

P.B.X. SYSTEMS
NO. 606B, 701A, OR 711A
MISCELLANEOUS ALARM CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

B.1	Superseded	Superseded By
	R710 Relay	R746 Relay
	R183 Relay	R1207 Relay

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 The use of relays R710 and R183 is rated Mfr. Disc. to show realistic ratings for obsolescent apparatus.

D.2 The rating is changed from "A&M ONLY; AT&TCo. PROV. FOR NO. 606B P.B.X." to "A&M ONLY" to agree with the rating of the 606B P.B.X.

D.3 Relays R710, R746, R183 and R1207 are added to note 107.

D.4 The ratings for Figs. 13, 14, 15, 16 and 18 formerly read: "AT&TCo. PROV."

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3440-MMS-EWO-PO

CIRCUIT DESCRIPTION
SYSTEMS DEVELOPMENT DEPARTMENT

CD-66137-01
Issue 4-D
Appendix 2-D
DWG. Iss. 12-D

PBX SYSTEMS
NO. 606.B, 701.A OR 711.A
MISCELLANEOUS ALARM CIRCUIT

CHANGES

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

C.1 The adjustment for

		<u>Soak</u>	<u>Opr.</u>	<u>Hold</u>	<u>Rel</u>
(S) relay Y50 was	Test	31.5	18.5	2.3	1
	Readj.	31.5	17.5	2.1	1.4

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330-LVB-FJS

CIRCUIT DESCRIPTION
SYSTEMS DEVELOPMENT DEPARTMENT

CD-66137-01
Issue 4-D
Appendix 1-D
Dwg. Iss. 11-D

PBX SYSTEMS
NO. 606B, 701A OR 711A
MISCELLANEOUS ALARM CIRCUIT

CHANGES

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

C.1 The release adjustment for relay
(S) was, readj. 1.1.

C.2 Added test note "Adjacent relays
shall not be energized. See
B.S.P." on page 3.

All other headings, No change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330-ACLH-WLF

P-194-3

FBX SYSTEM
NO. 606-B, 701-A, OR 711-A
MISCELLANEOUS ALARM CIRCUIT

CHANGES

A. CHANGED AND ADDED FUNCTIONS

- A.1 Added provision for giving an alarm when ringing machine transfer occurs in the power ringing circuit.
- A.2 Added provision for a (SW-BD) lamp on the miscellaneous relay rack.
- A.3 Added provision for connection to a 110-A power plant.
- A.4 Added means for giving an alarm when fuses connected to the 6 volt battery supply operate.
- A.5 Added means for giving an alarm in case of trouble in the 6 volt power circuit.
- A.6 Added means for giving an alarm when fuses connected to the 105V ± and machine ringing bus bars operate.
- A.7 Added provision for an alarm in case the pickup lead becomes grounded.

B. CHANGES IN APPARATUS

Added

- Figs. 2 & 3 - (PKU) 2Y Lamps
- Figs. 6, 7 & 8 - One 100C Res. per Figure
- Fig. 11 - (RT) R99 relay
- Fig. 12 - (PK) R642 relay
- Fig. 13 - (LV) R875 relay
(D) 82B resistance
(LV) 2Y lamp
- Fig. 14 - (6V) B272 relay
(6V PWR) 2Y lamp
- Fig. 15 - (CR) J20 relay
(CR) 2Y lamp
(CR) 100A resistance
- Fig. 16 - (MR) J20 relay
- Fig. 18 - (S) Y50 relay
- Fig. 16 - (MR) 100A resistance
- Fig. 18 - (MR) 2Y lamp
- Fig. 17 - (SWBD) 2Y lamp

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

C.1 Test operate for the (SA) E621 relay was formerly .014 amp.

