

1A1 KEY TELEPHONE SYSTEM MAINTENANCE

1. GENERAL

- 1.01 This section provides information on the maintenance of the 1A1 key telephone system.
- 1.02 This section is reissued to show rearrangements and changes and to include information on the 212A key telephone unit and on the 202B key telephone unit.
- 1.03 The maintenance information for telephone sets, buzzers, power equipment, etc., used with this system and commonly used at other stations, is contained in other C sections covering these various apparatus items.
- 1.04 Information pertaining to the joint use line circuit (213A KTU) used with stations of other key telephone systems or key equipment is covered in Section C53.164, Joint Use Line Circuit.
- 1.05 When 1A1 key telephone system equipment is installed in accordance with the tables shown in the connections practices, Sections C66.200 through C66.222, 1A1 Key Telephone System, Connection Data, the equipment will be tagged to so indicate.
- 1.06 Due to extensive changes, marginal arrows have been omitted.

2. RADIO SIGNAL DEMODULATION SUPPRESSION

- 2.01 Where interference is experienced either while talking or when a hold condition is placed on a line and the induction is originating between the central office or PBX and the equipment cabinet, install a 1542A inductor per Section C55.804, Radio Signal Suppression in Telephone Sets, 1542A Inductor, between the central office or PBX line and the 202A, 202B, or 212A key telephone unit.
- 2.02 If these inductors are not available, the KS-13814, L7 capacitor may be used by installing one each between terminals 1 and 3, and 2 and 4 on the 202A key telephone unit. On the 202B and 212A key telephone units, install one each between terminals 21 and 31, and 22 and 32 of the line circuit involved. Connect the bare wires of the capacitor under the terminal screws and cover the exposed portion of the bare wire with tape or tubular insulation.
- 2.03 Where induction is originating from both the line and local wiring and where 500-type key telephone sets are being used, it also may be necessary to install an additional KS-13814, L7 capacitor

between terminals F and L1 on the 425B network of the multibutton sets. An M1W cord, or equivalent, will be needed to connect terminal L1 on the 425B network and terminal N on the key assembly terminal strip, except in the 544A and 565A key telephone sets. In severe cases of induction, an additional capacitor also might be required and should be located between terminals R and RR of the 425B network.

3. TESTING AND ADJUSTMENT OF RELAYS

- 3.01 When necessary, tests and adjustments of relays shall be made in accordance with information in BSP B460, sections to meet the requirement tables in SD-69199-01 and SD-69203-01.

4. FIGURES

- 4.01 The figures included in this specification are for assistance in testing the various circuits of the 1A1 key telephone system. They are in addition to those found in standard drawings and are not intended to replace them. The figures illustrate individual features of circuits, and for the purpose of clarity, only those contacts and terminal punchings used in each circuit are shown. Strappings between punchings were placed either at the factory or at the time of installation. Part of the same relay, apparatus, or circuit may be shown in more than one figure. To facilitate selection of specific circuit features, an index is provided on page 2.
- 4.02 The 212A key telephone unit is a basic equipment unit which features the components of three 202B and one 209A key telephone units on one mounting plate.
- 4.03 The 202B key telephone unit is the same as the 202A except for the arrangement of the terminal punchings on the back of the unit.
- 4.04 The symbols A, B, C, and D are applicable only when power fusing is furnished in the 1A1 key equipment cabinet. They are defined as follows:
 - A — Talking battery and operation of talking circuit relays.
 - B — Relay operation only.
 - C — Relay operation and dc lamp supply.
 - D — Relay operation and dc audible signal.
- 4.05 When a common source of dc supply is used for the talking circuit and for the operation of audible signals, a noise suppression circuit must be used.

CIRCUIT	USED WITH	FIG.	PAGE
Automatic Tie Line Circuit 203A KTU	212A KTU	1	3
	209A KTU	2	4
Automatic Cutoff of Dial Selective Intercommunicating Line Circuit 26B KTU	207A and 208A KTU	3	5
Central Office or PBX Line Circuit 202A or 202B KTU with Common Audible Signal	16A, 211A, 212A KTU	4	6
	16A, 209A, 211A KTU	5	7
Central Office or PBX Line Hold Circuit 202A or 202B KTU	Key Telephone Set	6	8
Central Office or PBX Line Circuit 202A or 202B KTU	212A KTU	7	9
	209A KTU	8	10
Cut-through and Control Circuit for Automatic Cutoff 26B and 29A KTU		9-11	11-13
1. Station cannot cut off other stations and can be cut off except during a call (K wiring)		9	11
2. Station can cut off other stations and can be cut off except during a call (H and K wiring)		10	12
3. Station can cut off other stations and cannot be cut off (H and J wiring)		11	13
Code and Selective Signaling 3A KTU		12	14
Dial Selective Intercommunicating Line Circuit 207A KTU		13	15
Dial Selective Intercommunicating Line Circuit 207A KTU with Flashing Line Lamps	208A and 212A KTU	14	16
	208A and 209A KTU	15	17
Intercommunicating Line Battery Feed Circuit 31A KTU	23A, 209A, 211A, 212A KTU	16	18
Lamp Winking Circuit 210A KTU	202A or 202B KTU and 212A KTU	17	19
	202A or 202B KTU and 209A KTU	18	20
Lamp Resistance Circuit and AC Supply for Lamps (9 to 11 Volts)		19	21
Lamp Resistance Circuit When Flashing Lamp Feature is Provided — 101G Power Supply Connections		20	22
Power Failure Circuit 212A KTU	202A or 202B KTU	21	23
Power Failure Circuit 209A KTU	202A or 202B KTU	22	24
Ringer, Buzzer, and Noise Suppression Circuit for Battery Supply A		23	25
Ringdown Tie Line Circuit 204A KTU	212A KTU	24	26
	209A KTU	25	27
Ringling Lamp Circuit and AC Supply for Buzzers (15 to 25 Volts)		26	28
Station Line Circuit 205A KTU	212A KTU	27	29
	209A KTU	28	30
212A Key Telephone Unit		29	31

