBX button associated with flashing lamp—audible signal is silenced and lamp under CO/PBX button goes steady.
- (3) Answer call—acknowledge calling parties request.

5.02 To forward CO/PBX call to another station:

- (1) Place calling party on hold—depress hold button.

- (2) Select idle intercom path (lamp off) and depress associated intercom button—intercom lamp flashes.
- (3) Dial selected station number—tone generator signals called station with a spurt of tone.
- (4) Inform called party of CO/PBX line to be picked up—intercom lamp goes steady when called party answers.
- (5) Replace handset—all depressed buttons will restore to normal.

Intercom to Intercom Call

5.03 When intercom tone signal sounds:

- (1) Calling party will tell you whether to: (a) answer incoming CO/PBX call, (b) answer intercom call, (c) take appropriate action.
- (2) If necessary lift handset.
- (3) Depress flashing intercom button or appropriate line button.
- (4) Answer call.

PLACING CALLS**Outgoing Call (Any Station)**

5.04 To make an outgoing call:

- (1) Lift handset.
- (2) Depress CO/PBX button associated with an idle line.
- (3) Dial number.

Intercom Call (Station to Station)

5.05 To make an intercom call:

- (1) Lift handset.
- (2) Select idle intercom path and depress associated button.

Note: If lamp is flashing on other link, you will have to wait until the selector is released.

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While the selector is seized by another station, no dial tone or other indication is available.

- (3) Dial selected station—tone burst signals called station.
- (4) Calling station makes announcement to called party. When called party picks up, intercom lamp will be steady.

Intercom Call (Attendant Station Equipped with Station Busy Console with DSS)

5.06 To make an intercom call:

- (1) Lift handset.
- (2) Select idle intercom path and depress associated button.
- (3) Momentarily depress button on DSS field corresponding to desired station—tone burst signals called station.
- (4) Attendant may now make announcement to called party.

5.07 If called party does not answer and you wish to reach him at another station, proceed as follows:

- (1) Momentarily depress "RECALL" button on DSS console and dial tone will be returned.
- (2) Momentarily depress button on DSS field corresponding to desired station—tone burst signals called station.
- (3) Attendant may now make announcement to called party.

Note: The selector may be repeatedly recalled (without losing the seized intercom path) by repeatedly depressing the RECALL button and the DSS button. If intercom call is answered at any point, you must hang up and start over.

Intercom Call (Attendant Station Equipped with Station Busy Console with Message Waiting)

5.08 To signal an intercom station that there is a message waiting at the attendant, the attendant depresses the MW button associated with

the desired station. The button will lock down in a partially depressed state causing the lamp under the HOLD button of the called station to light (steady). This steady lamp alerts the station that he has a message waiting and to call the attendant. When the station calls the attendant, the attendant then depresses the associated MW button to release it.

Multiline CO/PBX Conferencing

5.09 To conference CO/PBX lines, depress CO/PBX line buttons of the lines to be conferenced.

Note: No more than three lines should be conferenced together.

5.10 All lines that are conferenced together may be put on hold simultaneously by depressing the HOLD button.

5.11 To make a call during a conference:

- (1) Depress HOLD button—all buttons restored.
- (2) Select an idle line.
- (3) Dial call.
- (4) If it is desired to add this call to the conference while holding this CO/PBX line button down, depress the conferenced CO/PBX line buttons.
- (5) To reenter conference again after call is completed, simultaneously depress conferenced buttons again.

5.12 If it is desired to add another call to the conference, while holding the conferenced CO/PBX line buttons down, depress button of CO/PBX line to be added.

5.13 To prevent dropping one of the participants when setting up a conference, ensure that the conferenced CO/PBX line buttons are held down when adding another station.



Intercom and CO/PBX lines cannot be conferenced together.

PAGING***Paging (From Any Station)*****5.14** To use paging feature:

- (1) Lift handset.
- (2) Select idle intercom path and depress associated button.
- (3) Dial "2"—tone burst will sound over paging system loudspeakers.

Note: Background music is automatically cut off during paging.

- (4) Speak into handset transmitter to make announcement.
- (5) Replace handset.

Paging (Attendant Station Equipped with Station Busy Console with DSS)**5.15** To use paging feature:

- (1) Lift handset.
- (2) Select idle intercom path and depress associated button.
- (3) Momentarily depress "PAGE" (code 2) button on DSS console—tone burst will be heard over paging system loudspeakers.
- (4) Speak into handset transmitter to make announcement.
- (5) Replace handset.

INTERCOM PRESET CONFERENCE

Note: *Any intercom station may originate preset conference but only those stations wired for preset conference will be alerted.*

5.16 To use preset conference:

- (1) Lift handset.
- (2) Select idle intercom path and depress associated button.

- (3) Dial "19"—tone burst signals all stations wired for preset conference.

Note: Attendant may use DSS code "19" if equipped with DSS console.

- (4) Announcement is made to all preset conference stations simultaneously.

PRIVACY RELEASE

5.17 To bring a locked out station into a conversation, depress the privacy release button. The line will go on hold with the lamp winking. The button must be held depressed until the locked out party bridges onto the line at which time the lamp goes steady.

Note: A privacy release button is required at each station that has a privacy (lockout) circuit and wishes to allow another locked out station to bridge on to his conversations. Stations not equipped with privacy (lockout) circuits may allow privacy (lockout) circuit equipped stations to bridge their conversations by placing the line on hold and then reentering the call after the privacy (lockout) circuit equipped station has picked up the line.

5.18 To add a station equipped with a privacy (lockout) circuit to a bridged conference, *all* of the sets already connected must depress their privacy release button to allow the station to bridge onto the conference.

NIGHT TRANSFER

5.19 To transfer ringing from attendant station to a designated secondary station, depress night transfer button (locking it down). To transfer ringing back to attendant station, depress night transfer button again which releases it. While the button is depressed, the lamp under it is lit (steady).

SPEAKERPHONE

Note: 3B speakerphone does not prevent normal use of the telephone set for originating, receiving, or transferring calls.

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5.20 To originate a call using speakerphone:

- (1) Depress CO/PBX key associated with an idle line.
- (2) Momentarily depress transmitter ON button. ON lamp lights and dial tone is heard through the loudspeaker.
- (3) Dial number in normal manner.
- (4) When called party answers, transmitter and loudspeaker are used to carry on the conversation. Adjust volume level as desired.

5.21 To answer an incoming call using speakerphone:

- (1) When audible tone signals an incoming call, depress CO/PBX key associated with flashing lamp.
- (2) Momentarily depress transmitter ON button. Audible signal is silenced and the speakerphone is connected to the line.
- (3) Answer call using transmitter and loudspeaker to carry on conversation.

5.22 To disable transmitter when it is desired not to transmit conversation from the surrounding area to the distant station.

- (1) Depress transmitter ON button during entire period transmitter is to be disabled.

Note: With transmitter disabled, conversation will not be transmitted to the distant station; however, the distant party may be heard over the loudspeaker.

- (2) Release transmitter ON button and system is restored to hands-free operation.

5.23 To transfer from handset to speakerphone operation:

- (1) Put line on hold.
- (2) Hang up handset.
- (3) Turn speakerphone on.
- (4) Depress line button.

5.24 To transfer from speakerphone to handset operation, lift handset during speakerphone operation to automatically transfer to handset operation. When it is necessary to transfer back to speakerphone, refer to 5.22 to prevent disconnect.

5.25 To terminate a call on speakerphone, momentarily depress transmitter OFF button.

Note: Restore any depressed line buttons.

5.26 While switchhook is flashing, hold line button depressed to avoid dropping the line.

6. MAINTENANCE

6.01 Maintenance of the 7A Communications System is limited to normal station repairs and wiring checks of the KSU and replacement of defective components.

6.02 When trouble is encountered, **first make a thorough check of all connections**, then make the following checks before replacement of KTU's, power unit, or KSU is considered.

6.03 Check as follows:

Telephone Sets

- Set plugged in securely.
- Volume control not turned off.
- Lamps not burnt out.

570A KSU

- Fuses in place and not blown.
- Lamps not burnt out.
- KTUs securely mounted in proper connectors with retainers and/or guide assemblies in place.
- Check wiring on connecting blocks.

Power Unit

- Fuses in place and not blown.

- AC power cord properly secured in both the ac receptacle and the power unit connector.
- Power present at the ac receptacle.
- Circuit and frame grounds properly connected.

KTUS

- Securely placed in proper connectors.
- Replace a suspected KTU with one known to be in good working order to determine whether trouble is in KTU or external to it.

- Should the replacement KTU not clear the trouble, the trouble is external and the original KTU should be returned to service.
- No field maintenance is to be performed on KTUs.

DIAGNOSTICS

6.04 Table G is to be used as an aid to diagnose and correct troubles in the system. The troubles should be identified before using the table, then the cause maybe recognized and a solution effected.

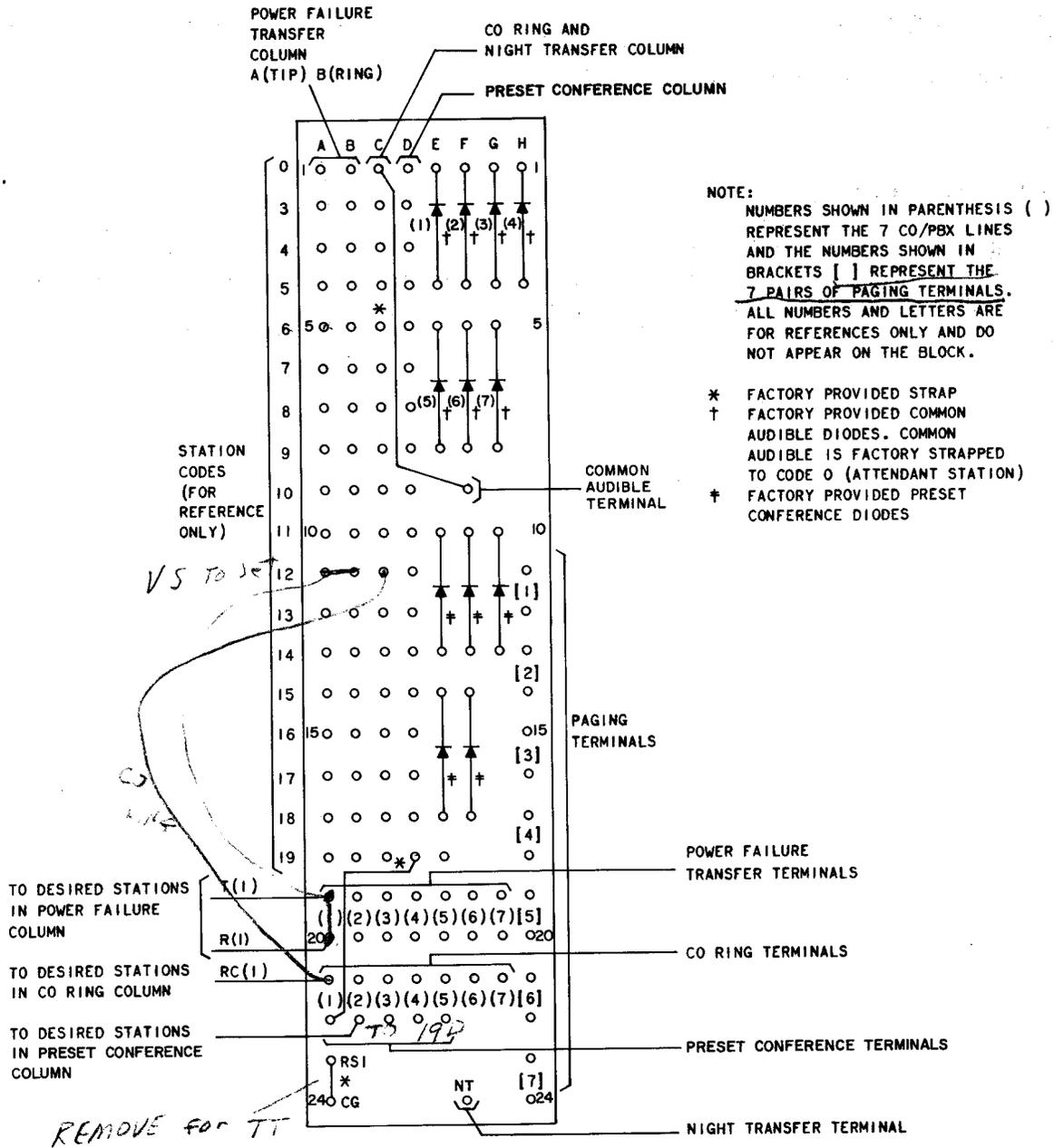
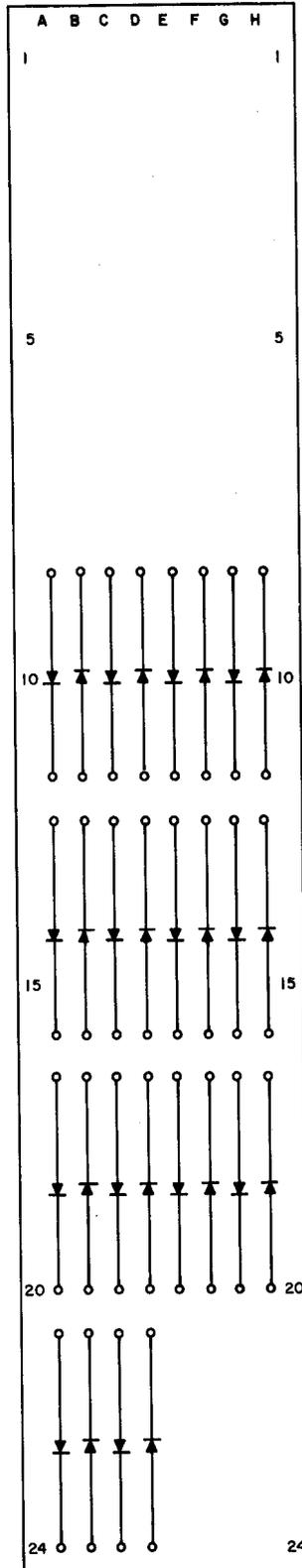


Fig. 4—Terminal Arrangement for Connecting Block 1



NOTE:
 DIODES SHOWN
 COMPRISE FACTORY
 WIRED POLARITY
 GUIDE.

