

## SWITCHING SYSTEM NO. 305

### OPERATIONAL SKETCHES AND SEQUENCE CHARTS

#### 1. INTRODUCTION

**1.01** This section covers the most important portions of switching system No. 305, using operational sketches and sequence charts. Symbols and format for the operational sketches and sequence charts are as shown in Section 005-109-101, DETACHED CONTACT - TYPE SCHEMATIC DRAWINGS (SDs)—DESCRIPTIVE INFORMATION.

**1.02** Index of operational sketches and sequence charts is as follows:

Figure	Title	Page	Figure	Title	Page
1	Switching System No. 305 — Block Diagram	3	16	Typical Line Status Indicating Circuit — Dial Select Key Lamps	18
2	Position Activating Circuit	4	17	Typical Line Status Indicating Circuit — Conference Line Select Key Lamps	19
3	Position Backlighting	5	18	Typical Line Status Indicating Circuit — Conference Bridge Select Key Lamp	20
4	Typical A/G Line Status Indicating Circuit	6	19	Four-Wire Circuits for Monitoring Other Positions	21
5	Channel Loudspeaker Control Circuit	7	20	Selector Circuit for Connecting Dial Selection Circuits	22
6	Radio Monitoring Circuit	8	21	Two-Wire Circuits for Connecting to Air Base for Scramble or Talking	23
7	A/G Line Select Control Circuit	9	22	Scramble Line Transfer and Signal Circuit — Located at NCC	24
8	Four-Wire Circuits for A/G Communications	10	23	Scramble Line Transfer and Signal Circuit — Located at Air Base	25
9	Push-to-Talk, Transmitter-ON, and CODAN Circuits	11	24	Two-Wire Circuits for Connecting to Recovery Base	26
10	Typical Push-to-Talk Lockout Circuit	12	25	Recovery Line Transfer and Signal Circuit — Located at NCC	27
11	Manual Transfer of Radio Site	13	26	Recovery Line Transfer and Signal Circuit — Located at Recovery Base	28
12	Method of Checking Continuity of 4-Wire Idle Trunk	14	27	Typical Conference Line Circuit Showing Method of Connecting to Conference Bridge	29
13	Alarm Circuits	15	28	Typical Circuit for Connecting Attendant to Conference Bridge	30
14	G/G Line Select Control Circuit	16	29	Circuits for Connecting to Local 2-Wire PBX	31
15	Typical Position Control Circuit	17	30	Circuits for Connecting to 4-Wire Line Circuit	32

## 2. GENERAL

### 2.01 Major circuits used in switching system

No. 305 have been reduced to simplified operational sketches and associated sequence charts. The operational sketches are compiled from cable diagrams and schematic drawings and use detached-type contact symbols. The sequence charts include the order of operation of the relays, keys, and other devices comprising the circuit.

### 2.02 The operational sketch is a circuit diagram

representing a portion of the switching in simplified form and completely disregarding boundaries of conventional schematic drawings. Use is made of the detached-type contact symbols, and operating paths of all relays and other apparatus comprising the circuit under discussion are shown from battery to ground.

### 2.03 A sequence chart serves as a guide in un-

derstanding the circuit as a whole and as a key to the order of events in the operation of

the circuit, although the chart may not show all the related operations taking place. *It supplements but does not replace the written circuit description and the schematic drawing.* Distinctive symbols, representing the operation and release of each relay or other device, are arranged on the chart in order of operation from the top downward and are connected by appropriate lines to show the interdependence of the successive operations.

### 2.04 In order to prevent duplicating circuits

common to more than one function, the common circuit is shown only once and referenced to thereafter. For example, the circuit for A/G line select control (Fig. 7) or G/G line select control (Fig. 14) is shown only once but is necessary for all line select functions. To prevent duplicating this circuit on every drawing concerning line select functions, a reference is made to Fig. 7 or Fig. 14.

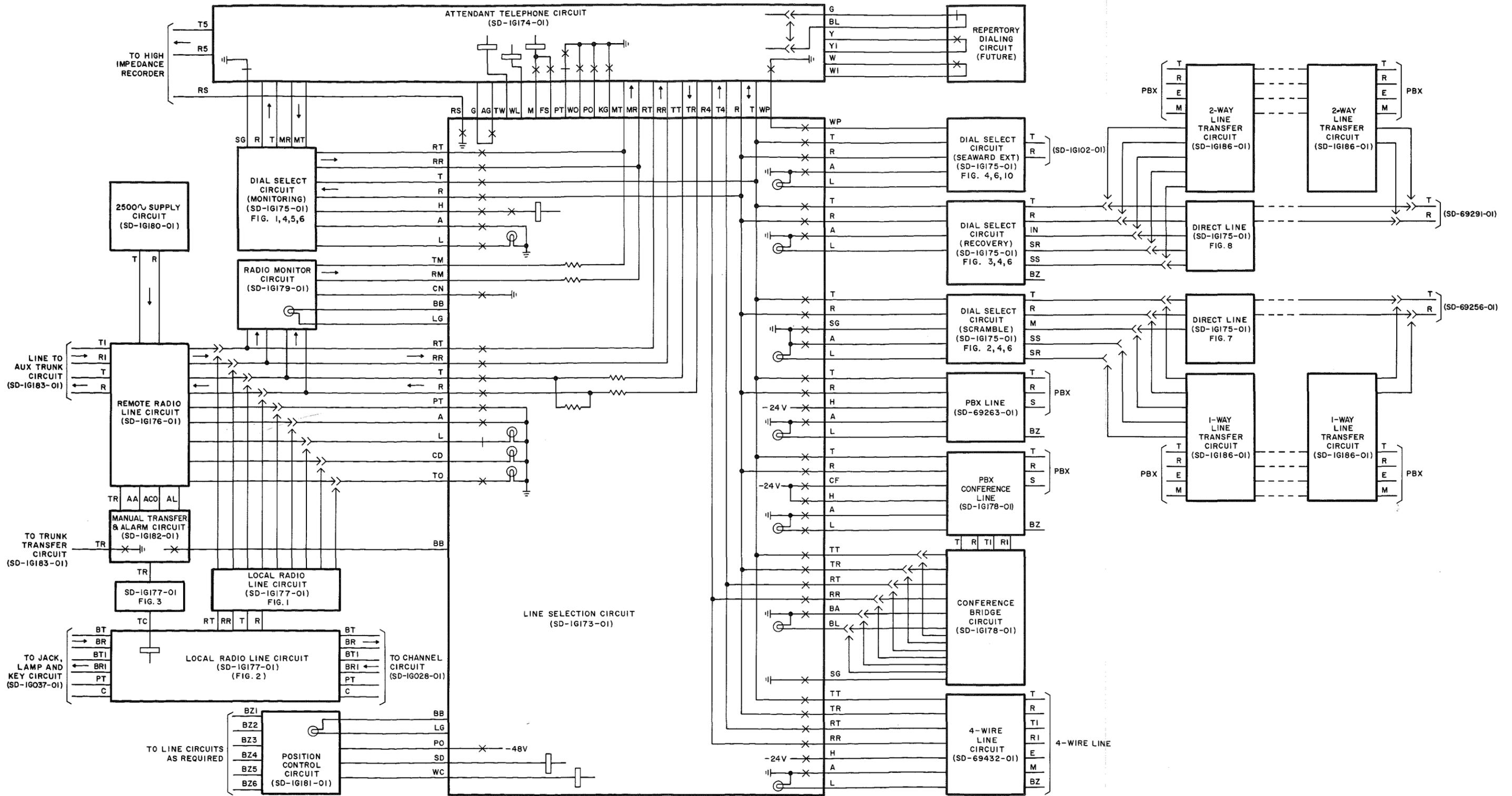


Fig. 1 — Switching System No. 305 — Block Diagram

DRAWINGS USED
SD-1G173-01
SD-1G174-01
SD-1G181-01

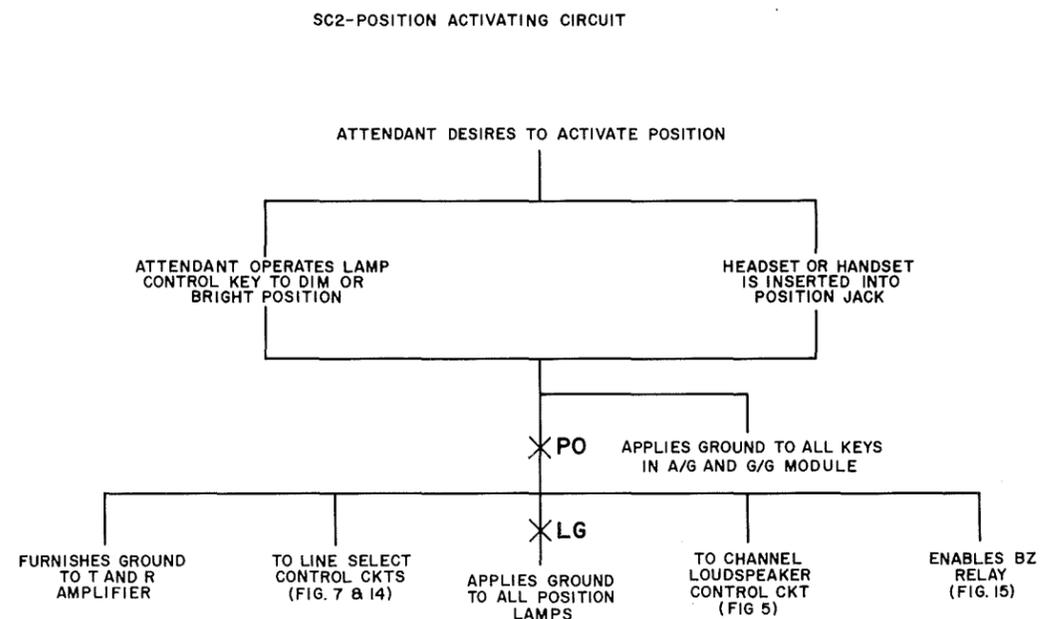
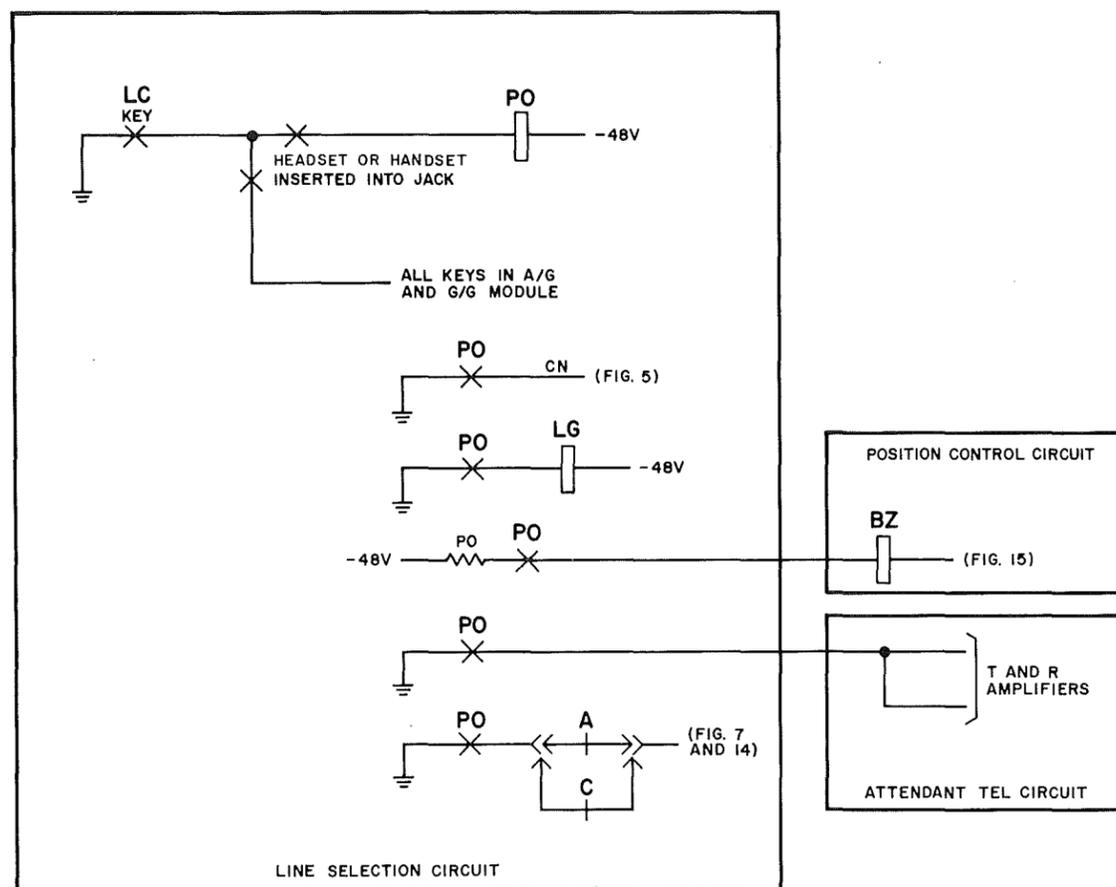
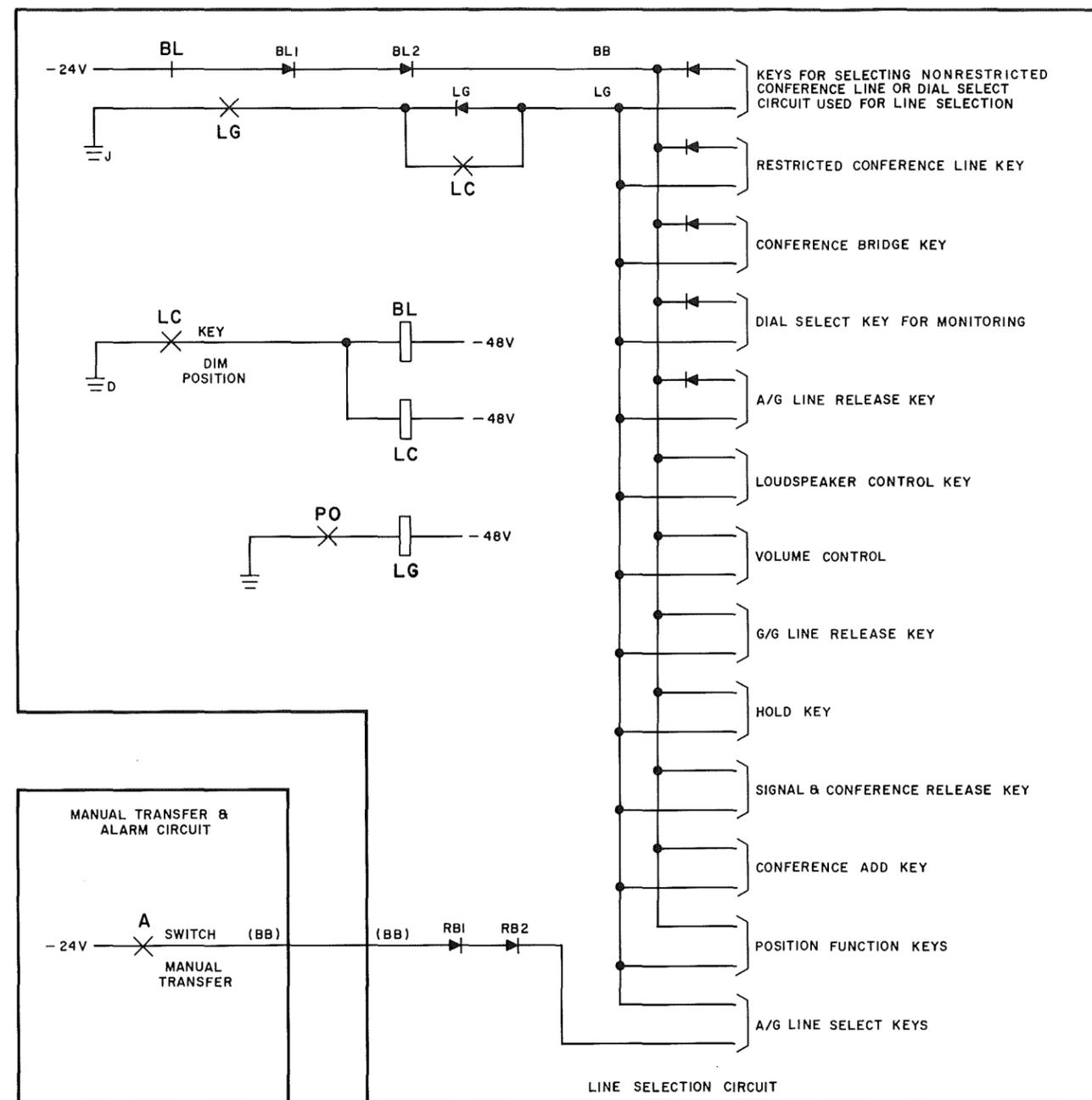


Fig. 2 — Position Activating Circuit



SC3 - POSITION BACKLIGHTING

DRAWINGS USED
SD-1G173-01
SD-1G182-01

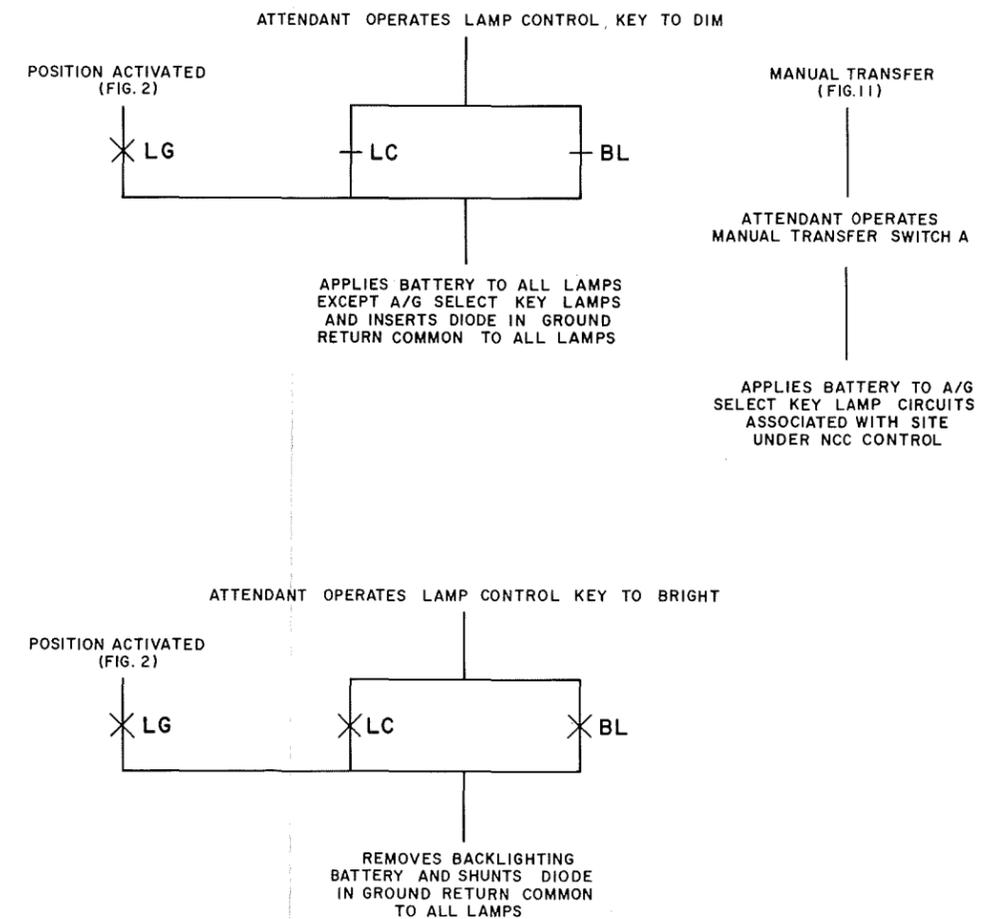
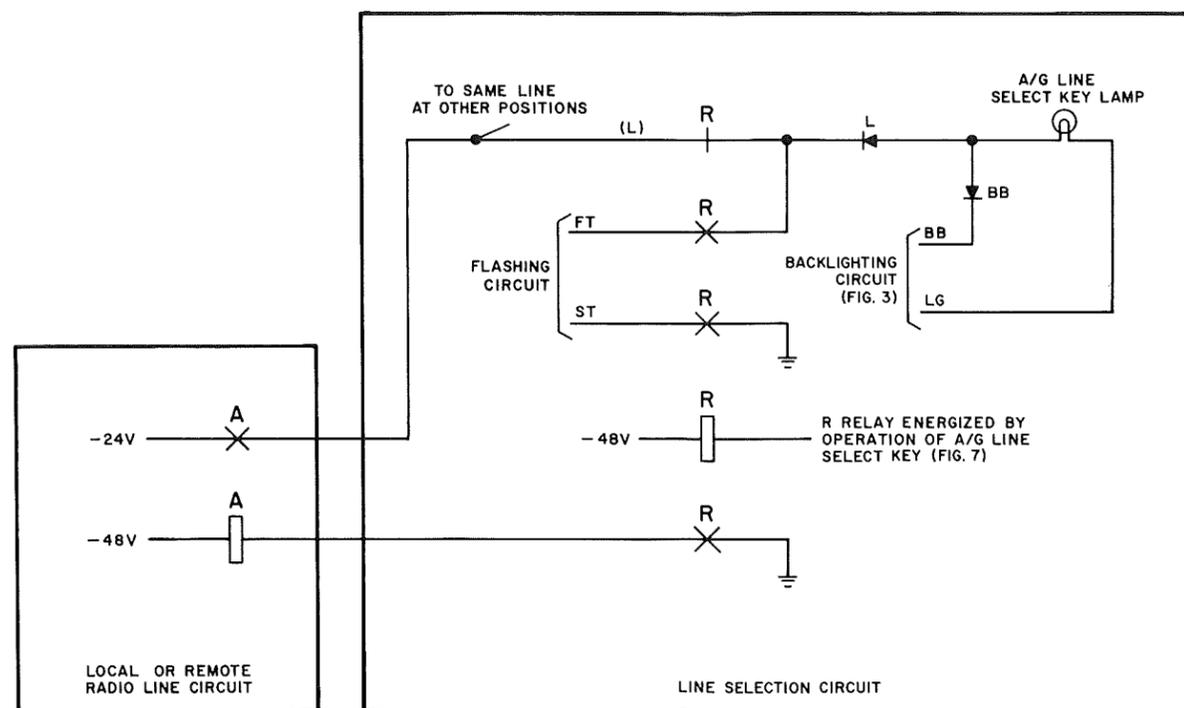