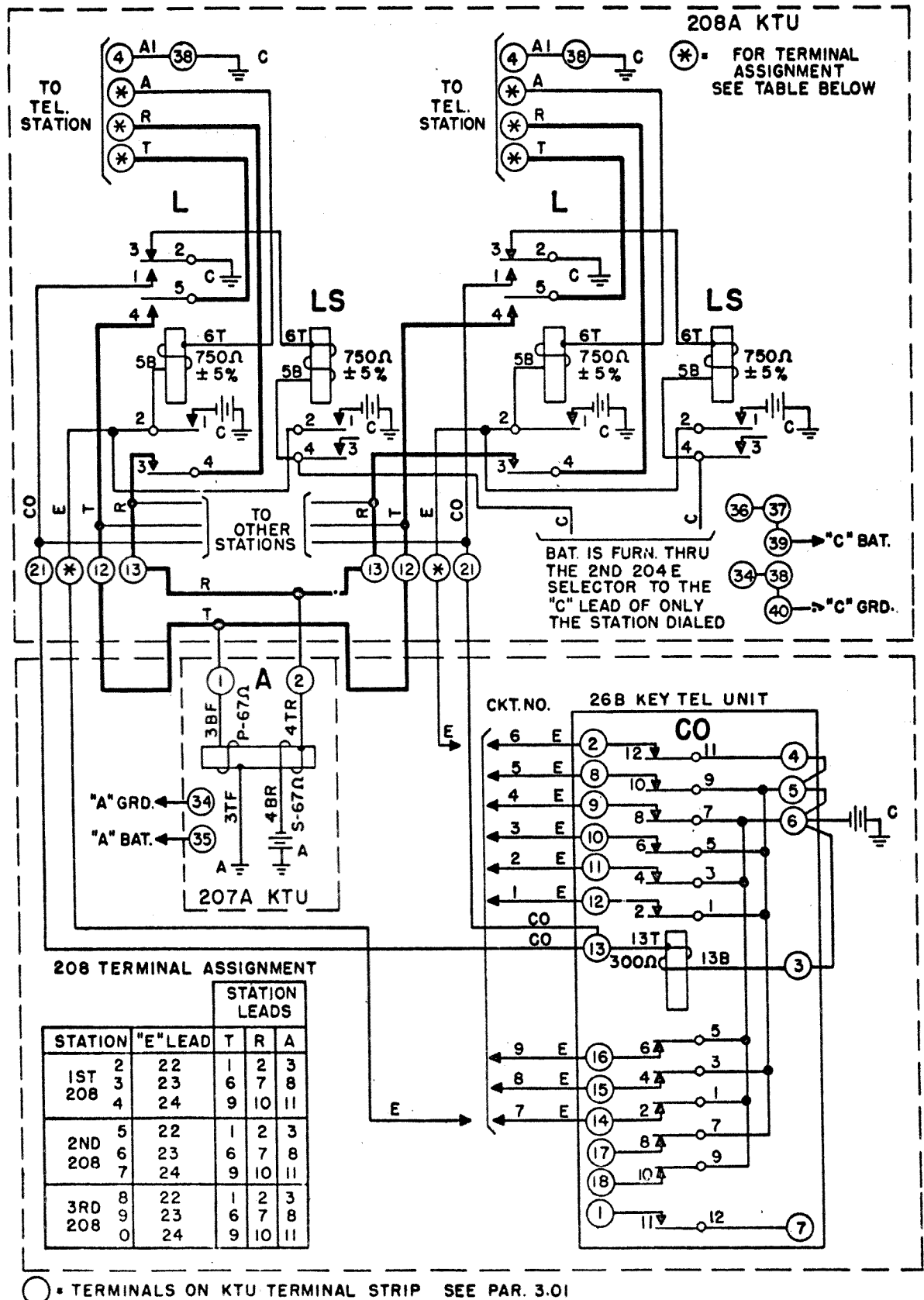
FIG. 1



AUTOMATIC TIE LINE CIRCUIT — 203A AND 209A KEY TELEPHONE UNITS

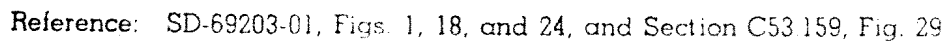


**AUTOMATIC CUT-OFF OF DIAL SELECTIVE
INTERCOMMUNICATING LINE CIRCUIT —
26B, 207A, AND 208A KEY TELEPHONE UNITS**

FIG. 3

Reference: SD-69199-01, Figs. 1, 12, and 13

CENTRAL OFFICE OR PBX LINE CIRCUIT —
COMMON AUDIBLE SIGNAL —
16A, 202A, 202B, 211A, AND 212A KEY TELEPHONE UNITS

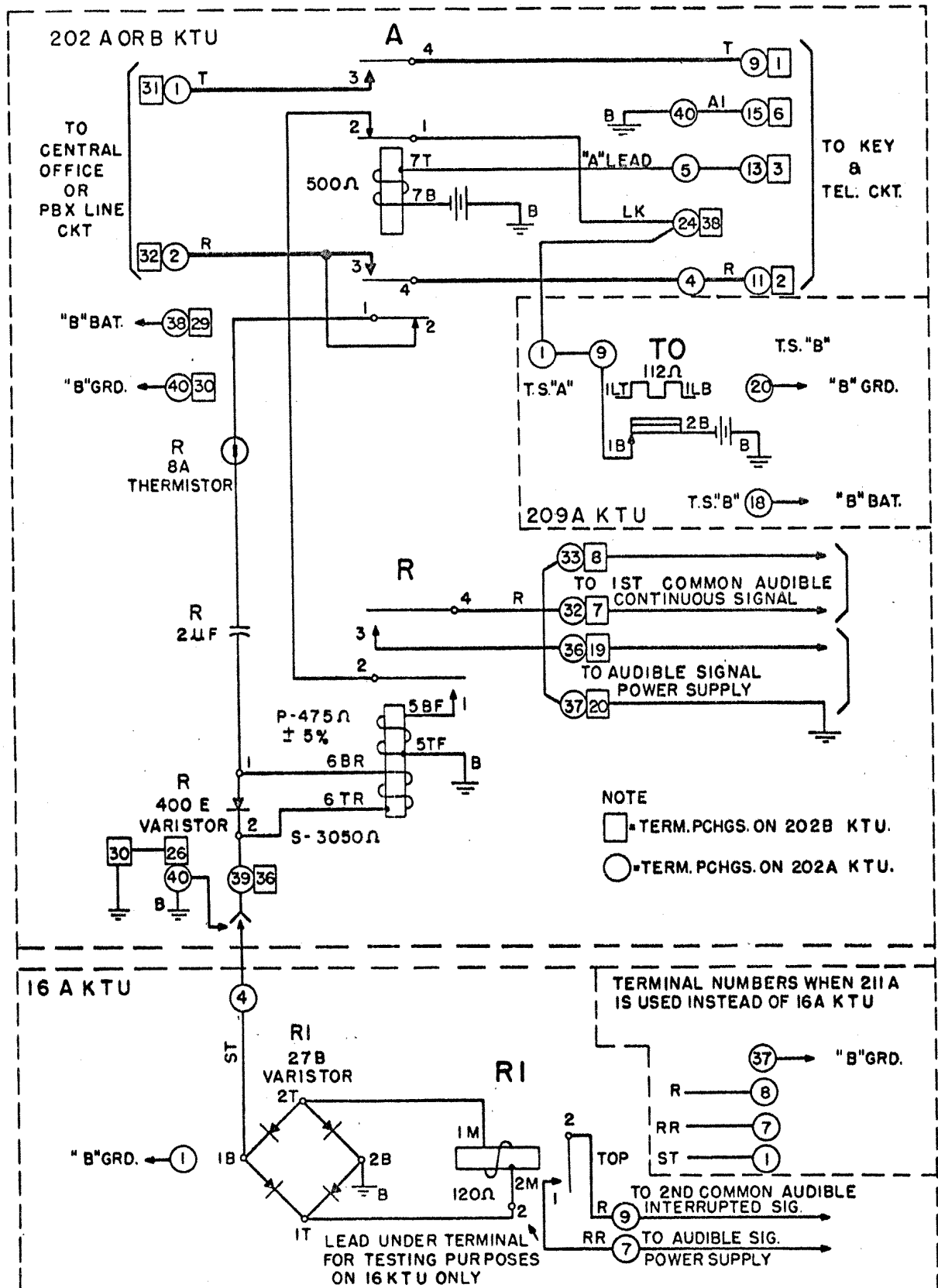


CENTRAL OFFICE OR PBX LINE CIRCUIT —

COMMON AUDIBLE SIGNAL —

16A, 202A, 202B, 209A, AND 211A KEY TELEPHONE UNITS

FIG. 5

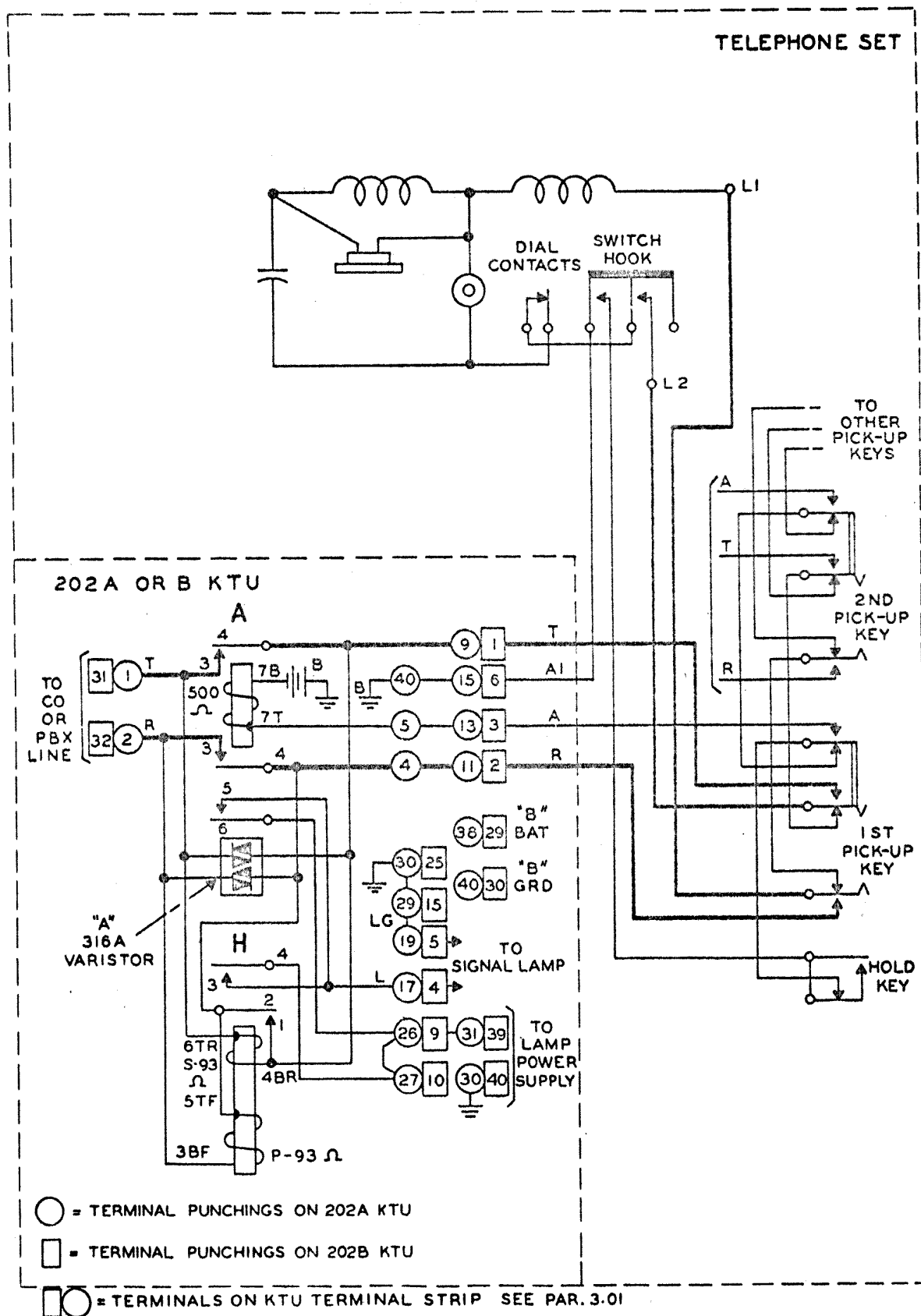


□ ○ = TERMINALS ON KTU TERMINAL STRIP SEE PAR. 3.01

Reference: SD-69203-01, Figs. 1, 6, 18, and 24

1A1 KEY TELEPHONE SYSTEM

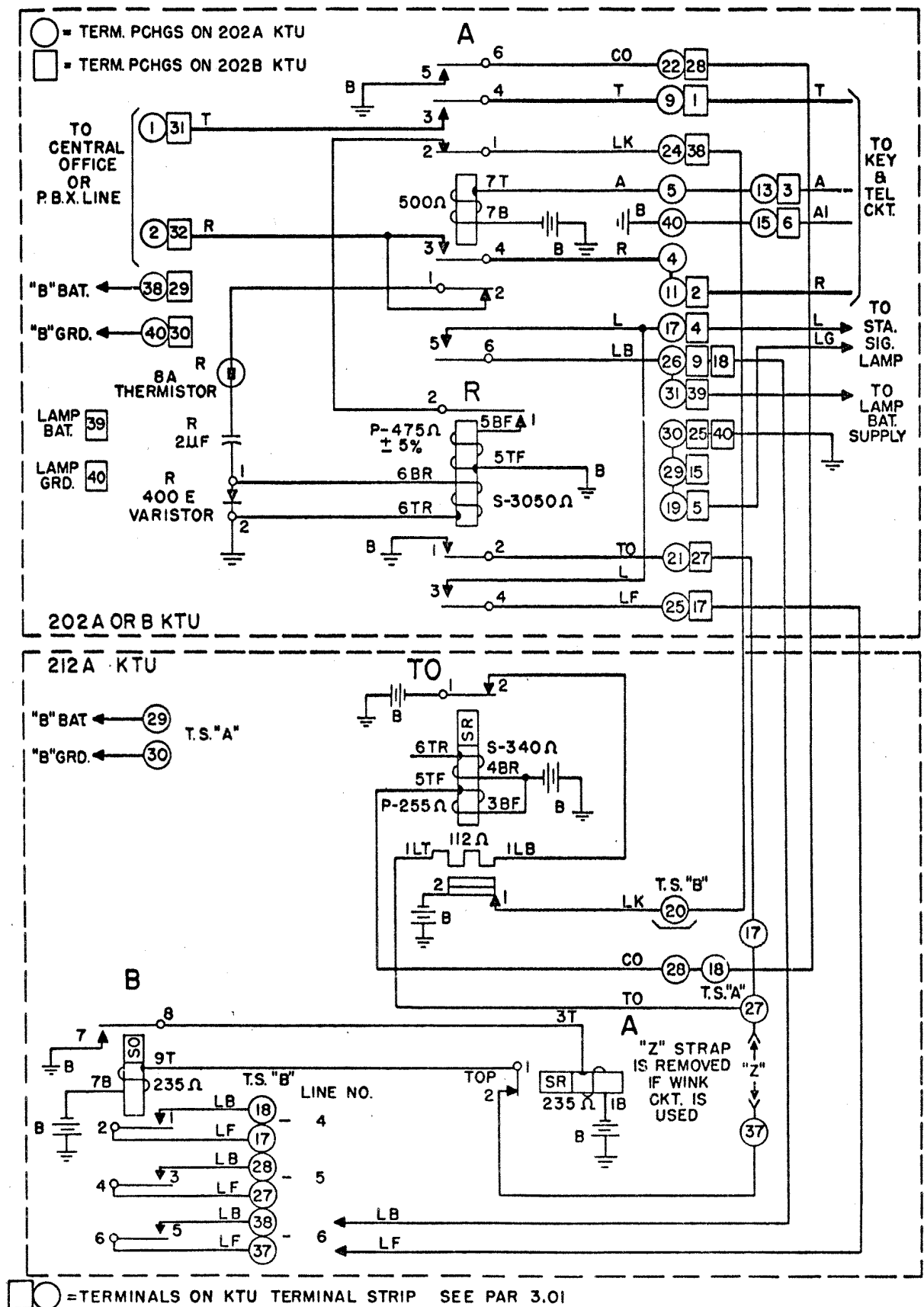
FIG. 6

CENTRAL OFFICE OR PBX LINE HOLD CIRCUIT —
202A AND 202B KEY TELEPHONE UNITS

Reference: SD-69203-01, Fig. 1

CENTRAL OFFICE OR PBX LINE CIRCUIT — LAMP FLASHING,
INCOMING VISUAL SIGNAL, TIME-OUT, AND BUSY SIGNAL CIRCUIT—
202A, 202B, AND 212A KEY TELEPHONE UNITS

