

CIRCUIT DESCRIPTION  
SWITCHING SYSTEMS DEVELOPMENT DEPARTMENT

CD-66506-01  
Issue 5-D  
Appendix 7-D  
Dwg. Issue 13-D

PBX SYSTEMS  
NO. 755A  
TONE, RINGING, ALARM AND  
COMMON TIMING CIRCUIT

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 In Fig. 1 connecting information (for leads M, AR, N, 2RS) previously read. "To link and link allotter circuits".
- D.2 In Fig. 1 V. T. information previously read, "Y" or "M" AR313A or 313C V. T. in 143B V. T. socket".
- D.3 In Fig. 1 "F" option was added.
- D.4 Reference to "H", "G" and "F" options was added to Circuit Note 108.

D.5 Circuit Note 110 was added.

D.6 In Fig. 2 connecting information (for leads BT, BTS, DT and DTS) previously read, "To link and link allotter circuits".

D.7 H, G and F were added to Options Used Table.

4. CONNECTING CIRCUITS

4.9 Recorded Telephone Dictation Trunk SD-65728-01.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 2313-JRA-RLL-TO

CIRCUIT DESCRIPTION  
SWITCHING SYSTEMS DEVELOPMENT DEPARTMENT

CD-66506-01  
Issue 5-D  
Appendix 6-D  
Dwg. Issue 12-D

P.B.X. SYSTEMS  
NO. 755A  
TONE, RINGING, ALARM AND  
COMMON TIMING CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded	Superseded By
584DE Sub. Set	531A3 Sub. Set
"K" option	"J" option

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Options "K" and "J" are added to the options used table and circuit note 108.

D.2 Note 105 is rated "Mfr. Disc." and the "a" wiring designation is removed.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3310-MKS-RLI-JI

TO BE USED AS AN ORIGINAL  
BY THE HAWTHORNE PRINT SHOP

PBX SYSTEMS  
NO. 755A

--- TONE, RINGING, ALARM AND  
COMMON TIMING CIRCUIT

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER  
THAN THOSE APPLYING TO ADDED OR RE-  
MOVED APPARATUS

C.1 Test Notes #4 on page 1 and #2 on  
page 2 formerly read "Insulate 3T  
of the (Z), (Z1), (Z2) or (Z3) relay  
which is in parallel with the relay  
under test. Insulate 3B of the (Z) re-  
lay when the (W) or (W1) relay is under  
test.

C.2 Insulate 3T (LK) and 3T (Z3) was  
added to the "block or insulate"  
column for the (W3) relay "S" or "T"  
options on page 2.

C.3 Reference to test note 2 at (W3)  
relay, option "T" was removed and  
added for (W), (W1) and (W2) relays,  
option "U".

All other headings, No change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330-WB-FJS-WK

CIRCUIT DESCRIPTION  
SYSTEMS DEVELOPMENT DEPARTMENT

CD-66506-01  
Issue 5-D  
Appendix 4-D  
Dwg. Issue 10-D

P.B.X. SYSTEMS  
NO. 755A  
TONE, RINGING ALARM AND  
COMMON TIMING CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded                      Superseded by  
KS-7673 Resis-              KS-13491 - List 2  
tance (AR)                      Resistance (AR)

D.2 Circuit Note 108 and the  
table of "Option Used" are  
revised to cover the addition of  
option M.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 The KS-13491 - List 2 Resistance  
is shown as option M in Fig. 1.

All other headings, No change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330-WB-WLF

P.B.X. SYSTEMS  
NO. 755A  
TONE, RINGING, ALARM AND  
COMMON TUNING CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded

Superseded By

(W )  
(W1) "V" Option U377 Relay  
(W2)  
(W3) "T" Option U374 Relay  
(CO) "P" Option U83 Relay  
(T1) "R" Option U347 Relay

(W )  
(W1) "U" Option U1242 Relay  
(W2)  
(W3) "S" Option U1241 Relay  
(CO) "N" Option U113 Relay  
(T1) "Q" Option U1237 Relay

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER  
THAN THOSE APPLYING TO ADDED OR RE-  
MOVED APPARATUS

C.1 The adjustment for

		Soak	Opr.	Hold	Rel.	
(D)(A) relay Y75 was	Test	69	34.5	2.9	1.2	
	Readj.	69	32.5	2.7	1.4	
(W )	Test		24.5			(For Relay
(W1) relay U377	Readj.		23			(Wdg. Alone)
(W2)						
(W3) relay U374	Test		28			(For Relay
	Readj.		20.5			(Wdg. Alone)
(T1) relay U347	Test		6.7			
	Readj.		6.3			
(CO) relay U83	Test		5.6			
	Readj.		5.3			

C.2 Test Note 3 added page 2

D.2 Circuit Note 109 added.