Fig. 3 — Position Backlighting



DRAWINGS USED
SD-1G173-01
SD-1G177-01
SD-1G176-01

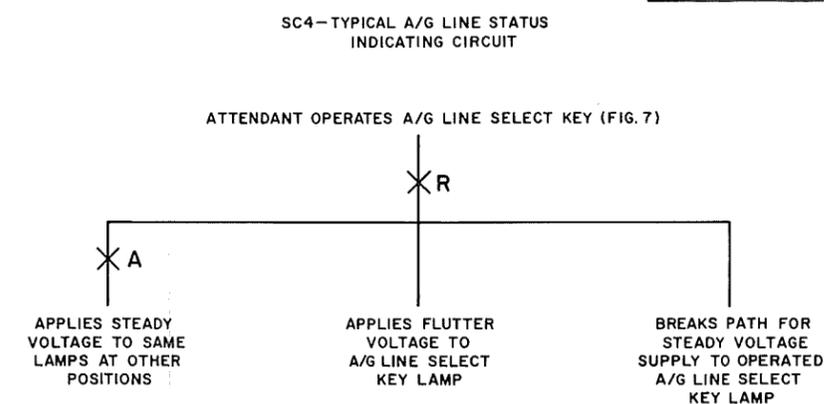


Fig. 4 — Typical A/G Line Status Indicating Circuit

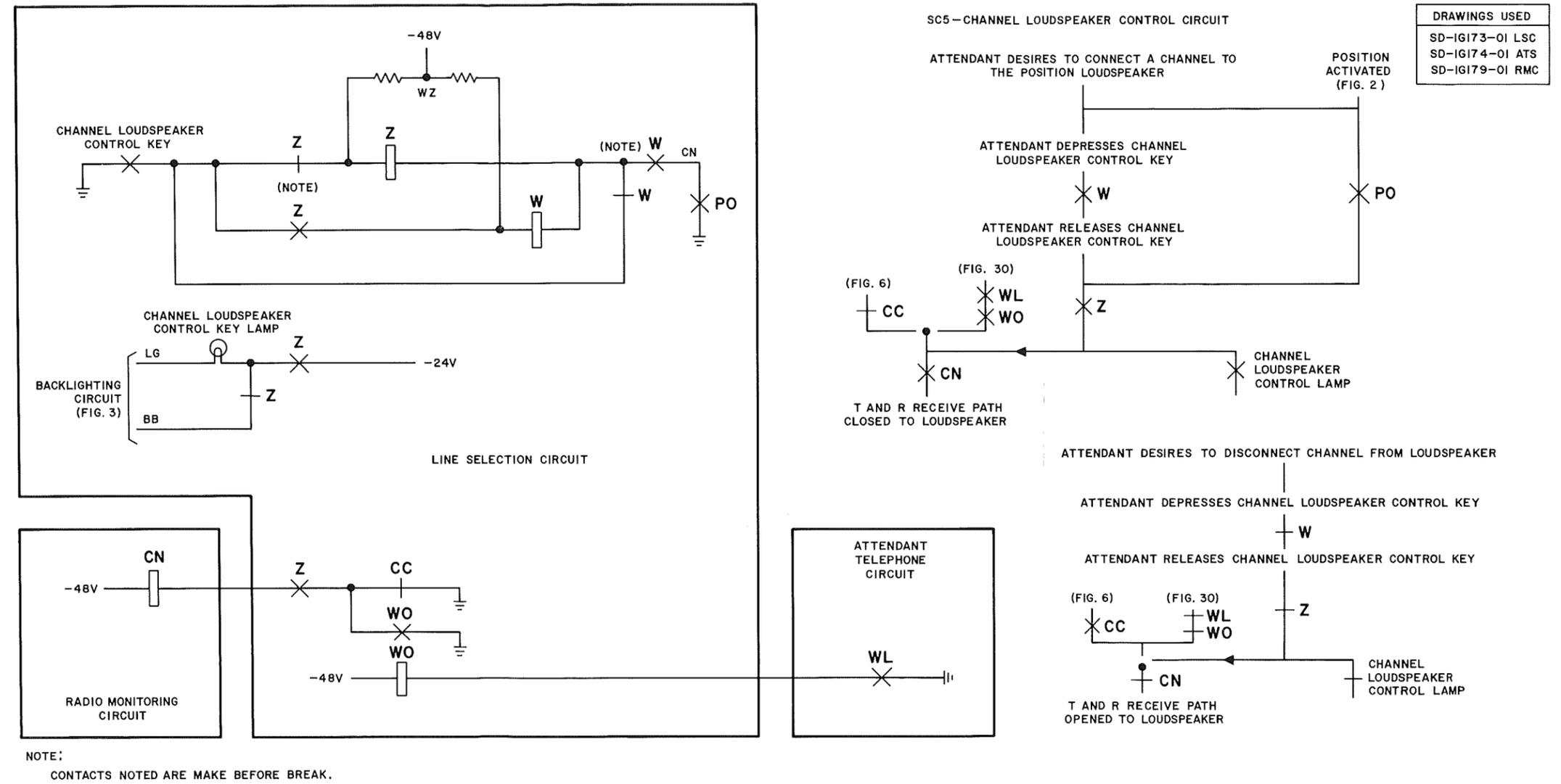


Fig. 5 — Channel Loudspeaker Control Circuit

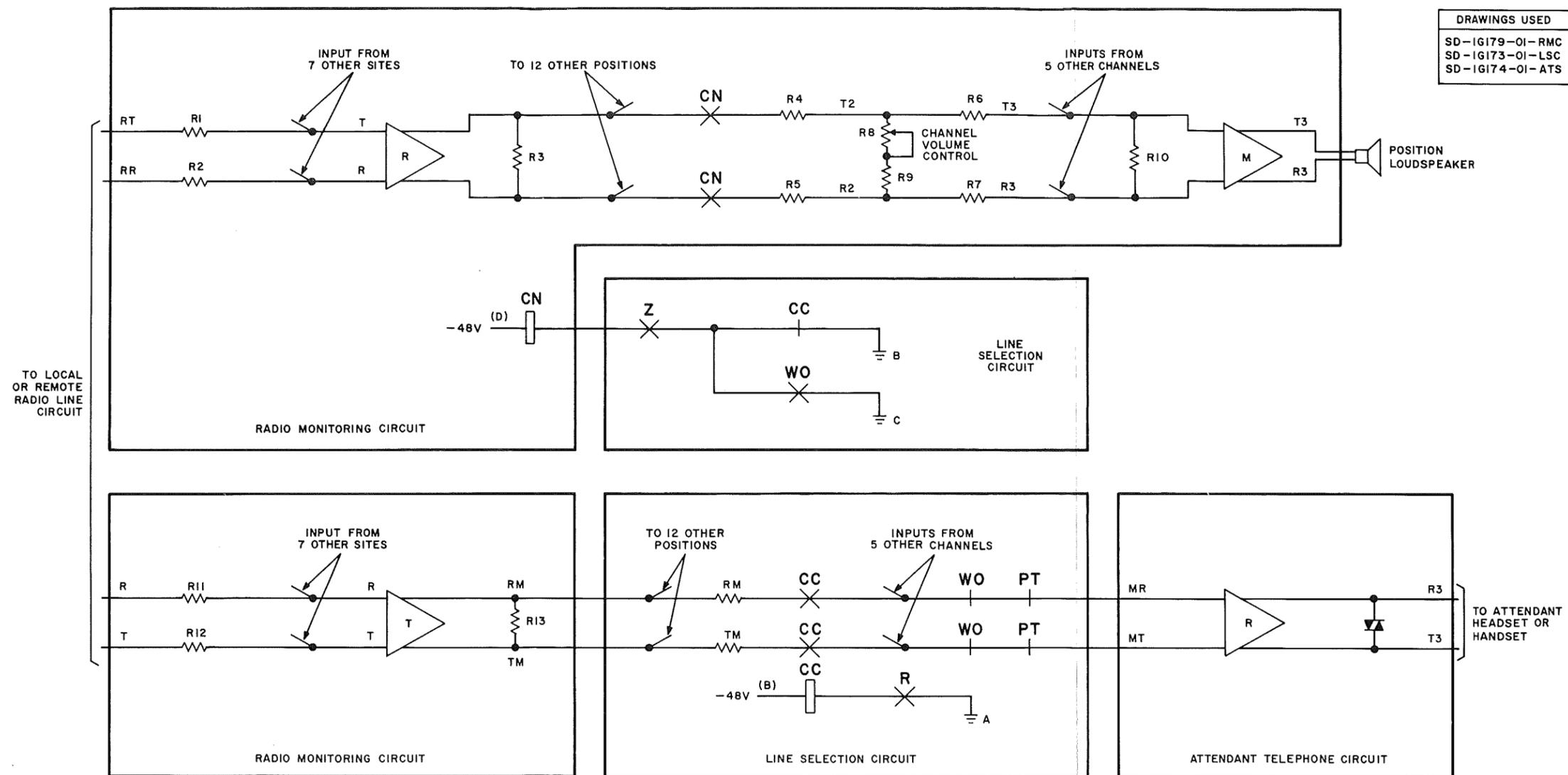
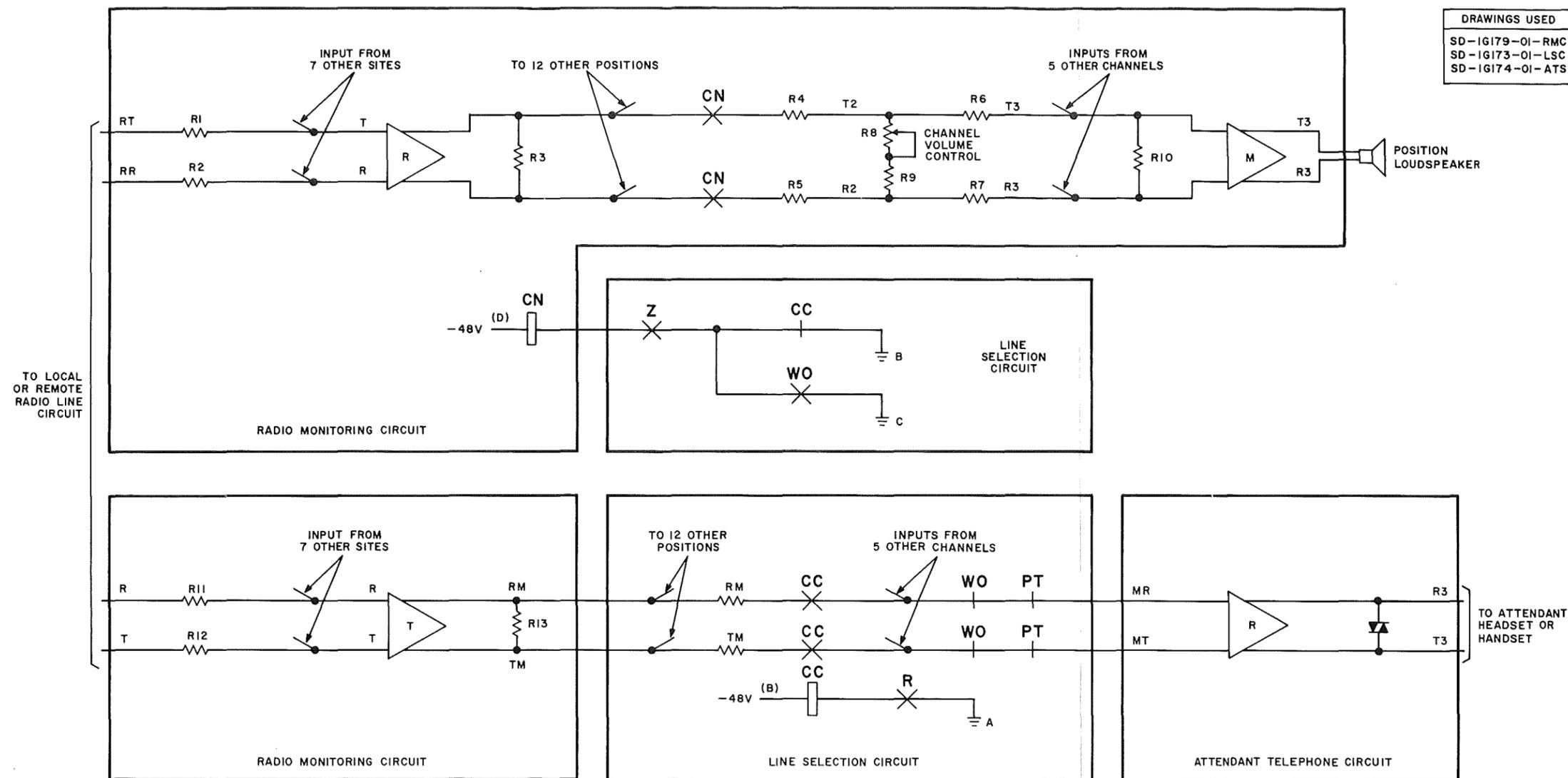
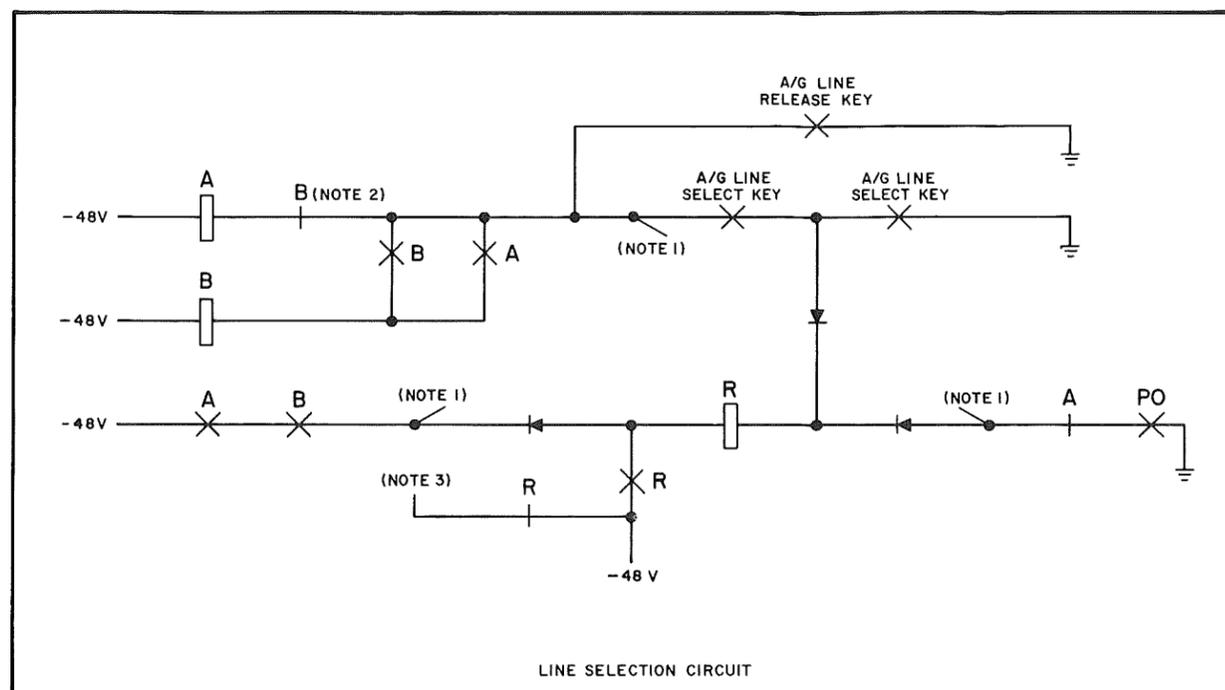


Fig. 6 — Radio Monitoring Circuit



DRAWINGS USED	
SD-1G179-01-RMC	
SD-1G173-01-LSC	
SD-1G174-01-ATS	

Fig. 6—Radio Monitoring Circuit



- NOTES:
1. MULTIPLIED TO OTHER SEVEN A/G LINE SELECT KEYS AND R RELAYS ASSOCIATED WITH SAME CHANNEL.
  2. CONTACTS REFERENCED TO THIS NOTE ARE MAKE BEFORE BREAK.
  3. SERIES CHAIN THROUGH OTHER SEVEN R RELAYS.

DRAWINGS USED
SD-16173-01 LSC

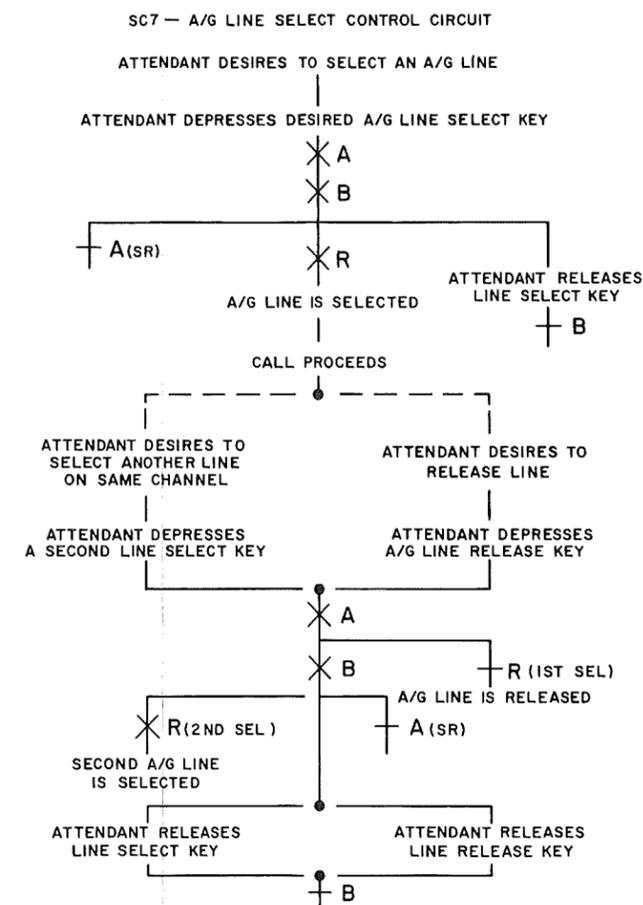
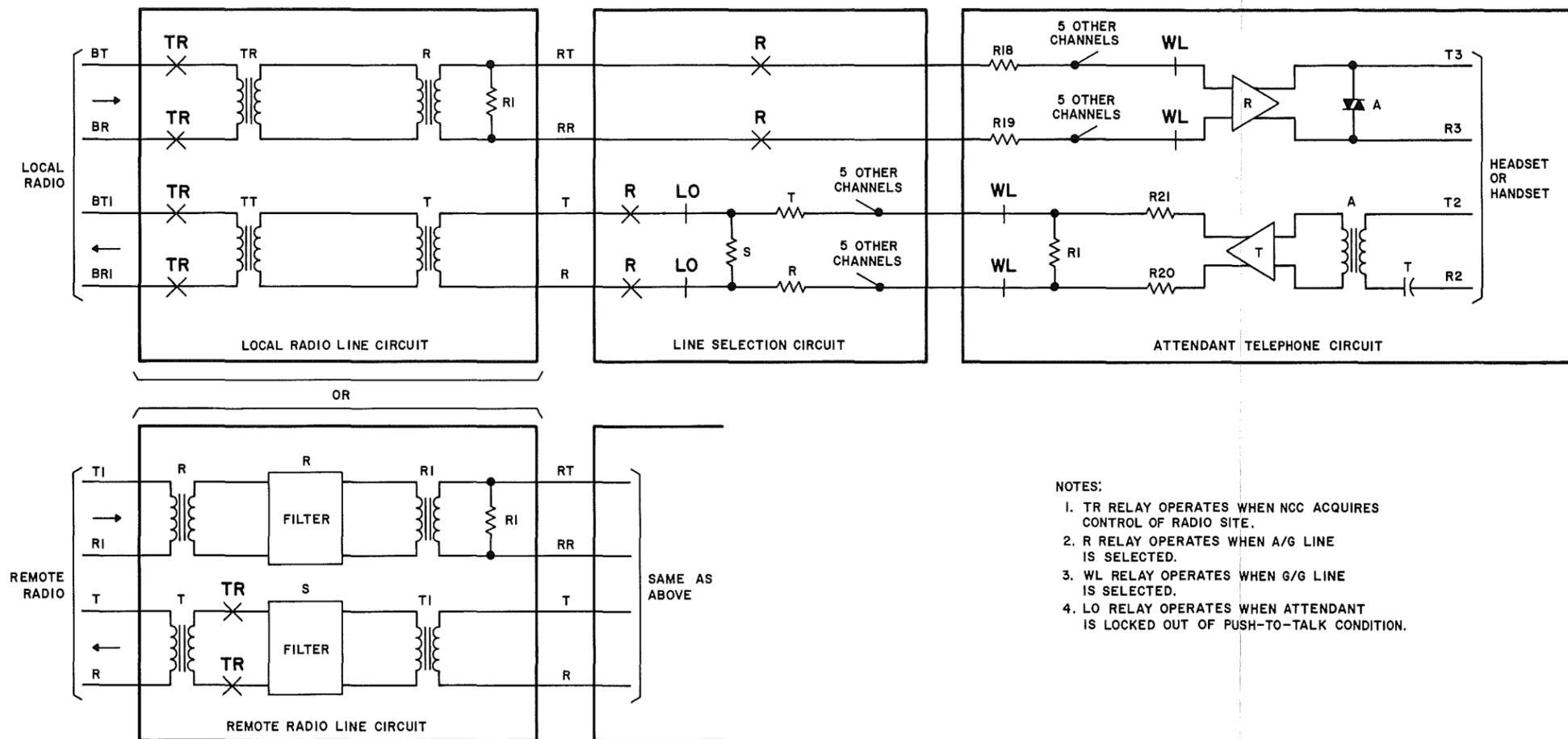


Fig. 7 — A/G Line Select Control Circuit

DRAWINGS USED
SD-IG173-01 LSC
SD-IG177-01 LRLC
SD-IG176-01 RRLC
SD-IG174-01 ATC



- NOTES:
1. TR RELAY OPERATES WHEN NCC ACQUIRES CONTROL OF RADIO SITE.
  2. R RELAY OPERATES WHEN A/G LINE IS SELECTED.
  3. WL RELAY OPERATES WHEN G/G LINE IS SELECTED.
  4. LO RELAY OPERATES WHEN ATTENDANT IS LOCKED OUT OF PUSH-TO-TALK CONDITION.

Fig. 8 — Four-Wire Circuits for A/G Communications

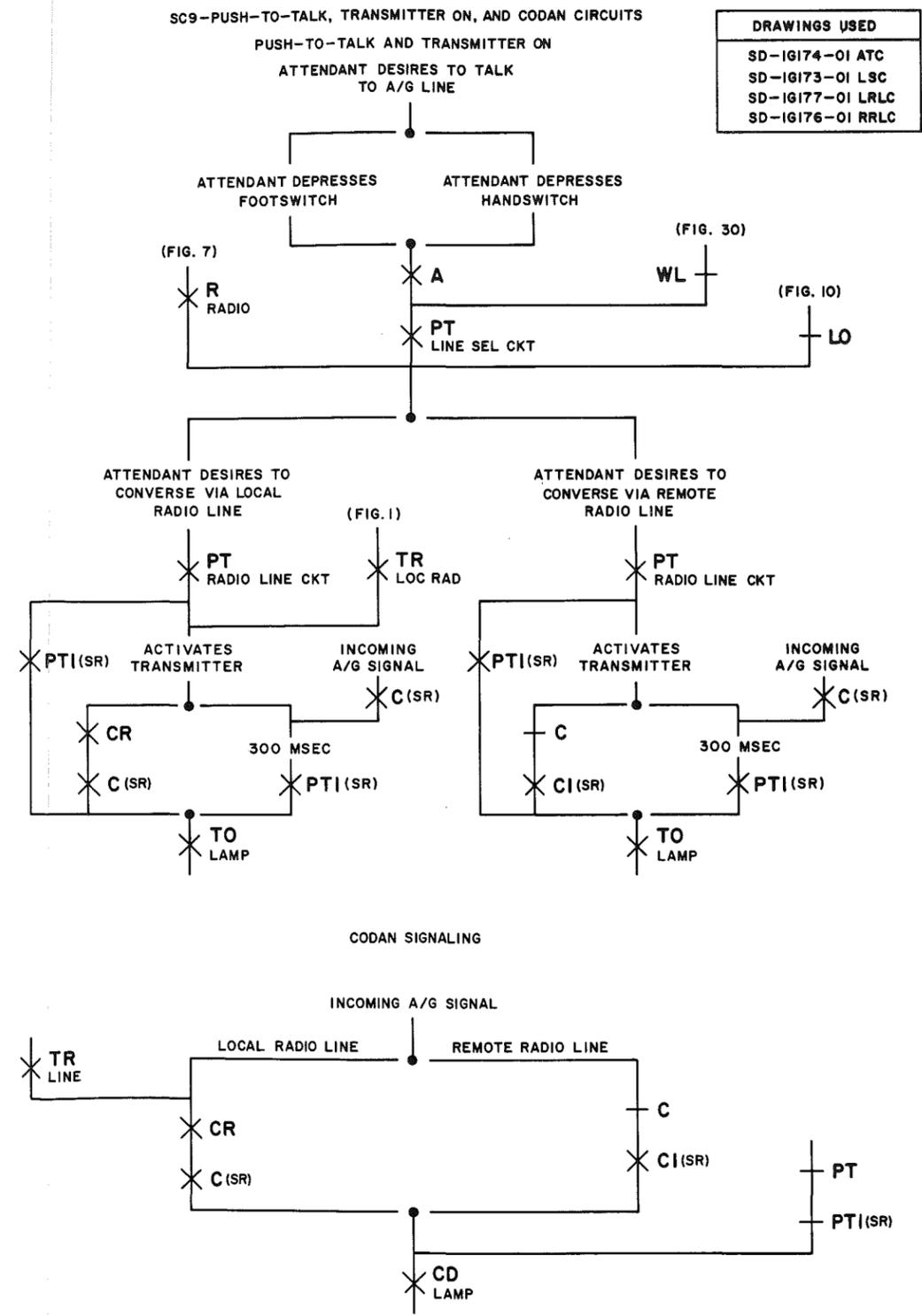
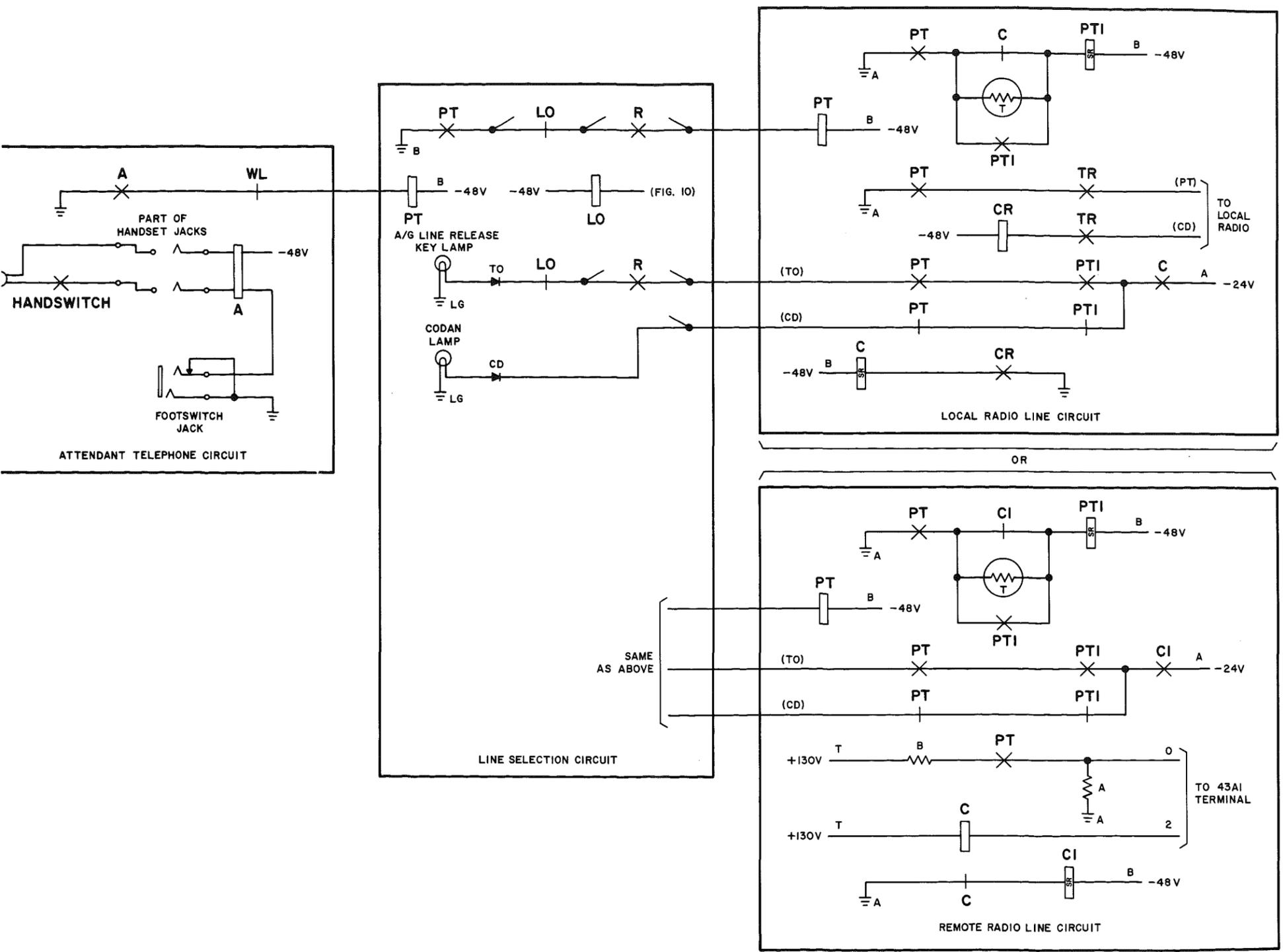
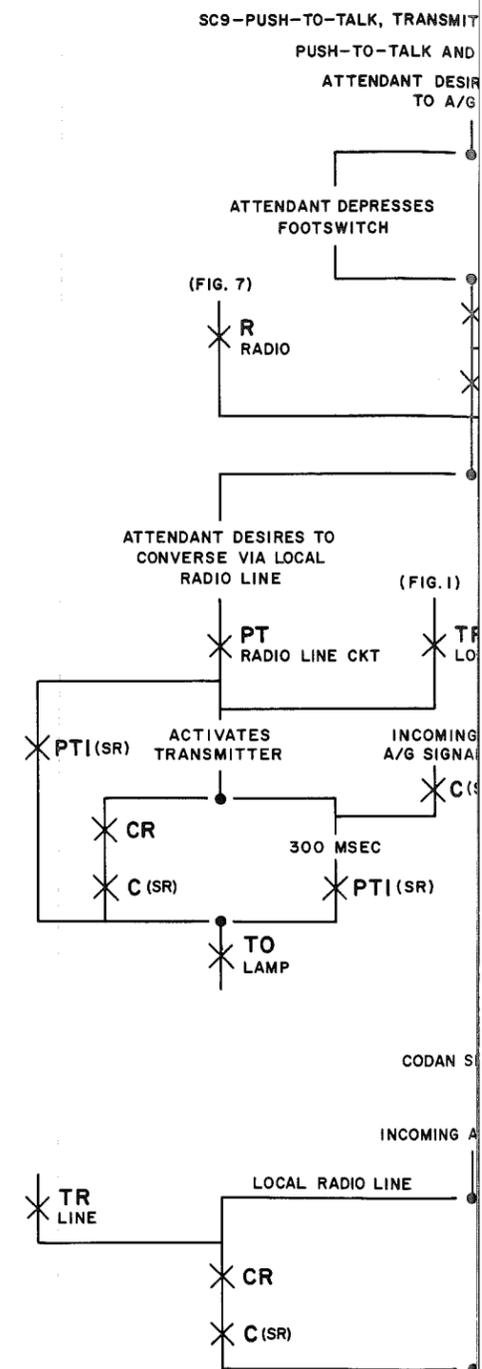
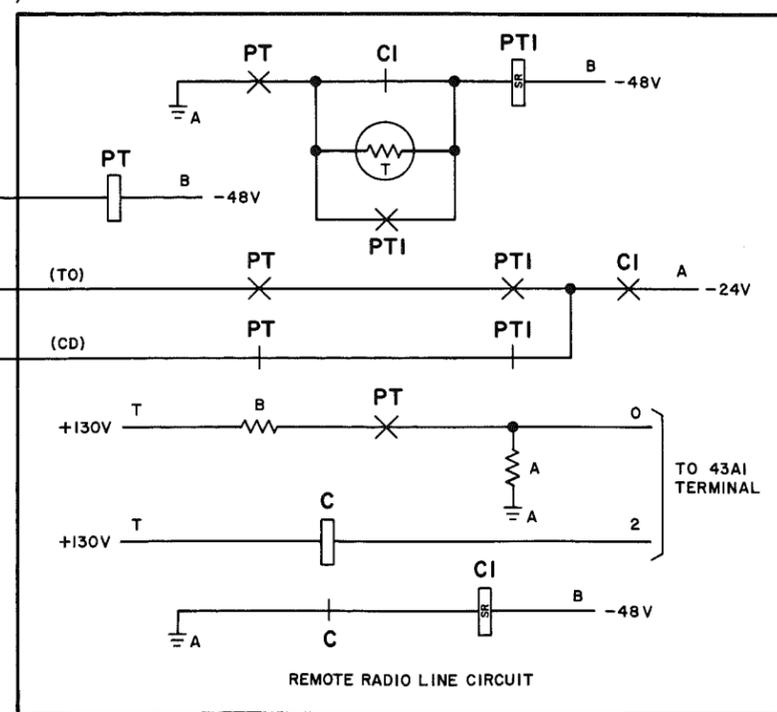
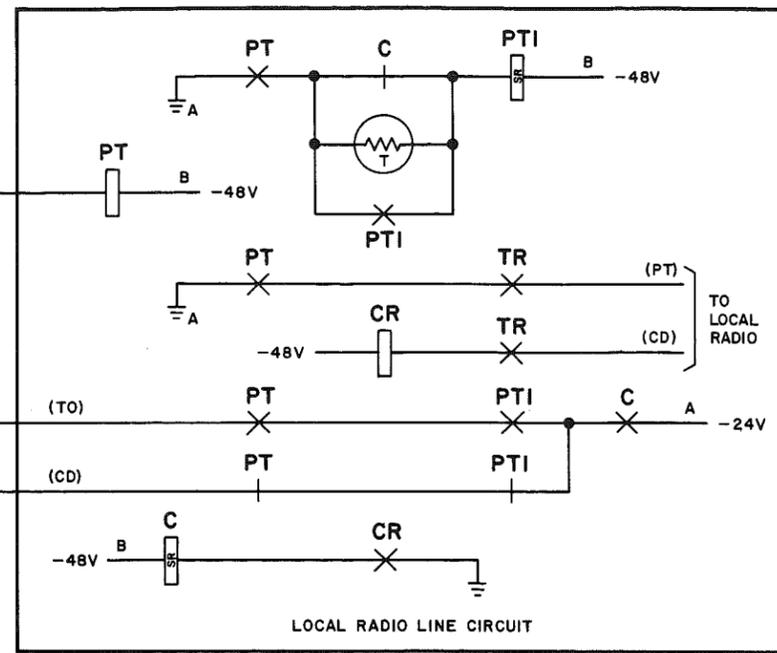
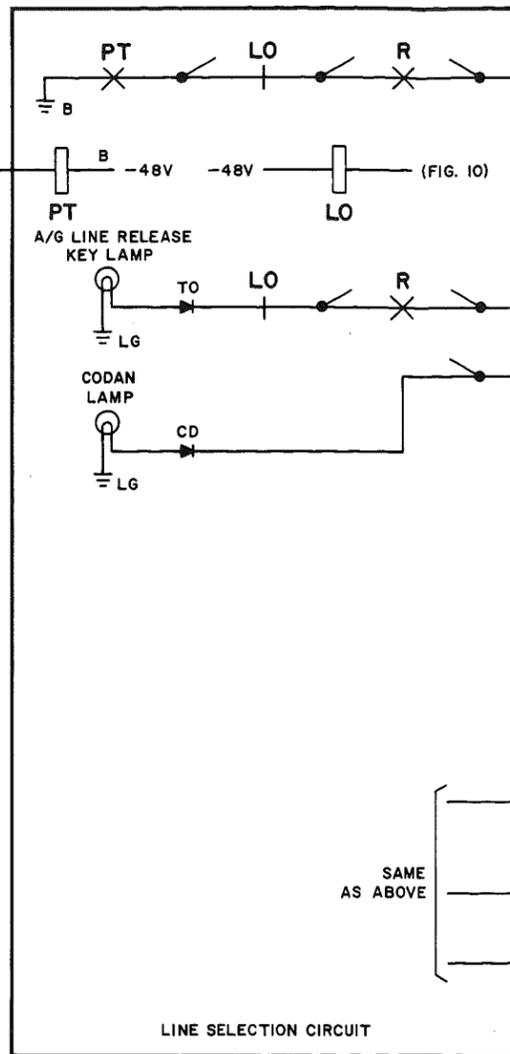
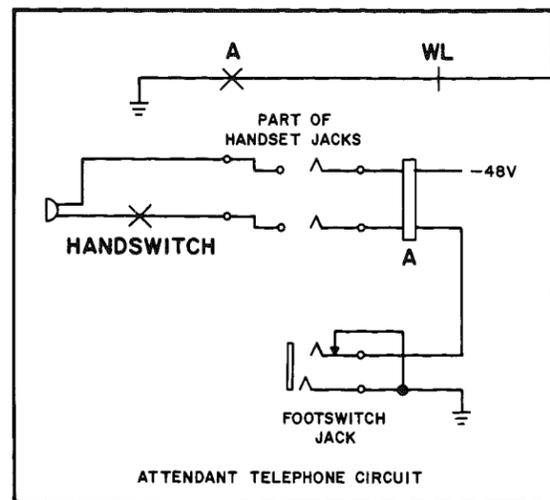