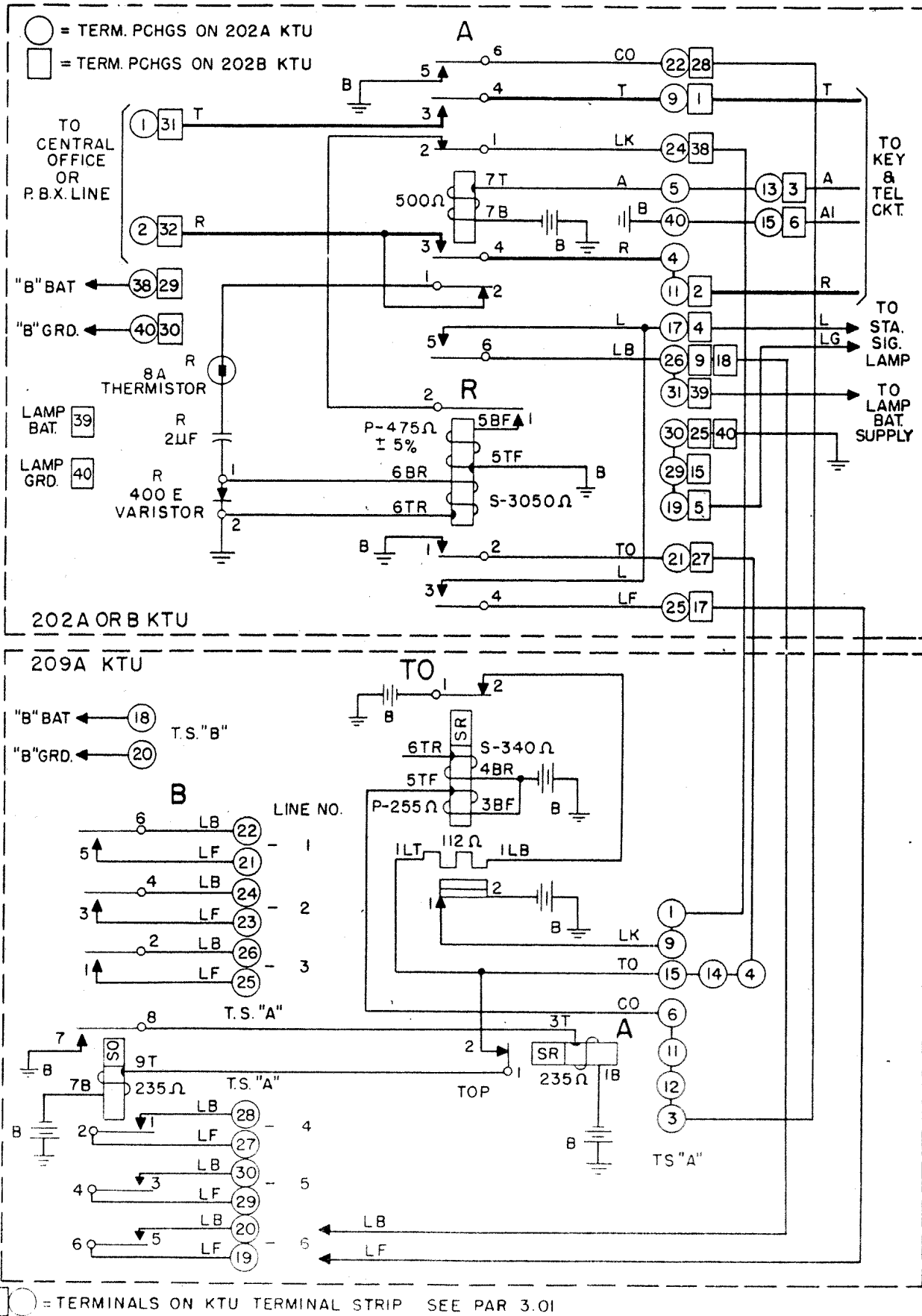
FIG. 7



Reference: SD-69203-01, Fig. 1, and Section C53.159, Fig. 29

FIG. 8

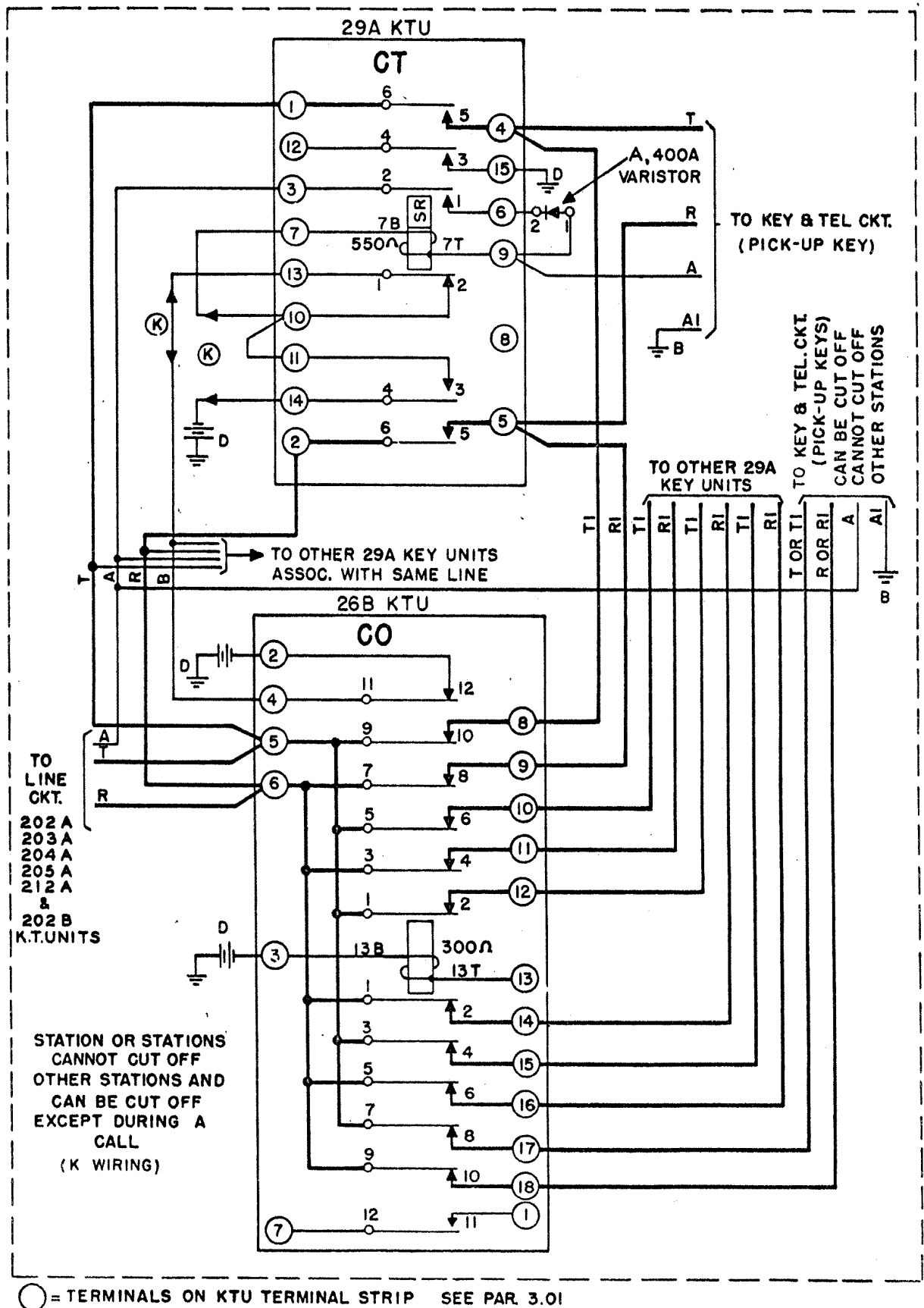
CENTRAL OFFICE OR PBX LINE CIRCUIT — LAMP FLASHING,
INCOMING VISUAL SIGNAL, TIME-OUT, AND BUSY SIGNAL CIRCUIT —
202A, 202B, AND 209A KEY TELEPHONE UNITS



Reference: SD-69203-01, Figs. 1 and 6

CUT-THROUGH AND CONTROL CIRCUIT
FOR AUTOMATIC CUT-OFF (K WIRING)—
26B AND 29A KEY TELEPHONE UNITS

FIG. 9

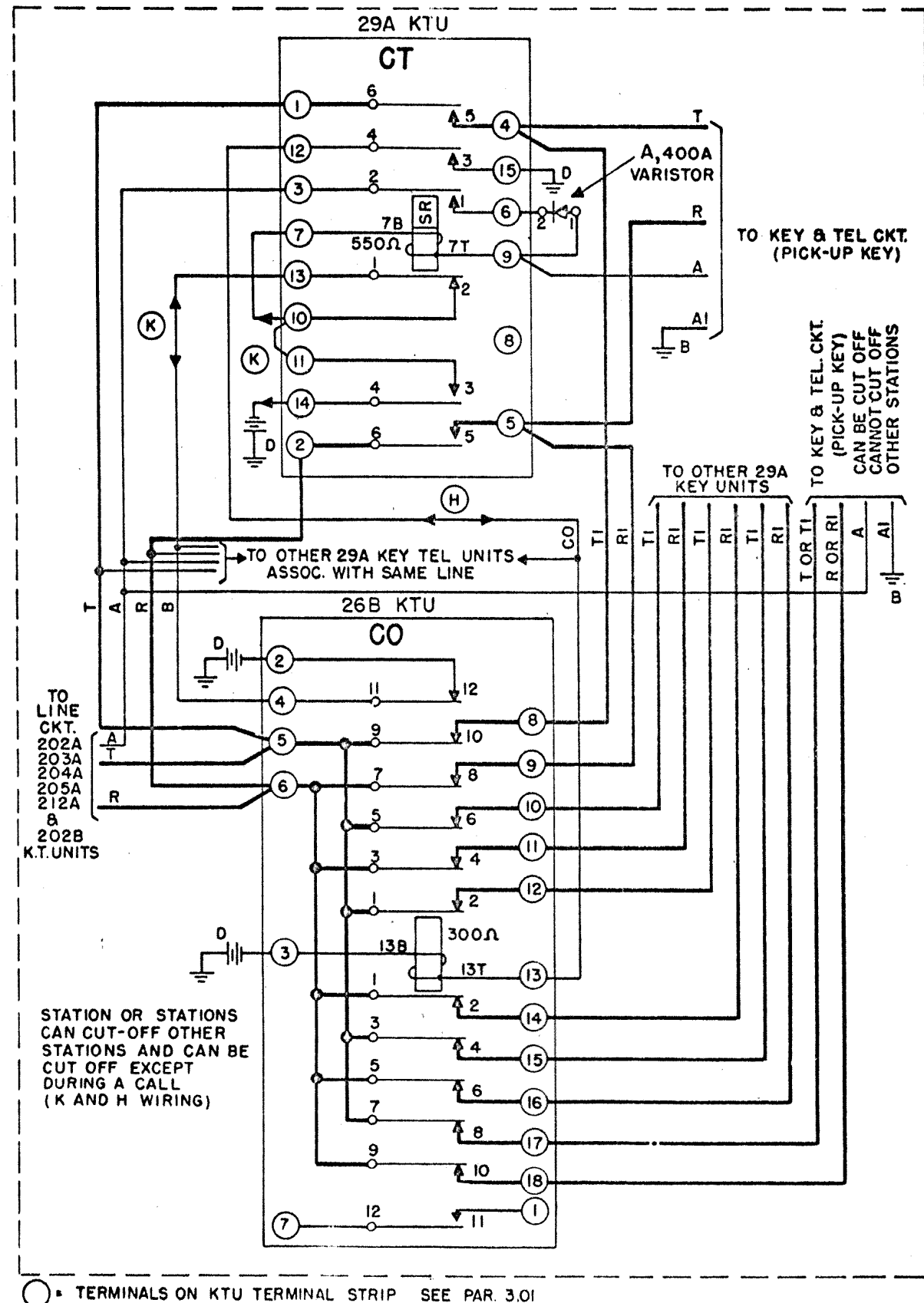


Reference: SD-69203-01, Figs. 11 and 12

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FIG. 10

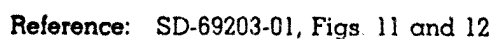
CUT-THROUGH AND CONTROL CIRCUIT
FOR AUTOMATIC CUT-OFF (H AND K WIRING)—
26B AND 29A KEY TELEPHONE UNITS



