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CRSSBAR SYSTEMS
NO. 3
OUTGOING INTERCEPT PLUG-ENDED TRUNK
CIRCUIT
TO ANNOUNCEMENT MACHINE
FOR VACANT CODE OR SPECIAL ANNOUNCEMENTS

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2. <u>GENERAL DESCRIPTION OF OPERATION</u> .	1	(a) An assistance operator with option X or option W with service cross-connection option V via a manual class line circuit.
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<u>SECTION I - GENERAL DESCRIPTION</u>		
1. <u>PURPOSE OF CIRCUIT</u>		
1.01 This trunk circuit is used to connect a line to a local announcement machine for vacant code or special announcements. The circuit is arranged to transfer the call to an assistance operator when so cross-connected or to force disconnect if the calling customer does not hang up after one or two announcement cycles.		

(b) Ground supplied by the marker is looped through the idle trunk on leads TG and TT and is directed by the marker connector, trunk block, and trunk group relays to operate one TT- relay.

(c) Battery supplied by the marker and directed by the marker connector, trunk block, and TT- relay through lead TF, operates the F relay in the trunk.

1.02 The operation of relay F:

- (a) Grounds the SW lead.
- (b) Locks its own winding to the TF lead.
- (c) Transfers the incoming T and R leads from this circuit to the T1 and R1 leads, respectively.
- (d) Transfers the incoming S lead from this circuit to the SL lead.
- (e) Operates the S1 relay.
- (f) Grounds the JC lead.

1.03 The operation of relay S1:

- (a) Closes a contact in the operating path of the P relay.
- (b) Closes a contact in the operating path of the CT1 relay.
- (c) Opens the MB lead and operates the MB relay.
- (d) Supplies a holding ground for later use on the S lead.

1.04 The operation of relay MB:

- (a) Connects ringing tone to the R lead.
- (b) Opens the loop through leads TT and TG.
- (c) Opens the FT lead.
- (d) Opens the F relay operating path.

1.05 When the marker has connected the line through the network to the trunk it:

- (a) Tests the T and R leads for continuity.

(b) Tests the S lead for a false ground.

(c) If above tests are satisfactory, it releases the F relay.

(d) Releases itself.

1.06 The release of relay F operates the S relay over the customers loop.

1.07 The operation of relay S:

- (a) Provides a holding ground for the S1 relay.
- (b) Closes the ST and ST1 lead loop as a start signal for the announcement machine.

1.08 When the announcement machine starts up, it places a ground pulse on the CT lead approximately 1-second before the beginning of the announcement. This pulse is repeated on every announcement cycle as long as the machine is running. The CT relay follows this ground pulse and causes the following sequence of relay operations:

(a) Option Z - 1 Announcement

CT	P	CT1	W	Z	TR
+	+	+			
-	-		+		
+	+				+
-	-		-		

(b) Option Y - 2 Announcements

CT	P	CTL	W	Z	TR
+	+	+			
-	-		+		
+	+			+	
-	-		-		
+	+				+
-	-			-	

1.09 The operation of the CTL relay:

- (a) Provides the operating ground for the W, Z, and TR relays.
- (b) Provides its own locking ground.
- (c) Removes audible ringing from the R lead and cuts the T and R leads through to the announcement machine.
- (d) Provide a transfer contact in the AL lead so that a ground on this lead can operate the P and TR relays as described in 5.01.

2. TRANSFER TO OPERATOR (OPTION X OR W WITH V) - SC2

2.01 If the calling customer does not hang up before the second (option Z) or third (option Y) operation of the P relay, the TR relay will operate and cause the following:

(a) Transfer the incoming T and R leads from the announcement machine to the manual class-of-service line switch appearance.

(b) Open the start loop to stop the announcement machine.

(c) Lock to ground through a contact on the CTL relay.

(d) Release the P and W or Z relays.

(e) Start the TD timer.

(f) Partially close the operating lead for the STO relay.

(g) Partially close the operating lead for the TN relay.

