

**NOTICE**  
 NOT FOR USE OR  
 DISCLOSURE OUTSIDE  
 THE BELL SYSTEM  
 EXCEPT UNDER  
 WRITTEN AGREEMENT

PBX SYSTEMS  
 NO. 756A  
 JUNCTOR CIRCUIT

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SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 The junctor circuit is used to

supply talking battery, and to provide supervision on station-to-station and dial repeating tie trunk-to-station calls.

1.02 When the marker is signaled by the register to set up a connection from a PBX line or incoming dial repeating tie trunk to another PBX line, the marker connects a link from the terminating end of junctor to the called line, and another link from the calling PBX line or tie trunk to the originating end of the junctor. The junctor continues to supervise the connection, supplying transmission battery both ways.

2. GENERAL DESCRIPTION OF OPERATION

2.01 When the register circuit, into which the number of the called station has been dialed, signals the marker to establish a connection to that line, it does so by connecting a link from the called station line hold magnet to the terminating end of a junctor. The marker also establishes a connection to the calling line or trunk over a link from the originating end of the junctor.

2.02 Upon seizure, the junctor supplies a holding ground to hold the originating and terminating line hold magnets, as well as the originating and terminating junctor hold magnets in the line, link, and marker circuit. The junctor also connects ringing current to the called line, via the terminating link. When the called line answers, the junctor trips the ringing and cuts through the transmission path. With option X, when the calling line disconnects, the junctor releases the originating link and calling line hold magnet, and subsequently when the called line disconnects, the junctor releases the terminating link and terminating line hold magnet. With option W, disconnection by the calling line will release both the calling and terminating line hold magnets.

2.03 If the originating line disconnects but the terminating line fails to disconnect with option X, the junctor will remain busy to the marker, even though the originating end of the connection is released. This feature is provided because the marker tests the terminating end of the junctor for a busy condition.

SECTION II - DETAILED DESCRIPTION

1. SEIZURE OF JUNCTOR CIRCUIT (STATION-TO-STATION OR TIE TRUNK-TO-STATION CALL)

OPERATION OF A RELAY AND HOLDING CROSSPOINTS

1.01 The marker, having received information from the register as to the called line number for a station-to-station or tie trunk-to-station call, sets up a connection to that line on a "junctur class" basis. A "junctur class" call requires a junctor circuit to supply transmission battery to both parties.

1.02 The marker tests the terminating hold magnets of the junctors. Having found an idle junctor, the marker SMTA and SMTB relays operate the terminating hold magnet for the junctor and the line hold magnet of the called line, to connect them together over an idle link already selected. The marker continues to hold the hold magnets operated.

1.03 Having established a connection to the called line, the marker recycles to operate the originating hold magnet of the junctor, which connects the junctor to the same link being used to connect the originating line hold magnet to the register. The register then drops off the link. When the junctor originating hold magnet operates to connect the calling line to the junctor, the calling station loop is extended through crosspoints to the winding of relay A to battery and ground, and relay A operates. Relay A operates relay B, which is slow relaesing in order to guard against momentary opens in the loop that would falsely drop the connection. Relay B operated (1) closes ground through both sections of resistance A to the terminating link sleeve and to the originating link sleeve, to hold the calling and called line hold magnets, (2) closes holding ground to the originating and terminating junctor hold magnets over leads "OHM" and "THM", respectively, to hold these operated after the marker releases, and (3) extends busy ground over lead TU(J-) toward the Traffic Measurement System Remote Scanner.

#### START OF RINGING

1.04 Ringing current, over lead R1, through a make contact of A, through the primary winding and a break contact of tripping relay TP, is applied to the ring conductor of the junctor toward the called line. Ringing ground is connected extended over lead "ring G" through a break contact of TP to the tip conductor of the junctor toward the called line. Condenser A is provided to furnish audible ringing tone to the calling line.

#### 2. RINGING TRIP AND CUT-THROUGH

2.01 When the called party answers, the terminating loop operates relay TP.

2.02 Relay TP operated locks to ground through a make contact of relay B

and transfers the terminating tip and ring leads from the power supply circuit (removes ringing current) to the windings of relay D, which operates. Relay D operated reverses the originating tip and ring leads, and provides a holding ground on lead TU(J-) for the Traffic Measurement System Remote Scanner.

2.03 This battery and ground reversal is used on calls to PBX lines from tie trunks that require reversed battery-type supervision. Relay D operated, provides supplementary holding ground for the terminating link sleeve, the junctor terminating hold magnets, and (with option X) relay TP. The junctor supplies talking battery through relay A to the calling line or tie trunk, and through relay D to the called line. The voice current path is complete through capacitors T and R.

#### 3. RELEASE

##### CALLLED LINE DID NOT ANSWER

3.01 When the calling line or tie trunk disconnects, relay A releases. Relay A released, removes ringing current from the terminating R lead and releases relay B. Release of relay B removes ground from lead TU(J-) toward the Traffic Measurement System Remote Scanner, and from leads SO, ST, OHM, and THM which releases the originating and terminating hold magnets of the junctor and the associated line hold magnets. The slow release of relay B insures that no current is flowing in the crosspoint circuits at the time the hold magnets are released.

