



Descriptions and Explanations

Practice P720.312
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Gen. Tel. Co. of Calif.

**1A KEY TELEPHONE SYSTEMS
CIRCUITS AND DESCRIPTIONS
(STRIP MOUNTED UNITS)**

1. GENERAL

1.01 This Practice covers the circuits and circuit descriptions for 1A key telephone systems using strip mounted units.

1.02 Section 55 Part 610 is hereby cancelled and replaced by this Practice.

1.03 The drawings (Figures 1 thru 10) together with the circuit descriptions are shown on the same page, wherever possible. These circuits consist of:

- (a) Fig. 1 Ringing and Common Audible Signaling Circuit for 51A KTU.
- (b) Fig. 2 Combined Line and Busy Lamp Circuit for 51A KTU.
- (c) Fig. 3 Time-Out Circuit for 51A KTU.
- (d) Fig. 4 Intercommunicating Line Circuit for 51A KTU.
- (e) Fig. 5 Ringing and Common Audible Signaling Circuit for 52A KTU.
- (f) Fig. 6 Combined Line and Busy Lamp Circuit for 52A KTU.
- (g) Fig. 7 Time-Out Circuit for 52A KTU.
- (h) Fig. 8 Holding Circuit for 51A and 52A KTU's.
- (i) Fig. 9 Terminal Strips for 51A and 52A KTU's.
- (j) Fig. 10 Winking Hold Circuit for 51A and 52A KTU'S.

2. RINGING AND COMMON AUDIBLE SIGNALING CIRCUIT FOR 51A KTU

2.01 Ringing current over ring (or tip) side of line, R or T condenser and thermistor, 3200 ohm secondary winding of the R relay, R1 varistor and R1 relay winding to ground.

2.02 The R varistor acts as a diode or halfwave rectifier, which passes 1/2 cycle of the ringing current but blocks the other 1/2 cycle, which operates the R relay.

2.03 The R1 varistor is a full wave bridge rectifier which rectifies the ringing current to operate the R1 relay.

2.04 Thermistors are heat controlled devices.

Their normal or cold resistance is about 50,000 ohms which prevents false operation of the R relay during dialing. As ringing current is applied the resistance drops to about 2,000 ohms, permitting current to flow. The two thermistors are shunted by the S varistor which provides protection from any large line surges.