Fig. 5—Connecting Block 2

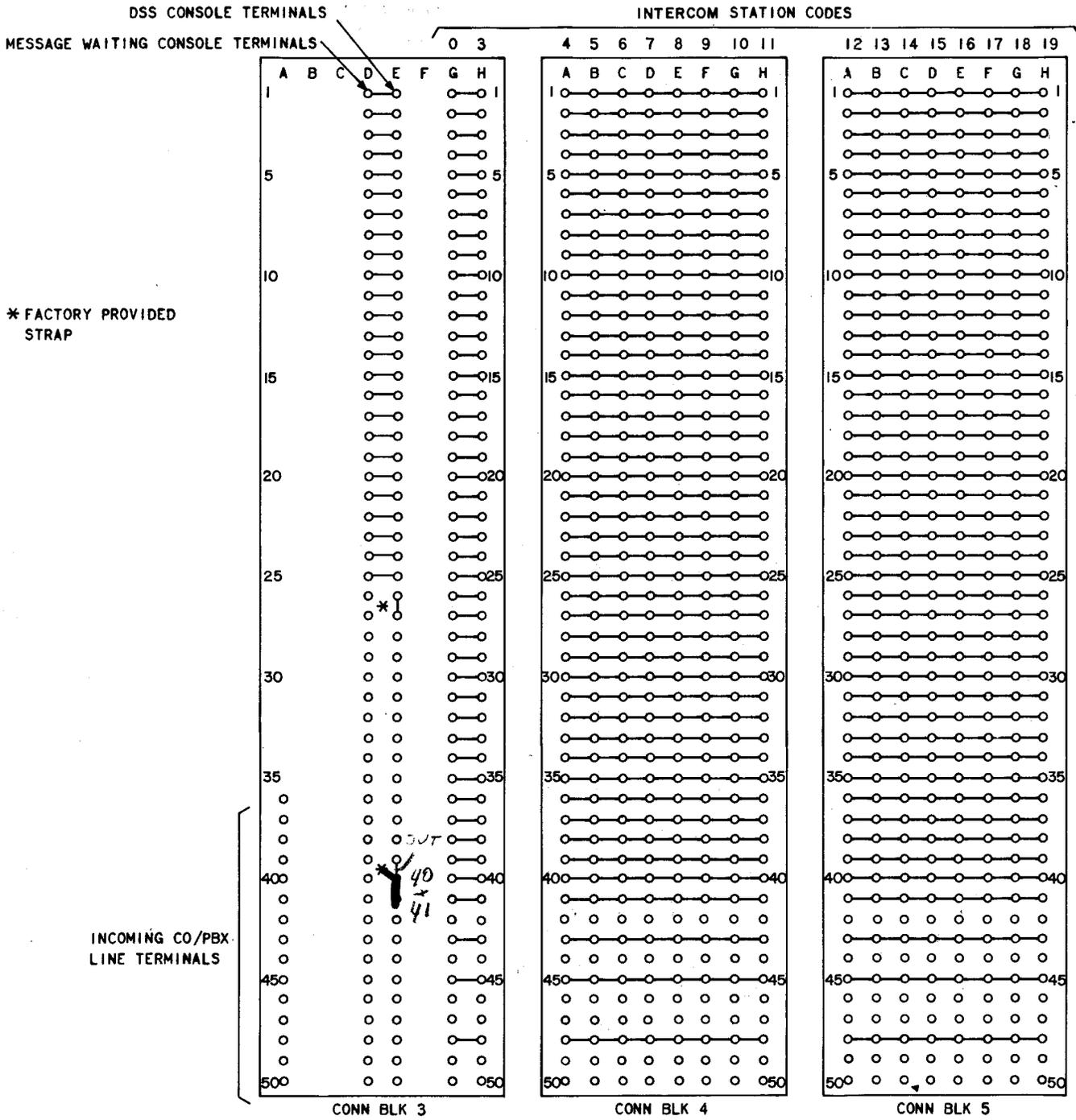


Fig. 6—Terminal Arrangement for Connecting Blocks 3, 4 and 5

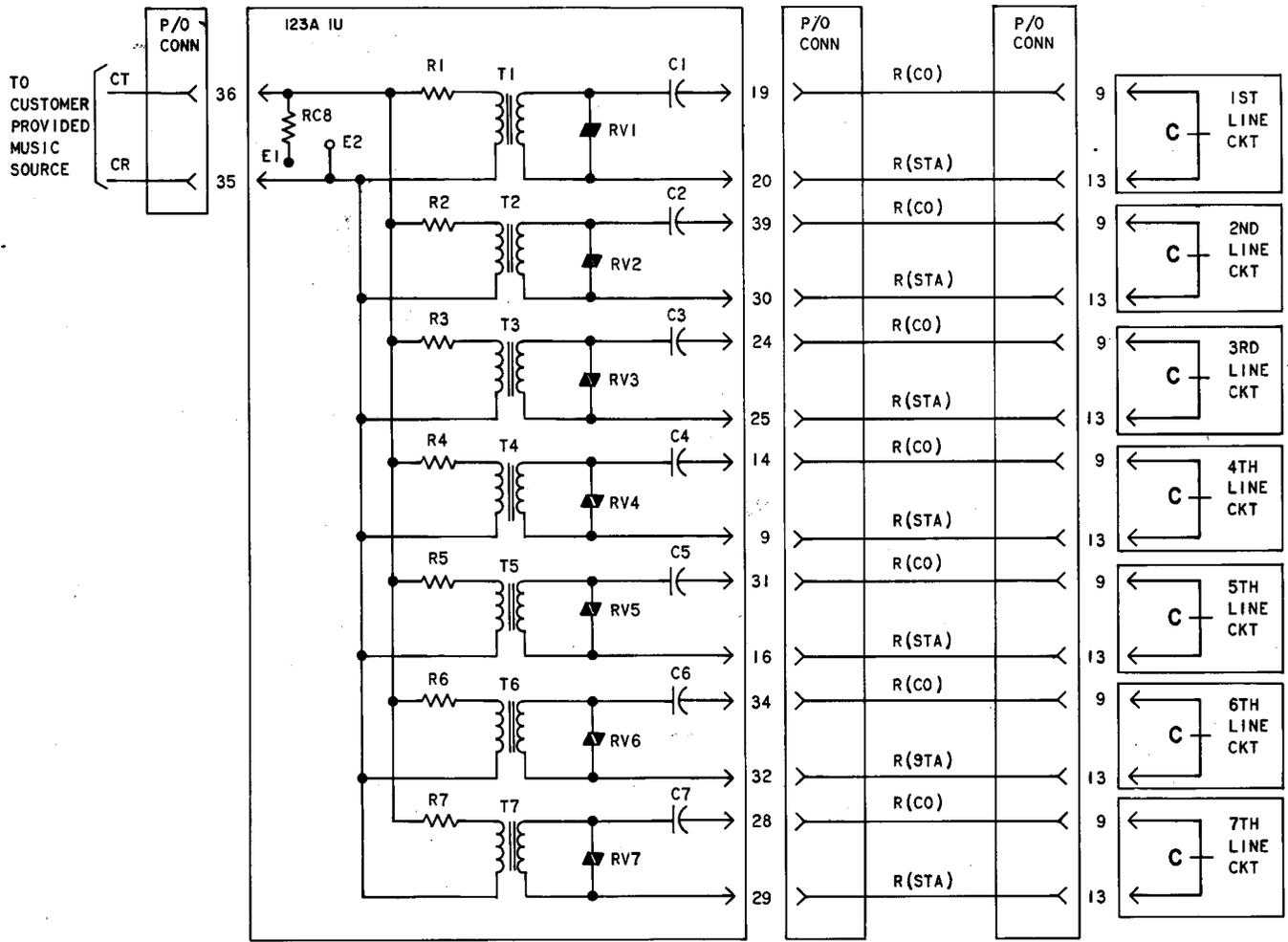


Fig. 7—Condensed Functional Schematic of 123A IU (Music-on-Hold Circuit)

451

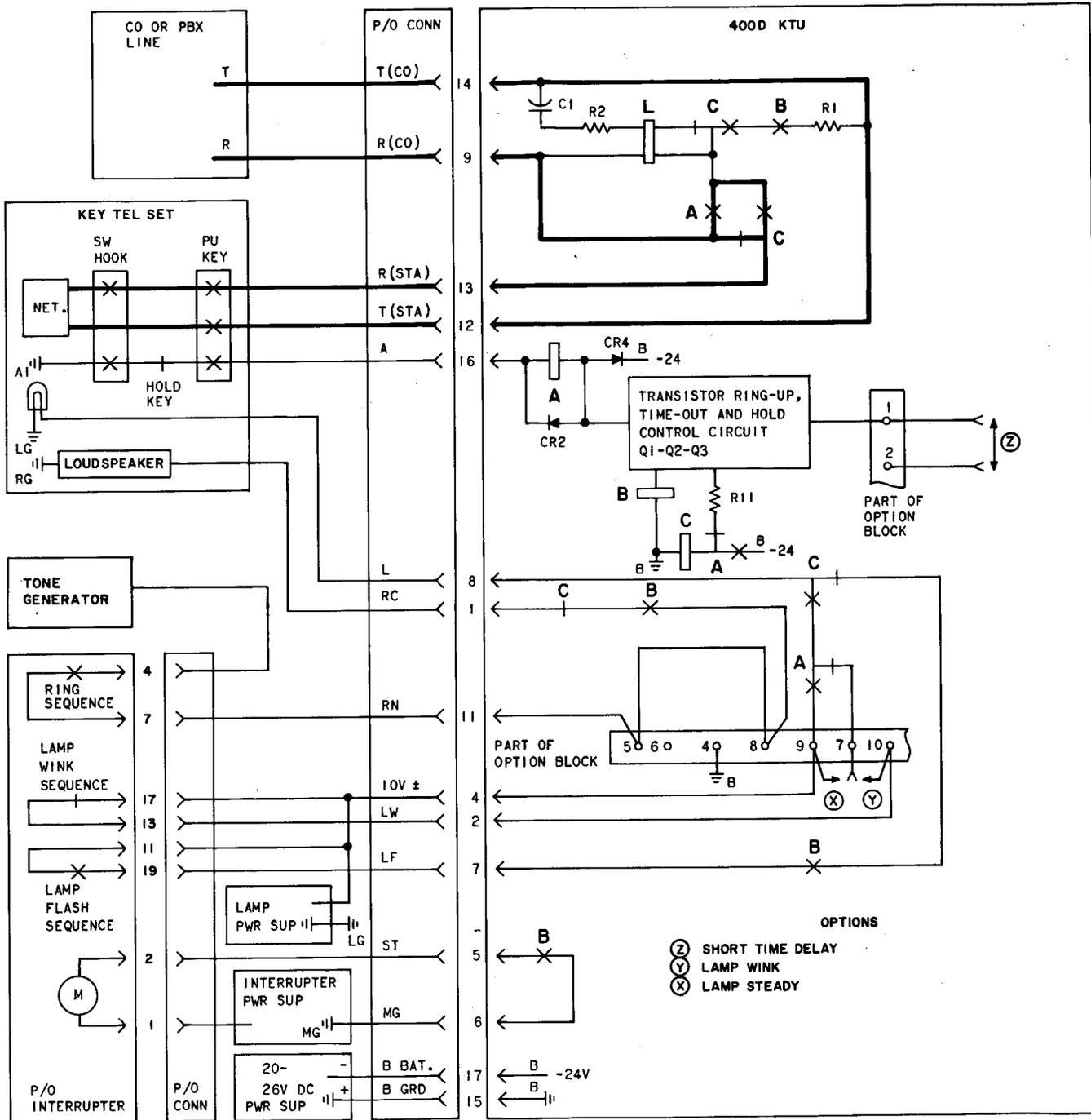


Fig. 8—Condensed Functional Schematic of 400-Type KTU (CO/PBX Line Circuit)

