

PBX SYSTEMS
NO. 701B OR 711B
CONNECTOR CIRCUIT
ROTARY HUNTING
ONE RING
WITH OR WITHOUT DIAL TRANSFER
AND CAMP-ON BUSY STATION LINE

CHANGES

A. CHANGED AND ADDED FUNCTIONS

A.1 An optional feature for an indication of camped-on call to a called party by applying a tone of approximately 1-1/2 second duration is added.

B. CHANGES IN APPARATUS

B.1 Added: 402B Tone Generator - "ZA" option - Fig. 3

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Added: Fig. 3

BELL TELEPHONE LABORATORIES, INCORPORATED

(W.E. Co. 7760RW-JMD-JCW)
DEPT. 5337-RAV-8D

**FBX SYSTEMS
NO. 701B OR 711B
CONNECTOR CIRCUIT
ROTARY HUNTING
ONE RING
WITH OR WITHOUT DIAL TRANSFER
AND CAMP-ON BUSY STATION LINE**

CHANGES**B. CHANGES IN APPARATUS****B.1 Added**

A diode - 4200 - "E" option
B diode - 4200 - "B" option

B.2 Removed

K resistor - 63E -
150 ohms -
"H" option

Replaced By

K resistor - 82A -
150 ohms -
"G" option

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 To increase the power rating and to reduce the possibility of damaging the resistor if the "B" relay fails to release, the K resistor - 63E - 150 ohms - "H" option is removed and rated MFR. DISC.

and is replaced by the K resistor - 82A - "G" option rated standard.

D.2 When this circuit is used with incoming trunks that provide busy line transfer, a diode is necessary to screen the 30 LPM to the telephone console. The "A" diode - 4200 - E option is required if lamp repeating is not provided with the telephone console and the "B" diode - 4200 - "B" option is required if the lamp repeating is provided with the telephone console. "P" option is designated and "E" and "B" options are added and rated standard.

D.3 Removal of the ground on number 5 contact of the (D) relay will make this circuit calling party control if camp-on is not provided. This ground is designated as "A" option and will always be provided with camp-on (Z option). If camp-on is not provided "A" option will be omitted.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 5336-ANSJ-FNR-PT

PEK SYSTEMS
NO. 701B OR 711B
CONNECTOR CIRCUIT
ROTARY HUNTING
ONE RING
WITH OR WITHOUT DIAL TRANSFER
AND CAMP-ON BUSY STATION LINES

CHANGES

B. CHANGES IN APPARATUS

B.1 Added

Resistor D - 63P - 1000 ohms
Resistor G - 63T - 2000 ohms

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Previously, when two calling stations dialed a busy station they could

converse with each other over the common busy tone lead. By adding the D or G resistor (K or J options) to the busy tone lead this conversation is prevented. K option is required with an 806D ringing machine and J option is required with an 806G ringing machine.

D.2 Q option (rated MFR. DISC.) and R option (rated Standard) are added.

D.3 Circuit Notes 102 and 104 revised and Note 108 added.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 5336-ASJ-EVDL-JP

FBI SYSTEMS
NO. 701B OR 711B
CONNECTOR CIRCUIT
ROTARY HUNTING
ONE RING
WITH OR WITHOUT DIAL TRANSFER
AND CAMP-ON BUSY STATION LINES

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES:

D.1 This is an AG change without rec.
Prior to this issue when camp-on is provided the test covering this feature could not be applied. One lead is added from 9 of the switch jack to 6 of the test jack to allow testing the camp-on feature. This change is added on this issue and designated as part of 2 option.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 5336-JVV-Evdl-EM

PBX SYSTEMS
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WITH OR WITHOUT DIAL TRANSFER
AND CAMP-ON BUSY STATION LINES

CHANGES

A. CHANGED AND ADDED FUNCTIONS

A.1 An optional feature to restrict inward dialing calls is added.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 "T" and "S" wiring is added. "T" wiring provides inward restriction. When this feature is provided, separate connector groups are required for the completion of local dialing calls.

