

1A1

KEY TELEPHONE

SYSTEM

Western Electric



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Western Electric

1A1

Key Telephone System

General Description

The 1A1 Key Telephone System is a switching system designed to provide a method of signaling customers stations on one or more lines from a common battery Central Office or PBX without the assistance of an attendant or operator. The 1A1 Key Telephone System is a revision of the 1A Key Telephone System incorporating all the features available in the 1A System and introducing the wink and dial intercommunicating features. The cabinet type units of the 1A System are replaced by new cabinet type units with 3 instead of 5 relays per circuit, the relays being of a different type requiring less maintenance.

The 1A1 System permits the subscriber to utilize the following features:

- a. Answer and originate calls on from one to six central office, PBX, intercommunicating or private lines.
- b. Hold calls on from one to five central office or PBX Lines.
- c. Answer and originate calls on ringdown tie lines and automatic tie lines between stations of Key Telephone Systems.
- d. Answer and originate calls on lines to distant individual station telephone sets.
- e. Answer and originate calls on manual or dial intercommunicating lines between stations of a 1A1 Key Telephone System.


Any single operating feature described above requires the assignment of one key of the multi-button key telephone sets associated with the 1A1 System. The multi-button sets have either four or six buttons and accordingly the features provided with one 1A1 System are limited to combinations of either four or less or six or less depending upon the types of telephone sets used.

The combination furnished by a given set may be varied to some extent by making suitable changes in the connection of the spade tipped leads in the sets as, for example, to convert a pick up key to a signaling key in those sets arranged for such conversion.

Some codes of telephone sets are equipped with an exclusion key which permits manual cut off of any other station or group of stations associated with a line appearing at several stations.

Table 1 on the following page indicates the telephone set codes and feature combinations available for use with the 1A1 System. Circuit Figures 1 to 4 noted in Table 1 illustrate the differences in wiring of the various sets. It should be noted as stated in information note 301 that manual sets can be obtained only by conversion of dial sets.

101. PROVIDE THE KEY TELEPHONE SET IN ACCORDANCE WITH REQUIREMENTS AS INDICATED IN THE FOLLOWING TABLE: THE CORD CONDUCTOR COLORS ARE SHOWN UNDER THE DESIGNATION OF THE TERMINALS IN THE SET, EXCEPT WHERE "OD" APPEARS WHICH INDICATES THAT THE SPADE TIP OF THE CONDUCTOR IS TAPED AND DRESSED UNDER THE TERMINAL PLATE OF THE KEY.

 A CIRCLE AROUND A COLOR ABOVE INDICATES A CORD CONDUCTOR WHICH IS NOT REQUIRED FOR USE IN THIS SET.

* DD INDICATES CONDUCTORS THAT ARE TAPED AND STORED UNDER THE TERMINAL PLATE OF THE KEY.

310. FOR MANUAL SERVICE REPLACE THE DIAL OF THE CORRESPONDING DIAL SET (E.G.-540B8) WITH A 95B APPARATUS BLANK AND TRANSFER THE GREEN KEY LEAD FROM TERMINAL "F" TO TERMINAL "RRR" ON THE NETWORK TO OBTAIN THE MANUAL SET (E.G.-540BA).
302. PROVIDE "M" WIRING WHEN THE BUZZER IS TO OPERATE ON 60 CYCLE AC, AND PROVIDE "N" WIRING WHEN THE BUZZER IS TO OPERATE ON DC.
303. ALL CONVERTIBLE KEY POSITIONS ARE ARRANGED IN THE SHOP AS PICKUP POSITIONS. TO CONVERT A KEY POSITION FROM PICKUP (LOCKING) TO SIGNALING (NON-LOCKING), REMOVE THE SCREW DETAIL P-12A892 ENTIRELY FROM THE PLUNGER AT THE KEY POSITION TO BE CONVERTED. MAKE THE NECESSARY CONNECTION CHANGES AS SHOWN IN TABLE C OF THE FIGURE INVOLVED. TO RECONVERT A KEY POSITION TO LOCKING, INSERT A SCREW DETAIL P-12A892.
304. WHEN USING THE ARRANGEMENT FOR A COMMON SIGNALING KEY FOR TWO OR THREE, PRIVATE AND INTERCOMMUNICATING LINES AS PROVIDED FOR IN FIG. 2, THE SIXTH KEY IS CONVERTED TO NON-LOCKING AND IS USED AS THE SIGNALING KEY. THE SIGNALING IS DIRECTED TO THE "S" OR "SI" LEAD OF THE 2nd 3rd OR 4th LINE, AS REQUIRED, THROUGH THE CROSS CONNECTIONS SHOWN IN TABLE C.

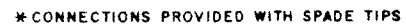
305. TO PROVIDE FOR A STATION BUSY LAMP FOR THOSE SETS WHERE SPECIFIC PROVISION FOR THIS FEATURE IS MADE (SEE TABLE NOTE 101) THE NECESSARY CONNECTION CHANGES SHOULD BE MADE AS SHOWN IN TABLE A OF THE PROPER CIRCUIT FIGURE. FOR THE 1A1 KEY TELEPHONE SYSTEM IT IS NECESSARY, IN ADDITION, TO PROVIDE A IN91 DIODE (G.E. CO. OR EQUIV.) AND A MIW CORD (OR EQUIV. ALENT) AND CONNECT THEM AS SHOWN IN FIGURE, WITH THE DIODE CLOSE ENOUGH TO THE TERMINALS TO PREVENT IT TOUCHING THE CAN OF THE 425B NETWORK. SEE ALSO CIRCUIT DRAWING, SD-69241-01, FOR STATION BUSY SIGNAL.

307. SETS EQUIPPED WITH CUTOFF KEY PER FIGURE 4 ARE WIRED IN THE SHOP WITH THE G-W AND R-W LEADS FROM THE CUTOFF KEY CONNECTED TO TERMINALS "2T" AND "2R" RESPECTIVELY. AS SHOWN IN TABLE B FOR THIS FIGURE, THESE LEADS MAY BE CONNECTED BY THE INSTALLER TO OTHER "R" AND "T" TERMINALS TO CUT OFF EXTENSION STATIONS ON LINES OTHER THAN 2. WITH THE 1A1 KEY TELEPHONE SYSTEM THE "A" LEAD SHOWN IN FIG. 4 CONNECTING TO THE EXTERNAL CONNECTING BLOCK FOR LINE 2 MUST ALSO BE CONNECTED TO THE CORRESPONDING LINE.

305. THE "R" AND "RR" TERMINALS IN THE TABLES A & B OF EACH FIGURE ARE ON THE TERMINAL STRIP UNLESS OTHERWISE SPECIFIED.

31G. THE LAMPS ARE NOT REGULARLY FURNISHED AS PART OF THE CODED SET.

311. BLOCKING RING P12A858 CAN BE USED TO MAKE A HOLD, PICKUP OR SIGNAL KEY INOPERATIVE.



3

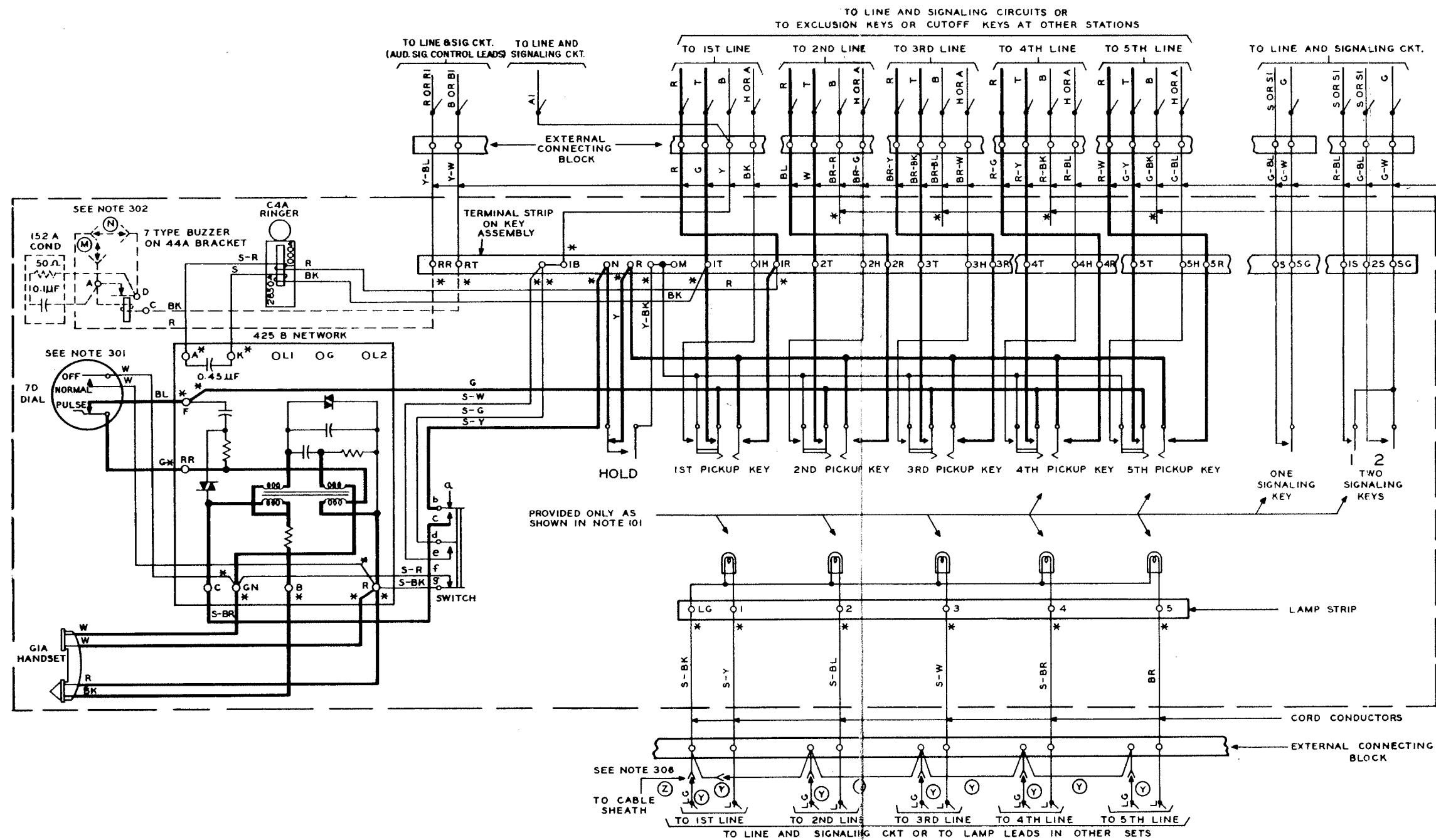


TABLE A OF FIG. 1

1A-1A1 SYSTEM CONVERSION CONNECTIONS OF KEY AND SWITCH LEADS (SEE NOTE 309)

KEY TEL SYSTEM	KEY AND SWITCH LEAD				
	S-W	S-G	S-Y	Y	Y-BK
1A	1B	1B	N	R	M
1A1	1B	N	R	M	N

TABLE B OF FIG. 1

RINGER CONNECTION (SEE NOTE 309)

	RINGER OR BUZZER LEADS			
	S-R	S	BK	R
SET RINGER USED AS LINE RINGER ON ANY LINE	A	K	T**	R**
SET RINGER USED AS PRIVATE LINE RINGER OR SET RINGER OR BUZZER USED FOR A COMMON SIGNAL OR OTHER USE (SEE NOTE 308)	WITH CONDENSER	A	K	RT RR
	WITHOUT CONDENSER	A	A	RT RR

** T OR R LEAD OF LINE INVOLVED

FIGURE 1

Key and Telephone Circuit

Arranged for Pickup, Holding, Lamps and Signaling

No Convertible Keys

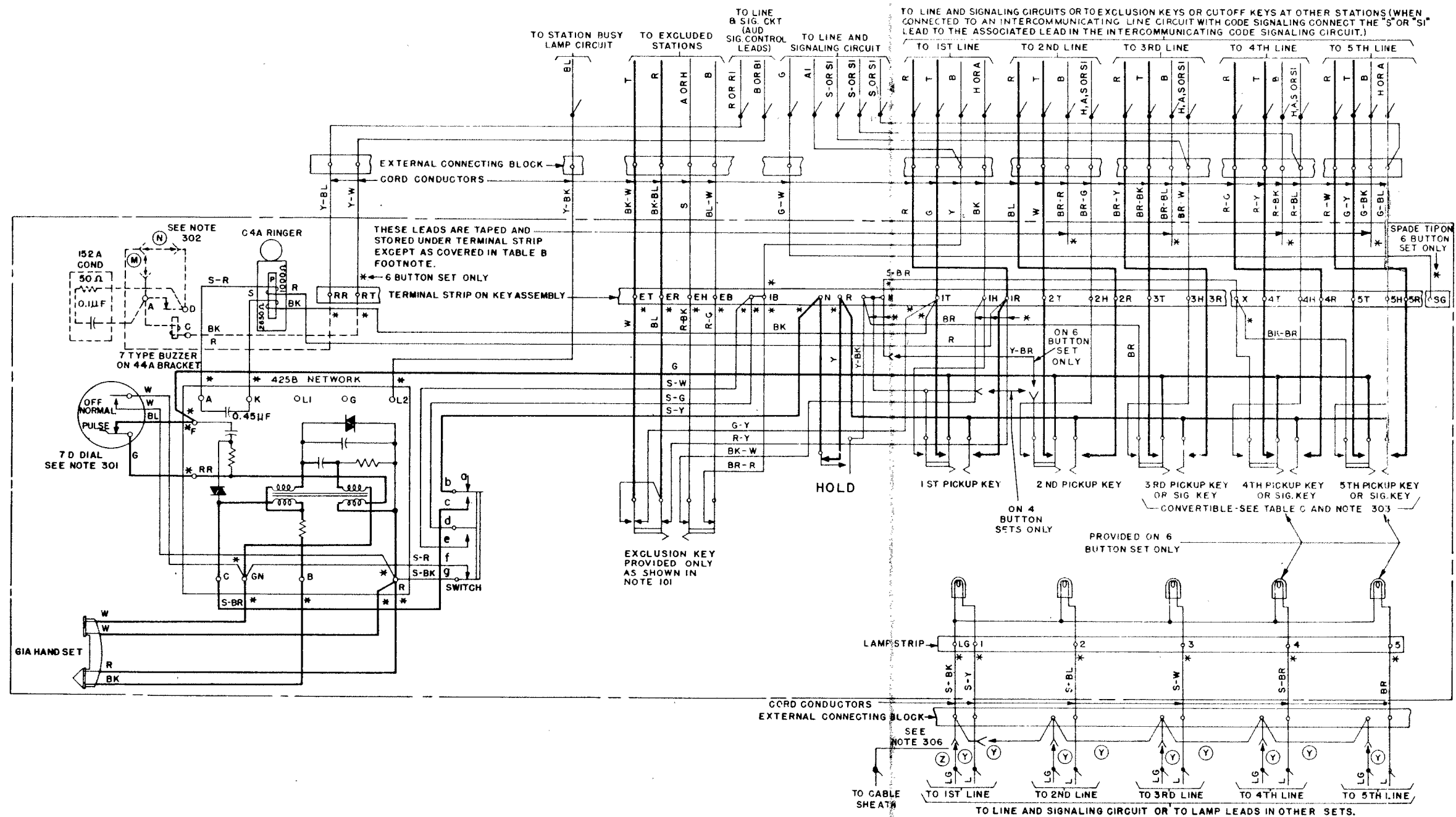


TABLE A OF FIG. 2
1A-1A1 SYSTEM CONVERSION-STATION BUSY SIGNAL CONNECTIONS
CONNECTION OF HOLD KEY AND SWITCH LEADS (SEE NOTE 309)

KEY TEL. SYS.	HOLD KEY	SW	S-G	S-Y	Y	Y-BK	MIW	CORD
NO STATION BUSY LAMP	1A	1B	N	R	M	N		
WITH STATION BUSY LAMP	1A	SG	L2*	N	R	M		
	1A1	1B	L2*	R	M	N	G*TON	SEE NOTE 305

* TERMINAL ON NETWORK

TABLE B OF FIG. 2
RINGER AND EXCLUSION KEY CONNECTIONS (SEE NOTE 309)

SET RINGER OR BUZZER NOT TO BE CUT OFF IN SET	WHEN USED AS BRIDGED RINGER ON ANY LINE	WHEN USED AS PRIVATE LINE OR COMMON SIG. OR FOR OTHER USE	WITH COND.	WITHOUT COND.	EXCLUSION KEY LEAD	EXCLUSION KEY LEAD
					S-R	S-BK
					A	K
					R	T
					R	R
					A	A
					E	T
					R	T
					R	R
					E	H
					E	B

LINE EXCLUSION
EXCLUSION ON LINE 1 OR NOT USED
EXCLUSION ON OTHER THAN LINE 1
* OF THE LINE INVOLVED
† REMOVE THE YELLOW CORD CONDUCTOR FROM TERMINAL 1B AND TAPE AND CONNECT THE BALANCE LEAD CORD CONDUCTOR OF THE LINE INVOLVED TO TERMINAL 1B.

TABLE C OF FIG. 2
PICKUP - SIGNALING CONVERSION
CONVERT FROM LOCKING TO NON-LOCKING OR VICE-VERSA (SEE NOTE 303) AND CHANGE LEADS AS FOLLOWS:

NO. OF PICKUP KEYS	NO. OF SIG. KEYS CONVERTED FROM P.U. KEYS	NO. OF PRIVATE AND INTER-COMMUNICATING LINES WITH COMMON SIG. KEY	KEY LEADS			
			Y-BR	BR	S-BR	BK-BR
4	3	1				
2	1	1				
5	1	1	M	M	M	X
4	1	1	M	M	M	SG
3	2	1	M	M	SG	X
2	3	1	M	X	SG	X
4	1	2	M	X	5H	SG
4	1	3	X	X	5H	SG

* INDICATES CONNECTIONS INSIDE SET PROVIDED WITH SPADE TIPS.