Fig. 9 — Push-to-Talk, Transmitter-ON, and CODAN Circuits



DRAWINGS USED
SD-16173-01 LSC

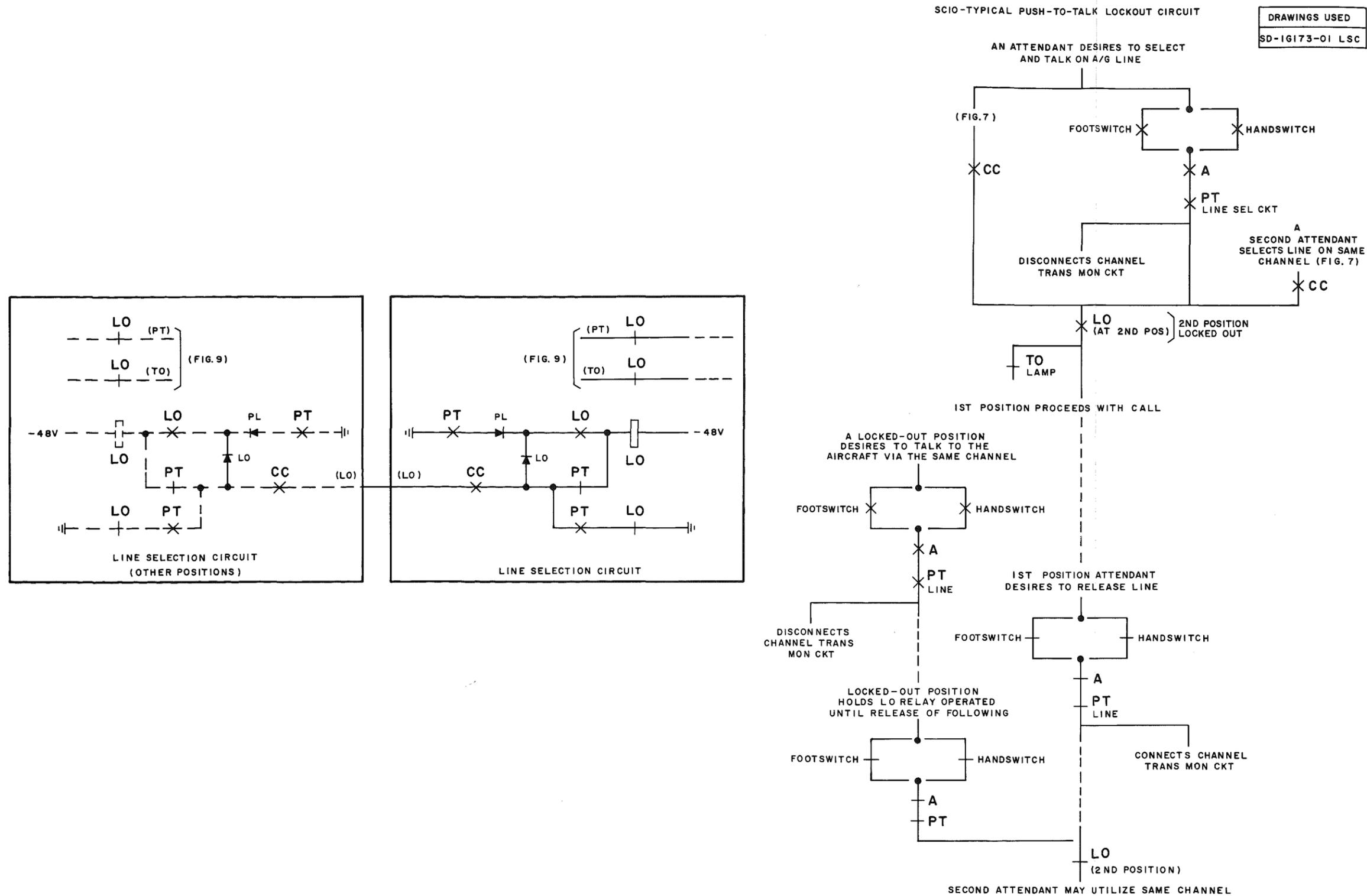
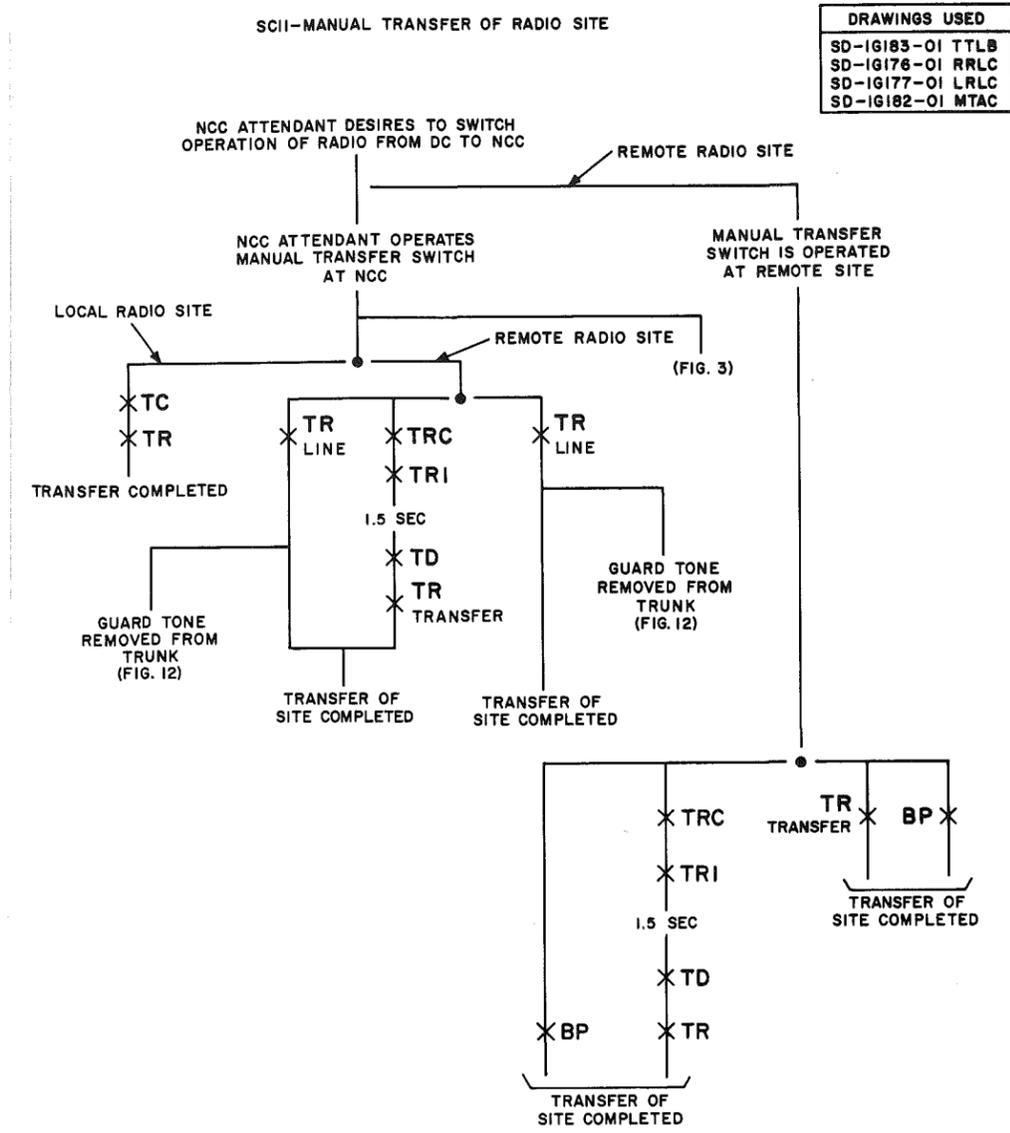
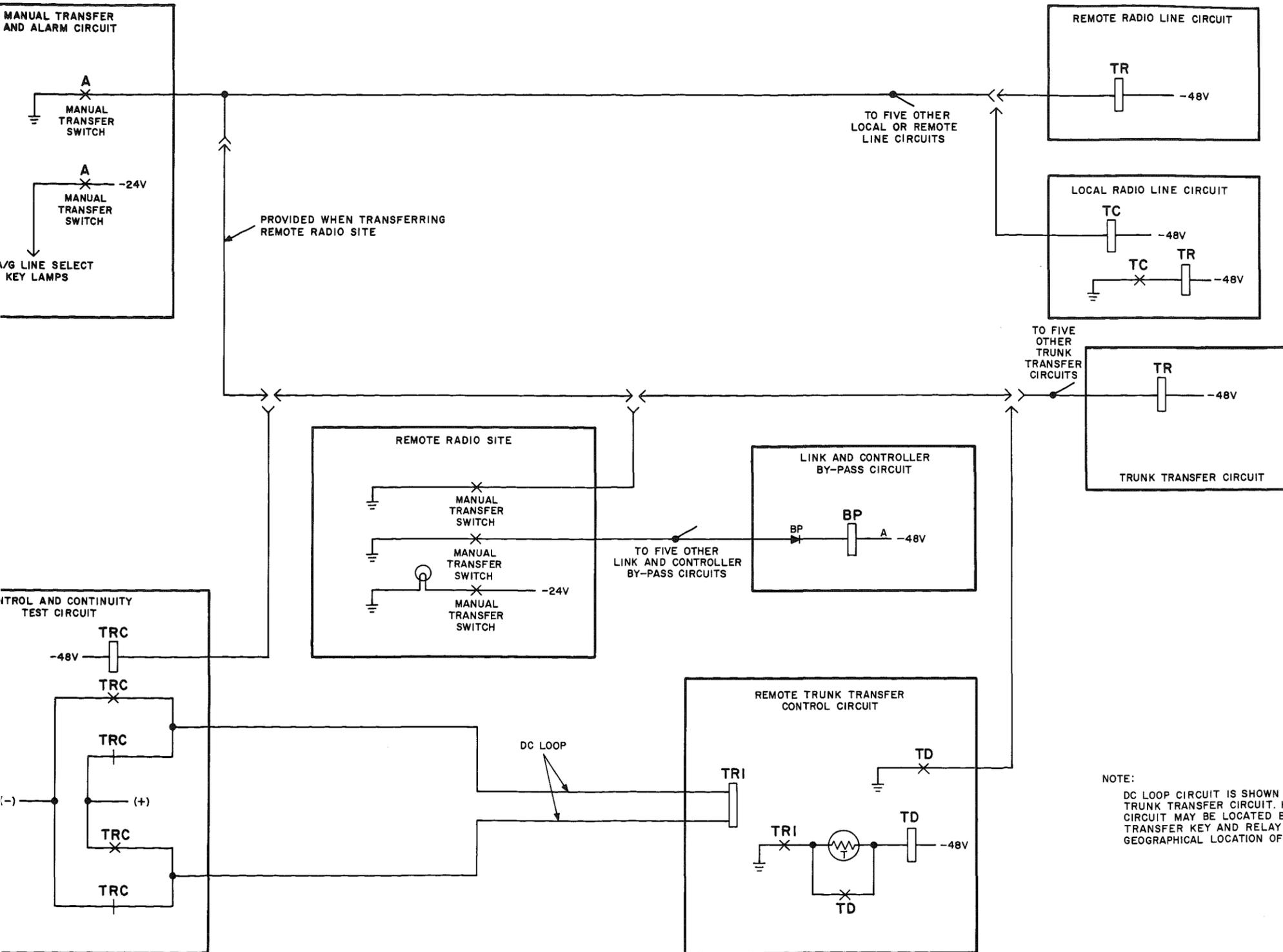
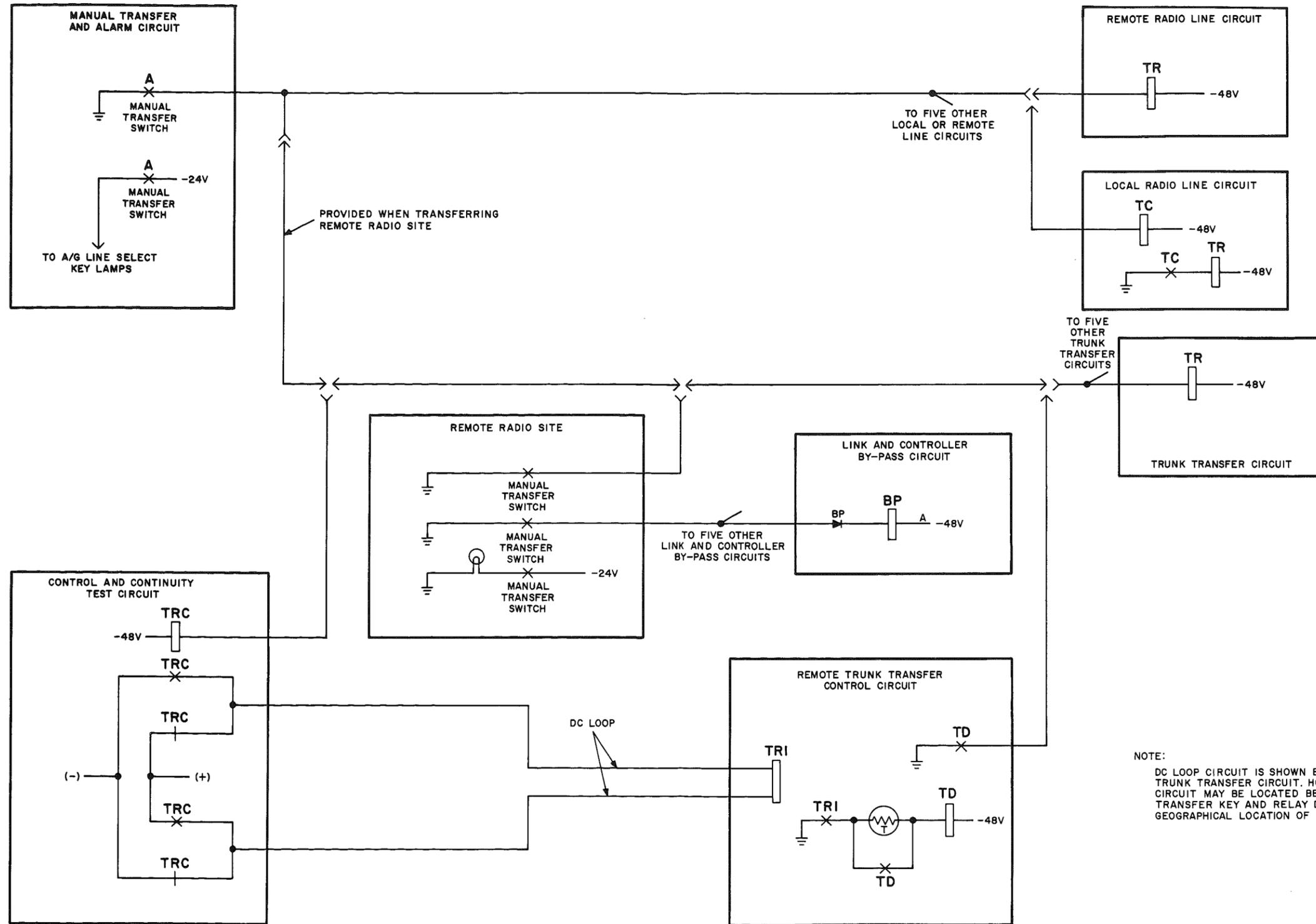


Fig. 10— Typical Push-to-Talk Lockout Circuit

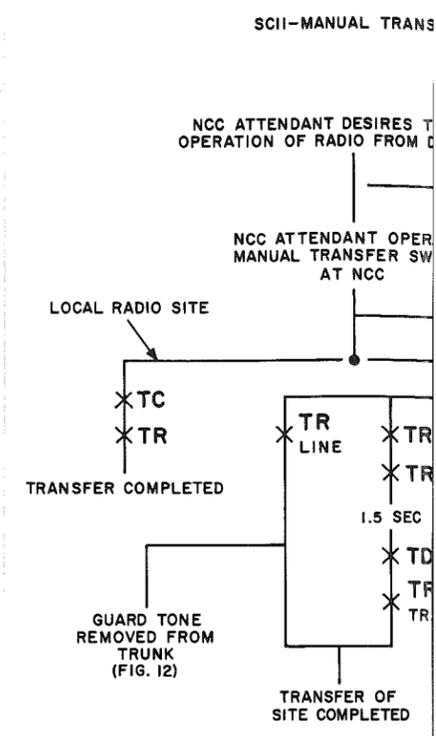


NOTE:  
DC LOOP CIRCUIT IS SHOWN BETWEEN NCC AND TRUNK TRANSFER CIRCUIT. HOWEVER DC LOOP CIRCUIT MAY BE LOCATED BETWEEN ANY TRANSFER KEY AND RELAY DEPENDING UPON GEOGRAPHICAL LOCATION OF EACH.

Fig. 11 — Manual Transfer of Radio Site



NOTE:  
 DC LOOP CIRCUIT IS SHOWN BETWEEN NCC AND TRUNK TRANSFER CIRCUIT. HOWEVER DC LOOP CIRCUIT MAY BE LOCATED BETWEEN ANY TRANSFER KEY AND RELAY DEPENDING UPON GEOGRAPHICAL LOCATION OF EACH.



