

CIRCUIT DESCRIPTION

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6

COMMON SYSTEMS  
12A ANNOUNCEMENT CIRCUIT

CHANGES

D. Description of Changes

D.01 For description of operation see Circuit  
Description, Issue 2.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-DAJ

WE DEPT 45820-SSA-WEA-MAF

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COMMON SYSTEMS  
 12A ANNOUNCEMENT CIRCUIT

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SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 To provide one to four different recorded announcements simultaneously or individually. Each announcement can feed up to 100 lines at the same time.

1.02 To provide butt-in service or coordinated cut through on all or any combination of announcements.

2. GENERAL DESCRIPTION OF OPERATION

CIRCUIT NORMAL

2.01 When the unit is not playing all relays are released, the solenoid is released, and the in-use lamp is not lit. The motor is running, the PWR lamp is lit, and the A1056 circuit pack is supplying 22 volts dc to the other circuit packs.

OPERATION WITH COORDINATED CUT-THROUGH OPTION

2.02 An announcement is requested with operation of the ST relay. When this occurs the PL relay operates the Solenoid (SOL) and the tape begins moving across the four channel tape head. All four announcements begin simultaneously and if all A1054 packs are provided four announcements will be amplified and available to the telephone

office. If all A1054 packs are not provided, the number of available announcements corresponds to the numbers that are provided. Up to 100 lines may be connected to any announcement.

2.03 At announcement start the E relay operates for around two seconds grounding four isolated CT leads that may be used for coordinated cut through. Contacts on the PL relay also provide four isolated contacts that are made all the time the machine is playing.

2.04 At announcement end the E relay again operates for around 2 seconds again grounding the CT leads. If a new announcement request has occurred, or if the old request is still present, the machine continues to play. However, if no request is present at announcement end the machine returns to circuit normal.

2.05 It is possible for one, all, or any combination of announcements to operate in the butt-in mode when the coordinated cut-through option is provided. However it is noted that a desirable effect occurs when this is done. When a butt-in announcement request occurs at circuit normal the message always starts at the beginning instead of wherever the last message left off as with normal butt-in service. If a message request occurs during the time the unit is playing normal butt-in service will be provided.

#### OPERATION WITH BUTT-IN OPTION

2.06 With coordinated cut-through operation one A1056 and one A1264 circuit pack is always required plus one A1054 circuit pack for each channel equipped. If only butt-in operation is required the A1264 circuit pack is deleted and wiring strap option Z is provided factory. This causes the PL relay to follow the ST relay, thus, the machine plays only when the office trunks are requesting messages. When the trunk releases the ST relay the SOL releases and the tape loop stops wherever it happens to be at that moment.

#### OPERATION WITH RECORD OPTION

2.07 Circuit Pack A1216 provides ac bias for recording and erase plus amplification for signal recording. When the record switch is depressed power is applied to A1216 and removed from the A1056 pack. With the erase switch depressed bias is applied to the erase head. The recording function is performed by depressing the record switch and speaking into an attendants head set while it is connected to the monitor jack.

#### OPERATION WITH PERMANENT SIGNAL OPTION

2.08 This option provides timing for permanent signal trunks.

#### OPERATION WITH OPTION ESS

2.09 This option provides four contacts to the ESS scanner when the announcement set is not in use.

#### MONITOR OPERATION

2.10 When the TST pushbutton is depressed the unit sees this as the same as an office trunk request. Earphone monitoring can be accomplished using the MON jacks and the CHAN SEL switch. Six-hundred ohms are inserted in the path of the jacks to simulate office impedances.

### SECTION II - DETAILED DESCRIPTION

#### 1. CIRCUIT NORMAL

1.01 When the unit is idle and no announcement has been requested all relays are released and the solenoid is not engaged. The motor runs continuously and the PWR lamp, which is across the secondary of transformer T1 is lit all the time. This lamp not only indicates ac power is being supplied to the unit and power is available at the secondary of T1 but it also serves as a source of illumination for the tape deck. Fuse F1 provides protection for the ac power line. Since motor M1 is a synchronous ac motor it requires a phase-splitting capacitor C1.

1.02 The secondary of T1 is run to circuit pack A1056. This circuit pack consists of a full-wave rectifier, a pi-filter network, an integrated circuit voltage regulator, and a power transistor output stage. The A1056 attempts to regulate the output voltage at 22 volts dc. This pack, which operates continuously, is the power supply for the other circuit packs in the unit.

1.03 The A1264 circuit pack is a combination detector and a master logic center for the machine. The integrated circuits on this pack function in the range of 5 volts dc which is obtained with a zener-resistor supply from the 22 volts. In circuit normal, outputs T0 and T1 are approximately 5 volts.

