

CIRCUIT DESCRIPTION

CD-65761-02  
ISSUE 1  
APPENDIX 3D  
DWG ISSUE 4D

17

PBX SYSTEMS  
NO. 701B OR 711B  
MISCELLANEOUS ALARM CIRCUIT

CHANGES

D. Description of Changes

D.1 CAD 18 is added to provide connecting information for the release magnet alarm and the fuse alarm for a new test connector switch shelf.

D.2 Circuit Note 305 is added to clarify the interconnection between this circuit and SD-65761-01, the previously Mfr Disc. rated 701B and 711B alarm circuit.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 3223-GLH-FLS

CIRCUIT DESCRIPTION

CD-65761-02  
ISSUE 1  
APPENDIX 2D  
DWG ISSUE 3D

PBX SYSTEMS  
NO. 701B OR 711B  
MISCELLANEOUS ALARM CIRCUIT

CHANGES

D. Description of Changes

D.1 New leads, MJ, MN, B, DF, L, WCT, WCR, and CAP are added for connection to the 850A PBX in FS6, 7, 8, and 11 and CAD 3 and 13.

D.2 In FS9 and App Fig. 3 terminal numbering on keys ACO, CB, COM, PS, and RM are changed to agree with manufacturing drawings.

F. Changes in CD Section

F.1 In SECTION III, 4., add 4.01 (at) as follows:

(at) PICTUREPHONE<sup>®</sup> Fuse, Alarm, and Emergency Transfer Circuit - SD-1E179-01.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 3223-RCL-FLS

PBX SYSTEMS  
NO. 701B OR 711B  
MISCELLANEOUS ALARM CIRCUIT

CHANGES

D. Description of Changes

- D.1 Lead ALM is added to FS6 for the Crossbar Link and Controller Circuit for "TOUCH-TONE" Calling.
- D.2 In FS3 all "B" battery and ground designations are changed to "P" except for battery on 3BF of relay RM which remains "B" battery. This change is made on a no record basis per agreement with WECO Standards Engineering.
- D.3 Equipment Note 201 is added to facilitate the ordering and installation of Common Alarm Circuit per R Option, App. Fig. 3.

F. Changes in CD Sections

- F.1 In SECTION II, Part 4, add Section E as follows:

E. Crossbar Link and Controller Circuit

- 4.19 When a second trial failure occurs in the Crossbar Link and Controller Circuit associated with Common Group "TOUCH-TONE" calling lead ALM is grounded. Lead ALM grounded operates Relay CB which functions as described in Part 4, Section C. Call Blocked. When the alarm condition in the "TOUCH-TONE" equipment is cleared, ground is removed from lead ALM which causes this circuit to restore to normal.
- F.2 In SECTION III, Part 4, CONNECTING CIRCUITS, paragraph 4.01 add the following:
- 4.01 (at) Crossbar Link and Controller Circuit for "TOUCH-TONE" Calling - SD-5E053-01

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 5152HW-RCL-WEA  
DEPT. 5337-RVL

PBX SYSTEMS  
NO. 701B OR 711B  
MISCELLANEOUS ALARM CIRCUIT

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SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 This circuit provides for visual, shelf and line-up pilot, and audible alarm signals at the PBX and, when required, will indicate two classes of alarms at the central office.

SECTION II - DETAILED DESCRIPTION

1. ALARM TRANSMITTAL

A. Class A Alarm

1.01 A class A alarm condition is transmitted by the release of relay CAS as a result of a call blocked, common failure or release magnet alarm or as a result of a blown ABS fuse or loss of commercial power.

Option Z

1.02 Relay CAS released causes a class A alarm at the central office to indicate a major alarm at the PBX by removing battery and ground from leads WCR and WCT, respectively.

Option X

1.03 Relay CAS released places a short across leads WCT and WCR causing a class A alarm indication at the central office or, with a 1 or 2 type telephone console, causes the night closing and alarm circuit to function.

Option Y

1.04 With relay NC1 of the night closing and alarm circuit released, PBX on day operation, lead NC1-2 is connected to lead NC1-3, lead NC1-5 is grounded and leads NC1-1, NC1-4 and NC1-6 are open. Relay CAS released extends ground on lead NC1-5 to lead WCT causing the night closing and alarm circuit to flash lamp AL and provide an audible alarm at the 1 or 2 type telephone console as an indication of the class A alarm condition.

1.05 With relay NC1 operated, PBX on night operation, leads NC1-3 and NC1-5 are open, lead NC1-2 is connected to lead NC1-1, lead NC1-6 is grounded and lead NC1-4 is connected to lead WCR of the night closing and alarm circuit. Relay CAS released removes battery and ground from leads NC1-4 and WCT respectively causing a class A alarm condition at the central office.

Option W

1.06 Relay CAS released ground lead R and grounds lead MJ or DL (option V) or applies resistance battery to lead MJ or DL (option T) as a class A alarm indication.

B. Class B Alarm

1.07 A class B alarm condition is transmitted by the operation of relay PSS as a result of a permanent signal alarm or an all-finders-busy condition.