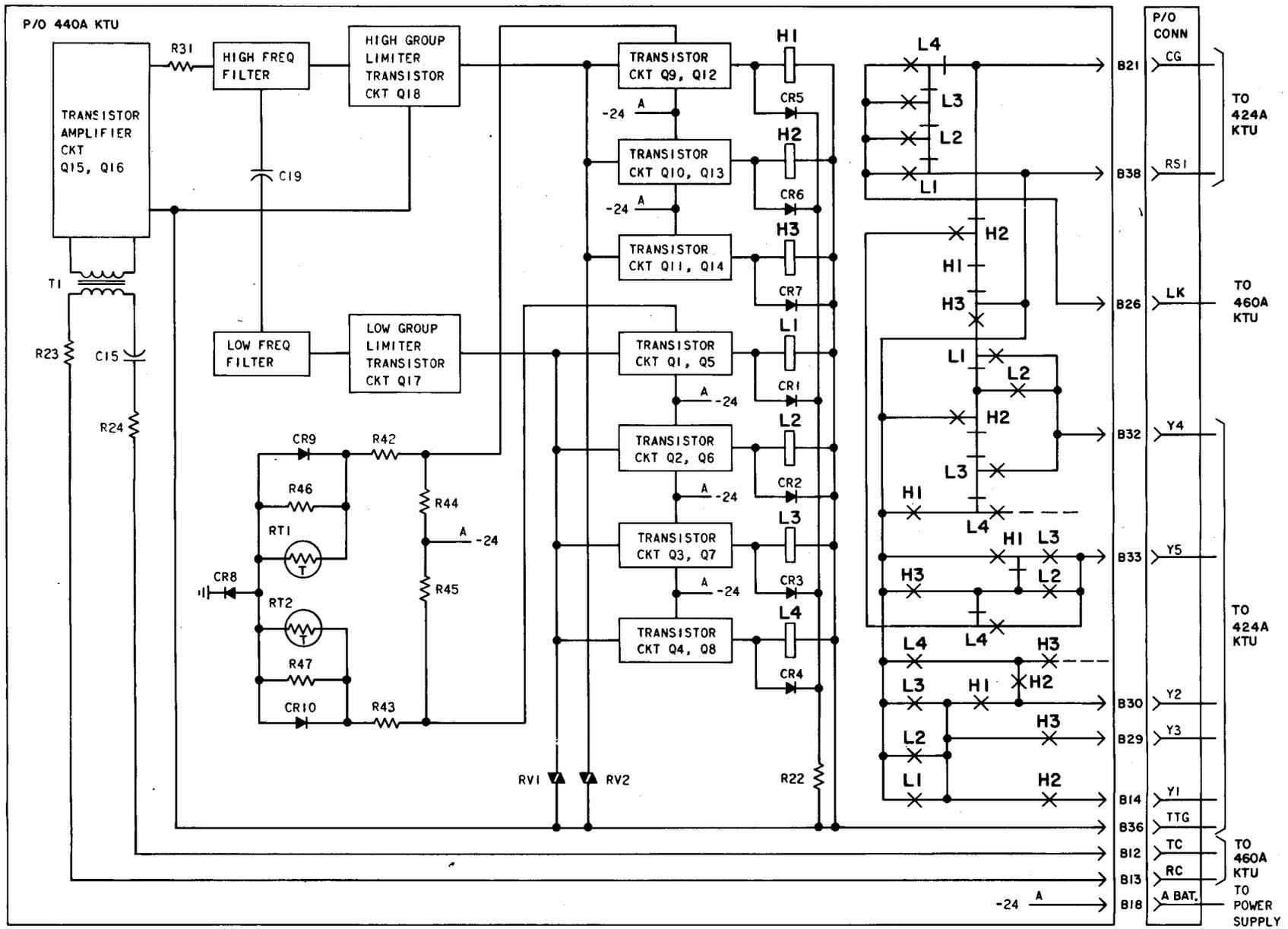


Fig. 10—Condensed Functional Schematic of 440A KTU (TOUCH-TONE[®] Adapter Circuit)

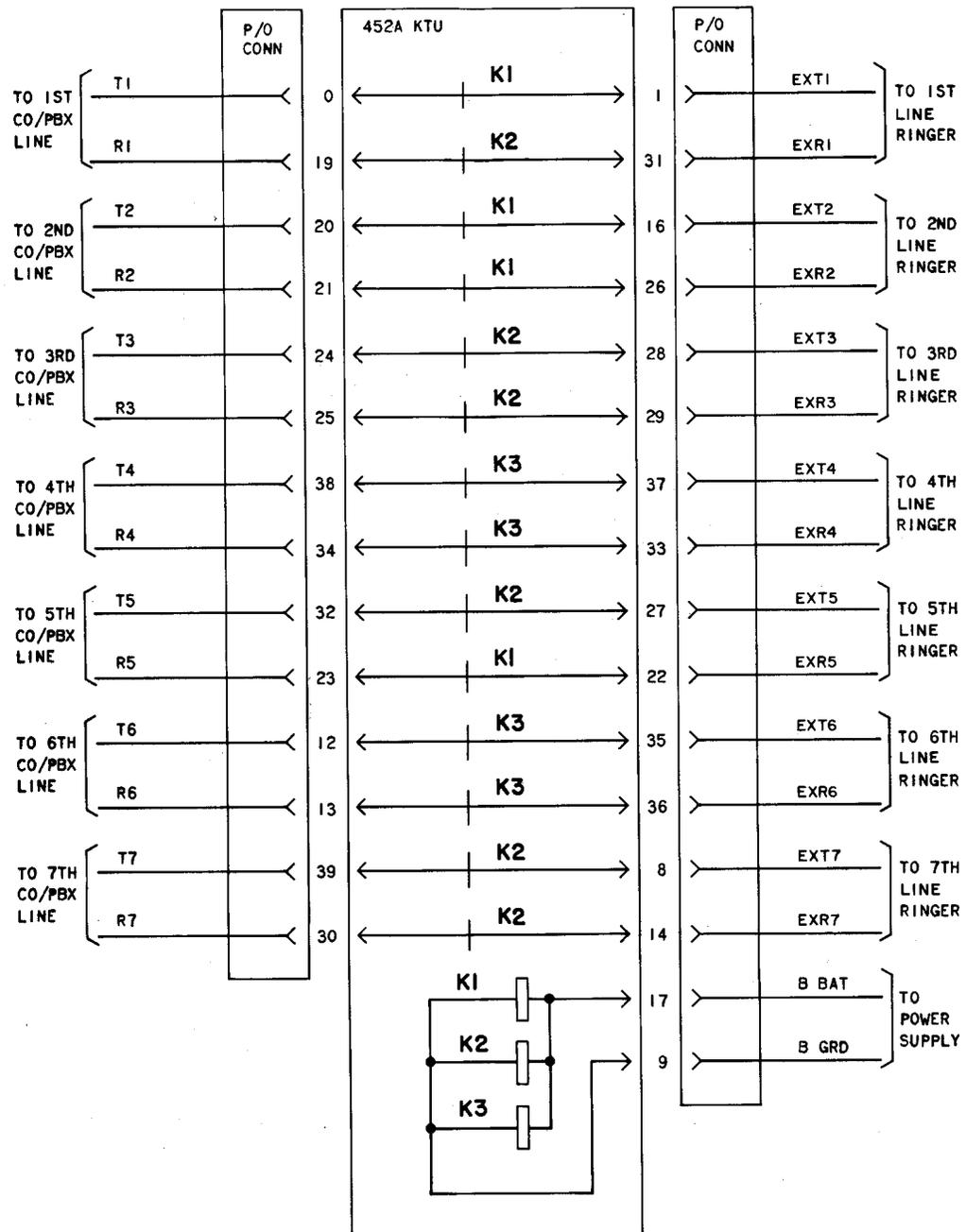


Fig. 11—Condensed Functional Schematic of 452A KTU (Power Failure Transfer Circuit)

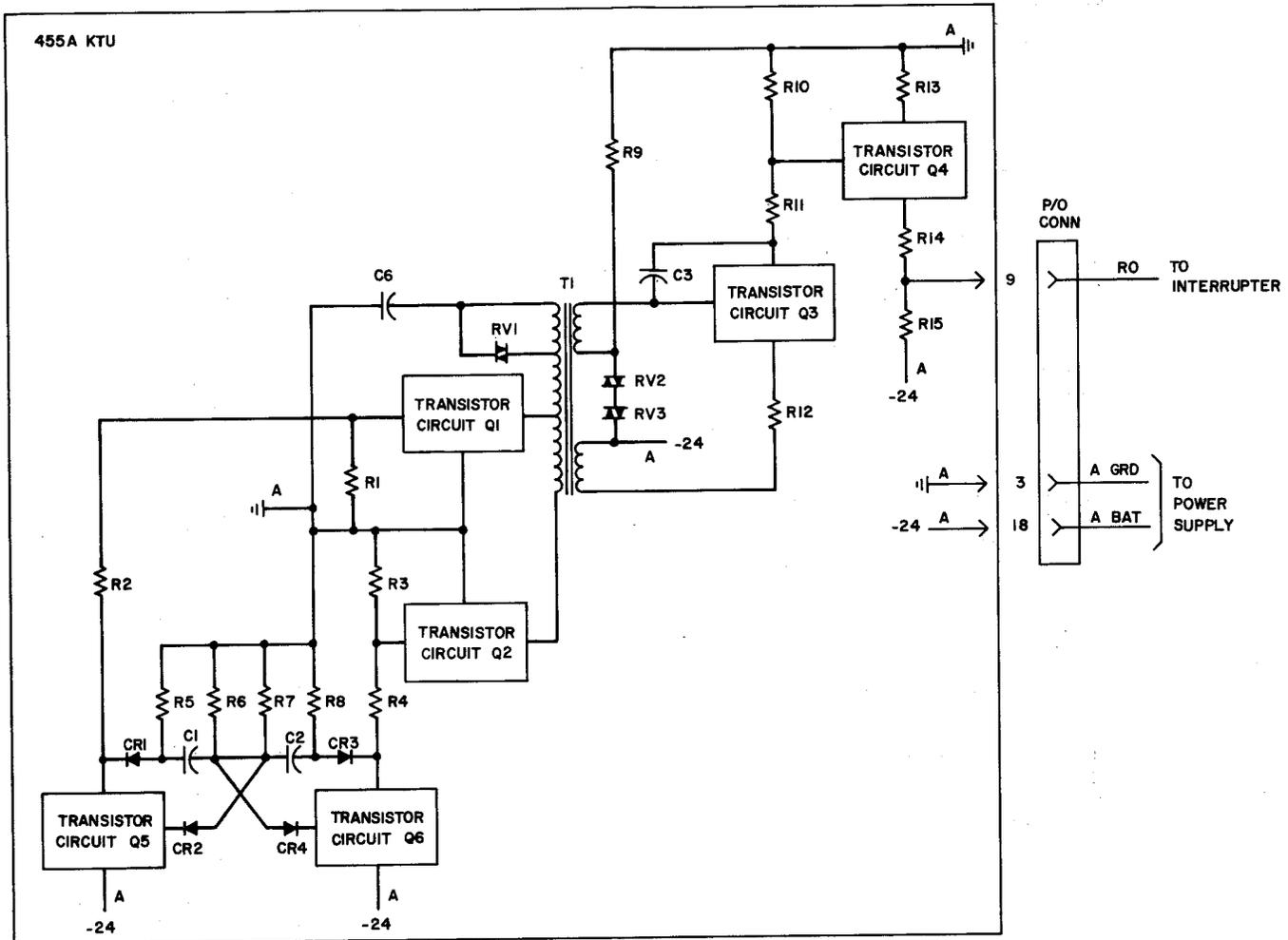


Fig. 12—Condensed Functional Schematic of 455A KTU (Tone Ringing Signal Generator Circuit)

