

# REFERENCE

## 1A1 KEY TELEPHONE SYSTEM

### KEY TELEPHONE UNITS

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## 1. GENERAL

1.01 This section identifies the key telephone units (KTUs) used in the 1A1 Key Telephone System. Functional schematics (Fig. 1 through 18)

cover the basic circuitry of the KTUs and their relationship with associated apparatus. For additional information on the 1A1 Key Telephone System, refer to Section 518-114-105 for identification and arrangements and Section 518-114-425 for connections.

1.02 This section is reissued to:

- Revise KTU schematics
- Add option table to Fig. 17.

1.03 This issue of the section is based on the following drawings:

SD-69203-01, Issue 7B

SD-69288-01, Issue 18D.

If this section is to be used with equipment or apparatus reflecting later issues of the drawings, reference should be made to the SDs and CDs to determine the extent of the changes and the manner in which the section may be affected.

## 2. IDENTIFICATION

2.01 The KTUs are individual circuit packages which provide switching and control functions and are arranged for panel mounting in standard equipment cabinets or apparatus mountings.

2.02 The 1A1 Key Telephone System KTUs provide the following station service features:

- Holding on CO, Centrex, or PBX line
- Visual and audible line signals
- Manual and dial intercom
- Cutoff, exclusion, and selective privacy
- Time-out
- Private lines.

### A. 201C KTU (Fuse Unit)

2.03 The 201C KTU (Fig. 1) is a fuse mounting unit arranged to mount seven No. 24-type fuses.

**B. 202A (MD), 202B (MD), 202C (MD), and 202D KTUs (CO or PBX Line Circuit)**

**2.04** These KTUs provide:

- Line pickup
- Hold feature
- The control of other KTUs for visual signaling
- Ringing options which include steady ringing, interrupted ringing, and relay control of a common audible signal.

**2.05** The 202A and 202B KTUs (Fig. 2) are arranged for grounded ringing only.

**2.06** The 202C (Fig. 3) and 202D KTUs (Fig. 4) are arranged for metallic or grounded ringing.

**2.07** Ringing options are steady ringing, interrupted ringing, and relay control of a common audible signal.

**C. 203A KTU (Automatic Tie Line Circuit)**

**2.08** The 203A KTU (Fig. 5) is used on private (tie) lines to provide:

- Automatic signaling to the called station
- The control of the KTUs for visual signaling
- Ringing options as shown in paragraph 2.07.

One 203A KTU is required at each end of the private line.

**D. 204A KTU (Ringdown Tie Line Circuit)**

**2.09** The 204A KTU (Fig. 6) is used on private (tie) lines to provide:

- Manual signaling to the called station
- The control of the KTUs for visual signaling
- Ringing options as shown in paragraph 2.07.

One 204A KTU is required at each end of the private line.

**E. 205A KTU (Station Line Circuit)**

**2.10** The 205A KTU (Fig. 7) is used on private (tie) lines to provide:

- Manual signaling toward the distant station
- The control of other KTUs for visual signals
- Ringing options as shown in 2.07.

One 205A KTU is required to serve both the originating and terminating stations.

**F. 207B (MD) and 207C KTU (Selector Circuit)**

**2.11** The 207B and 207C KTUs (Fig. 8) are the basic selector only intercom unit. The KTUs provide:

- Station Selection
- Busy Lamp
- Audible Signaling.

Each 207B or 207C KTU can serve nine stations.

**G. 208A KTU (Signaling Unit for Flashing Line Lamps)**

**2.12** The 208A KTU (Fig. 9) is used on intercom lines to control:

- Flashing and busy lamp signals at the called station
- Time-out at the called station.

The 208A KTU serves three stations and is used in conjunction with the 207B or 207C KTU.

**H. 209A KTU (MD) (Lamp Flashing and Time-Out Circuit)**

**2.13** The 29A KTU (Fig. 10) is used on CO or PBX lines to provide:

- Interruption interval for flashing lamps
- Time-out of locked-in signals approximately 30 seconds after a call is abandoned.

The 209A KTU can serve five lines when wink option is provided and six lines when wink option is not provided.

**I. 210A KTU (Wink Circuit)**

2.14 The 210A KTU (Fig. 11) is used on CO or PBX lines to provide the interruption interval for the wink option.

**J. 211A KTU (Intercom Line Circuit, Ringing Lamp Circuit, Noise Suppression Circuit, and Audible Signal Control Circuit)**

2.15 The 211A KTU (Fig. 12) is used on intercom lines to provide:

- Busy lamp (other signals must be provided separately)
- Protection against an overload of the ringing supply
- Noise suppression circuit
- Independent common audible control of two lines to the same station.

**K. 212A KTU (MD) (CO or PBX Line Circuit With Lamp Flashing and Incoming Signals Time-Out Circuits)**

2.16 The 212A KTU (Fig. 13) provides line pickup on three CO or PBX lines and common equipment for up to six lines.

**L. 227B KTU (Common Audible Control Circuit)**

2.17 The 227B KTU contains three relays which provide control for:

- Auxiliary lamp relay circuits
- Multisignals, ie, buzzers, bells, or ringers
- Common audible signals (CO, Centrex, or PBX line circuits).

2.18 Refer to Section 518-310-401 for additional information on the 227B KTU.

**M. 228A KTU (Blank Unit)**

2.19 The 228A KTU is a blank unit with 40 screw type terminals. It is used for miscellaneous purposes.

**N. 230A (MD) and 230B KTU (CO or PBX Line Circuit)**

2.20 The 230A KTU (Fig. 3) is the equivalent of five 202C line circuits, and the 230B KTU (Fig. 4) is the equivalent of four 202D line circuits.

**O. 232A (MD), 232B (MD), and 232C KTU (Electro-Mechanical Flash, Wink, Ring, and Time-Out Circuit)**

2.21 The 232A or 232B KTU (Fig. 14) plus the associated interrupter provides the following timing features:

- Audible signals
- Lamp flash
- Lamp wink
- Busy tone
- Audible ringback
- Time-out on abandoned call
- Busy lamp control for manual intercom line.

**P. 233A KTU (MD) (CO or PBX Line Circuit)**

2.22 The 233A KTU (Fig. 15) is the equivalent of ten 202C KTUs. Circuits terminate on back of units in five KS-16671L1 plugs. A25B connector cables must be used for cabling to distributing frame or equivalent. Lamp fusing is provided on the unit.

**Q. 237B KTU (Bridging Circuit)**

2.23 The 237B KTU provides an arrangement for bridging two PBX lines for conferencing purposes under control of an exclusion or nonlocking key at a key telephone station.

2.24 Refer to Section 518-310-407 for additional information on the 237B KTU.

**R. 238A KTU (CO or PBX Line Circuit)**

**2.25** The 238A KTU (Fig. 16) is the equivalent of nine 202D (Fig. 4) KTUs. It also contains circuitry to provide all the functions of the 232A or 232B KTUs (see paragraph 2.21).

**S. 239A KTU (CO or PBX Line Circuit)**

**2.26** The 239A KTU is the equivalent of eleven 202D (Fig. 4) KTUs. The 239A KTU is arranged in line groups of 4-4-3 and each line group can be associated with its own time-out and auxiliary interrupter equipment.

**T. 26B KTU (Automatic Cutoff Circuit)**

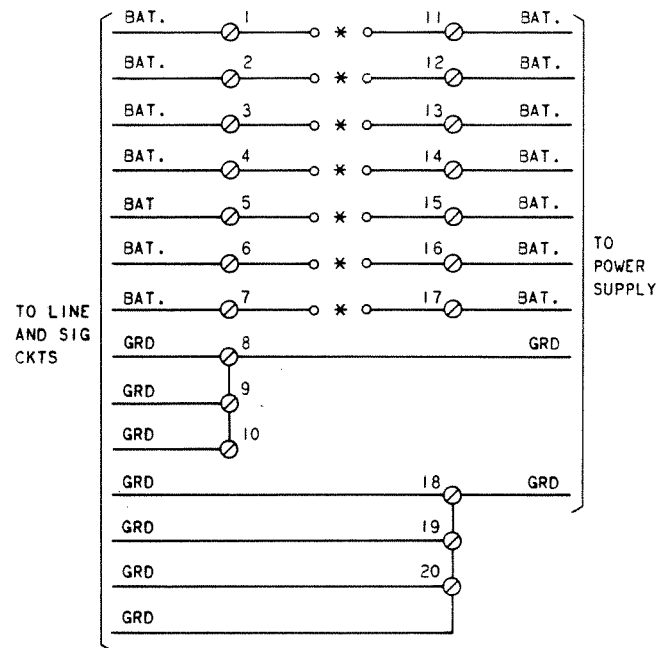
**2.27** The 26B KTU (Fig. 17) disconnects cutoff stations from CO or PBX lines under control of the 29B KTU. One 26B KTU will serve five cutoff stations.