Reference: SD-69203-01, Figs. 11 and 12

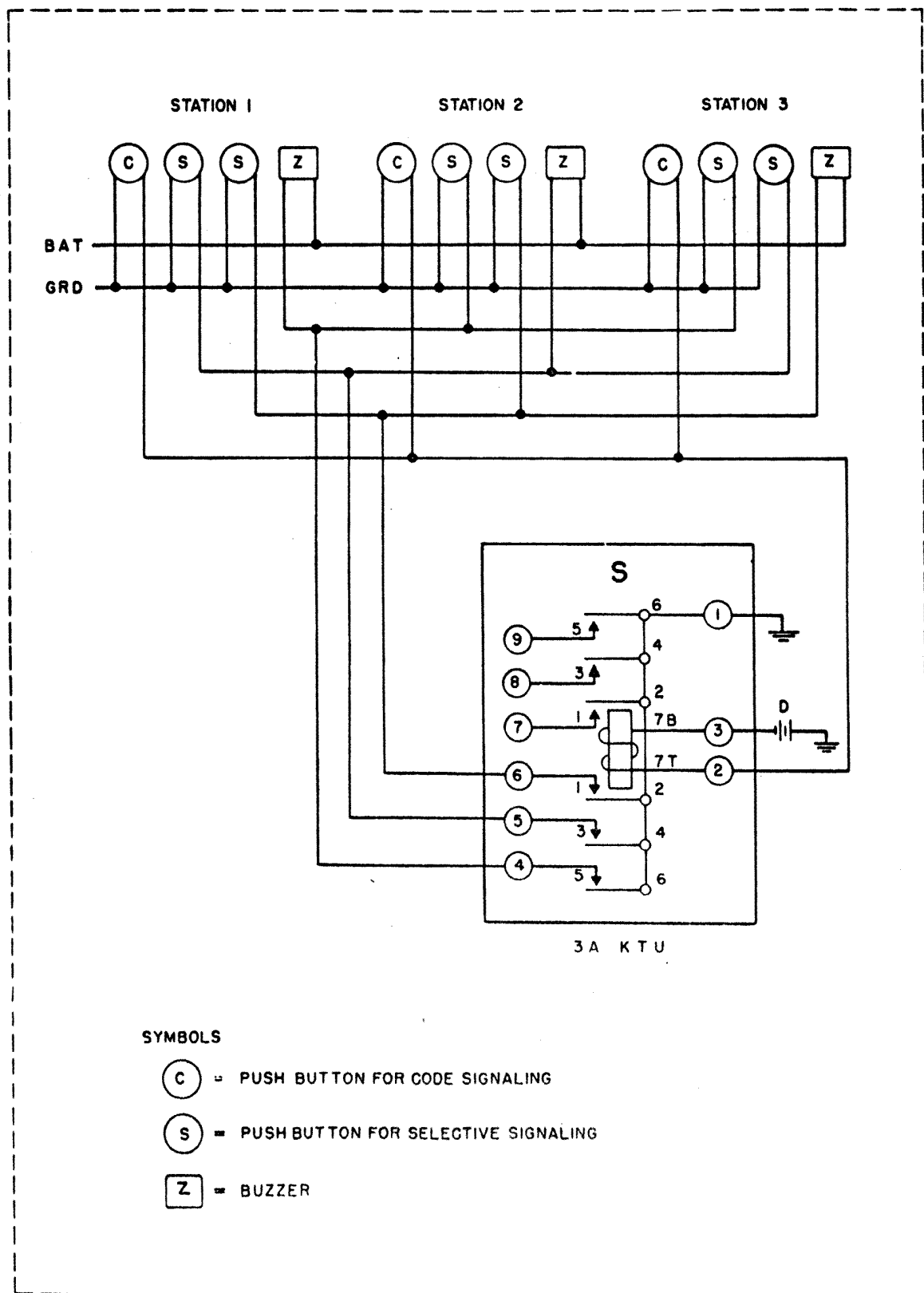
SECTION C53.159

FIG. 11



1A1 KEY TELEPHONE SYSTEM

FIG. 12

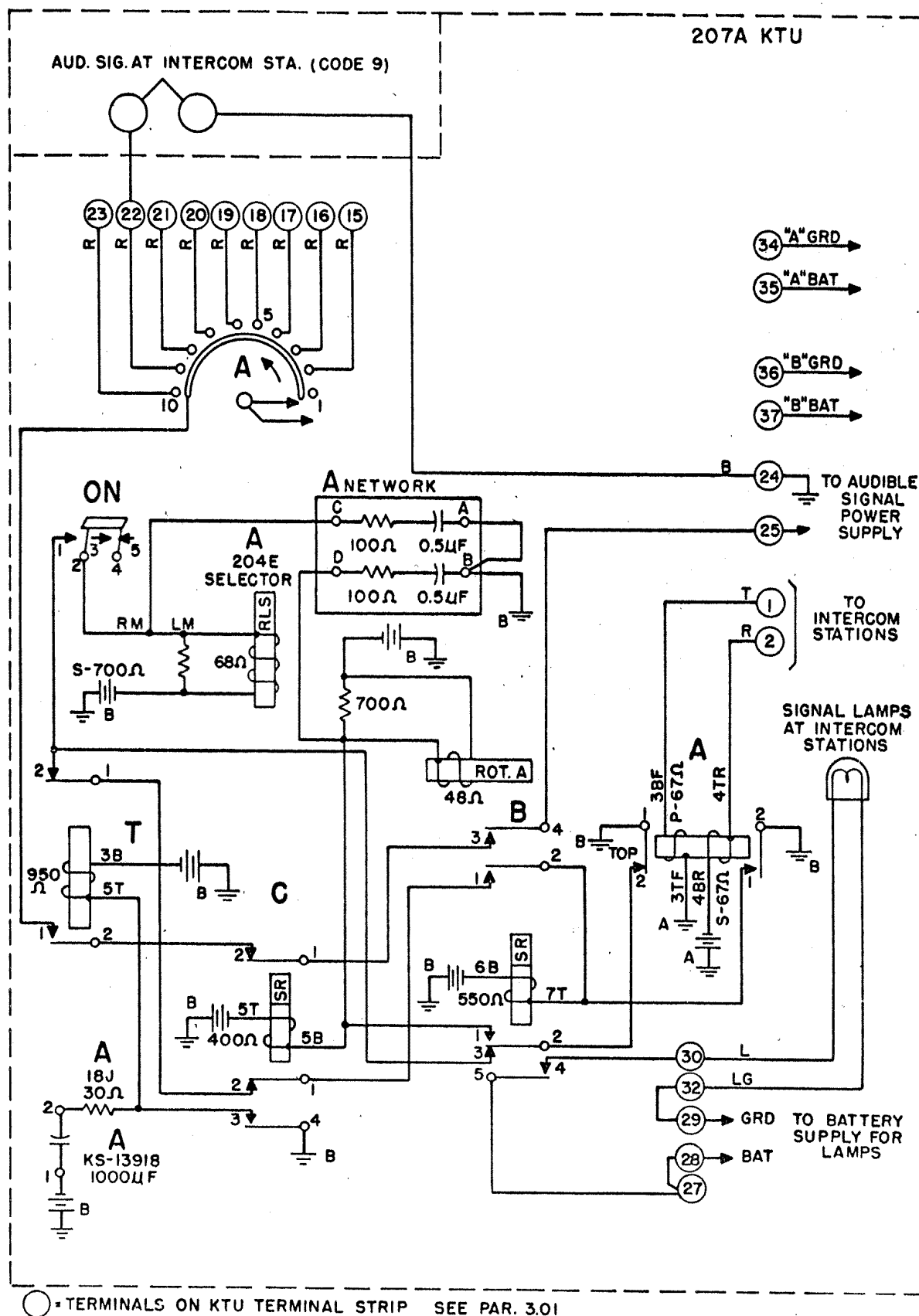
CODE AND SELECTIVE SIGNALING —
3A KEY TELEPHONE UNIT

○ = TERMINALS ON KTU TERMINAL STRIP SEE PAR. 3.01

Reference: SD-69203-01, Fig. 19

DIAL SELECTIVE INTERCOMMUNICATING LINE CIRCUIT —
207A KEY TELEPHONE UNIT

FIG. 13



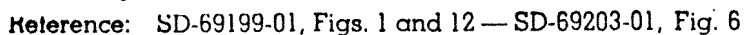
Reference: SD-69199-01, Fig. 1

DIAL SELECTIVE INTERCOMMUNICATING LINE CIRCUIT WITH FLASHING LINE LAMPS — 207A, 208A, AND 212A KEY TELEPHONE UNITS



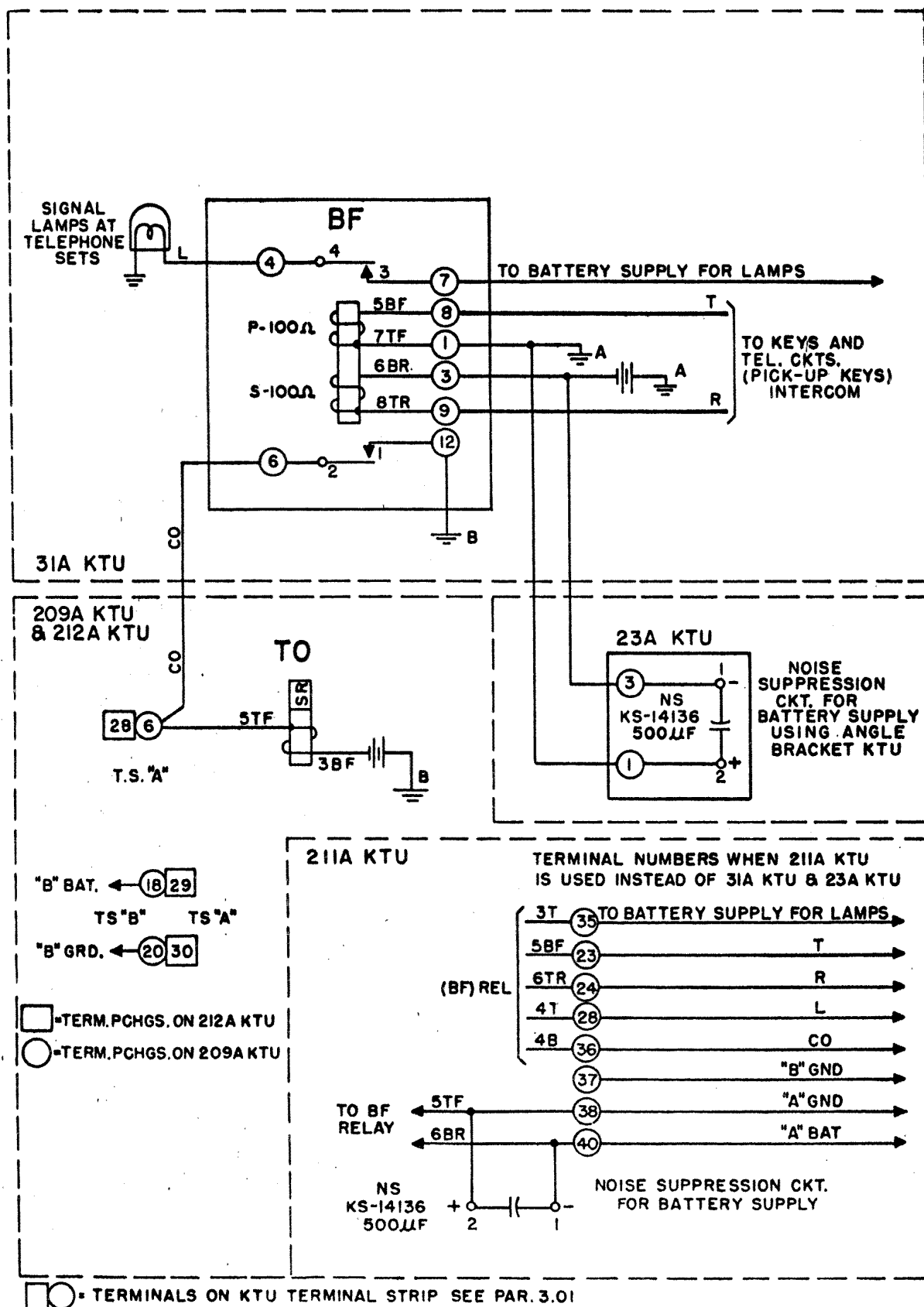
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FIG. 15