FIGURE 2
Key and Telephone Circuit
Arranged for Exclusion, Pickup, Holding, Lamps and Signaling
with Individual Signaling Keys or on Private and Intercommunicating Lines with Common Signaling Key (See Note 304)

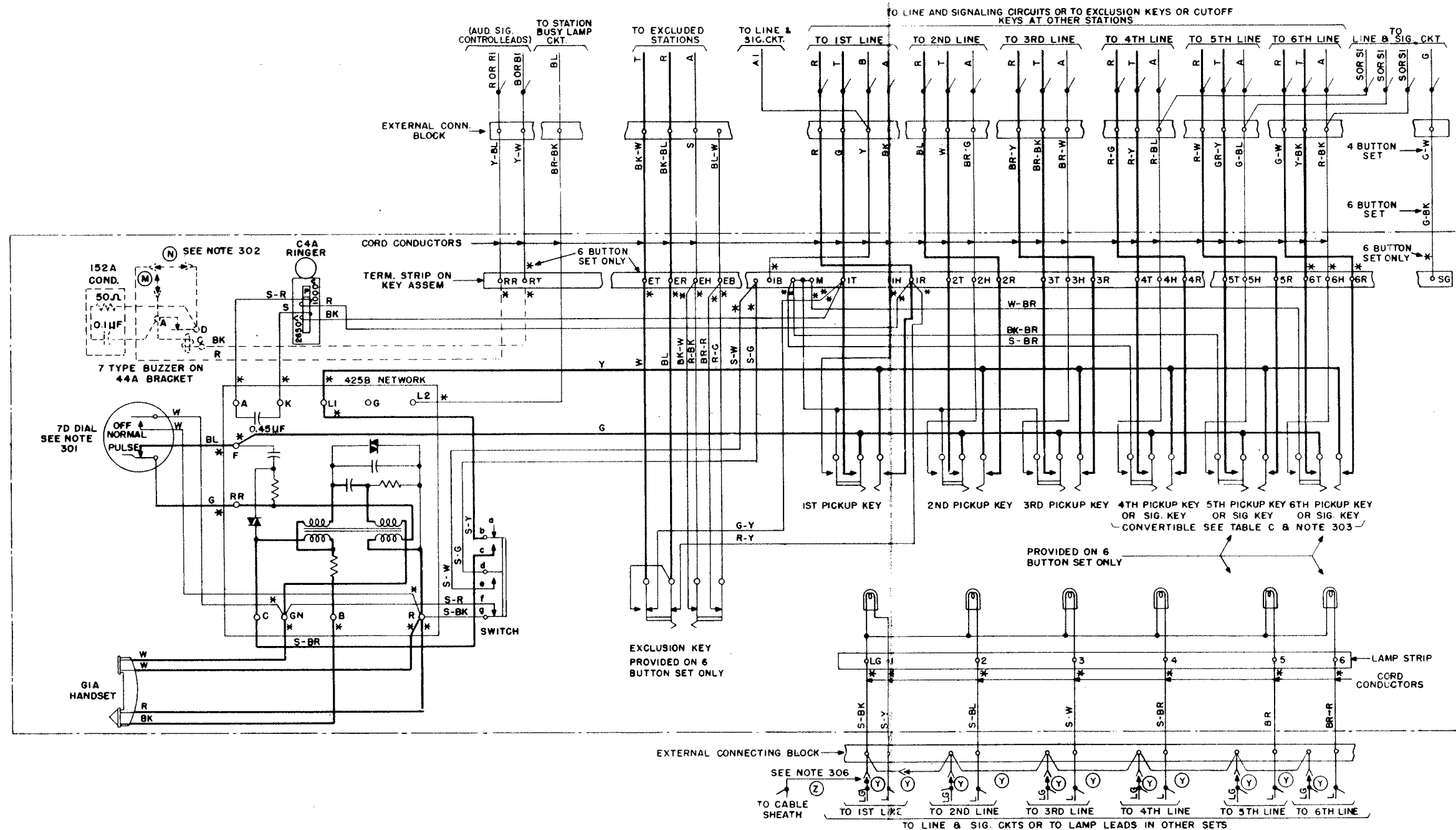


TABLE A OF FIG. 3
IA-IAI SYSTEM CONVERSION & STATION BUSY SIG. CONNECTIONS

	KEY TEL. SYS.	SWITCH LEADS	MIW CORD
NO STATION BUSY LAMP 4 & 6 BUTTON SETS	IA	IB	IB
WITH STATION BUSY LAMP 6 BUTTON SETS ONLY	IA	SG	L2 +
	IAI	IB	L2 + G*TO M SEE NOTE 305

* TERMINAL ON NETWORK

TABLE B OF FIG. 3
RINGER AND EXCLUSION KEY CONNECTIONS (SEE NOTE 308)

SET RINGER OR BUZZER NOT TO BE CUTOFF IN SET	WHEN USED AS BRIDGED RINGER ON ANY LINE	WHEN USED AS PRIVATE LINE OR COMMON SIG. OR FOR OTHER USE (SEE NOTE 308)	RINGER OR BUZZER LEAD		EXCLUSION KEY LEADS			
			S-R	BK-R	G-Y	R-Y	BK-W	BR-R
WITH COND.	A	K	A	K	ET	RT	RR	EH
WITHOUT COND.	A	A	A	A	ET	RT	RR	EH
WITH COND.	A	K	A	K	ET	RT	RR	EH
WITHOUT COND.	A	A	A	A	ET	RT	RR	EH

LINE EXCLUSION

EXCLUSION ON LINE 1	IA KEY TEL. SYSTEM	IT	IR	EH	EB
EXCLUSION ON OTHER THAN LINE 1	IAI KEY TEL. SYSTEM	TH	R**	EH	EB
	IAI KEY TEL. SYSTEM	TH	R**	EH	EB

** OF THE LINE INVOLVED

TABLE C OF FIG. 3
PICKUP — SIGNALING CONVERSION
CONVERT FROM LOCKING TO NON-LOCKING OR VICE-VERSA (SEE NOTE 303) AND CHANGE LEADS AS FOLLOWS

	NO. OF P.U. KEYS	NO. OF SIG. KEYS	KEY LEADS		
			S-BR	BK-BR	W-BR
pppp5	4	—	M		
	3	1	SG		
pppp5	6	—	M	M	M
	5	1	M	M	SG
	4	2	M	SG	SG
	3	3	SG	SG	SG

* INDICATES CONNECTIONS INSIDE SET PROVIDED WITH SPADE TIPS

FIGURE 3
Key and Telephone Circuit
Without Hold Arranged for Pickup, Lamps and Signaling with
Convertible Keys Exclusion with 6 Button Set Only

Station Apparatus

Key Telephone Sets are combined telephone sets which include in a single housing the switching keys, line and busy lamps if desired, subscriber set apparatus, ringer and the additional cord conductors required for keys and lamps. Where more than one line terminates in a set the ringer may be connected to any one of the lines, ringers in adjacent sets or externally mounted ringers being used for the balance of the lines. If desired, the set ringers may also be used as an audible signal common to a group of lines. This feature is described in more detail on page 21 of this bulletin. The keys of the set serve to switch the talking circuit to any one line. On sets having 4 or 6 button keys the keys are equipped with a device that prohibits two keys from becoming locked when depressed simultaneously.

Common Equipment

When line and signaling equipment for an installation is required it is provided in the form of Key Telephone Units (K.T.U.). These are small panel type units approximately 7" high varying in width from 2 $\frac{5}{8}$ " to 9 $\frac{1}{4}$ " wide. Two rows of key telephone units can be mounted in an apparatus cabinet consisting of a 16A Apparatus Mounting and a 117AW Cover. The 200DW and 200EW Key Telephone Units consist of such an apparatus cabinet equipped for 3 or 4 central office or PBX Lines respectively in which line, lamp flashing, incoming common signaling and incoming line lamp time out circuits are assembled and wired. One lamp flashing and time out circuit will provide the requirements for 5 line circuits when a wink signal is provided or 6 line circuits without wink.

If 6 lines with wink are required an additional 209A Unit must be installed. Other key telephone units may be added to the units provided in the 200DW and 200EW Key Telephone Units depending upon the operating features desired in a particular installation.

It is sometimes desirable to provide the apparatus cabinet separately to be equipped with individual feature units. The following table lists the Key Telephone Units available for use with the 1A1 Key Telephone System and indicates the number of each required per line, per station, per group of lines, etc.

INDIVIDUAL FEATURE KEY TELEPHONE UNITS

Feature Req'd.	K.T.U. Code	# Req'd.	Panel Size	Description See Para.
Fuse Mounting Panel	201B	See Desc.	6 $\frac{1}{8}$ " x 2 $\frac{5}{8}$ "	A
Central Office or PBX Line Circuit	202B	1 Per C.O. or PBX line	7" x 3 $\frac{1}{8}$ "	B
Automatic Tie Line Circuit	203A	1 Per Auto. Tie Line (see description)	7" x 3 $\frac{1}{2}$ "	C
Ringdown Tie Line Circuit	204A	1 Per Ringdown Tie Line	7" x 3 $\frac{1}{8}$ "	D
Station Line Circuit	205A	1 Per Station Line	7" x 3 $\frac{1}{8}$ "	E
Dial Selective Intercom Line Ckt.	207A	1 Per 9 Station Inter- com Line	7" x 5 $\frac{1}{8}$ "	F
Signal Ckt. for Flashing Line Lamps	208A	1 Per 3 Intercom Stations	7" x 3 $\frac{1}{2}$ "	G
Lamp Flashing & Incoming Signal Time Out Circuit	209A	1 Per 5 or 6 lines (see description)	7" x 4 $\frac{1}{8}$ "	H
Hold Lamp Wink Ckt.	210A	1 Per 5 Lines	7" x 2 $\frac{5}{8}$ "	J
Cent. Off. or PBX Line Circuit	213A	1 Per Line	7" x 4 $\frac{3}{8}$ "	K
Manual Intercom Signal Ckt.	3A	1 Per group for code signaling	see desc.	L
Ringing Lamp Ckt.	* 11A	1 Per System	see desc.	M
Common Audible Signal	* 16A	1 Per System	see desc.	N
Lamp Resistance Ckt. for D.C. Lamp Power Supply	22 type	1 Per 2 Lamps per 3 Lines or 6 Lamps per line	see desc.	P
Battery Feed Noise Suppression Condenser	* 23A	1 Per Line	see desc.	Q
Automatic Cut off Circuit	26B	1 Per Line	see desc.	R
Cut Through & Control Ckt. for Automatic Cut off	29A	See desc.	see desc.	R
Intercomm. Line Battery Feed Ckt.	* 31A	1 Per Intercom Line	see desc.	S

* These features included in multifeature 211A Key Tel. Unit noted below.

MULTIFEATURE KEY TELEPHONE UNITS

Comm. Equip. Unit	211A	1 Per System	7" x 3 $\frac{1}{8}$ "	T
3 Cent. Off. or PBX lines with lamp flashing & time out ckt.	212A	1 Per 3 Lines	7" x 9 $\frac{1}{4}$ "	U
3 Cent. Off. or PBX lines with lamp flashing & time out ckt.	200DW	1 Per 3 Lines	see desc.	V
4 Cent. Off. or PBX lines with lamp flashing & time out ckt.	200EW	1 Per 4 Lines	see desc.	V

DESCRIPTION OF KEY TELEPHONE UNITS

A. The 201B unit is a single panel fuse mounting for 7 fuses and 6 ground terminals with fuse terminals wired to an associated terminal panel. This unit is required where battery supply to the key telephone system is obtained from a source not always attended by a maintenance man for replacement of fuses. See paragraph on fusing in POWER SUPPLY section of this bulletin.

B. The 202B is a single panel unit on which the apparatus for one Central Office or PBX Line circuit is mounted and wired to an associated terminal panel with soldered terminations on the wired side and screw type terminals for connections outside the unit. This unit is used to answer and originate calls on lines to a Central Office or PBX. A holding feature is provided which permits the subscriber to apply a holding bridge across a line by depressing a hold key associated with the telephone set and to pick up the line again after having obtained desired information or conversed on any other line associated with the system.

C. The 203A is a single panel unit on which the apparatus for one Automatic Tie Line is mounted and wired to an associated terminal panel with soldered terminations on the wired side and with screw type terminals for connections outside the unit. This unit is used when it is desired to signal automatically and talk on a designated tie line by removing the telephone set handset from its mounting and depressing the key associated with the tie line. No additional signaling features such as auxiliary signaling keys or lamps are required. An automatic tie line unit is also required at the distant end of the line. No hold feature is available with this circuit.

D. The 204A is a single panel unit on which the apparatus for one ringdown tie line circuit is mounted and wired to an associated terminal panel with soldered terminations on the wired side and screw type terminals for connections outside the unit. This unit is used when it is desired to signal manually and talk on a designated line. Signaling is accomplished by removing the telephone set handset from its mounting, depressing the key associated with the tie line and operating the signaling key associated with the tie line. The manual signaling feature permits the calling party to make use of code signaling when more than one station is connected at the distant end. A ringdown tie line circuit is required at the distant end of the tie line. No hold feature is available with this circuit.

E. The 205A is a single panel unit on which the apparatus for one Station line circuit is mounted and wired to an associated panel with soldered terminations on the wired side and screw type terminals for connections outside the unit. This unit is used when it is desired to signal and talk on a line to a distant key telephone station. When this unit is used the station at the distant end need only pick up the Handset and the station at the equipment end is automatically signalled. The station at the equipment end must signal with a button.

F. The 207A is a single panel unit on which the apparatus for one dial intercomm line having access to nine stations is mounted and wired to an associated panel with soldered terminations on the wired side and screw type terminals for connections outside the unit. This unit is used for selectively dialing nine stations associated with the same intercomm line, any station of the nine being able to dial any other station. When a station key associated with this circuit is depressed and the handset is removed from its associated telephone set single digit dialing causes a spurt of ringing of one to three seconds duration at the called station. No hold feature is available with this circuit.

G. The 208A is a single panel unit on which the apparatus for providing a flashing lamp feature at three stations of a dial intercomm line is mounted and wired to an associated panel with soldered terminations on the wired side and screw type terminals for connection outside the unit. This unit is used to provide a flashing lamp feature at the called station of a dial intercomm line. Without this flashing feature the lamp at a called station would be lighted steady indicating only that the dial intercomm line was in use.

H. The 209A is a single panel unit on which the apparatus for the lamp flashing and incoming signal time out circuit is mounted and wired to an associated terminal panel with soldered terminations on the wired side and screw type terminals for connections outside the unit. This unit is used when flashing lamps and a time out circuit are desired at the stations of a 1A1 Key Telephone System, the flashing lamp indicating an unanswered condition on the line associated with the lamp and the time out circuit removing all indications of an incoming call on the line if the line is unanswered after approximately 30 seconds. If a wink signal is used for indicating a held condition this unit can provide the flashing and time out feature for five lines. When the wink signal is not used the unit provides flashing and time out for 6 lines. This unit or its equivalent is required for all central office or PBX Lines.

J. The 210A is a single panel unit on which the apparatus for a wink signal feature is mounted and wired to an associated terminal panel with soldered terminations on the wired side and screw type terminals for connection outside the unit. If a wink signal feature is not used a held line appears the same as a busy line having its line lamp illuminated steady. With the wink feature the lamp of a held line is off three hundredths of a second during each second of operation giving the impression of a wink. The wink is easily distinguishable from the flashing line lamp signal of an incoming call which flashes the line lamp off one half second and on one half second during each record of operation.

K. The 213A is a panel type unit on which is mounted the apparatus and wiring for one central office or PBX Line Circuit for use as a single line common to stations of both 1A1 and 1A Key Telephone systems. Apparatus is wired to associated terminal panels with soldered terminations on the wired side and screw type terminals for connections outside the unit.

L. The 3A is an angle bracket type unit on which a signaling relay is mounted and wired to a terminal panel with soldered terminations on the wired side and screw type terminals for connections outside the unit. This unit is not designed to mount directly on the 15A or 16A Apparatus Mountings and when required must be mounted on a bracket, P-37B204, which is arranged for mounting on the 15A or 16A Mountings. The 3A Key Telephone Unit is used when both code signaling and selective signaling are desired. No auxiliary equipment is required for buzzer signaling when all of the buzzers are operated either selectively or on a code ringing basis but when some of the signaling keys are used for selective buzzer operation and others are employed to operate the same buzzers on a code signaling basis, the 3A Key Telephone Unit or its equivalent will be required.

M. The 11A is an angle bracket type unit on which a resistance lamp is mounted and wired to a terminal panel with soldered terminations on the wired side and screw type terminals for connections outside the unit. The resistance lamp is used to prevent ringing current exceeding safe limits and to improve the performance of small ringing generators under maximum load. The resistance lamps are used to insure ringing current to other apparatus working on same supply if ringing grounds or crosses occur beyond lamps of circuit in trouble. This unit, like the 3A KTU must be mounted on hinged bracket 37B204 when it is desired to mount the unit on the 15A or 16A Apparatus Mountings with panel type key telephone units.

N. The 16A is an angle bracket type unit on which the apparatus for an audible signal control circuit is mounted and wired to a terminal panel with soldered terminations on the wired side and screw type terminals for connections outside the unit. This unit, like the 3A KTU must be mounted on hinged bracket 37B204 when it is desired to mount the unit on the 15A or 16A Apparatus Mountings with panel type key telephone units. The audible signal control unit is used when two independent common audible signals are required with one or more line circuits common to two lines or common to separate groups of lines.

P. The 22 Type Key Telephone Units are of the angle bracket type with resistances mounted and wired to a terminal panel with soldered terminations on the wired side and screw type terminals for connections outside the unit. These units are required when DC power or 48 volt battery over

feeders is used to illuminate lamps. The following table indicates the lettered code of 22 type units that should be used for various conditions:

Type of Battery Supply	Type of KTU Req'd.
FOR 51A LAMPS	
Local battery 9 cells 14-20V	22F
9 Cell building battery 16-22V	22G
10 Cell building battery 18-24V	22H
11 Cell building battery 20-26V	22J
23 Cell regulated cent. off. battery 47.5-50V	22K
FOR K2 LAMPS	
23 Cell regulated cent. off. battery 47.5-50V	22J

These units like the 3A KTU must be mounted on bracket P37B204 when it is desired to mount the units on 15A or 16A Apparatus Mountings.

Q. The 23A is an angle bracket type unit on which a condenser is mounted and wired to a terminal panel with soldered terminations on the wired side and screw type terminals for connections outside the unit. The condenser is wired across the key telephone system battery supply when the source is poorly filtered or when noise caused by switching operations in the system is objectionable. This unit, like the 3A KTU must be mounted on bracket, P-37B204, when it is desired to mount the unit on 15A or 16A Apparatus Mountings with panel type key telephone units.

R. The 26B and 29A are angle bracket type units on which the relays are mounted and wired to terminal panels with soldered terminations on the wired side and screw type terminals for connections outside the units. Combinations of the 26B and 29A Key Telephone Units are used to provide automatic cut off of stations associated with an individual line appearing at several stations. Four optional arrangements can be provided as follows:

- 1 — A station can cut-off others and can not be cut off.
- 2 — A station can cut-off others and can be cut-off except during a call.
- 3 — A station or group of stations cannot cut-off others and can be cut-off except during a call.
- 4 — A station cannot cut-off others and can be cut-off at any time.

The Key Telephone Units required to provide the above conditions are respectively as follows:

- 1 — One 26B Key Tel. Unit per line and one 29A Key Tel. Unit per station
- 2 — One 26B Key Tel. Unit per line and one 29A Key Tel. Unit per station
- 3 — One 26B and one 29A Key Tel. Unit per line and one 29A Key Tel. Unit per station or groups of stations
- 4 — None — This condition applicable only to one of the stations that can be cut off in accordance with conditions 1, 2, 3, above.

The 26B and 29A Key Telephone Units like the 3A KTU must be mounted on a bracket P-37B204 when it is desired to mount the units on 15A or 16A Apparatus Mountings with panel type key telephone units.

When the automatic cut-off feature is required with a dial intercomm line it is provided by furnishing one 26B Key Tel. Unit per line which in conjunction with a 208A Key Telephone Unit automatically cuts off all other stations on the line and reconnects only the called station to the calling station.

S. The 31A is an angle bracket type unit on which a battery feed relay is mounted and wired to a terminal panel with soldered terminations on the wired side and screw type terminals for connections outside the unit. This unit is used to light busy lamps steady at stations on a manual intercomm line. The 31A KTU like the 3A KTU must be mounted on a bracket, P-37B204 when it is desired to mount the unit on 15A or 16A Apparatus Mountings with panel type units.