Option Z

1.08 Relay PSS operated causes a class B alarm at the central office to indicate minor alarm at the PBX by reversing the polarity on leads WCT and WCR.

Option X

1.09 Relay PSS operated places a 2500 ohm resistive bridge across leads WCT and WCR causing a class B alarm indication at the central office or, with a 1 or 2 type telephone console, causes the night closing and alarm circuit to function.

Option Y

1.10 With relay NC1 of the night closing and alarm circuit released, PBX on day operation, lead NC1-2 is connected to lead NC1-3, lead NC1-5 is grounded and leads NC1-1, NC1-4 and NC1-6 are open.

Relay PSS operated places a 2500 ohm resistive ground on lead WCT to the night closing and alarm circuit causing it to light lamp AL to the 1 or 2 type telephone console as an indication of the class B alarm condition.

1.11 With relay NC1 operated, PBX on night operation, leads NC1-3 and NC1-5 are open, lead NC1-2 is connected to lead NC1-1, lead NC1-6 is grounded and lead NC1-4 is connected to lead WCR of the night closing and alarm circuit. Relay PSS operated reverses the polarity on leads WCT and NC1-4 causing a class B alarm indication at the central office.

Option W

1.12 Relay PSS operated grounds G and grounds lead MN or F (option V) or applies resistance battery to lead MN or F (option T) as a class B alarm indication.

2. PERMANENT SIGNAL ALARM SCI

2.01 If a station line becomes permanently short-circuited, the ring side of a line becomes grounded or is a receiver is left off the switchhook, a selector, selector connector or connector will ground lead PS which operates relay PS.

2.02 Relay PS operated:

- (a) Operates relay PU via lead PU unless another permanent signal is being timed (relay ST normal).
- (b) Prepares an operate path for relay TO.
- (c) Connects battery to lead PS1 to start permanent signal timing in the No. 701A PBX Miscellaneous Alarm Circuit when 701B shelves are added to a 701A PEX.

2.03 Relay PU operated:

- (a) Locks operated under control of relay PS operated and relay TO released.
- (b) Opens lead PU to prevent grounding the PU multiple to prevent operating a PU relay on another shelf after relay ST operates.
- (c) Prepares an operate path for relay TO.
- (d) Operates relay ST via lead ST.

2.04 Relay ST operated removes ground from lead PU to prevent operating a PU relay of another shelf until this permanent signal timing has been completed and starts the operation of relay PST.

2.05 Relay PST operates in 20 to 30 minutes and grounds lead TO, operating relay TO.

2.06 Relay TO operated:

- (a) Locks operated under control of relay TO.
- (b) Opens its original operate path to prevent grounding the TO multiple.
- (c) Releases relay PU.
- (d) Operates relay PSA via lead PSA.
- (e) Lights lamp PS on the shelf.
- (f) Grounds lead PAP to light the aisle pilot lamp PS associated with the line-up.

2.07 Relay PU released removes ground from lead ST releasing relay ST. Relay ST released releases relay PST and applies ground to lead PU. The common permanent signal timing circuit is now available for timing a permanent signal in another shelf.

2.08 Relay PSA operated:

- (a) Operates relay PSS which transmits a class B alarm as described in part 1, section B. Class B Alarm.
- (b) Lights lamp PS and sounds an audible alarm at the alarm panel.
- (c) Lights lamp PS and sounds an audible alarm at the switchboard if provided.
- (d) Prepares a path to resound the audible alarm at the alarm panel and/or switchboard when the trouble condition is cleared if key PS is operated at the alarm panel and/or switchboard to silence the original audible alarm.

2.09 When the permanent signal condition is removed, the associated switch will remove ground from lead PS releasing relay PS.

2.10 Relay PS released releases relay TO and removes battery from lead PS1 to release the permanent signal alarm in the 701A Miscellaneous Alarm Circuit if provided.

2.11 Relay TO released:

- (a) Releases relay PSA.
- (b) Extinguishes shelf lamp PS.
- (c) Extinguishes aisle pilot lamp PS associated with the line-up.

2.12 Relay PSA released:

- (a) Extinguishes lamp PS at the alarm panel and switchboard.
- (b) Silences the audible alarm at the alarm panel and/or switchboard if operated, key PS released.
- (c) Sounds the audible alarm at the alarm panel and/or switchboard if key PS was operated as an audible indication that the trouble condition was cleared.
- (d) Releases relay PSS.

2.13 Relay PSS released removes the class B alarm indication restoring the circuit to normal.

2.14 A quick check of a permanent signal condition on all shelves may be made by a momentary operation of key PS RLS. Key PS RLS operated grounds leads PU and TO. Ground on lead PU operates the PU relay on all shelves waiting for a permanent signal to be picked up and timed (relay PS on shelf operated). Ground on lead TO by passing the 20 to 30 minute time delay of relay PST operating relay TO on all shelves on which relay PU is operated.