**U. 29A KTU (Cut Through Relay Circuit)**

**2.28** The 29A KTU (Fig. 17) is used to provide manual cutoff on CO or PBX lines.

**V. 30A KTU (Time-Out Circuit)**

**2.29** The 30A KTU (Fig. 18) provides system time-out on abandoned calls. The KTU will time-out approximately 20 seconds after the call is abandoned.



\* 24-TYPE FUSES ARE NOT FURNISHED WITH THE KTU. THEY MUST BE PROVIDED LOCALLY.

**Fig. 1—Functional Schematic of 201C KTU (Fuse Unit)**



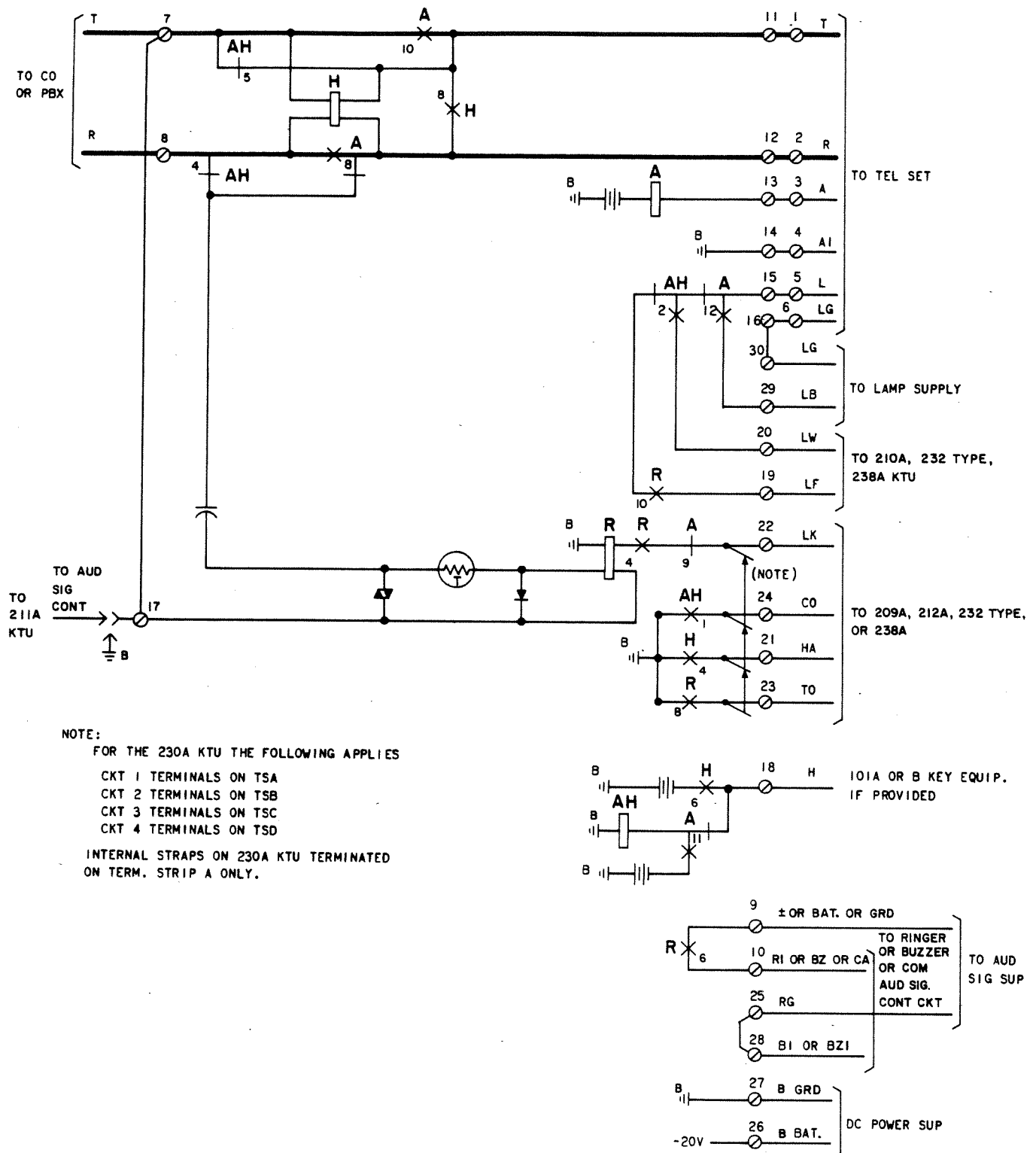


Fig. 3—Functional Schematic of 202C (MD) and 230A KTU (MD) (CO or PBX Line Circuit)

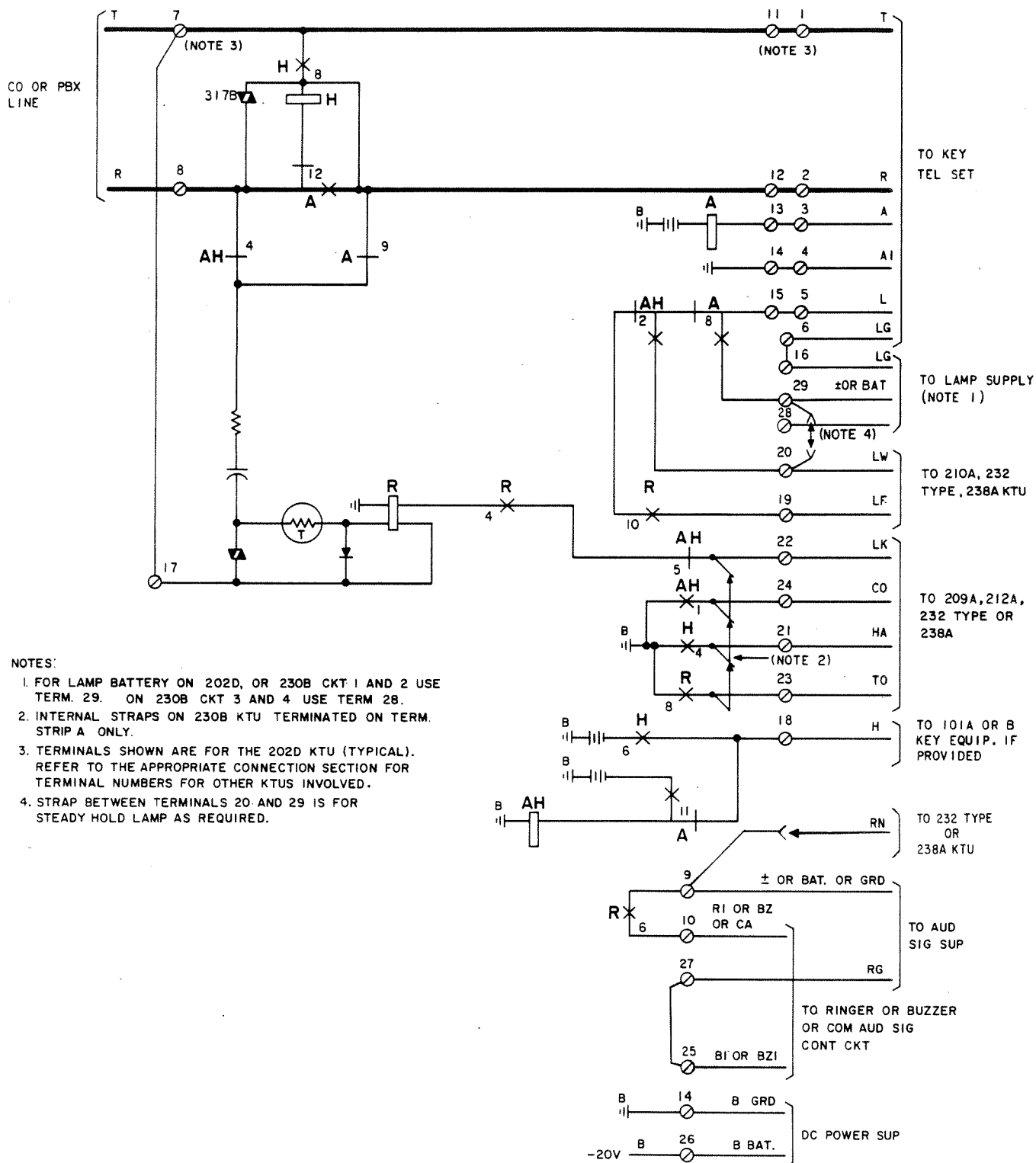


Fig. 4—Functional Schematic of 202D, 230B, 238A (Line Circuit Portion) and 239A KTUs (CO or PBX Line Circuit)