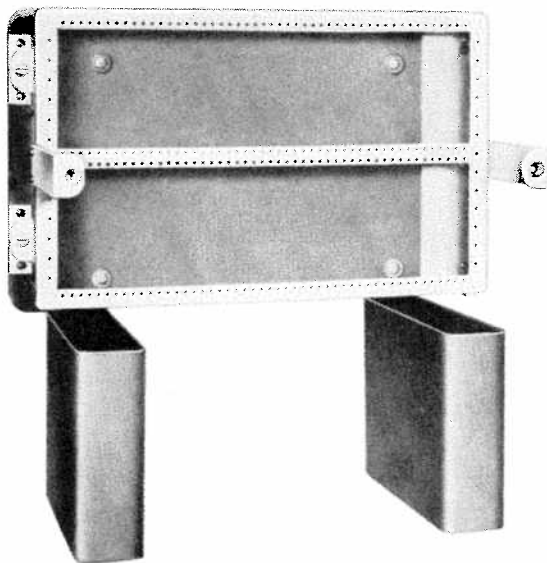
T. The 211A is a single panel unit on which apparatus for the manual intercomm signaling ckt, the common audible signal control circuit, the ringing lamp circuit, the battery feed noise suppression circuit and the intercomm battery feed circuit is mounted and wired to an associated terminal panel with soldered terminations on the wired side and screw type terminals for connections outside the unit. This unit provides all of the features covered by paragraphs K, M, P and R.

U. The 212A Key Telephone Unit is a single panel unit on which is mounted the apparatus and wiring for three Central Office or PBX Line circuits and flashing and time out circuit apparatus common to the three lines. This common apparatus will accommodate 5 lines. Apparatus is wired to associated terminal panels with soldered terminations on the wired side and screw type terminals for connections outside the unit.

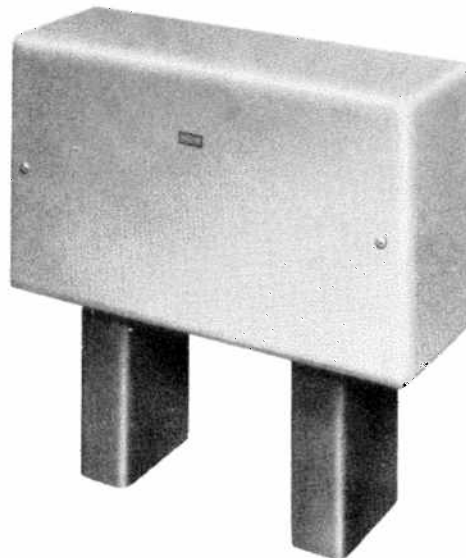
V. The 200DW and 200EW Key Telephone Units are packaged units mounted and wired in a cabinet consisting of a 16A Apparatus Mounting and a 117AW Cover with equipment for 3 or 4 Central Office or PBX Lines respectively. The 200DW unit consists of the 212A Unit mounted in a cabinet. The 200EW unit consists of the 212A unit plus a 202B unit mounted in a cabinet. Adequate space is available in the cabinet for units required to complete a key telephone system in which additional lines or additional operating features are desired.

CABINETS AND MOUNTING ARRANGEMENTS

Cabinets per Figure 5 are available for housing the panel type key telephone units of the 200 series. The 200DW and 200EW Key Telephone Units are assembled units mounted and wired in a cabinet since it is expected that a high percentage of 1A1 Key Telephone System installations will require one of these basic units. Cabinets consisting of a 16A Apparatus Mtg and a 117AW Cover are part of the 200DW and 200EW Units or can be ordered separately when desired.



*16A Apparatus Mounting on Metal Stand
ED-95023-70 Groups 2 & 4*



*16A Apparatus Mounting and 117AW Cover
on Metal Stand ED-95023-70 Groups 2 & 4*

FIGURE 5

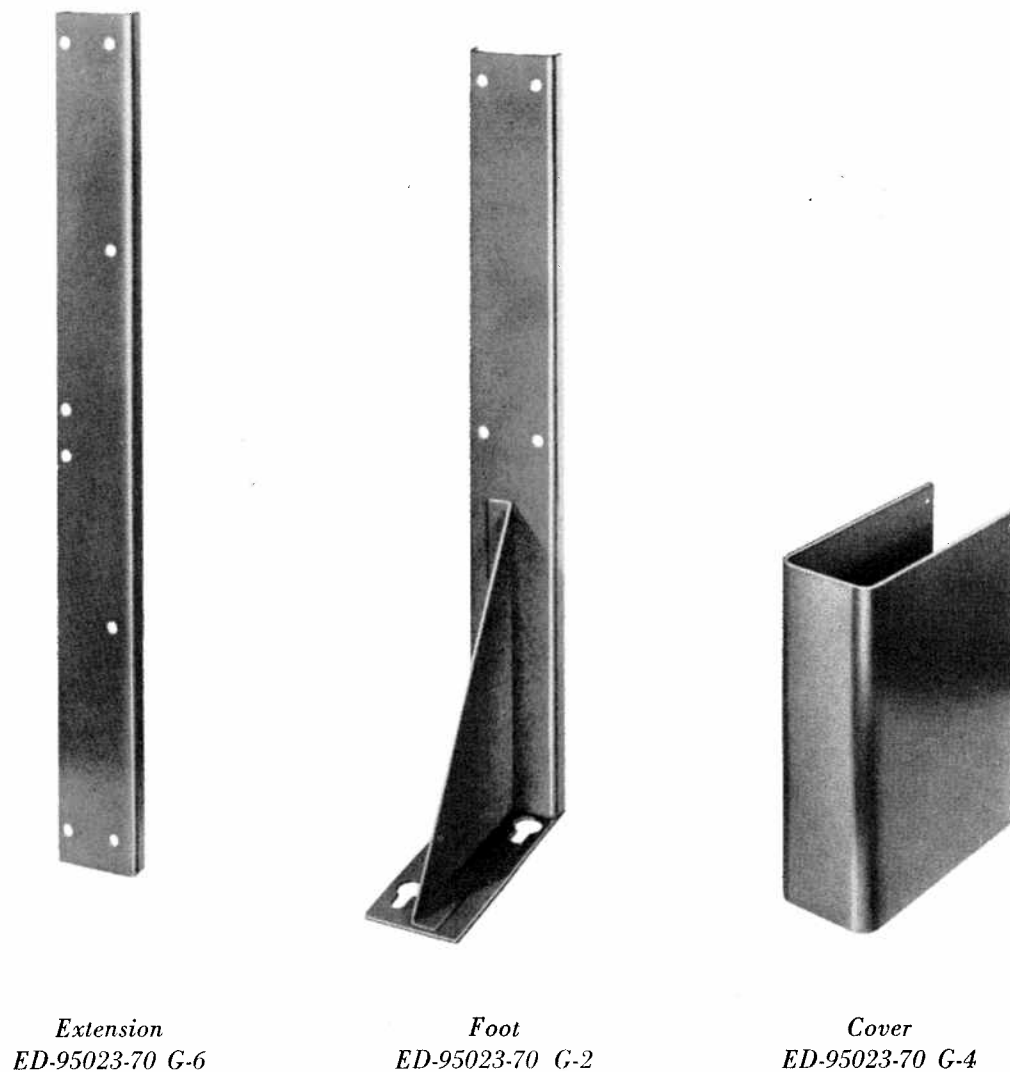
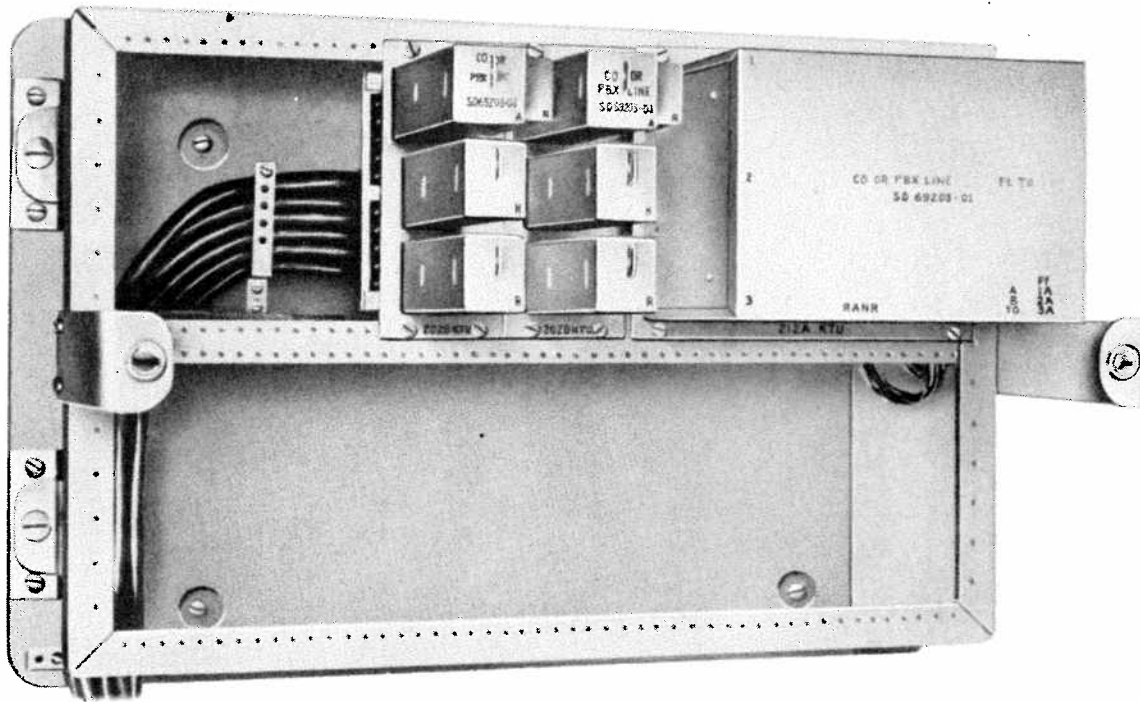


FIGURE 6

The assembly of the 16A Apparatus Mounting includes a wood backboard which serves to insulate the cabinet from any surface on which it is mounted. When it is desirable to mount the cabinet on the floor a floor stand, ED-95023-70 Group 2, can be used and where appearance is a factor a cover for the base of the stand, ED-95023-70 Group 4 can be provided. One floor stand foot and cover are shown in Figure 6. One ED-95023-70 Group 2 and 4 is required to provide the two foot assemblies and covers necessary to support one cabinet.

The 16A apparatus mounting and cover have overall dimensions of $26\frac{1}{8}" \times 16\frac{1}{8}" \times 9\frac{3}{8}"$. The cover has a beige gray wrinkle finish and is furnished with an inner lining of sound absorbent material for noise reduction purposes. The apparatus mounting has a hinged gate assembly affording easy access to the terminal side of mounted apparatus, the gate assembly providing two rows of mounting space each 7" high (see Fig. 7) each row having horizontal space available for any number of key telephone units with a total horizontal requirement of $21\frac{9}{16}"$ or less.



*200EW Key Telephone Unit with an Additional
202B Key Telephone Unit (Cabinet Cover Removed)*

FIGURE 7

The gate assembly is also arranged for mounting six 2" x 23" apparatus mounting plates which permits a combination of panel type and mounting plate type units to be mounted in the same cabinet. The shorter 19" mounting plates may be mounted in the cabinet by using adapters per P-36B209. Two adapters are required for each plate to be mounted.

For small installations of panel type key equipment units a smaller cabinet consisting of a 173A Backboard, a 15A Apparatus Mounting Assembly and 116AW Cover is available. This cabinet is 16 $\frac{5}{8}$ " high and 13 $\frac{3}{2}$ " wide and 9 $\frac{3}{8}$ " deep. The apparatus mounting assembly provides two rows of mounting space each 7" high, each row having horizontal space available for any number of key telephone units with a total horizontal requirement of 10 $\frac{1}{6}$ inches. Although the cabinet is primarily intended for wall mounting and not arranged for floor support, the floor stand ED-95023-70 Groups 2 and 4 can be used by drilling the cabinet backboard as required.

Small individual angle bracket type key telephone units such as the 3A, 11A, 16A, 31A, (Fig. 8) etc. can be mounted on the 15A or 16A apparatus mounting by using a mounting bracket assembly P37B204. Using this assembly three single space or one double space and one single space key telephone units of the angle bracket type can be mounted on the front and rear of the bracket.

Extension auxiliary uprights, ED-95023-70 Group 6 can be provided when it is desirable to mount the 101G Power Plant on the same stand with the cabinet. With this arrangement the 101G Power Plant will be located above the equipment cabinet with approximately 2" separating the two units. Should it be desirable to mount the 101G Power Plant on a separate floor stand a metal stand ED-95023-70 Group 3 is used.

Three other apparatus cabinets which are available can be used for mounting key telephone units of the angle bracket or mounting plate type. These cabinets which have a capacity of 4, 1 $\frac{3}{4}$ " x 19" Mounting Plates or 11 or 18 mounting plates 1 $\frac{3}{4}$ " x 23" are available per ED-91472-70, ED-91194-70 and ED-91180-70 respectively. When it is necessary to mount angle bracket type units in these cabinet bent bars per ED-69143-70 Group 1 for 19" mounting plates or Group 2 for 23" mounting plates are used. The bent bars, furnished in pairs, are designed to occupy the space of one or two 1 $\frac{3}{4}$ " mounting plates and provide for mounting three single space or double space key telephone units on both front and back, thereby giving a capacity of six key telephone units per set of bars.

The 4-plate cabinet uses bent mounting bars 19" long per ED-69143-70 Group 1 and the 11 and 18-plate cabinets use bent mounting bars 19" or 23" long as required. The 11 and 18 plate cabinets are arranged for 23" mounting plates but each may be equipped with auxiliary framework to permit the mounting of 19" mounting plates. By using special adapter angle, mounting angles P37A502 for 23" spans or P37A823 for 19" spans, the 200 series Key Telephone Units and the bracket P37B204 may be mounted in the eleven or 18 plate apparatus cabinets or on relay rack designed for 19" or 23" mounting plates. Two mounting angles are required for each row of panel type units or brackets.

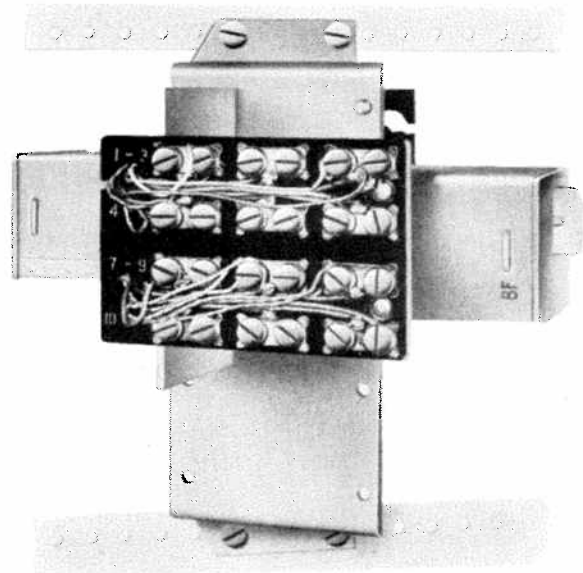


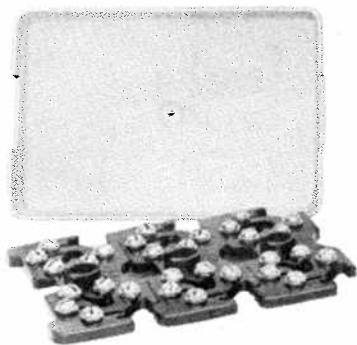
Fig. 8—2-31A Key Telephone Units mounted front and rear on P-37B204 Angle Bracket mounting.

STATION SET CONNECTIONS

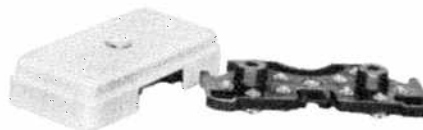
A ten terminal connecting block, 44A, is used to terminate key telephone set cords having more than four conductors. The 44A Connecting Block may be used individually or in a group arrangement of up to four blocks.

The Nos. 101A-4 (Ivory) or 101A-9 (Brown) covers are used with a single No. 44A Connecting Block and two or three No. 44A Connecting Blocks may be mounted under the No. 101C-4 (Ivory) or 101C-9 (Brown) covers. The Nos. 168A-4 (Ivory) or 168A-9 (Brown) Backboards are arranged

for mounting one No. 44A Connecting Block and the Nos. 168B-4 (Ivory) or 168B-9 (Brown) Backboards are arranged for mounting two or three No. 44A Connecting Blocks. The Nos. 168C-4 (Ivory) or 168C-9 (Brown) Backboards are arranged for mounting four No. 44A Connecting Blocks. One 101A Type and one 101C Type Cover are used when four 44A Connecting Blocks are mounted on a 168C Type Backboard.



*Three No. 44A Connecting Blocks
and No. 101C-4 Cover*



*One No. 44A Connecting Block
and No. 101A-4 Cover*

FIGURE 9

The following table associated with Fig. 10 indicates the terminals on which the various pairs of inside wiring cable and key telephone set cord conductors are terminated on No. 44A Connecting Blocks. The first group of ten conductors is for the first connecting block (one nearest butt of cable) and the second, third and fourth groups are for the second, third and fourth connecting blocks respectively. The cord attaches to the last block on the side opposite the side where the cable enters.

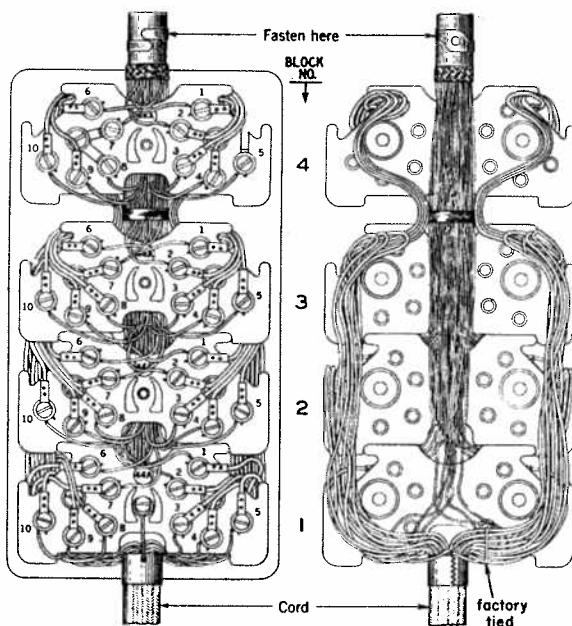


FIGURE 10

Four No. 44A Connecting Blocks. One Nos. 101A and 101C Covers Required

Block No.	Connecting Block Terminals	Type D Inside Wiring Cable Pairs	Type C Inside Wiring Cable Pairs	Cord Conductors
1	1 2 4 5 6 7 9 10 3 8	Blue) White) Orange) White) Green) White) Brown) White) Slate) White)	Blue White Orange White Green White Brown White Slate White	Red Green Yellow Black Blue White *Brown-Red *Brown-Green *Brown-Yellow *Brown-Black
2	1 2 4 5 6 7 9 10 3 8	Blue Red Orange Red Green Red Brown Red Slate Red	Blue-White White Blue-Orange White Blue-Green White Blue-Brown White Blue-Slate White	Brown-Blue Brown-White Red-Green Red-Yellow Red-Black Red-Blue Red-White Green-Yellow Green-Black Green-Blue
3	1 2 4 5 6 7 9 10 3 8	Blue Black Orange Black Green Black Brown Black Slate Black	Orange-White White Orange-Green White Orange-Brown White Orange-Slate White Green-White White	Green-White Yellow-Black Yellow-Blue Yellow-White Black-Blue Black-White Blue-White Slate Slate-Red Slate-Green
4	1 2 4 5 6 7 9 10 3 8	Blue Yellow Orange Yellow Green Yellow Brown Yellow Slate Yellow	Green-Brown White Green-Slate White Brown-White White Brown-Slate White Slate-White White	Slate-Yellow Slate-Black Slate-Blue None Slate-White None Slate-Brown None Brown None
* Double red, double green, double yellow and double black in cords with rubber insulated conductors. These conductors have ribs to distinguish them from the others in the cord.				