1.04 Although the A1054 amplifier packs have operating potential across them all the time, there is no output unless there is a signal at the input. No input signal is available except when the tape is moving across the tape head. During circuit normal the tape is not moving, therefore no output signal is present at the A1054 circuit packs.

2. ANNOUNCEMENT REQUEST WHEN CIRCUIT  
NORMAL WITH COORDINATED CUT THROUGH

2.01 An announcement request for any available machine channel is received from the announcement trunk as a contact closure from ground, through ST1 and ST2, to MST. This closure operates the ST relay. The uppermost contacts of the ST relay are across leads SA and SB. When ST operates T3 is held low (close to ground). This operation sets a flip-flop on the Al264 circuit pack and this, in turn, causes T1 on the Al264 to go low and remain low until the Al264 is reset at the end of the recorded messages. The PL relay operates when T1 of the Al264 goes low. Leads across contacts one to four of PL are brought out to a connector block for office use if this is desired. These isolated contacts, one for each announcement channel, are closed during machine play. Contact five of the PL relay is used to control the current to SOL. Power resistor R3 acts as a series dropping resistor and enables the use of a standard 24-volt solenoid with 48-volt office battery. The in-use lamp which is wired in parallel with the SOL lights whenever a message is playing. The SOL activates a mechanical arrangement which causes the pressure roller to press the tape to the capstan which, in turn, causes the tape loop to move across the tape head at 1-7/8 inches per second. When the loop is in motion all of the announcements are available at their respective Al054 packs output.

2.02 The OPT- detector feeds the Al264 when the reflective strip on the recording M001A appears at the OPT- detector. If the Al264 pack detects the presence of this signal for at least 30 milliseconds terminal TO of the pack goes low (toward ground) for approximately 2 seconds and then returns to a high logic level (toward plus 5 volts dc). This action operates the E relay for 2 seconds. Make-contacts 1 to 4 of the E relay connect associated CT leads to ground. Four of these CT leads are available to the connecting trunk for proper use of the coordinated cut through feature.

2.03 At message end the OPT- detector signal occurs once again. Detection (after 30 milliseconds of valid signal) initiates the sequence of events described in 2.02 again. If the connecting trunk is no longer requesting any message the PL relay is released by the Al264 pack. If the office is continuing to request the message the PL relay will remain operated and only one cycle of the E relay occurs as the recorded tone passes over the tape head.

3. ANNOUNCEMENT REQUEST WHEN CIRCUIT  
PLAYING WITH COORDINATED CUT THROUGH

3.01 If the office requests a message during the time the same or another message is already playing the circuit performs as described in 2.03 under the situation when the office request has not been released and the tone is present.

4. BUTT-IN OPERATION WITH A MACHINE EQUIPPED FOR COORDINATED CUT THROUGH

4.01 Butt-in operation on any combination of channels can easily be obtained on a machine equipped with the coordinated cut-through feature. If the butt-in channel requests an announcement when the unit is playing normal butt-in operation will occur. However, if the butt-in request occurs during circuit normal the message will begin at message start and the tape loop will return to message end when the butt-in request is no longer present. So even though the trunk is wired for butt-in service a desirable form of simulated coordinated cut through exists. There will never be a wait period with this form of butt-in service either.

5. OPERATION WITH MACHINE EQUIPPED FOR  
BUTT-IN ONLY

5.01 The Al264 is not supplied and wiring option Z is provided when the unit is ordered with butt-in only service.

5.02 The ST relay is operated as with coordinated cut through when an office request is received for an announcement. At this time the SOL is operated by the PL relay which follows the operation of the ST relay. When the announcement request is released all relays and the solenoid return to normal. The E relay is not used with butt-in service.

5.03 All of the other operations are the same as described in the coordinated cut-through descriptions.

6. PERMANENT SIGNAL OPERATION

6.01 The ED-94937-40 G11 provides the necessary timing for permanent signal. When a ground potential is placed on pin 6 of this circuit board relay PS makes for approximately 9.5 seconds which provides a ground to the LIM lead back to the permanent signal trunk.

7. ESS OPERATION

7.01 The circuit performs in a normal manner except four contacts are provided to the ESS scanner when the unit is not in use.

8. MONITORING THE SYSTEM

8.01 Depressing the TST pushbutton appears the same to the unit as an announcement trunk request.

8.02 A headset jack set is provided for monitoring any channel during machine play. This jack is labeled MON and can be connected to the output of any A1054 pack through a pair of 300-ohm resistors R1 and R2 by using the Channel Select (CHAN SEL) rotary switch.

