CROSSBAR SYSTEMS
NO. 5
COIN SUPERVISORY LINK CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

B.1 Added

Apparatus figure 4 containing a 324-K crossbar switch and 10 AF-79 wire spring relays is added.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 App. Fig. 4 has been added to the circuit and is optional with App. Fig. 1. FS 5 shows the operation of the circuit with 100 point crossbar switches and the resulting reduced number of trunk preference relays.

D.2 Options M and K are added to the circuit. Option M covers 10 trunks per horizontal group and option K covers 20 trunks per horizontal group when App. Fig. 4 is used.

D.3 Sheet index, lead index, option index, and apparatus index are changed to show addition of FS 5 and App. Fig. 4 to circuit.

D.4 App. Figs. 2 and 3 have been changed to show new locations for contact protection networks. These contact protection networks are now optional.

D.5 CAD 3 has been changed and CADs 4 and 5 have been added.

D.6 Circuit notes 101, 102, and 104 have been changed.

D.7 App. Fig. 1 and FS1 have been changed to show optional apparatus.

F. CHANGES IN CD SECTIONS

F.1 Change the second paragraph in part 2 of Section I to read:

"Two basic types of coin supervisory link frames are provided. The first type is arranged with eight 200 point 6 wire switches and control relays which provide capacity for 160 trunks (App. Fig. 1). The second type is arranged with eight 100 point 6 wire switches and control relays which provide capacity for 80 trunks (App. Fig. 4). A maximum of three frames may be associated with a link group of 10 coin supervisory circuits. Additions to the first frame maybe 80 trunk or 160 trunk frames."

F.2 Change the third sentence of paragraph 2.1 in Section I to read:

"A horizontal group may consist of a maximum of 40 TP relays if FS 1 is used or a maximum of 20 TP relays if FS 5 is used."

F.3 Change last sentence in paragraph 2.2 of Section I to read:

"The link switch and trunk preference relays are shown in FS 1 or FS 5."

F.4 Change first paragraph in part 2 of Section I to read:

"When a trunk requires connection to a coin supervisory circuit it connects ground to the ST lead to operate its trunk preference relay TP as shown in FS 1 or FS 5."

F.5 Change second sentence of second paragraph in part 1 of Section II to read:

"The operation of an intermediate TP relay as shown in FS 1 or FS 5 removes battery from the winding of higher numbered TP relays."

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CROSSBAR SYSTEMS
NO. 5
COIN SUPERVISORY LINK CIRCUIT

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Changes have been made to provide for operation with a minimum of two coin supervisory circuits. This involves looping-by contact 8M on relays (SB0), (SB1), (SB2) and (SB3).

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2311-DEW-MFF-BB

CROSSBAR SYSTEMS
NO. 5
COIN SUPERVISORY LINK CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded	Superseded By
"S" Option 328B X-Bar Switch	"R" Option 328F X-Bar Switch

B.2 Added SBO-3 Relays AF130 option "N".

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Circuit notes 107 and 108 were added and the option index table, FS1, App. Fig. 1, and the Circuit Requirements table were changed to show the above change in apparatus.

D.2 Changes have been made to provide for the use of this circuit as an auxiliary to existing non-wire-spring relay type coin supervisory link circuits. This involves using the SBO-3 relays optioned "N" in place of the SBO-3 relays optioned "Q". Circuit notes 109, 110, 111 and leads connecting to the non-wire-spring coin supervisory link circuit have been added.

D.3 The replacement note formerly read: "Replacing SD-25585-01 for new coin supervisory link groups".

All other headings, no change.

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CROSSBAR SYSTEMS
NO. 5
COIN SUPERVISORY LINK CIRCUIT

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 To simplify specifying the options on chain leads between frames the following changes are made on FS2 and FS101. Options "V" and "W" on lead B have been interchanged and option "T" is used in place of "X" on this lead. Option "T" has been added to the option index and circuit Note 102.

D.2 CAD 3 has been changed.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 2311-JJD-JWD-RN

CROSSBAR SYSTEMS
NO. 5
COIN SUPERVISORY LINK CIRCUIT

SECTION I GENERAL DESCRIPTION

1. GENERAL

This link circuit provides means for connecting trunk circuits arranged for coin disposal to a group of coin supervisory circuits. It consists of a single stage of crossbar switches giving the trunks direct access to the coin supervisory circuits. The trunks are connected to the switch verticals, one vertical per trunk and the coin supervisory circuits are connected to the switch horizontals as shown in Fig. 1. The ten supervisory circuits are multipled to a number of such switches depending on the trunk load and the call capacity of the supervisory circuits. All of the switches and trunks associated with the same ten coin supervisory circuits constitute a link group.