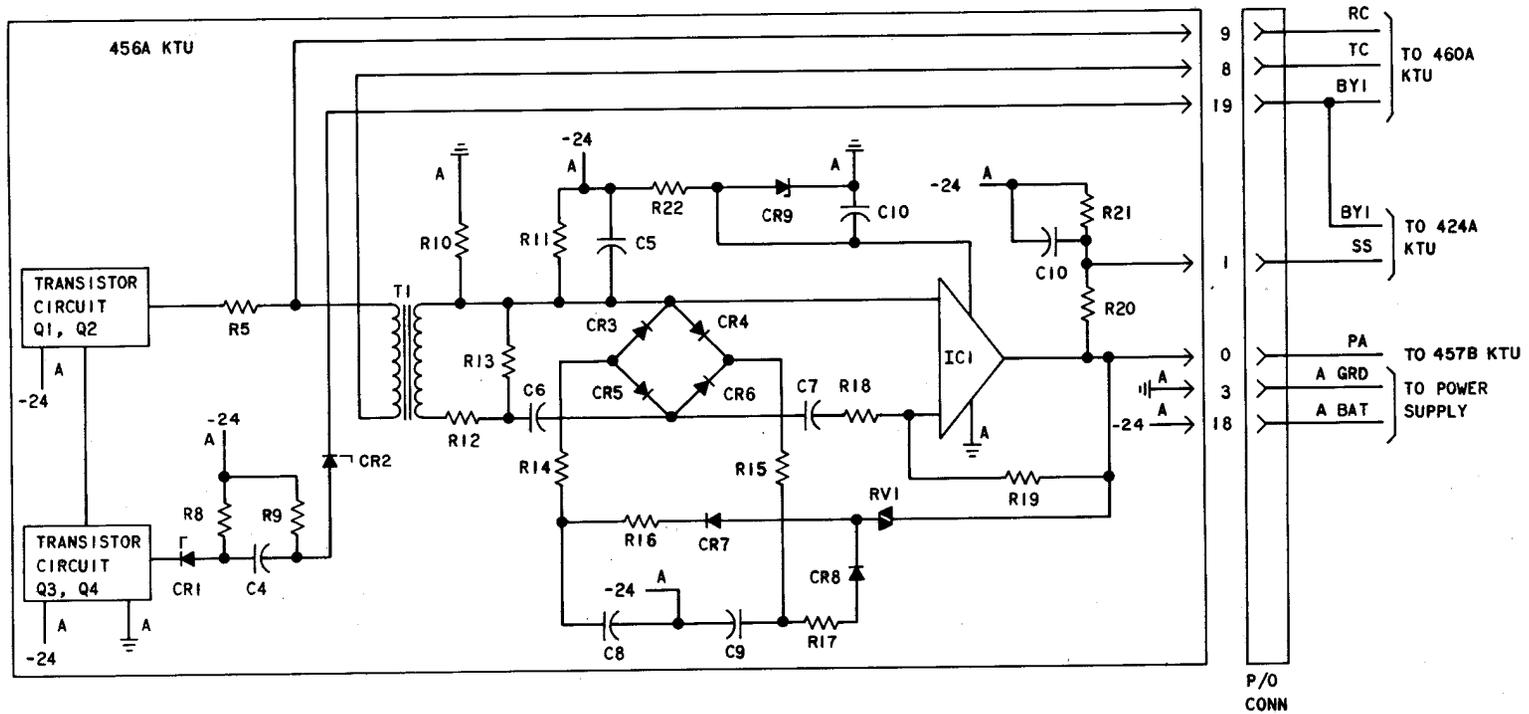


Fig. 13—Condensed Functional Schematic of 456A KTU (Voice and Tone Alerting Circuit)

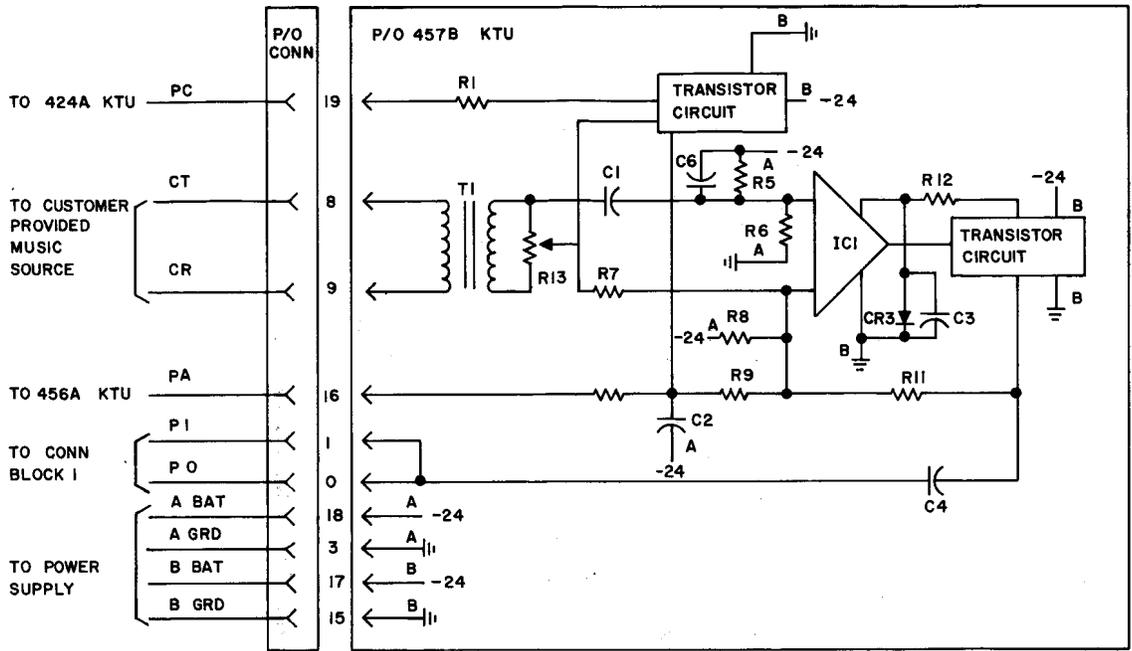
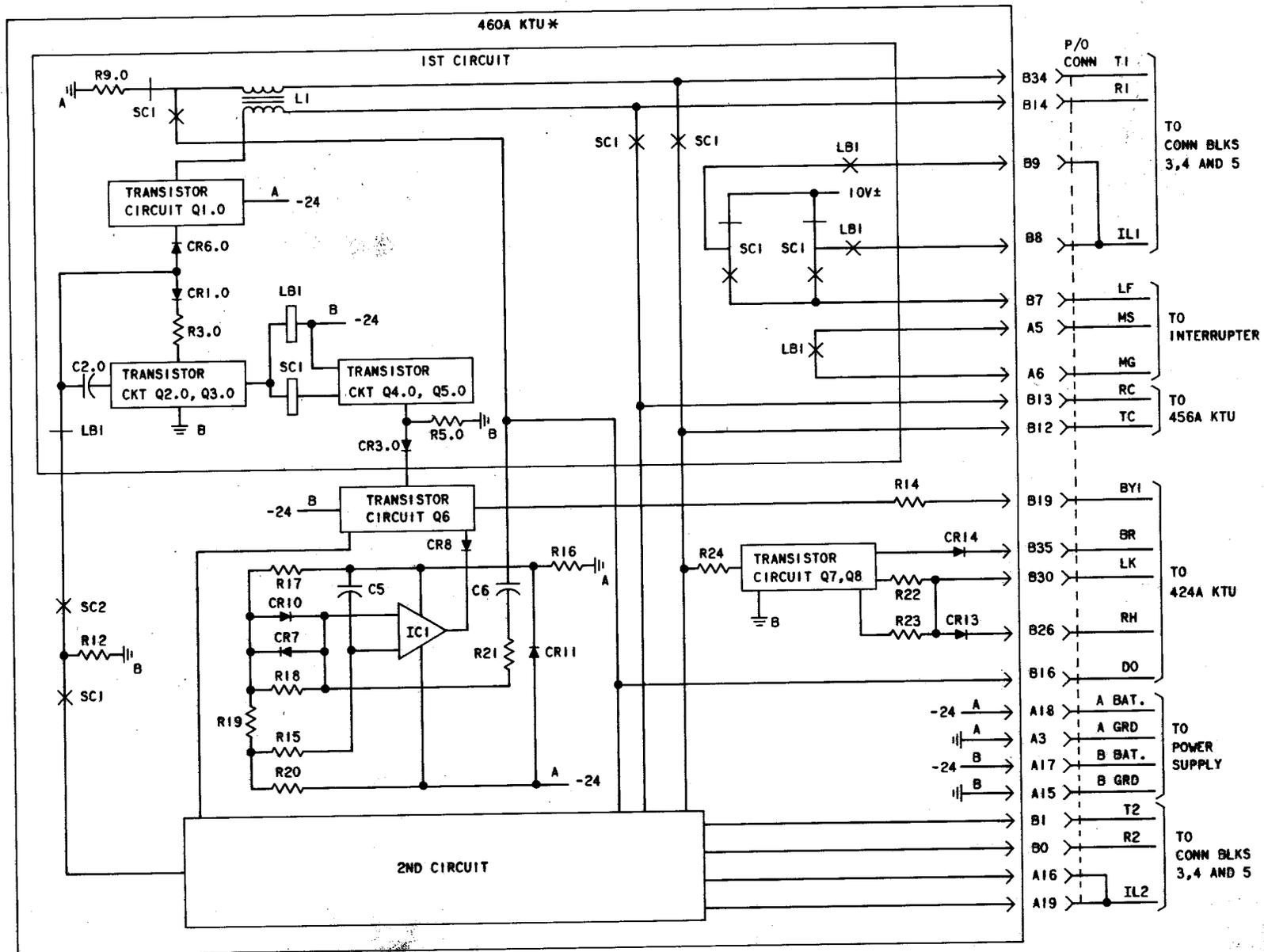


Fig. 14—Condensed Functional Schematic of 457B KTU (Paging Amplifier Circuit)



* - THE 406A KTU CONTAINS TWO CIRCUITS.

Fig. 15—Condensed Functional Schematic of 460A KTU (2-Path Intercom Access Circuit)



Fig. 16—832A Telephone Set

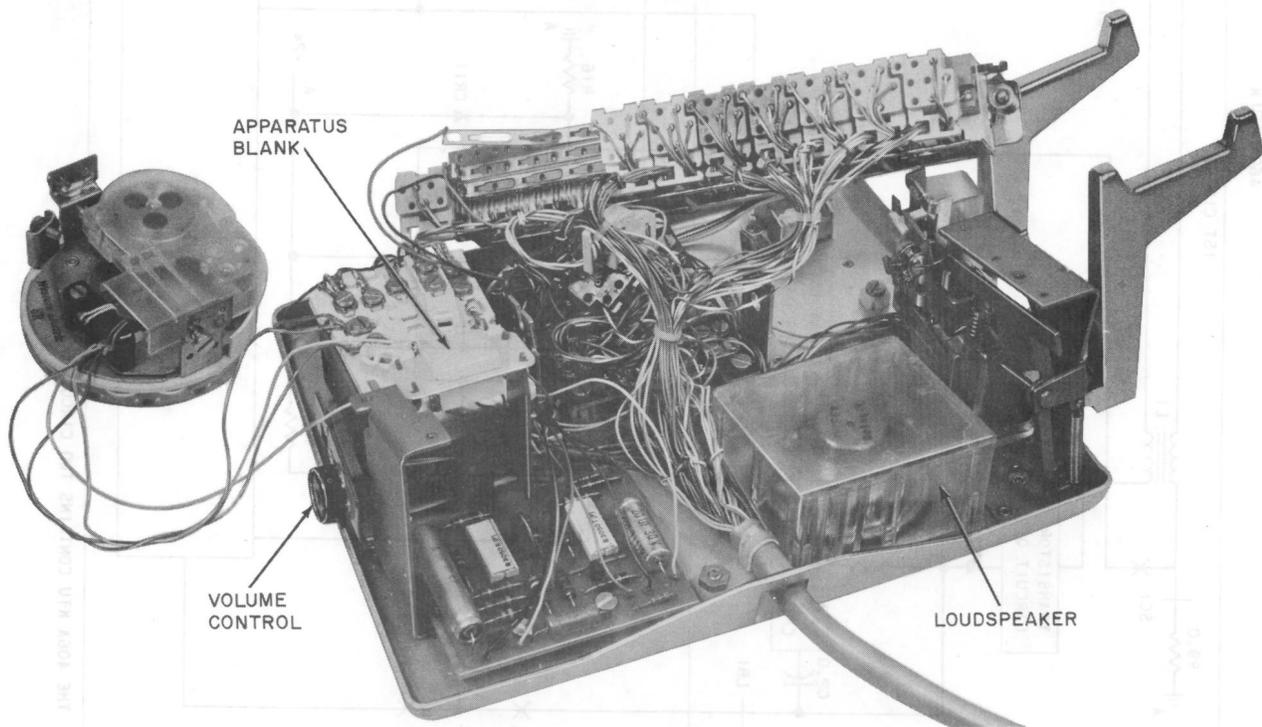


Fig. 17—832A Telephone Set (Housing Removed)