2.15 When 701B shelf units are added to a 701A PBX, operation of relay PS, battery on lead PS1, starts the permanent signal timing of the 701A Miscellaneous Alarm Circuit which transmits all alarm indications after timeout. Option R provides a parallel timing circuit to control relays PU and TO to prevent shelf visual alarm indications on each operation of relay PS after a permanent signal condition has been timed in the 701A alarm circuit.

3. RELEASE MAGNET TIMING

A. Release Magnet Alarm - SC2

3.01 Battery for the release magnet of the switches on a shelf is obtained through the primary winding of relay RM. Relay RM operates each time a release magnet on the associated shelf operates.

701B PBX

3.02 Relay RM operated:

- (a) Grounds lead RT to start the operation of thermal relay RT.
- (b) Prepares an operate path for relay Rm1.
- (c) Prepares a path to shelf light lamp RM.
- (d) Grounds lead R to the traffic register circuit if provided.

3.03 With normal operation of the release magnet, relay RM is not operated for a sufficient period of time to permit relay RT to operate. If, for any reason, a switch fails to restore to normal, relay RT will operate after a delay of 15 to 25 seconds. Relay RT operated grounds lead G operating relay Rm1.

3.04 Relay Rm1 operated:

- (a) Locks operated under control of relay RM.
- (b) Opens its original operate path via lead G.
- (c) Lights lamp RM on the shelf.
- (d) Removes ground from lead RT releasing thermal relay RT.
- (e) Operates relay S via lead S.
- (f) Grounds lead RAP to light aisle pilot lamp RM associated with the line-up.

3.05 Relay S operated:

- (a) Releases relay CAS.
- (b) Lights lamp RM and sounds an audible alarm at the alarm panel.
- (c) Lights lamp RM and sounds an audible alarm at the switchboard if provided.

(d) Prepares a path to resound the audible alarm at the alarm panel and/or switchboard when the trouble condition is cleared if key RM is operated at the alarm panel and/or switchboard to silence the original audible alarm.

3.06 Relay CAS released sounds buzzer AL if provided and transmits a class A alarm as described in part 1, section A. Class A Alarm.

3.07 When the switch in trouble has been returned to normal, relay RM will release.

3.08 Relay RM released:

- (a) Releases relay Rm1.
- (b) Extinguishes shelf lamp RM.
- (c) Removes ground from lead R to the traffic register circuit.

3.09 Relay Rm1 released removes ground from lead S releasing relay S and extinguishes aisle pilot lamp RM associated with the line-up.

3.10 Relay S released:

- (a) Extinguishes lamp PS at the alarm panel and at the switchboard.
- (b) Silences the audible alarm at the alarm panel and/or switchboard is operated, key RM released.
- (c) Sounds the audible alarm at the alarm panel and/or switchboard if key RM was operated as an audible indication that the trouble condition was cleared.
- (d) Operates relay CAS.

3.11 Relay CAS operated removes the class A alarm indication and silences buzzer AL.

3.12 The circuit is now restored to normal.

3.13 Release of a switch from terminal 1, level 1, does not hold relay RM operated long enough for a traffic register to operate. Capacitor A and resistor A (App. Fig. 10) are provided to enable the associated register to operate on a short pulse of relay RM.

701A PBX

3.14 If a 701B shelf is added to a 701A PBX, relay RM operated grounds lead RLS to the 701A Miscellaneous Alarm Circuit. Dash-pot relay RLS in the 701A circuit will operate after a time delay and ground lead G.

3.15 Ground on lead G operates relay RML which locks operated under control of relay RM and lights shelf lamp RM.

3.16 When the switch is restored to normal, relay RM releases.

3.17 Relay RM released:

(a) Releases dash-pot relay RLS in the 701A alarm circuit.

(b) Releases relay RML.

(c) Extinguishes shelf lamp RM.

740E PBX

3.18 If a 701B shelf is added to a 740E PBX, relay RM operated grounds lead C to the 740E Miscellaneous Alarm Circuit. After a time delay, the 740E alarm circuit functions to ground lead A.

3.19 Ground on lead A operates relay RML which locks operated under control of relay RM and lights shelf lamp RM.

3.20 When the switch is restored to normal, relay RM releases.

3.21 Relay RM released:

(a) Releases relay RML.

(b) Extinguishes shelf lamp RM.

(c) Removes ground from lead C to the 740E alarm circuit restoring it to normal.

B. Rotary Out Trunk Switch Alarm - SC5

3.22 When a trouble condition exists with a rotary out trunk switch, ground is connected to lead P operating relay RO.

3.23 Relay RO operated grounds lead RT to start the operation of thermal relay RT and prepares an operate path for relay RO1.

3.24 With normal operation of the rotary out trunk switches, relay RO is not operated for a sufficient period of time to permit relay RT to operate. If, for any reason, the rotary out trunk switch circuit fails to remove ground from lead P, relay RT will operate after a delay of 15 to 25 seconds. Relay RT operated grounds lead G operating relay RO1.

3.25 Relay RO1 operated:

(a) Locks operated under control of relay RO.

(b) Opens its operate path.