A basic coin supervisory link frame is arranged with eight 200 point 6 wire switches and control relays which provide capacity for 160 trunks. As a practical limit provision is made for connecting three such frames together forming a link group of 480 trunk capacity.

Within each frame the circuits are divided into 4 horizontal groups with one or two switches in each group and the controls are so arranged that simultaneous calls from each of the four groups may be served independently.

2. GENERAL FUNCTIONS

The coin supervisory link can be divided into the following functional parts: (1) control relays for Trunk Preference and for Coin Supervisory Preference and Busy and (2) Link Switches.

2.1 Trunk Preference Relays

Each trunk is connected to a TP relay which is operated when the trunk requires connection to a coin supervisory circuit. The TP relays for all of the trunks in a horizontal group are in a chain of preference so that only one trunk in the horizontal group is served by the coin supervisory control relays at a time. A maximum of 40 relays may be in one horizontal group. This relay also steers the associated switch hold magnet to the coin supervisory control relays and connects certain other leads from the trunk to the coin supervisory circuit by way of the coin supervisory control relays during the time that the switch connection is being set up.

2.2 Link Switches

Each coin supervisory circuit occupies the same level on each switch and the associated select magnets of a horizontal group are operated thru the coin supervisory preference control relays for that horizontal group. The hold magnets, as noted above are selected by the associated trunk preference relay and are operated when the select magnet off normal springs on the particular switch are operated. See Fig. 2. Five of the six crosspoints are used for coin control functions and the sixth is used to hold the crosspoints closed from the coin supervisory circuit after the preference control relays are released. The link switch and trunk preference relays are shown in FS-1.

2.3 Control Relays For Coin Supervisory Preference and Busy Functions

The coin supervisory control for one coin supervisory circuit consists of a two relay lockout circuit for each horizontal group. The coin supervisory preference relays SP carry a number of work leads in chains and the coin supervisory busy relays SB perform the function of controlling the start leads from the trunk preference relays.

A trunk preference relay TP operating from a trunk circuit closes the start circuit to operate the coin supervisory preference relay SP of the first idle coin supervisory circuit. Upon seizure the coin supervisory will operate the SB relays associated with it in all horizontal groups except the one being served to pass calls in those groups to other coin supervisory circuits. After closure of the crosspoints the coin supervisory circuit will release the TP and SP relays and operate the remaining SB relay. Upon release of the coin supervisory circuit the associated SB relays in all horizontal groups except the ones which have operated TP relays will release.

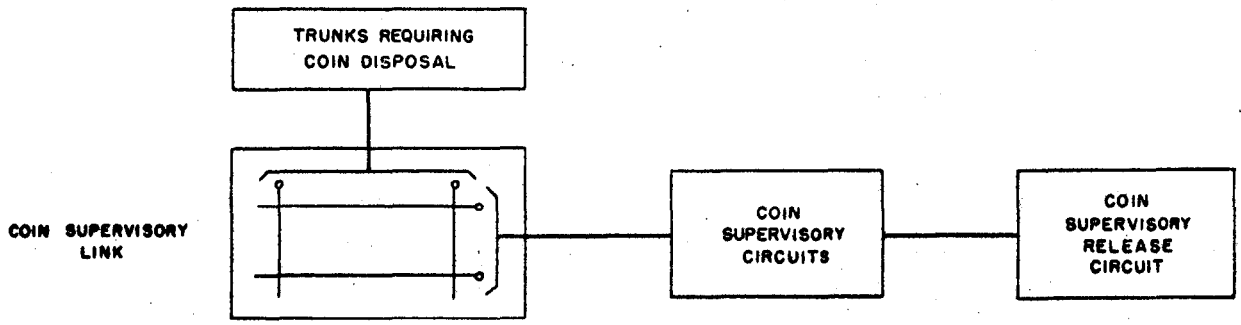
TRUNKS REQUIRING COIN DISPOSAL
COIN SUPERVISORY LINK
COIN SUPERVISORY CIRCUITS
COIN SUPERVISORY RELEASE CIRCUIT