##### CALLING PARTY DISCONNECTS FIRST

##### A. With X Option

3.02 Relays A and B release as described above, but relay D is held operated over the called station loop, and only the originating end of the junctor will release. This condition will prevail until the called party hangs up, at which time the release of relay D releases relay TP, opens terminating lead ST, removes ground from lead TU(J-), and also opens leads THM, thereby releasing the terminating hold magnet and restoring the junctor to normal.

##### B. With W Option (SC4)

3.03 When the calling line or tie trunk disconnects, relay A releases, which opens lead R1 to relay TP and releases relay B. Relay B released, releases the originating trunk and line hold magnets and relay TP. Relay TP released opens the loop to the terminating end of the junctor, causing relay D to release. Relay D

released removes ground from lead TU(J-), and releases the line and trunk hold magnets, restoring the trunk to normal.

#### CALLED PARTY DISCONNECTS FIRST

3.04 Relay D releases as described above, but the junctor terminating hold magnet, the terminating line hold magnet, and relay TP cannot release until the supplementary holding grounds supplied by operated relay B are removed. When the calling party hangs up, relays A and B release, and the junctor restores to normal as described above.

#### 4. FUNCTION OF MAKE BUSY AND BUSY DISPLAY CIRCUIT

##### JUNCTOR KEY NORMAL

4.01 With the junctor key (JCTR key) normal in the make busy and busy display circuit, the junctor terminating lamp (JCTR TERM lamp) will light when relay SMT- in the line, link, and marker circuit operates the terminating held magnet for the junctor. The junctor originating lamp (JCTR ORIG lamp) will light when the originating hold magnet is operated. This indicates that the junctor has been made busy through normal operations.

##### JUNCTOR MADE BUSY

4.02 If it is desired to make a junctor busy, key JCTR is operated. Key JCTR operated, grounds lead THM of the terminating hold magnet in the line, link, and marker circuit. The grounding of lead THM:

- (a) Operates the junctor's terminating hold magnet in the marker circuit.
- (b) Makes the junctor busy to the marker on subsequent requests for service.
- (c) Lights lamp JCTR TERM in the make busy and busy display circuit.

The lighting of lamp JCTR TERM indicates that the junctor has been made busy.

#### SECTION III - REFERENCE DATA

##### 1. WORKING LIMITS

- 1.01 Maximum external circuit loop is 1410 ohms.
- 1.02 Voltage limits are: 45 to 52 volts dc  
75 to 110 volts ac.

##### 2. FUNCTIONAL DESIGNATIONS

None

#### 3. FUNCTIONS

- 3.01 To respond to seizure and supply holding ground for the originating line hold magnet and the terminating line hold magnet under control of the calling station loop.
- 3.02 To supply ringing to the called station and audible ringing tone to the calling station.
- 3.03 To recognize that the called station has answered the ringing signal and to cut through the transmission path supplying transmission battery to both lines.
- 3.04 To reverse the battery and ground toward the calling end as an answered signal to tie trunks requiring reverse battery supervision.
- 3.05 To recognize when either party disconnects, and with option X to hold itself busy until both parties hang up.
- 3.06 To release the entire connection when the calling party hangs up, whether or not the answering party has disconnected if option W is supplied.
- 3.07 To provide an indication to the make busy and busy display circuit that the originating side of the junctor is connected.
- 3.08 To provide a busy ground condition for the Traffic Measurement System Remote Scanner.

#### 4. CONNECTING CIRCUITS

- 4.01 When this circuit is listed on a keysheet, the connecting information thereon is to be followed.
  - (a) Line, Link, and Marker Circuit - SD-65741-01.
  - (b) Power Supply Circuit - SD-81326-01.
  - (c) Make Busy and Busy Display Circuit - SD-5E029-01.
  - (d) Traffic Measurement System No. 1A Remote Scanner - SD-3B200-01.

#### 5. MANUFACTURING TESTING REQUIREMENTS

- 5.01 The junctor circuit shall be capable of performing all the service functions specified in this circuit description and meeting all the requirements in the Circuit Requirements Tables.

6. TAKING EQUIPMENT OUT OF SERVICE

6.01 To make the junctor busy, it is necessary to ground to lead THM toward the line, link, and marker circuit. This can be accomplished by ascertaining that no select magnet is operated and blocking relay D operated.

7. ALARM INFORMATION

A. Fuse Alarm

7.01 An operated fuse supplying the junctor circuit is indicated by a major alarm at the plant service center if alarm transmitting features are provided, and in any case by a visual signal at the attendant position, and in the alarm transfer and test circuit in the equip-

ment cabinet. Replace the operated fuse to silence the alarm and extinguish the visual alarm signal.

SECTION IV - REASONS FOR REISSUE

D. Description of Changes

D.1 Option N is designated and rated Mfr Disc.

D.2 Option M is rated Standard and is added to prevent relay A from reoperating from the discharge of capacitors T and R after stations hang-up, thus causing a lock-up condition.

D.3 The options index and Circuit Note 103 are revised to include options M and N.

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