Fig. 18—6A1 Selector Console (DSS)

Fig. 18—6A1 Selector Console (DSS)



Fig. 19—6B1 Selector Console (MW)

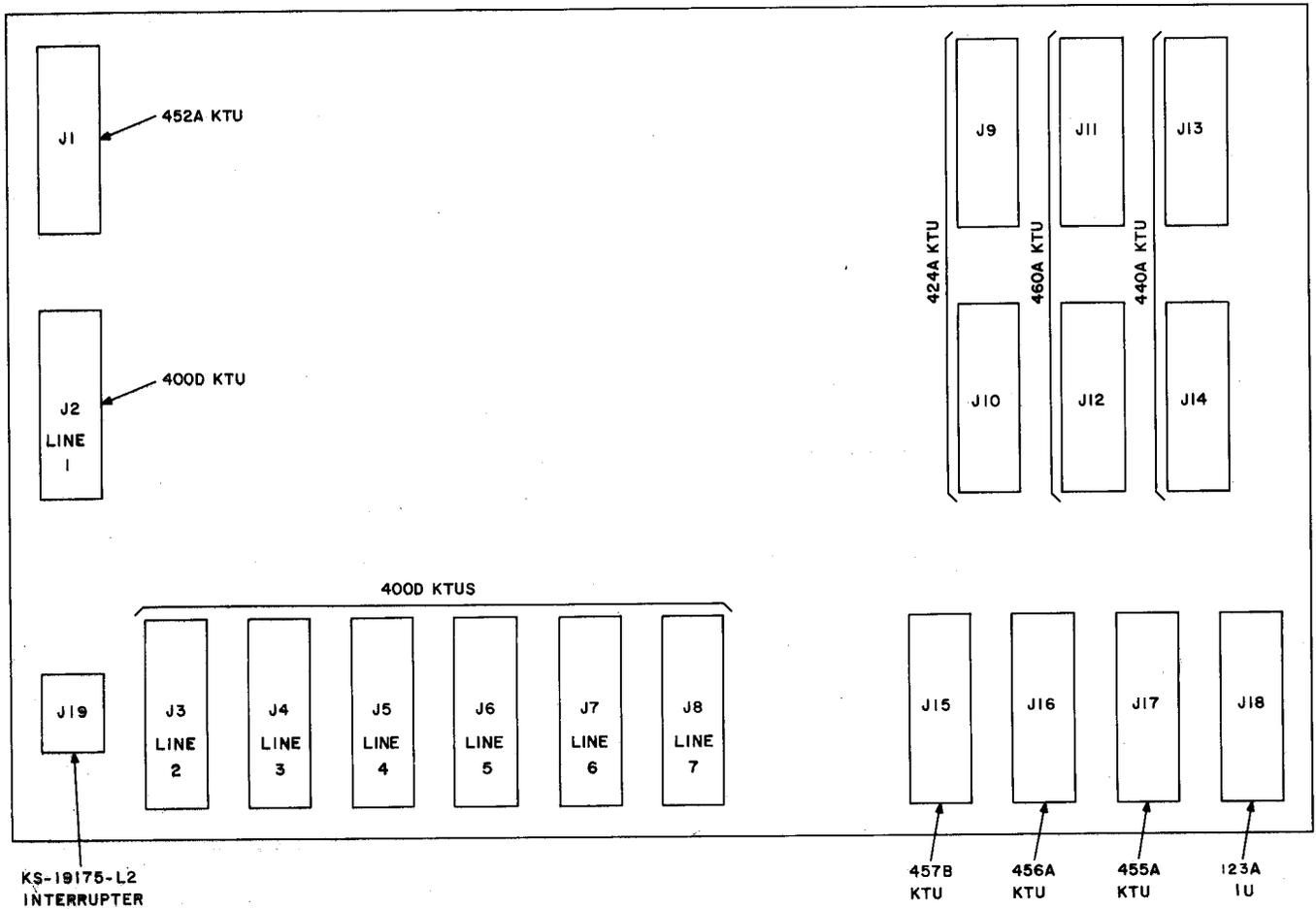


Fig. 20—570A KSU Connector Arrangement

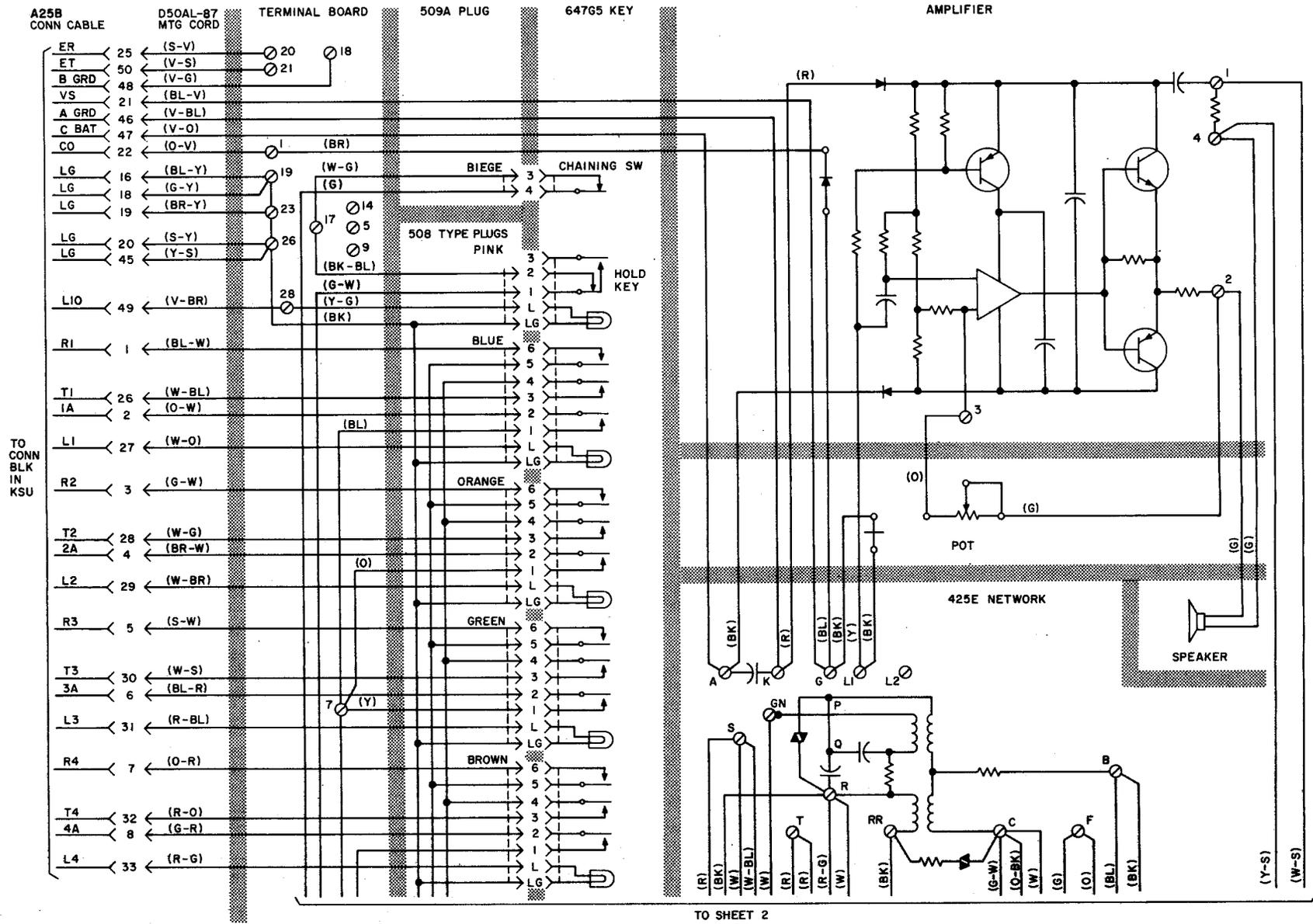


Fig. 22—2832A Telephone Set Schematic (Sheet 1 of 2)

TABLE B
COLOR ORDERING GUIDE

TELEPHONE SETS, HANDSET CORDS, SELECTOR CONSOLES, HOUSINGS, LOUDSPEAKER, HANDSETS, TRANSMITTER		FACEPLATES	
SUFFIX	COLOR	SUFFIX	COLOR
-3	Black	-70	Charcoal
-50	Ivory	-80	Muted Ivory
-51	Green	-71	Light Green
-53	Red	-69	Muted Red
-56	Yellow	-72	Light Yellow
-58	White	-73	Light Gray
-61	Light Gray	-70	Charcoal
-62	Aqua Blue	-76	Muted Blue

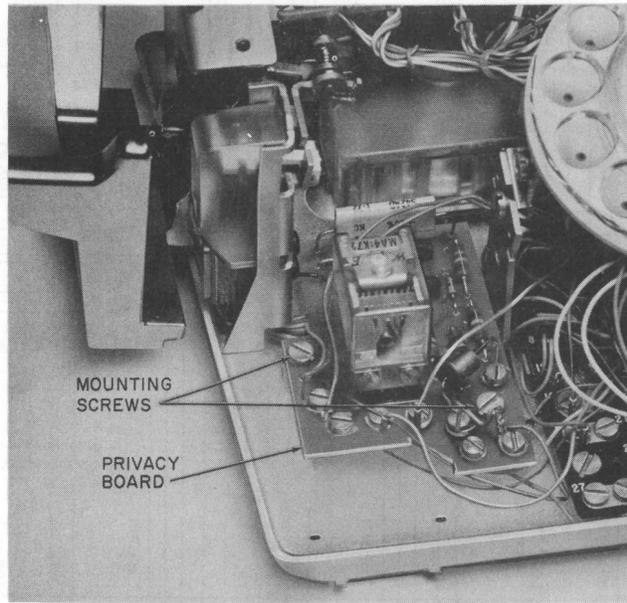


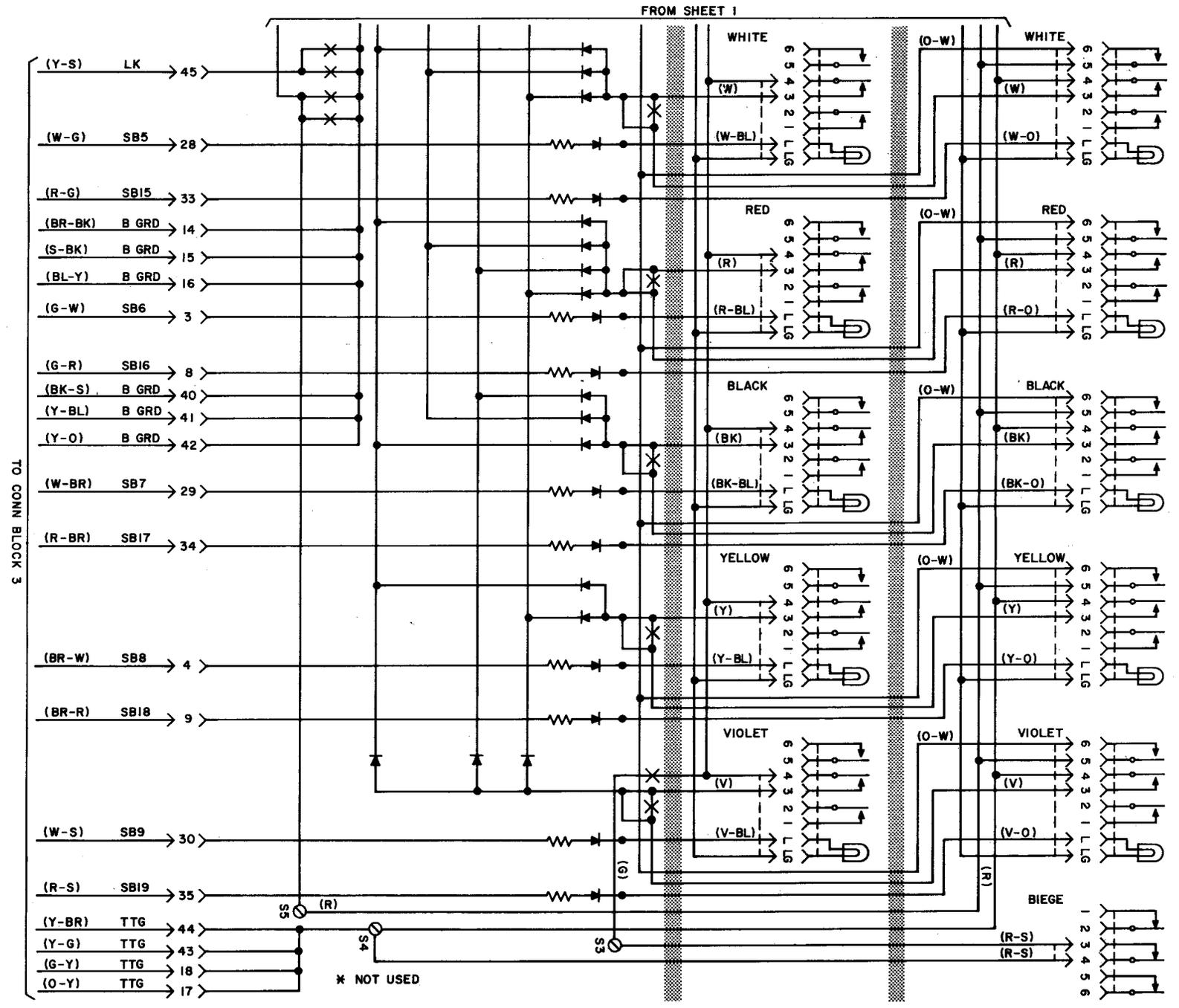
Fig. 23—Privacy Circuit Mounted on Telephone Set

TABLE C
CONNECTIONS FOR EXTERNAL RINGER (E1C)

CONNECT LEADS*	
FROM TEL SET TERM.	TO RINGER TERM.
<i>VS</i> 20	5
21	6

* Use inside wire.