FIGURE 10A

POWER SUPPLY

The relays used in the 1A1 Key Telephone System which require a local battery supply are arranged to operate on 14 to 26 volts. Battery for lamp operation may be either 10 volts AC, 14 to 26 volts DC or 48 volts DC. The power supply may be obtained from any of the following sources:

- a — direct feed over cable pairs from a central office
- b — direct feed from a PBX or building battery
- c — a local 101G Power Plant per J-86731A List 6 & NP or List 4 & NP providing the following power:

LIST 6

Supply	Voltage Range	Resistance Load Range	Amp.
DC (talk)	14-28	0 to 20 ohms	0.9
DC (Sig.)	18-28	0 to 32 ohms	0.6
AC—60 Cycle	9-11	0 to 7 ohms (36-51A Lamps)	1.4
*AC—60 Cycle	16-20	0 to 13 ohms (36-A3 Lamps)	1.4

** LIST 4

Same as above plus

20 Cycle Ringing	75-110	1 to 8 high impedance ringers or 1 to 2 high impedance ring- ers with condensers
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** The List 4 power plant is used when a 20 cycle ringing supply is required for private lines or to ring local bell or buzzers.

* The 16-20 volt 60 cycle output of the rectifier also can be used for buzzer signaling.

When the sources of power listed above are not available the following alternate sources can be used:

- d — a local storage battery plant per J-59010 floated over cable pair or charged from a local rectifier.
- e — a KS5714 Transformer for operating buzzers on alternating current.
- f — a 393B Transformer for illuminating key telephone set lamps or indicator lamps on alternating current.

Fusing

The 101G Power Plants J-86731A Lists 6 & NP or List 4 & NP are equipped with 2 ampere fuses which eliminate the need for separate fusing when only the 101G power supply is used in a 1A1 Key Telephone System. In cases where a 1A1 System obtains battery over cable pair from a central office or from a local building supply separate fusing will be required only where the main battery supply is not attended by a maintenance man for the replacement of fuses. When the central office or local building battery supply is unattended individual circuit fuses for a 1A1 System should be furnished by providing a 201B Key Telephone Unit when space is available in apparatus cabinet ED-95021-70 or by providing a 21A Key Telephone Unit for mounting in a 105AW Apparatus Box or on mounting plates in the 4, 11 or 18 plate cabinets. The 21A Key Telephone Unit is an angle bracket type mounting with space for six fuses and three ground terminals. When used in a 105 Type Apparatus Box the fuse panel should be mounted in the top half of the box to facilitate replacement of fuses when required.

OPERATION

Line Circuits

The key telephone sets listed herein provide for picking up central office, PBX, private or inter-communicating lines. Incoming calls on central office PBX or private lines are audibly indicated by the station ringers or by buzzers signaling which line to pick up. The key telephone sets equipped with signal lamps also provide a visual signal indicating which line has an incoming call waiting to be answered by illuminating the key button of the associated line at all stations at which the line appears. The tables of key telephone sets on the previous pages indicate the number of lines and feature combinations available.

An incoming call on a line is answered by pressing the key button associated with the audible or visual (or both) signals received and picking up the station handset. An outgoing call is originated by selecting a desired line, pressing the associated key button and picking up the station handset. The line is then ready to place an outgoing call.

Should a local power failure occur all types of lines except the Central Office or PBX Lines become inoperative. With central office or PBX lines, however, it is possible during a power failure to make an outgoing call since selection of a line and removal of the station handset permits the line to receive a call regardless of the availability of local power to the key telephone system. If, during a local power failure, the local ringing supply remains operative the common audible signals, if provided, will operate during an incoming call but will follow the incoming ringing on the line rather than locking in as would be the case when power is available to the relays of the system. During a complete local power failure it is possible, on Central Office and PBX lines only, to receive incoming signals only if ringers are bridged across the lines to operate on incoming ringing current.

Holding

A holding key button is provided on some key telephone sets to enable the subscriber to hold an incoming call while conversing with another person on a separate line or to transfer an incoming call to another station on the same line.

When the subscriber desires to hold an incoming call for the purpose of obtaining information over another line, transferring an incoming call, etc., the hold key button is pressed. This causes a holding bridge to be placed across the line and keeps lighted the lamp associated with the line being held so that other stations will know the line is in use. When the subscriber (or the station to which

the call has been transferred) desires to pick up the line again the key button associated with that line is pressed and the hold condition is automatically released permitting the subscriber (or the person to whom the call was transferred) to converse on the line. The holding feature is not available with the automatic tie line circuit, the station line circuit, or the intercommunicating line.

Wink

A visual hold signal called a wink can be provided in conjunction with the holding feature to enable a subscriber to distinguish between a line being held and a line in a normal busy condition or a line with an incoming call. This "wink" signal feature uses the same signal lamp used for line and busy signals, but has a long "on" period and a short "off" period giving the impression of a wink when the line is in a held condition.

Intercommunicating Lines

Both manual and dial intercommunicating lines are available with the 1A1 Key Telephone System.

Manual Intercomm

The manual intercomm line requires the use of a battery feed relay which provides talking battery to the stations connected to the line and which in addition, when the intercomm line is being used, lights the associated line lamps steady indicating a busy condition on the line. With the manual intercomm line a separate audible signaling system is used to indicate to stations on the line that a call should be answered. One or more intercomm lines per station may be provided, each requiring the assignment of one of the pickup buttons of the station key telephone sets. Each line requires a talking battery supply which is obtained from the 101G Power Plant or from any local talking battery supply available in the office in which the lines appear.

Dial Intercomm

The dial intercommunicating line permits any one of a maximum of nine stations on a line to dial any other station on the line by picking up the telephone set handset pressing the line key button associated with the intercomm line and dialing the single digit assigned to any other station. The line lamps at all stations on the line are lighted steady as soon as a station picks up and selects the intercomm line. At the completion of dialing the buzzer or bell assigned to the called station only will ring for a period of from one to three seconds indicating to the called station that a call is to be answered. If the called station fails to answer a dial intercomm call the calling station can hang up and repeat the calling operation to cause the audible signal to operate again for one to three seconds at the called station.

When desired, a flashing feature can be furnished with the intercomm line to provide a flashing line lamp at only the called station while the uncalled station line lamps remain lighted steady. A stations cut off feature is also available with the dial intercomm line which permits cutting off all stations except calling or called.

Common Audible Signal

When it is desirable to have two or more C.O. or P.B.X. lines operate a common audible signal it is possible to connect one or more ringers or buzzers mounted external to the telephone sets so that an incoming signal on any line will cause a steady audible signal to operate. By using an audible signal control circuit which is part of the 211A Key Telephone Unit or the separately mounted 16A Key Telephone Unit, a second common audible signal can be provided. The ringing signal when this equipment

is used will provide, when associated with the Automatic Tie Line Circuit or the station line circuit, a steady signal and when associated with the C.O. or P.B.X. line or the ringdown tie line circuit, an intermittent signal which follows the incoming signal. A ringing supply, either 105 volt 20 cycles for ringers, or 18 volts AC or 20 volts DC for buzzers must be provided for the common audible signals.

When desirable, a 7-type buzzer may be mounted in any of the key telephone sets in place of the ringer by using a No. 44B Bracket. The buzzer may be used as an intercommunicating signal buzzer or as a common line signal. The No. 44A Bracket is also arranged to mount the 152A Condenser which should be used when radio frequency suppression is required for the buzzer.

5 HYPOTHETICAL INSTALLATIONS

Equipment and apparatus summaries for various hypothetical installations of the 1A1 Key System are shown as a guide for determining the requirements of similar installations. No wire or cable is included in these summaries. Cabinets are assumed to be wall mounted.

1. Three dial operated Central Office or PBX Lines appearing at five stations, no optional features used.

Quantity	Description	Function
5	544BBW-3 Telephone Sets	Hold and 3 pick-up keys.
15	51A Lamps	Lamps for line keys 3 per station (no spares included).
1	200DW Key Telephone Unit	Line and hold relay equipment for 3 lines plus common lamp flashing and incoming signal time out circuit mounted and wired on a 16A apparatus mounting with a 117AW cover.
15	44A Connecting Blocks	Termination for Key Telephone Set Cords (3 per station).
5	168B Backboard	For mounting 3 Connecting Blocks.
5	101C9 Covers (Brown) or 101C4 (Ivory)	Covers for connecting blocks.
1	J-86731A List 4 & NP 101G Power Plant	DC-18-28 Volt supply for relay operation. AC-60 cycle 9-11 Volt supply for lamps in telephone sets. AC-20 cycle 75-110 Volt supply for ringers in telephone sets.
1	SD-69219-01 Drawing	Telephone Set Circuit.

2. Four dial operated Central Office or PBX Lines appearing at 5 stations with wink signal feature for hold lamps, one manual intercommunicating line appearing at all stations. Code ringing on intercomm signaling circuit.

Quantity	Description	Function
5	564 BBW-3 Telephone Sets	Hold and 5 pick-up keys.
25	51A Lamps	Lamps for line keys 5 per station (No spares included).
1	200EW Key Telephone Unit	Line and hold relay equipment for 4 lines plus common lamp flashing and incoming signal time out circuit mounted and wired on a 16A apparatus mounting with a 117AW cover.
20	44A Connecting Blocks	Termination for Key Tel. Set Cords. (4 Per Station)
5	101A9 Covers (Brown) or 101A4 (Ivory)	Cover for 1 Connecting Block.

5	101C9 Covers (Brown) or 101C4 (Ivory)	Cover for 3 Connecting Blocks.
5	168C Backboards	For mounting 4 Connecting Blocks.
1	J-86731A List 4 & NP 101G Power Plant	DC-18-28 Volt Supply for Relay operation. AC-60 Cycle 9-11 Volt Supply for lamps in Telephone Sets. DC-14-28 Volt supply for talking battery for intercomm. AC-60 Cycle 16-20 Volt Supply for buzzer operation. AC-20 Cycle 75-110 Volt Supply for ringers in Telephone Sets.
1	210A Key Telephone Unit	Wink signal relay unit for association with hold feature.
1	31A Key Telephone Unit	Lamp lighting relay for lamp busy indication and talking battery feed for intercomm.
1	P37B204 Bracket	Bracket for mounting 31A Key Telephone Unit in ED95021-70 Cabinet.
5	7AW Buzzers	Intercomm signal at each station.
5	551A Keys	Intercomm signaling keys one per station.
1	SD-69219-01 Drawing	Telephone Set Circuit.

3. Four dial operated Central Office or PBX Lines appearing at seven stations with wink signal feature for hold lamps and one dial intercommunicating line having access to all stations. Dial intercomm to have flashing line lamp at called stations only, other intercomm stations steady busy lamp.

Quantity	Description	Function
7	564 BBW-3 Telephone Sets	Hold and 5 pick-up keys.
35	51A Lamps	Lamps for line keys 5 per station (no spares included).
1	200EW Key Telephone Unit	Line and hold relay equipment for 4 lines plus common lamp flashing and incoming signal time out circuit mounted and wired on a 16A apparatus mounting with a 117AW cover.
28	44A Connecting Blocks	Terminations for Key Telephone Set Cords.
7	168C Backboards	For mounting 4 Connecting Blocks.
7	101A9 Covers (Brown) or 101A4 (Ivory)	Cover for 1 Connecting Block.
7	101C9 Covers (Brown) or 101C4 (Ivory)	Cover for 3 Connecting Blocks.
1	J-86731A List 4 & NP 101G Power Plant	DC-18-28 Volt Supply for Relay operation. AC-60 Cycle 9-11 Volt Supply for lamps in Telephone Sets. DC-14-28 Volt Supply for talking battery for intercomm. AC-60 Cycle 16-20 Volt Supply for buzzer operation. AC-20 Cycle 75-110 Volt Supply for ringers in Telephone Sets.
1	210A Key Telephone Unit	Wink signal relay unit for association with hold feature.
1	207A Key Telephone Unit	Dial intercomm relay unit.
3	208A Key Telephone Units	Station lamp flashing circuit for intercomm. One 3 circuit unit required for each 3 stations on line.
7	7AW Buzzers	Intercomm signaling buzzer at each station.
1	SD-69219-01 Drawing	Telephone Set Circuit.

4. 3 Dial operated Central Office or PBX Lines appearing at nine stations with wink signal feature for hold lamps and one dial intercommunicating line having access to all stations. First station to have exclusion key and cut-off button to permit first station to cut off all others on two of the three lines. Dial intercomm to have automatic cut off of stations and flashing line lamp at called station only, other intercomm stations having steady busy lamps.

Quantity	Description	Function
8	564 CBW-3 Telephone Sets	Hold Key, 5 pick-up keys, with exclusion feature.
1	565 EBW-3 Telephone Set	Hold Key, 4 pick-up keys, cut-off key with exclusion feature.
36	51A Lamps	4 per station (no spares included).
1	200DW Key Telephone Unit	Line and hold relay equipment for 3 lines plus common lamp flashing & incoming signal time out circuit mounted and wired on a 16A apparatus mounting with a 117AW cover.
9	168C Backboards	For mounting 4 Connecting Blocks.
36	44A Connecting Blocks	Terminations for Key Telephone Set Cords.
9	101A9 Covers (Brown) or 101A4 (Ivory)	Covers for 1 Connecting Block.
9	101C9 Covers (Brown) or 101C4 (Ivory)	Covers for 3 Connecting Blocks.
1	J-86731A List 4 & NP 101G Power Plant	DC-18-28 Volt Supply for Relay operation. AC-60 Cycle 9-11 Volt Supply for lamps in Telephone Sets. DC-14-28 Volt Supply for talking battery for intercomm. AC-60 Cycle 16-20 Volt Supply for buzzer operations. AC-20 Cycle 75-110 Volt Supply for ringers in Telephone Sets.
1	210A Key Telephone Unit	Wink signal relay unit for association with hold feature.
1	207A Key Telephone Unit	Dial intercomm relay unit.
3	208A Key Telephone Unit	Station lamp flashing circuit for intercomm. One 3 circuit unit required for each 3 stations on line.
9	7AW Buzzers	Intercomm signaling buzzer at each station.
1	26B Key Telephone Unit	Station cut-off relay unit for intercomm line.
1	P37B204 Bracket	Bracket for mounting 26B KTU.
1	SD-69219-01 Drawing	Telephone Set Circuit.

5. 3 Dial operated Central Office or PBX Lines appearing at six stations. 1 Automatic Tie Line from Station 1 to separate key telephone system* 1 Station line from Station 1 to individual station telephone set.

Quantity	Description	Function
5	544BBW-3 Telephone Sets	Hold and 3 pick-up keys for stations 2 through 6.
1	564BBW-3 Telephone Sets	Hold and 5 pick-up keys for station 1.
19	51A Lamps	Lamps for line keys (no spares included).
1	200DW Key Telephone Unit	Line & hold relay equipment for 3 lines plus common lamp flashing and incoming signal time out circuit mounted and wired on a 16A apparatus mounting with a 117AW cover.

15	44A Connecting Blocks	Terminations for Key Telephone Set Cords (4 Blocks at Station 1, 2 Blocks at Stations 2 to 6, 1 Block at individual station).
1	168A Backboard	For mounting connecting block at individual station.
5	168B Backboards	For mounting connecting blocks at Stations 2 to 6.
1	B168C Backboard	For mounting connecting blocks at Station 1.
6	101C9 Covers (Brown) or 101C4 (Ivory)	Covers for connecting blocks Station 1 to 6.
2	101A9 Covers (Brown) or 101A4 (Ivory)	Cover for 1 connecting block at individual station and Station 1.
1	203A Key Telephone Unit	Relay equipment for Automatic tie line circuit (no hold feature available with this circuit).
1	205A Key Telephone Unit	Relay equipment for station line circuit (no hold feature available with this circuit).
1	J-86731A List 4 & NP 101G Power Plant	DC-18-28 Volt Supply for relay operation. AC-60 Cycle 9-11 Volt Supply for lamps in Telephone Sets. DC-14-28 Volt Supply for talking battery for tie line & station line. AC-60 Cycle 16-20 volt supply not used. AC-20 Cycle 75-110 Volt for ringing supply on tie line and station line for ringers in Telephone Sets.
1	500CW-3 Telephone Set	Station Set for individual station line.
1	SD-69219-01 Drawing	Telephone Set Circuit.

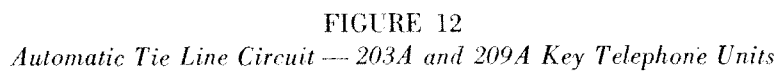
** Automatic tie line relay equipment is required at both ends of tie line. Unit for distant end is not included herein.*

For further information regarding the No. 1A1 Key Telephone System, you are invited to address the Western Electric distributor whose name is listed on back cover.

INTERCONNECTIONS BETWEEN UNITS

To show simplified interconnections between key telephone units various typical connecting arrangements are shown on the following pages. The figures listed below in the reference table illustrate individual features of various circuits and for purposes of clarity show only those circuit contacts and terminal punchings associated with the feature illustrated. Strapping between punchings represents wiring which is sometimes provided by the factory and sometimes added at the time of installation. Part of the same relay apparatus or circuit may be shown in more than one figure.