DRAWINGS USED
SD-1G176-01 RRLC
SD-1G183-01 TTLB

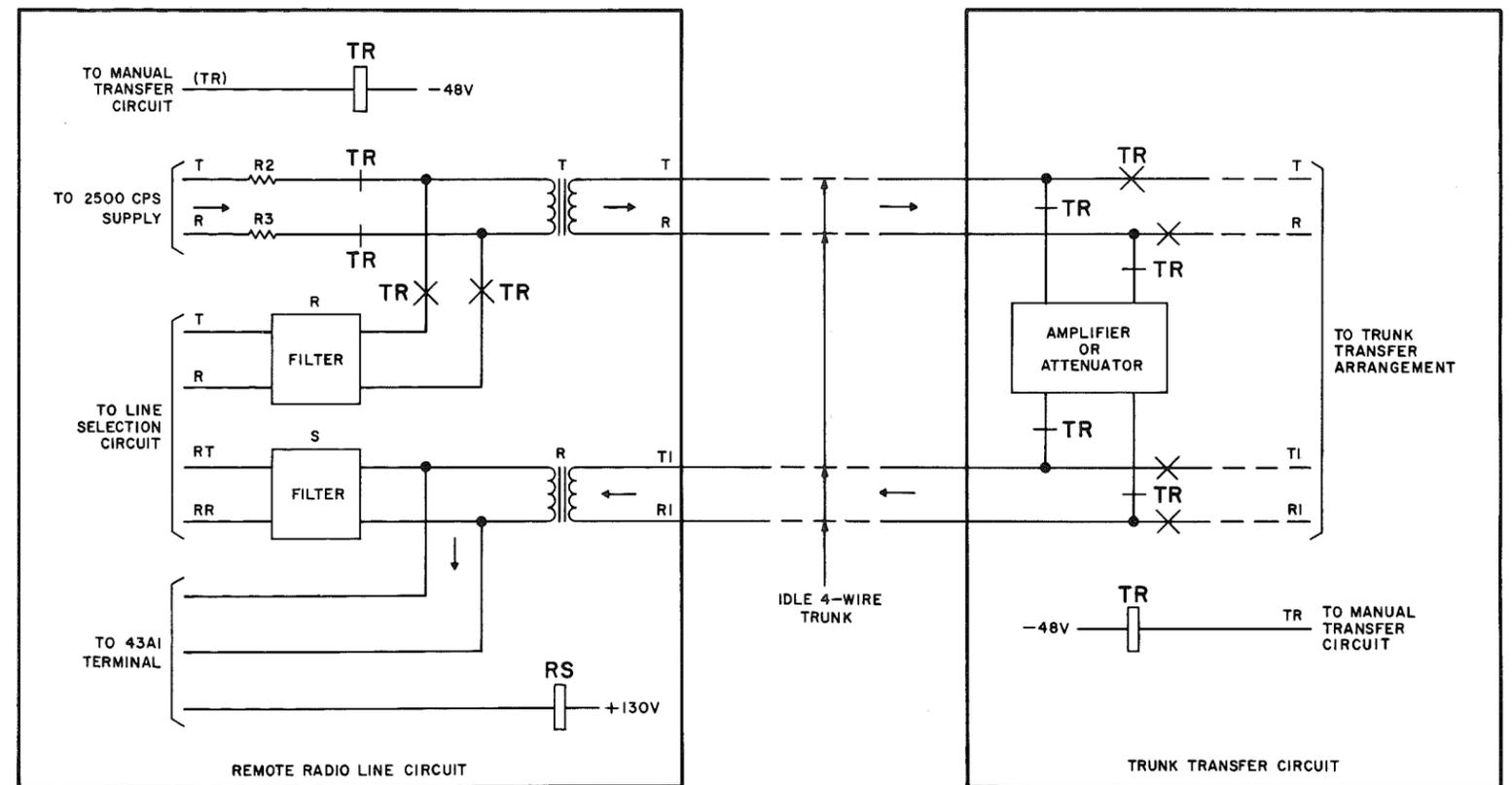


Fig. 12 — Method of Checking Continuity of 4-Wire Idle Trunk

DRAWINGS USED	
SD-1G176-01	RRLC
SD-1G183-01	TTLB
SD-1G182-01	MTAC

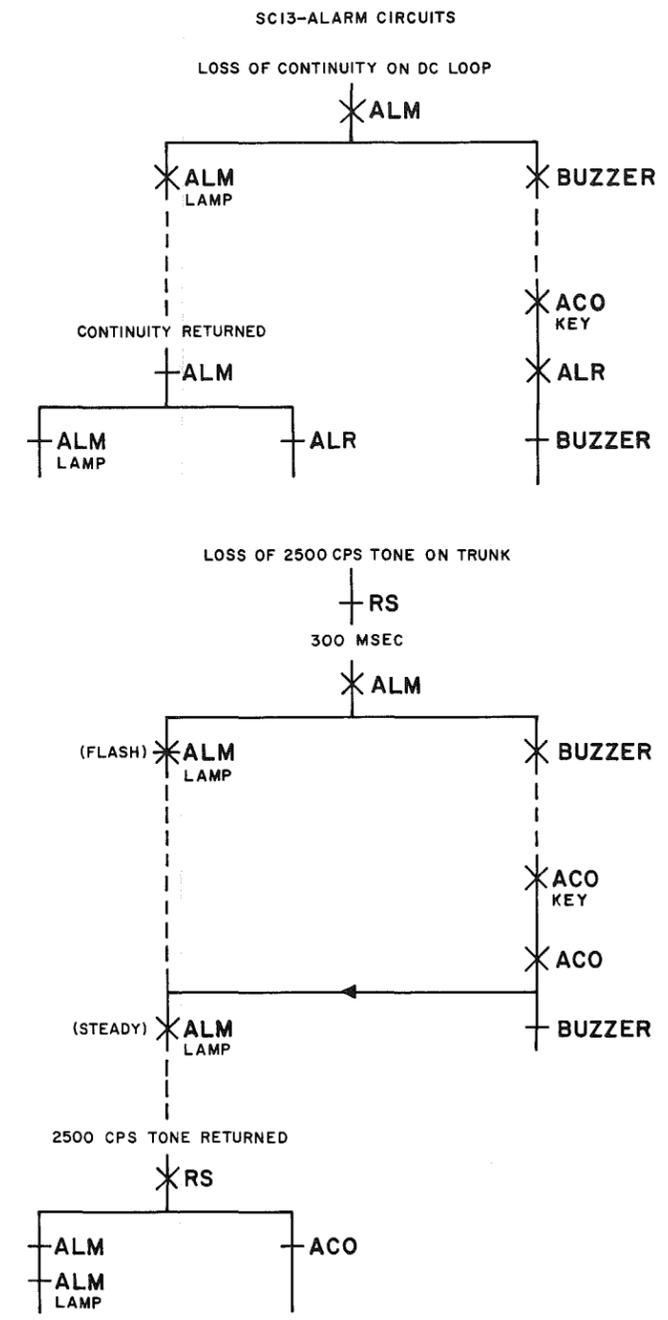
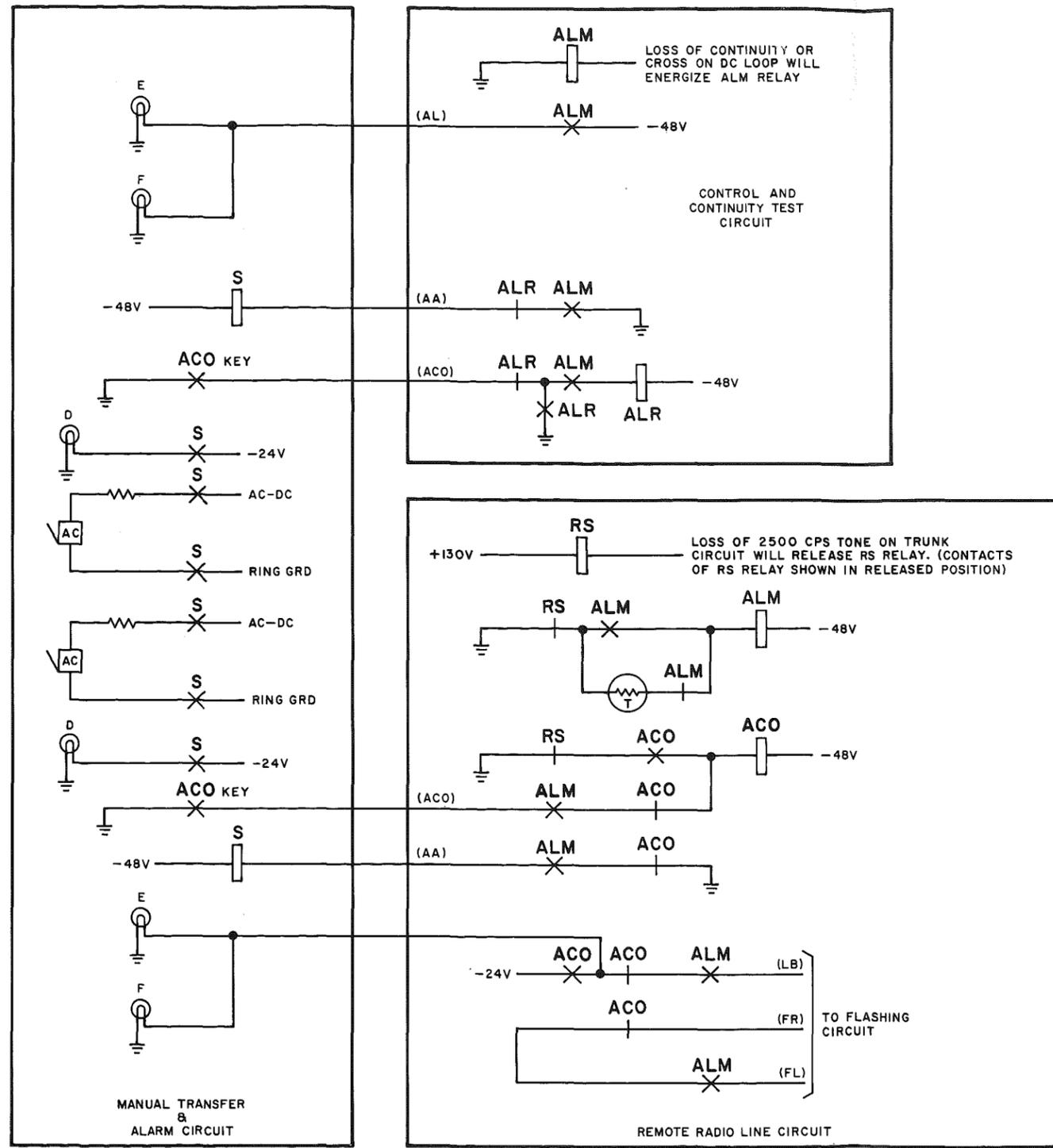
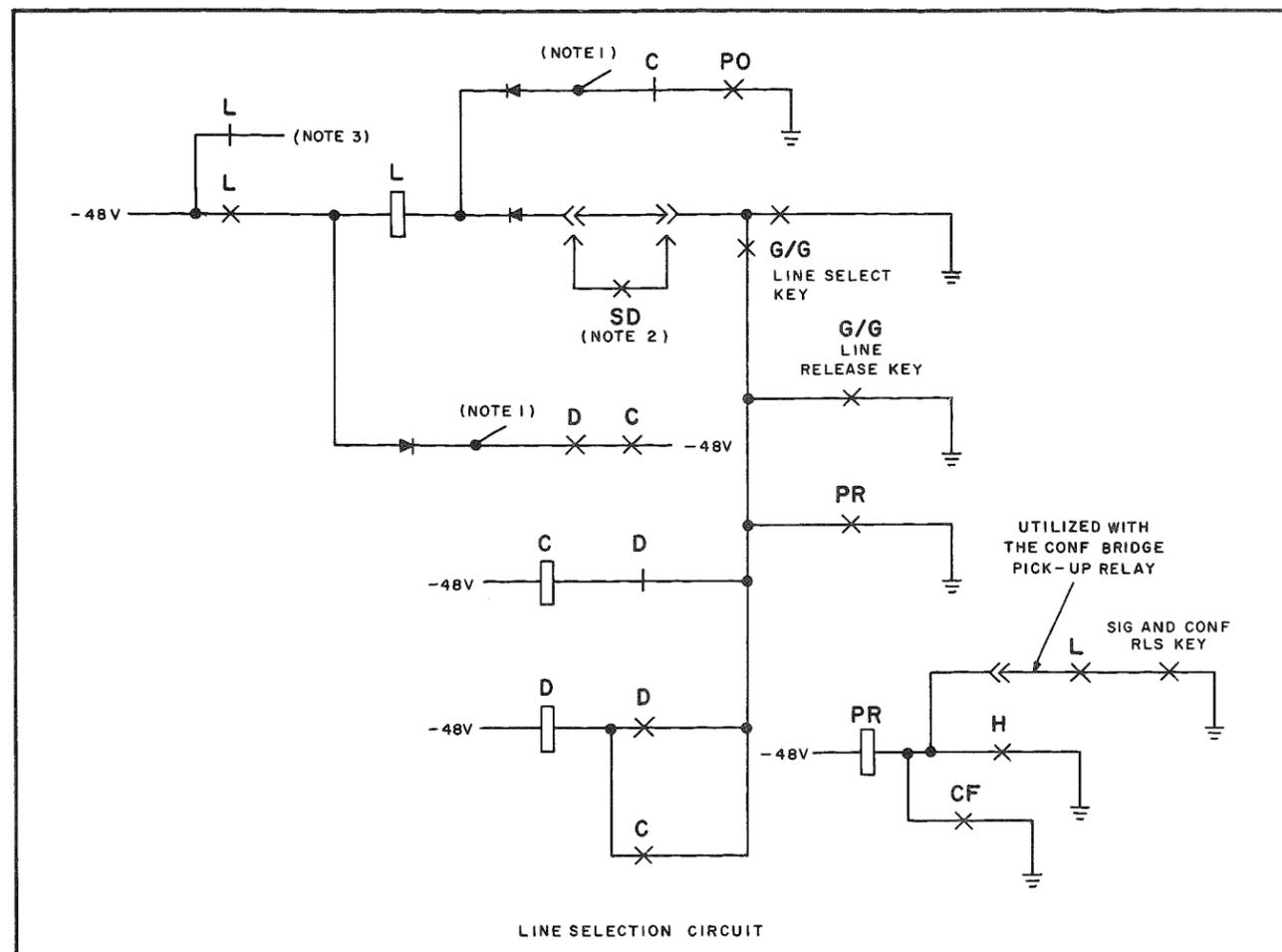


Fig. 13 — Alarm Circuits

DRAWINGS USED
SD-16173-01



- NOTES:
1. MULTIPLIED TO OTHER G/G LINE SELECT KEYS AND L RELAYS AT SAME POSITION.
  2. OPTION REQUIRED FOR PICKING UP CONFERENCE LINE, CONFERENCE BRIDGE, AND MONITORING CIRCUITS. PATH ENABLED ONLY AT SENIOR DIRECTOR POSITION.
  3. CHAINED THROUGH OTHER L RELAYS AT SAME POSITION.

SC14 - G/G LINE SELECT KEY CONTROL CIRCUIT

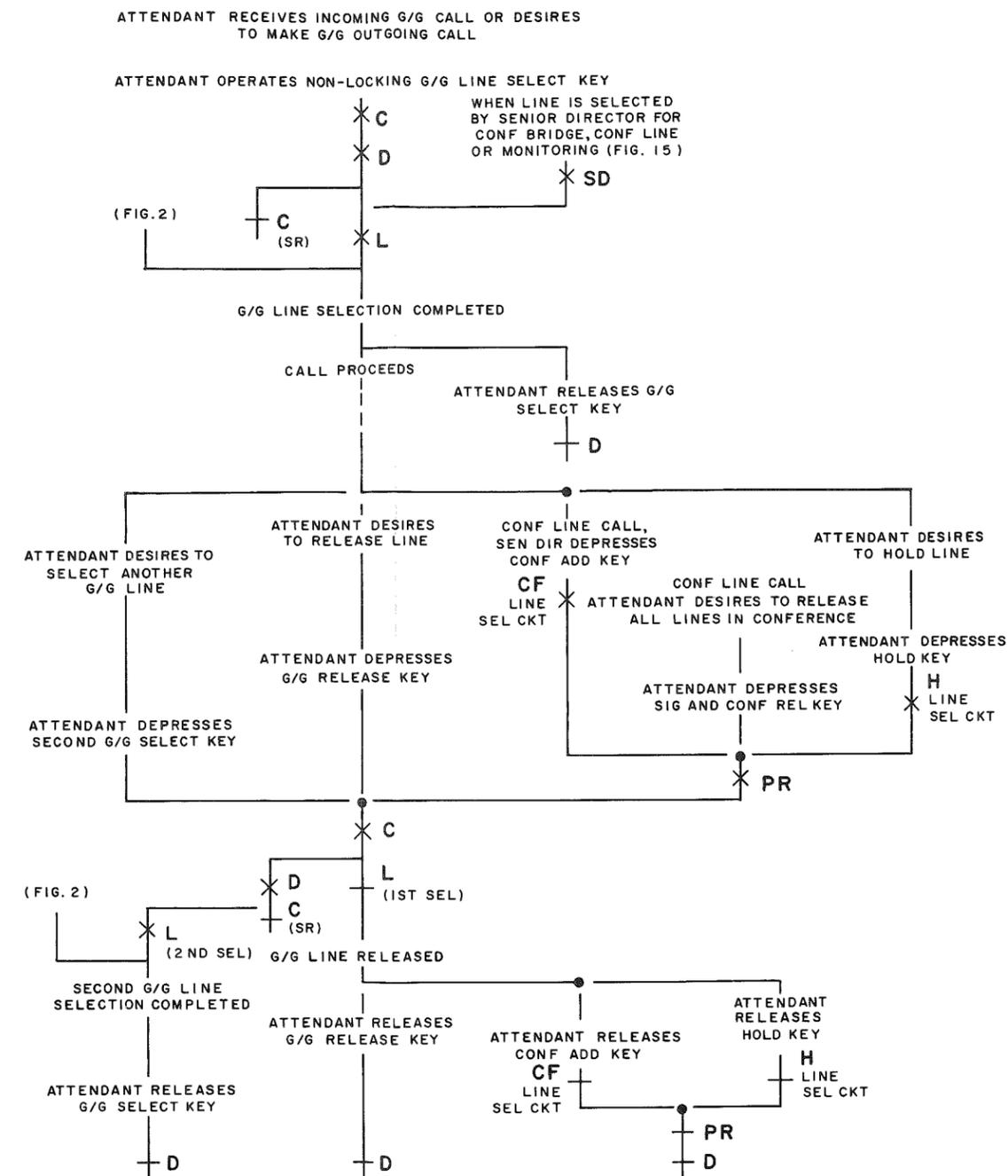


Fig. 14 — G/G Line Select Control Circuit

DRAWINGS USED
SD-1G181-01

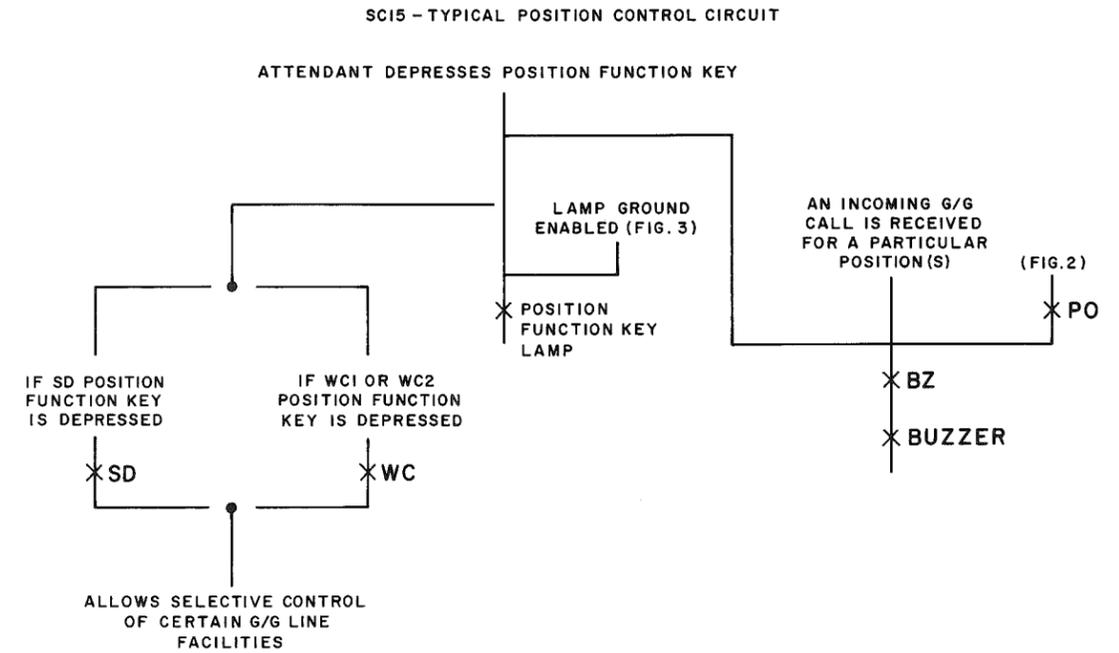
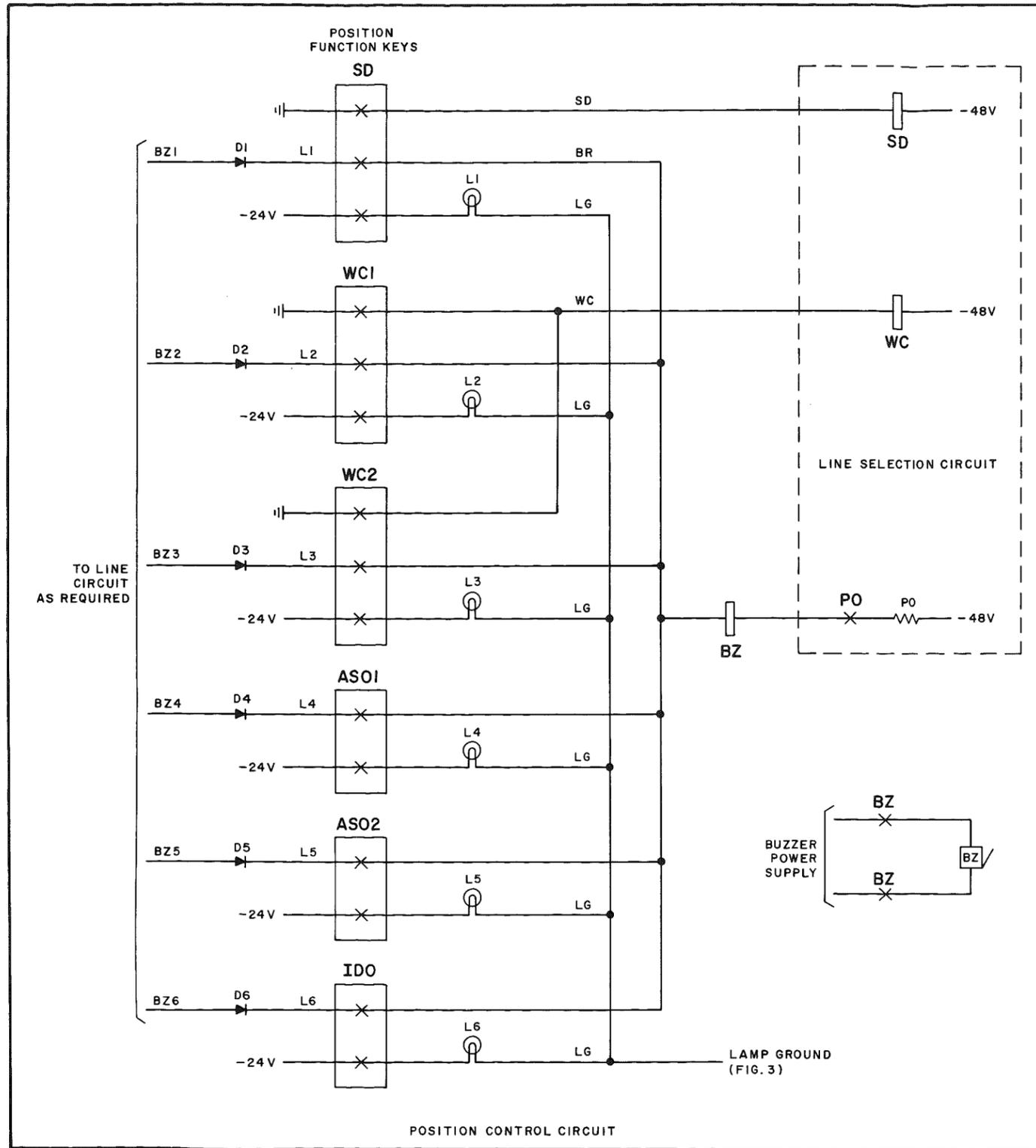
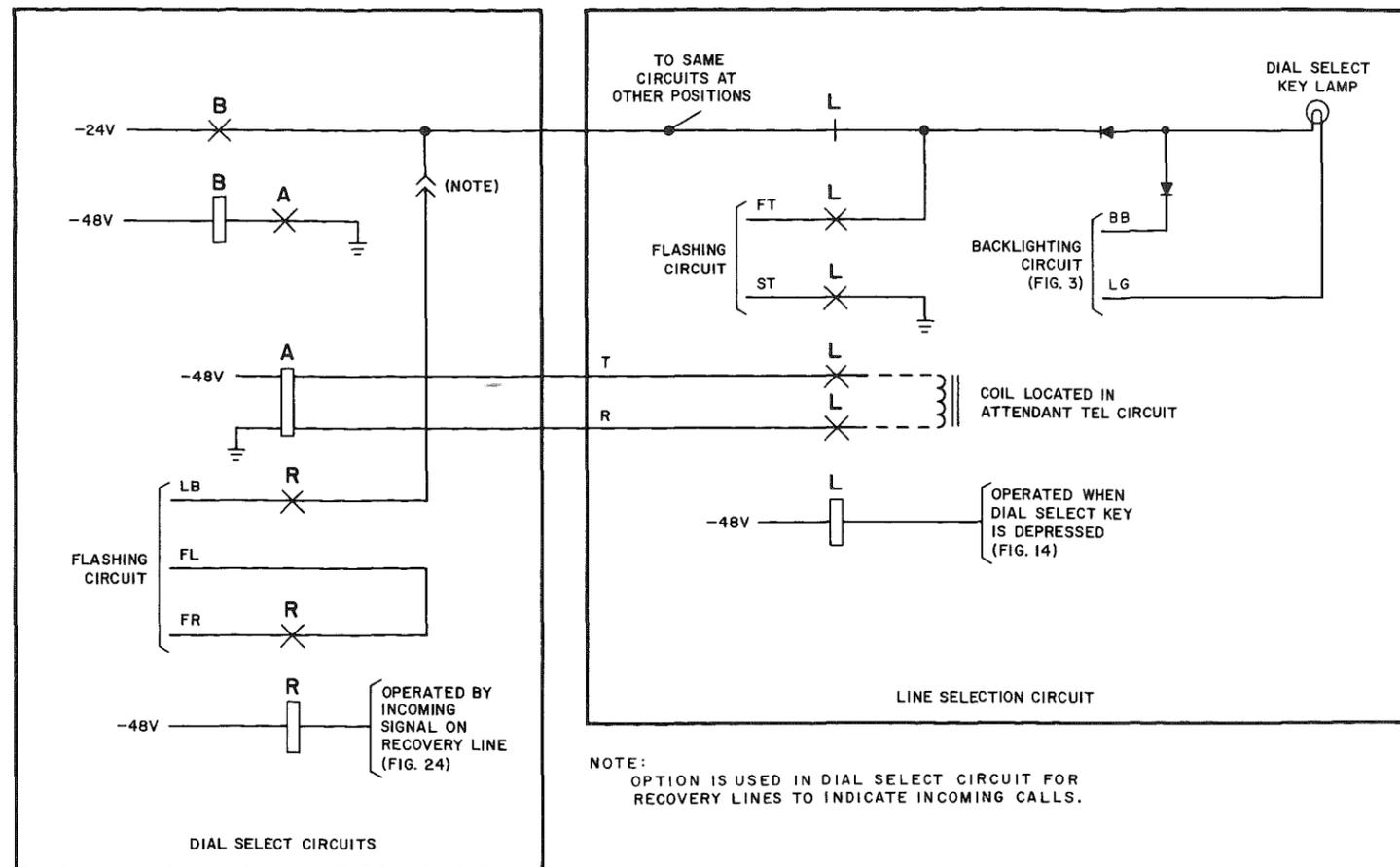


Fig. 15 — Typical Position Control Circuit



DRAWINGS USED	
SD-IG173-01	LSC
SD-IG175-01	DSC

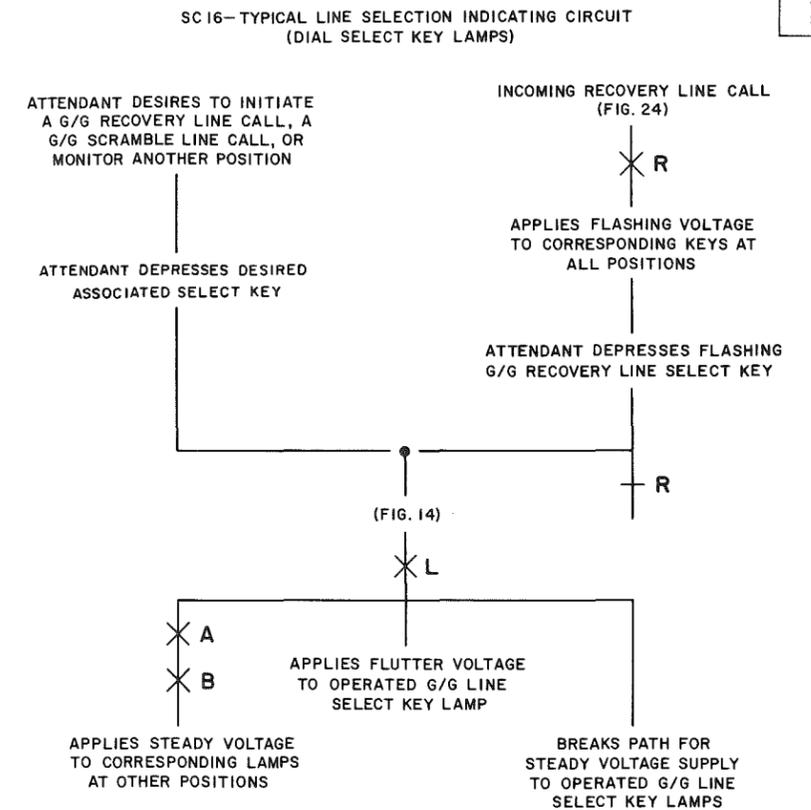


Fig. 16—Typical Line Status Indicating Circuit — Dial Select Key Lamps

DRAWINGS USED
SD-1G173-01 LSC
SD-1G178-01 CLC

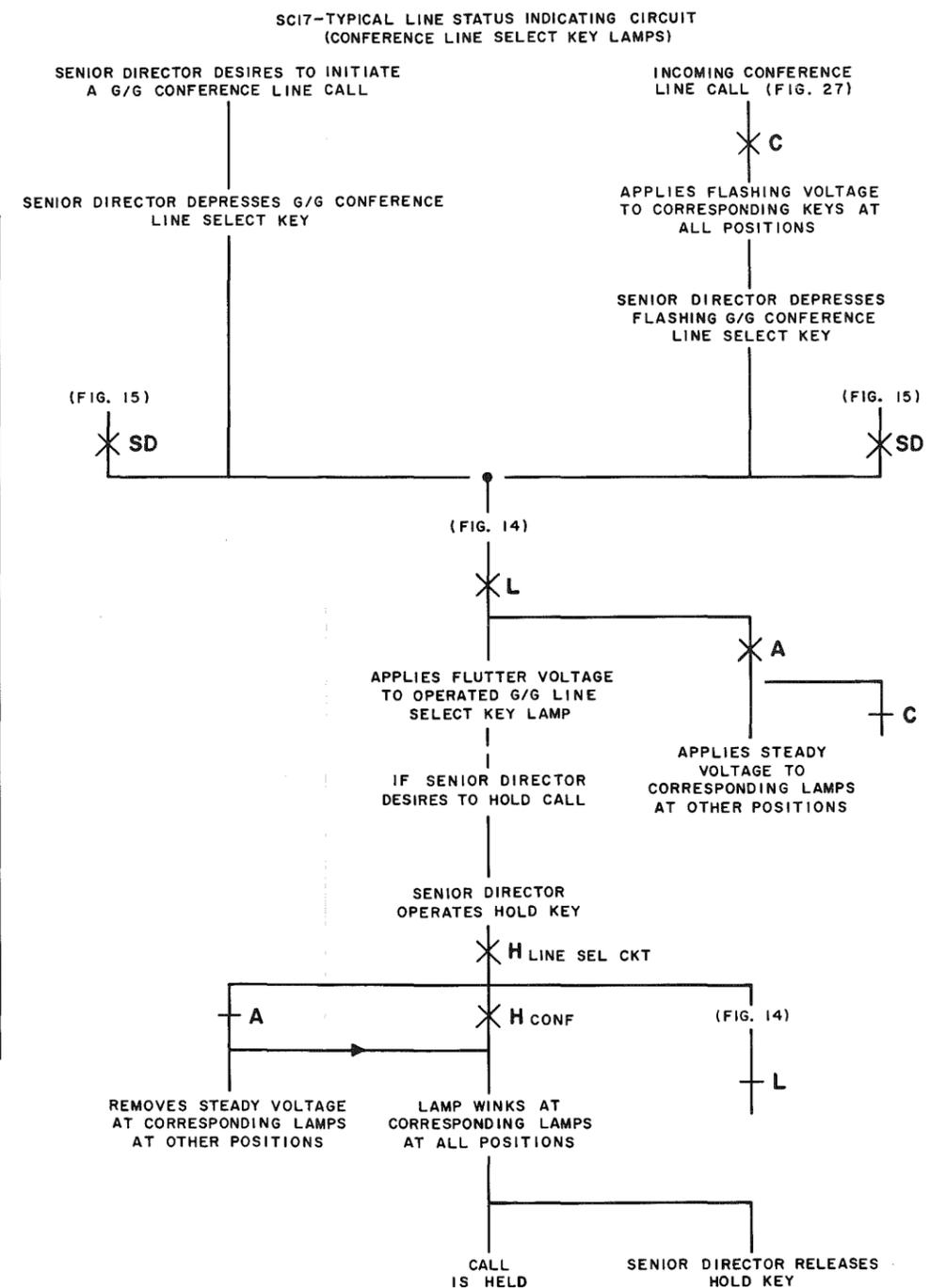
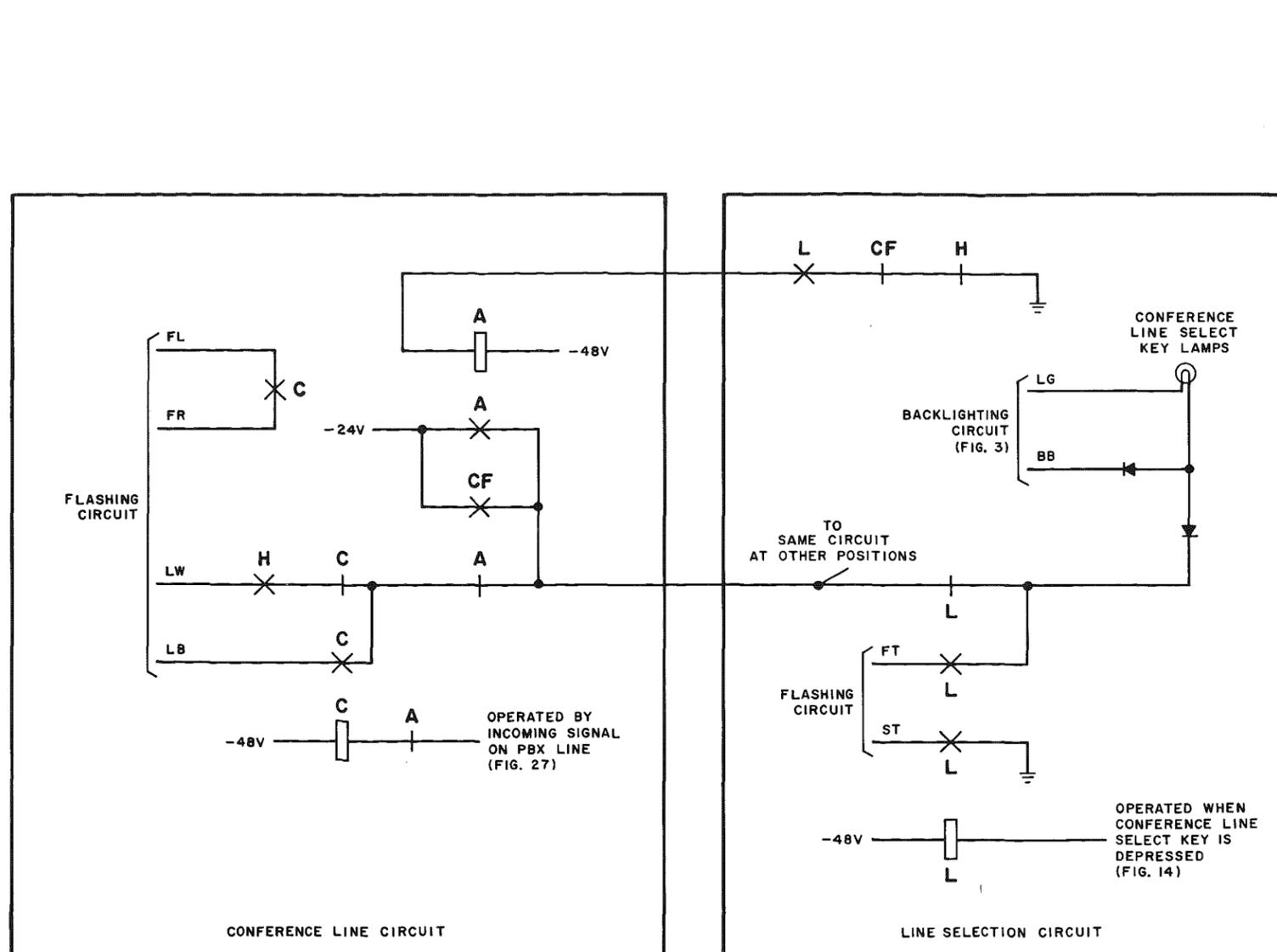