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FBX SYSTEMS
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CONNECTOR CIRCUIT
ROTARY HUNTING
ONE RING
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AND CAMP-ON BUSY STATION LINES

CHANGES

A. CHANGED AND ADDED FUNCTIONS

A.1 An optional feature to restrict inward dialing calls is added.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 "R" and "S" wiring is added. "S" wiring provides inward restriction. When this feature is provided, separate connector groups are required for the completion of local dialing calls.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 5136-VJM-KvdL-BE

**FX SYSTEMS
NO. 701B OR 711B
CONNECTOR CIRCUIT
ROTARY HUNTING
ONE RING
WITH OR WITHOUT DIAL TRANSFER
AND CAMP-ON BUSY STATION LINE**

CHANGES

A. CHANGED AND ADDED FUNCTIONS

A.1 To provide dial transfer
Dial Transfer allows the called station to flash the switchhook and operate a relay in the Dial Transfer Connector Applique Circuit which will hold the original switch train and remove the (T) and (R) condensers from leads "T" and "R", permitting the called stations to dial the desired station.

B. DESCRIPTION OF CIRCUIT CHANGES

D.1 On this issue the title has been changed to read:

**FX SYSTEMS
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ROTARY HUNTING
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- D.2** CADs 1, 2, and 7 are rated Mfr. Disc. and CAD 9 was added.
- D.3** Added W, T and V options.
- D.4** W option rated MD.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 5336-CS-Ev4L-70

**PBX SYSTEMS
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CONNECTOR CIRCUIT
ROTARY HUNTING
ONE RING
WITH OR WITHOUT
CAMP ON BUSY STATION LINE**

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1. GENERAL METHOD OF OPERATION	1	When this circuit is seized by a selector, it prepares the circuit to receive two sets of dial pulses and places a holding ground to the switch train over the sleeve.
2. GENERAL FUNCTIONS	1	When the digits are dialed into the connector, it functions to find the called line. If the line is idle it will then ring the associated PBX station.
<u>SECTION II - DETAILED DESCRIPTION</u>	1	When the station answers the connector closes through the calling and called parties and sends reverse battery over the "T&R" leads to the calling end as a charge or supervision signal.
1. SEIZURE	1	The "Camp-On" feature permits the attendant to insure than an incoming directory call, waiting to be connected to a busy PBX station will be automatically connected to this station, when it becomes available.
2. VERTICAL STEPPING	2	<u>2. GENERAL FUNCTIONS</u>
3. ROTARY STEPPING	2	(1) To respond to seizure and supply a holding ground for the selectors back of this connector.
4. TESTING THE CALLED LINE	2	(2) To step the shaft in a vertical and a rotary direction in response to dial pulses.
5. ROTARY HUNTING	2	(3) To connect the calling and called parties.
6. FIRST LINE OF GROUP	2	(4) To prevent intrusion on the called line.
7. CUTTING THROUGH TO CALLED LINE	2	(5) To test a busy line and hunt for an idle line in a PBX group.
8. RINGING THE CALLED STATION	2	(6) To provide Camp on to a busy line.
9. CAMP ON TO BUSY LINES "2" OPTION USED SINGLE LINE OR LAST LINE OF A HUNTING GROUP	3	(7) To release and return to normal when both parties have disconnected.
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12. RELEASE OF CONNECTOR WHEN THE CALLED PARTY IS LAST TO DISCONNECT	3	When this switch is seized by a selector, relay (A) operates over the loop
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which in turn operates (B) which returns ground to the sleeve lead "S" for holding the switches in the train in their operated condition, opens the release circuit for this switch and prepares the circuit for the operation of the vertical magnet, as well as preparing certain holding circuits which will be described later.

2. VERTICAL STEPPING

With (A) and (B) relays operated on the seizure of the switch, the dialing pulses of the first digit operate and release (A) relay which will operate (C) relay and vertical magnet in series to step the shaft vertically. (B) and (C) relays remain operated during this series of pulses since they are slow to release. As soon as the shaft moves one vertical step, the original circuit for operating the vertical magnet is transferred from VQH spring 3 to VQH spring 4 and the make contact of (C). As soon as this series of pulses ceases (C) releases and prepares the circuit for sending pulses through the rotary magnet.