Fig. 24—6A1 Selector Console Schematic (DSS) (Sheet 2 of 2)



SECTION 518-450-100

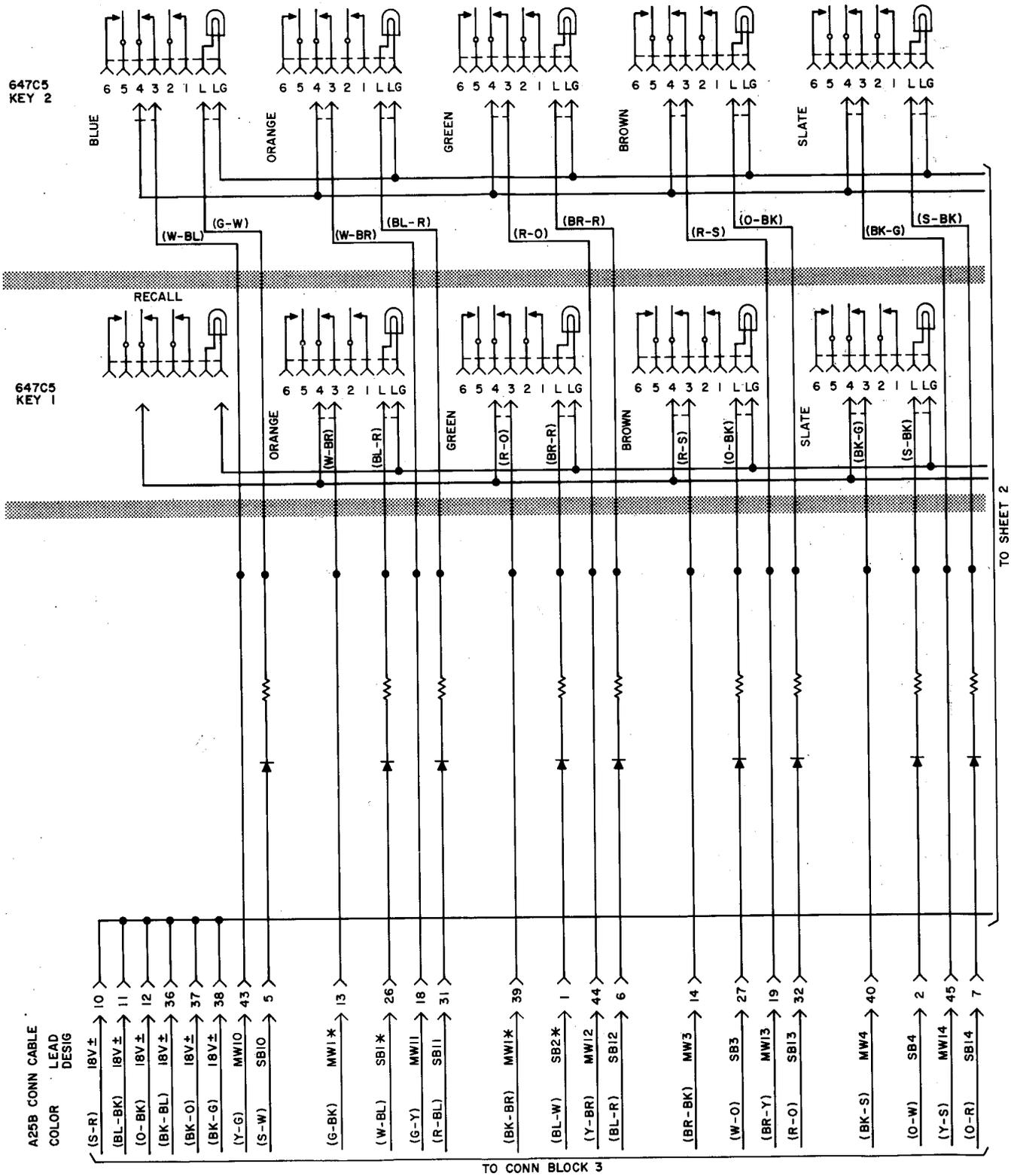


Fig. 25—6B1 Selector Console Schematic (MW) (Sheet 1 of 2)

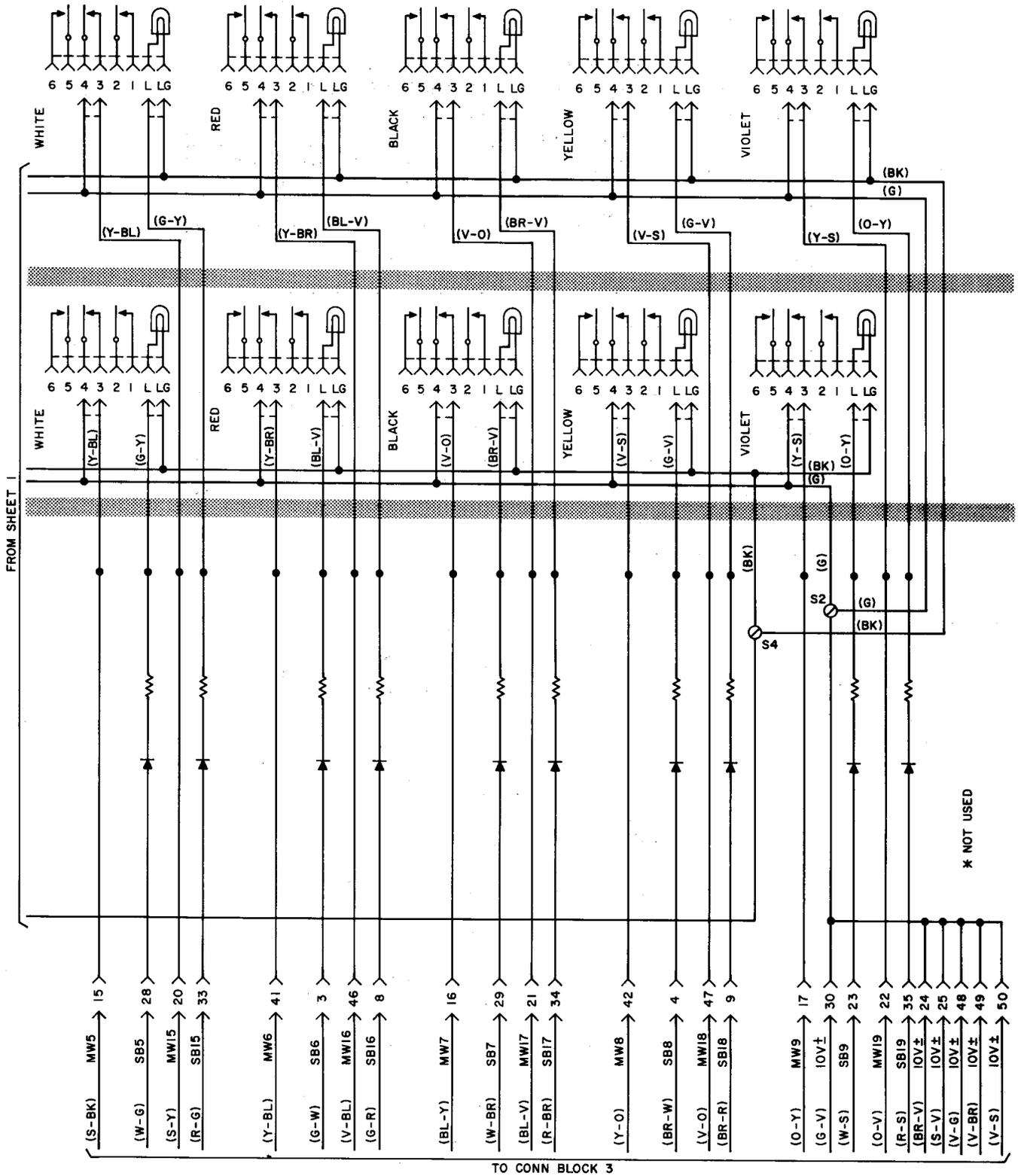


Fig. 25—6B1 Selector Console Schematic (MW) (Sheet 2 of 2)

TABLE D
TELEPHONE SET CONNECTIONS
FOR PRIVACY CIRCUIT (D-180486, KIT OF PARTS)

COLOR	CONNECT LEAD TO TEL SET TERM.	MOVE LEAD	
		FROM TEL SET TERM.	TO PRIVACY BOARD TERM.
O*	8		
BR*	F on Net.		
S*	15		
BK*	12		
BL*	6		
R†		13	P2
G-W†		13	P1
Y†		6	R1
O†		F on Net.	T

* Privacy board leads.

† Telephone set leads.