Fig. 17—Typical Line Status Indicating Circuit—Conference Line Select Key Lamps

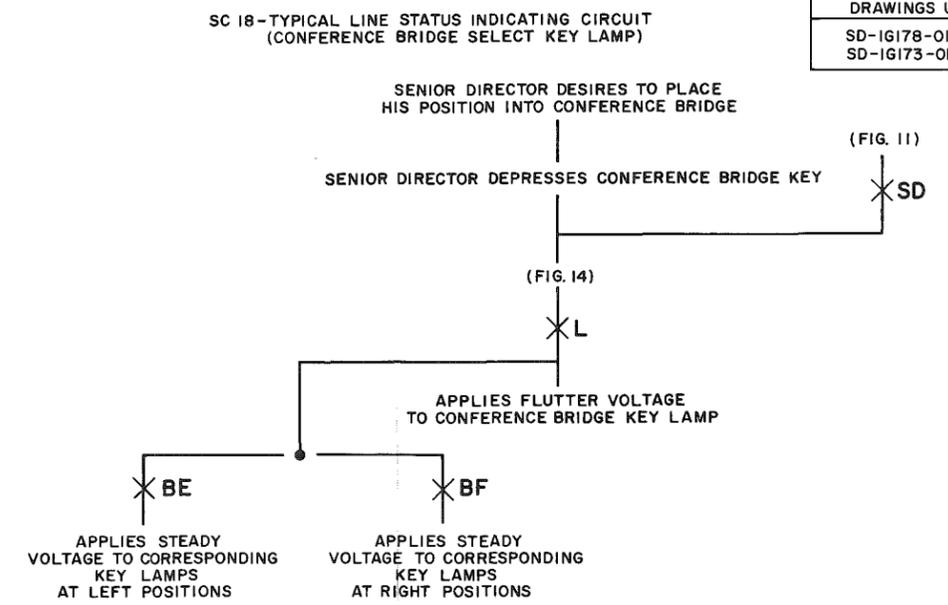
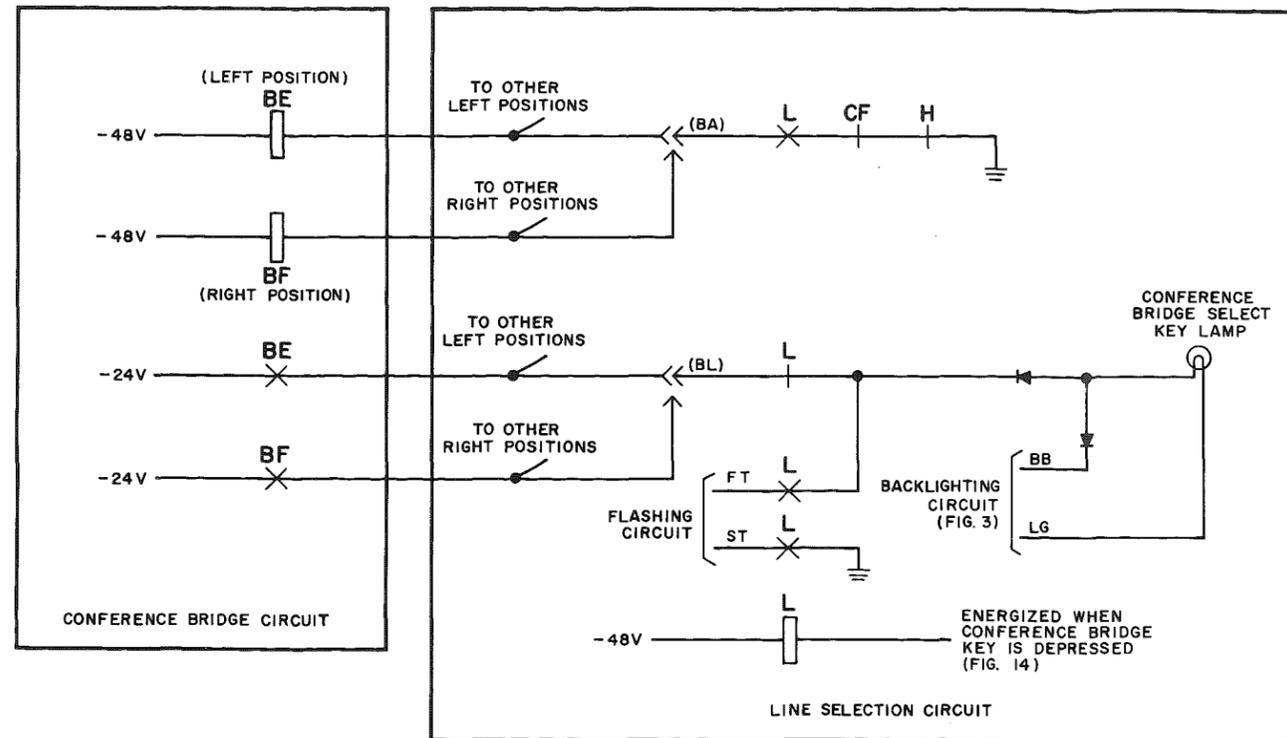


Fig. 18—Typical Line Status Indicating Circuit—Conference Bridge Select Key Lamp

DRAWINGS USED	
SD-1G174-01	ATC
SD-1G173-01	LSC
SD-1G175-01	DSC

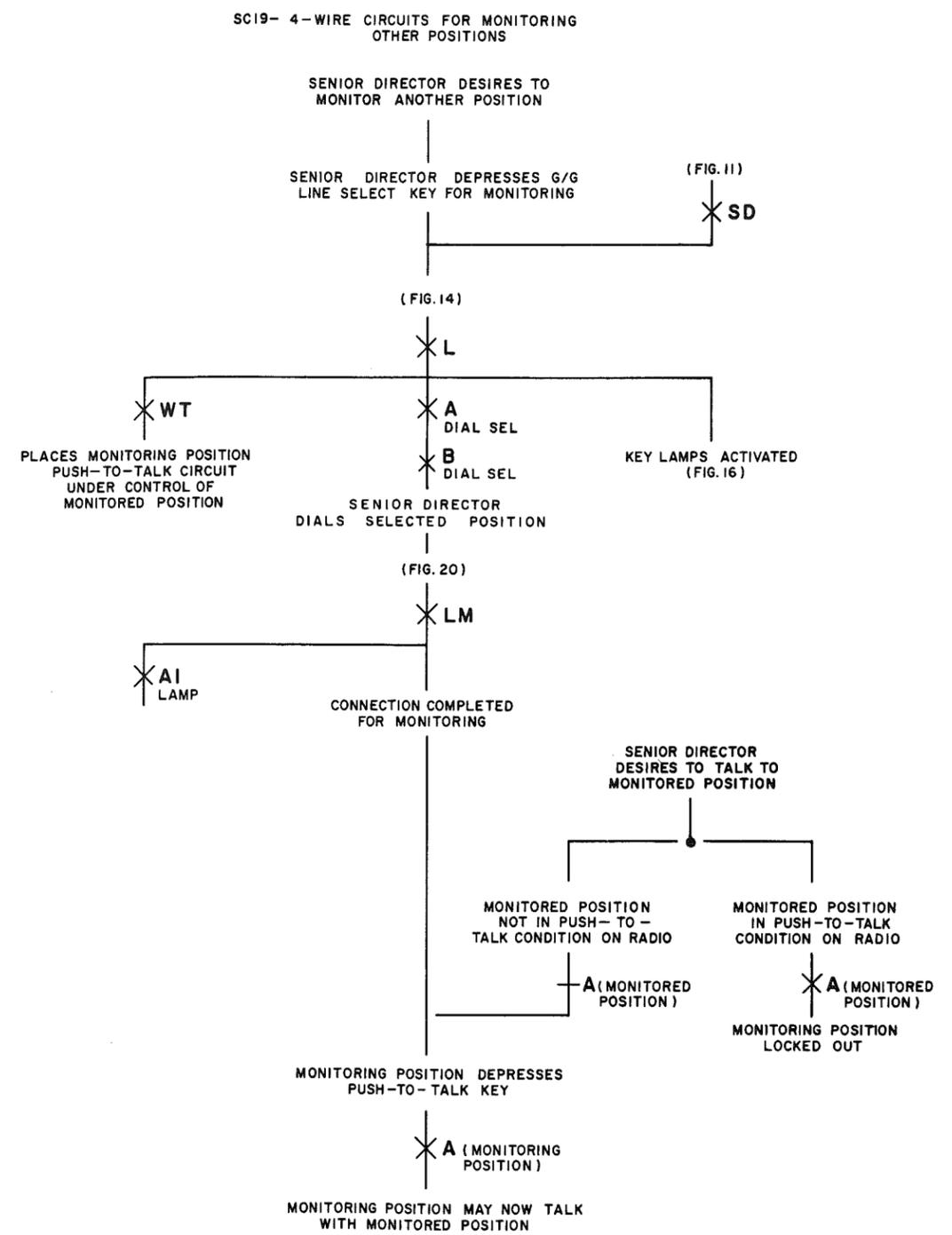
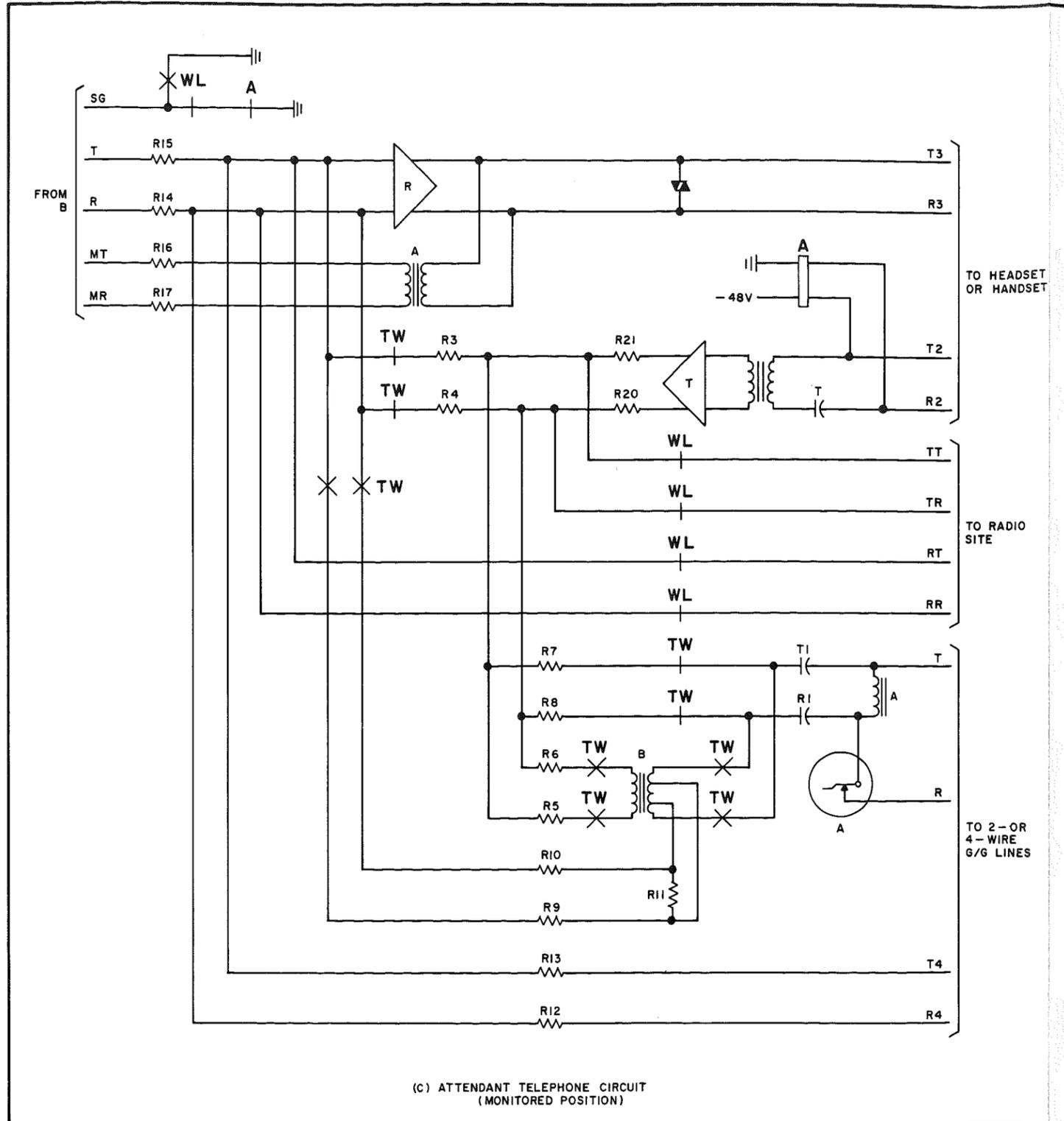
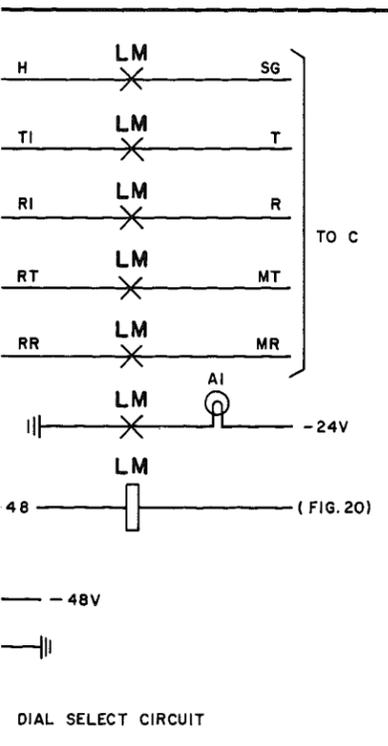
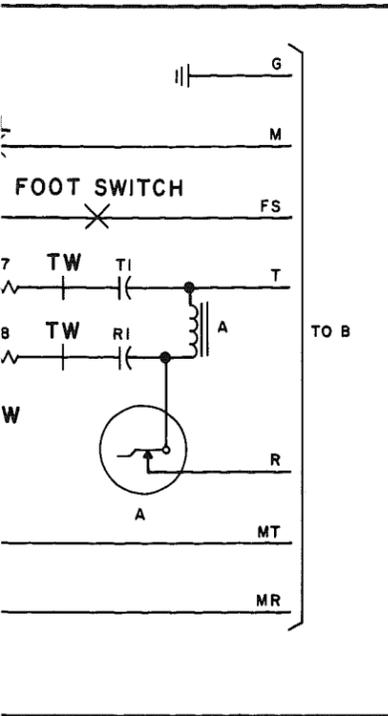
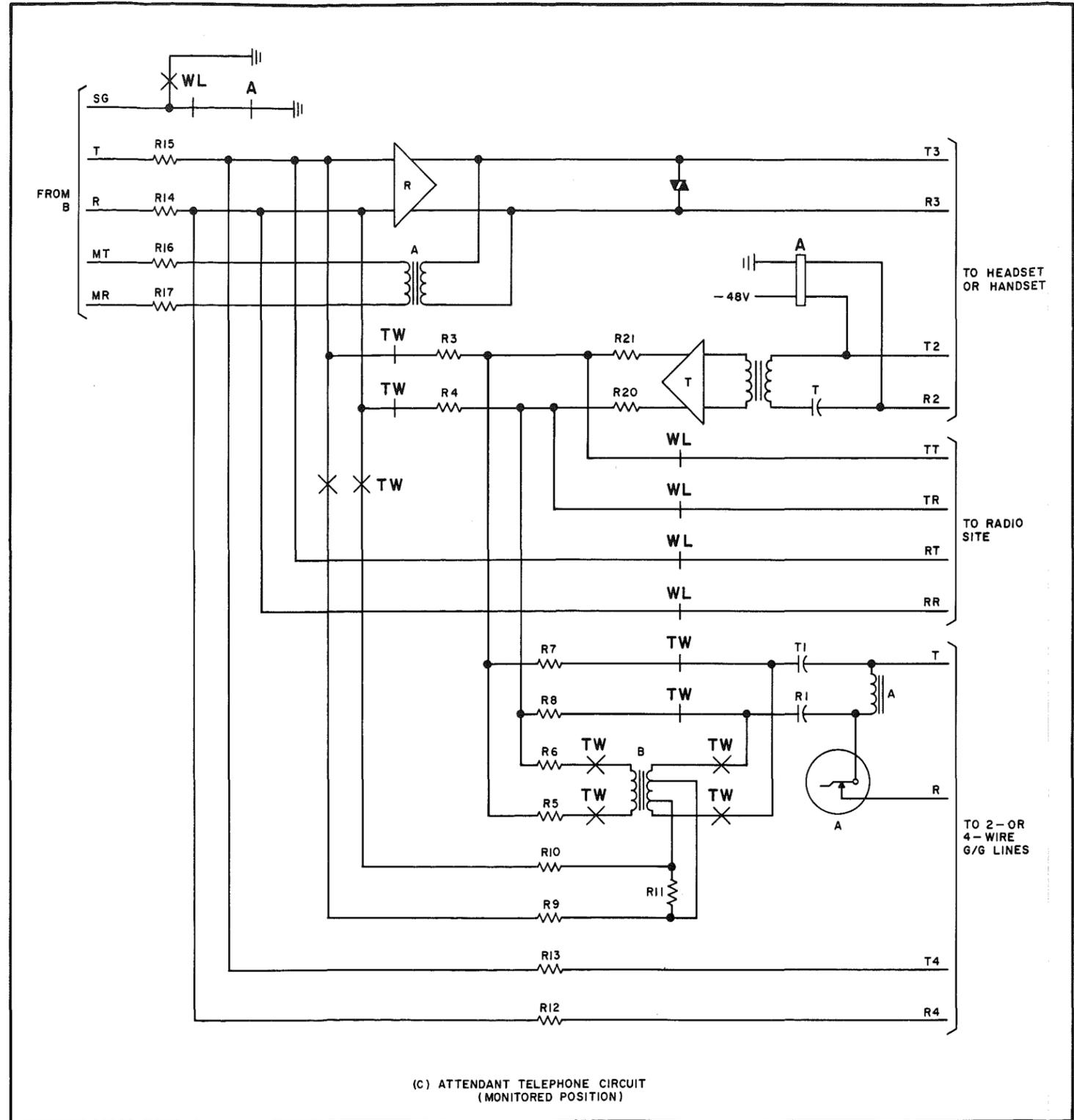
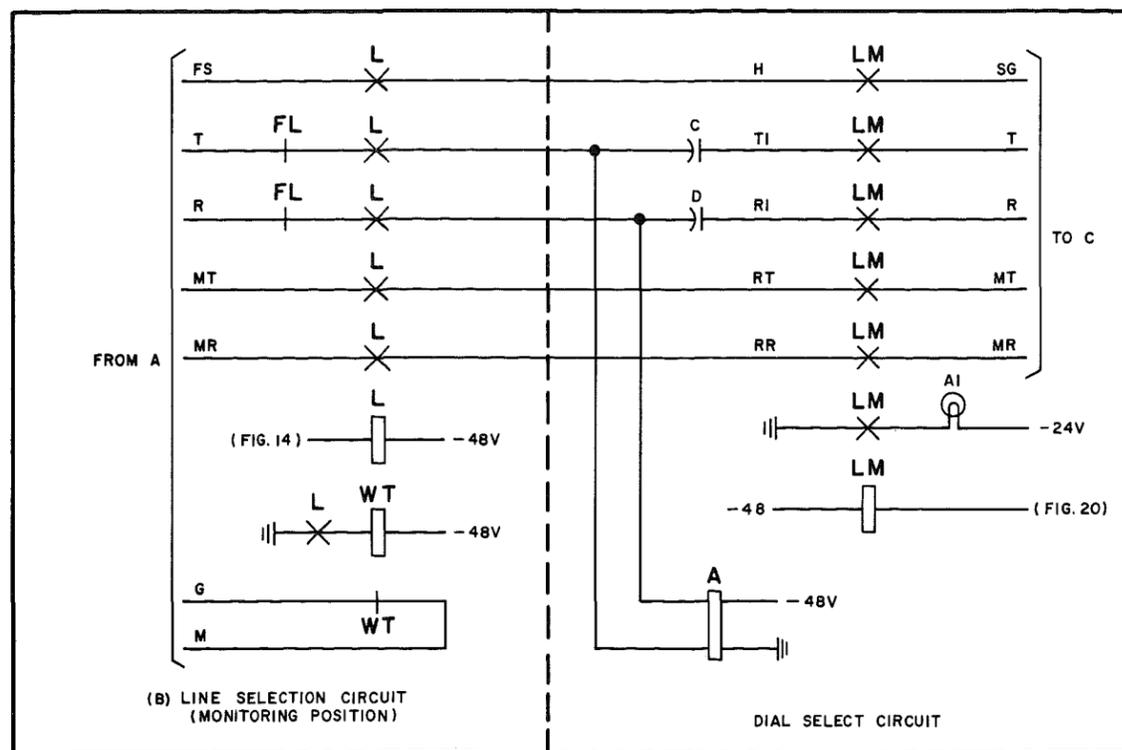
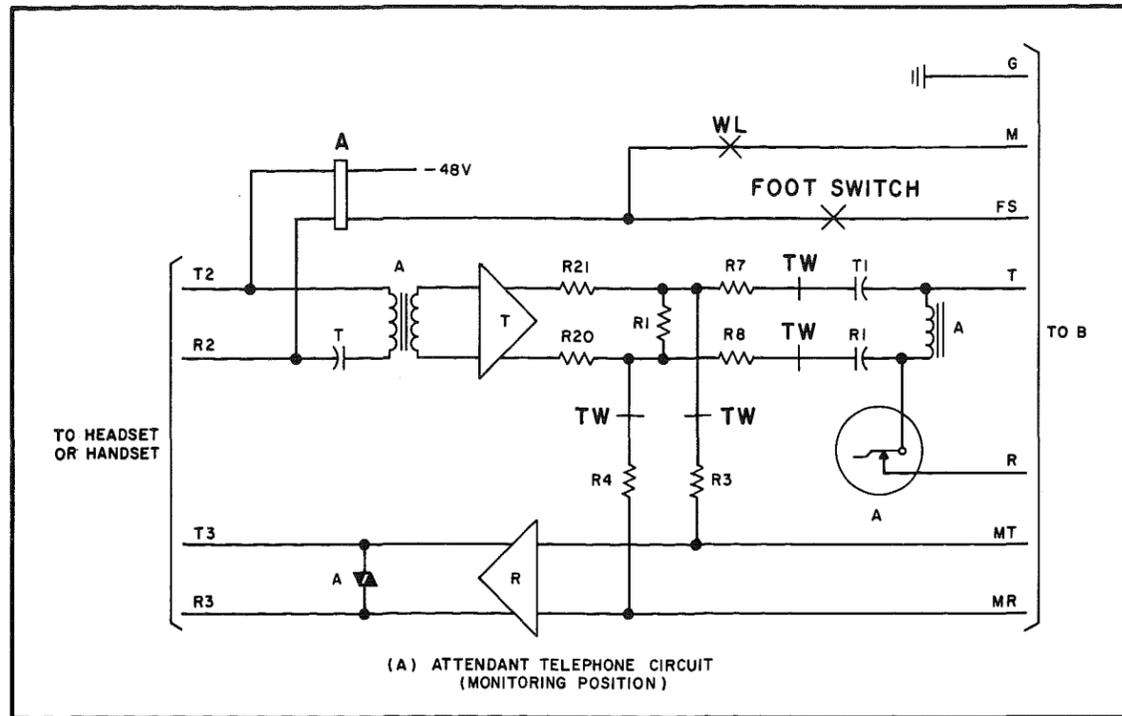
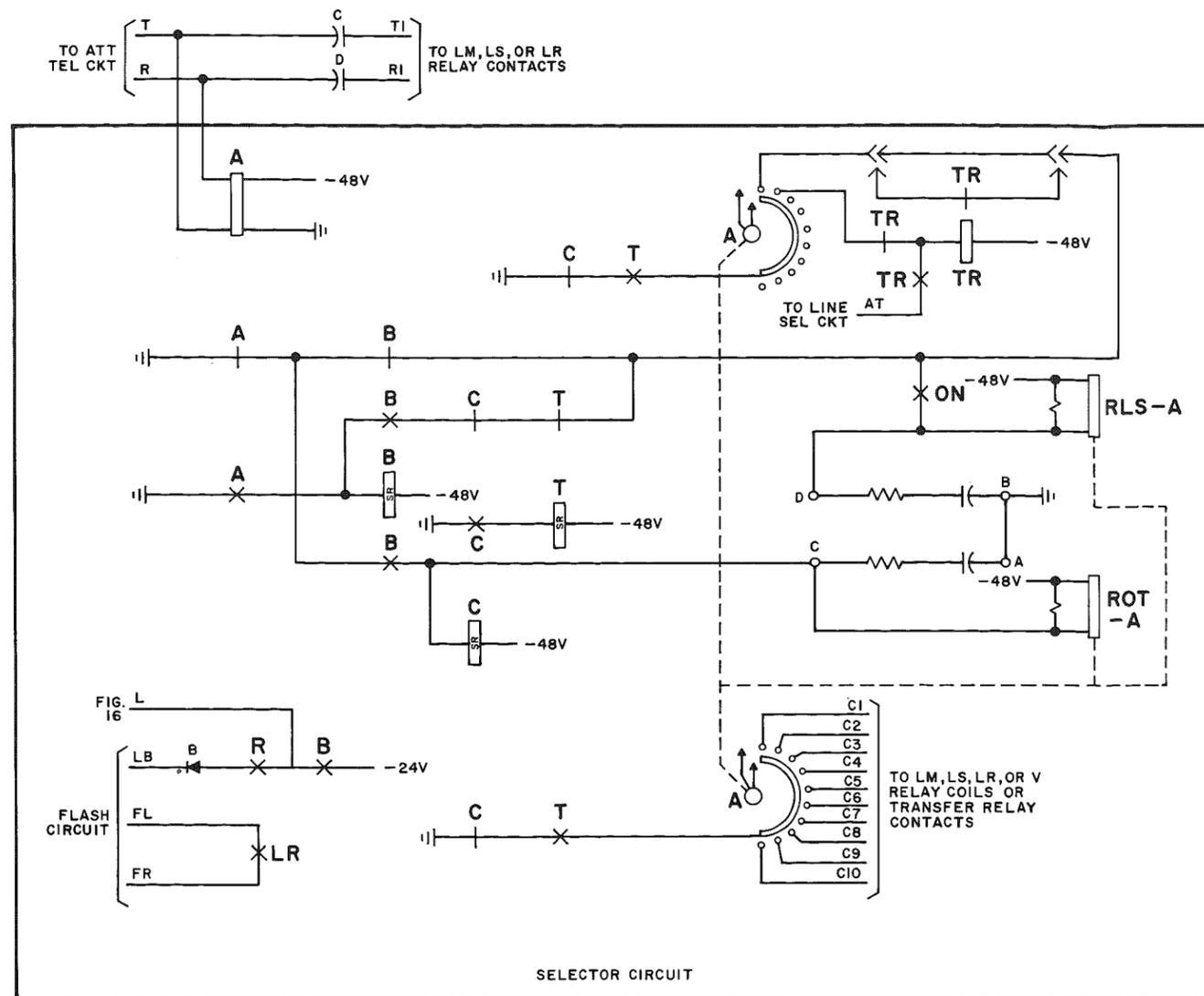