D. DESCRIPTION OF CIRCUIT CHANGES

D.3 Options used table is added.

D.1 The "V", "U", "T", "R", "S", "Q", "P",  
and "N" options have been added  
to circuit note 108 and to the relays  
listed in Par. B.

All other headings, No change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3350-HCM:FS

P.B.X. SYSTEMS  
NO. 755A  
TONE, RINGING, ALARM AND  
COMMON TIMING CIRCUIT

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS  
OTHER THAN THOSE APPLYING TO  
ADDED OR REMOVED APPARATUS

C.1 The release adjustment for  
relay (A) was, readj. 1.3  
(D) 1.3

C.2 Added test note "Adjacent relays  
shall not be energized. See B.S.P." All other headings, No change.

C.3 Added insulate inf. for re-  
lays (A) on olt req. tables.

C.4 Remove blocking inf. "(B)NO)"  
for relay (A)

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330 HBN-WLF

CIRCUIT DESCRIPTION  
SYSTEMS DEVELOPMENT DEPARTMENT  
PRINTED IN U.S.A.

CD-66506-01  
Issue 5-D  
Appendix 1-D  
(1 Page) Page 1

P.B.X. SYSTEMS  
NO. 755A  
TONE, RINGING, ALARM AND  
COMMON TIMING CIRCUITS

CHANGES

B. CHANGES IN APPARATUS

Superseded

Superseded by

U6012 Relay (BY) Z Option

UA15 Relay (BY) W Option

D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 In Fig. 4 Connecting information was added for the 2 way ringdown tie trunks.
- D.2 The information in connection with X and Y wiring, Y apparatus and the 313A & 313C vacuum tubes now shown in the table Fig. 108 which was added was formerly covered in notes 108 and 109.

All other headings, No change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330

WHB)  
WLF)MT

P.B.X. SYSTEMS  
NO. 755A  
TONE, RINGING, ALARM AND  
COMMON TIMING CIRCUITS

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 In Fig. 1 connecting information and the + and G leads were added for the 2 way ringdown tie trunks.
- D.2 In Figs. 2 and 5 connecting information was added for the 2 way ringdown tie trunk.

All other headings under "Changes", no change.

1. PURPOSE OF CIRCUIT

- 1.1 This circuit provides dial tone, busy tone, audible ringing tone, interrupted ringing current, a timing and flashing circuit for the visual signals of the trunks, ringdown tie trunks and lines and audible and visual alarm signals for the 755A P.B.X.

2. WORKING LIMITS

- 2.1 Maximum conductor loop resistance of ringing leads to central office - 500 ohms.
- 2.2 Maximum conductor resistance for the (BY) relay - 100 ohms.
- 2.3 Min. Ring. Voltage of Ring. supply at central office - 97 V.
- 2.4 Min. Ring. Voltage of Ring. machine at P.B.X. - 75 V.

3. FUNCTIONS

- 3.01 To provide dial tone.
- 3.02 To provide line busy tone.
- 3.03 To provide trunk busy tone.

- 3.04 To provide all links busy tone.
- 3.05 To provide audible ringing tone.
- 3.06 To interrupt continuous ringing current from the central office or from the ringing machine for operating individual trunk ringers or ringers common to a group of trunks and tie trunks, and a station line.
- 3.07 To furnish interrupter ringing with silent period battery to the link and link allotter circuits.
- 3.08 To give an audible and visual alarm when a fuse operates.
- 3.09 To extend the alarm to the central office when required.
- 3.10 To provide means for cutting off the audible alarm signal manually.
- 3.11 To provide means for flashing the trunk lamps during the ringing and silent interval of the central office machine ringing or the 2 way ringdown tie trunk lamps during the ringing or between rings on these tie trunks and to extinguish them when the call is abandoned.
- 3.12 To provide means for flashing station line lamps in incoming calls.