3. ROTARY STEPPING

A set of impulses now sent out by the calling dial will operate the rotary magnet and step the shaft in a rotary direction. (B) will remain operated as during vertical stepping due to its slow release feature. During the rotary stepping, (E) operates in series with the rotary magnet and closes a circuit for testing the called line. (E) also holds the pulsing circuit closed if (H) operates when passing over a busy line.

4. TESTING THE CALLED LINE

If the first terminal of a PBX group called is busy, ground is found on the "S" and "R" leads, since the circuit arrangement is such that the "S" and "H" leads are strapped together on all lines of the group except the last line of the group, and the guarding potential placed on the "S" lead will also be placed on the "H" lead. The guarding potential on the "S" lead will operate relay (H) which will lock up through its front contact when (E) releases at the end of dial pulsing. With (H) operated and (E) released, a path is provided for operating (O) over the "H" lead which is grounded as above described.

5. ROTARY HUNTING

The conditions as described in Testing the Called Line have closed a circuit to operate the rotary magnet which will step the wipers to the next terminal and open the operate path of the (G) relay which releases. If the second terminal is busy (H) relay will remain operated and (G) will again operate stepping the switch to the next terminal. This operation will continue

until either an idle line is found or until the last line of the group is reached where the S and H terminals are not strapped together. In this case, if the line is busy, the "S" lead will be grounded and relay (H) will remain operated, but (G) relay will not again operate due to the fact that there is no ground on the H wiper. During the hunting operation just described (J) did not operate due to the fact that it must operate in series with (G), and the ground on the "H" lead, which operated (O) shunted out (J). As soon as the last terminal of the group is reached, (J) will operate, since there is now no ground on the "H" lead, and lock to a lead which is grounded by (B). Relay (J) puts the 60 IPM busy tone and 60 IPM busy flash if required, back to the calling party and together with (H) keeps the "S" wiper lead open toward the switch. If the switch in rotating finds an idle line, (H) will release and the switch will cut through to the called line as described below.

6. FIRST LINE OF GROUP

If the first line of the group dialed as above described is idle (H) and (G) will not operate, there will be no further rotation of the switch, and the switch will be in a position to cut through to the called line.

7. CUTTING THROUGH TO CALLED LINE

As soon as an idle line is found in the called group (K) will operate through its primary winding from battery on the sleeve of the called line to ground on the front contact of (B). This ground acts as a guarding potential on the "S" lead until (K) operates and puts ground on the "S" lead. The circuit through the primary winding of (K) serves only to operate contacts 1B and 2B of the relay which closes a local circuit through its secondary winding and fully operates the relay. This circuit is maintained until the switch releases. The operation of (K), (1) closes the tip and ring wipers through to the ringing leads on (F) for automatically ringing the called station, (2) places 30 IPM on the "F" lead as a station ringing indication to the attendant on attendant originated or completing calls, (3) connects ringing induction to the calling end over the ring lead.

8. RINGING THE CALLED STATION

Negative superimposed ringing is now impressed on the called line through the back contacts and the primary winding of (F). This ringing will continue until the called station answers whereupon (F) will operate to close contacts 1 and 2 due to the current in its primary winding. The secondary winding being energized, fully operates the relay and it remains operated

until the switch releases. The operation of this relay connects the talking leads through to (D) which supplies talking battery to the called station. The called and the calling stations are now connected for talking purposes through the 2 mf condensers connected in the tip and ring leads. (D) then operates to reverse battery and ground from the (A) relay to the calling party for registration or supervision.