2.05 The intermittent common audible signal is provided on each operation of the R1 relay by make contacts 1 and 2.

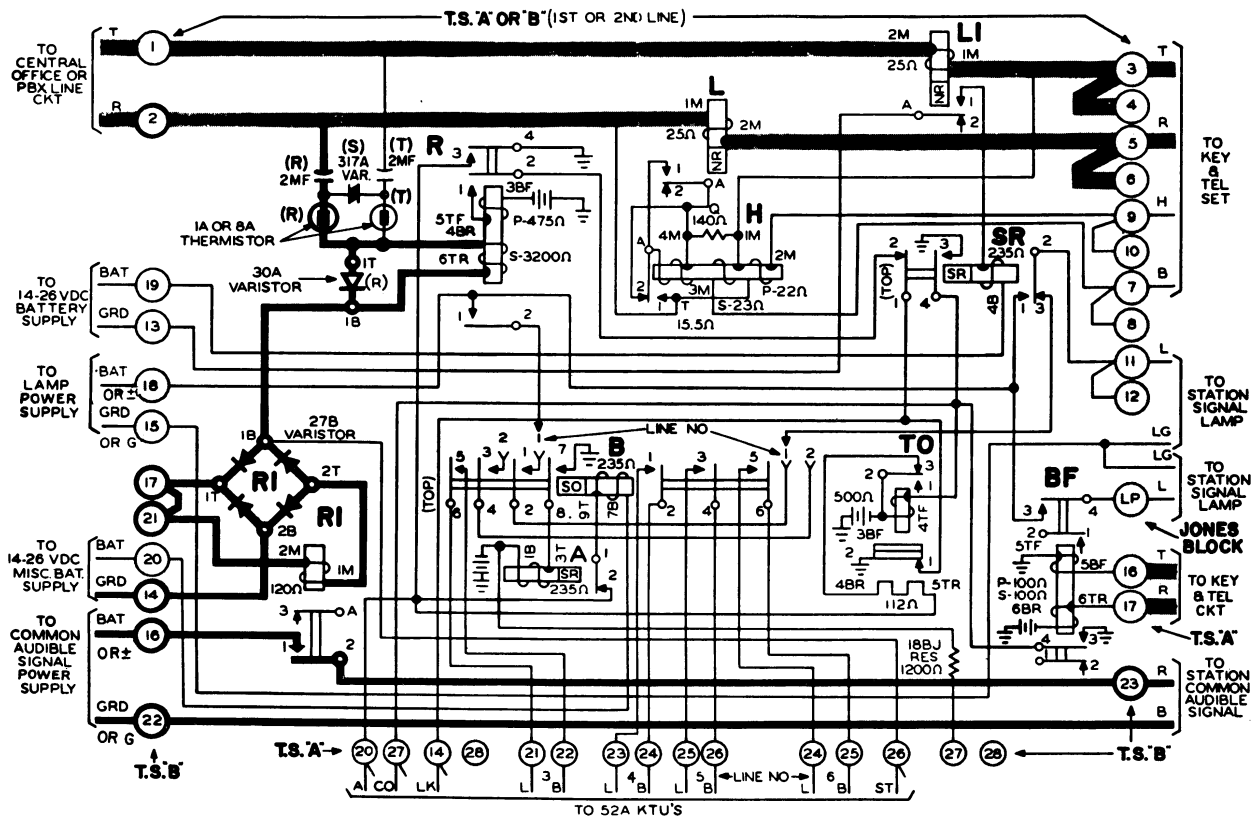


Fig. 1 Ringing and Common Audible Signaling Circuits - 51AKTU

3. COMBINED LINE AND BUSY LAMP CIRCUITS FOR 51A KTU

3.01 The 3-4 make contacts of the R relay operate the B relay under control of the A relay 1-2 break contacts. B relay operated operates relay A through the (B relay) 1-2 contacts. Relay A operated releases relay B. The combined operate-release action of the A and B relays flash the station lamps to indicate an inward call.

3.02 When the call is answered, line battery operates the L1 relay in series with the station loop. (L relay also operates, but

performs no useful function at this time - see part 9. Holding Circuit. L1 relay operated operates relay SR. SR relay operated:

- Break contacts 1-2 top release the R relay which releases the B and A relays in the flashing circuit.
- Make contacts 1-2 bottom provide the station busy lamp circuit.