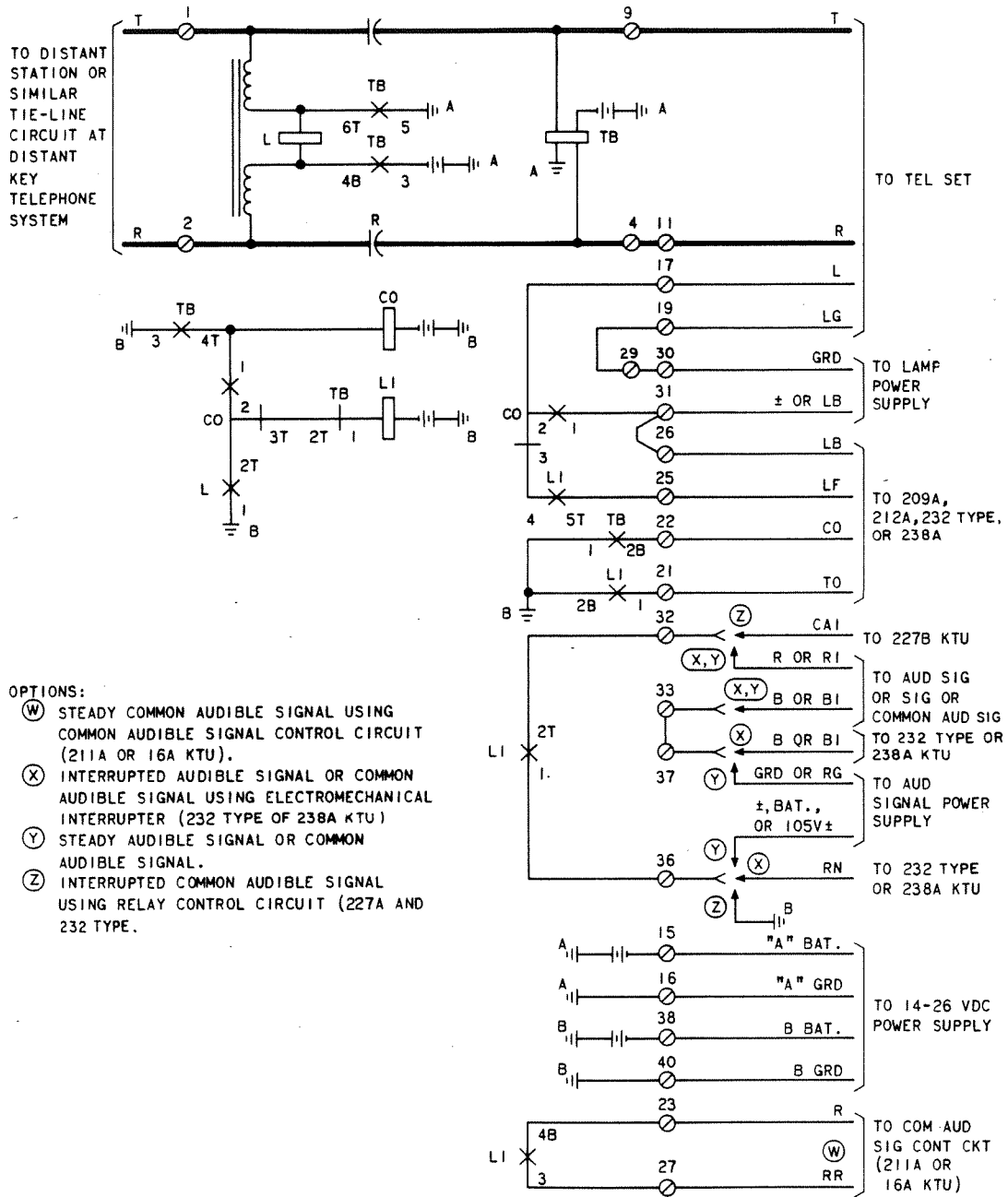


Fig. 5—Functional Schematic of 203A KTU (Automatic Tie Line Circuit)

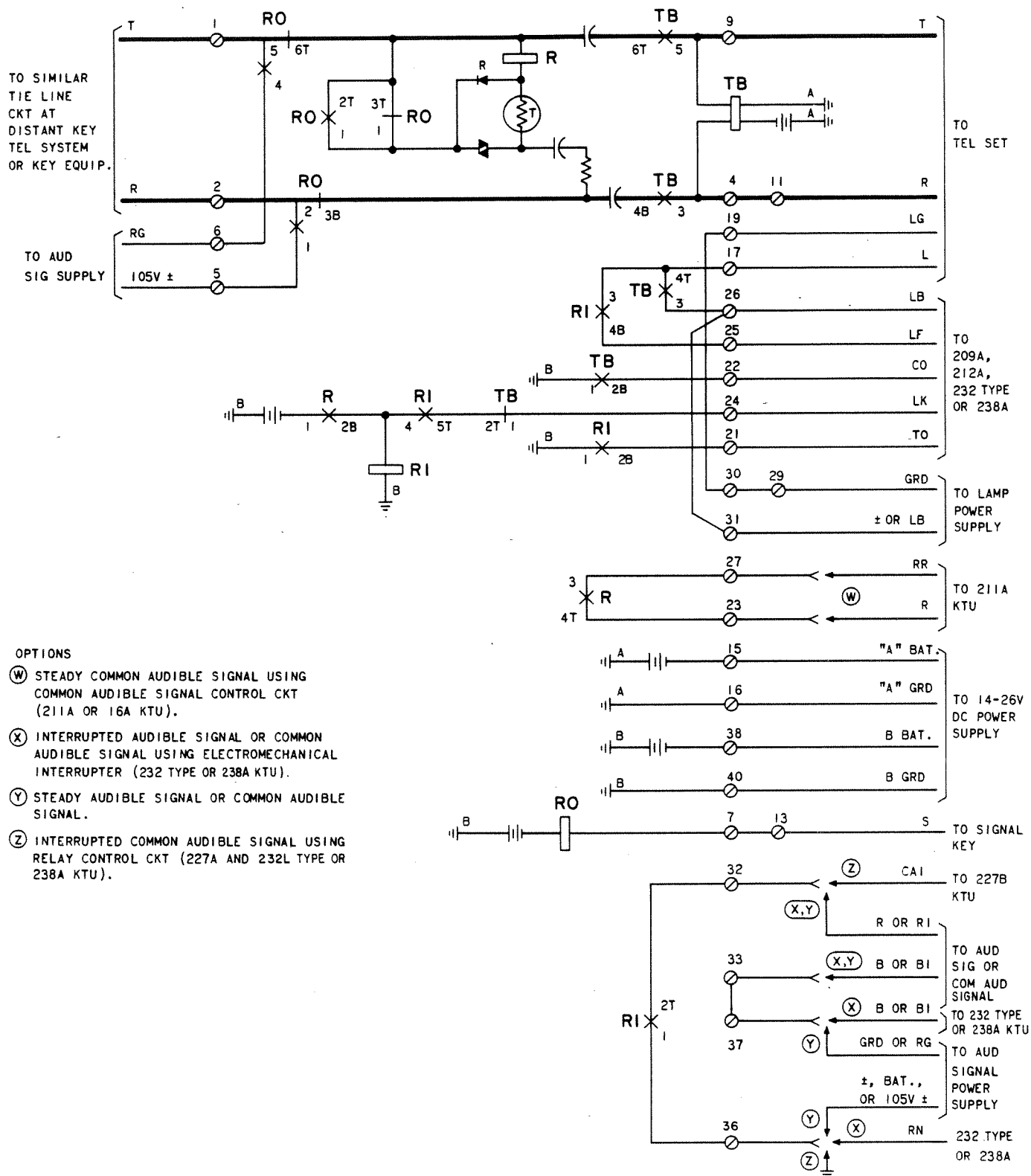


Fig. 6—Functional Schematic of 204A KTU (Ringdown Tie Line Circuit)