1A1 KEY TELEPHONE SYSTEM

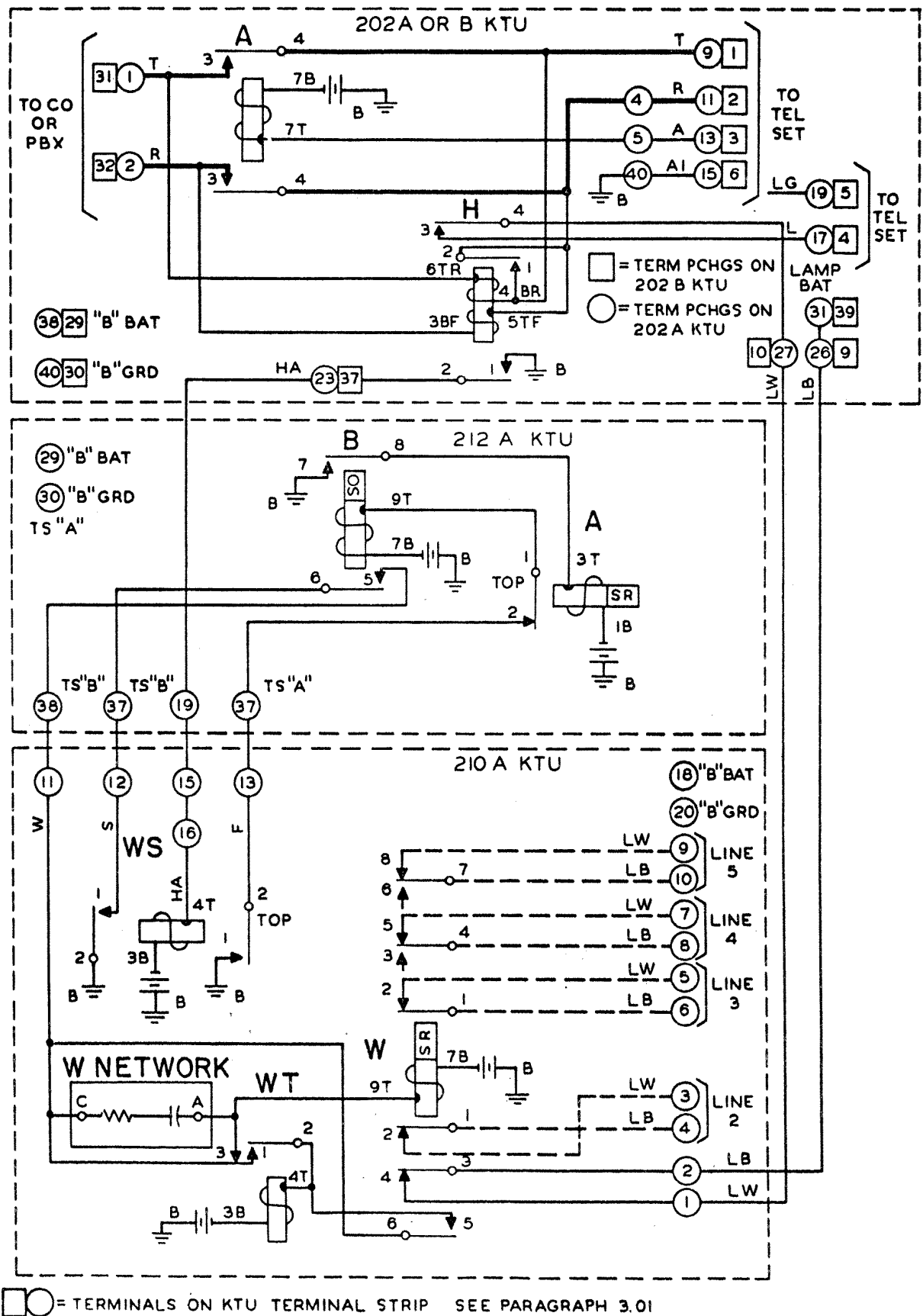
FIG. 16

INTERCOMMUNICATING LINE BATTERY FEED CIRCUIT —
23A, 31A, 209A, 211A, AND 212A KEY TELEPHONE UNITS

LAMP WINKING CIRCUIT —

202A, 202B, 210A, AND 212A KEY TELEPHONE UNITS

FIG. 17.



Reference: SD 69203-01, Figs. 1 and 2, and Section C 53.159, Fig. 29.

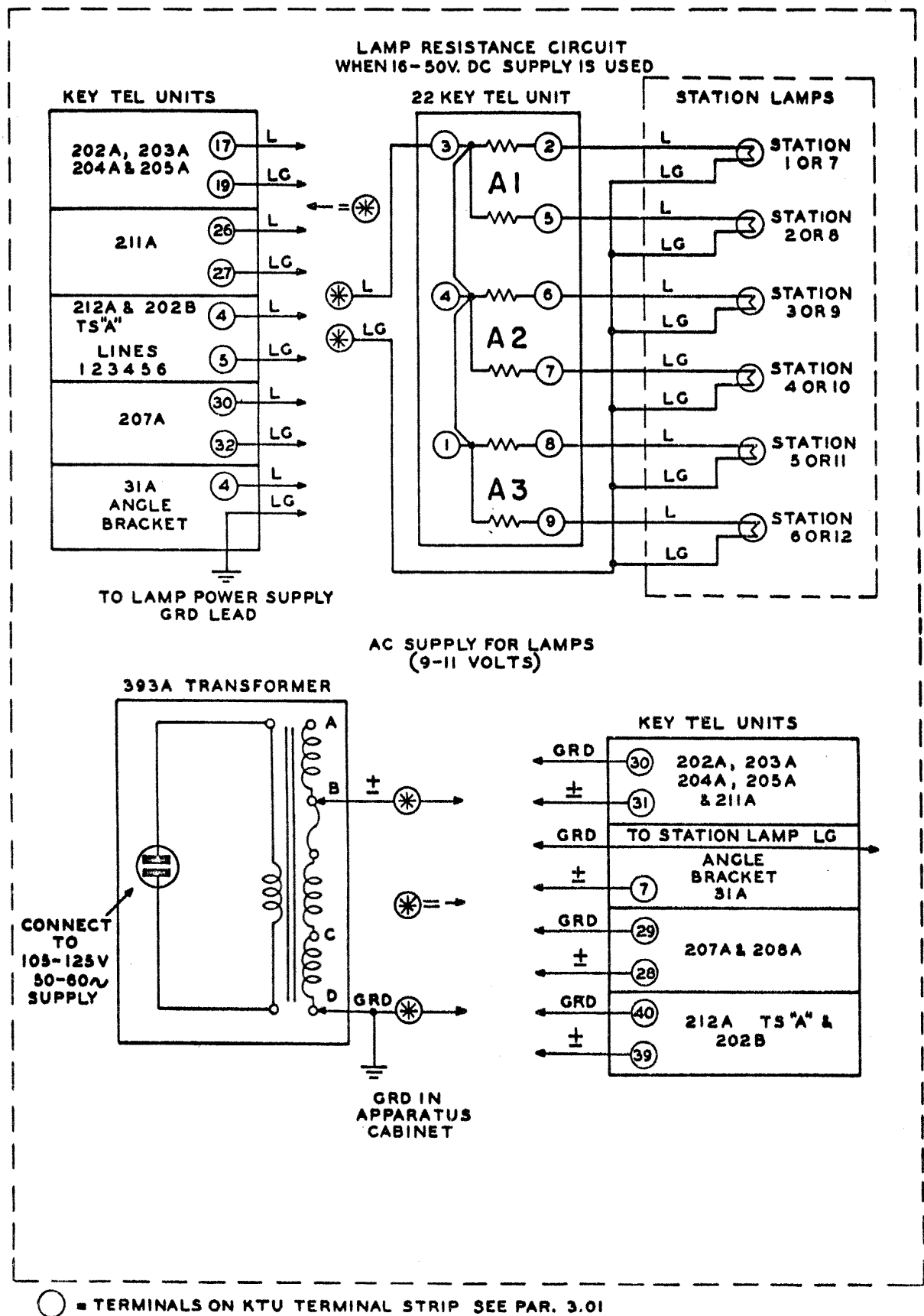
LAMP WINKING CIRCUIT —
202A, 202B, 209A, AND 210A KEY TELEPHONE UNITS



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LAMP RESISTANCE CIRCUIT AND AC SUPPLY
FOR LAMPS (9 TO 11 VOLTS)