3.03 When the call is completed and the station hangs up the L1 and SR relays release extinguishing the busy lamps.

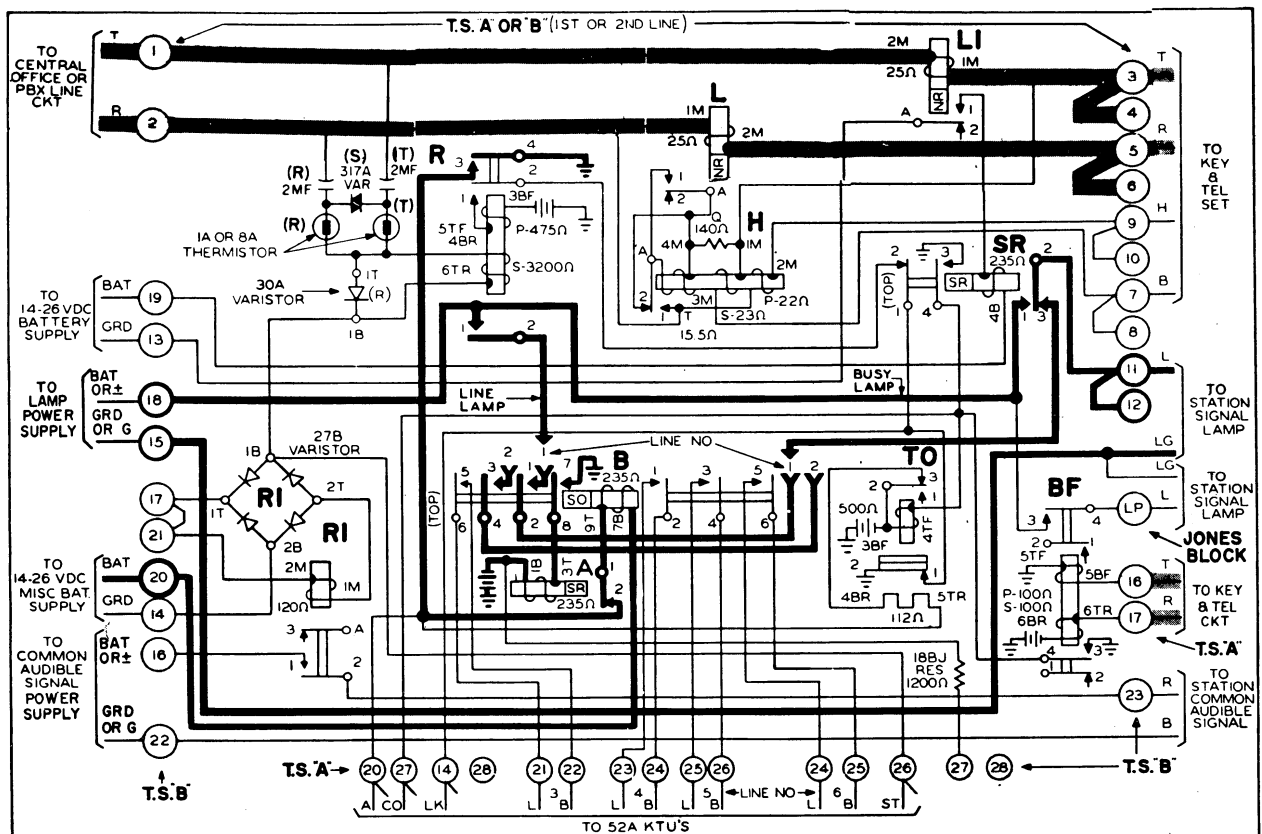
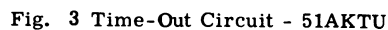


Fig. 2 Combined Line and Busy Lamp Circuits - 51AKTU

4.01 When an inward call is made and the system is unattended, R relay locks operated through the 475 ohm primary winding, the 1-2 top make contacts, 1-2 top break contacts of the SR relay under control of the thermal contacts of the TO relay. R relay 3-4 top make contacts connect ground to the heater winding of the TO relay, which starts the time-out circuit. The thermal contacts open in about 20 to 30 seconds, releasing the R relay.

4.03 The thermal contacts will cool in from 1 to 3 minutes and again make contact, restoring the circuit to normal.

4.04 The TO relay is operated at all times that a call is in progress or in the hold condition under control of the SR relay 3-4 top contacts.



(b) Make contacts 3-4 bottom operate the TO relay preventing time out during the time the circuit is busy.

5.03 In addition to the relay functions described, the 100 ohm primary and secondary windings act as retard coils and provide the common transmission path for this circuit.

(a) Make contacts 3-4 top operate the station busy lamps.