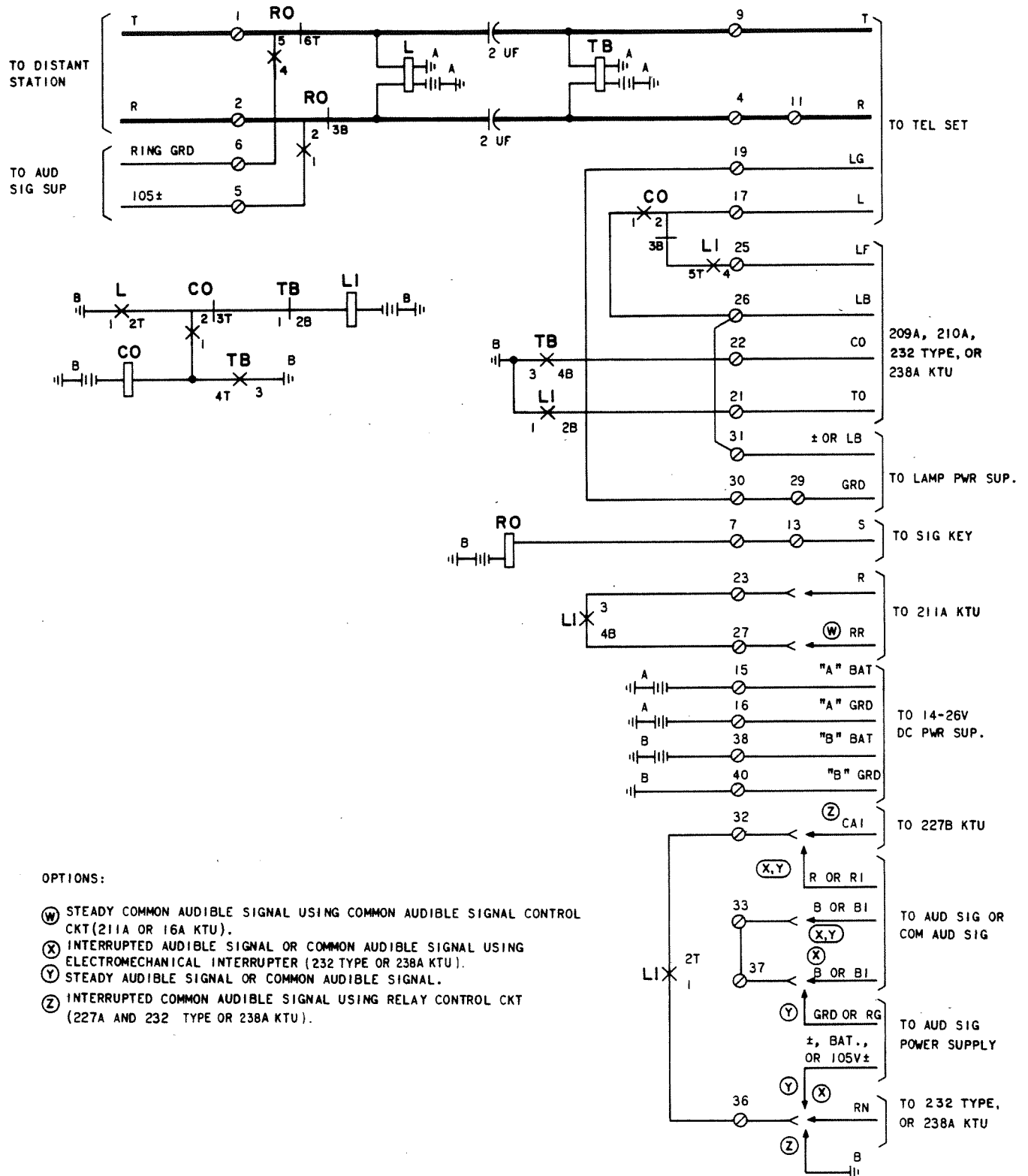
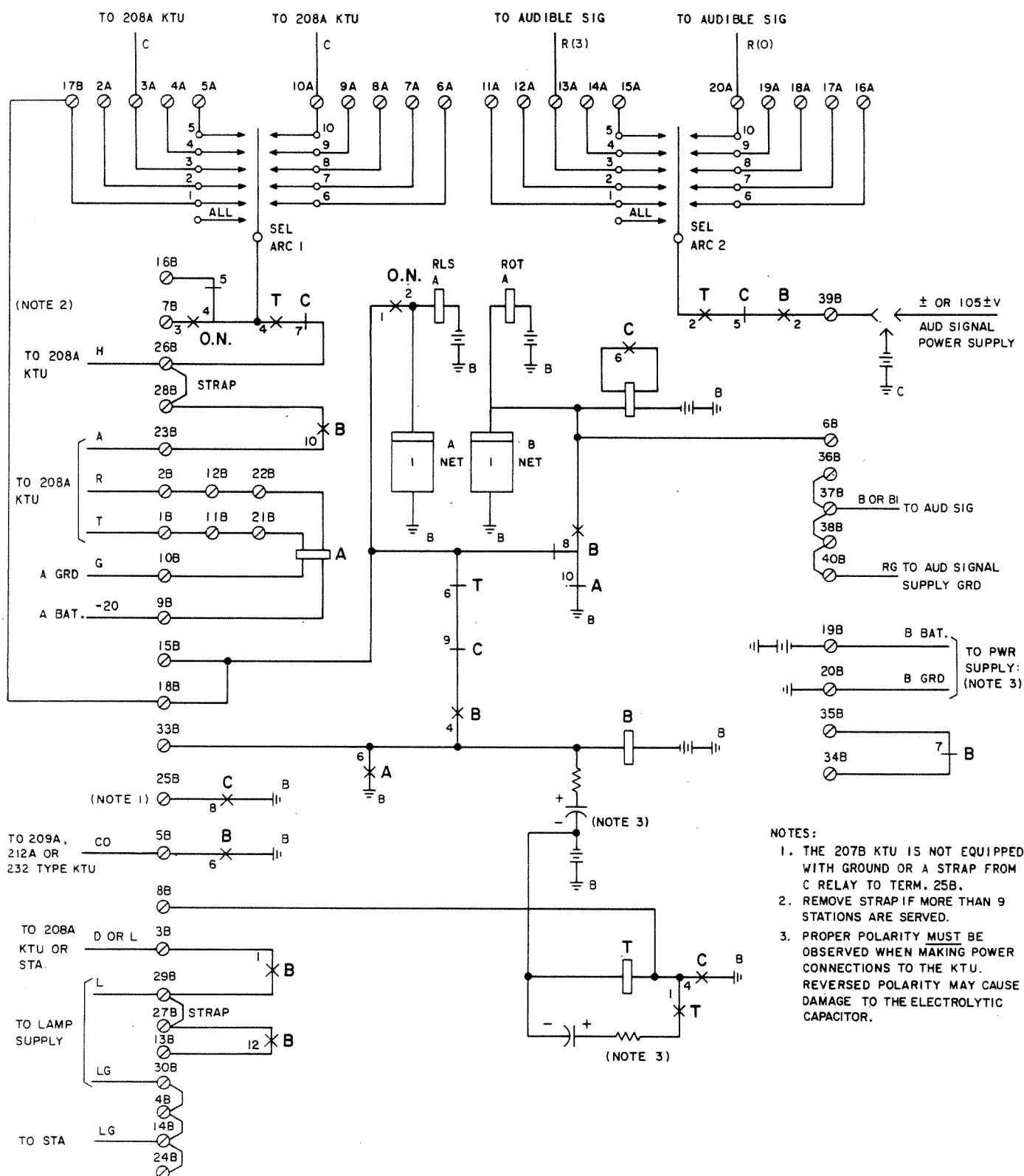


Fig. 7—Functional Schematic of 205A KTU (Station Line Circuit)