9. PRERECORDED TAPE

9.01 Any combination of messages may be ordered from the factory. These are supplied on prerecorded tape loops made in a sound studio with controlled acoustics.

9.02 A drawing is also available from WE which describes the procedure for making and recording tape loops from standard one-quarter inch magnetic tape. This is to allow local production and recording if this is desirable.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 AC Volts: From 95 Volts to 125 Volts  
RMS  
DC Volts: From -44 Volts to -52 Volts

2. FUNCTIONAL DESIGNATIONS

2.01 Relays

<u>Designation</u>	<u>Meaning</u>
ST	Start System
E	Beginning/End of Message
PL	Play

2.02 Solenoid

<u>Designation</u>	<u>Meaning</u>
SOL	Solenoid

2.03 Switches

<u>Designation</u>	<u>Meaning</u>
CHAN SEL	Channel Select
TST	Test
PLAY	Play
REC	Record
ERASE	Erase
TONE	Tone

2.04 Jacks

<u>Designation</u>	<u>Meaning</u>
MON	Monitor

3. FUNCTIONS

3.01 To provide 1 to 4 simultaneous recorded announcements, each announcement being capable of operating over 100 station sets simultaneously.

3.02 To provide various timing and logic functions needed to operate with an announcement trunk requesting either coordinated cut-through or butt-in service.

4. CONNECTING CIRCUIT

4.01 When this circuit is listed on a key-sheet the following connecting circuits should be specified:

- (a) Originated Register Circuit - SD-26385-01.
- (b) Voice Alarm and Control Circuit - SD-26390-01.
- (c) Intercept Trunk Circuit - SD-26403-01.
- (d) Outgoing Intercept Trunk Circuit - SD-26404-01.

5. MANUFACTURING TESTING REQUIREMENTS

5.01 This circuit shall be capable of performing all the functions listed in this Circuit Description.

6. ALARM INFORMATION

6.01 A voice alarm circuit may be used to monitor any one of the available announcements.

7. TAKING EQUIPMENT OUT OF SERVICE

7.01 No special sequence of operations is required to remove this unit from service.

SECTION IV - REASONS FOR REISSUE

B. Changes in Apparatus

B.01 Added

LIM/SL Relay, AK44, Option Y  
CAL, ED-94937-40 G11 CPNT, Option Y  
CR4, Diode, 446A, Option Y  
Circuit Pack, A1216, App Fig. 9  
Erase Head PC-B4EQ8 (Nortronics), App Fig. 9  
Lamp Record 387 (Dialco), App Fig. 9  
Switch ZKNM 022000-0124 Central Lab, App Fig. 9

Added (Cont)

Opt- Detector TIL 139 Texas Instruments  
 Resistor KS-19152 L1 510 SL, Option R  
 Capacitor KS-16390 L8 40 UF, Option R  
 Connector, 139-78 (Nortronics), App  
 Fig. 8  
 Connector, 139-79 (Nortronics), App  
 Fig. 8  
 Connector, 139-80 (Nortronics), App  
 Fig. 8  
 Connector, 139-81 (Nortronics), App  
 Fig. 8

B.02 Removed

Replaced By

Switch KS-13633 L104, Option J	Standard Grigsby 46372-4MLR-3, Option H
Switch P8121 (C and K) Option J	Central Lab 022000-0124, Option H
Al055 Circuit Pack	Al264 Circuit Pack
Relay AK2, Option Q	Relay AG32, Option R
Head PB4Q4K (Nortronics)	Head BQQ4K (Nortronics)

D. Description of Changes

D.01 This circuit description covers SD  
 Issues 4A and 5D.

D.02 The following changes have been made  
 to provide the record feature:

- (a) Circuit pack Al216 is added.
- (b) The PC-B4EQ8 is added.
- (c) Lamp 387 is added.
- (d) Switch ZKNM is added.

D.03 The following changes have been made  
 to provide the permanent signal feature.

- (a) The CA1, ED-94937-40 G11 CPNT is added.
- (b) Relay LIM/SL is added.
- (c) Diode CR4 is added.

D.04 The following changes have been made  
 to provide the ESS feature.

- (a) Relay LIM/SL

D.05 Change title from:

CROSSBAR SYSTEMS  
 NO. 3  
 ANNOUNCEMENT CIRCUIT

to read as follows:

COMMON SYSTEMS  
 12A ANNOUNCEMENT CIRCUIT

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-DAJ

WE DEPT 45820-SSA-WEA-KAP