#### 4. CONNECTING CIRCUITS

- 4.1 755A P.B.X. Line, Line Switch and Call Allotter Circuit.
- 4.2 755A P.B.X. Trunk Circuit.
- 4.3 755A P.B.X. 2 Way Ringdown Tie Trunk Circuits.
- 4.4 755A P.B.X. Power Charge and Discharge Circuit.
- 4.5 Extension Alarm Circuit at Central Office.
- 4.6 Central Office Ringing Leads Circuit to P.B.X.'s.
- 4.7 755A P.B.X. Link and Link Allotter Circuit.
- 4.8 P.B.X. Power Ringing Circuit.

#### DESCRIPTION OF OPERATION

#### 5. RINGING CURRENT FOR THE LINKS - FIG. 1

When ground is connected to the "RS" lead from the link and link allotter circuit, the (R) relay will operate which connects ringing current and ground to the "M" and "N" leads from the link and link allotter circuit for signaling

a called subscriber and audible ringing tone to the "AR" lead to provide an audible ringing signal to the calling subscriber. The (A) relay also operates from ground on the "RS" lead which in turn operated the (B) relay. The (B) relay operated the (D) relay which releases the (A) and which in turn releases the (B) and (D) relays. With the (D) relay released, the (A) relay again operates, starting the second cycle of operations and releasings of the (A), (B) and (D) relays. These relays are slow acting, for the purpose of providing a time period in conjunction with the (W) and (Z) relays that will simulate machine ringing intervals for operating the subscribers ringers. When the (B) relay operates on the first cycle, the (W) relay operates and when the (B) relay releases, the (Z) relay operates. The (Z) relay operated, releases the (R) relay which connects silent period tripping battery to the station line through the link and link allotter circuit. When the (B) relay again operates on the second cycle, the (W) relay will release, which will operate the (W1) relay. When the (B) relay releases, the (Z) relay will release and the (Z1) relay will operate. When the (B) relay again operates on the third cycle, the (W) relay operates and when the (B) relay releases, the (Z) relay will operate. When the (B) relay operates on the fourth cycle, the (W) relay releases, releasing the (W1) relay. When the (B) relay releases, the (Z) and (Z1) relays release, which operates the (R) relay. The (R) relay operated again connects ringing current and audible ringing tone to the station lines through the link and link allotter circuit. In this manner, ringing current and silent period battery are connected to the line intermittently, approximately one second ringing and three second silent. When ground is removed from the "RS" lead, all operated relays release restoring the circuit to normal. The (AR) vacuum tube is used to provide the audible ringing tone.

6. PROVIDING MEANS FOR KEEPING THE LAMPS OF THE TRUNKS FLASHING DURING THE RINGING OR SILENT PERIOD OF CENTRAL OFFICE RINGING OR THE LAMPS OF THE 2 WAY RINGDOWN TIE TRUNKS FLASHING DURING THE RINGING OR BETWEEN RINGS ON THESE TIE TRUNKS

When ground is connected to the "ST" lead from the trunk circuit or tie trunk circuit, the (A), (B), (D), (W), (Z), (W1), (Z1) and (R) relays operate as described in paragraph 5. At the same time ground is connected to the "ST" lead, ground will also be connected on the "R" and "R1" leads. Ground on the "R1" lead performs no function until after the (Z1) relay operates. Ground on the "R" lead causes the operation of the (LK) relay, which is under control of the ringing relay in the trunk or tie trunk and which only operates during the ringing period of the applied central office ringing current or during the ringing on the tie trunks. The (LK) relay closes ringing current to the "M" lead from the trunk or tie trunk which