(c) Removes ground from lead RT releasing relay RT.

(d) Grounds RAP to light the aisle pilot lamp RM associated with the line-up.

(e) Connects the primary winding of relay RO in parallel with the secondary winding of relay RO to light the associated shelf lamp of the rotary out-trunk switches.

(f) Grounds lead S operating relay S.

3.26 Relay S operated functions as described in part 3, section A. Release Magnet Alarm.

3.27 When the trouble condition has been cleared, ground will be removed from lead P releasing relay RO which releases relay RO1.

3.28 Relay RO1 released extinguishes aisle pilot lamp RM associated with the line-up and releases relay S which functions as described in part 3, section A. Release Magnet Alarm.

C. Station Message Register Surcharge Alarm

3.29 If selector SC of the station message register surcharge circuit should fail to operate at the end of a call, it functions to ground lead RT operating thermal relay RT. After a delay of 15 to 20 seconds, relay RT operates grounding lead G to the surcharge circuit.

3.30 Ground on lead G causes the surcharge circuit to function and ground lead S to operate relay S. Relay S operated functions as described in part 3, section A. Release Magnet Alarm.

4. ALL FINDERS BUSY OR CALL BLOCK CONDITION

A. Common Timing

4.01 When an all finders busy or call blocked condition occurs in a line or trunk finder group, the group circuit functions from ground on lead PU provided by relay ST1 if no other alarm is being timed.

4.02 The group circuit in functioning grounds lead ST1 which operates relay ST1.

4.03 Relay ST1 operated removes ground from lead PU1 to prevent any other alarm from being timed and applies battery to the relay time delay circuit causing it to function.

4.04 After a delay of 15 to 30 seconds, the relay time delay circuit functions to ground lead T01.

4.05 Ground on lead T01 causes the group circuit to function which releases relay ST1 and grounds leads L1, PAP and PSS if an all finders busy condition exists or grounds leads CFA and L if a call blocked condition exists.

4.06 Relay ST1 released removes battery from the relay time delay circuit and grounds lead PU1 to permit timing another alarm.

B. All Finders Busy

4.07 Ground on lead L1 lights lamp AFB at the alarm panel and switchboard and ground on lead PAP lights aisle pilot lamp PS associated with the line up.

4.08 Ground on lead PSS operates relay PSS which transmits a class B alarm as described in part 1, section B. Class B Alarm.

4.09 When any one finder in the line or trunk finder group becomes available, the group circuit functions to remove ground from leads L1, PAP and PSS to

extinguish lamp AFB at the alarm panel and switchboard and the aisle pilot lamp PS associated with the line-up and to release relay PSS.

4.10 Relay PSS released retires the class B alarm indication restoring this circuit to normal.

C. Call Blocked

4.11 Ground on lead CAP lights aisle pilot lamp COM associated with the line-up and ground on lead L operates relay CB.

4.12 Relay CB operated:

(a) Releases relay CAS.

(b) Lights lamp CB at the alarm panel and switchboard.

(c) Sounds an audible alarm at the alarm panel and switchboard.

(d) Prepares a path to resound the audible alarm at the alarm panel and/or switchboard when the trouble condition is cleared if key CB is operated at the alarm panel and/or switchboard to silence the original audible alarm.

4.13 Relay CAS released sounds buzzer AL and transmits a class A alarm as described in part 1, section A. Class A Alarm.

4.14 Release of the call blocked condition causes the group circuit to remove ground from leads CAP and L extinguishing the aisle pilot lamp COM associated with the line-up and releases relay CB.

4.15 Relay CB released:

(a) Operates relay CAS.

(b) Extinguishes lamp CB at the alarm panel and switchboard.

(c) Silences the audible alarm at the alarm panel and/or switchboard if key CB was released.

(d) Sounds the audible alarm at the alarm panel and/or switchboard if key CB was operated as an audible indication that the trouble condition was cleared.

4.16 Relay CAS operated silences buzzer AL and retires the class A alarm indication restoring this circuit to normal.

D. Call Distribution Circuit

4.17 When an all-finders-busy condition occurs in a finder group controlled by the call distribution circuit, the distribution circuit functions to ground lead L1 which lights lamp AFB. No class B alarm is transmitted under this condition. When a finder becomes available, the distribution circuit will remove ground from lead L1 to extinguish lamp AFB.

4.18 When a call blocked condition occurs in a finder group controlled by the call distribution circuit, the distribution circuit performs the call blocked timing and, after time out, grounds lead L operating relay CB which functions as described in part 4, section C. Call Blocked. When the call blocked condition is cleared, the distribution circuit functions to remove ground from lead L which causes this circuit to restore to normal.

5. COMMON FAILURE ALARMS - SC4

A. Fuse Alarm

Shelf Unit Fuse

- 5.01 When a fuse on a shelf operates, it operates relay FA.
- 5.02 Relay FA operated:
  - (a) Lights shelf lamp FA.
  - (b) Grounds lead CAP lighting aisle pilot lamp COM associated with the line-up.
  - (c) Grounds lead B (701B PBX).
  - (d) When a 701B shelf is added to a 740E PBX, lead B to the 740E alarm circuit is grounded.
  - (e) When a 701B shelf is added to a 701A PBX, lead B is grounded (option Q) or battery is connected to lead SWFA (option N) to the 701A alarm circuit.