CIRCUIT	USED WITH	FIG.
Automatic Tie Line Circuit 203A KTU	212A KTU	11
	209A KTU	12
Automatic Cutoff of Dial Selective Intercommunicating Line Circuit 26B KTU	207A and 208A KTU	13
Central Office or PBX Line Circuit 202B KTU with Common Audible Signal	16A, 211A, 212A KTU	14
	16A, 209A, 211A KTU	15
Central Office or PBX Line Hold Circuit 202B KTU	Key Telephone Set	16
Central Office or PBX Line Circuit or 202B KTU	212A KTU	17
	209A KTU	18
Cut-through and Control Circuit for Automatic Cutoff 26B and 29A KTU		19 - 21
1. Station cannot cut off other stations and can be cut off except during a call (K wiring)		19
2. Station can cut off other stations and can be cut off except during a call (H and K wiring)		20
3. Station can cut off other stations and cannot be cut off (H and J wiring)		21
Code and Selective Signaling 3A KTU		22
Dial Selective Intercommunicating Line Circuit 207A KTU		23
Dial Selective Intercommunicating Line Circuit 207A KTU with Flashing Line Lamps	208A and 212A KTU	24
	208A and 209A KTU	25
Intercommunicating Line Battery Feed Circuit 31A KTU	23A, 209A, 211A, 212A KTU	26
Lamp Winking Circuit 210A KTU	202B KTU and 212A KTU	27
	202B KTU and 209A KTU	28
Lamp Resistance Circuit and AC Supply for Lamps (9 to 11 Volts)		29
Lamp Resistance Circuit When Flashing Lamp Feature is Provided — 101G Power Supply Connections		30
Power Failure Circuit 212A KTU	202B KTU	31
Power Failure Circuit 209A KTU	202B KTU	32
Ringer, Buzzer, and Noise Suppression Circuit for Battery Supply A		33
Ringdown Tie Line Circuit 204A KTU	212A KTU	34
	209A KTU	35
Ringin Lamp Circuit and AC Supply for Buzzers (15 to 25 Volts)		36
Station Line Circuit 205A KTU	212A KTU	37
	209A KTU	38
212A Key Telephone Unit		39





Automatic Cut-off of Dial Selective Intercommunicating Line Circuit — 26B, 207A, and 208A Key Telephone Units

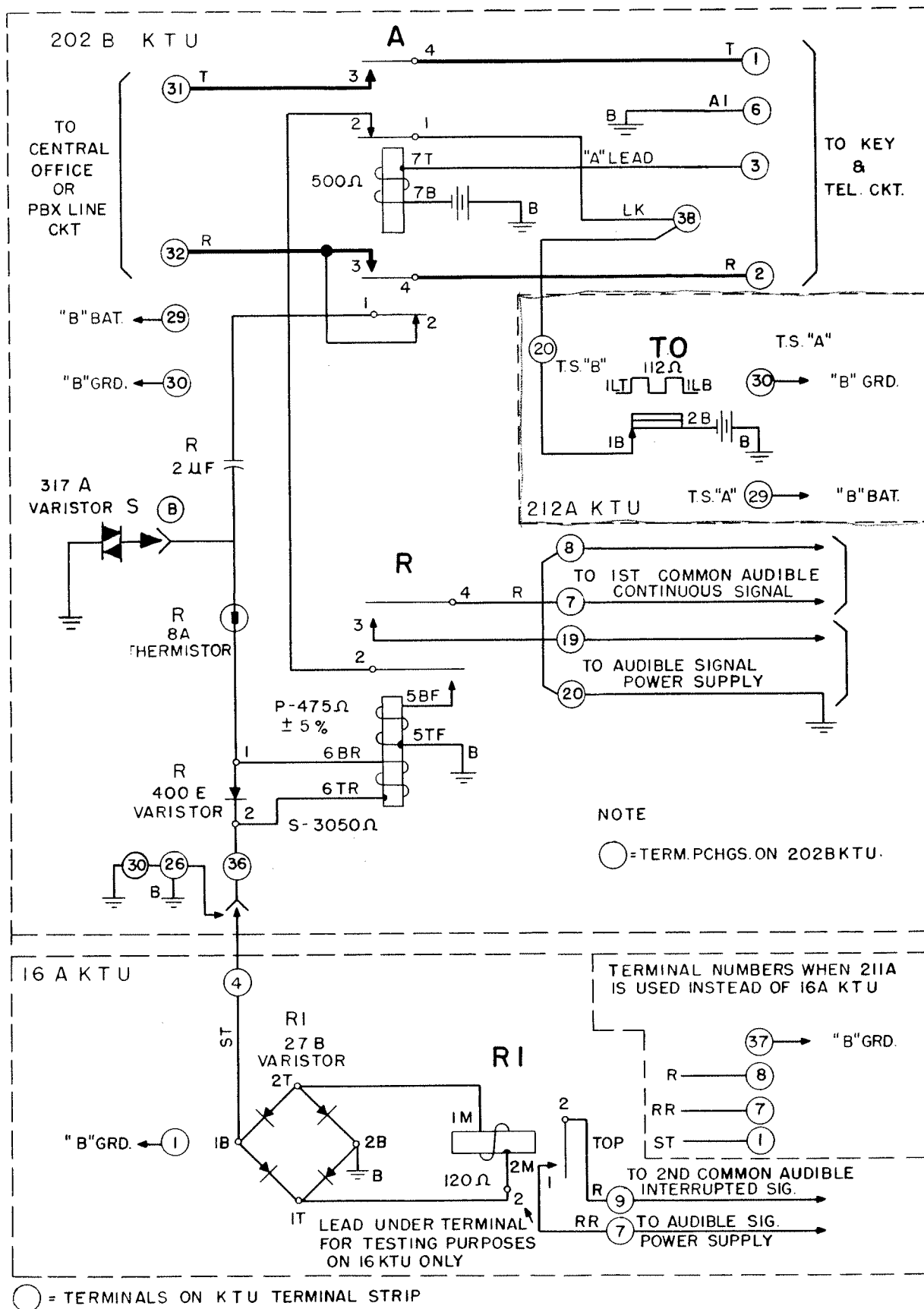


FIGURE 14
Central Office or PBX Line Circuit — Common Audible Signal —
16A, 202B, 211A, and 212A Key Telephone Units

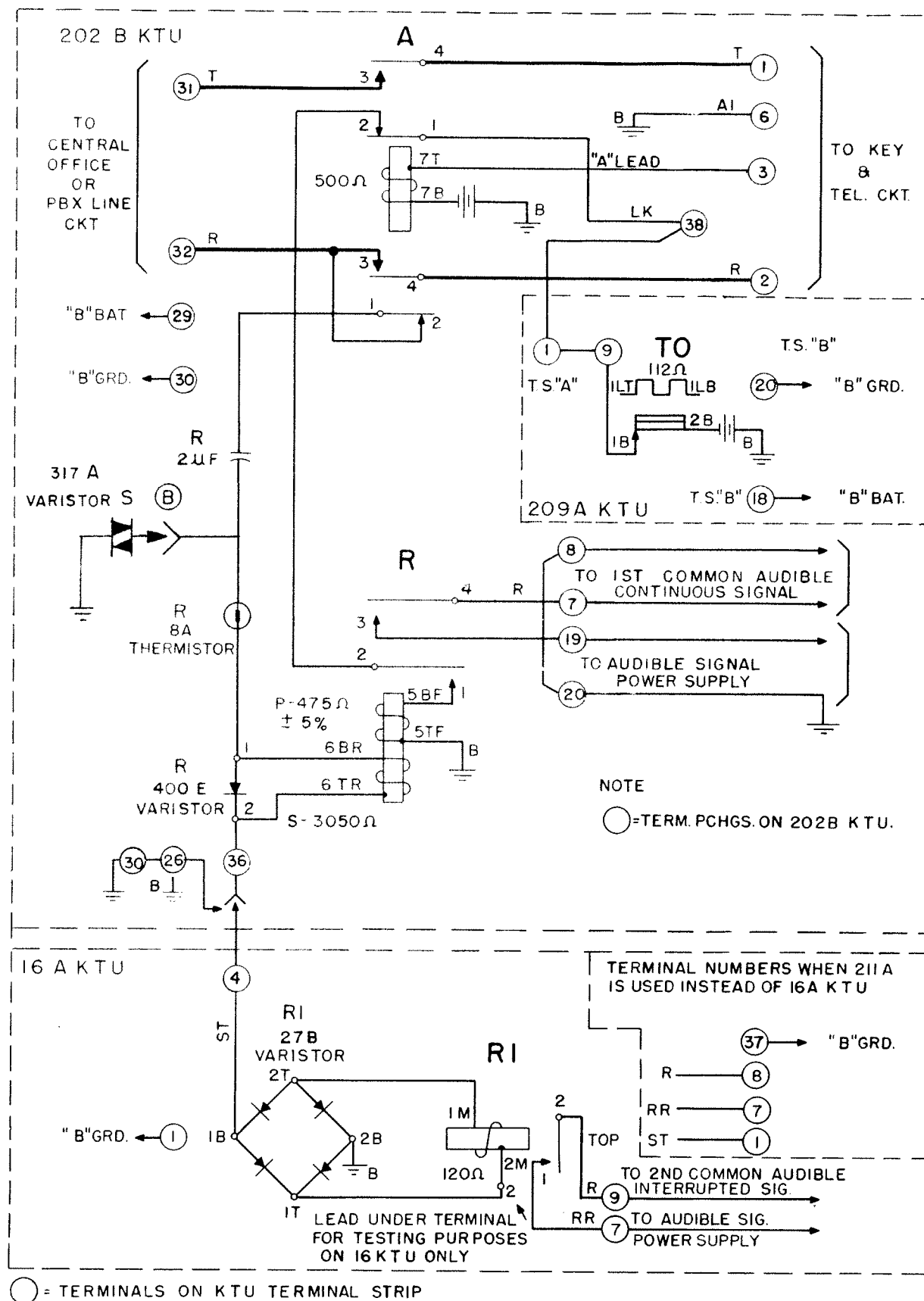


FIGURE 15
Central Office or PBX Line Circuit — Common Audible Signal —
16A, 202B, 209A, and 211A Key Telephone Units

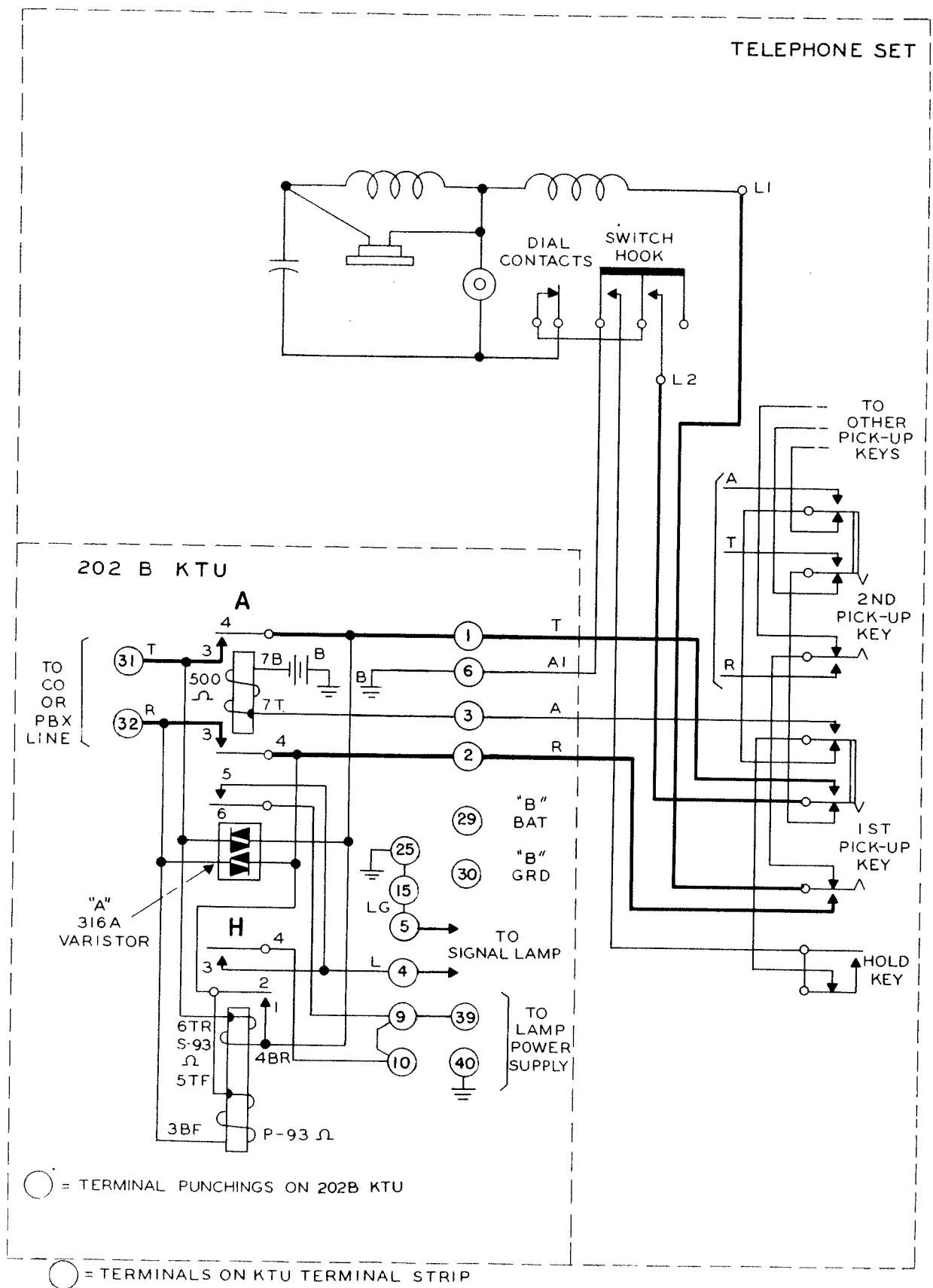


FIGURE 16
Central Office or PBX Line Hold Circuit — 202B Key Telephone Units

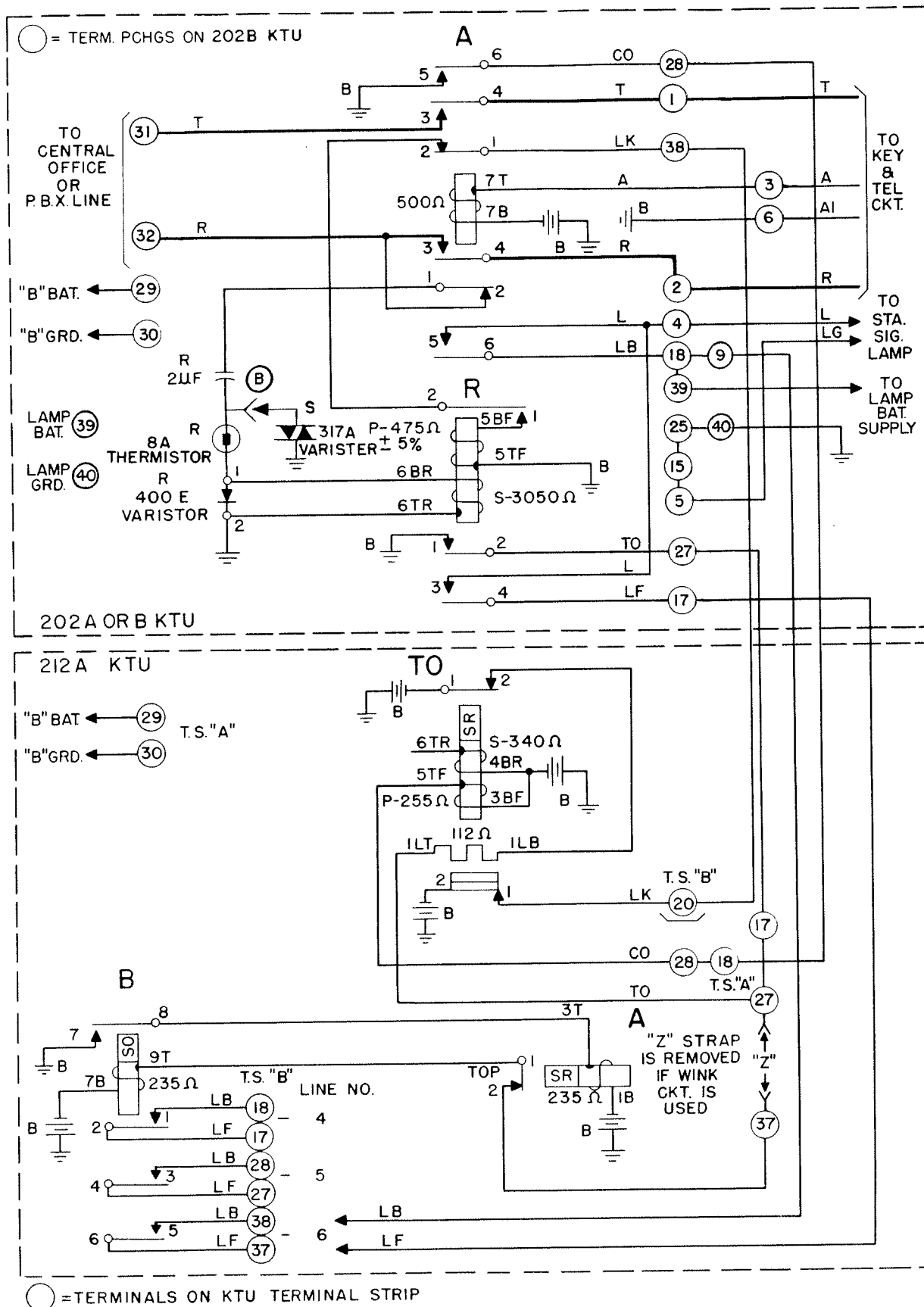


FIGURE 17

Central Office or PBX Line Circuit — Lamp Flashing, Incoming Visual Signal, Time-out, and Busy Signal Circuit — 202B and 212A Key Telephone Units

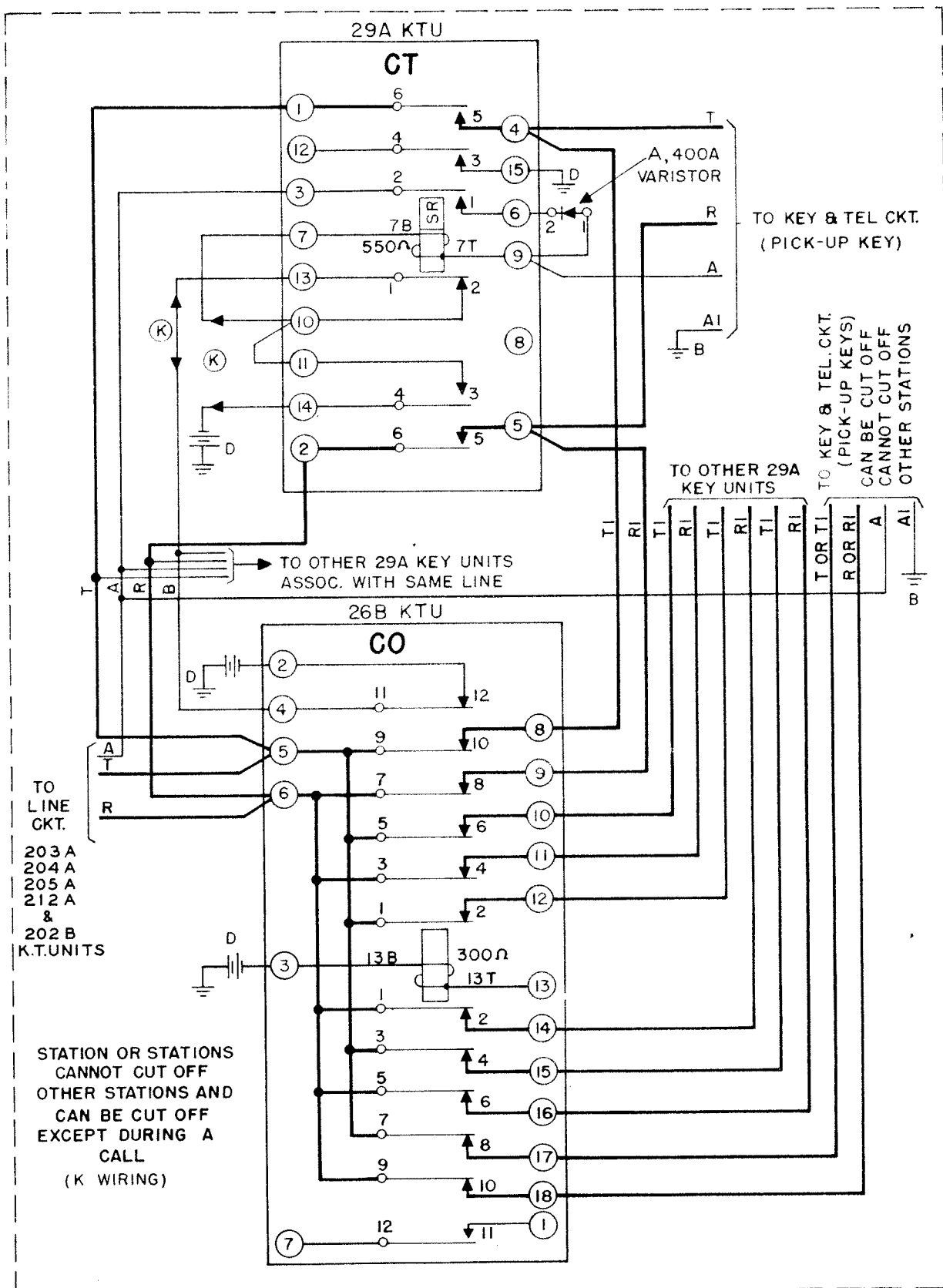


FIGURE 19
Cut-Through and Control Circuit for Automatic Cut-off (K Wiring) —
26B and 29A Key Telephone Units