Fig. 19— Four-Wire Circuits for Monitoring Other Positions



PLACES MONITOR  
PUSH-TO-T  
UNDER CON  
MONITORED

DRAWINGS USED  
SD-16175-01 DSC



SC20-SELECTOR CIRCUIT FOR CONNECTING DIAL SELECTION CIRCUITS

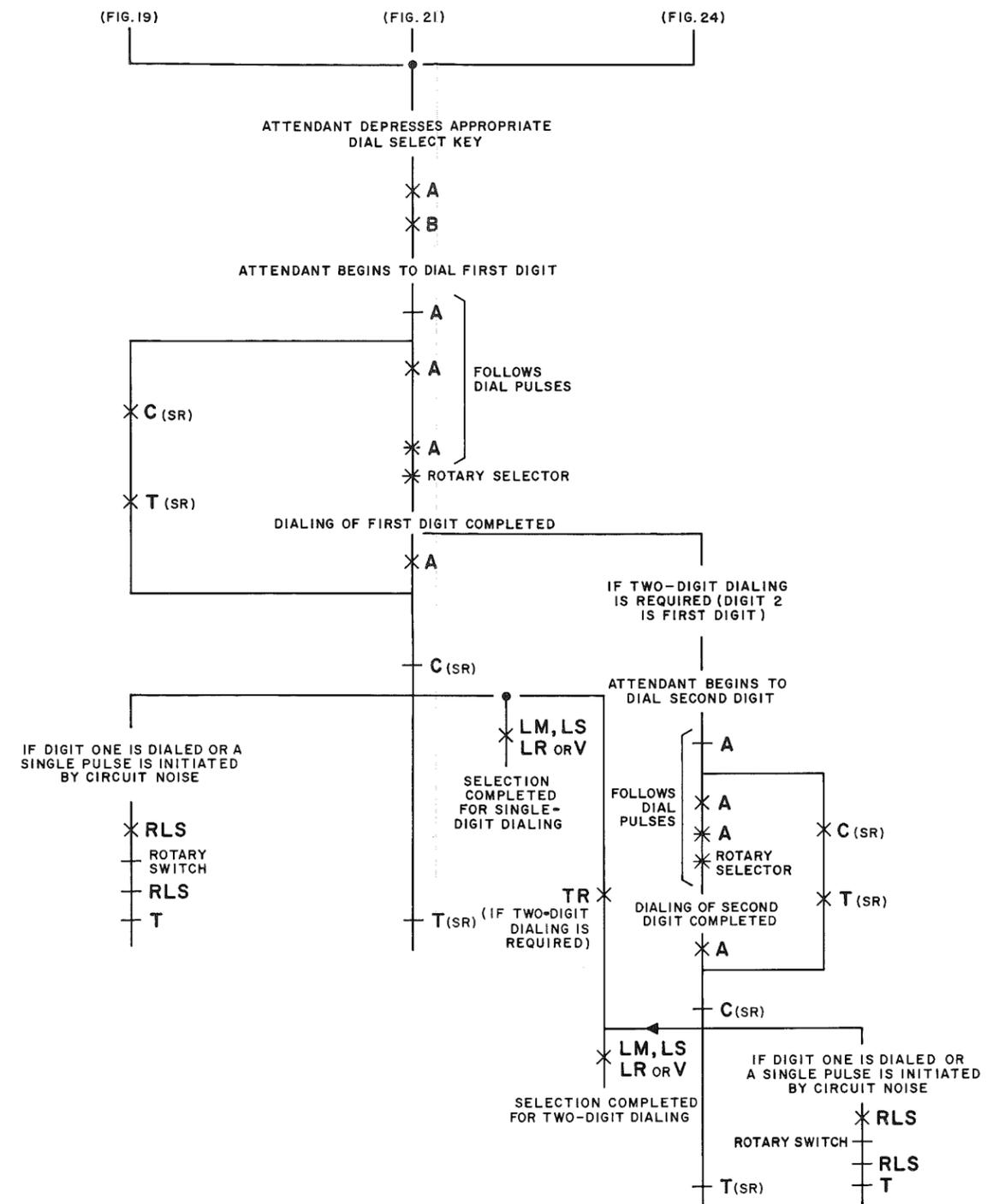


Fig. 20—Selector Circuit for Connecting Dial Selection Circuits

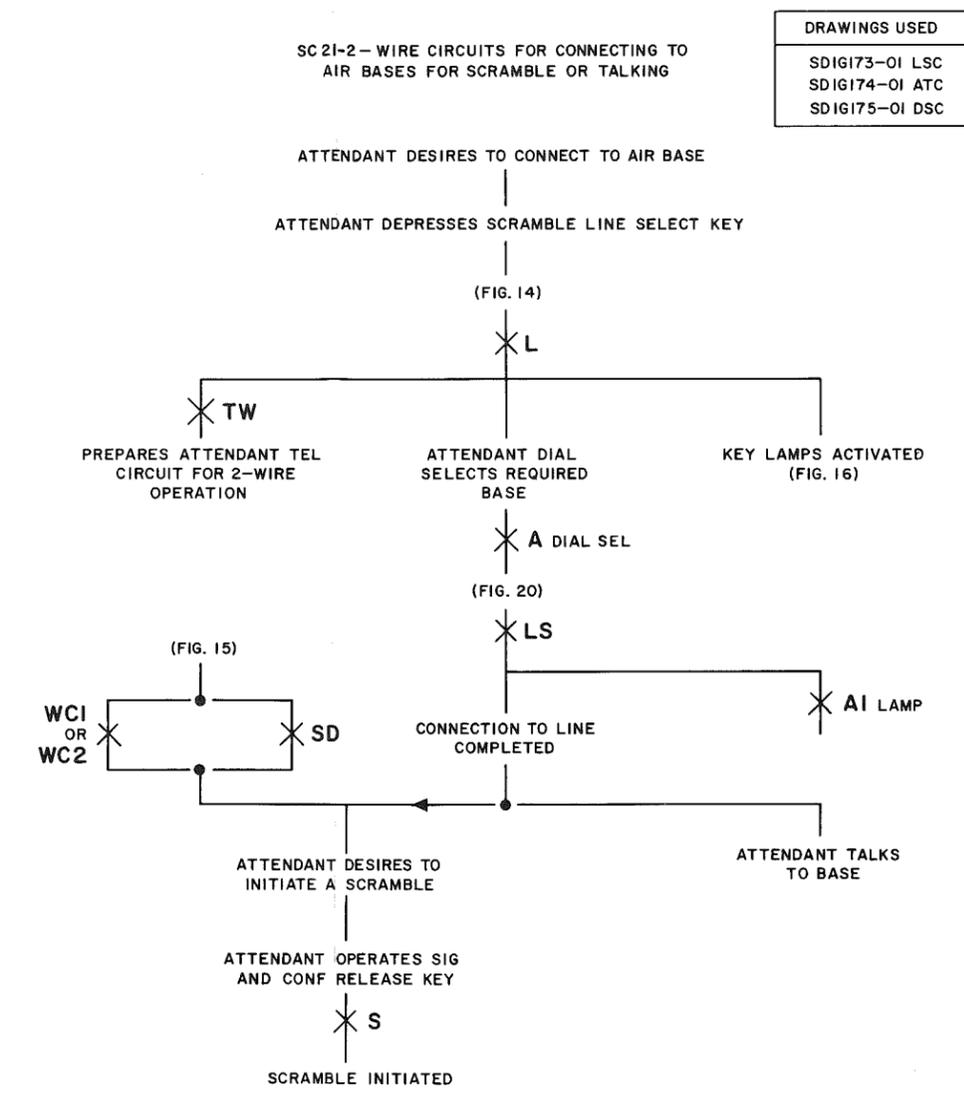
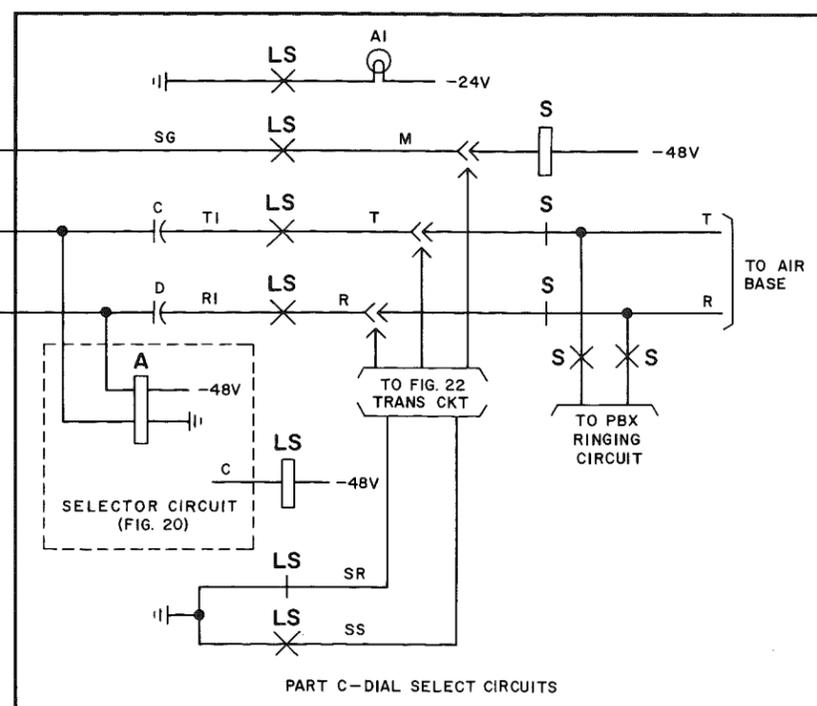
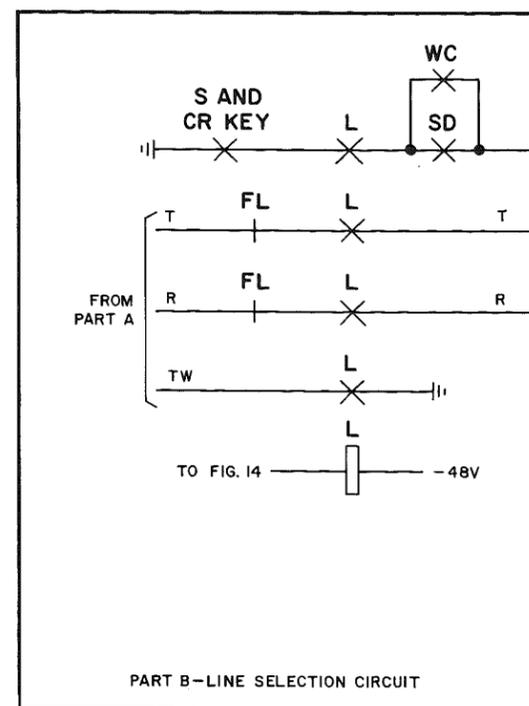
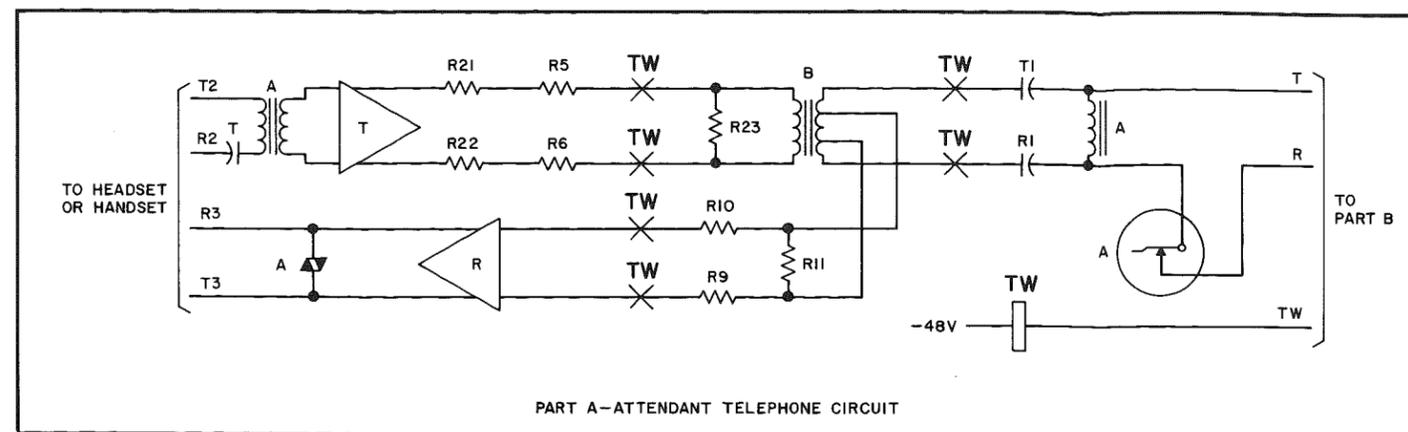
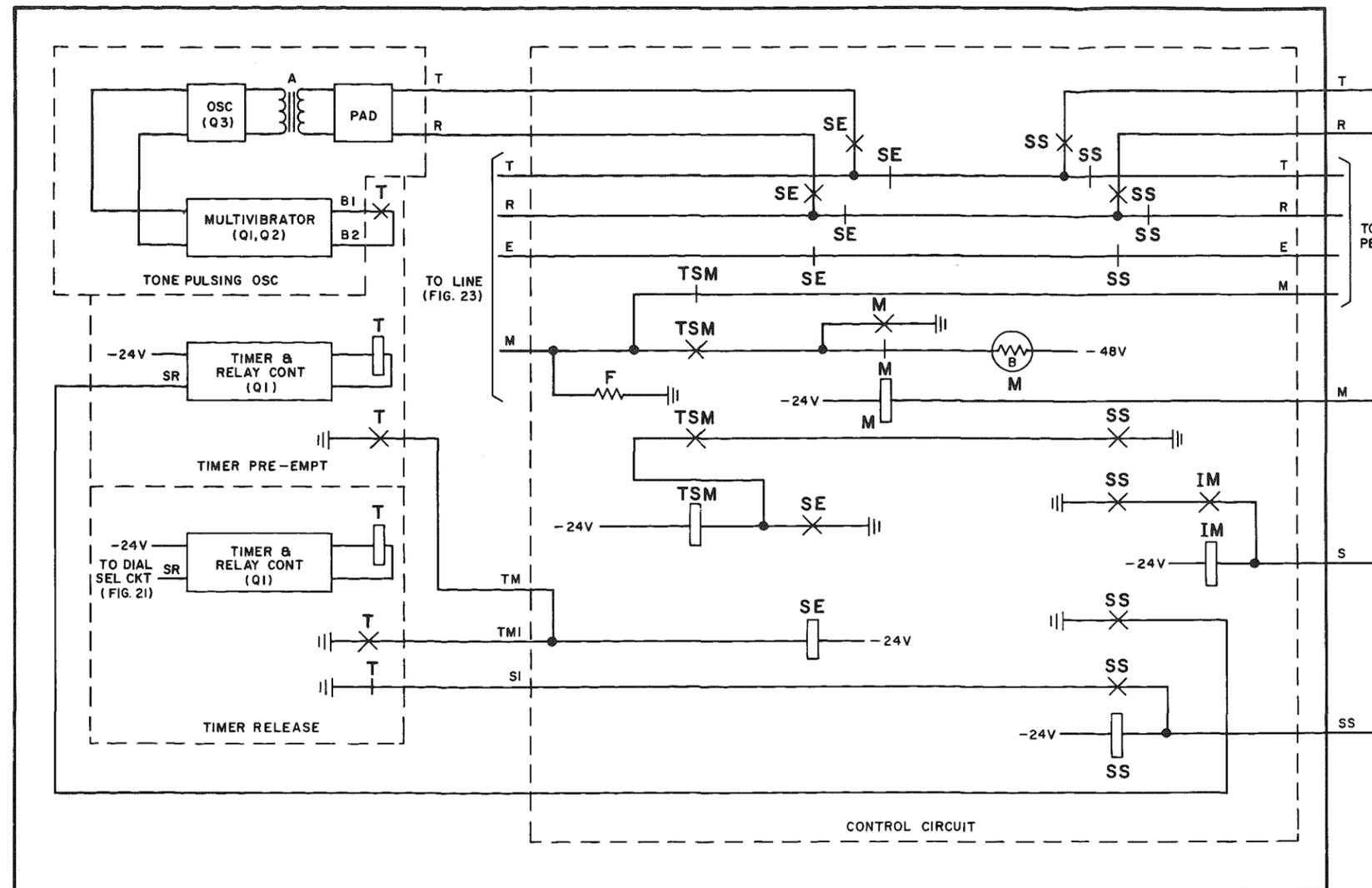


Fig. 21 — Two-Wire Circuits for Connecting to Air Base for Scramble or Talking



TO DIAL SEL CKT (FIG. 21)

SC22—SCRAMBLE LINE TRANSFER AND SIGNAL CIRCUIT (LOCATED AT NCC)

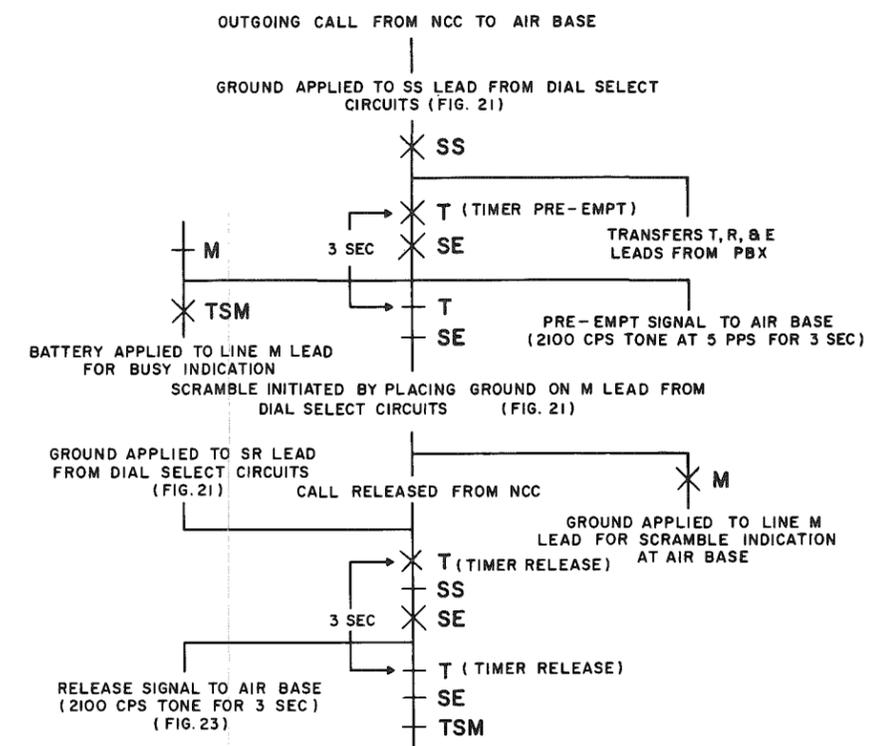
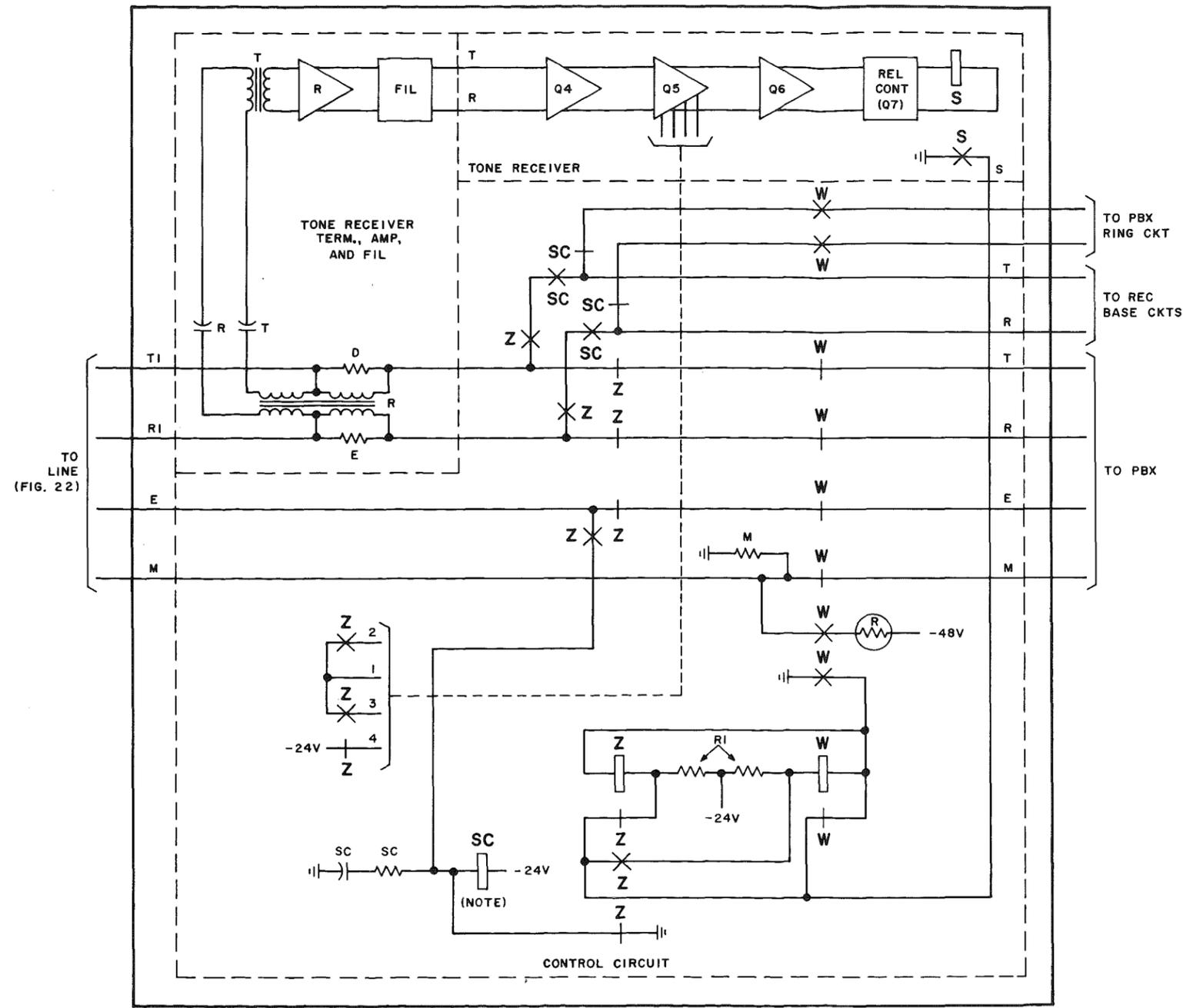


Fig. 22—Scramble Line Transfer and Signal Circuit— Located at NCC



NOTE:  
SC RELAY NORMALLY OPERATED. CONTACTS  
ARE SHOWN IN RELEASED POSITION.