5.03 Ground on lead B operates relay FA1 and lights lamp COM FA at the alarm panel to indicate an operated fuse in a lineup.

5.04 Relay FA1 operated operates relay CFA to indicate a common failure alarm and applies resistance battery to leads ALM 1-6 to a 5 or 6 type console.

Relay Rack Fuse

5.05 An operated fuse at a relay rack causes the relay rack or apparatus cabinet fuse alarm circuit to function grounding lead B.

5.06 Ground on lead B operates relay FA1 and lights lamp COM FA at the alarm panel to indicate an operated fuse in a lineup.

5.07 Relay FA1 operated operates relay CFA to indicate a common failure alarm and applies resistance battery to leads ALM1-6 to a 5 or 6 type console.

Switchboard Fuse

5.08 An operated fuse for a switchboard operates relay SA and lights lamp FA at the switchboard and grounds lead A.

5.09 Ground on lead A operates relay FA1 and lights lamp SWBD FA to indicate an operated fuse in the switchboard.

5.10 Relay FA1 operated operates relay CFA to indicate a common failure alarm and applies resistance battery to leads ALM1-6 to a 5 or 6 type console.

B. Ringing Machine Failure

5.11 With a failure of the ringing machine, the power ringing circuit functions to ground lead F which operates relay RMF.

5.12 Relay RMF operated:

- (a) Lights lamp RMF on the alarm panel to indicate a trouble condition in the ringing circuit.
- (b) Grounds lead CAP lighting aisle pilot lamp COM associated with the line-up.
- (c) Operates relay CFA to indicate a common failure alarm.

C. Auxiliary Power Supply

5.13 Auxiliary power supplies provided for special voltage requirements which are equipped with an alarm relay capable of providing a ground output when a trouble condition exists may be alarmed. The output provided on failure operates relay APS via lead DF.

5.14 Relay APS operated:

- (a) Lights lamp APS on the alarm panel to indicate a trouble condition in a special power supply.
- (b) Applies resistance battery to leads ALM1-6 to a 5 or 6 type console.
- (c) Operates relay CFA to indicate a common failure alarm.

D. Miscellaneous

5.15 Common failure alarms which originate as a result of the conditions described in this section do not have individual lamps on the alarm panel to indicate their source. Only lamp COM is provided on the alarm panel upon operation of relay CFA.

Finder Group Alarm

5.16 If the start lead becomes permanently grounded or the chain circuit has a foreign potential on it in any finder group, the group circuit functions to ground leads CAP and CFA.

5.17 Ground on lead CAP lights aisle pilot lamp COM associated with the lineup.

5.18 Ground on lead CFA operates relay CFA to indicate a common failure alarm.

Call Distribution Circuit

5.19 If the chain circuit has a foreign potential on it or if the gate circuit fails, the call distribution circuit functions to ground leads CAP and CFA.

5.20 Ground on lead CAP lights aisle pilot lamp COM associated with the lineup.

5.21 Ground on lead CFA operates relay CFA to indicate a common failure alarm.

Automatic Number Identification

5.22 When a signaling failure or system failure occurs in the automatic number identification circuit, it functions to ground leads CAP and CFA.

5.23 Ground on lead CAP lights aisle pilot lamp COM associated with the line-up.

5.24 Ground on lead CFA operates relay CFA to indicate a common failure alarm.

Connecting Systems

5.25 When a trouble condition occurs in a connecting system, lead MJ or DL is grounded operating relay CFA to indicate a common failure alarm.

E. Common Failure Alarm

5.26 Any trouble condition which results in the operation of relay CFA causes a common failure alarm.

5.27 Relay CFA operated:

- (a) Releases relay CAS.
- (b) Lights lamp COM and sounds an audible alarm at the alarm panel.
- (c) Lights lamp COM and sounds an audible alarm at the switchboard if provided.
- (d) Prepares a path to resound the audible alarm at the alarm panel and/or switchboard when the trouble condition is cleared if key COM is operated at the alarm panel and/or switchboard to silence the original audible alarm.

5.28 Relay CAS released sounds buzzer AL if provided and transmits a class A alarm as described in part 1, section A. Class A Alarm.

5.29 When all trouble conditions are cleared which cause the common failure alarm, relay CFA will release.

5.30 Relay CFA released:

- (a) Extinguishes lamp COM at the alarm panel and at the switchboard if provided.
- (b) Silences the audible alarm at the alarm panel and/or switchboard if operated, key COM released.

(c) Sounds the audible alarm at the alarm panel and/or switchboard if key COM was operated as an audible indication that the trouble condition has been cleared.

(d) Operates relay CAS.