operates the individual trunk ringer and the common ringer in Fig. 5 or the common buzzer in Fig. 5 and also connects the "R1" lead to the "LK" lead for holding a relay in the trunk circuit or tie trunk circuit operated. This relay in the trunk circuit or tie trunk circuit closes the trunk or tie trunk lamps to the "TL" lead and by the operation and releasing of the (B) relay will cause the trunk or tie trunk lamp to flash. (Battery is connected to the "LB" lead in the trunk or tie trunk.) If the (LK) relay releases while the (Z1) relay is operated, ground on the "R1" lead will operate the (W2) relay. When the (Z1) relay releases, the (Z2) relay operates and when the (Z1) relay reoperates, the (W2) relay will release which will operate the (W3) relay. When the (Z1) relay again releases the (Z3) relay will operate and the (W3) relay will release. The operation of the (Z3) relay and the releasing of the (W3) relay, removes ground from the "LK" lead which will release the relay in the trunk or tie trunk which closes the lamp through for flashing. In case ringing current is reapplied to the trunk or tie trunk before the (Z3) relay operates, the (LK) relay will operate, releasing the operated (W2), (Z2) or (W3) relays. When ringing on the trunk or tie trunk ceases, the cycle of operation of these relays will continue until the (Z3) relay operates and (W3) relay releases, removing the ground on the "LK" lead.

7. PROVIDING MEANS FOR FLASHING STATION LINE LAMPS AND OPERATING THE COMMON TRUNK, TIE TRUNK AND STATION RINGER OR BUZZER FIG. 4 OR 5 ON AN INCOMING CALL TO A STATION

As described in Par. 5 for supplying ringing current to the links, the (B) and (R) relays operate and release intermittently. The operation of the (B) relay closes and removes battery from the "LL" lead to the line, line switch and call allotter circuit which with the operation of a relay in the line circuit causes the station line lamp to flash. The operation of the (R) relay closes and removes ringing current from the "M" lead to the line, line switch and call allotter circuit, which with the operation of the relay in the line circuit referred to above will connect this ringing current to the CB1, CB2 or CB3 lead, Fig. 4, or 5 which will operate the common ringer or buzzer.

8. TONE CIRCUIT - FIGURE 2

8.1 Dial Tone

When ground is connected to the "DTS" lead from the link and link allotter circuit, the (T) relay will operate and release on its "P" winding in a self-interrupter circuit; the "S" winding of the (T) relay will then have a tone induced in it which will be transmitted to the link and

link allotter circuit through the (A) and (B) condensers and the (B) repeating coil over the "DT" lead.

### 8.2 Called Line Busy

On a call to a busy line, a ground is connected to the "BTS" lead from the link and link allotter circuit which will operate the (T1) relay. The operation of the (T1) relay causes the (A), (B) and (D) relays to function as described in paragraph 5, connects ground to the "P" windings of the (T) relay to again cause the relay to self-interrupt and partially closes the "BT" lead from the link and link allotter circuit to the tone supply. When the (B) relay operates, tone will be connected to the "BT" lead for supplying a busy indication to the calling subscriber. Tone is interrupted, approximately 60 I.P.M. by the (B) relay.

### 8.3 Trunks, Tie Trunks and All Links Busy

When a station selects a busy trunk or tie trunk or tries to make a local call while all the links are busy, ground will be connected to the "TS" lead from the trunk, tie trunk or link and link allotter circuit. This operates the (BY) relay which operates the (T1) relay, removes the shunt from the 23 ohm winding of the (A) repeating coil and closes the 3 and 4 winding of the (A) repeating coil and the (D) condenser circuit. When the (T1) relay operates the circuit functions as described in paragraph 8.1 except that the interrupted busy tone will be transmitted over the "BT" lead to the line switch and call allotter circuit and then to the calling station.

## 9. ALARM CIRCUIT - FIGURE 3

When a fuse operates battery will be connected to the (F) relay through the (FA) fuse operating the (F) relay. The operation of the (F) relay lights the (F) lamp to give a visual alarm, operates the ringers in the (A) subscriber set to give an audible alarm, connects leads "WCT" and "WCR" together in order to give an alarm in the central office and connects ground to the "CT" lead in order to increase the battery charging rate. The (A) key is provided in order that the bells in the (A) subscriber set may be silenced. The operation of the (A) key operates the (CO) relay which looks under control of the (F) relay and disconnects ringing current from the subscriber set. The alarm lamp will remain lighted and the alarm leads to the central office will remain closed until the operator's fuse is removed. If the (FA) fuse also operates, no alarm is given.