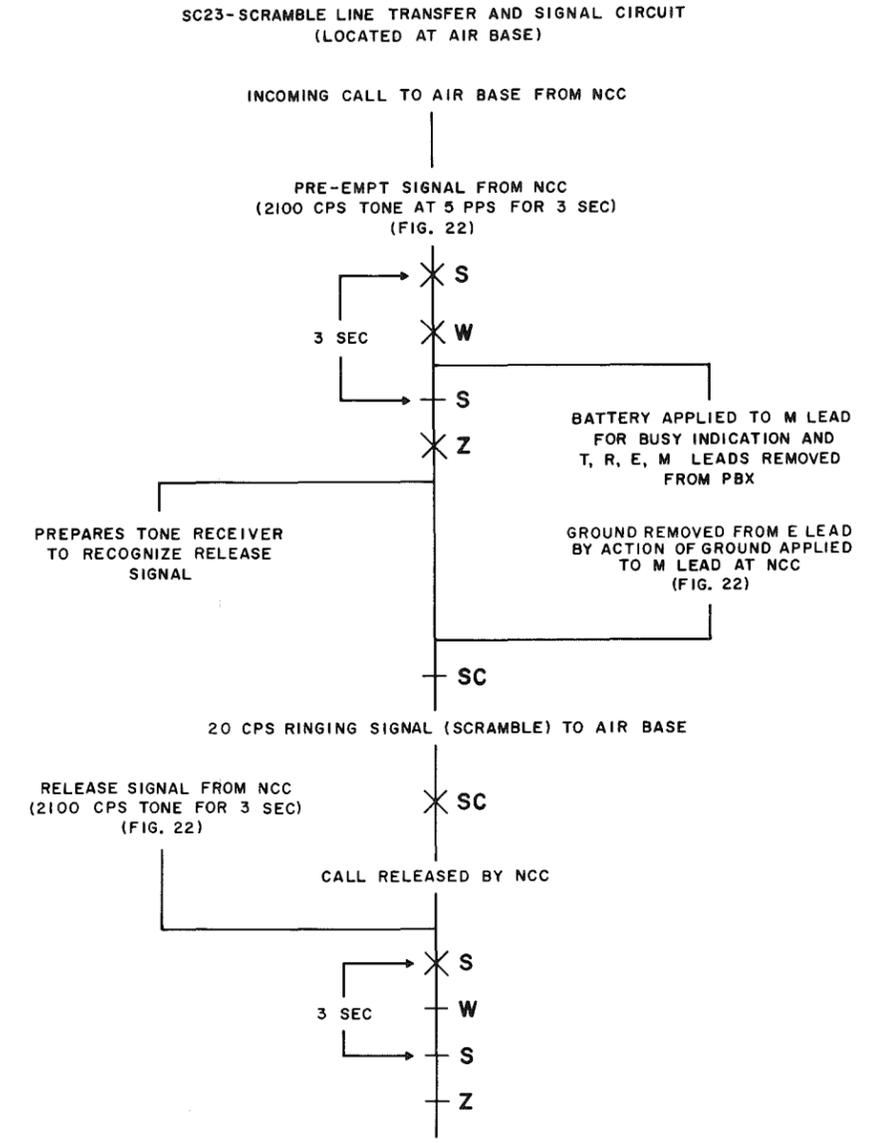
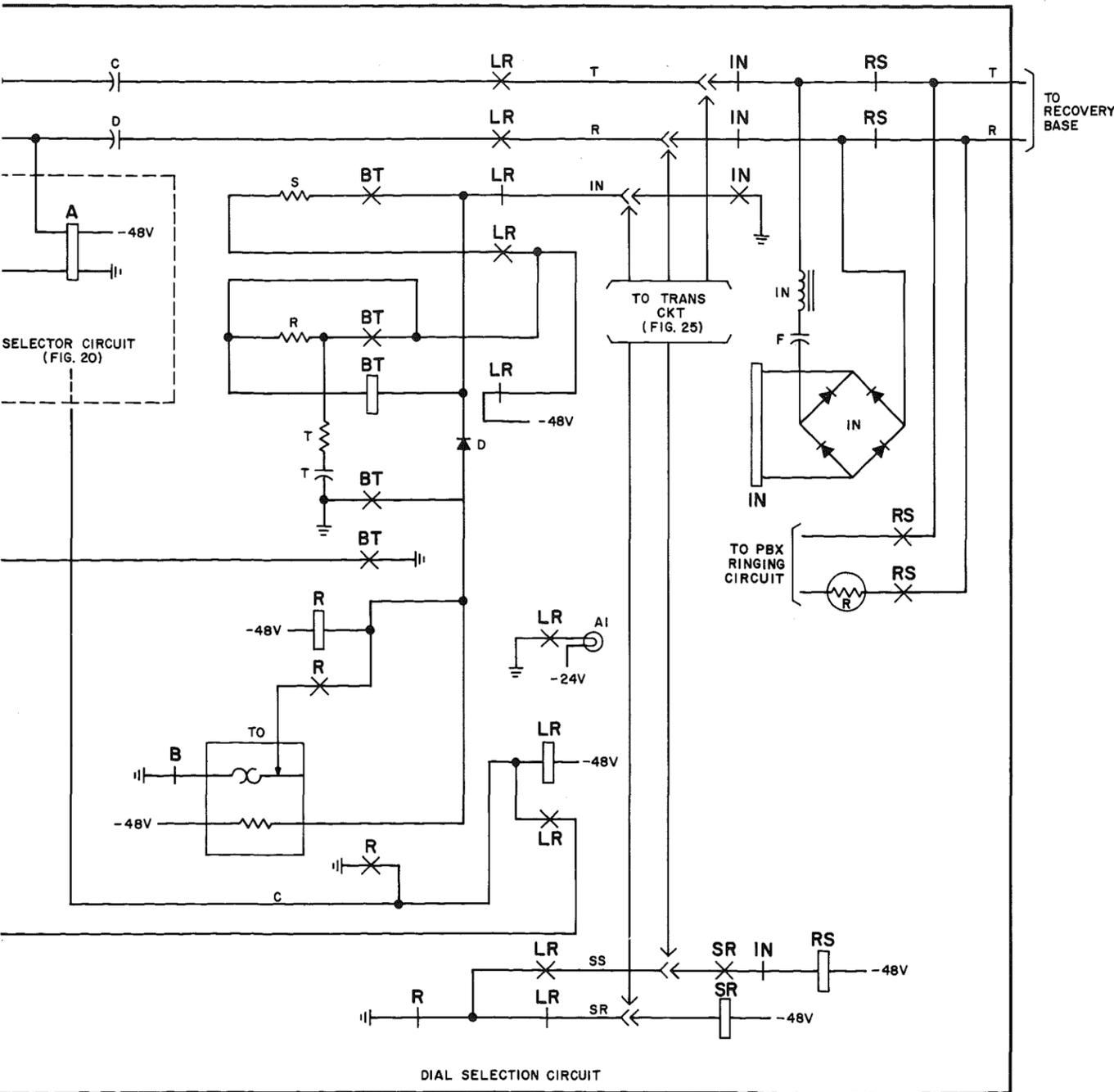
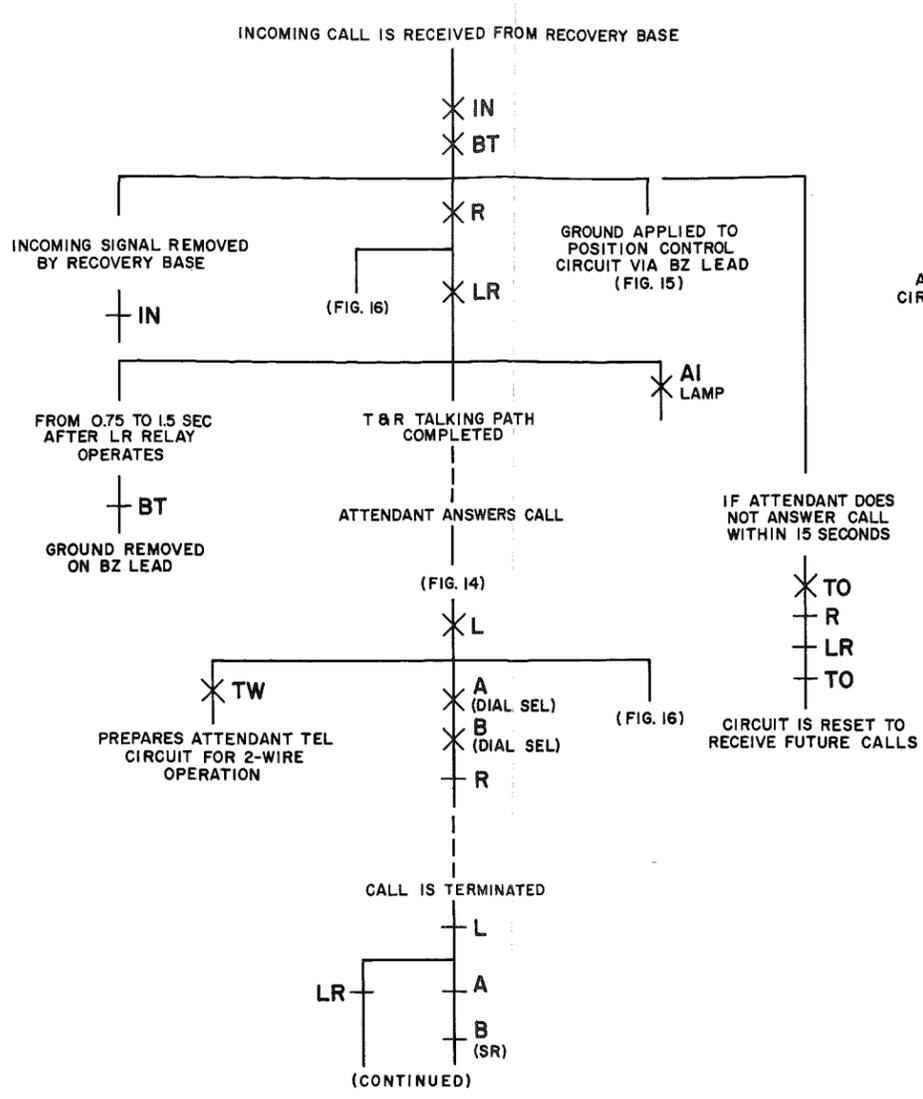


Fig. 23 — Scramble Line Transfer and Signal Circuit — Located at Air Base

DRAWINGS USED	
SD-1G173-01	LSC
SD-1G175-01	DSC
SD-1G181-01	PCC



SC24-2-WIRE CIRCUITS FOR CONNECTING TO RECOVERY LINE



SC24-2-WIRE CIRCUITS FOR CONNECTING TO RECOVERY LINE (CONT.)

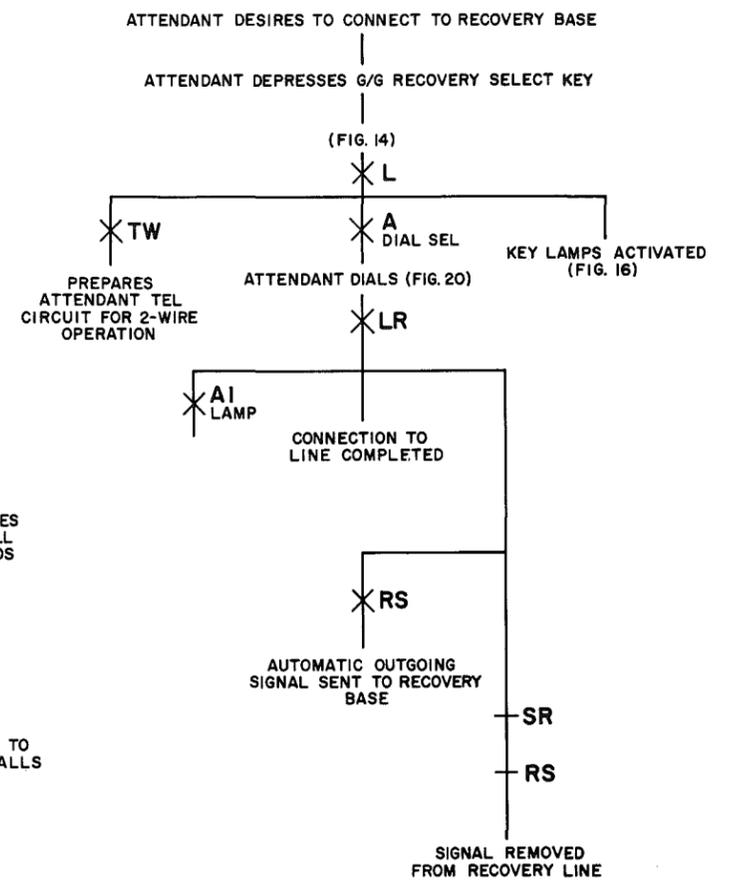


Fig. 24—Two-Wire Circuits for Connecting to Recovery Base



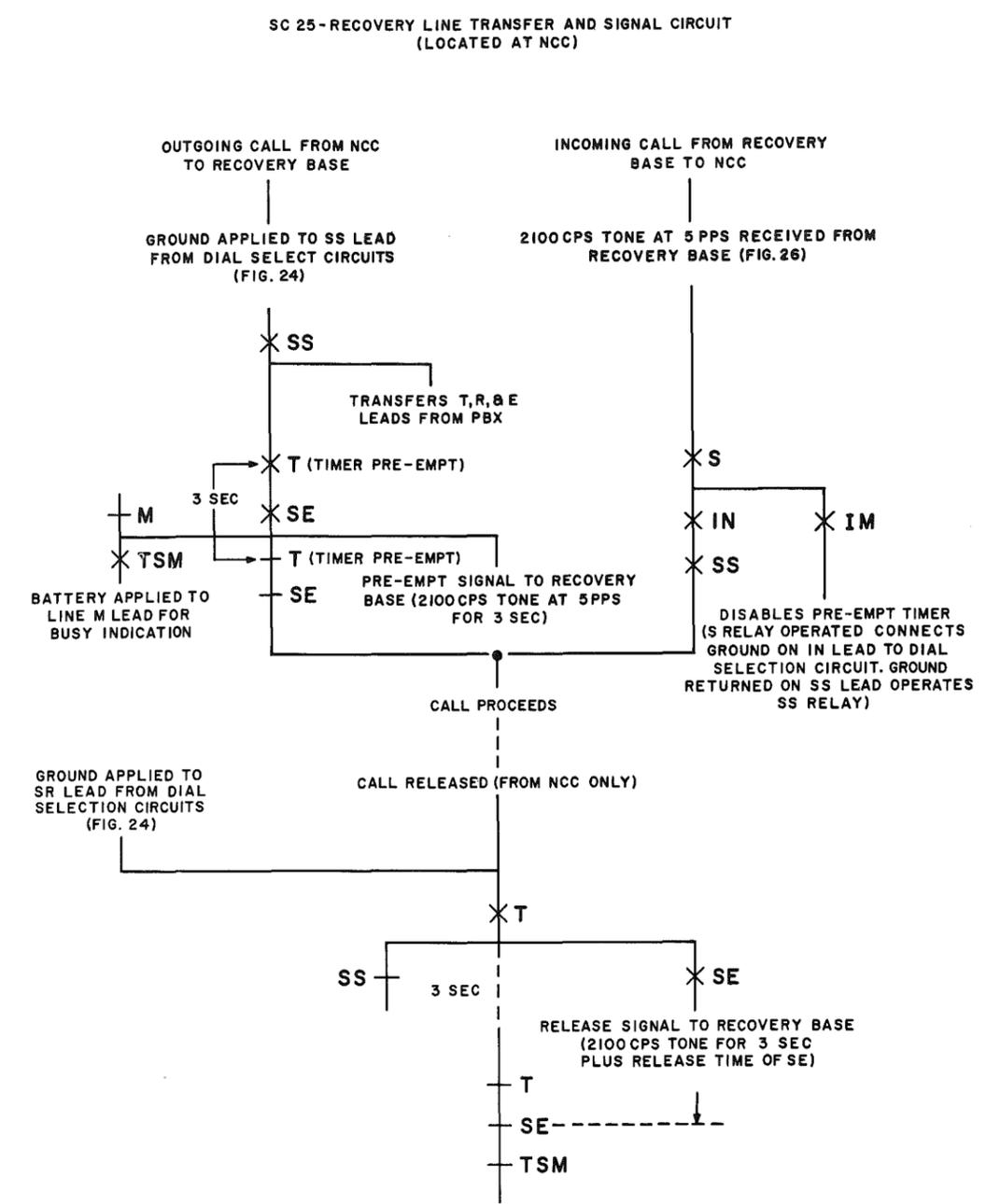
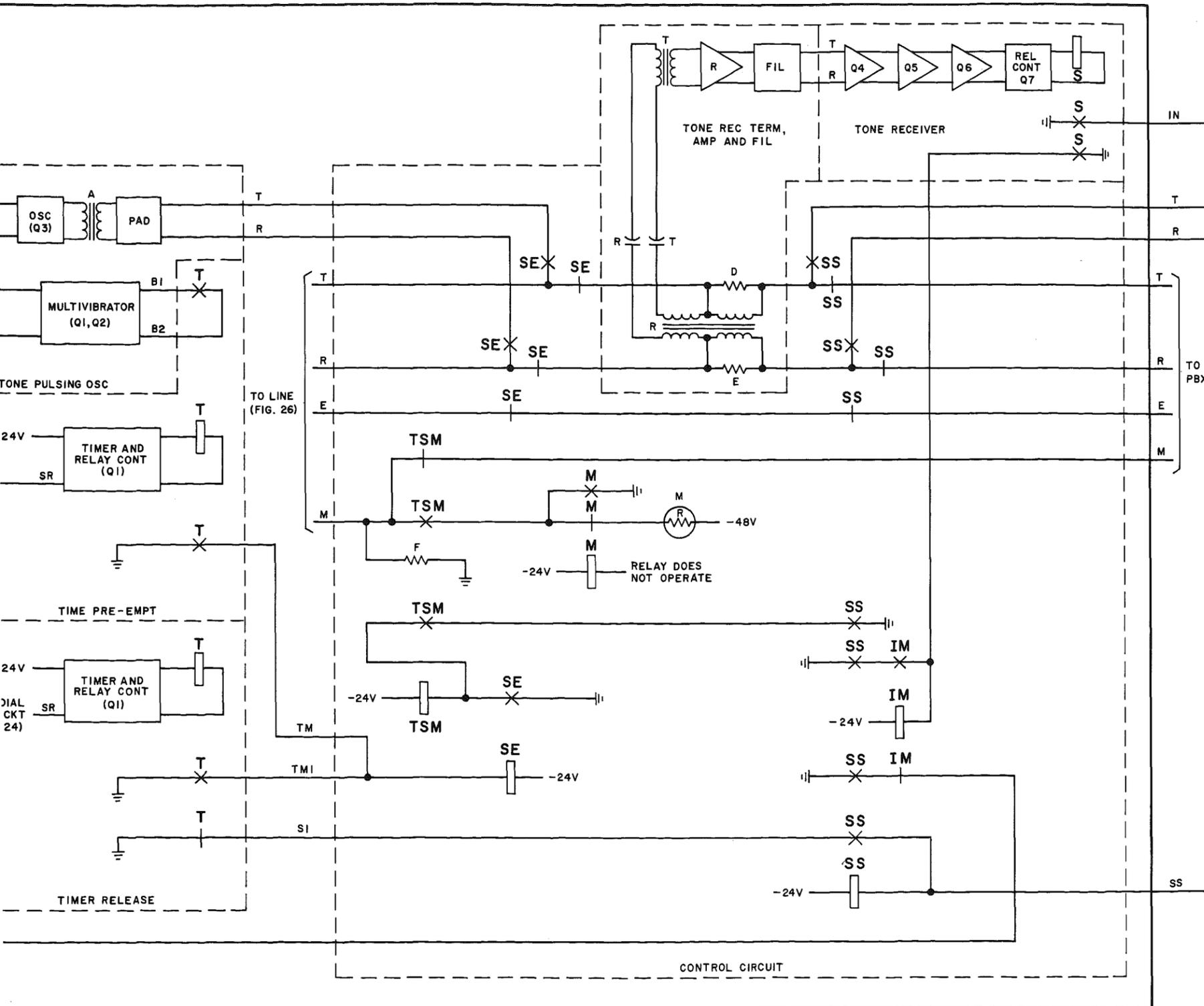
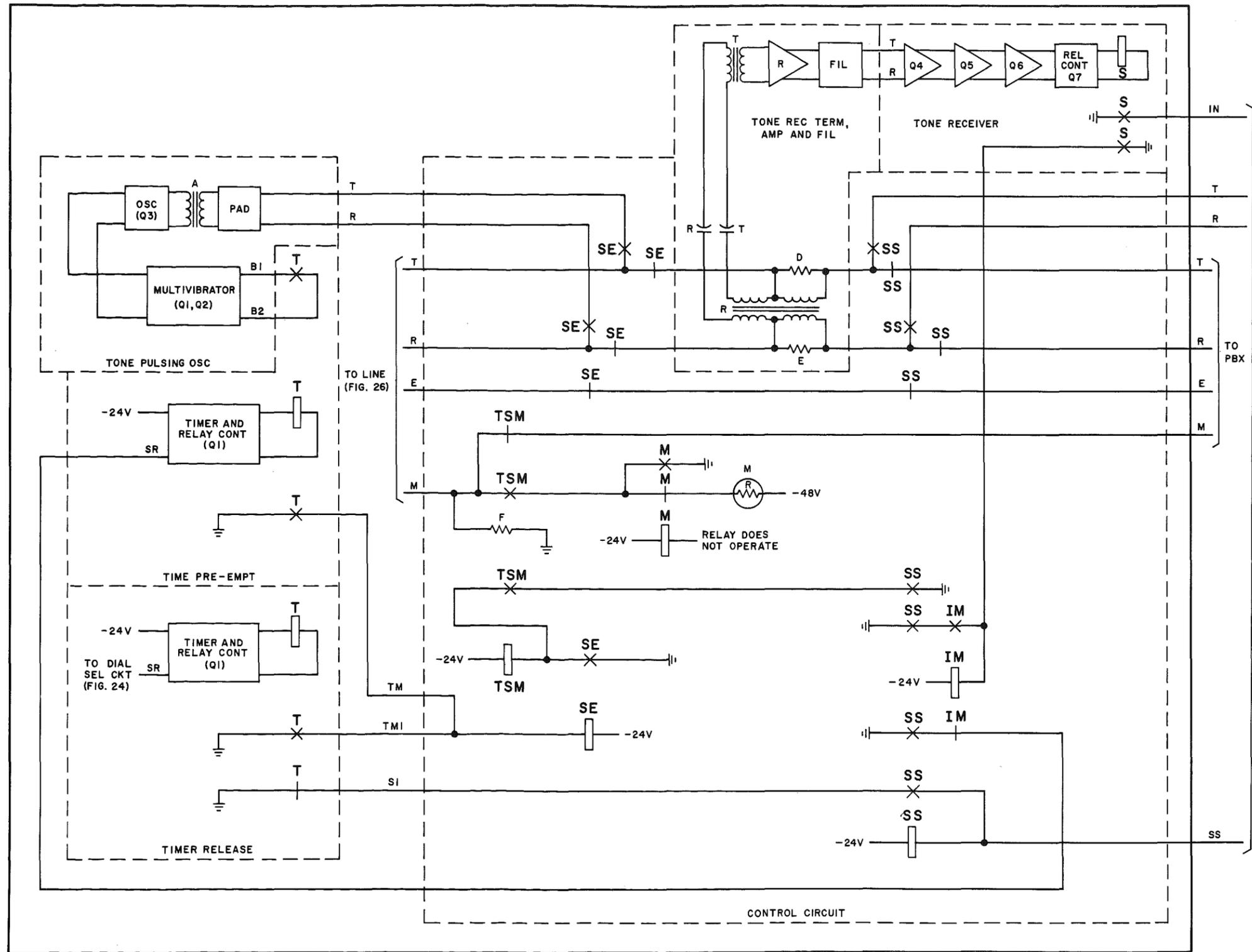


Fig. 25 — Recovery Line Transfer and Signal Circuit — Located at NCC



TO DIAL SEL CKT (FIG. 24)

BATTERY A  
LINE M L  
BUSY INC

GROUND AP  
SR LEAD F  
SELECTION  
(FIG.