5.31 Relay CAS operated removes the class A alarm indication and silences buzzer AL.

## 6. POWER PLANT ALARMS

### A. Battery Operation

#### Operated Battery Fuse

6.01 An operated ABS fuse in the power plant releases relay CAS and applies resistance battery to lead ABSF or PG. Relay CAS released sounds buzzer AL and transmits a class A alarm as described in part 1, section A. Class A Alarm.

6.02 Resistance battery on lead ABSF or PG operates relay PWR on its secondary winding.

6.03 Relay PWR operated:

(a) Lights lamp PWR on the alarm panel to indicate a trouble condition in the power plant.

(b) Applies resistance battery to leads AIM1-6 to a 5 or 6 type telephone console.

(c) Operates relay CFA which functions as described in part 5, section E. Common Failure Alarm.

(d) Grounds lead CAP lighting aisle pilot lamp COM associated with the line-up.

6.04 Battery for lamp PWR, relay CFA and bell A with an operated ABS fuse is obtained from battery E via diode C.

#### Operated Main Fuse

6.05 An operated main feeder fuse in the power plant applies resistance battery to lead ABSF or PG to operate relay PWR on its secondary winding.

6.06 Relay PWR operated:

(a) Lights lamp PWR on the alarm panel to indicate a trouble condition in the power plant.

(b) Applies resistance battery to leads AIM1-6 to a 5 or 6 type telephone console if battery E is not obtained from the operated main feeder fuse.

(c) Operates relay CFA which functions as described in part 5, section E. Common Alarm Failure, except lamp COM will not be lit if battery D is obtained from the operated main feeder fuse.

6.07 Battery for lamp PWR, relay CFA and bell A is obtained from battery ABS via diode D.

#### Operated Main and ABS Fuse

6.08 An operated ABS and main feeder fuse in the power plant releases relay CAS and applies resistance battery to lead ABSF or PG operating relay PWR on its secondary winding.

6.09 If the operated main fuse provided battery for the line-up in which this circuit is located, no visual or audible alarm indications will be provided at the alarm panel. However, relay CAS released will transmit a class A alarm indication as described in part 1, section A. Class A Alarm.

6.10 Correction of either alarm condition will cause this circuit to function as described above.

#### Voltage Level Alarm

6.11 If the voltage level should fall outside the limits set in the power plant, it will function to ground lead DF or F operating relay PWR on its primary winding.

6.12 Relay PWR operated:

(a) Lights lamp PWR on the alarm panel to indicate a trouble condition in the power plant.

(b) Applies resistance battery to leads AIM1-6 to a 5 or 6 type telephone console.

(c) Grounds lead CAP to light aisle pilot lamp COM associated with the line-up.

(d) Operates relay CFA.

6.13 Relay CFA operated causes a common failure alarm as described in part 5, section E. Common Failure Alarm.

#### B. Batteryless Operation

##### Operated ABS Fuse

6.14 An operated ABS fuse in the power distribution circuit applies resistance battery to lead ABSF and releases relay CAS. Relay CAS released sounds buzzer AL and transmits a class A alarm as described in part 1, section A. Class A Alarm.

6.15 Resistance battery on lead ABSF operates relay PWR on its secondary winding.

6.16 Relay PWR operated:

(a) Lights lamp PWR on the alarm panel to indicate a trouble condition in the distribution circuit.

(b) Applies resistance battery to leads AIML-6 to a 5 or 6 type telephone console.

(c) Grounds lead CAP to light aisle pilot lamp COM associated with the line-up.

(d) Operates relay CFA which functions as described in part 5, section E. Common Failure Alarm.

6.17 Battery for lamp PWR, relay CFA and bell A with an operated ABS fuse is obtained from battery E via diode C.

##### Operated Circuit Breaker

6.18 An operated circuit breaker in the distribution circuit grounds lead F operating relay PWR on its primary winding.

6.19 Relay PWR operated:

(a) Lights lamp PWR on the alarm panel to indicate a trouble condition in the distribution circuit.

(b) Applies resistance battery to leads AIML-6 to a 5 or 6 type telephone console if battery E is not obtained from the operated circuit breaker.

(c) Operates relay CFA which functions as described in part 5, section E. Common Alarm Failure, except lamp COM will not be lit if Battery D is obtained from the operated circuit breaker.

6.20 Battery for lamp PWR, relay CFA, and bell A is obtained from battery ABS via diode D.

##### Operated Circuit Breaker and ABS Fuse

6.21 An operated ABS fuse and circuit breaker in the distribution circuit releases relay CAS, grounds lead F and applies resistance battery to lead ABSF operating relay PWR on its secondary winding.

6.22 If the operated circuit breaker provided battery for the line-up in which this circuit is located, no visual or audible alarm indications will be provided at the alarm panel. However, relay CAS released will transmit a class A alarm indication as described in part 1, section A. Class A Alarm.

6.23 Correction of either alarm condition will cause this circuit to function as described above in this section.

##### Operated Output Fuse

6.24 An operated output fuse of a rectifier applies resistance battery to lead ABSF via the power distribution circuit operating relay PWR on its secondary winding.