**Fig. 8—Functional Schematic of 207B (MD) and 207C KTU (Selector Circuit)**

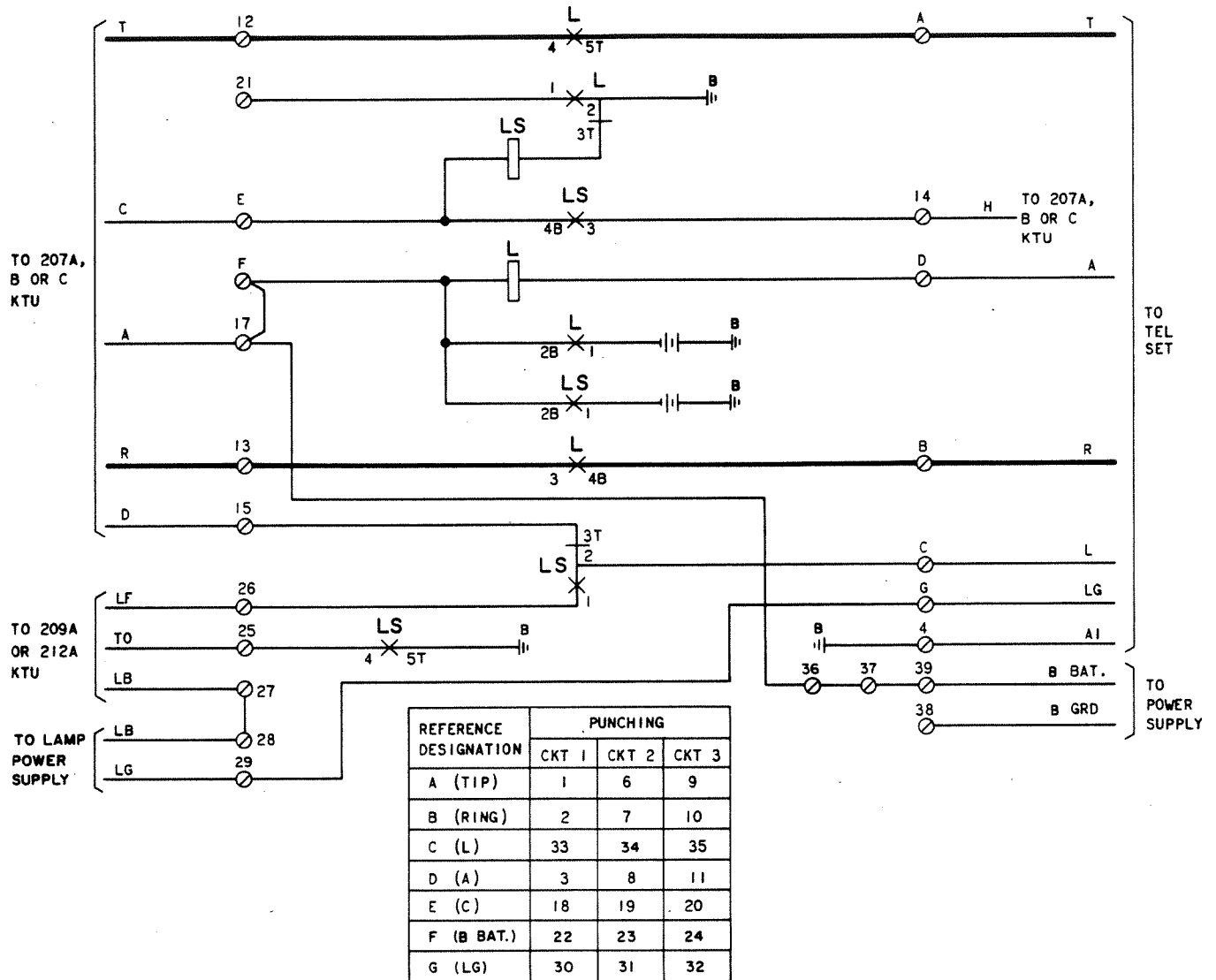
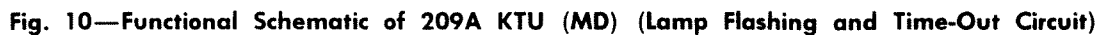


Fig. 9—Functional Schematic of 208A KTU (MD) (Signaling Unit for Flashing Line Lamps)

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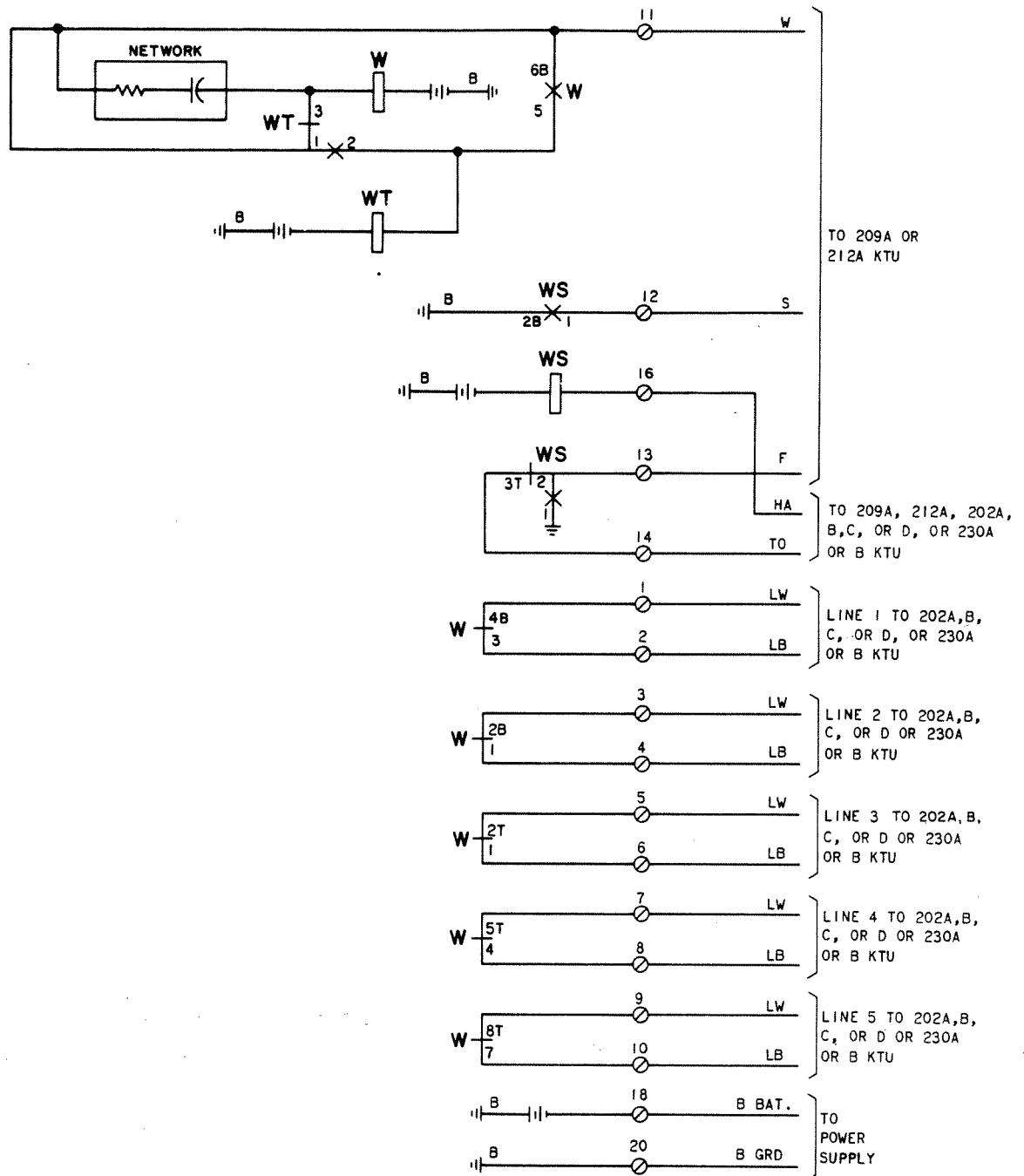
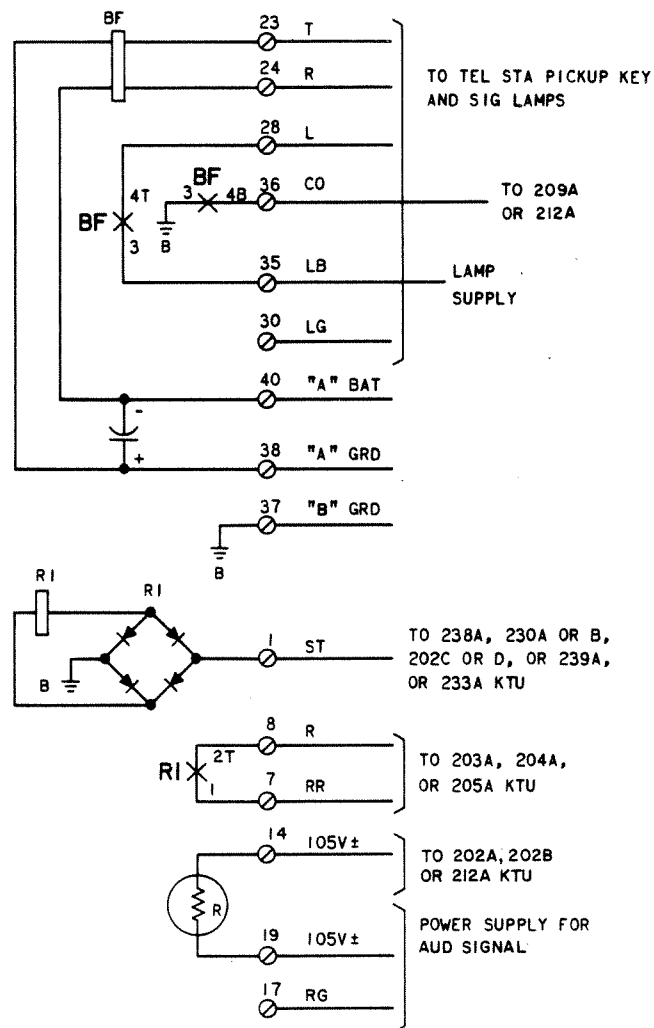