2.02 If the calling customer does not hang up before the end of the 4-second TD timing interval, relay TD will operate.

2.03 The operation of relay TD:

- (a) Opens the operating path of the TN relay.
- (b) Opens one of the two paths connecting the OA inductor across the T and R leads.
- (c) Operates the STO relay.

2.04 The operation of relay STO:

- (a) Stops the TD timer and releases the TD relay.
- (b) Locks to ground through a contact on the TR relay.
- (c) Changes the timing of the TD timer from 4 seconds to 2 seconds.
- (d) Connects the OA inductor across the T and R leads as an off-hook signal on the manual class-of-service line circuit.

2.05 The off-hook signal causes the manual line circuit to be connected through the switching network to an outgoing trunk terminating at an assistance operators position. The outgoing trunk places a resistance ground (18.7 ohms) on the S lead. This resistance ground places a reverse bias on the input of the Q1 transistor preventing its operation and keeping the SLA relay in its idle state. The resistance ground does, however, operate the SL relay.

2.06 The operation of the SL relay:

(a) Closes a second path to keep the OA inductor across the T and R leads after the TD relay operates at a later time.

(b) Connects the negative biasing resistor to the base of the Q1 transistor to prepare it for later operation.

2.07 When the operator answers, the outgoing trunk changes the resistance ground on the S lead to a direct ground. This direct ground places a forward bias on the input of the Q1 transistor, turning it on and operating the SLA relay. Resistor E is a current limiting resistor, and resistor A and B are used as a voltage dividing biasing network. The B capacitor and D1 diode provide surge protection for the Q1 transistor.

2.08 The operation of relay SLA:

(a) Starts the TD timer.

(b) Operates the TN relay.

2.09 The operation of the TN relay connect audible ringing tone to the line to identify the nature of this call to the assistance operator.

2.10 The TD timer operates after a 2-second interval operating the TD relay.

2.11 The operation of relay TD releases the TN relay.

2.12 The release of relay TN removes the audible ringing tone from the line enabling the assistance operator to talk to the calling customer.

3. TRANSFER WITH FORCED DISCONNECT (OPTION W WITHOUT V) - SC4

3.01 If the calling customer does not hang up before the second (option Z) or third (option Y) operation of the P relay, the TR relay will operate and cause the following:

(a) Open the holding ground on the S lead to the trunk switch and connector circuit to release the channel.

(b) Open the start loop to stop the announcement machine.

(c) Transfer the incoming T and R leads from the announcement machine to the line, line switch, and connector circuit appearance which is not cross-connected.

(d) Release the P and W or Z relays.

3.02 The release of the channel will:

(a) Drop the line to line lockout which causes 120 IPM overflow tone to be returned to the calling customer.

(b) Open the T and R leads to release relay S which in turn releases relay S1 and then CT1, MB, and TR to return this circuit to normal.

4. CUSTOMER DISCONNECT - SC3

4.01 When the calling customer hangs up, relay S releases.

4.02 The release of relay S:

(a) Releases the S1 relay.

(b) Removes the start signal to the announcement machine (if the call was not transferred).

4.03 The release of relay S1:

(a) Releases the CT1 relay.

(b) Releases the MB relay.

(c) Releases the line channel.

4.04 The release of relay CT1:

(a) Releases the W or Z relay (if the call was not transferred).

(b) Releases the TR relay (if the call was transferred).

4.05 The release of relay TR (if the call was transferred):

(a) Releases the STO relay.

(b) Releases the TD relay.

4.06 The release of relay STO sends an on-hook signal to the assistance operator (if the call was transferred).

4.07 The assistance operator disconnects which releases the SL and SLA relays (if the call was transferred).

4.08 The trunk is now in its idle state.

5. ANNOUNCEMENT MACHINE BYPASS - SC1

5.01 The voice alarm and control circuit will ground the AL lead in the event of an announcement machine failure, or to

intentionally bypass the announcement machine either temporarily or permanently. This will cause the following sequence of operations when this circuit is seized:

- (a) Relay F operates.
- (b) Relay S1 operates.
- (c) Relay MB operates.
- (d) Relay F releases.
- (e) Relay S operates.
- (f) Start signal to announcement machine.
- (g) Lead AL grounded.
- (h) Relay P operates.
- (i) Relay CT1 operates.
- (j) Relay TR operates.
- (k) From here on the operations are the same as in 2. or 3. depending upon the option provided.