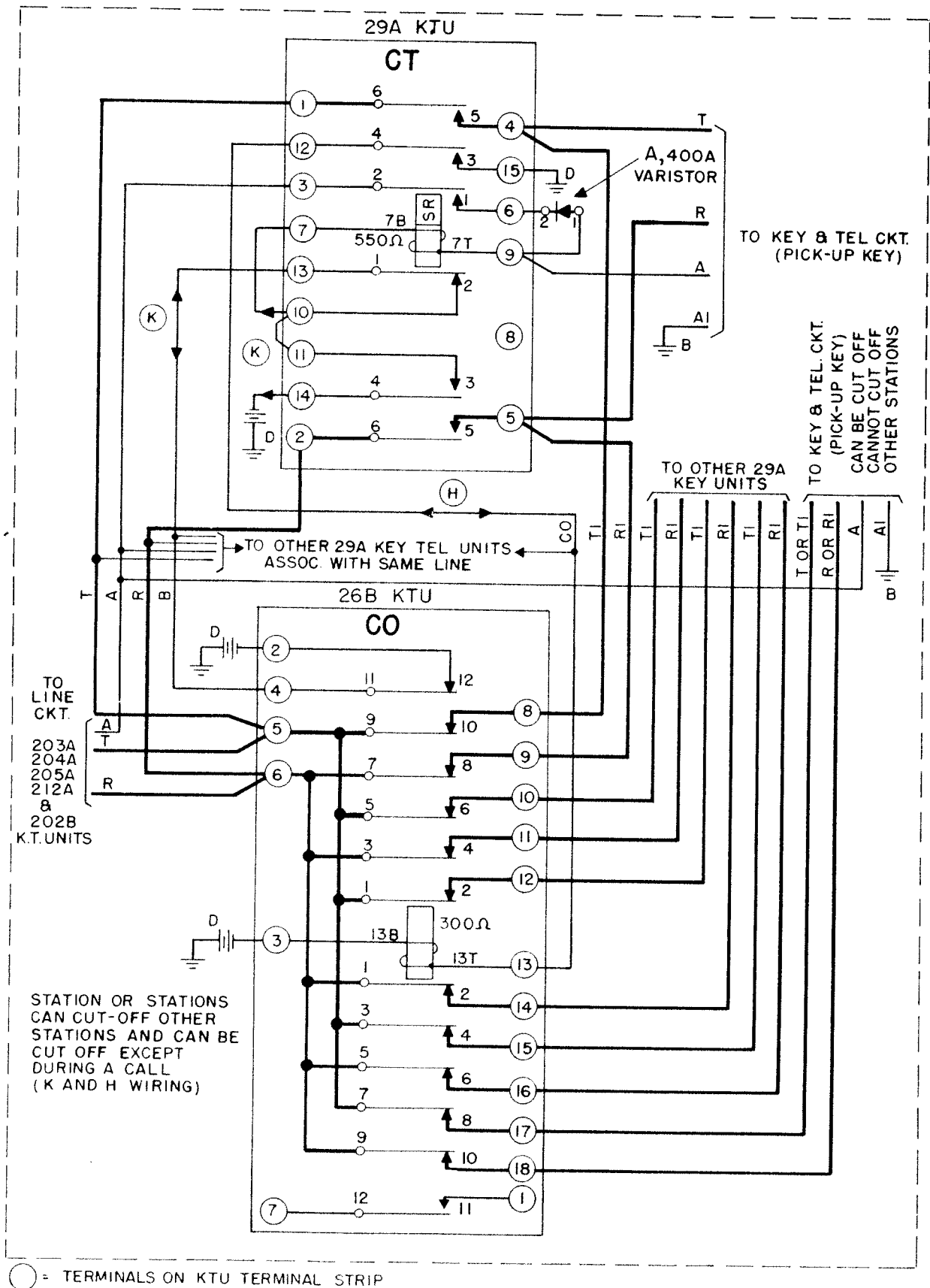


FIGURE 20
Cut-Through and Control Circuit for Automatic Cut-off (H and K Wiring) —
26B and 29A Key Telephone Units

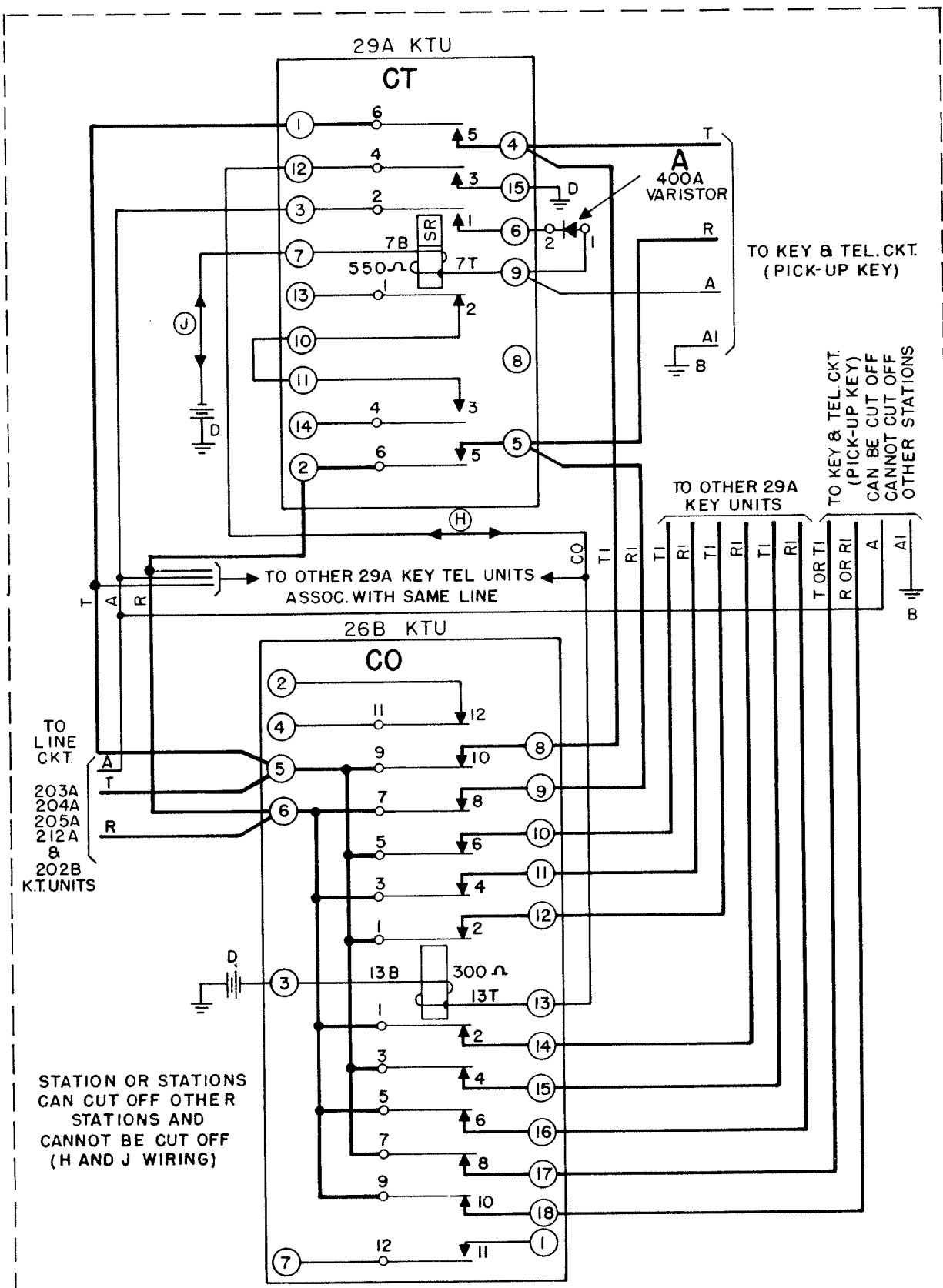


FIGURE 21

Cut-Through and Control Circuit for Automatic Cut-off (H and J Wiring) —
26B and 29A Key Telephone Units

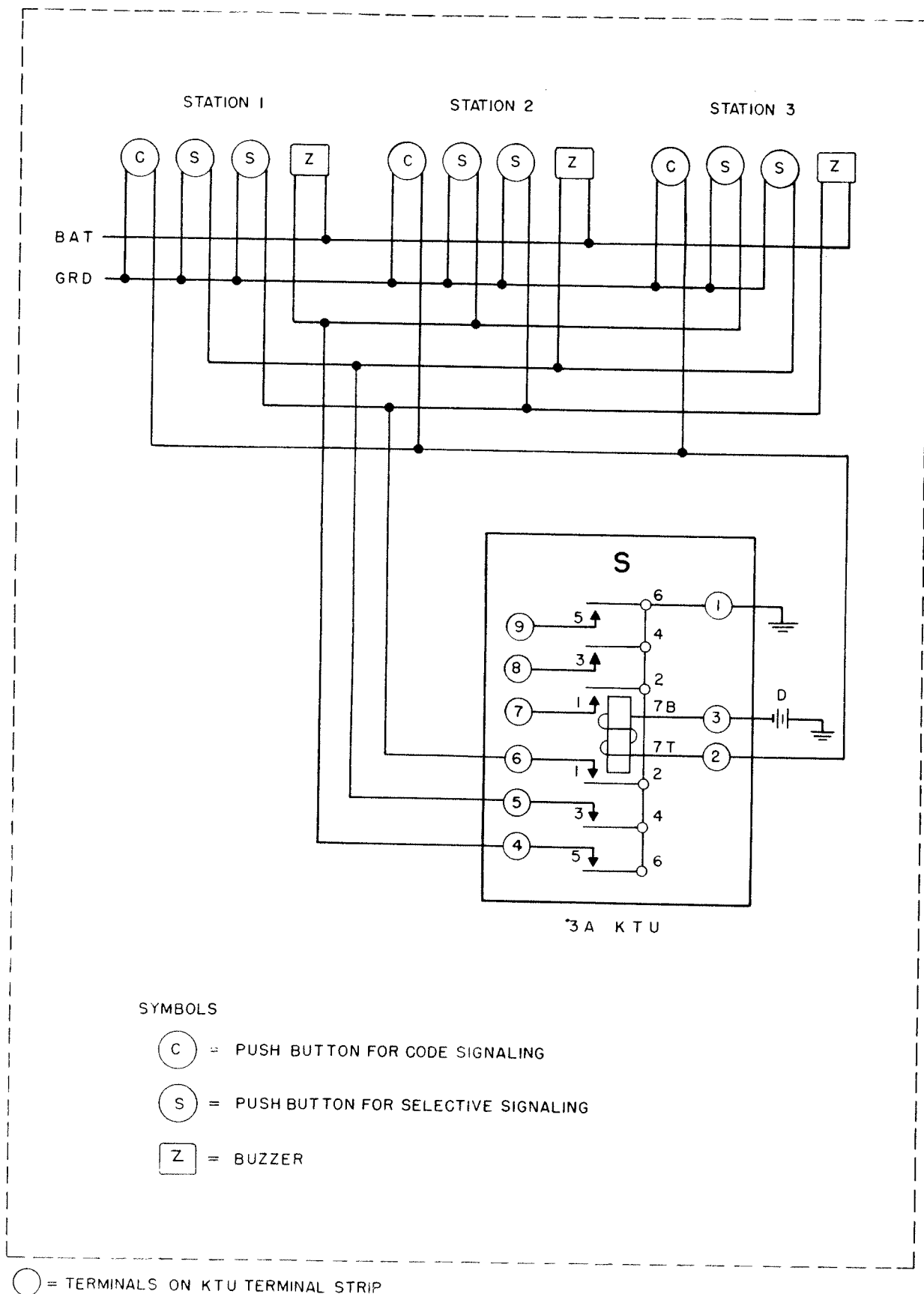


FIGURE 22
Code and Selective Signaling—3A Key Telephone Unit

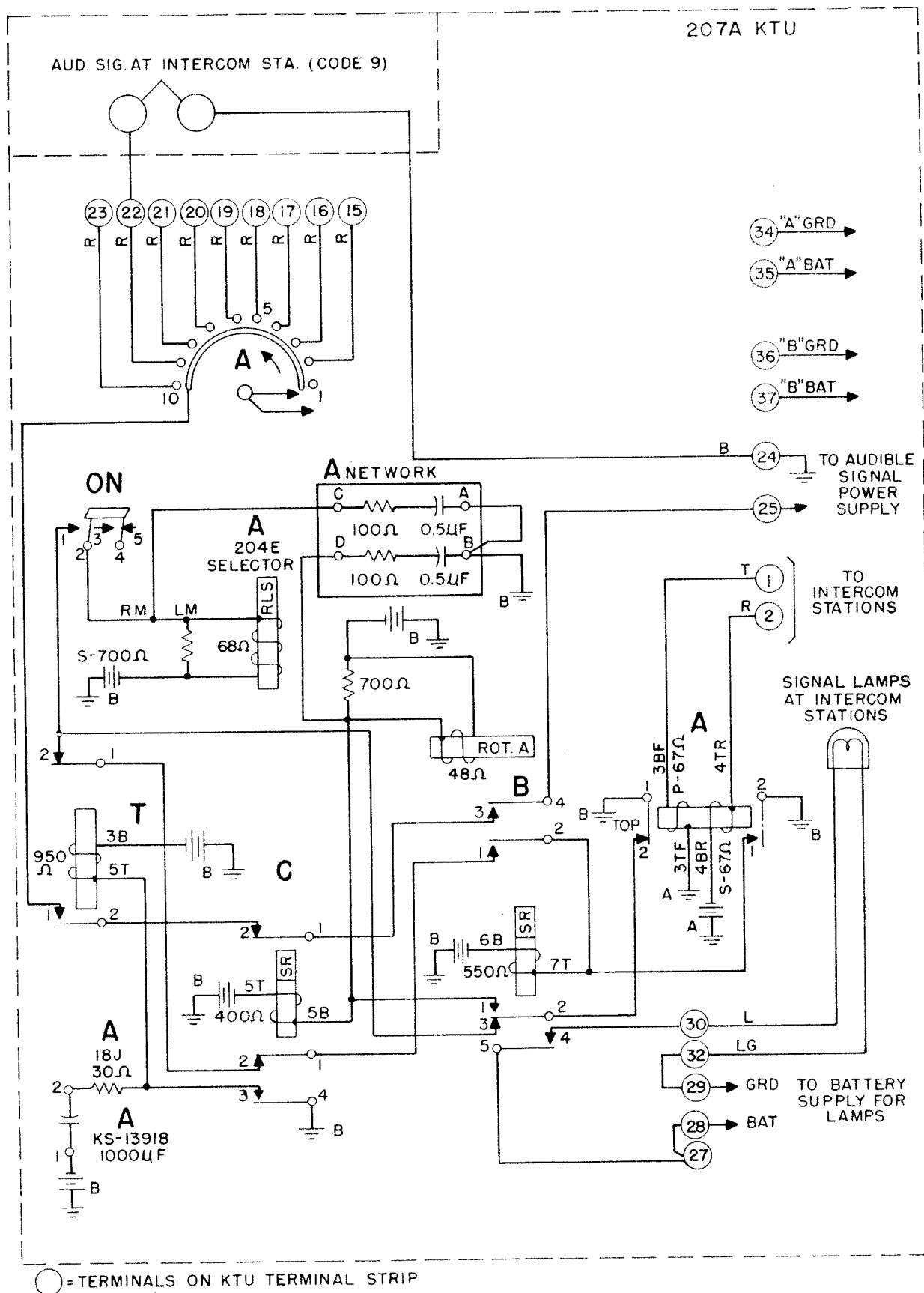


FIGURE 23

Dial Selective Intercommunicating Line Circuit — 207A Key Telephone Unit

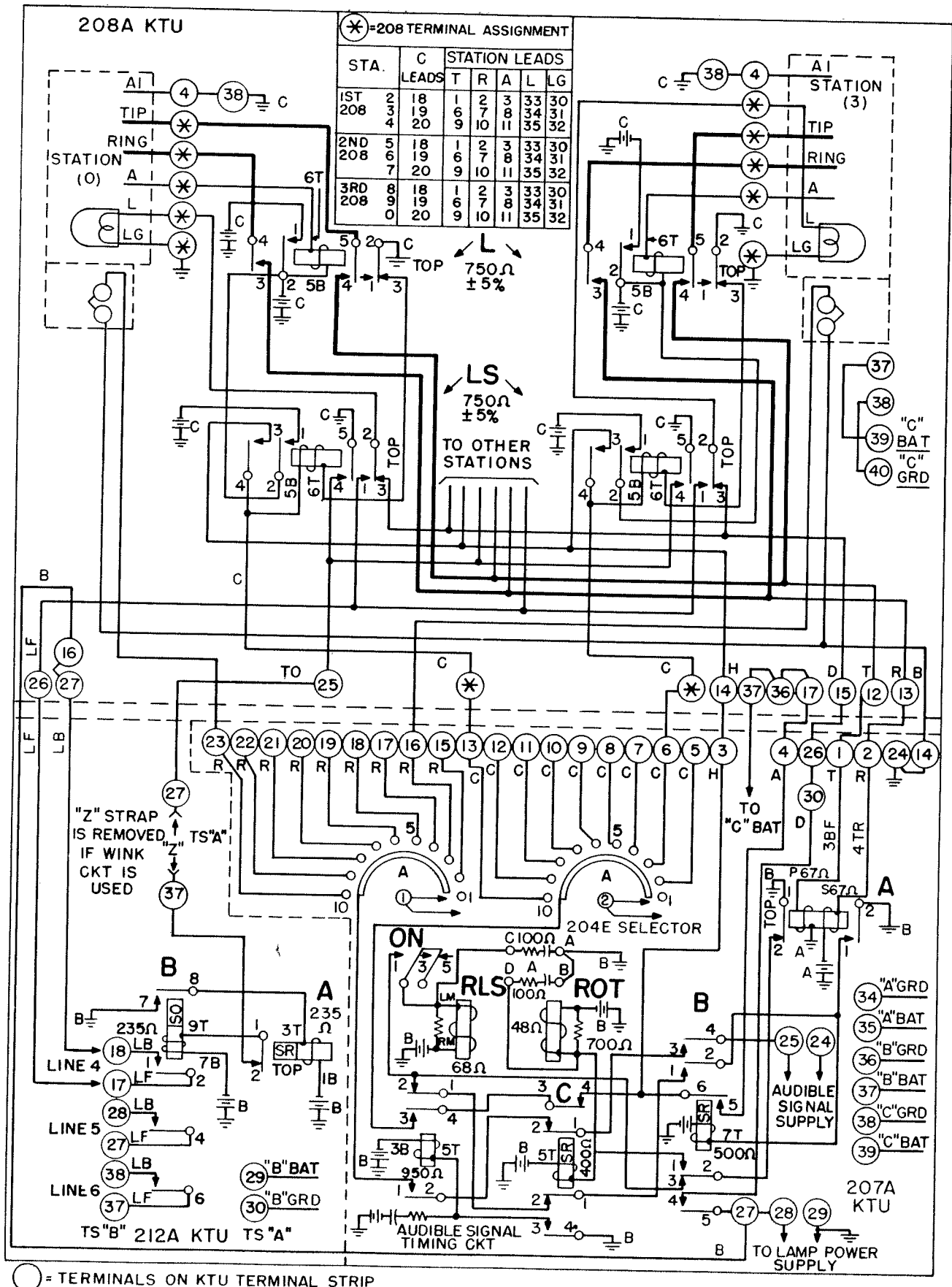
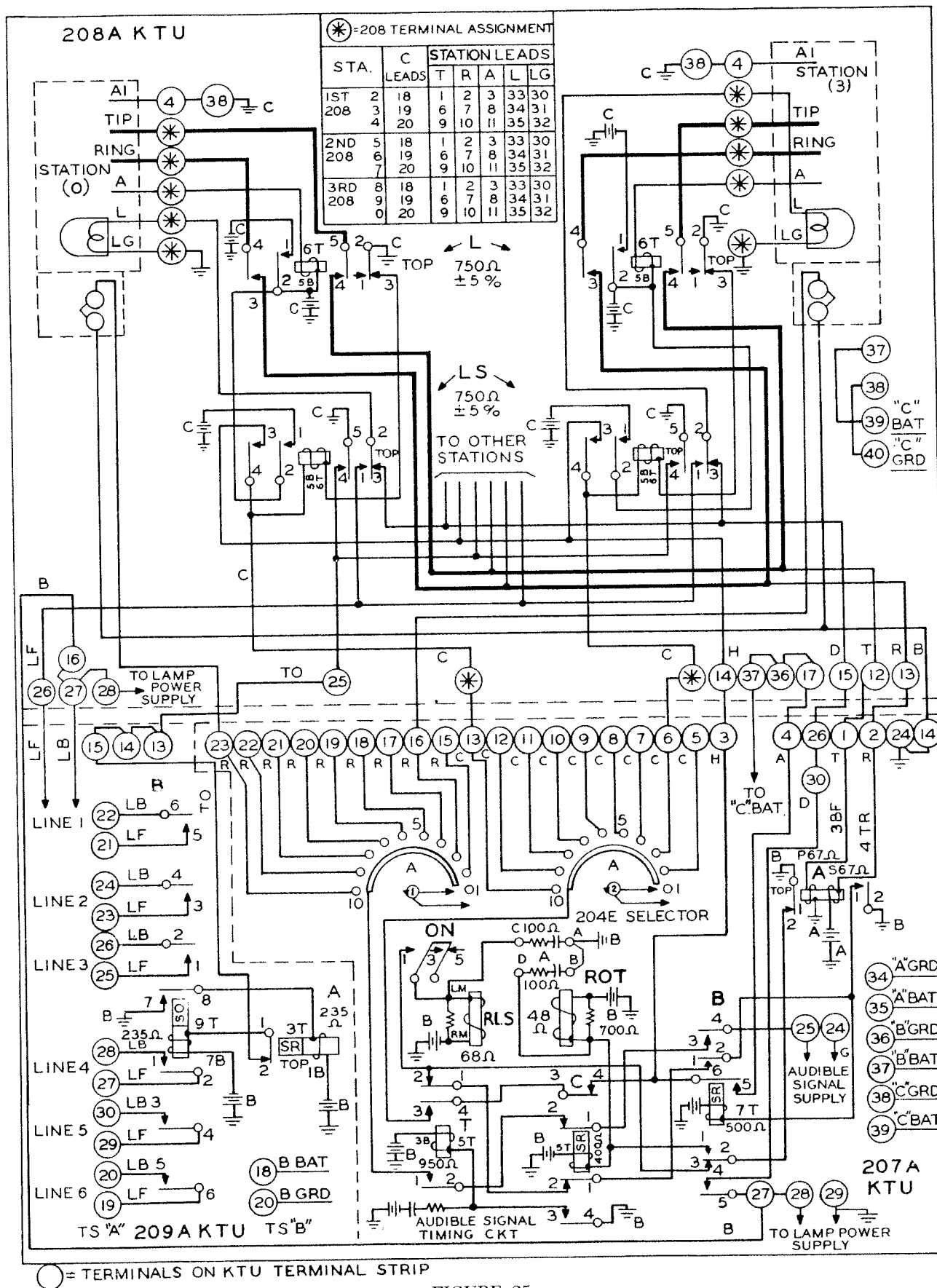