Fig. 11—Functional Schematic of 210A KTU (Wink Circuit)



**Fig. 12—Functional Schematic of 211A KTU (Intercom Line Circuit, Ringing Lamp Circuit, Noise Suppression Circuit, and Audible Signal Control Circuit)**

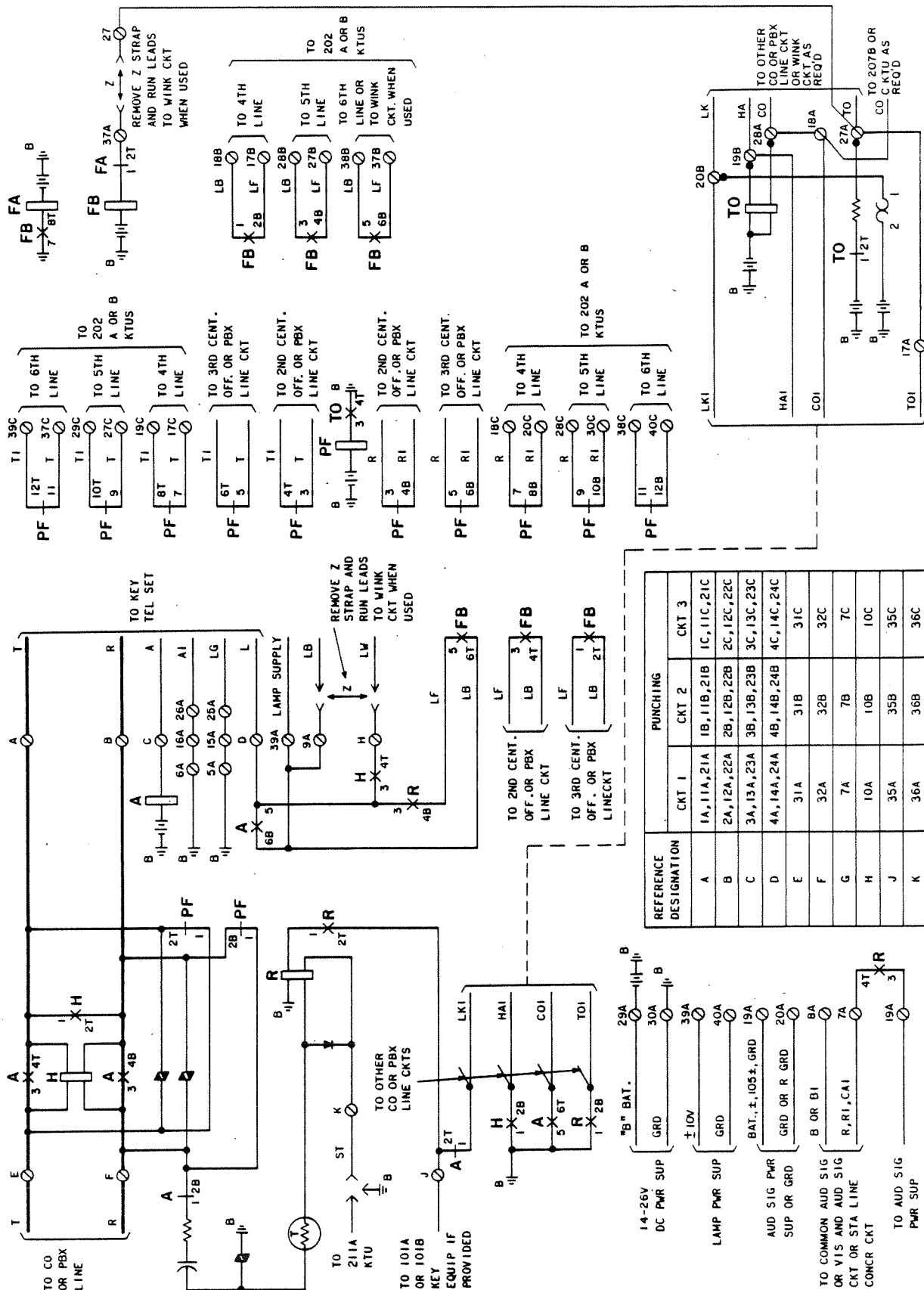
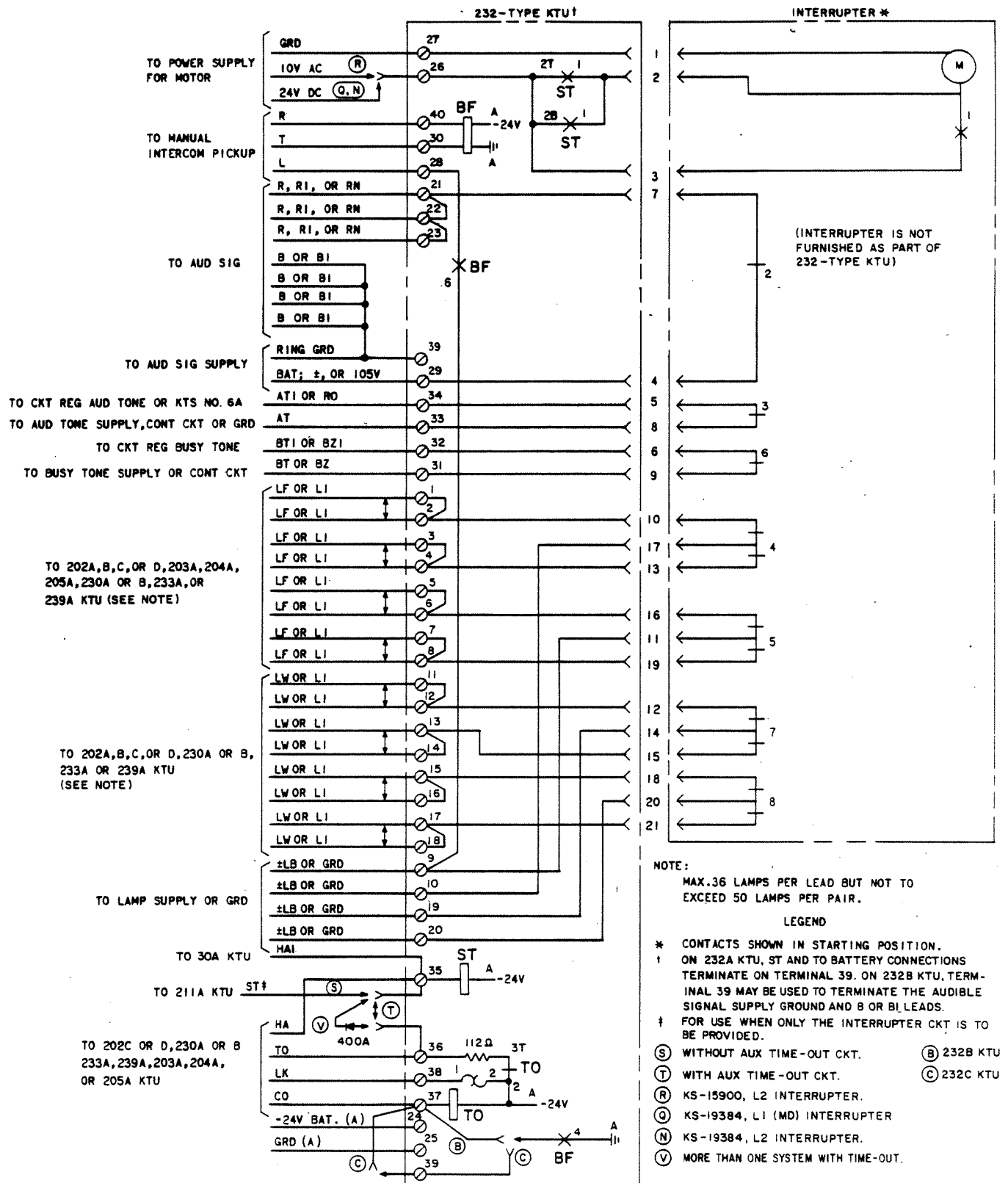
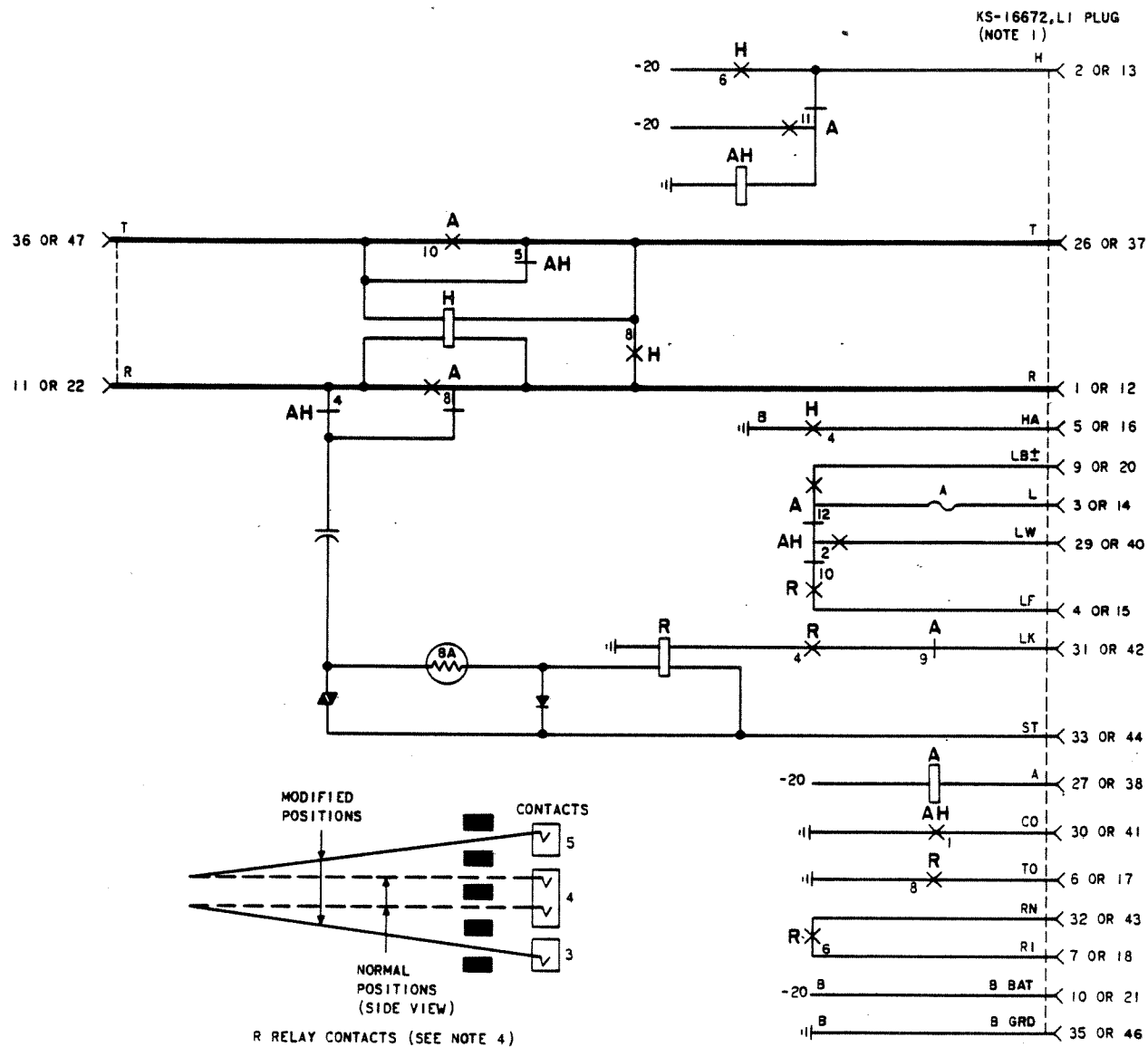