D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 ABSF, ABS, F, and DF leads are added to provide for connections to a 110A power plant.
- D.2 The CB or AHM lead to the voltage regulation circuit was formerly designated AHM. Provision is also shown for connecting this lead to a power discharge or generator and C.E.M.F. cell control circuit.
- D.3 Figure 11 is added, with connecting leads in Figure 1 to provide an alarm in case of ringing machine transfer.
- D.4 Figure 12 is added to provide an alarm in case the pickup lead becomes grounded.
- D.5 Figure 17 is added, with its connecting lead in Fig. 1 to provide for a switchboard fuse alarm at the miscellaneous relay rack.
- D.6 Figures 13 and 14 are added to provide alarms for the 6 volt power supply.
- D.7 Figures 15 and 16, and 18 are added to provide alarms for the operation of ringing fuses.
- D.8 The Records table of note 107 is enlarged to include information for Issue 10-D.
- D.9 Notes 109, 110, 111, and 112 are added.
- D.10 Fusing information for Figures 13, 14, 15 and 18 is added to Note 101. Fusing for "F" battery in Fig. 10 is removed since "F" battery is no longer used.
- D.11 Information for the 606-B PBX is added to Note 102.
- D.12 The optional designation (CBKR) is added for the (AHM) key and lamps.
- D.13 "N" wiring is added, and the "u" option is shown to permit the omission of the (AM) relay and associated key and lamps, when a continuous charge power plant is used.
- D.14 The designation (ABS) is added for the (BB) lead to the power charge and discharge circuit.
- D.15 An 82A resistance has been added in Figs. 6, 7 and 8 to prevent battery from being connected to the alarm bar w/

All other headings under "Changes", No change.

1. PURPOSE OF CIRCUIT

- 1.1 The purpose of this circuit is to provide visual and audible alarm signals at the PBX and also at the central office when required to indicate the presence of certain trouble conditions in the PBX.

2. WORKING LIMITS

- 2.1 None.

3. FUNCTIONS

- 3.01 To give an alarm signal when any of the station lines become permanently short-circuited or grounded on the ring side or when the receiver is left off the switchhook.
- 3.02 To give an alarm signal when any switch fails to restore to normal when its release magnet is energized.
- 3.03 To provide for a release magnet peg count.
- 3.04 To give an alarm signal when any of the fuses in the PBX blow.
- 3.05 To give an alarm signal when a line finder fails to find the calling line.
- 3.06 To give an alarm signal when a line finder start wire becomes grounded or the chain circuit becomes grounded or short-circuited.
- 3.07 To give an alarm signal when trouble occurs in the power circuit or voltage regulation circuit.
- 3.08 To give an alarm in case the pickup lead becomes grounded.
- 3.09 To give an alarm when ringing machine transfer occurs.
- 3.10 To extend any of the above alarms to central office.

4. CONNECTING CIRCUITS

- 4.1 This circuit will function with any of the 606-B, 701-A or 711-A PBX circuits indicated on the circuit.
- 4.2 PBX alarm circuit at central office.

DESCRIPTION OF OPERATION

5. COMMON EQUIPMENT (FIGURE 1) - SUPERVISORY AND PILOT LAMPS (FIGURES 2 AND 3)

The supervisory lamps shown in Fig. 2 are mounted in the manual switchboard section and are designated so that the attendant can plainly see the nature of the trouble when any of these lamps light. In addition there are common pilot lamps (Fig. 3) in multiple with the supervisory lamps which are furnished as required and which may be mounted in the switch room or in any other convenient place to show the nature of the trouble.

Besides the lamp signals there is an auxiliary audible signal (A-2) Fig. 1, mounted in the switchboard, which gives an indication whenever any of the lamps are lighted. This audible signal is controlled by three keys (PS-AL) (C-AL) and (AHM) or (CBKR), Fig. 1, so that it may be entirely cut off or so that it will operate when either the (C) or the (A) relay operates, that is, on a permanent signal alarm or on the common alarms. The use of the ampere hour meter or circuit breaker key (AHM) or (CBKR) is slightly different and will be described in detail in paragraph 14.4.

The (C) relay operates from the permanent signal only whereas the (A) relay operates whenever any of the other alarms, power, ampere hour meter, release magnet, fuse, call blocked or line finder start wire and chain circuit are given. The (C) relay not only operates the audible signal but also closes the 2500 ohm resistance across leads "WCT" and "WCR" to the central office, causing a "class B" alarm. A "class B" alarm at central office indicates a minor trouble at the PBX. When the (A) relay operates due to one of the above alarms it closes a short circuit across leads "WCT" and "WCR" giving a "class A" alarm to the central office indicating an important trouble at the PBX. The extension bell (A-1) Fig. 9 may also be provided to operate when the (A) relay operates as well as the bell (A-2) Fig. 1. The extension bell, however, will not be cut off from the (C-AL) key. The detailed operation of the various alarms is given in the succeeding paragraphs.