FIGURE 24
Dial Selective Intercommunicating Line Circuit with Flashing Line Lamps —
207A, 208A, and 212A Key Telephone Units



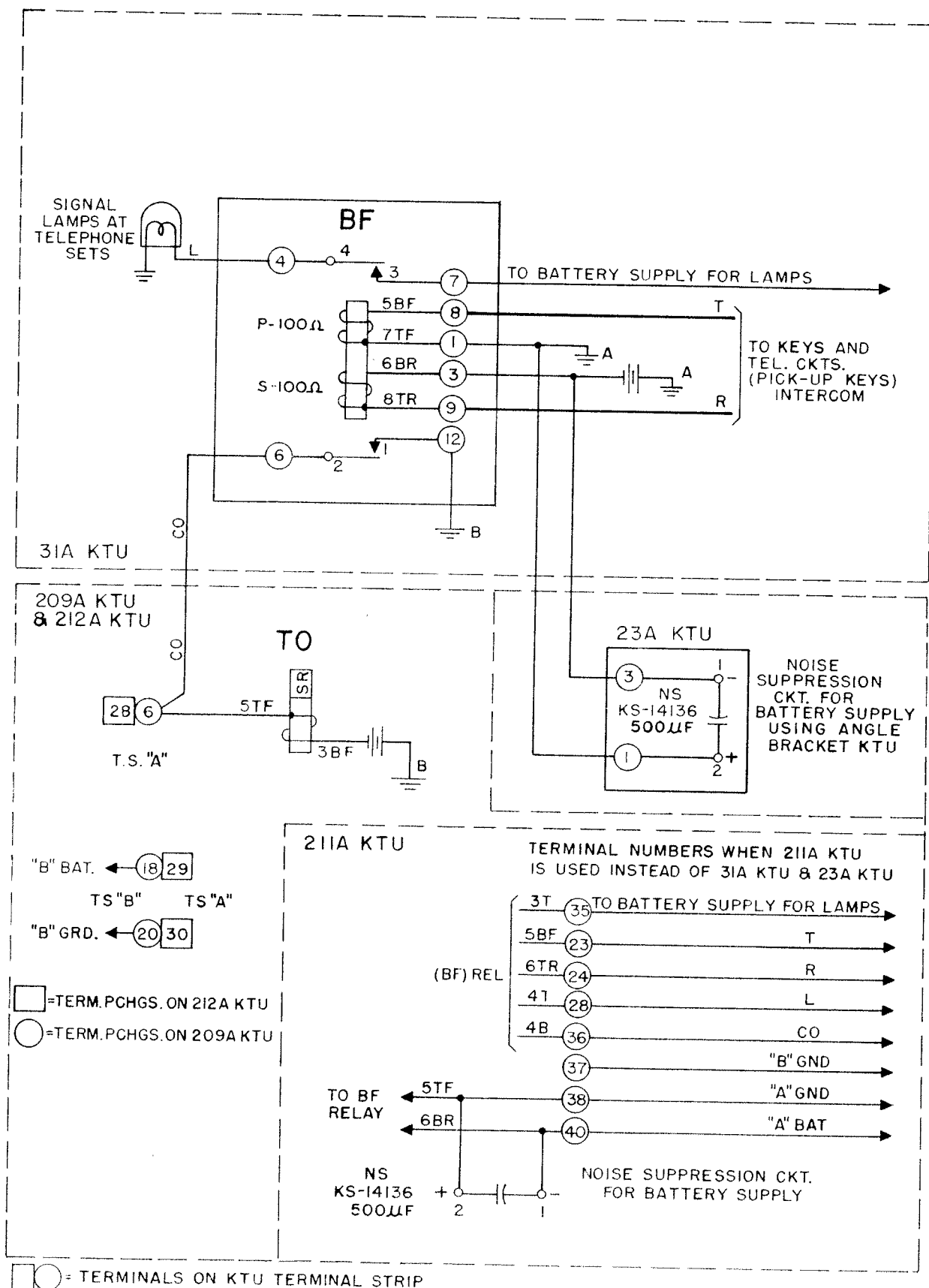


FIGURE 26
Intercommunicating Line Battery Feed Circuit —
23A, 31A, 209A, 211A, and 212A Key Telephone Units

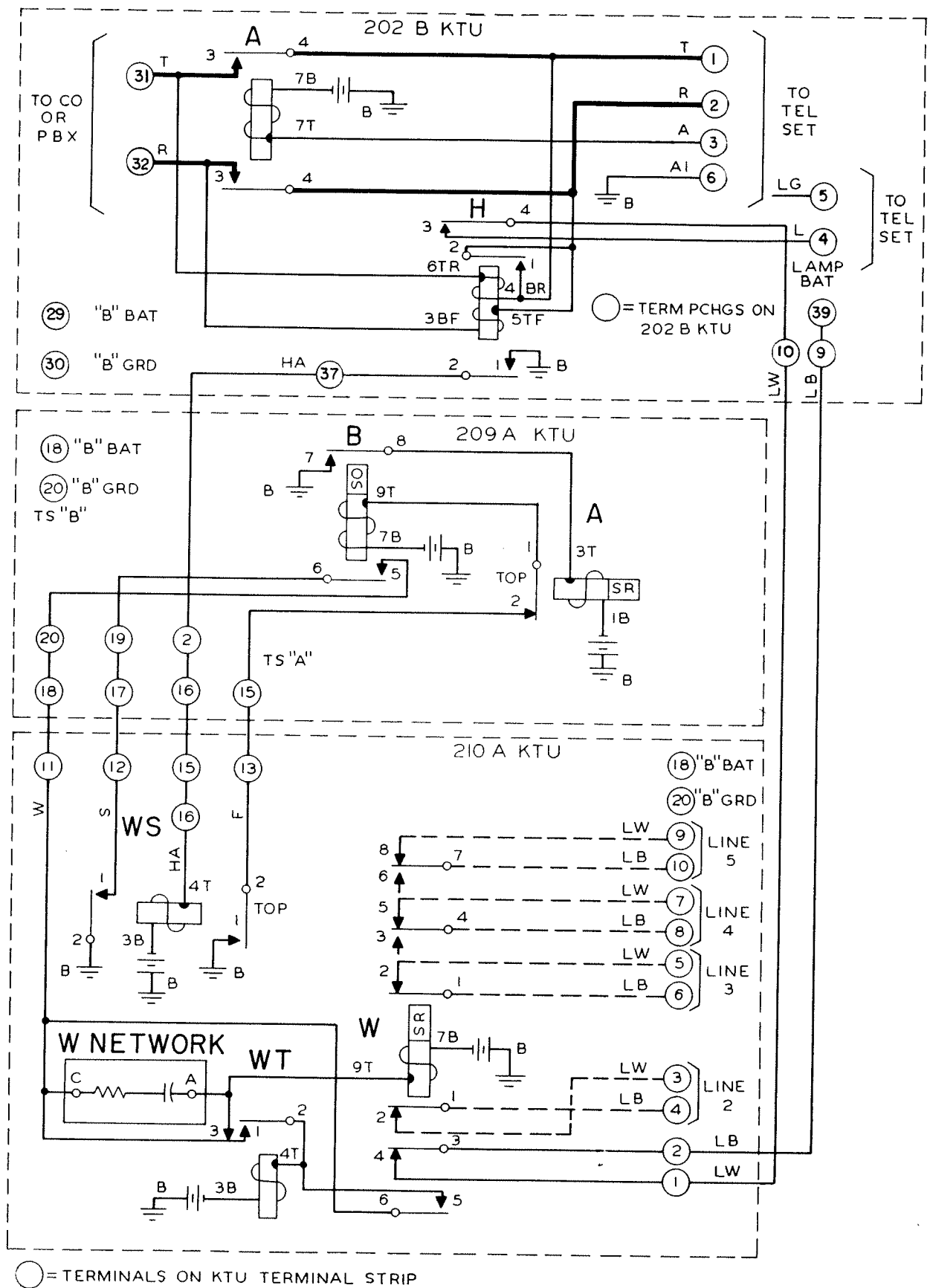
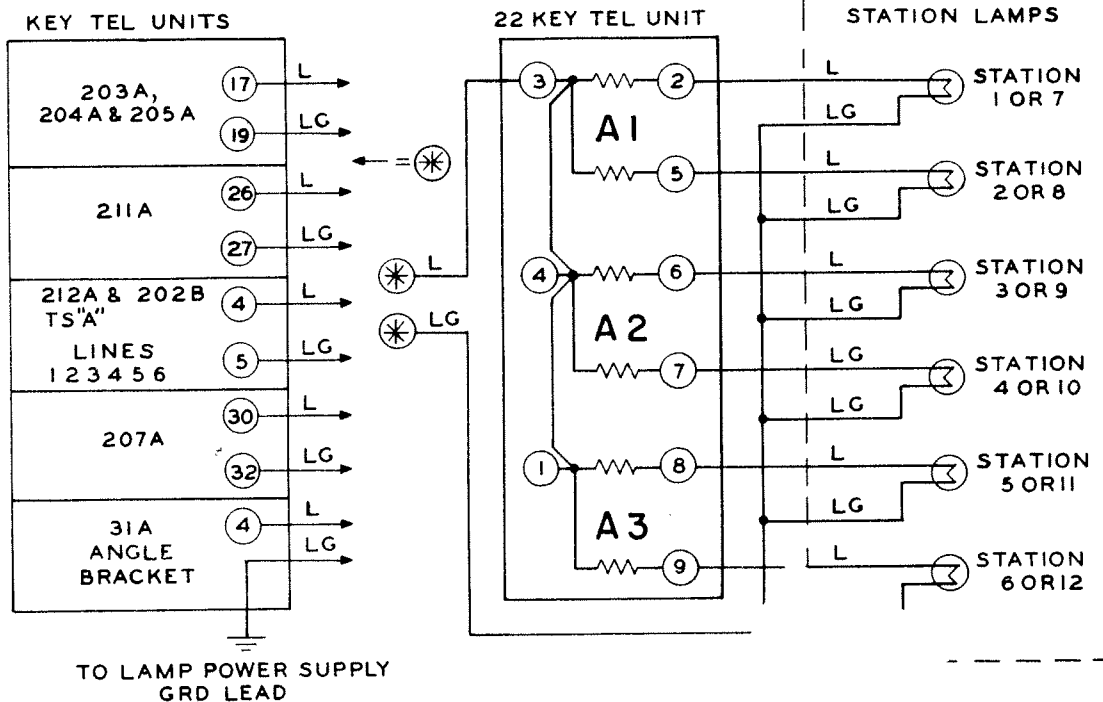


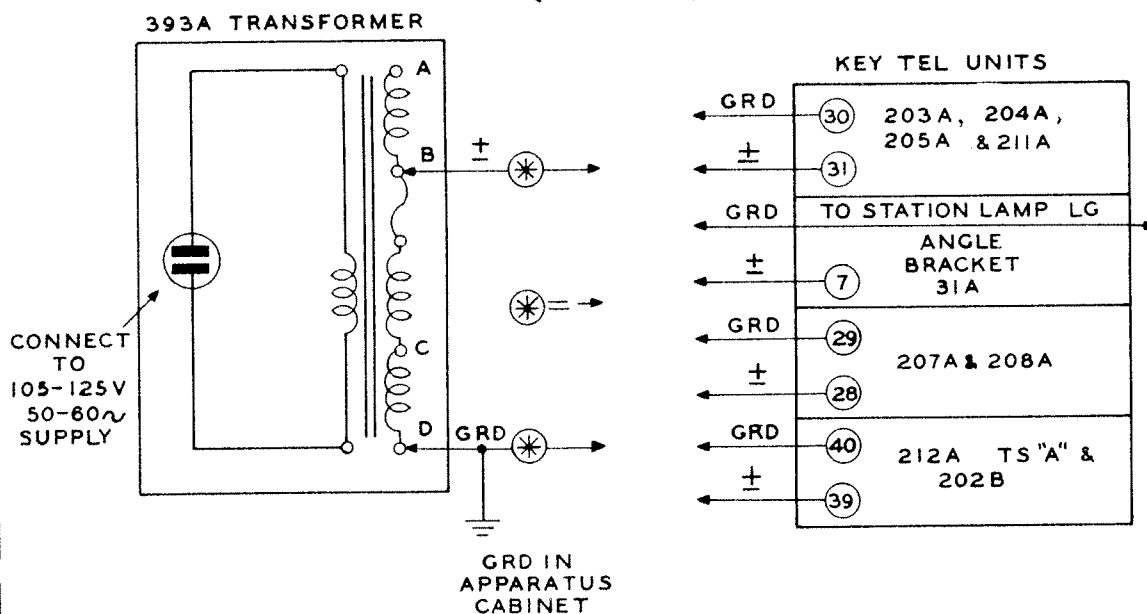
FIGURE 28

Lamp Winking Circuit — 202B, 209A, and 210A Key Telephone Units

LAMP RESISTANCE CIRCUIT
WHEN 16-50V. DC SUPPLY IS USED



AC SUPPLY FOR LAMPS
(9-11 VOLTS)



○ = TERMINALS ON KTU TERMINAL STRIP

FIGURE 29

Lamp Resistance Circuit and AC Supply for Lamps (9 to 11 Volts)

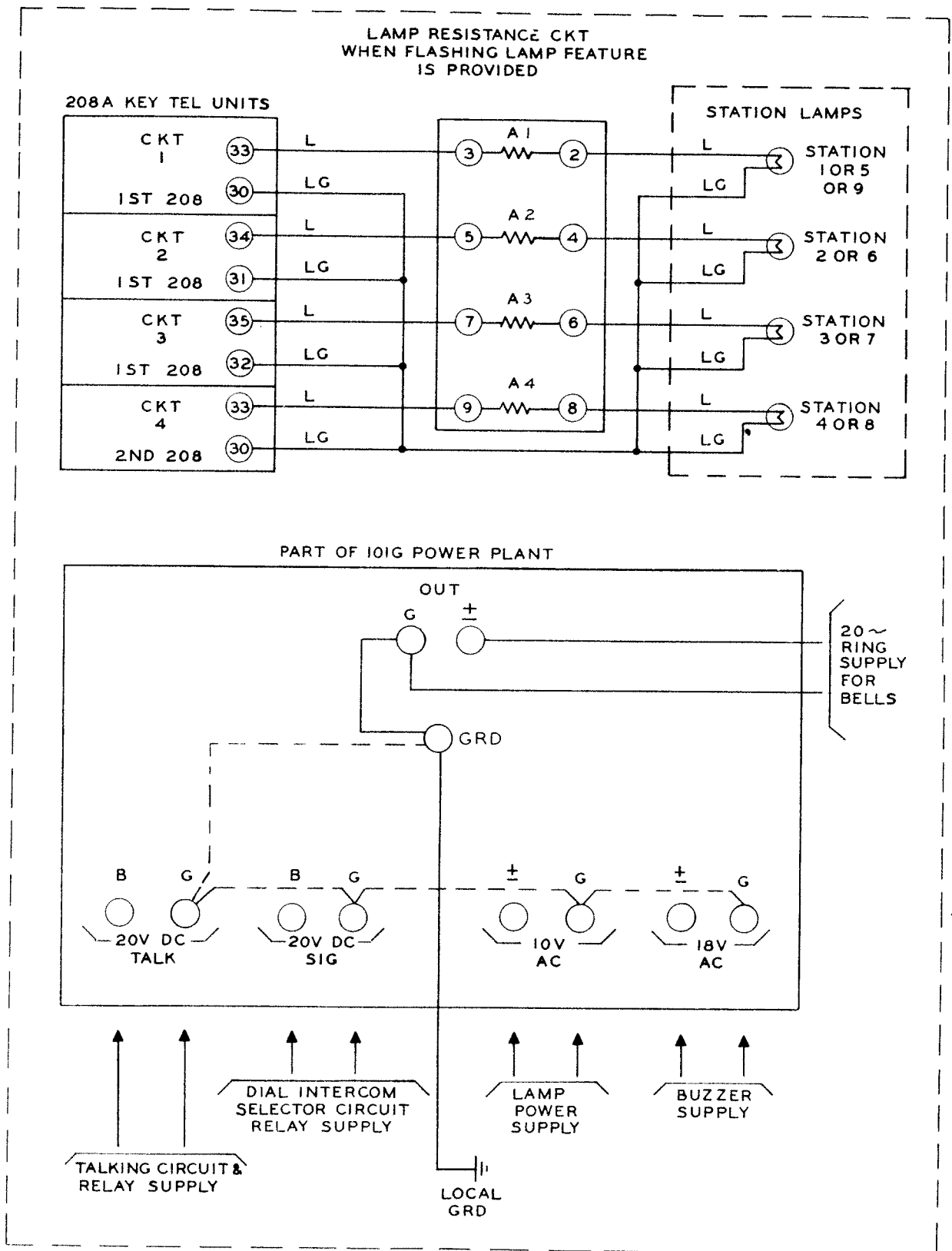


FIGURE 30
*Lamp Resistance Circuit When Flashing Lamp Feature is Provided —
101G Power Supply Connections*