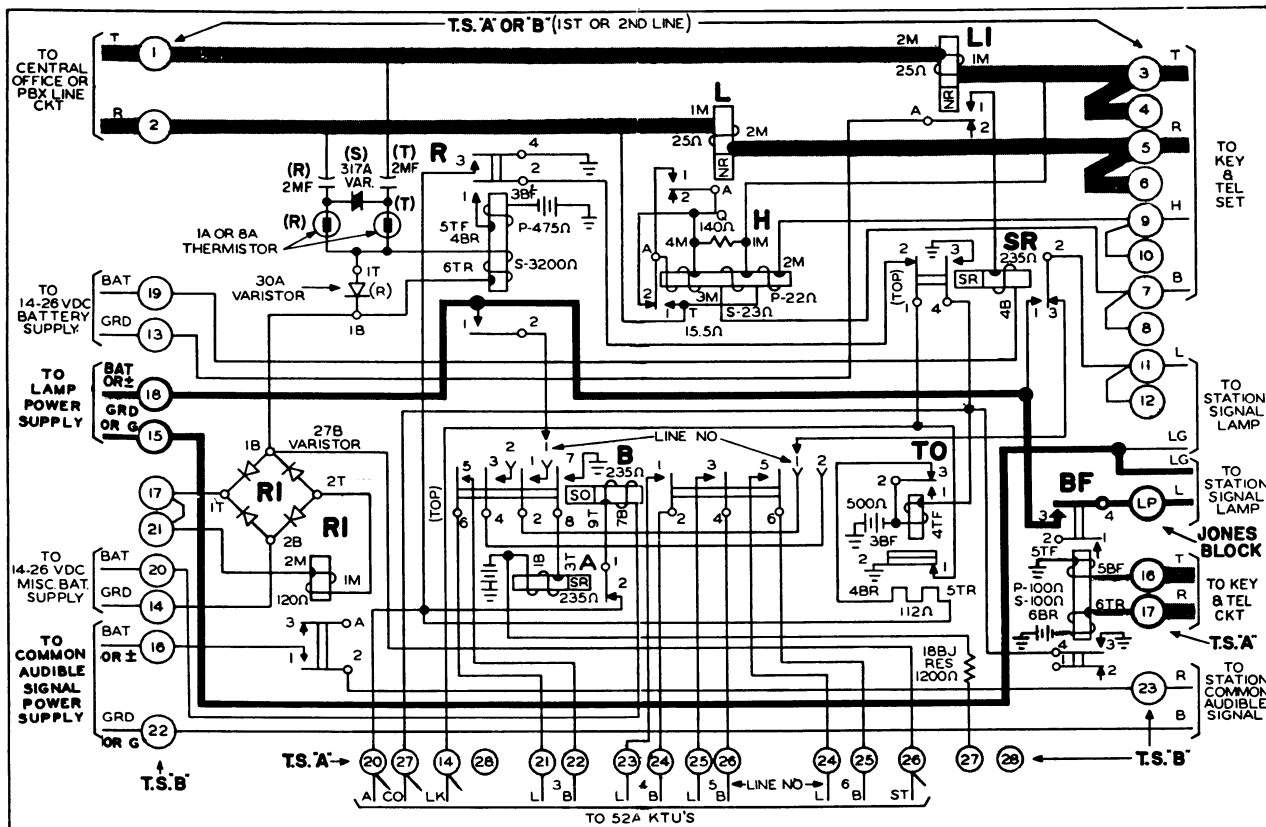


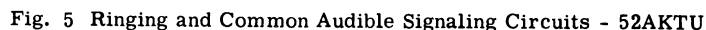
Fig. 4 Intercommunicating Line Circuit - 51AKTU

6.04 Thermistors are heat controlled devices.

Their normal or cold resistance is about 50,000 ohms which prevents false operation of the R relay during dialing. As ringing current is applied the resistance drops to about 2,000 ohms, permitting current to flow. The two thermistors are shunted by the S varistor which provides protection from any large line surges.

6.05 The intermittent common audible signal is provided on each operation of the R1 relay by make contacts 1 and 2.

6.03 The R1 varistor is a full wave bridge rectifier which rectifies the ringing current to operate the R1 relay.



7. COMBINED LINE AND BUSY LAMP CIRCUITS FOR 52A KTU

7.01 The 3-4 make contacts of the R relay operate the B relay under control of the A relay 1-2 break contacts. B relay operated operates relay A through the (B relay) 1-2 contacts. Relay A operated releases relay B. The combined operate-release action of the A and B relays flash the station lamps to indicate an inward call.

7.02 When the call is answered, line battery operates the L1 relay in series with the

station loop. (L relay also operates, but performs no useful function at this time - see part 9. Holding Circuit. L1 relay operated operates relay SR. SR relay operated:

- (a) Break contacts 1-2 top release the R relay which releases the B and A relay in the flashing circuit.
- (b) Make contacts 1-2 bottom provide the station busy lamp circuit.