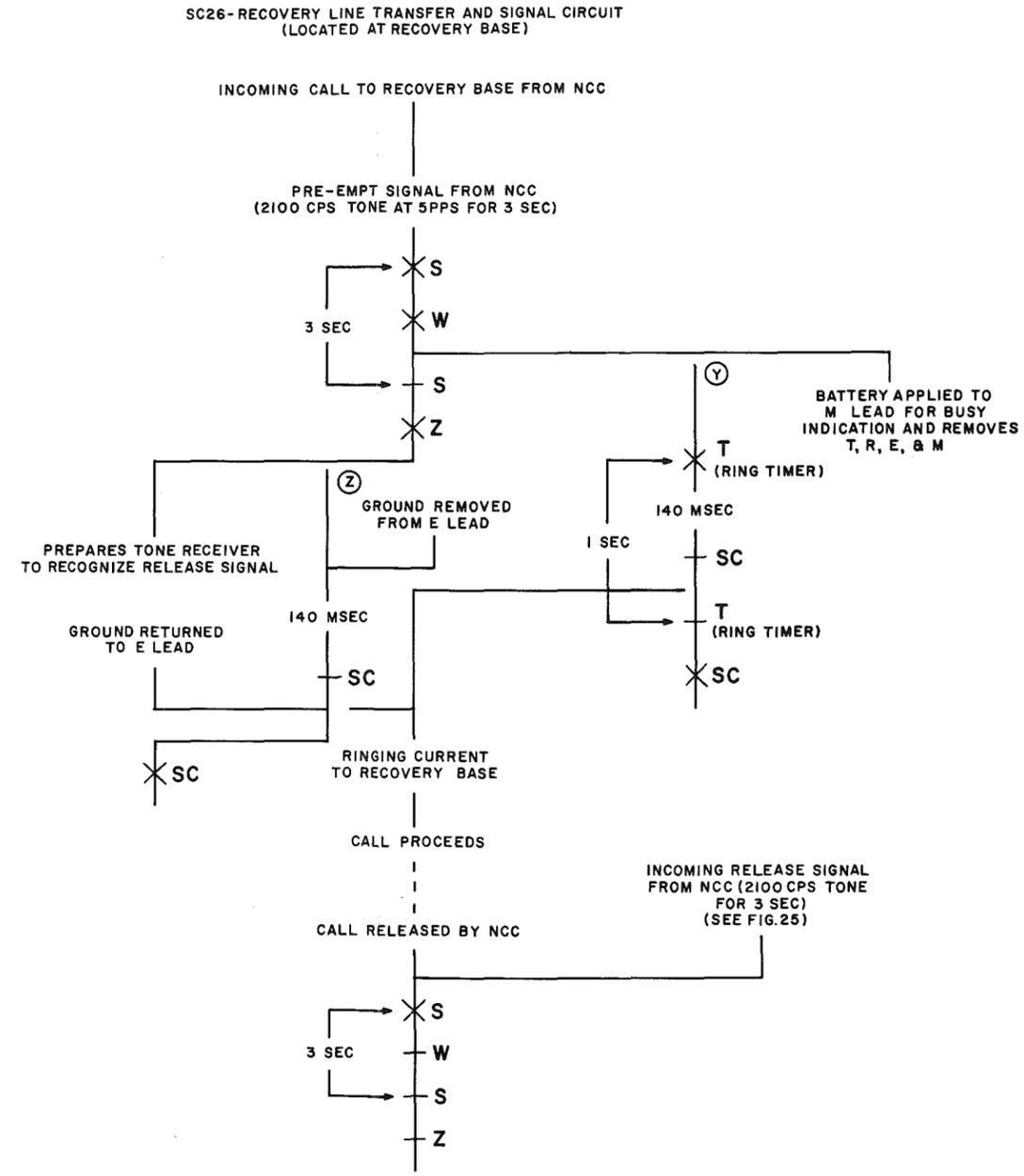
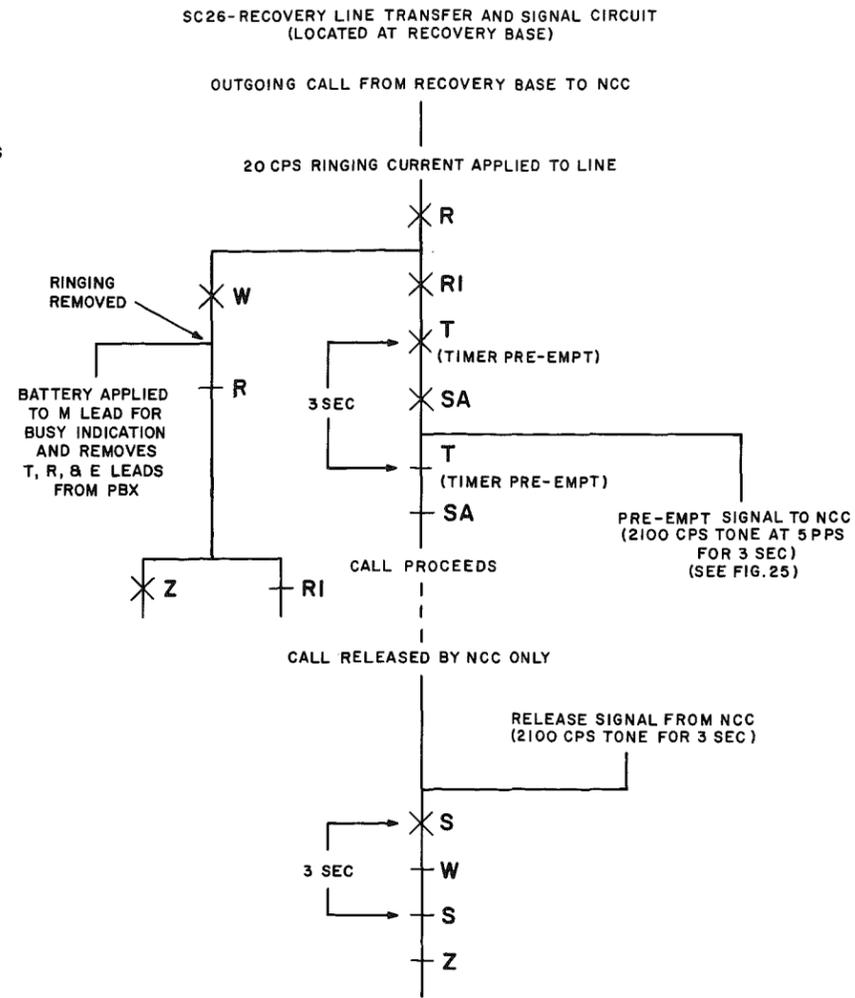
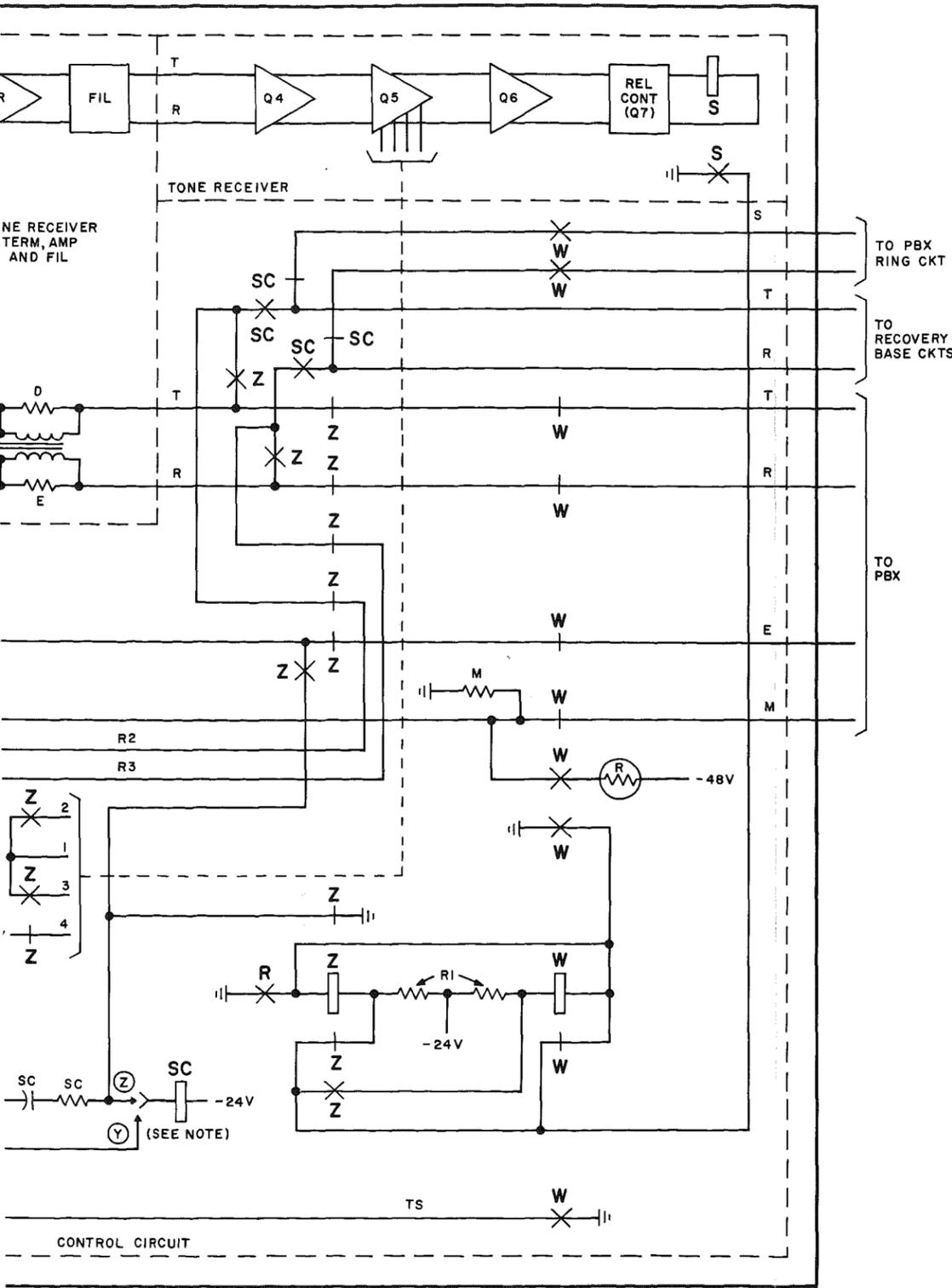
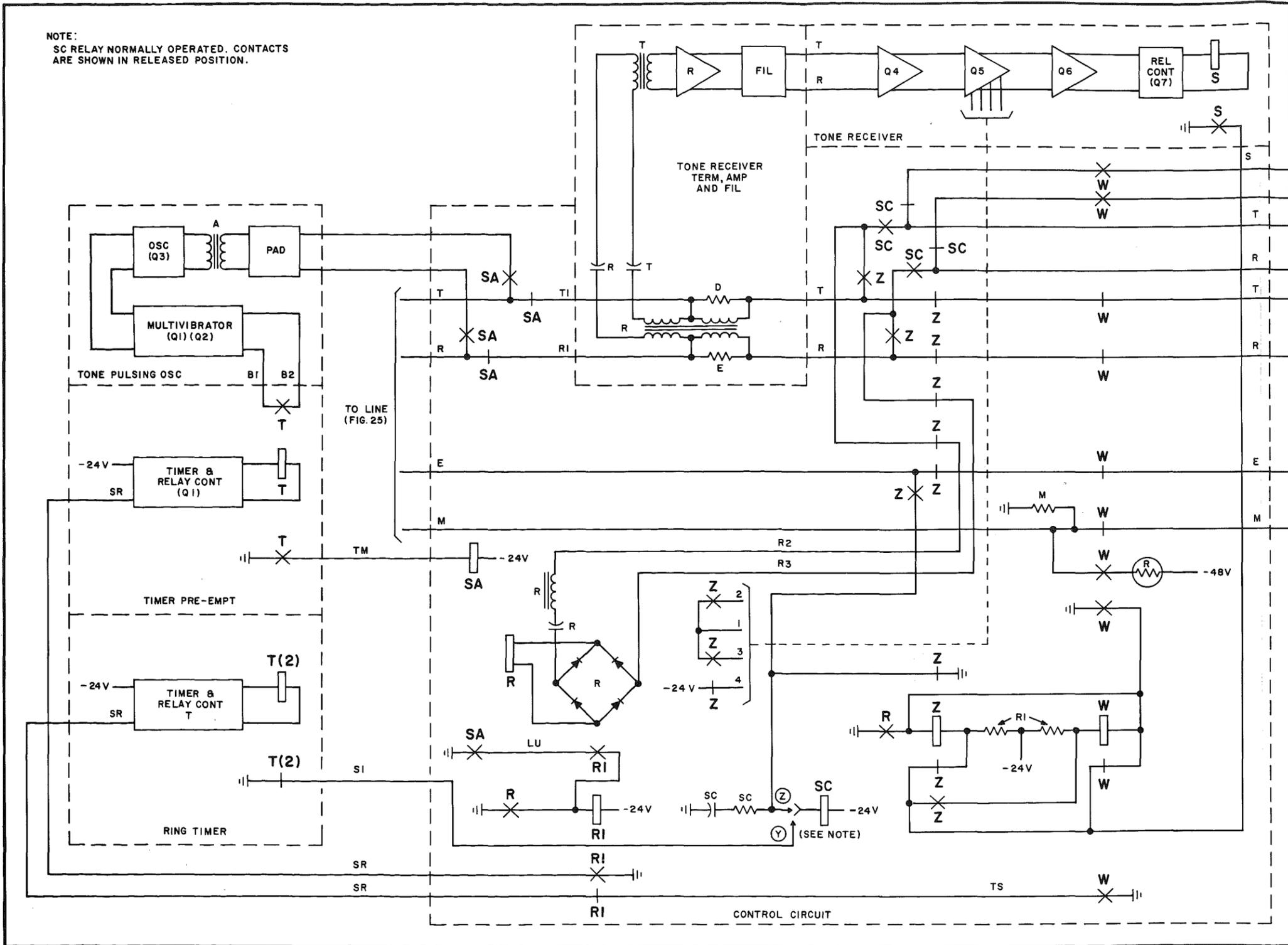


Fig. 26 — Recovery Line Transfer and Signal Circuit — Located at Recovery Base

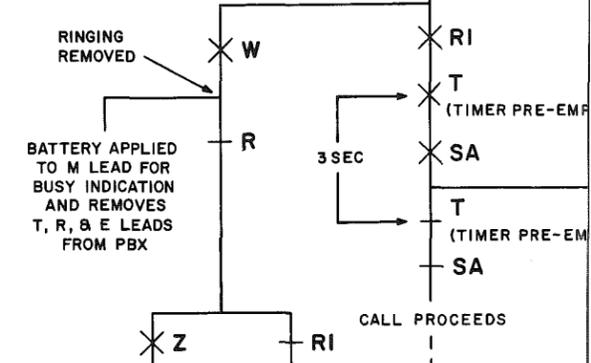
NOTE:  
SC RELAY NORMALLY OPERATED. CONTACTS  
ARE SHOWN IN RELEASED POSITION.



SC26-RECOVERY LINE TRANSFER AND SIGNAL  
(LOCATED AT RECOVERY BASE)

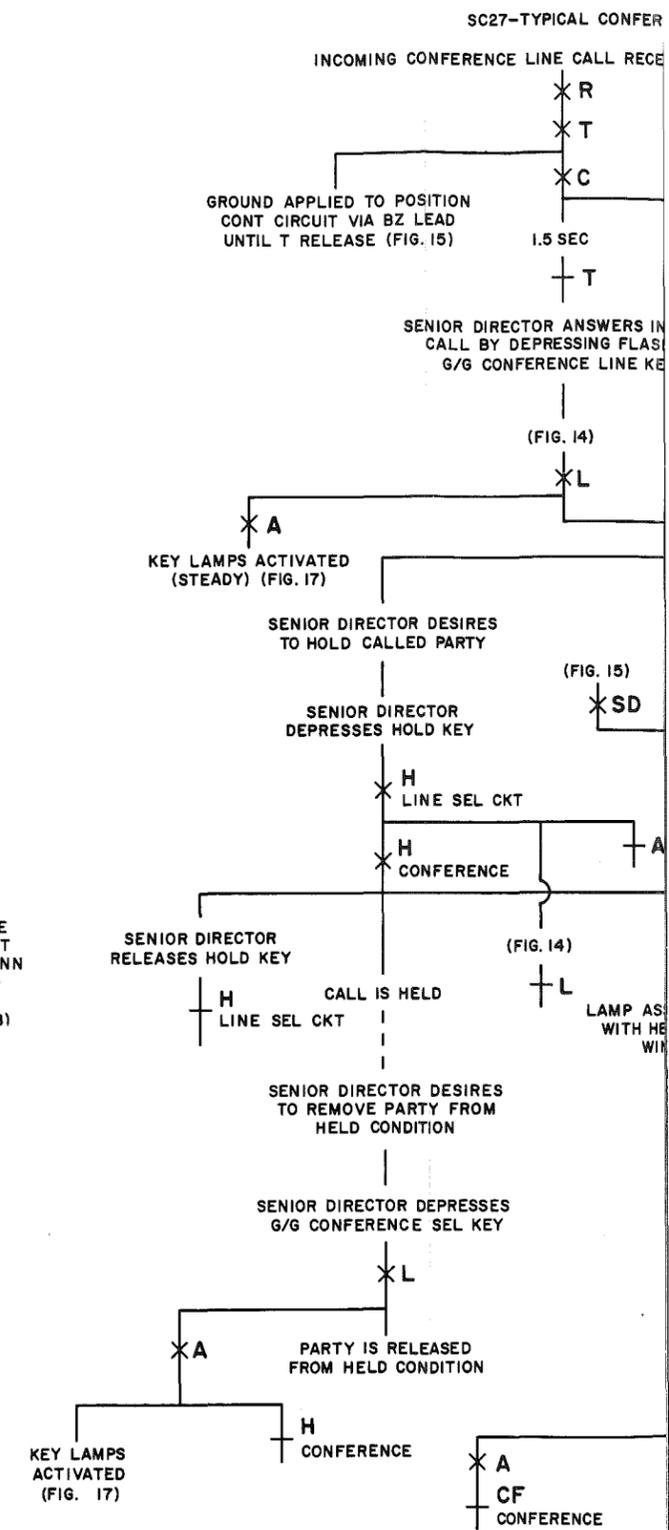
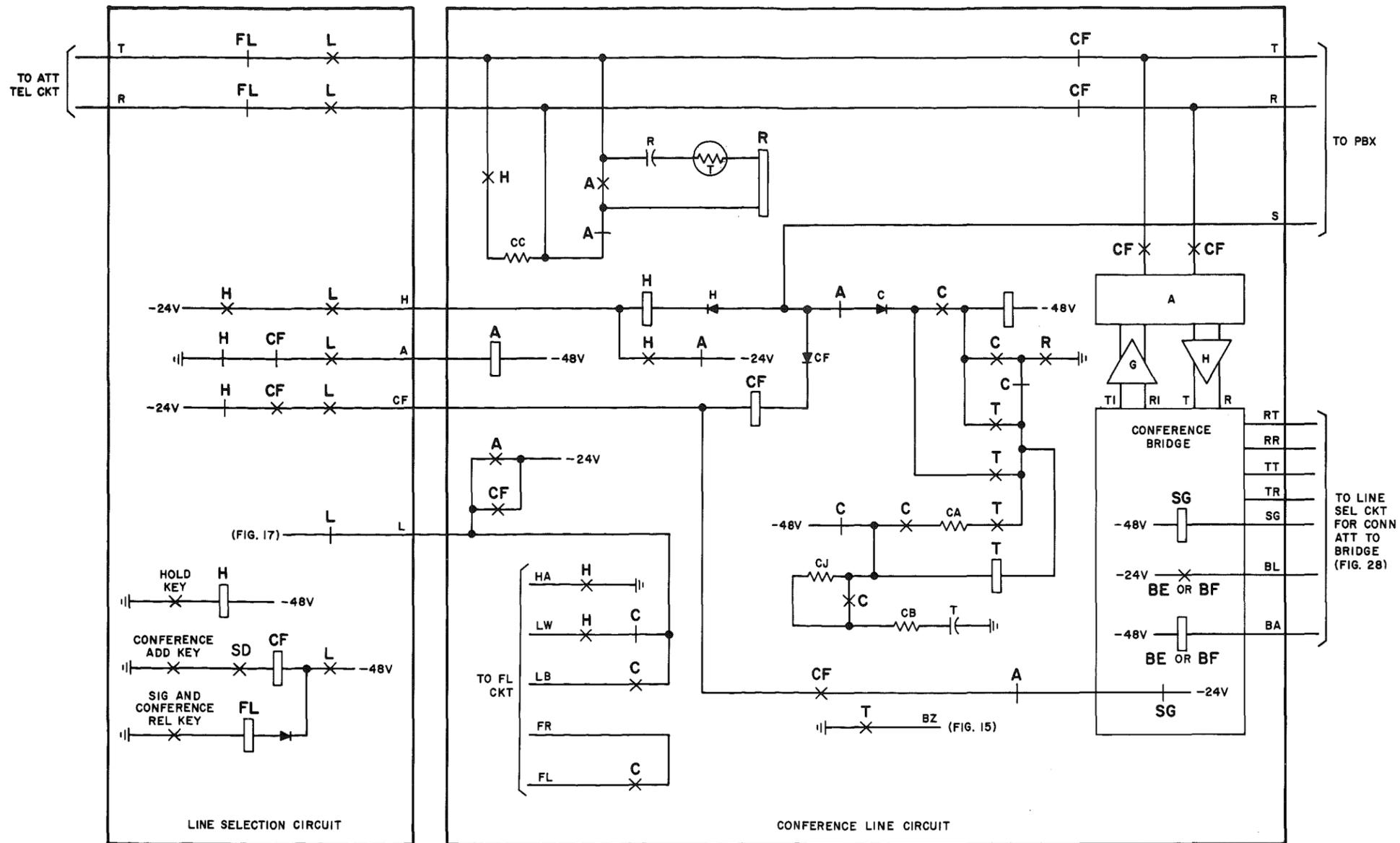
OUTGOING CALL FROM RECOVERY BASE TO

20 CPS RINGING CURRENT APPLIED TO



RELEASES  
(2100 C)





DRAWINGS USED
SD-1G173-01 LSC

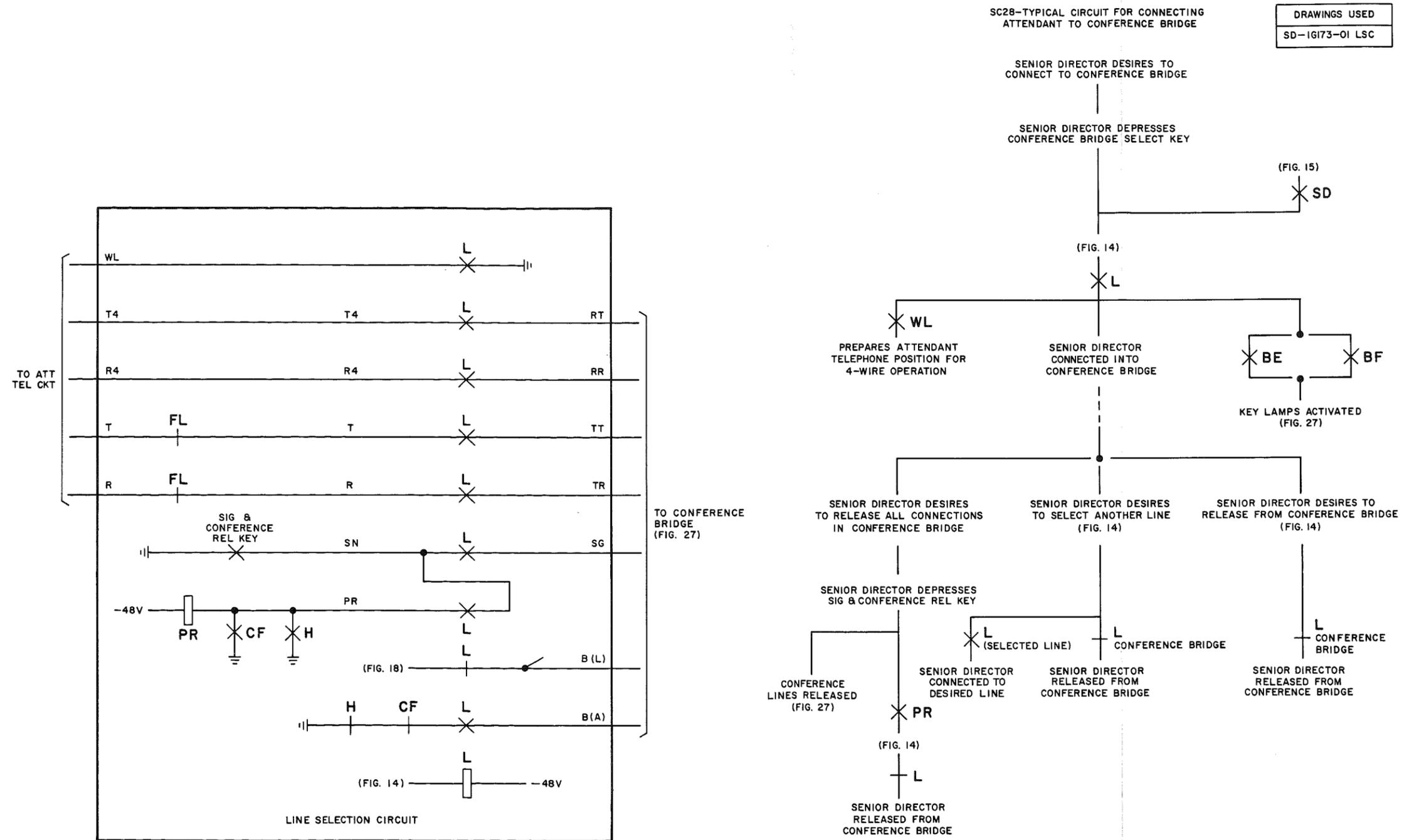


Fig. 28—Typical Circuit for Connecting Attendant to Conference Bridge

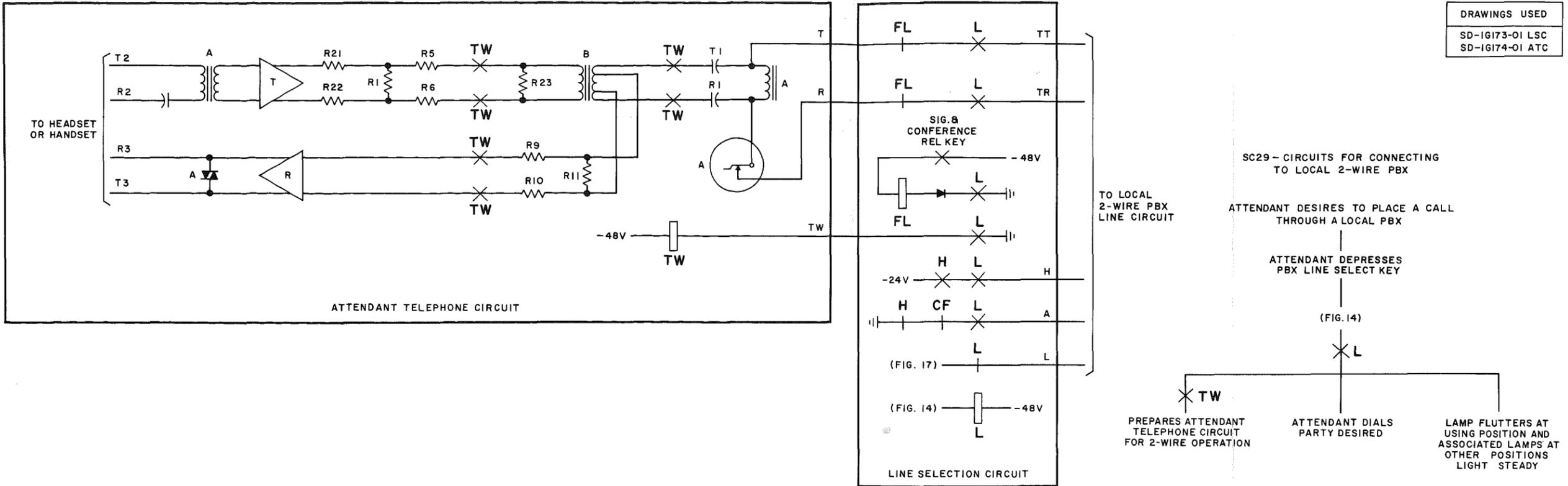


Fig. 29 — Circuits for Connecting to Local 2-Wire PBX

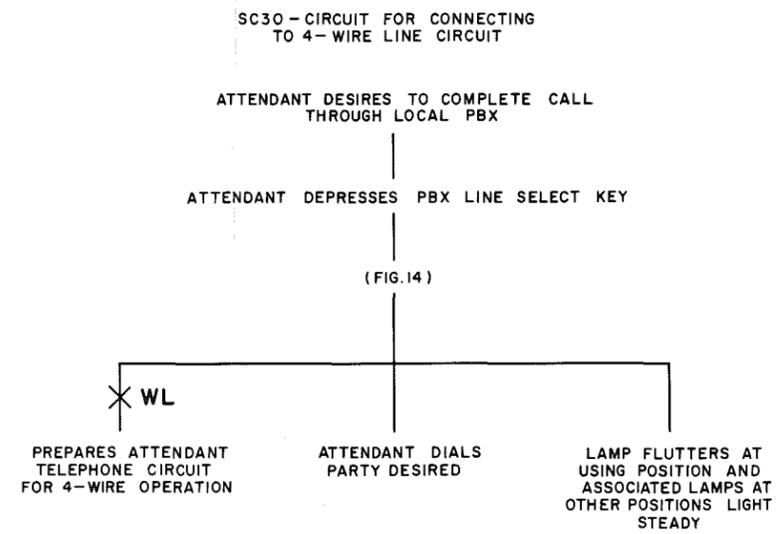
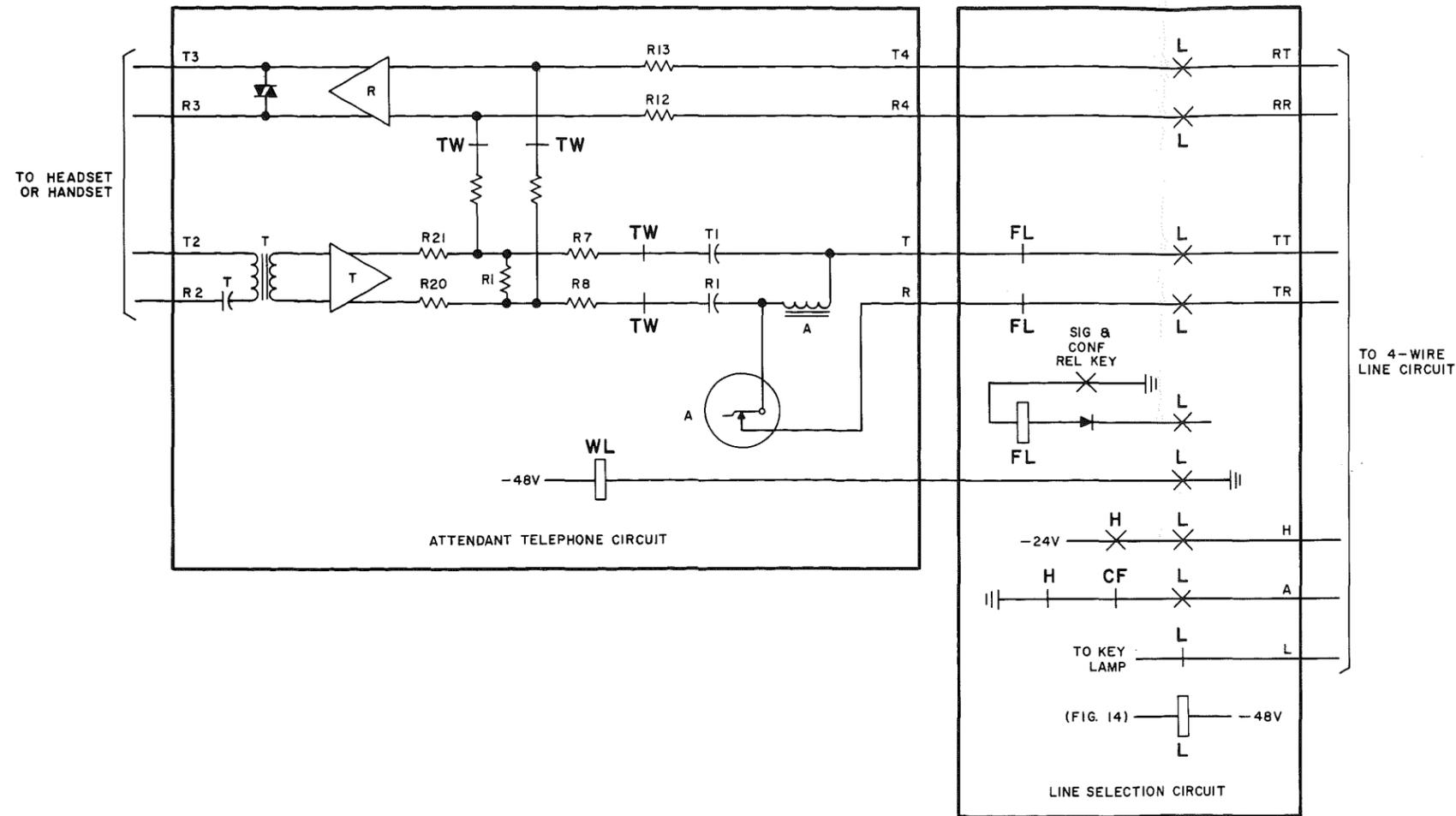


Fig. 30—Circuits for Connecting to 4-Wire Line Circuit