9. CAMP ON TO BUSY LINES "Z" OPTION USED SINGLE LINE OR LAST LINE OF A HUNTING GROUP

When the attendant, in attempting to complete an incoming call to a PBX station, finds the station busy, she may employ "Camp On". This is accomplished by the operation of a key in the attendant position, which superimposes 10 volt positive battery on the jack sleeve of the connector. A semi-conductor diode in the connector separates this 10 volt positive signal from sleeve ground and passes it to the (Z) Camp On relay. This relay operates, permitting the connector to test the busy station "H" lead. If the connector finds battery on the "H" lead the (J) relay will remain operated and the connector will not camp-on. If the connector finds the "H" lead open, indicating that no other calls are camped on or are testing the busy station line, the (J) relay releases. The (J) relay released (1) locks the (Z) relay operated, (2) places resistance battery on the "H" lead to prevent other calls from camping on to the line, (3) removes 60 IPM busy tone from the "T" and "R" leads, to indicate to the attendant that the call is camped on. When the called station becomes available ground is removed from, and battery is placed on the "S" lead, releasing relay (H) and operating relay (K). The (H) relay released, releases the (Z) relay, removing the camp on condition from the connector. The (K) relay operated connects ringing to the called station and the connector functions per paragraph 8 to connect the waiting call to the called station.

10. RELEASE OF CONNECTOR WHEN THE CALLING PARTY IS LAST TO DISCONNECT

If the called station disconnects before the calling station, (D) is released and when the calling station disconnects, (A) and (B) will release and ground will be removed from the sleeve lead "S" allowing the switches back of this switch to return to normal. (F) and (K) which were held operated from a contact of (B) will also release and the release magnet of this switch will be energized, to return the shaft to its normal position.

11. RELEASE OF SWITCHES BACK OF THE CONNECTOR WHEN THE CALLED PARTY IS LAST TO DISCONNECT

If the calling party disconnects before the called party, (D) will remain op-

erated and through its front contact, hold (K) and (F) operated, thus maintaining the path for holding the (D) operated as long as the called party does not disconnect. If the calling party now disconnects, (A) and (B) will release and a pulse will be sent to (E) due to the slow release action of (B). (E) will operate and momentarily remove the ground upon the sleeve lead "S" which would otherwise be supplied through the primary winding of (K). This momentary opening will allow the switches back of this connector to release and upon the release of (E), a guarding potential will be placed upon the sleeve lead "S" through the primary winding of (K). The resistance K is placed in the circuit to prevent the rotary magnet from operating when (S) operates to remove the ground to release the switches back of this connector.

12. RELEASE OF CONNECTOR WHEN THE CALLED PARTY IS LAST TO DISCONNECT

When the called party disconnects, (D) will release and the release magnet will now be energized through the back contacts of relays (A), (B), (K) and (D) and the vertical off-normal springs 1 and 2 whereupon the switch will return to normal.

13. INDIVIDUAL LINES

It is possible to use the lines connected to this switch as individual lines by leaving the strap open between the bank contacts of the "S" and "H" leads which will cause the switch to function the same as the last line of a PBX group.

14. PERMANENT SIGNAL

If the called station remains on the line after the calling end disconnects, the (D) relay remains operated and relays (A) and (B) release. Ground is placed on the "PS" lead to the alarm circuit. The alarm circuit will sound the Permanent Signal alarm if the called station fails to disconnect after a 20-30 minute interval.

15. TEST JACKS

Springs 1 and 2, may be used for making local tests on this switch to cause it to function in the same manner as described for an originating call. Spring 5 may be used to test busy flash for operator originated calls.

16. CONTACT PROTECTION

Contact protection unit B is provided to reduce sparking at springs of relay (F) when this relay operates. The C unit reduces sparking at the contacts which open the stepping magnet circuits.

until the switch releases. The operation of this relay connects the talking leads through to (D) which supplies talking battery to the called station. The called and the calling stations are now connected for talking purposes through the 2 mf condensers connected in the tip and ring leads. (D) then operates to reverse battery and ground from the (A) relay to the calling party for registration or supervision.

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When the called party disconnects, (D) will release and the release magnet will now be energized through the back contacts of relays (A), (B), (K) and (D) and the vertical off-normal springs 1 and 2 whereupon the switch will return to normal.

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