FIG. 1

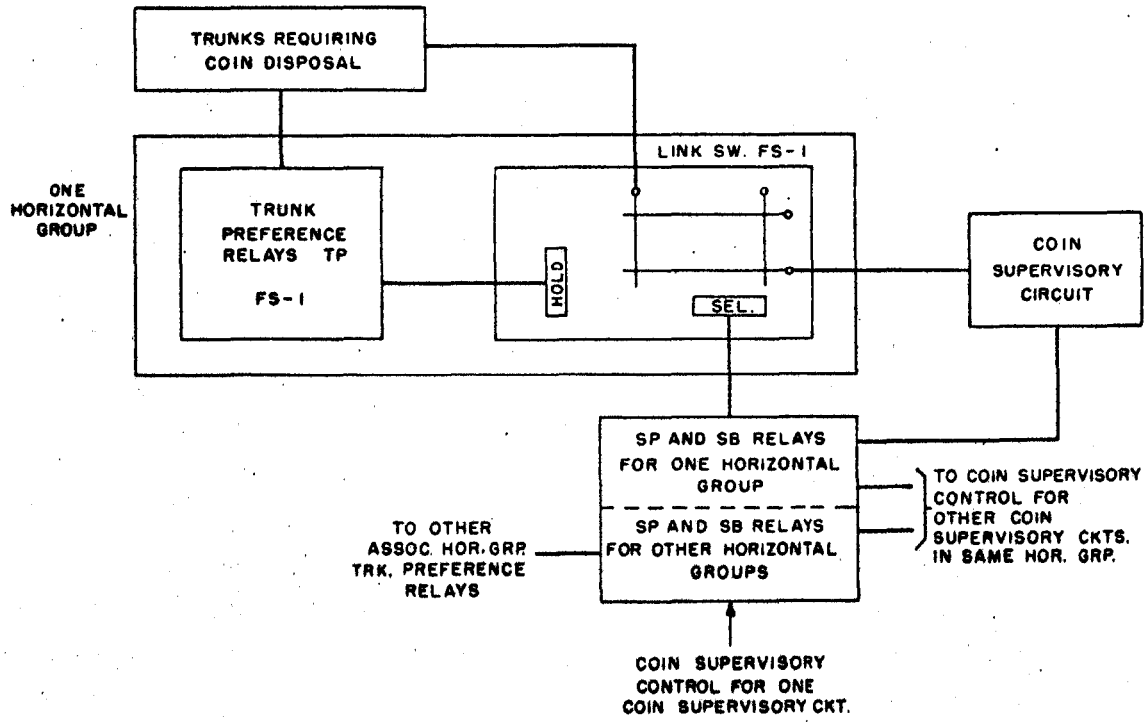
TRUNKS REQUIRING COIN DISPOSAL
ONE HORIZONTAL GROUP
TRUNK PREFERENCE RELAYS TP
FS-1
LINK SW. FS-1
HOLD
SEL.
COIN SUPERVISORY CIRCUIT
SP AND SB RELAYS FOR ONE HORIZONTAL GROUP
SP AND SB RELAYS FOR OTHER HORIZONTAL GROUPS
TO COIN SUPERVISORY CONTROL FOR OTHER COIN SUPERVISORY CKTS. IN SAME HOR. GRP.
TO OTHER ASSOC. HOR. GRP. TRK. PREFERENCE RELAYS
COIN SUPERVISORY CONTROL FOR ONE COIN SUPERVISORY CKT.

FIG. 2

SECTION II DETAILED DESCRIPTION

1. OPERATION OF TRUNK PREFERENCE RELAYS

When a trunk requires connection to a coin supervisory circuit it connects ground to the ST lead to operate its trunk preference relay TP shown in FS-1.

Since all TP relays in a horizontal group are in a chain of preference only one trunk call can proceed at a time. The operation of an intermediate TP relay such as shown in FS-1 removes battery from the winding of all higher numbered TP relays. Lower numbered TP relays may operate but can do no work since all of the work leads are in a chain running in the opposite direction and these are therefore opened at the higher numbered relays. If during the time one call is being served other TP relays operate these trunks will be served in order starting from the highest numbered. Trunks waiting which are not able to operate their TP relays must wait until the last operated TP is released before being served.