6. PERMANENT SIGNAL ALARM FOR SELECTORS OR SELECTOR CONNECTORS - FIGURE 4

If a station line becomes permanently short-circuited or the ring side becomes grounded or the receiver is left off the switchhook a selector or selector connector will ground lead "PS" and energize the dash-pot relay (PS). After a given time interval the (PS) relay operates and prepares a circuit for the (PS-AL) lamps and closes the circuit to

the common dash-pot relay (PS1) Fig. 1, which also operates after a given time interval. The (PS1) relay closes the (PS-AL) lamp circuit. The (PS1) relay also operates the (C) relay which in turn closes the (A) and (B) resistances across the "WCT" and "WCR" leads giving a "class B" alarm to central office, operates the (A-2) bell of the (PS-AL) key is normal and lights the supervisory and common alarm lamps (PS-AL) Figs. 2 and 3. The "BB" lead furnishes battery from the power charging circuit to the (A-2) bell. Lamps in Figs. 2 and 3 indicate the trouble as described in paragraph 5.

7. RELEASE MAGNET ALARM (FIGURE 5)

Each winding of relay (RM) supplies battery to five release magnets in the line finder, selector, connector and selector connector circuits and operates whenever a release magnet operates. In operating, relay (RM) energizes the dash-pot relay (RLS) and prepares a circuit from the (R-MAG-REG) lamp to the dash-pot relay. In normal operation the release magnet on the switch is energized for only a short time until the switch is restored to normal and in this case the dash-pot relay will not have time to completely operate so that no signal will be given. If for some reason the switch fails to restore to normal, the release magnet will remain operated and the dash-pot relay will fully operate. The dash-pot relay (RLS) operated lights the alarm lamp (R-MAG-REG) and the supervisory and pilot lamps (R-MAG-REG) Figs. 2 and 3 and operates relay (A), Fig. 1, from battery supply on lead "BB" from the power charging circuit. Relay (A) operated gives a "class A" alarm to central office and operates the (A-1) and (A-2) bells as described in paragraph 5.

8. FIG. 10 - PEG COUNT

The winding of relay (RR) supplies battery to five release magnets in the second selectors, tie-line and trunk selectors and connectors and operates each time a release magnet operates. In operating, the (RR) relay closes a circuit for the (RLS) dash-pot relay which will not have time to operate, grounds leads "R" to the register circuit, locks through its "S" winding to the "R-1" lead and prepares a circuit for the (R-MAG) lamp to the (REG)

dash-pot relay (RLS). When ground is removed from the "R-1" lead relay (RR) releases and removes the ground from the dash-pot (RLS) relay. In the event that relay (RR) is energized steadily due to some trouble conditions on the (RB) lead, the dash-pot relay (RLS) will operate and light the (RLS. MAG.) and (R-MAG) lamps and the usual (REG) alarm as outlined in paragraph 7 will be brought in.

However, should a trouble ground occur on the "R-1" lead relay (RR) will be held operated through its (S) winding and will in turn operate the dash-pot (RLS) relay.

9. FUSE ALARM FOR SWITCH FRAMES (FIGURE 6)

When a switch circuit fuse blows, battery from the bus bar operates the (SW-FA) pilot in series with the (FA) relay, Fig. 1. The (FA) relay operated, operates the supervisory and pilot lamps (SW-FA) Figs. 2 and 3, and relay (A) to bring in a "Class A" alarm at central office and to give an audible signal at the switchboard, as previously described. Ground for the (FA) relay is protected by a protector so that in case of a trouble condition on relay (FA) or a short circuited lamp the protector fuse will blow and operate the (A) relay and give an alarm.