7.03 When the call is completed and the station hangs up the L1 and SR relays release extinguishing the busy lamps.

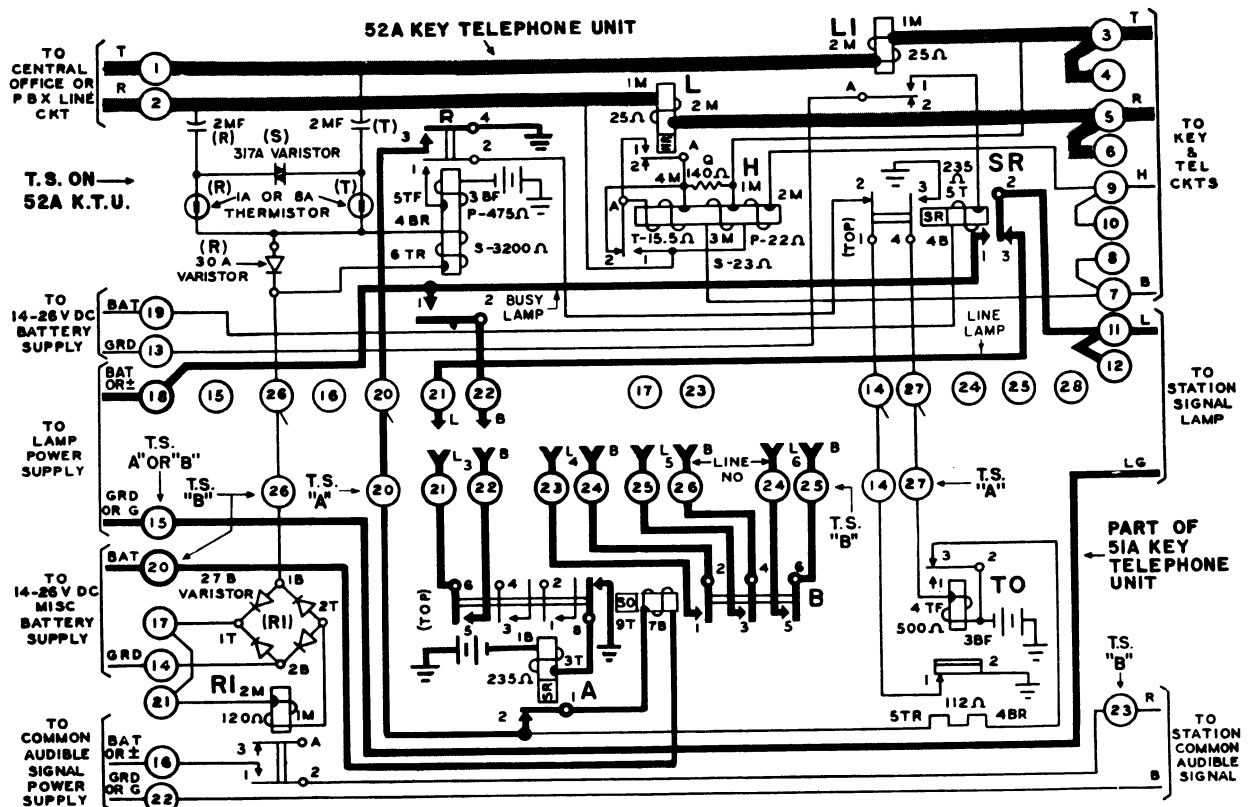


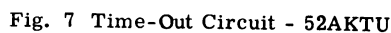
Fig. 6 Combined Line and Busy Lamp Circuits - 52AKTU

8.01 When an inward call is made and the system is unattended, R relay locks operated through the 475 ohm primary winding, the 1-2 top make contacts, 1-2 top break contacts of the SR relay under control of the thermal contacts of the TO relay. R relay 3-4 top make contacts connect ground to the heater winding of the TO relay, which starts the time-out circuit. The thermal contacts open in about 20 to 30 seconds, releasing the R relay.

8.02 Should calls be received before the contacts cool, the R relay will operate only during the ringing periods and the lamps will flash only at that time.