2. SELECTION OF IDLE COIN SUPERVISORY CIRCUIT

2.1 Start Chain

Referring now to FS-2, ground from the operated TP relay operates the coin supervisory preference relay SP of the first idle coin supervisory circuit, for instance horizontal group 0 has coin supervisory circuit 0 as first choice and in a similar manner horizontal groups 1, 2 and 3 have coin supervisory circuits 1, 2 and 3 respectively as their first choices. It will also be noted that the battery for each SP relay is chained thru the other SP relays for the same coin supervisory circuit. The place where the battery starts is such as to give the first preference to the SP relay which also has first preference in a horizontal group. Because of this double chain when all coin supervisory circuits are busy and calls are waiting, the horizontal group chosen will depend upon the coin supervisory circuit which becomes free even though all calls are directed to that coin supervisory circuit. This results in distributing the coin supervisory choice for horizontal groups to minimize what might be called "grooving" under heavy load conditions. Since one fully equipped frame has more coin supervisory circuits than horizontal groups the SP battery chains are necessarily in the same order in more than one coin supervisory circuit control, for instance, in FS-2 control relays for coin supervisory circuits 0, 4 and 8 have the same order of preference for horizontal groups. Also when there is more than one frame in a link group the first choice of horizontal groups for supervisory circuits is not always the first choice of supervisory circuits for horizontal groups, but, as may be seen in FS-101 the latter is distributed between frames as evenly as possible. Partially equipped frames may also cause a less even distribution of preferences.

2.2 Coin Supervisory Circuit Seizure

The operation of relay SP grounds leads "ON" and "LK" to operate relays ON and RLK, respectively, in the coin supervisory circuit. Closure of the coin supervisory MB relays operates the SB relays associated with that coin supervisory circuit on all horizontal groups except the one being served. That SB relay is held shunted down by ground on the LO lead. Thus in all other horizontal groups the start chain is advanced beyond the coin supervisory circuit chosen.

2.3 Operation of Select Magnet

Battery from the coin supervisory circuit on the "SM" lead is connected by the SP relay to the select magnet associated with the particular coin supervisory circuit selected and in the horizontal switch group associated with the particular SP relay.

2.4 Closure of Switch Points

Operation of the coin supervisory off normal relay and a link select magnet closes a circuit thru the operated trunk preference relay to operate the hold magnet for the trunk being served. This operating ground is extended thru the crosspoints to the coin supervisory circuit to operate relay H in the supervisory circuit which opens the circuit thru the trunk preference relays and closes the double connection check relay DCK circuit. Relay DCK operates unless there is a ground already on the crosspoint such as would occur if two crosspoints were closed on the same coin supervisory circuit. Then DCK would be shunted down and the coin supervisory circuit will give an alarm and then release. Otherwise the DCK locks and the hold magnet is held over the "HM" lead thru the crosspoints. Coin supervisory relay H then releases the select magnet.

3. RELEASE OF CONTROL CIRCUIT

When the coin supervisory circuit has been satisfied as to the closure of the leads thru the crosspoints and is ready to release the preference relays it applies ground to the "BL" lead to operate relays in the trunk which will open its "ST" lead. Removal of ground from the trunk "ST" lead will release relay TP in the link and relay RLK in the coin supervisory circuit. If no TP relays are operated in that horizontal group the SP relay will now release. Leads "BL", "LK" and "LO" will open upon release of the coin supervisory relay RLK. Opening

the "LO" lead removes the shunt on the SB relay allowing it to operate and transfer the start lead to the next coin supervisory circuit. The preference circuits are now free to serve another call.

4. RELEASE OF COIN SUPERVISORY CIRCUIT

The release of relay ON in the coin supervisory circuit will remove ground from lead "HM" to release the hold magnet and open the crosspoints. Upon release of the MB relays in the coin supervisory circuit, battery will be removed from leads "SB" to the primary windings of the associated SB relays. However, if there is a TP relay operated in any horizontal group at the time that the SB primary winding is opened in that group, the relay will have its secondary winding energized by the TP relay to prevent its release. This insures the continuity of the start lead of the call in progress. It also provides progressive use of the coin supervisory circuits where a number of over-lapping short holding time calls are handled. Each SB relay in succession is held on its secondary winding to the SB lead until the last SB relay is reached. The last SB relay operating releases all preceding SB relays that are not held by their respective coin supervisory circuits.

SECTION III REFERENCE DATA

1. WORKING LIMITS

1.1 None

2. FUNCTIONAL DESIGNATIONS

Relays

TP00-19 Trunk Preference-first 20 trunks in a horizontal group.

TP20-39 Trunk Preference-second 20 trunks in a horizontal group.