Fig. 13—Functional Schematic of 212A KTU (MD) (CO or PBX Line Circuit With Lamp Flashing and Incoming Signal Time-Out Circuits)





**Fig. 14—Functional Schematic of 232-TYPE KTU (Electro-Mechanical Flash, Wink, Ring, and Time-Out Circuit)**



## NOTES:

1. TERMINALS 1 TO 11 AND 26 TO 36 ARE FOR ODD NUMBERED CIRCUITS. TERMINALS 12 TO 22 AND 37 TO 41 ARE FOR EVEN NUMBERED CIRCUITS.
2. THE POWER SUPPLY LEADS AND THE LEADS TO THE CENTRAL OFFICE OR PBX LINE ARE CONNECTED TO THE TERMINALS OF THE PLUG AS SHOWN BELOW:

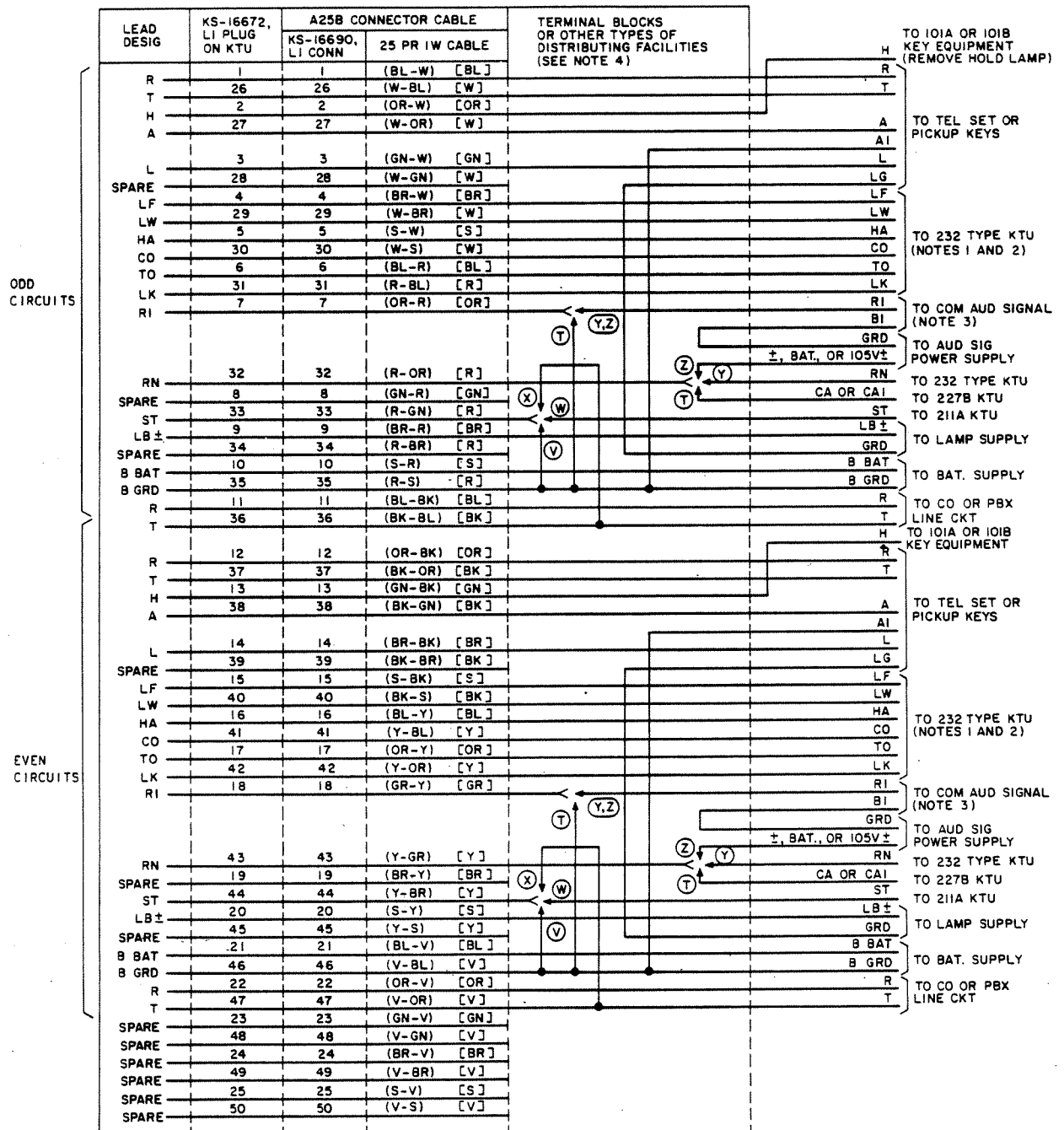
|             | LEAD      | CIRCUITS  |            |
|-------------|-----------|-----------|------------|
|             |           | 1-3-5-7-9 | 2-4-6-8-10 |
| CO OR PBX   | T         | 36        | 47         |
|             | R         | 11        | 22         |
| LAMP SUPPLY | GRD       |           |            |
|             | ± OR BAT. | 9         | 20         |
| BAT. SUPPLY | GRD       | 35        | 46         |
|             | -20       | 10        | 21         |