6.25 Relay PWR operated:

(a) Lights lamp PWR to indicate a trouble condition in the power distribution circuit.

(b) Applies resistance battery to leads AIML-6 to a 5 or 6 type telephone console.

(c) Grounds lead CAP lighting aisle pilot lamp COM associated with the line-up.

(d) Operates relay CFA.

6.26 Relay CFA operated causes a common failure alarm as described in part 5, section E.

Low Voltage Alarm

6.27 If the voltage level of a rectifier should fall below the limit set in the rectifier, the lead F is grounded via the power distribution circuit operating relay PWR on its primary winding. Relay PWR operated functions as described above for an operated output fuse.

Loss of Commercial Power

6.29 Loss of commercial to a rectifier will result in a low voltage alarm. Complete loss of commercial will result in the release of relay CAS which transmits a class A alarm indication as described in part 1, section A. Class A Alarm.

7. AUDIBLE ALARM CONTROL

A. Keys CB, COM, PS and RM

7.01 When the audible alarm sounds as a result of a call blocked, common, permanent signal or release magnet alarm, the audible alarm signal may be silenced at the alarm panel or switchboard by operating the CB, COM, PS or RM key associated with the alarm at the alarm panel or switchboard respectively.

7.02 Operation of a key conditions the circuit to resound the audible alarm when the alarm condition is cleared as an indication that the associated malfunction has been corrected. Release of the operated key will silence the audible alarm.

B. Key ACO

7.03 The audible alarm signal may be disabled by operating key ACO. Key ACO operated lights lamp ACO providing a visual indication that the audible alarm has been disabled.

C. Relay ACO

7.04 As long as the battery cutoff key is normal (attended PBX), relay ACO will be released connecting the A bells to battery. With the battery cutoff key operated (unattended PBX), relay ACO is operated disconnecting battery from the A bells to disable the audible alarm.

D. Key AL

7.05 Key AL is provided to silence buzzer AL which provides an extension of the audible alarm.

8. AUTOMATIC CALL THROUGH TEST SET ALARM

8.01 In the event that the call through test set encounters a failure, leads TSA and TSP become grounded. These ground leads are extended through the jack access circuit for connection to the alarm circuit. Ground on the TSA lead will operate bell A to sound an audible alarm. Ground on the TSP lead will light the TST aisle pilot lamp for the call through test set.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 None

2. FUNCTIONAL DESIGNATIONS

2.01 Relays

<u>Desig.</u>	<u>Meaning</u>	<u>Primary Function</u>
ACO	Alarm Cut-Off Relay	To disable the audible alarm signal
APS	Auxiliary Power Supply Relay	To respond to a trouble condition in a special power supply
CAS	Class A Signal Relay	To transmit an indication of a major trouble condition
CB	Call Blocked Relay	To respond to a call blocked condition
CFA	Common Failure Alarm Relay	To provide indications of a common failure alarm
FA	Fuse Alarm Relay	To respond to an operated shelf fuse
FAL	Fuse Alarm Auxiliary Relay	To provide indications of a fuse alarm

<u>Desig.</u>	<u>Meaning</u>	<u>Primary Function</u>	<u>Desig.</u>	<u>Meaning</u>	<u>Primary Function</u>
PS	Permanent Signal Relay	To recognize a permanent signal condition	S	Signal Relay	To indicate a shelf release magnet failure
PSA	Permanent Signal Auxiliary Relay	To provide indications of a permanent signal alarm	ST	Start Relay	To start the permanent signal timing
PSS	Permanent Signal Signaling Relay	To transmit a minor alarm	ST1	Start Relay	To start a call blocked timing
PST	Permanent Signal Timing Relay	To time a permanent signal condition	TO	Time Out	To recognize a permanent signal timing time out
PWR	Power Relay	To respond to a trouble condition in the power plant	<u>3. FUNCTIONS</u>		
PU	Pick-Up Relay	To seize the common permanent signal timing circuit if available	3.01	To give a permanent signal alarm when any of the station lines become permanently short-circuited or grounded on the ring side or when a receiver is left off the hook.	
RM	Release Magnet Relay	To recognize the operation of any release magnet on a shelf	3.02	To provide for a visual permanent signal lamp per shelf.	
RMF	Ringling Machine Failure Relay	To recognize a trouble condition in the power ringing circuit	3.03	To provide for a 20- to 30-minute delay for permanent signals.	
RMI	Release Magnet Auxiliary Relay	To indicate a release magnet failure	3.04	To provide for a key to release the delayed timing on all permanent signals.	
RO	Rotary Relay	To recognize a stepping selector in the rotary out-trunk switch	3.05	To give an alarm signal when any switch fails to restore to normal after its release magnet has been energized.	
RO1	Rotary Auxiliary Relay	To indicate a failure of the rotary out trunk switch	3.06	To provide for a release magnet peg count.	
RT	Release Timing Relay	To time a release magnet alarm.	3.07	To provide for a visual release magnet alarm lamp per shelf.	
			3.08	To provide for a 15- to 25-second delay for release magnet alarms.	
			3.09	To recognize a line finder group grounded start lead or foreign potential on the chain circuit alarm and transmit a class A alarm to the central office.	
			3.10	To recognize a line finder group all finders busy alarm and provide a 15- to 30-second time delay and transmit a class B alarm to the central office.	