SB Coin Supervisory Busy

SP Coin Supervisory Preference

Switches

L Link Switch-for first 20 trunks in a horizontal group.

SL Supplementary Link Switch-for second 20 trunks in a horizontal group.

3. FUNCTIONS

3.1 To operate the associated trunk preference relay TP when ground is closed to the start lead "ST" by the trunk.

3.11 To prevent other TP relays in the horizontal group chain further away from battery (higher numbered) from operating and to open all work leads in the chain from relays nearer battery (lower numbered).

3.12 To connect battery to the "SB" lead to provide for locking on its secondary winding each operated SB relay.

3.13 When the last SB relay in a horizontal group operates to release other operated SB relays not held busy by coin supervisory circuits.

3.2 To ground the start lead "ST" and operate the coin supervisory preference relay SP of the first idle coin supervisory circuit in the start chain.

3.21 To prevent operation of other SP relays associated with the same coin supervisory circuit.

3.22 To ground the "ON" lead to the coin supervisory circuit as a seizure signal.

3.23 To close the "BL" lead from the coin supervisory circuit to the trunk to provide a means of allowing the coin supervisory circuit to dismiss the preference relays.

3.3 When the coin supervisory circuit busy relays MB operate to operate all link SB relays associated with that coin supervisory circuit except the one in the horizontal group in which the call originated and to prevent that one from operating by ground on the "LO" lead in the coin supervisory circuit.

3.31 To pass the coin supervisory start leads in these horizontal groups to the next succeeding coin supervisory preference relay in the chain.

3.4 To close a path for operating the select magnet on the link switch or switches associated with the trunk being served and the level corresponding to the coin supervisory circuit selected.

3.5 After select magnet operation to operate the hold magnet associated with the trunk being served.

3.6 When the crosspoints of the link switch have closed to connect the "T", "R", "F", "D" and "CO" leads from the trunk to the coin supervisory circuit and to hold the hold magnet thru crosspoints under control of the coin supervisory circuit.

3.7 When the hold magnet has been checked operated by the coin supervisory circuit to release the select magnet, release the TP and SP relays and operate the remaining SB relay associated with that coin supervisory circuit.

3.8 When a coin supervisory circuit releases to release the hold magnet and SB relays associated with the coin supervisory circuit not held by operated TP relays.

4. CONNECTING CIRCUITS

When this circuit is listed on a key sheet the connecting information thereon is to be followed:

4.01 Intra Office Trunk Coin Timing SD-25737-01 (Typical)

4.02 Outgoing Trunk Coin Timing SD-25840-01 (Typical)

4.03 Coin Supervisory Circuit - SD-25736-01

5. METHOD OF TAKING EQUIPMENT OUT OF SERVICE

This section covers the method to be followed in taking coin supervisory link frames, coin supervisory links and individual pieces of apparatus on the links out of service.

5.1 Link Frame

Make busy the associated outgoing trunks at the master test frame, the associated intraoffice trunks at the trunk equipment and any other associated miscellaneous trunks as required.

5.2 Link Switch

Make busy the associated trunks as outlined in 5.1.

5.3 Hold Magnet and Vertical Unit

Make busy the associated trunks as outlined in 5.1.

5.4 Select Magnet and Selecting Unit

Block operated the SB relay associated with the select magnet or selecting unit to be removed from service.

5.5 TP Relay

Make busy the associated trunk as outlined in 5.1.

5.6 SB Relay

Block operated the SB relay to be removed from service.

5.7 SP Relay

Block operated the associated SB relay.

SECTION IV

CHANGES

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

C.1 In App. Fig. 1 contacts 3M and 9M on the AF79 relay have been removed. These contacts were never equipped on the AF79.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 On FS4 "To TP Rel. For Hor. Grp." formerly read "To TP Rel" and "To Sel. Mag. For Hor. Grp." formerly read "For Horiz. Grp."

D.2 The sequence chart has been changed to show that the operation of SB- will release its associated SP- relay.

D.3 The information for the coin supervisory circuit connecting to FS3 is corrected to include MB1 relays closing the SB- leads and to remove resistance designations.

D.4 The cabling of chain leads for the 3 frame supervisory link group as shown in FS 101 have been changed.

D.5 Ground for network S- in FS 1 has been changed from "A" to "B" to conform with Ckt. Note 101. In Ckt. Note 101 apparatus Fig. 3 has been added to "A Ground".

All other headings under Changes no change.

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