FIG. 19

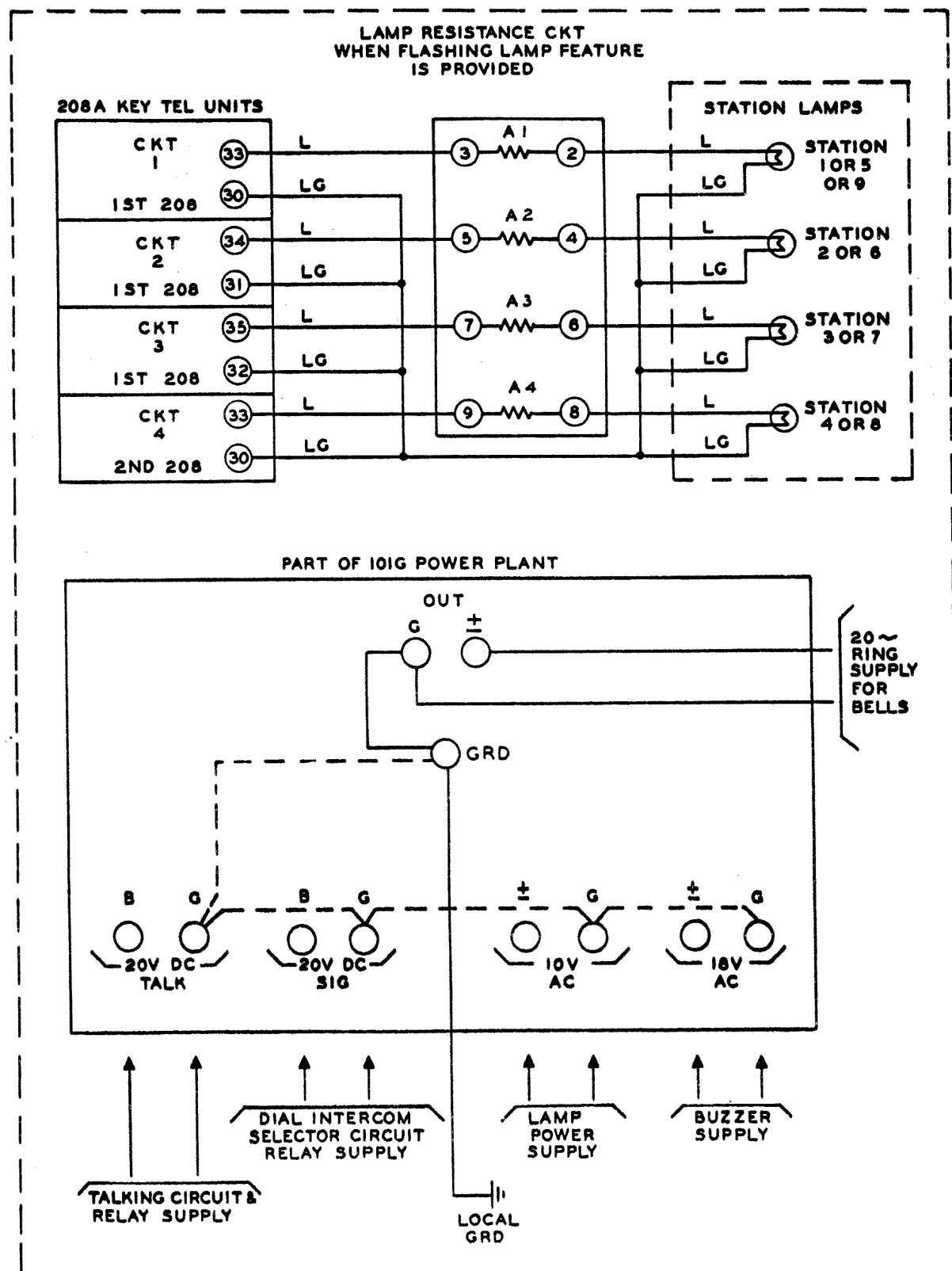


Reference: SD-69203-01, Figs. 13 and 16

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FIG. 20

LAMP RESISTANCE CIRCUIT WHEN FLASHING LAMP FEATURE IS PROVIDED — 101G POWER SUPPLY CONNECTIONS

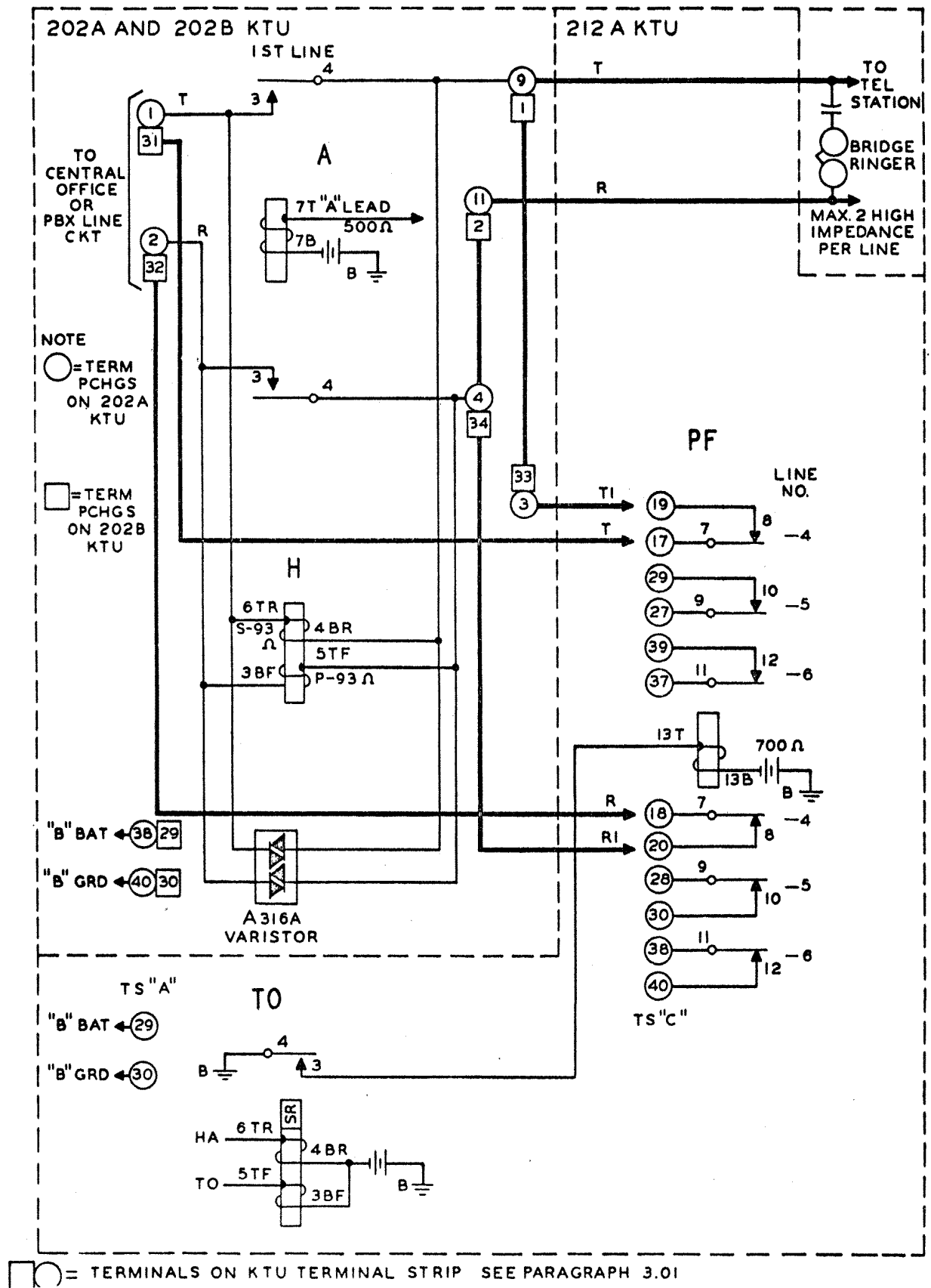


○ = TERMINALS ON KTU TERMINAL STRIP SEE PAR. 3.01

Reference: SD-69199-01, Fig. 11, and Section C53.513

POWER FAILURE CIRCUIT —
202A, 202B, AND 212A KEY TELEPHONE UNITS

FIG. 21

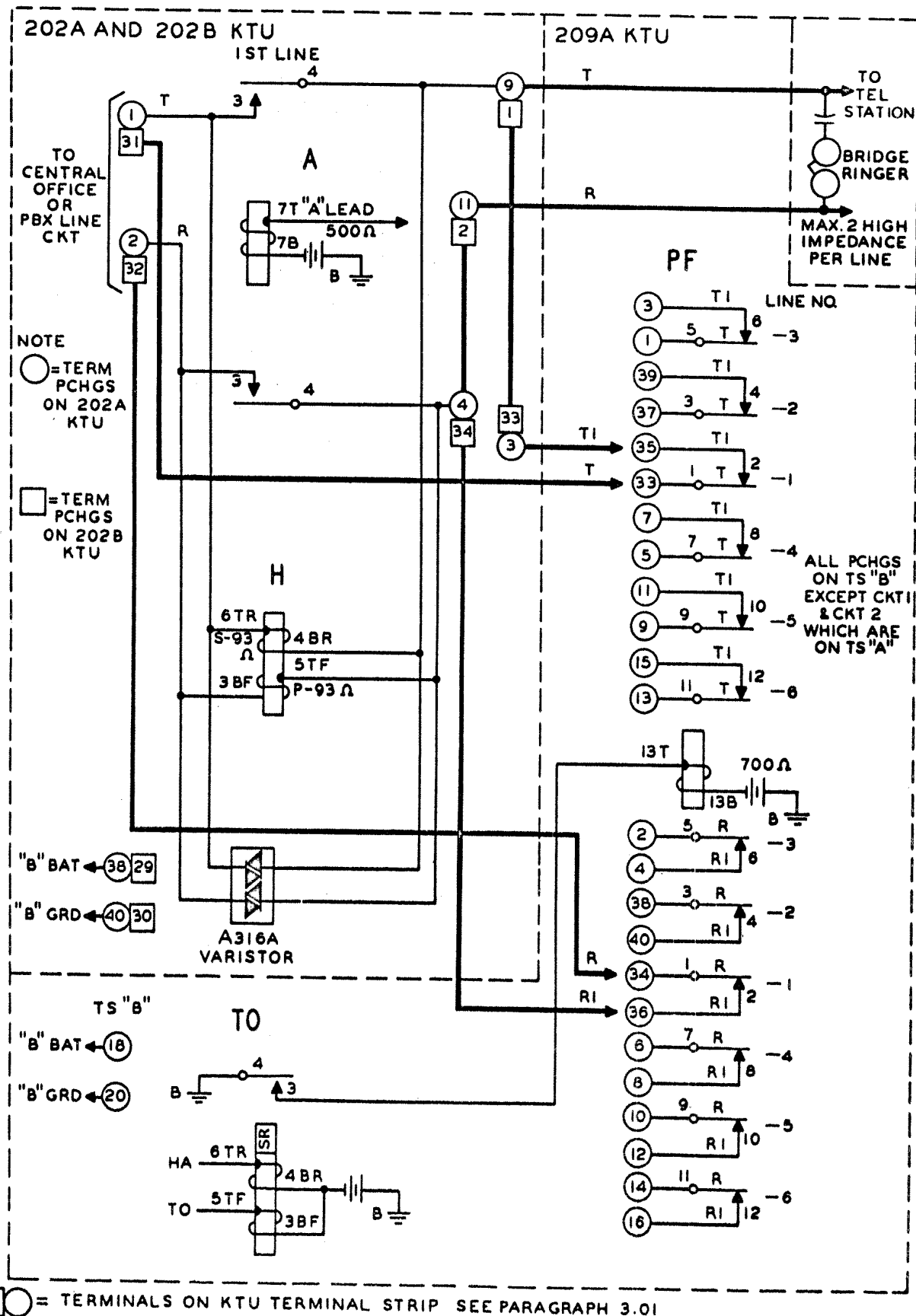


Reference: SD-69203-01, Fig. 1, and Section C53.159, Fig. 29

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FIG. 22

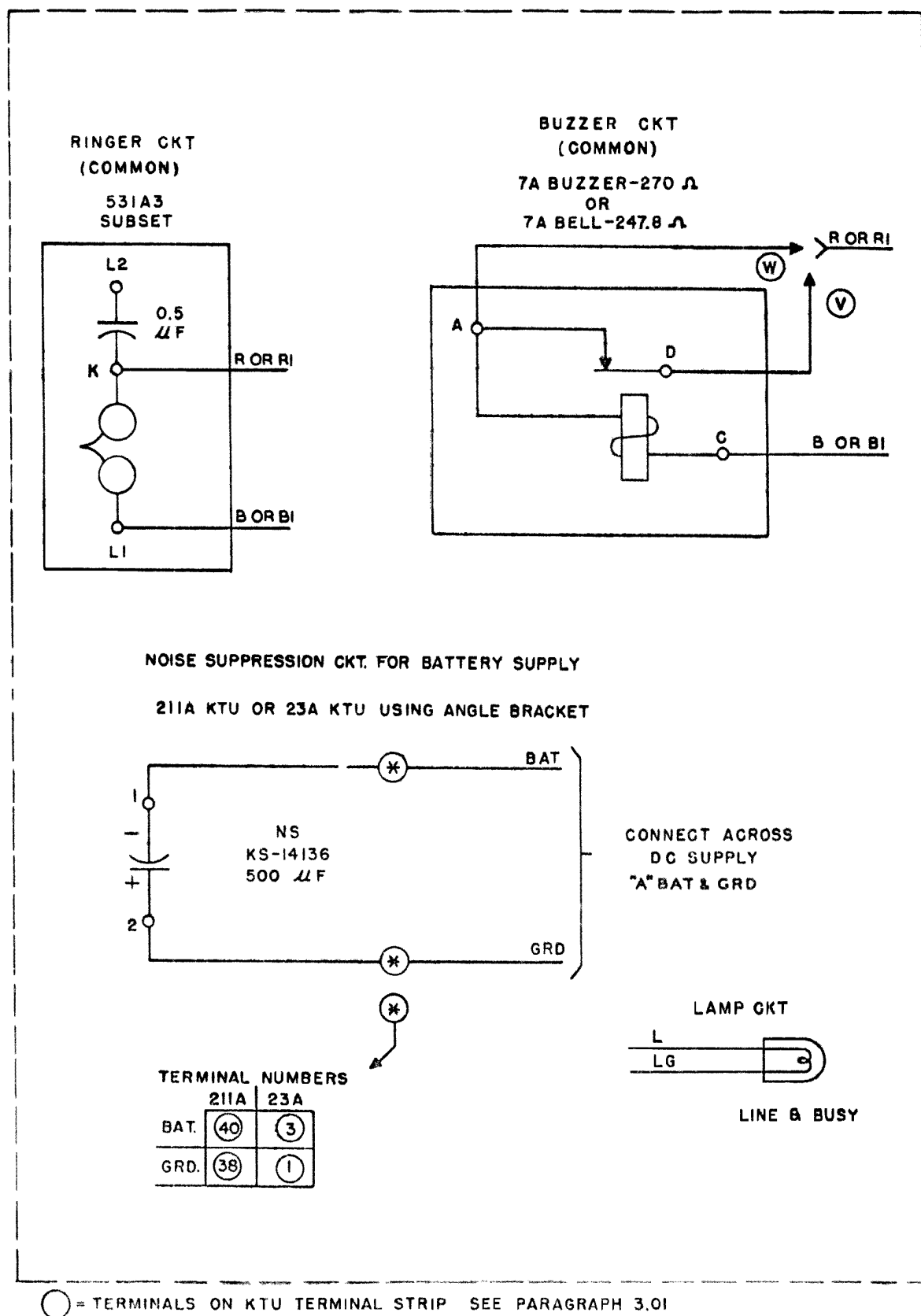
POWER FAILURE CIRCUIT —
202A, 202B, AND 209A KEY TELEPHONE UNITS



Reference: SD-69203-01, Figs. 1 and 6

RINGER, BUZZER, AND NOISE SUPPRESSION CIRCUIT
FOR BATTERY SUPPLY A

FIG. 23



Reference: SD-69203-01, Figs. 8, 9, 10, 17, and 23

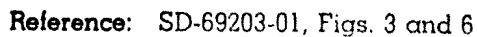
RINGDOWN TIE LINE CIRCUIT — 204A AND 212A KEY TELEPHONE UNITS



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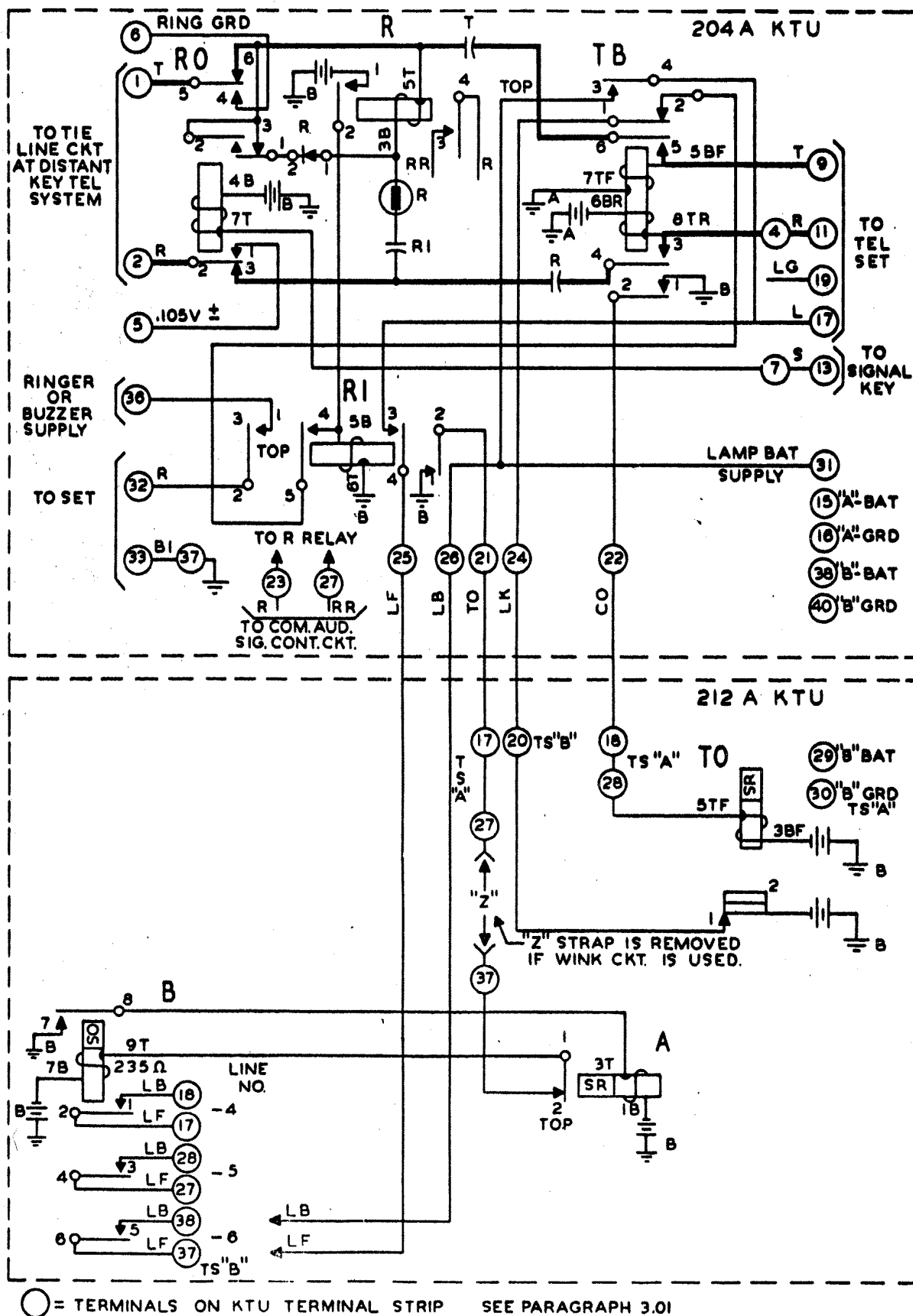
SECTION C53.159

FIG. 25



1A1 KEY TELEPHONE SYSTEM

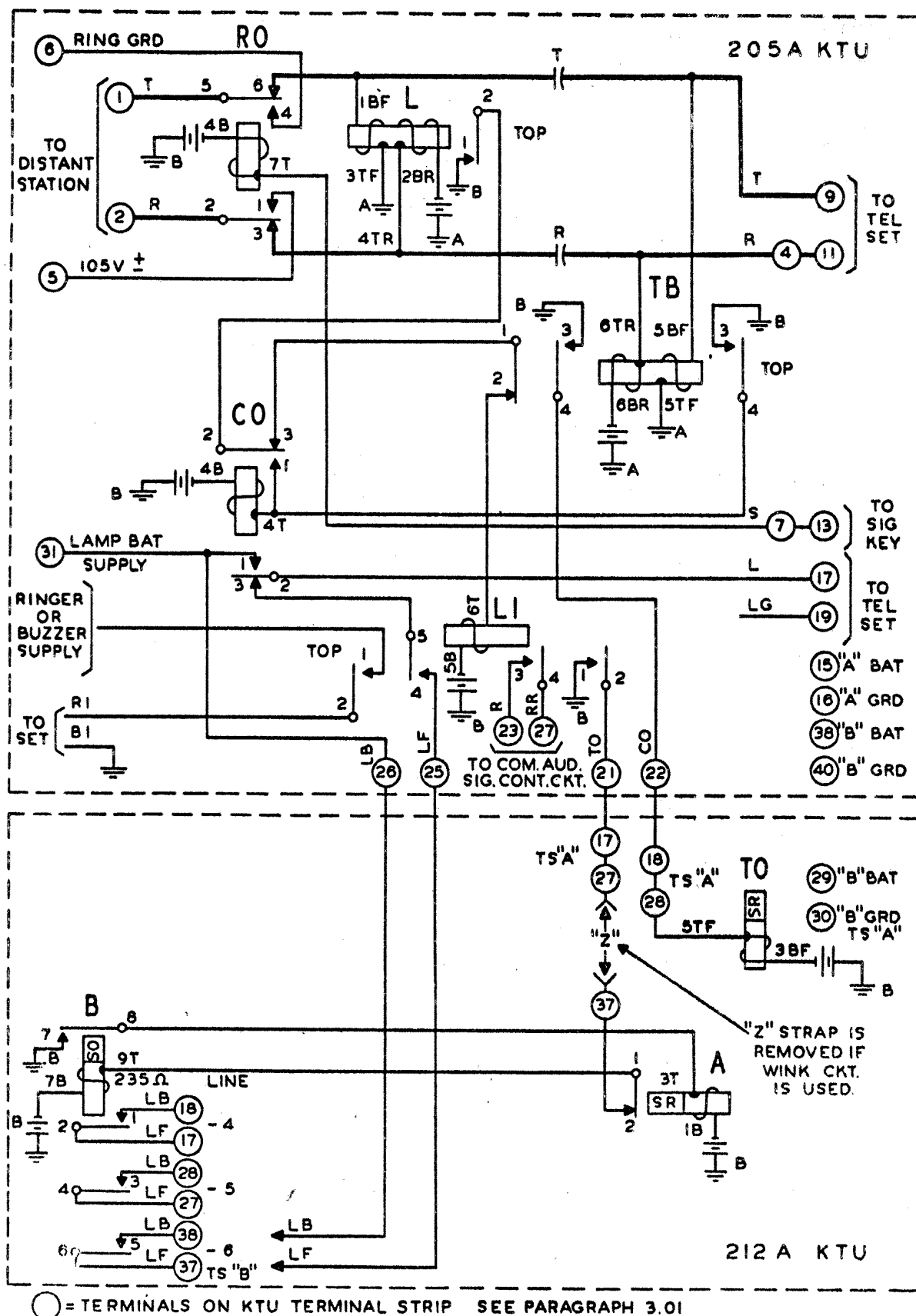
FIG. 24

RINGDOWN TIE LINE CIRCUIT —
204A AND 212A KEY TELEPHONE UNITS

Reference: SD-69203-01, Fig. 3, and Section C53.159, Fig. 29

STATION LINE CIRCUIT—
205A AND 212A KEY TELEPHONE UNITS

FIG. 27



Reference: SD-69203-01, Fig. 4, and Section C53.159, Fig. 29

1A1 KEY TELEPHONE SYSTEM MAINTENANCE

1. GENERAL

1.01 This addendum supplements Section C53.159, Issue 2. It includes connecting information pertaining to radio signal demodulation suppression and deletes a portion of the note which appears below each figure in the section. It also includes Figs. 30, 31, 32, and 33 showing the new 207B key telephone unit.

1.02 This addendum is issued to provide information pertaining to a modification of the KS-14136 polarized electrolytic capacitor. This capacitor is used in the 23A, 51A, and 211A key telephone units. Information about the KS-16485 nonpolar electrolytic capacitor, which replaces the KS-14136 polarized electrolytic capacitor, also is included in this addendum.

1.03 This addendum also changes the rating of the section from AT&TCo Provisional to AT&TCo Standard.

1.04 This modification and change is to eliminate the defect of faulty KS-14136 polarized electrolytic capacitors. Should the dc potential connected to this capacitor be reversed, the capacitor will heat up, causing a gas expansion within the capacitor. Even though a safety vent was included in the case of the capacitor, incidents have been reported where the vent has failed to operate and relieve the pressure within the case of the capacitor. In these incidents the case has actually been forced off the capacitor.

1.05 The Western Electric Company has modified existing stocks of KS-14136 polarized capacitors by puncturing the case and covering the puncture with three layers of cellophane tape. The capacitor is then marked with a red P stenciled under the KS number on the end of the capacitor. This modification is a temporary expedient, to be used only until the newly developed nonpolar electrolytic capacitor designated KS-16485 is available.