- 3.11 To recognize a line finder group call block alarm and provide a 15- to 30-second time delay and transmit a class A alarm to the central office.
- 3.12 To provide an alarm unit that is common to all switch frames.
- 3.13 To provide for line-up aisle pilot lamps for alarms.
- 3.14 To give an alarm signal when trouble occurs in the power ringing or charge and discharge circuits or power distribution circuit.
- 3.15 To extend the PBX alarms to the central office and to function on either a marginal or reversed battery alarm system at the central office.
- 3.16 To give an alarm when the ringing machine transfers due to a trouble.
- 3.17 To provide visual and audible alarm signals at the switchboard and alarm panel.
- 3.18 To provide an aisle pilot lamp for separate relay rack line-up fuse alarms.
- 3.19 To provide an audible signal on call block alarms with audible signal cutoff key.
- 3.20 To provide an audible alarm signal cutoff under control of the battery cutoff key.

4. CONNECTING CIRCUITS

4.01 When these circuits are listed on a keysheet, the connecting information thereon is to be followed.

- (a) Line Finder Circuit - SD-65901-01.
- (b) First Selector Circuit - SD-66359-01.
- (c) Second Selector Circuit - SD-66010-01.
- (d) Incoming Selector - SD-66360-01.
- (e) Hunting Connector - SD-66144-01.

- (f) Hunting Incoming Connector for Repeating Tie Trunks - Supplies Dial Tone - SD-66596-01.
- (g) Digit Absorbing Selector - SD-65900-01.
- (h) Incoming First Selector for Operation with Repeating Tie Trunk - Supplies Dial Tone - SD-66594-01.
- (i) Incoming Selector - SD-65950-01.
- (j) Second Selector - SD-65948-01.
- (k) Hunting Connector - SD-65949-01.
- (l) Selector Connector Circuit - SD-65721-01.
- (m) 701A or 711A Miscellaneous Alarm Circuit - SD-66384-01.
- (n) 701B, 711B, 701PK or 711PK Miscellaneous Alarm Circuit - SD-65761-01.
- (o) 740 Alarm Circuit - SD-65660-01.
- (p) Night Closing and Alarm Circuit - SD-65898-01.
- (q) Audible and Visual Alarm - SD-96188-01.
- (r) No. 5 Crossbar Alarm - SD-25671-01.
- (s) Extension Alarm Circuit - SD-95484-01.
- (t) Power Ringing Circuit - SD-81337-01 (typical).
- (u) Power Discharge Circuit - SD-80720-01 (typical).
- (v) 701B Power Distribution, Ringing, Tone and 30, 60, 120 IPM Interrupter Circuit - SD-5E031-01.
- (w) Relay Rack or Apparatus Cabinet Fuse Alarm Circuit - SD-65779-01.

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- (x) Idle Trunk Indicating Circuit - SD-65783-01.
- (y) 552A, 552B, 552D or 552E Auxiliary Signal, Battery Cutoff, Buzzer, Fuse Alarm, and Night Alarm Circuit - SD-65786-01.
- (z) No. 605A Fuse, Night, and Power Alarm Circuit - SD-66426-01.
- (aa) No. 608A Auxiliary Signal Fuse Alarm, Battery Cutoff, and Miscellaneous Circuit - SD-65722-01.
- (ab) No. 608D Auxiliary Signal, Fuse Alarm, Battery Cut-Off and Miscellaneous Circuit - SD-67039-01.
- (ac) No. 5B and 6B Type Consoles - SD-66927-01.
- (ad) Auxiliary Trunk for Use with Telephone Consoles - SD-65725-01.
- (ae) Call Distribution Circuit - SD-65911-01.
- (af) Call Distribution Circuit - SD-65929-01.
- (ag) Common Group and Sub Group Circuit - SD-65871-01.
- (ah) 701B Battery Cutoff Circuit - SD-65773-01.
- (ai) Control Circuit, Group Alerting System - SD-95883-01.
- (aj) Order Turrent No. 6 or 6A Tone, Alarm and Register Circuit - SD-66642-01.
- (ak) Station Message Register Pulse Circuit - SD-66915-01.
- (al) Station Message Register Surcharge Circuit - SD-66922-01.
- (am) Traffic Register Circuit - SD-65774-01.
- (an) Automatic Number Identification Circuit - SD-1E007-01.
- (ao) Jack Access Circuit for Automatic Call Through Test Set - SD-32523-01.
- (ap) Rotary Out Trunk Circuit - SD-30868-01.
- (aq) Rotary Out Trunk Circuit - SD-30891-01.
- (ar) 3A ACD Tone Alarm, Register, Ringing Leads and Flashing Circuit - SD-65793-01.
- (as) Trunk Finder Circuit - SD-65906-01.

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