8.03 The thermal contacts will cool in from 1 to 3 minutes and again make contact, restoring the circuit to normal.

8.04 The TO relay is operated at all times that a call is in progress or in the hold condition under control of the SR relay 3-4 top contacts.



9. HOLDING CIRCUIT FOR 51A AND 52A KTU'S

9.01 When a call is in progress, line battery operates the L and L1 relays in series with the station loop. L relay performs no useful function at this time. L1 relay controls the station busy lamps.

9.02 When a call is held the L relay releases and the H relay operates, initially through the primary 22 ohm winding. It then locks operated through the tertiary 15.5 ohm and the

140 ohm non-inductive windings in series with the L1 relay. This combination provides the holding bridge.

9.03 When the call is again picked up the L relay re-operations, short circuiting the H relay winding, which releases and removes the holding bridge.

9.04 When the call is completed and the hand set replaced on the cradle, L and L1 relays release restoring the circuit to an idle condition.

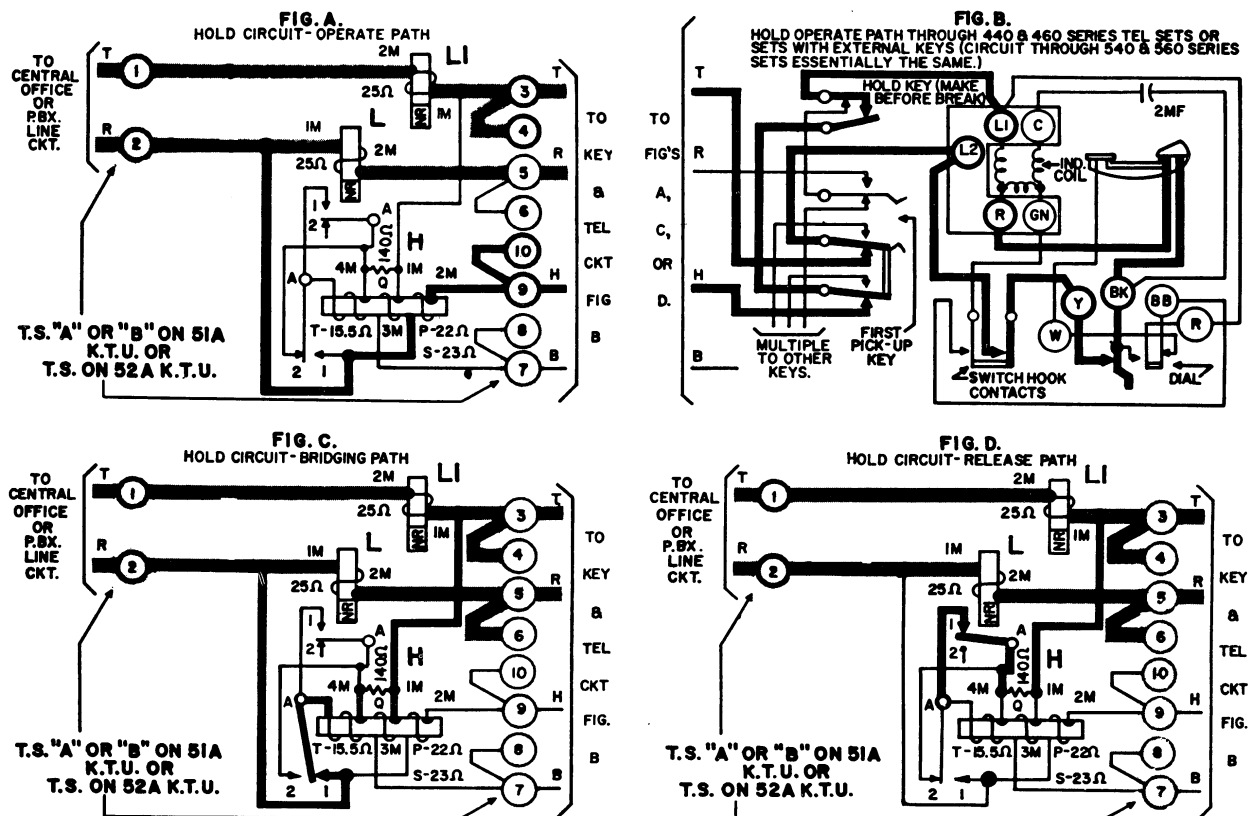


Fig. 8 Holding Circuit - 51A or 52AKTUS

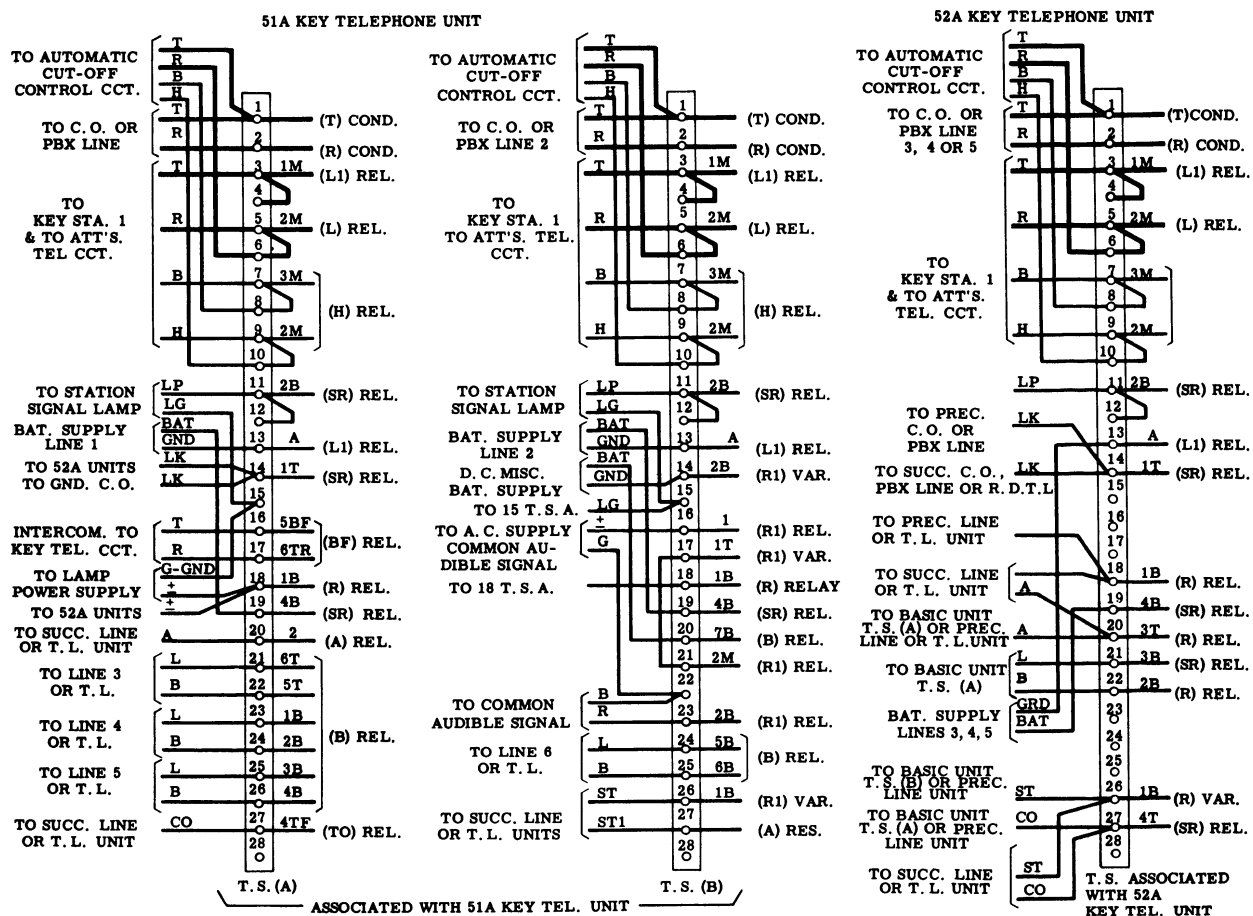


Fig. 9 Terminal Strips - 51A and 52AKTUS

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