3. EACH PLUG PROVIDES LEADS FOR TWO LINE CIRCUITS WHICH ARE ARRANGED ACCORDING TO THE FOLLOWING TABLE:

|               | PLUG |   |   |   |    |
|---------------|------|---|---|---|----|
|               | A    | B | C | D | E  |
| ODD CIRCUITS  | 1    | 3 | 5 | 7 | 9  |
| EVEN CIRCUITS | 2    | 4 | 6 | 8 | 10 |

4. FOR NONLOCKING OPERATION OF R RELAY, MOVE THE UPPER WIRE SPRING CONTACT FROM ITS GUIDE IN CONTACT POSITION 4 TO THE LOWER GUIDE OF CONTACT POSITION 5. MOVE THE LOWER WIRE SPRING CONTACT FROM ITS GUIDE IN CONTACT POSITION 4 TO THE UPPER GUIDE OF CONTACT 3. CONTACT POSITIONS 3 AND 5 ARE UNEQUIPPED AND THE STATIONARY CONTACTS UNWIRED.

Fig. 15—Functional Schematic of 233A KTU (MD) (CO or PBX Line Circuit) (Sheet 1 of 2)



## NOTES:

1. LF LEADS MAY BE STRAPPED NOT TO EXCEED 50 LAMPS PER GROUP.
2. LW LEADS MAY BE STRAPPED NOT TO EXCEED 50 LAMPS PER GROUP.
3. FOR COMMON AUDIBLE SIGNAL WITH Z OR Y OPTION, STRAP ALL RI LEADS.
4. THE TYPE OF TERMINATING EQUIPMENT TO BE USED, SUCH AS 30- OR 66-TYPE CONNECTING BLOCKS, BUNCH BLOCKS, DISTRIBUTION FRAME, ETC., WILL BE GOVERNED BY THE SIZE AND NEEDS OF A PARTICULAR INSTALLATION.

( ) CURRENT COLOR CODE  
[ ] MD COLOR CODE

## CIRCUIT NOTES

| FEATURE OR OPTION    |                     |                                | APP OR WIR |
|----------------------|---------------------|--------------------------------|------------|
| LINE RINGING CIRCUIT | METALLIC            |                                | X          |
|                      | GROUNDED            |                                | V          |
|                      |                     | COM AUD CONTROL RELAY PROVIDED | W          |
| COMMON AUDIBLE       | INTERRUPTED RINGING | INTERRUPTER                    | Y          |
|                      |                     | COM AUD CONTROL RELAY PROVIDED | T          |
|                      | STEADY RINGING      |                                | Z          |

Fig. 15—Functional Schematic of 233A KTU (MD) (CO or PBX Line Circuit) (Sheet 2 of 2)

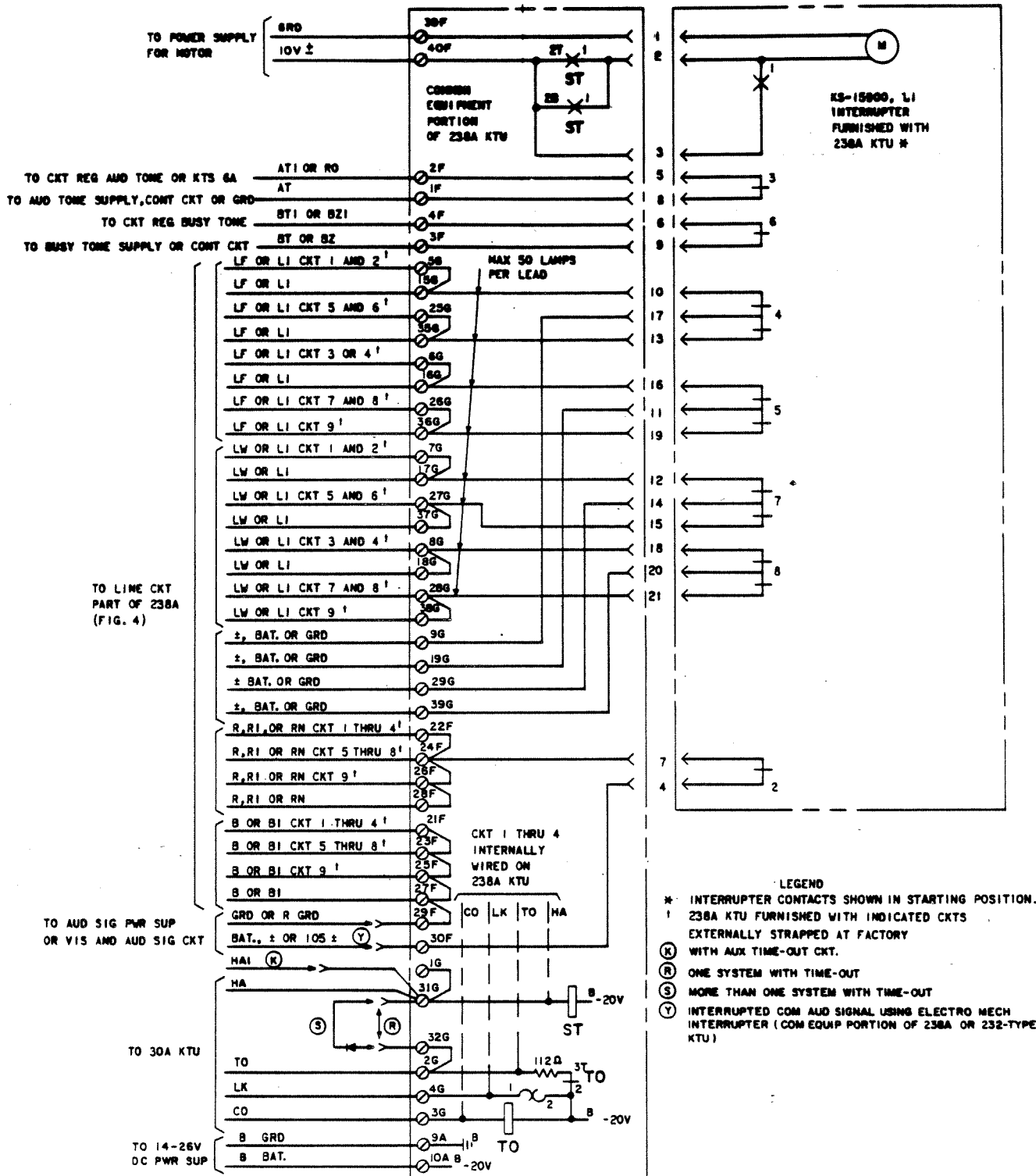


Fig. 16—Functional Schematic of 238A KTU (CO or PBX Line Circuit)



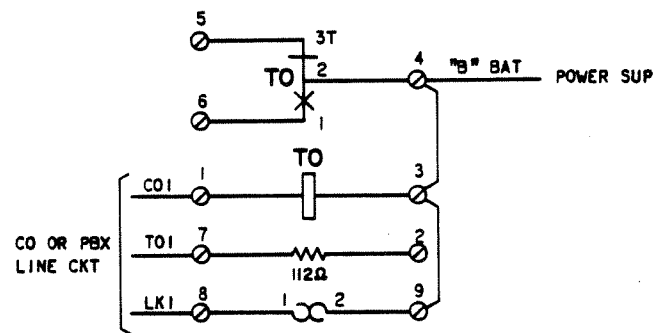


Fig. 18—Functional Schematic of 30A KTU (Time-Out Circuit)