Caution: Do not modify this capacitor yourself.

1.06 The KS-16485 nonpolar electrolytic capacitor will replace the KS-14136 polarized electrolytic capacitor (including the modified capacitor) in all 23A, 51A, and 211A key telephone units. The key telephone unit codes will not change. The KS-16485 capacitor is 1/2 inch longer but has the same diameter as the KS-14136 capacitor, and will mount interchangeably.

1.07 It is recommended that all working key telephone units (23A, 51A, and 211A) employing the KS-14136 polarized electrolytic capacitor have this capacitor replaced with the KS-16485 nonpolarized electrolytic capacitor on the next station visit. This change is covered in 4.05.

2. RADIO SIGNAL DEMODULATION SUPPRESSION

2.03 Change to read: Where induction is originating from both the line and local wiring and where 500-type key telephone sets are being used, it also may be necessary to install an additional KS-13814, List 7 capacitor between terminals F and L1 on the 425B network of the multibutton sets. An M1W cord, or equivalent, will be needed to connect terminal L1 on the 425B network and terminal R on the key assembly terminal strip. In severe cases of induction, an additional KS-13814, List 7 capacitor also may be required and should be located between terminals R and RR of the 425B network.

4. FIGURES

4.01 Below Figs. 1 through 28, pages 3 through 30, delete the part of the note reading "see 3.01."

4.02 Replace index table on page 2, with new index table.

1A1 KEY TELEPHONE SYSTEM MAINTENANCE

1. GENERAL

Caution: Do not modify this capacitor yourself.†

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4. FIGURES

4.01 Below Figs. 1 through 28, pages 3 through 30, delete the part of the note reading "see 3.01."

4.02 Replace index table on page 2, with new index table.

Γ4.05 Change to read: When a common source of dc supply is used for the talking circuit and for the operation of audible signals, a noise suppression circuit must be used. This circuit will be the same as that shown in Fig. 23 on page 25, which consists of a 23A or 211A key telephone unit. The KS-14136 polarized electrolytic capacitor must be removed and a KS-16485 nonpolar electrolytic capacitor installed as follows:

- (1) Disconnect battery from the circuit.
- (2) Discharge the KS-14136 capacitor by momentarily shorting the terminals with a screw driver having an insulated handle, or an equivalent tool.

Γ (3) Disconnect the wire leads from the capacitor and remove the capacitor from its mounting.

(4) Mount the KS-16485 capacitor in the key telephone unit and connect the wire leads to it. Solder the connections.

(5) Reconnect the battery to the circuit.

Note: This is a nonpolar capacitor; therefore, it is not necessary to determine the polarity of each wire before connecting it to the capacitor.