10. CALL BLOCKED ALARM FOR LINE FINDERS (CB) RELAY FIG. 1

The purpose of this alarm is to give a signal if a line finder fails to find a calling line causing the sub-group relay in the line finder circuit to remain operated. Normally this relay remains operated only for the time necessary for a line finder to find the calling line. During this interval ground is connected to the dash-pot relay (CB) Fig. 1, over the "DP" lead but the time interval being short, the (CB) relay will not operate. On a trouble condition the ground remains on the "DP" lead fully operating the (CB) relay. The (CB) relay operated closes ground to the "L" lead to light an alarm lamp shown in the line finder circuit, and lights the supervisory and common pilot lamps (CB) Figs. 2 and 3. It also operates relay (A) which gives an audible alarm and gives a "class A" alarm to central office.

11. LINE FINDER START WIRE AND CHAIN CIRCUIT ALARMS (G) RELAY (FIG. 1)

The purpose of this alarm is to give a signal if the line finder start wire should become permanently grounded or the chain circuit should have a trouble ground or battery or become crossed. In either case lead "SC" is grounded thru alarm lamps shown on the line finder circuit and operates relay (G), Fig. 1. Relay (G) operated lights supervisory and pilot lamps (L.F.GRD.) in Figs. 2 and 3 and operates relay (A) to bring in a "class A" alarm at central office and the audible alarm in the PBX, as previously described.

12. RELAY RACK FUSE ALARM (FIGURE 7)

Each relay rack bus bar has an associated lamp (RR-FA) to locate a blown fuse. The (RA) relay Fig. 1, is common to all relay rack bus bars. When a fuse blows relay (RA) operates, lighting supervisory and pilot lamps (RR-FA), Figs. 2 and 3, and operating relay (A), Fig. 1, to give a "class A" alarm to central office and an audible signal to the PBX. Relay (RA) is protected by a protector fuse in order to give an alarm in case of a trouble condition on relay (RA) or a short-circuited lamp. Ground from the protector operates the (A) relay as above.

13. SWITCHBOARD FUSE ALARM (FIGURES 8 AND 17)

Each position in the 701-A manual switchboard is equipped with battery and ground bus bars for the position circuits. When a battery fuse blows, relay (SA) operates and lights the (SWBD) lamp Fig. 2, and operates relay (MA), Fig. 1. Relay (MA) operated operates relay (A) which gives a "class A" alarm to central office and an audible alarm in the PBX, as described in paragraph 5. If the pilot lamps per Fig. 3 are equipped the (MA) relay in operating also lights lamp (SWBD), Fig. 3. If Fig. 17 is provided, the (SWBD) lamp on the Misc. Relay Rack lights.

When a ground fuse at the switchboard blows, ground is supplied directly from the alarm bus bar to light lamp (SWBD) Fig. 2, and operates relay (MA) which operates the alarm as before.

When the PBX is 711-A, Figs. 2 and 3, relay (MA) Fig. 1 and (SWBD) lamp Fig. 3 are omitted.

When the PBX is 606-B, Figs. 8 and 17, relay (MA) Fig. 1 and (SWBD) lamps Figs. 2 and 3 are omitted.

14. POWER CIRCUIT ALARM**14.1 "BB" or "ABS" Lead**

The "BB" or "ABS" lead supplies battery from the power charge and discharge circuit to the (A), (P) and (AM) relays, the (A2) bell and (PWR-BD) lamp so that any blown fuse on the relay rack will not affect the common alarms. This lead is fused at the power distributing panel.

14.2 Fuse Alarm

When any fuse in the power alarm circuit blows, battery is closed to the "PG" lead operating the (PA) relay,

Fig. 1. The (PA) relay operated closes the "WCT" and "WCR" leads to give a "class A" alarm to central office, and operates the (P) relay. The (P) relay operated lights the (PWR-BD) lamps Figs. 2 and 3 and (PWR-BD) lamp Fig. 1 and operates the (A) relay which operates the audible alarms as previously described. The purpose in closing the central office alarm leads from relay (PA) as well as relay (A) is so that in the event that the blown power circuit fuse is the fuse in the "BB" lead, that an alarm will be sent in to the central office. In this case, of course, no audible alarms can be operated in the PBX, but when Fig. 1B is provided the (PWR-BD) lamp will light.