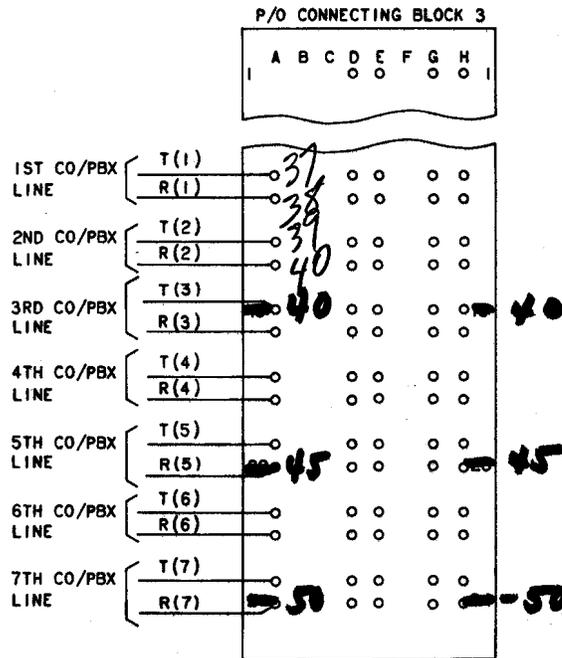
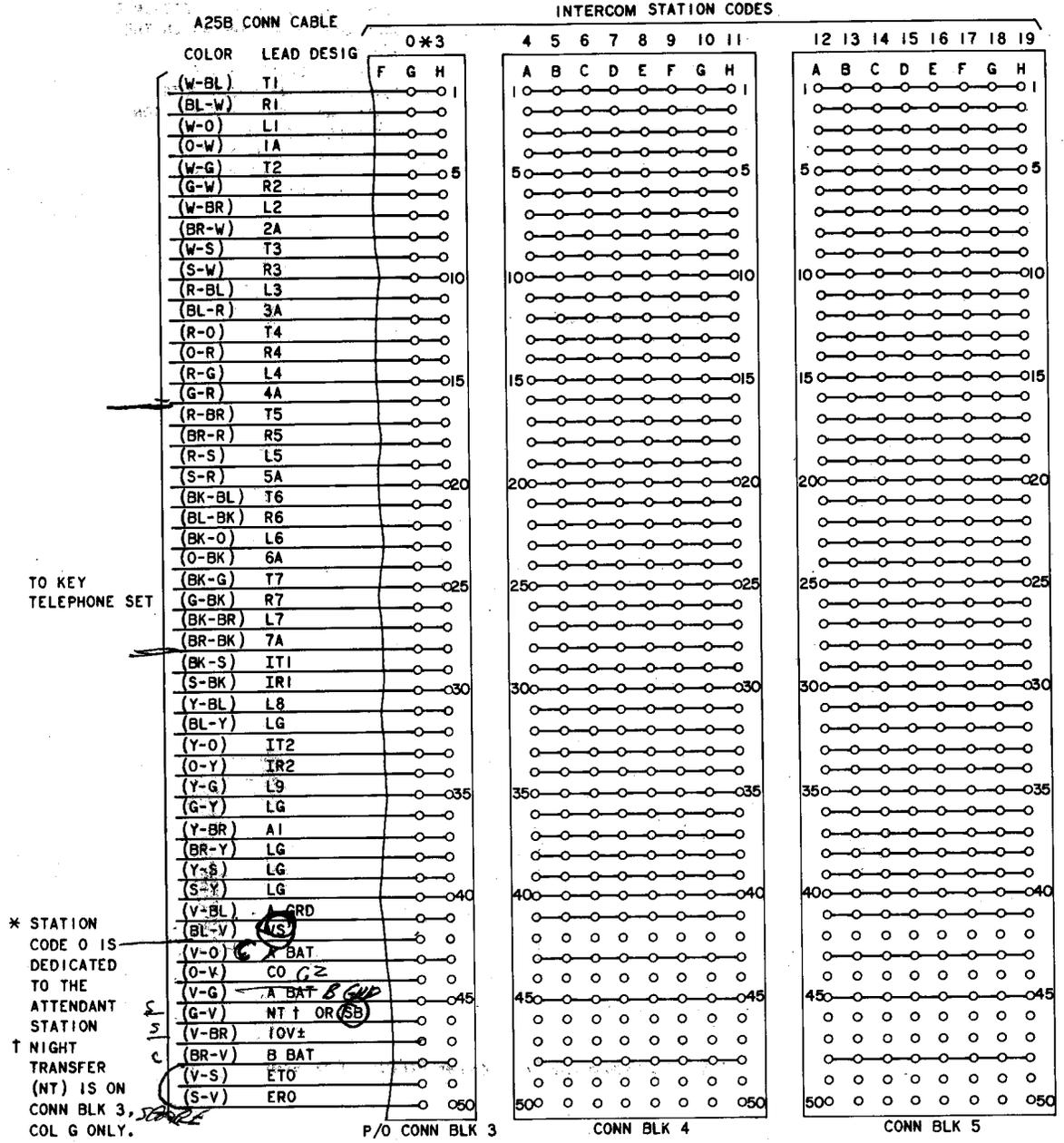
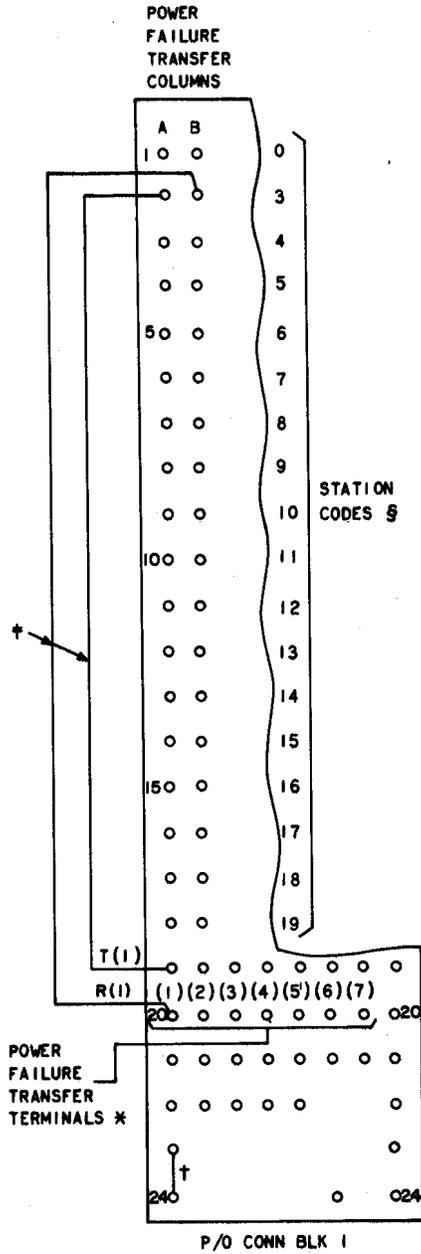


Fig. 26—Connections for Incoming CO/PBX Lines



VS
SB
10V±

Fig. 27—Station Connections



* NUMBERS SHOWN IN PARENTHESIS () REPRESENT THE 7 INCOMING CO/PBX LINE NUMBERS ARE FOR REFERENCE ONLY AND DO NOT APPEAR ON THE BLOCK.

† FACTORY PROVIDED STRAP CONNECTIONS AS SHOWN PUTS POWER FAILURE IN THE STATION CABLE FOR STATION 3

§ A GIVEN STATION MAY PICK UP ONLY ONE POWER FAILURE LINE.

Fig. 28—Connections for Power Failure Transfer

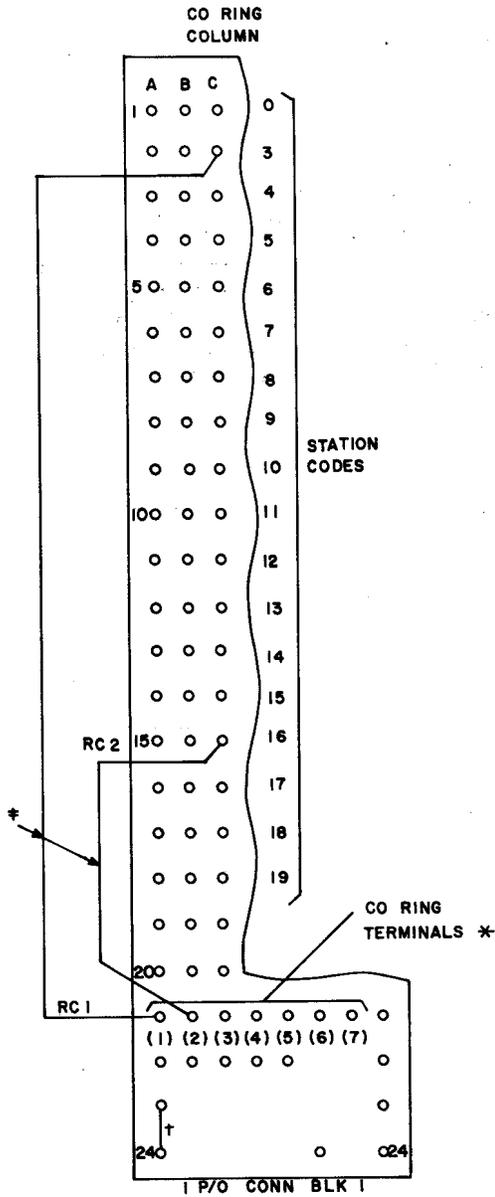
TABLE E
TELEPHONE SET CONNECTIONS
FOR PRIVACY RELEASE (D-180488, KIT OF PARTS)

COLOR	CONNECT LEAD TO TEL SET TERM.	CONNECT LEAD TO PRIVACY BOARD TERM.	MOVE LEAD	
			FROM TEL SET TERM.	TO PRIVACY BOARD TERM.
O-BK*	10			
BK-BL*	15			
G-Y*	27			
Y-G*	27			
G-W*		S2		
BK			15	S2
S†			15‡	

* Privacy release key leads.

† Privacy circuit lead.

‡ If set originally had a privacy circuit and a privacy release circuit is now being installed.



* NUMBERS SHOWN IN PARENTHESIS () REPRESENT THE 7 INCOMING CO LINES. NUMBERS ARE FOR REFERENCE ONLY AND DO NOT APPEAR ON THE BLOCK.
 † FACTORY PROVIDED STRAP
 ** CONNECTIONS AS SHOWN CAUSE STATION 3 TO RING ON LINE 1 AND STATION 16 TO RING ON LINE 2.