Circuit	Used With	Fig.	Page
Automatic Tie Line Circuit 203A KTU	212A KTU	1	3
	209A KTU	2	4
Automatic Cutoff of Dial Selective Intercommunicating Line Circuit 26B KTU	207A and 208A KTU	3	5
	207B and 208A KTU	30	(Add) 3
Central Office or PBX Line Circuit 202A or 202B KTU with Common Audible Signal	16A, 211A, 212A KTU	4	6
	16A, 209A, 211A KTU	5	7
Central Office or PBX Line Hold Circuit 202A or 202B KTU	Key Telephone Set	6	8
Central Office or PBX Line Circuit 202A or 202B KTU	212A KTU	7	9
	209A KTU	8	10
Cut-through and Control Circuit for Automatic Cutoff 26B and 29A KTU		9-11	11-13
1. Station cannot cut off other stations and can be cut off except during a call (K wiring)		9	11
2. Station can cut off other stations and can be cut off except during a call (H and K wiring)		10	12
3. Station can cut off other stations and cannot be cut off (H and J wiring)		11	13
Code and Selective Signaling 3A KTU		12	14
Dial Selective Intercommunicating Line Circuit	207A KTU	13	15
	207B KTU	31	(Add) 4
Dial Selective Intercommunicating Line Circuit with Flashing Line Lamps	207A, 208A, and 212A KTU	14	16
	207B, 208A, and 209A KTU	32	(Add) 5
	207A, 208A, and 209A KTU	15	17
	207B, 208A, and 212A KTU	33	(Add) 6
Intercommunicating Line Battery Feed Circuit 31A KTU	23A, 209A, 211A, 212A KTU	16	18
Lamp Winking Circuit 210A KTU	202A or 202B KTU and 212A KTU	17	19
	202A or 202B KTU and 209A KTU	18	20
Lamp Resistance Circuit and AC Supply for Lamps (9 to 11 Volts)		19	21
Lamp Resistance Circuit When Flashing Lamp Feature is Provided—101G Power Supply Connections		20	22
Power Failure Circuit 212A KTU	202A or 202B KTU	21	23
Power Failure Circuit 209A KTU	202A or 202B KTU	22	24
Ringer, Buzzer, and Noise Suppression Circuit for Battery Supply A		23	25
Ringdown Tie Line Circuit 204A KTU	212A KTU	24	26
	209A KTU	25	27
Ringling Lamp Circuit and AC Supply for Buzzers (15 to 25 Volts)		26	28
Station Line Circuit 205A KTU	212A KTU	27	29
	209A KTU	28	30
212A Key Telephone Unit		29	31

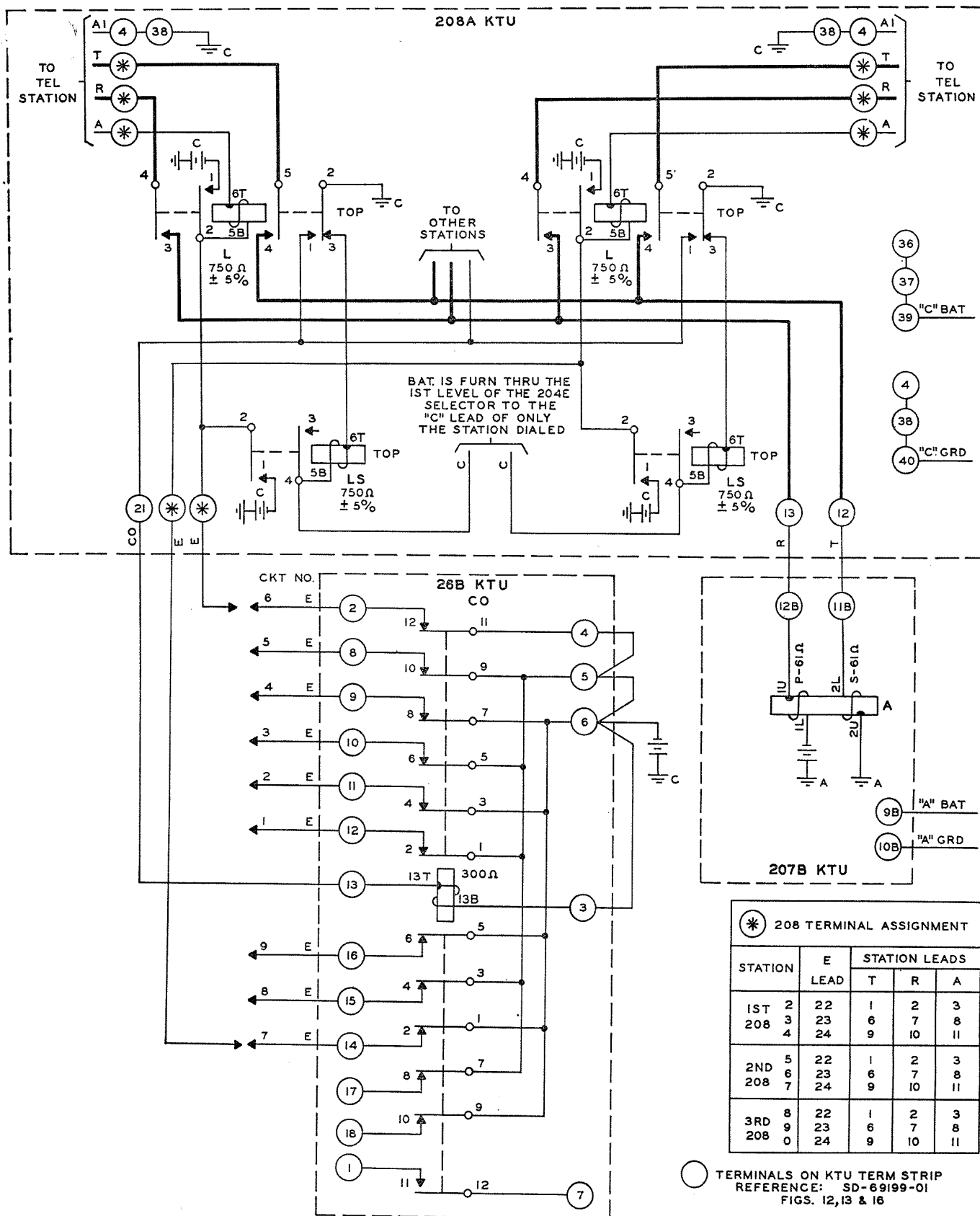


FIG. 30—AUTOMATIC CUTOFF OF DIAL SELECTIVE INTERCOMMUNICATING LINE CIRCUIT—26B, 207B, AND 208B KEY TELEPHONE UNITS

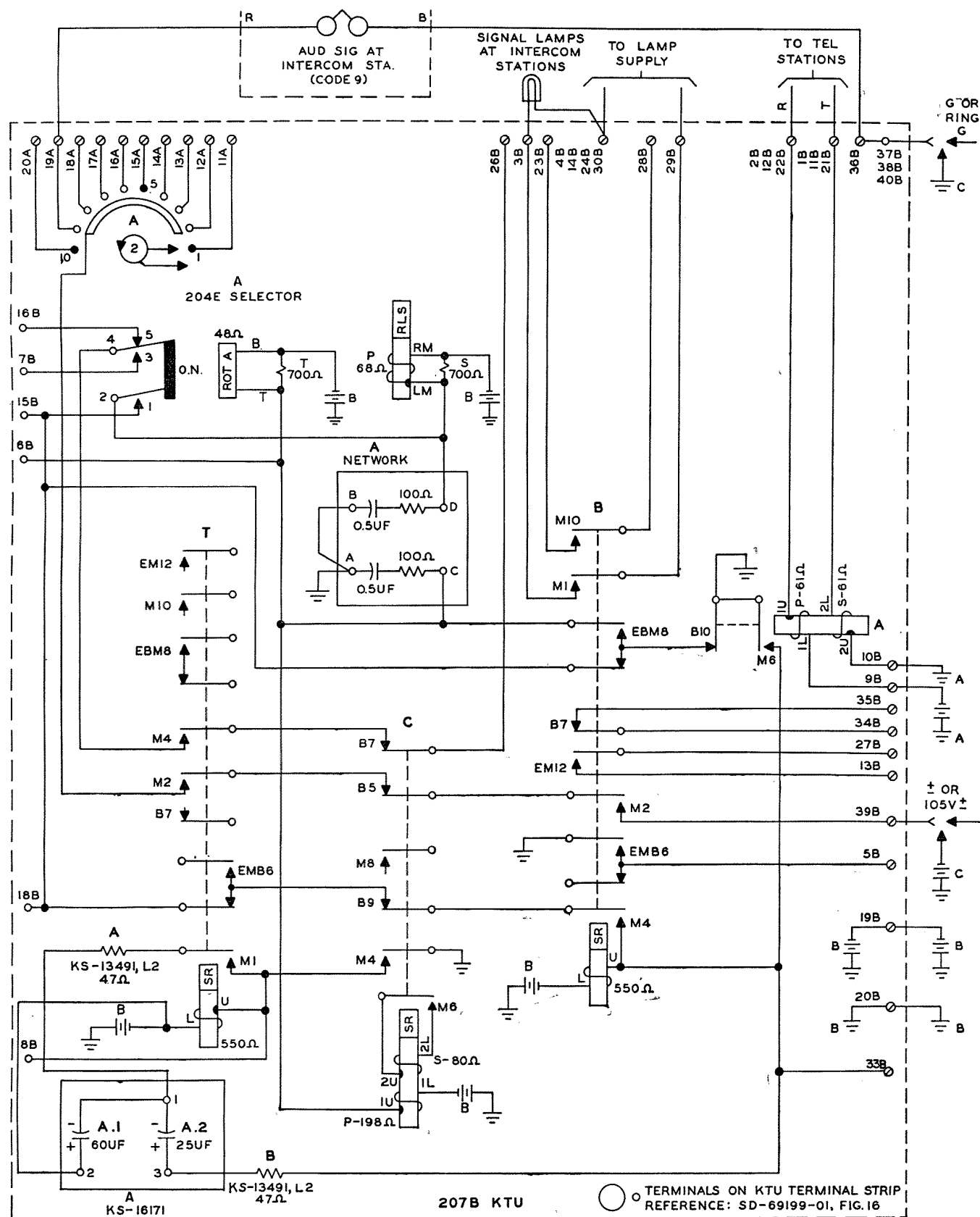


FIG. 31—DIAL SELECTIVE INTERCOMMUNICATING LINE
Circuit—207B KEY TELEPHONE UNIT

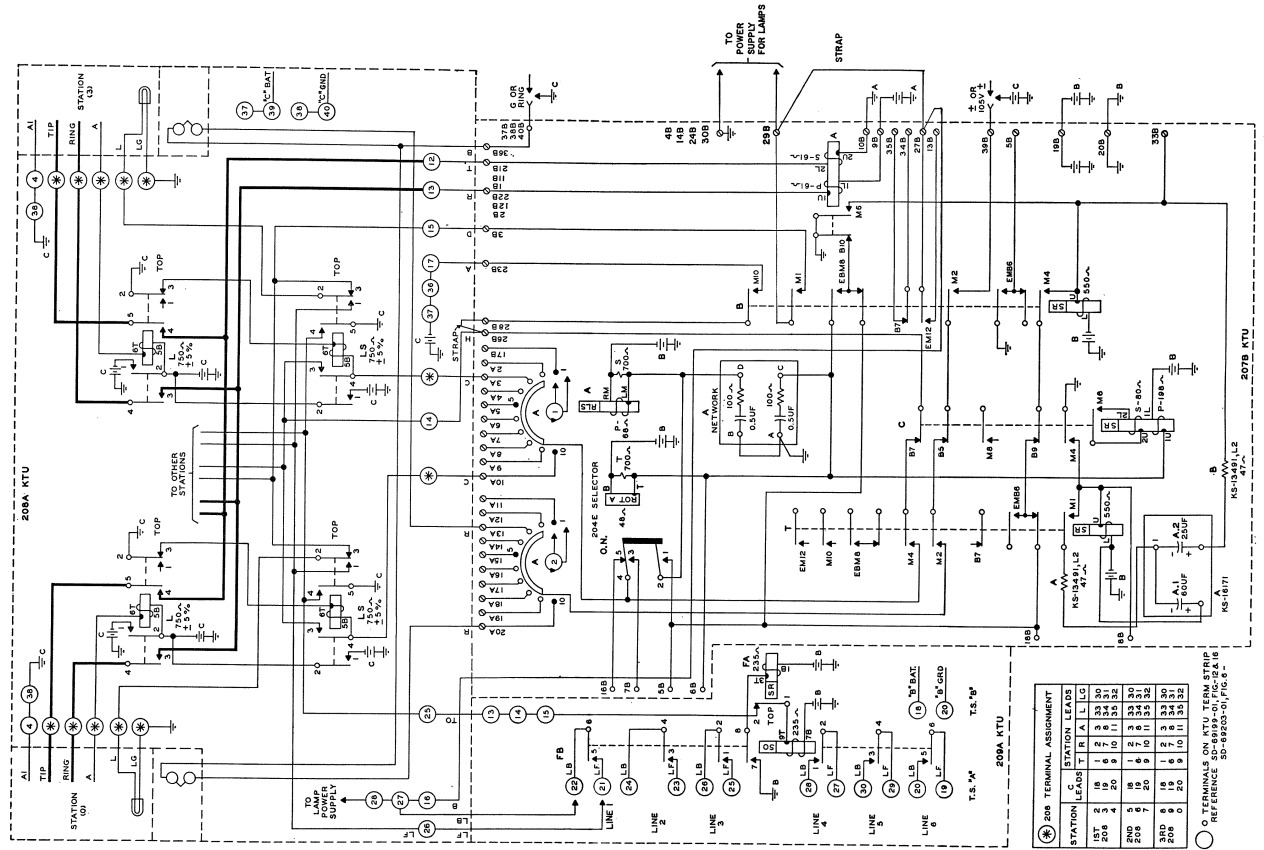


FIG. 32—DIAL SELECTIVE INTERCOMMUNICATING LINE CIRCUIT WITH FLASHING LINE LAMPS—207B, 208A, AND 209A KEY TELEPHONE UNITS