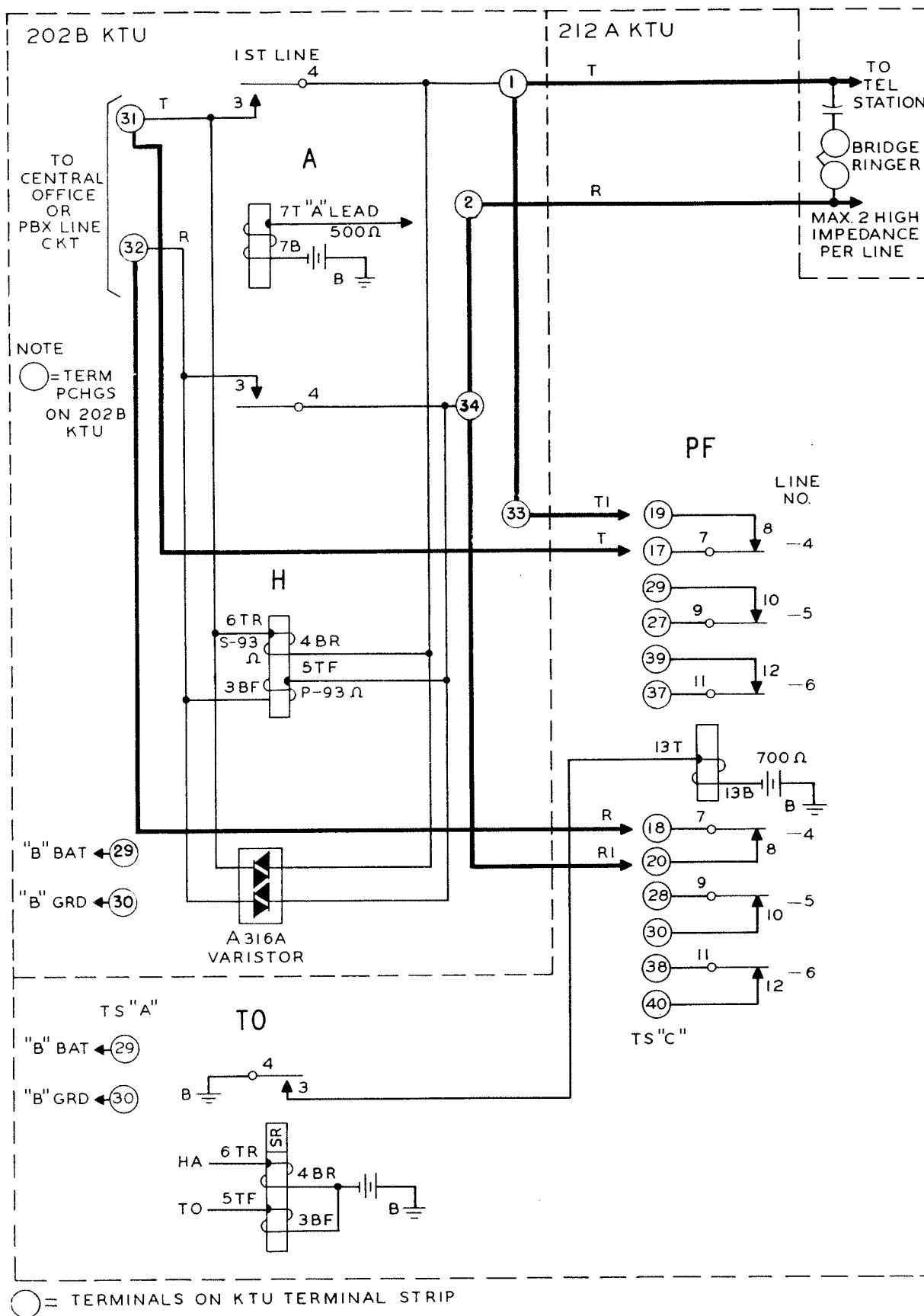


FIGURE 31

Power Failure Circuit—202B, and 212A Key Telephone Units

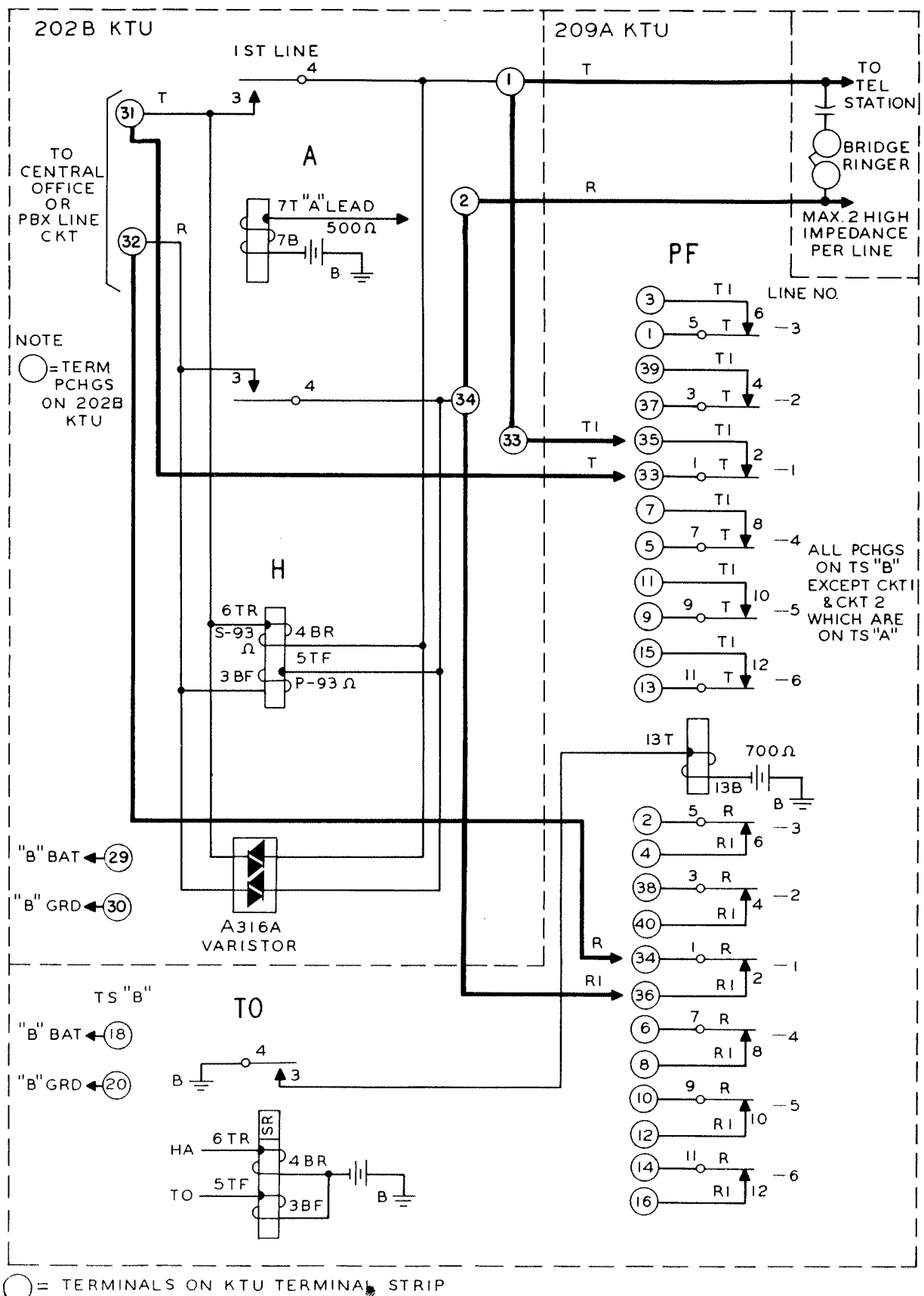
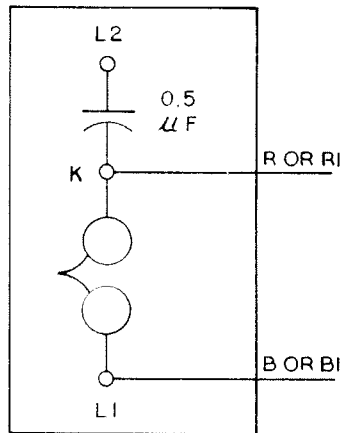


FIGURE 32
Power Failure Circuit — 202B, and 209A Key Telephone Units

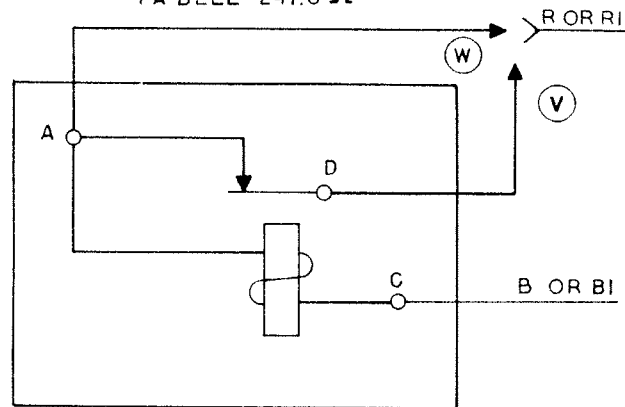
RINGER CKT
(COMMON)

687AW3
SUBSET



BUZZER CKT
(COMMON)

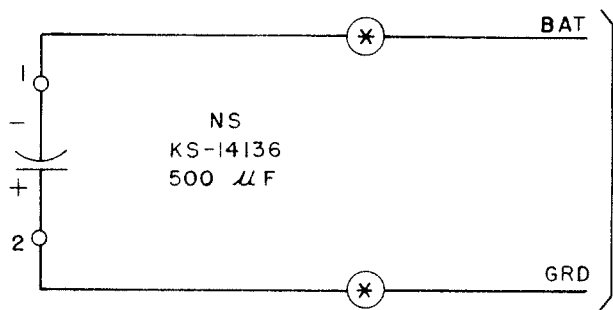
7A BUZZER-270 Ω
OR
7A BELL-247.8 Ω



W WIRING AC OPERATION
V WIRING DC OPERATION

NOISE SUPPRESSION CKT. FOR BATTERY SUPPLY

211A KTU OR 23A KTU USING ANGLE BRACKET

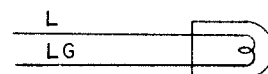


CONNECT ACROSS
DC SUPPLY
"A" BAT & GRD

TERMINAL NUMBERS

	211A	23A
BAT.	(40)	(3)
GRD.	(38)	(1)

LAMP CKT



LINE & BUSY

○ = TERMINALS ON KTU TERMINAL STRIP

FIGURE 33

Ringer, Buzzer, and Noise Suppression Circuit for Battery Supply A

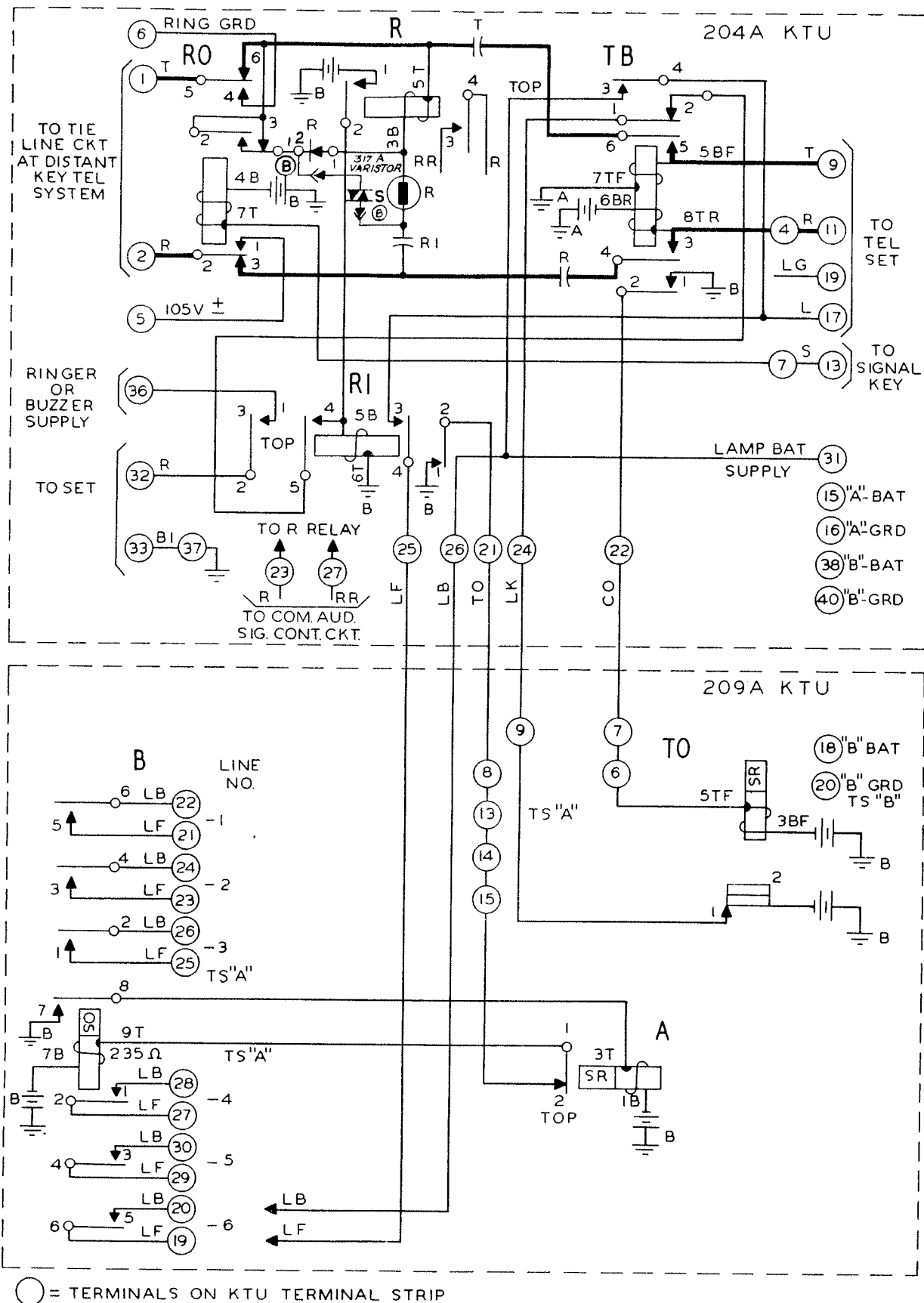


FIGURE 35

Ringdown Tie Line Circuit — 204A and 209A Key Telephone Units

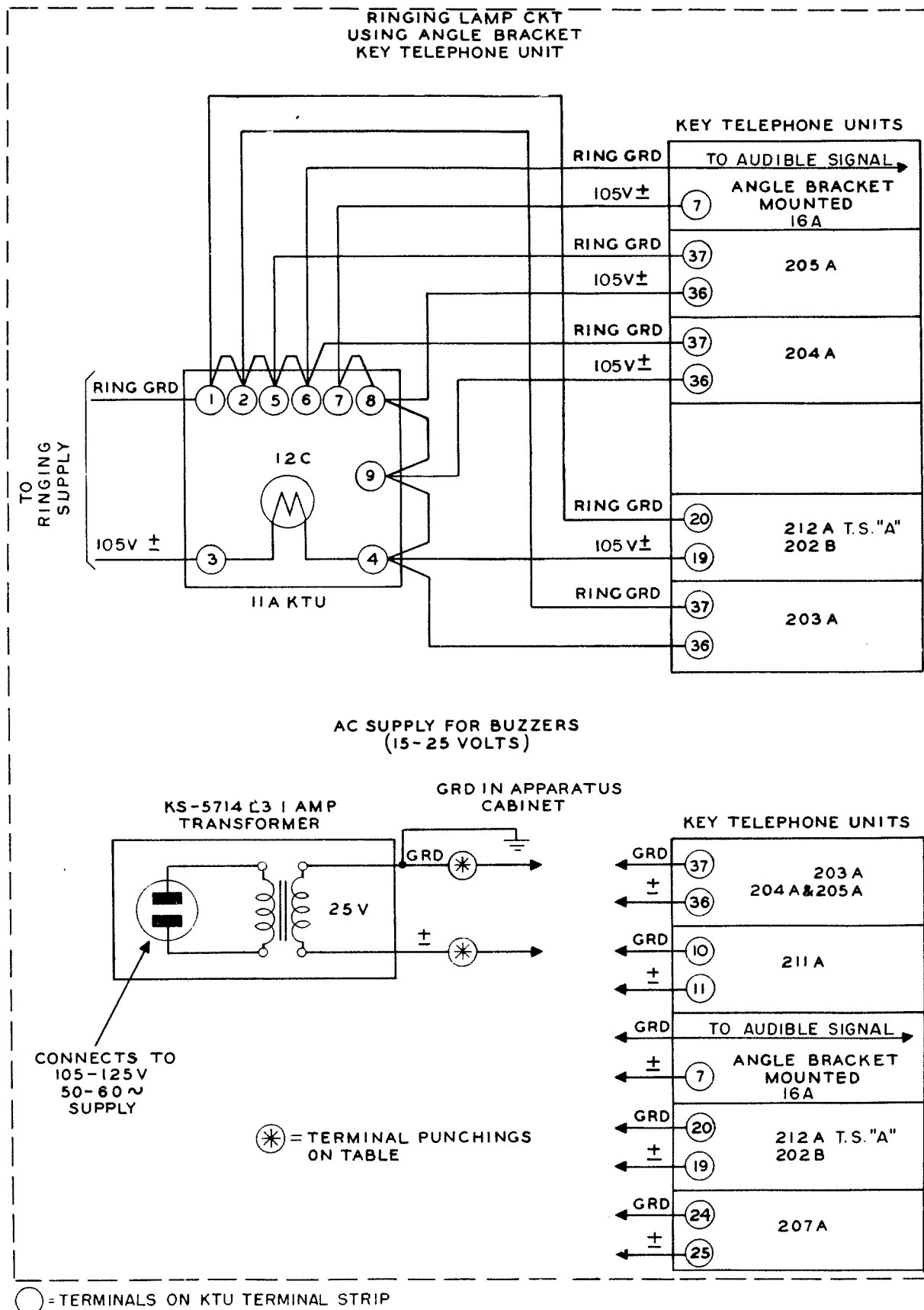


FIGURE 36

*Ringing Lamp Circuit and AC Supply for Buzzers (15 to 25 Volts) —
11A Key Telephone Unit and KS-5714, L3 Transformer*