Fig. 29—Connections for CO Ringing

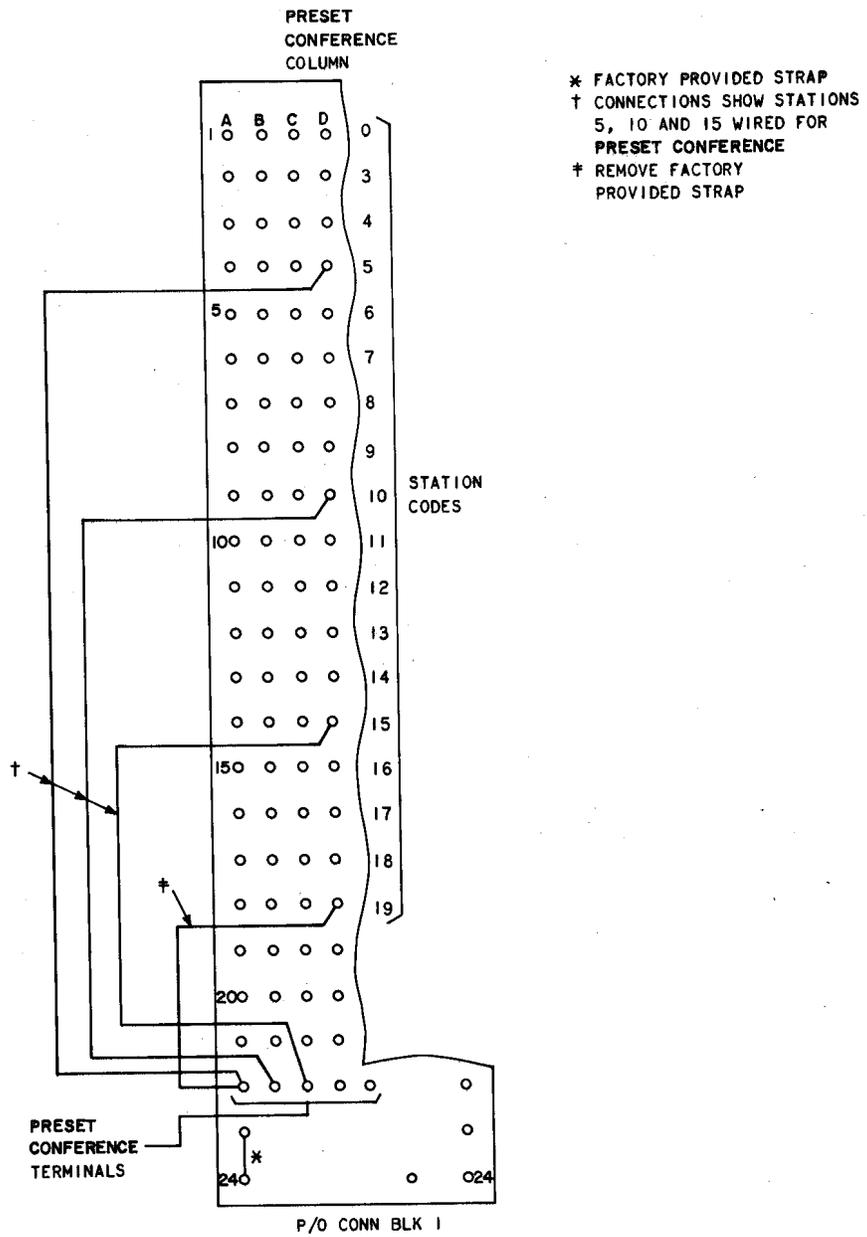


Fig. 30—Connections for Preset Conference

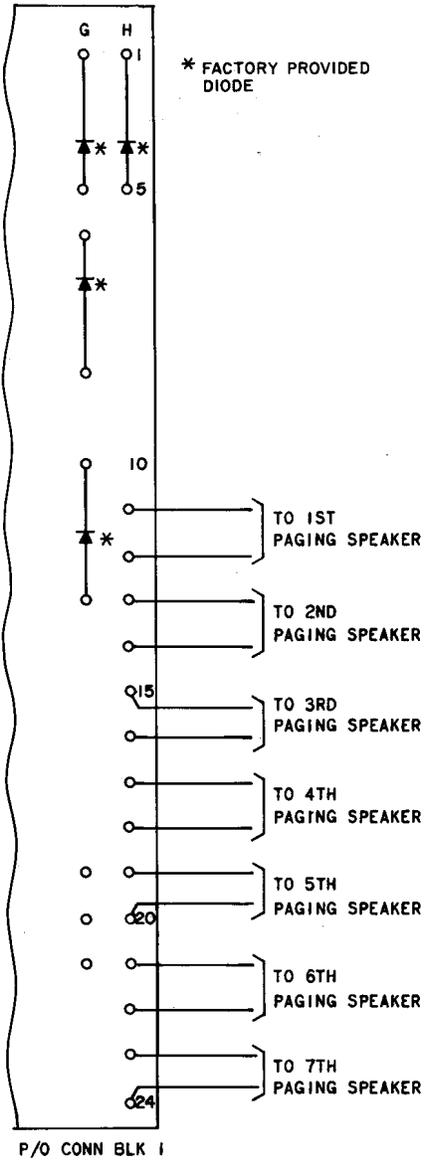


Fig. 31—Connections for Paging

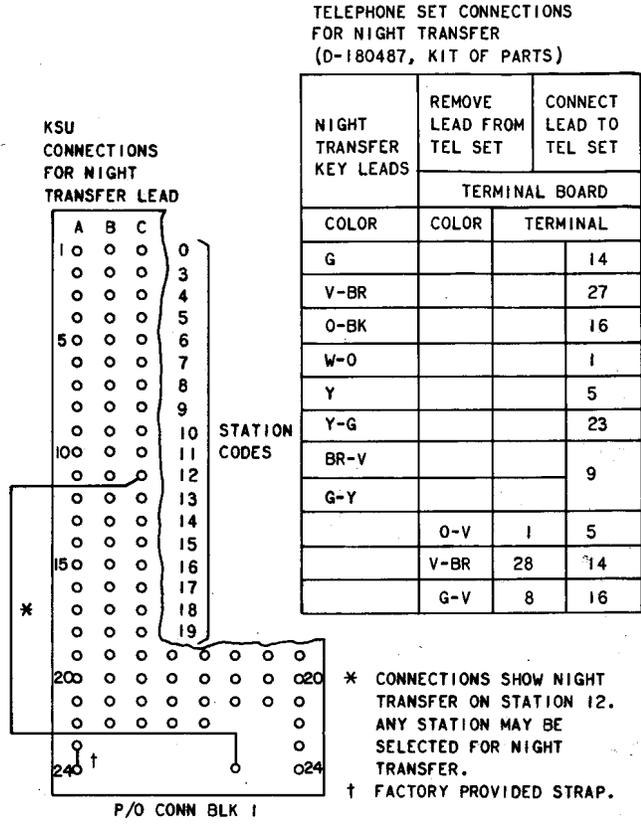


Fig. 32—Connections for Night Transfer

TABLE F
3B SPEAKERPHONE CONNECTIONS

CONNECT LEADS FROM				LEAD DESIG	CORD COLORS			CONNECT LEADS TO 55B CONTROL UNIT TERM.††
TEL SET TERM.	TRMTR TERM.	SPEAKER TERM.	TRNSF TERM.		DIOR‡	T7A	R2FK	
24				P4*	W-S			13
				IR†				6
30				P3*	S-W			4
				IT†				15
25†				T1	W-BL			1
RR¶*								
6				R1	BL-W			10
29				LK	W-BR			35
8				AG	BR-W			11
10				A1	W-G			2
	8			LK		BK-O		35
	7			F1		G-Y		17
	5			S		O-BK		18
	6			A1		Y-O		19
	3			M2		BK-S		16
	2			P1		BL-R		8
	1			M1		S-BK		7
		‡‡		SP2			G	20
		‡‡		SP1			R	29§
			**	TF1				27
			**	TF2				36

* For rotary dial tel set.

† For TOUCH-TONE® tel set.

‡ Insulate and store spare leads.

§ Connect lead to terminal 30 if a reduction in volume is desired.

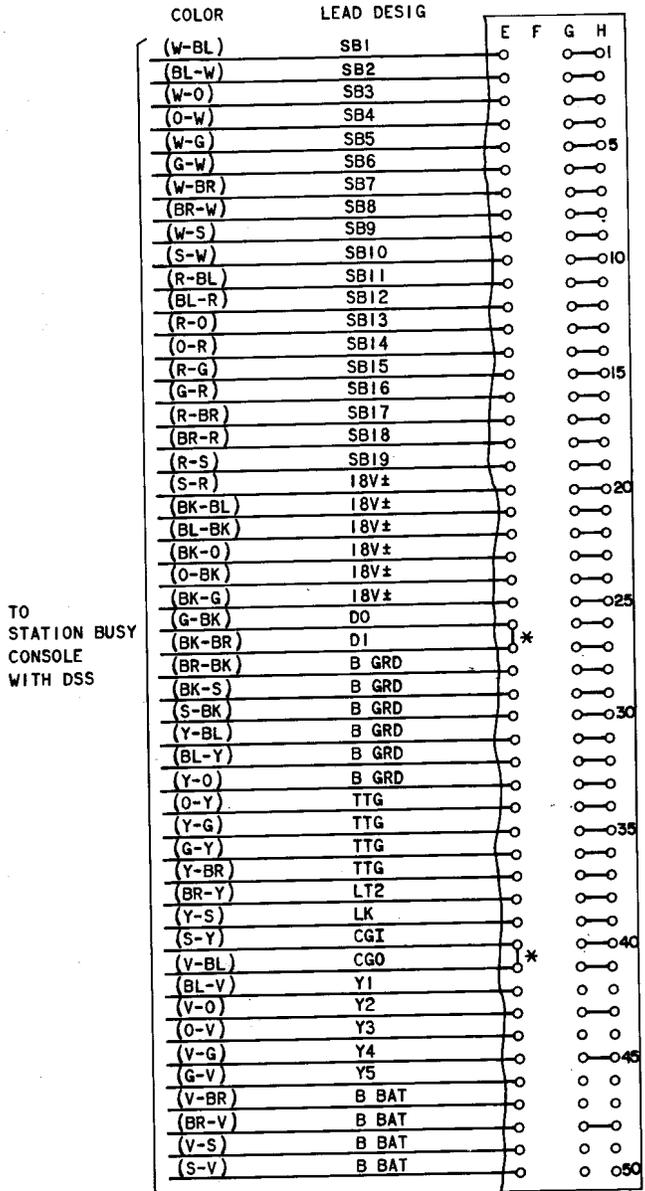
¶ Located on network.

** Use inside wiring.

‡‡ Strap terminals 4 and 5 when used with TOUCH-TONE tel sets.

†† Speaker terminals are not designated.

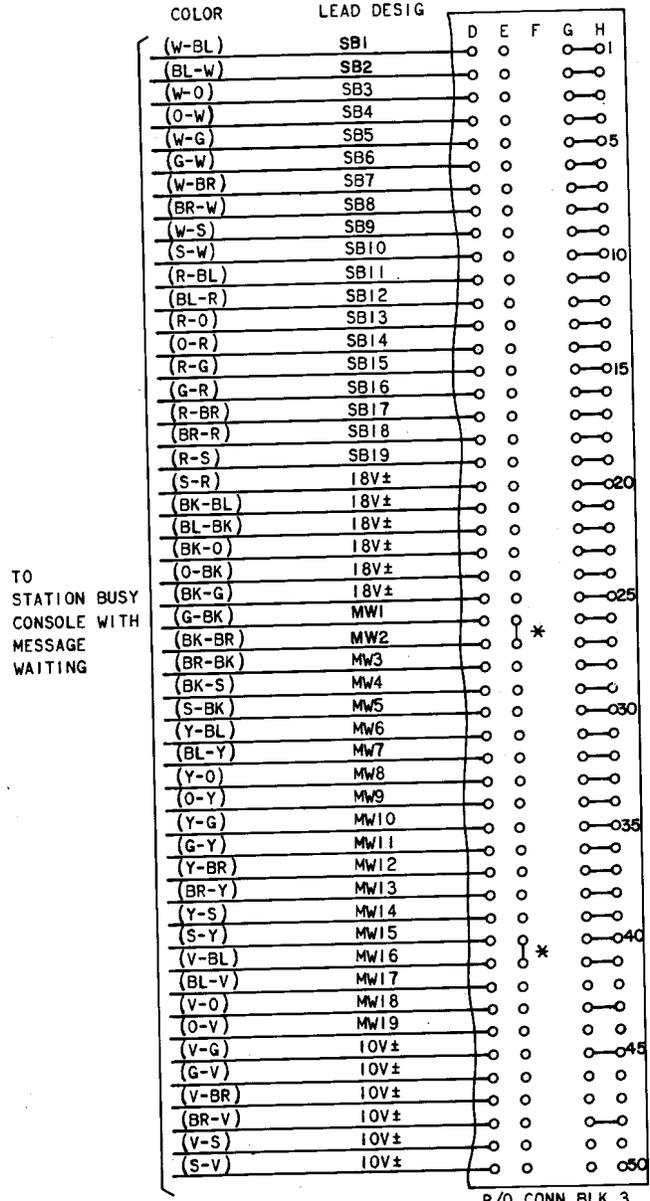
A25B CONN CABLE



* FACTORY PROVIDED STRAPS MUST BE REMOVED WHEN CONSOLE IS CONNECTED. IF CONSOLE IS REMOVED, THE STRAPS MUST BE REPLACED.

Fig. 33—Connections for Station Busy Selector Console with DSS

A25B CONN CABLE



* FACTORY PROVIDED STRAPS MUST BE REMOVED WHEN CONSOLE IS CONNECTED. IF CONSOLE IS REMOVED, THE STRAPS MUST BE REPLACED IN PLACE WHEN MW CONSOLE IS USED

Fig. 34—Connections for Station Busy Selector Console with MW

TABLE G
DIAGNOSTIC TABLE

TROUBLE	POSSIBLE CAUSE	POSSIBLE SOLUTION
No side tone on CO/PBX line	<ul style="list-style-type: none"> a. Incoming CO/PBX line is dead. b. Incoming tip and ring terminated on the wrong terminals. c. Line circuit (400D KTU) not plugged in correctly. d. Diode(s) in polarity guard may be defective. e. Switchhook pileup on telephone set is defective. f. Privacy circuit in the telephone set may be operating (if the set is equipped with a privacy circuit). g. If dial restriction diode is installed in the set, tip and ring may be reversed. 	<p>Check incoming tip and ring with test set.</p> <p>Check connections.</p> <p>Check that KTU is properly seated in connector and is located in the right connector. See Fig. 20.</p> <p>Replace diodes with ones known to be good.</p> <p>Change out telephone set.</p> <p>Check to see if privacy relay is falsely operating when going off-hook.</p> <p>Check station cutdown and polarity of dial restriction diode.</p>
Line busied out (lamp steady)	<ul style="list-style-type: none"> a. Lamp and A leads reversed. b. Lamp and A leads shorted. 	<p>Check station cutdown for that line.</p> <p>Check station cutdown for that line.</p>
Dial tone over an answered call or two lines seized together.	<ul style="list-style-type: none"> a. Two lines conferenced from an idle station set. 	<p>Check stations to ensure that no idle sets have more than one line button depressed.</p>
Intercom oscillates (repeatedly comes up then drops) when seized	<ul style="list-style-type: none"> a. Selector (424A KTU) not plugged in correctly. b. D0-D1 strap is missing (if no DSS console is provided). c. DSS console unplugged or not connected (if DSS console is provided). 	<p>Check that KTU is properly seated in connector and is located in the right connector. See Fig. 20.</p> <p>Check option strap. See Fig. 33.</p> <p>Check DSS console cutdown. Check that DSS console is properly plugged in.</p>
Incorrect intercom codes are dialed (TOUCH-TONE dial set)	<ul style="list-style-type: none"> a. Y3 relay in selector (424A KTU) is not operating. 	<p>Check that RS1-CG strap is removed. See 4.19.</p>
Incorrect intercom codes are dialed when using DSS console	<ul style="list-style-type: none"> a. Y3 relay in selector (424A KTU) is not operating. 	<p>Check that CG0-CG1 strap is removed. See Fig. 33.</p>

TABLE G (Cont)

TROUBLE	POSSIBLE CAUSE	POSSIBLE SOLUTION
Cannot dial on intercom. On going off-hook calling station hears tone burst.	<ul style="list-style-type: none"> a. 440A KTU is not plugged in correctly. b. Rotary dial system with CG-RS1 strap missing. c. If DSS console is provided, connections may be bad. 	<p>Check that KTU is properly seated in connector and is located in the right connector. See Fig. 20.</p> <p>Check CG-RS1 strap. See Fig. 4.</p> <p>Check DSS console cutdown. Check that console is properly plugged in.</p>
Hold lamp on attendants set is always lit	<ul style="list-style-type: none"> a. Attendant set is not modified or is improperly modified. 	See 3.08.
No music-on-hold	<ul style="list-style-type: none"> a. 123A IU is not plugged in properly. b. Music source volume too low. c. Music source unable to drive the 123A IU. 	<p>Check that IU is properly seated in connector and is located in the right connector. See Fig. 20.</p> <p>Gradually increase volume while listening. See 4.15.</p> <p>Source must be approx 8 ohms or less.</p>