When the 110-A power plant is used, ground is connected to the F or DF leads in case of trouble in the power circuit, thus operating the (P) relay, which controls alarm signals as described above.

14.3 Ringing Voltage Alarm

Failure in the ringing supply will be indicated by battery on lead "PG" from the power ringing circuit which operates the (PA) relay, in turn operating the (P) relay and (PWR-BD) lamps Figs. 1, 2 and 3 and relay (A) as in Par. 14.2 to give a "class A" alarm and common visual and audible alarms.

14.4 Ampere Hour Meter Alarm or Circuit Breaker Alarm

When the ampere hour meter in the power ringing circuit indicates a certain current consumption, or the circuit breaker operates, ground is closed to the "AHM" or "CB" lead which operates the (AM) relay. The (AM) relay operated operates the (A2) bell, lights the (AHM) or (CBKR) lamps Figs. 1, 2 and 3 and operates relay (A). Relay (A) closes the "WCT" and "WCR" leads to give a "class A" alarm to central office and to operate the extension bell. The attendant, upon finding the (AHM) or (CBKR) lamp lighted, operates the (AHM) or (CBKR) key which opens the circuit to the (A2) bell. The lamps then remain lighted until the trouble has been cleared, at which time the (AM) relay is released. A circuit is then closed thru the (AHM) or (CBKR) key to reoperate the (A2) bell. The lamps are extinguished when the (AM) relay releases and the attendant, noting that no lamp is lighted, restores the (AHM) or (CBKR) key to normal.

If when this alarm first comes in the attendant operates the (C-AL) key instead of the (AHM) or (CBKR) key,

the bell will continue to ring until the proper key is operated.

15. PROTECTION OF ALARM LEADS (FIGS. 6, 7, 8 AND 13)

The resistances in the alarm leads of Figs. 6, 7, and 8 are provided to prevent direct battery from being connected to the wiring associated with the alarm bar.

16. PICKUP ALARM (FIG. 12)

When a ground is applied to lead "PUA" relay (PK) operates and locks to lead "PKU". Relay (PK) lights the (PKU) lamps and operates relay (A). Relay (A) gives a "class A" alarm at the central office and operates the (A1) and (A2) bells as described in Par. 5.

17. RINGING MACHINE TRANSFER (FIG. 11)

When battery is connected to lead "MT", it is in turn connected to lead "PG" through contacts of relay (RT) which operates relay (PA); causing alarms as described in Par. 14.2. When ground is applied to lead "MTK", relay (RT) operates, opening lead "PG", grounding lead 5, and locking through its own contacts to ground under control of lead "MT". The ground on lead 5 keeps the (PWR-BD) lamps lighted.

18. 6V + BATTERY FUSE ALARM (FIG. 13)

When a fuse in the 6 volt positive battery supply lead operates, relay (LV) operates, lighting the (LV) lamp in series with the (RA) relay. The (RA) relay operates and lights the (RR-FA) lamps and also operates the (A) relay which gives a "class A" alarm and operates the (A1) and (A2) bells as described in par. 5.

19. 6V + POWER SUPPLY ALARM (FIG. 14)

When battery is connected to lead "LV", relay (6V) operates, lighting the (6V-PWR) lamp in series with the (RA) relay. The (RA) relay operates lighting the (RR-FA) lamps and operating the (A) relay which gives a "class A" alarm and operates the (A1) and (A2) bells as described in par. 5.

20. CONTINUOUS RINGING FUSE ALARM (FIG. 15)

When a fuse in the continuous ringing supply operates, relay (CR) operates, lighting the (CR) lamp and operating the (RA) relay. This lights the (RR-FA) lamps and gives alarms as described in par. 19.

21. MACHINE RINGING FUSE ALARM (FIGS. 16 & 18)

When a fuse in the machine ringing supply operates, re-
lay (MR) operates, operating the (S) relay. The (S)
relay lights the (MR) lamp in series with the (RA)
relay which operates, in turn lighting the (RR FA) lamps
and giving alarms as described in par. 19.

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DEPT. 3330

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