6. TESTING

6.01 Testing of this trunk is performed by setting up a test connection to this trunk from a test line. Routine operations are performed from the test line in the same manner as for a regular service call.

7. MISCELLANEOUS

- 7.01 A 185A network is connected across the CT relay winding to protect its operating contact.
- 7.02 The T and R capacitors are provided to isolate the input circuit from the output circuit.
- 7.03 The T1, R1, and A capacitors are provided to isolate the AC tones and DC signals.
- 7.04 The T and R resistors are provided to match the trunk impedance with the announcement machine impedance.
- 7.05 The TD capacitor and C and D resistors are the timing elements of the TD time delay circuit.
- 7.06 Network S is provided to protect the diodes in the line circuits.
- 7.07 Inductor OA is provided to block the talking currents from the DC supervisory path.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

- 1.01 See the No. 3 crossbar keysheet for customer line supervision limits.

2. FUNCTIONAL DESIGNATIONS

2.01 Relays

<u>Designation</u>	<u>Meaning</u>
CT	Cut-Through
CT1	Auxiliary Cut-Through
F	Frame
MB	Make-Busy
P	Pulsing
S	Subscriber
S1	Sleeve (Trunk)
SL	Sleeve (Line)
SLA	Auxiliary Sleeve (Line)
STO	Start Operator
TD	Time Delay
TN	Tone
TR	Transfer
W } Z }	Walking

3. FUNCTIONS

- 3.01 See SECTION I and II for functions of this circuit.

4. CONNECTING CIRCUITS

4.01 When this circuit is listed on a key-sheet, the connecting information thereon shall be followed.

- (a) Trunk Switch and Connector Circuit - SD-26383-01.
- (b) Line, Line Switch, and Connector Circuit - SD-26382-01.
- (c) Announcement Circuit - SD-26435-01.
- (d) Voice Alarm and Control Circuit - SD-26390-01.

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SD-26390-01.

(e) Traffic Usage Recorder Circuit -
SD-96494-01.

(f) Test Circuit - SD-26411-01.

(g) PRTD Circuit - SD-26414-01.

(h) Time Delay Control Circuit -
SD-94820-01.

5. MANUFACTURING TESTING REQUIREMENTS

5.01 This circuit shall be capable of performing all of the functions listed in this Circuit Description and meeting the requirements listed in the Circuit Requirement Tables.

6. TAKING EQUIPMENT OUT OF SERVICE

6.01 If it is desired to remove this trunk from service for trouble or other reasons, the test circuit is arranged to ground the MB lead which operates the MB relay. This sets the trunk in the busy state.

6.02 The test circuit can ground the MB lead by either of the following methods:

- (a) Insertion of a make-busy plug in the associated TRK MB- jack.

(b) Operation of the remote make-busy facilities if they are provided.

6.03 Removal of ground from the MB lead will restore this circuit to service.

SECTION IV - REASON FOR REISSUE

D. Description of Changes

D.01 To expand the use of this circuit to include special announcements in addition to vacant code announcements.

D.02 To arrange this circuit to force release after 1 or 2 announcements when advancement to an operator is not desired. Wiring options W and V are added replacing option X (Mfr Disc.).

D.03 Change title from:

CROSSBAR SYSTEMS
NO. 3
OUTGOING PLUG-ENDED TRUNK
CIRCUIT
VACANT CODE TO ANNOUNCEMENT MACHINE

to read:

CROSSBAR SYSTEMS
NO. 3
OUTGOING INTERCEPT PLUG-ENDED TRUNK
CIRCUIT
TO ANNOUNCEMENT MACHINE
FOR VACANT CODE OR SPECIAL ANNOUNCEMENTS

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