

OUTGOING TRUNK CIRCUIT TO SWITCHBOARD NO. 3CL IN DISTANT
BUILDING HIGH-LOW SUPERVISION REVERSE BATTERY RINGBACK COIN
CONTROL ON TIP AND RING (SD-2H105)—TEST
NO. 2 AND NO. 2B ELECTRONIC SWITCHING SYSTEMS

1. GENERAL

1.01 This section describes the method of testing the outgoing trunk circuit (SD-2H105) to switchboard No. 3CL in distant building high-low supervision reverse battery ringback coin control on tip and ring used in the No. 2 or No. 2B Electronic Switching Systems (ESS).

1.02 The following tests will be performed:

A. Circuit State and Scan Point Operation:

This test verifies the operation of the circuit relays and the saturation of the ferrod sensors associated with the outgoing trunk circuit.

B. Transmission Loss Measurements:

This test verifies the transmission loss of the outgoing trunk circuit.

1.03 The outgoing trunk circuit tests are performed on a periodic basis as prescribed by the equipment test list or when a malfunction of the circuit is suspected.

1.04 The tests will be performed from the trunk test panel (TTP) in conjunction with the maintenance center display buffer and teletypewriter (TTY). For detailed information about the TTP and its operation, refer to Section 232-130-301, Trunk Test Panel—Method of Operation.

1.05 The keys on the TTP may be either a locking or a nonlocking type. In order to differentiate between the two types of keys, the use of a locking type key shall be identified by the words "operate" and "release" and the use of a nonlocking type key shall be identified by the word "depress" in the ACTION column.

Note: Nonlocking keys require a depression of at least one-half second to ensure system recognition.

1.06 **Lettered Steps:** A letter a, b, c, etc, added to a step number in Part 3 or 4 of this section indicates an action which may or may not be required depending on local conditions. The condition under which a lettered step or series of lettered steps should be made is given in the ACTION column and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

2. APPARATUS

Note: Equivalent apparatus may be substituted.

2.01 KS-14510 L1 volt-ohm-milliammeter (VOM).

2.02 KS-14510 L3 test leads (one red and one black).

2.03 Two 2P4A cord assemblies consisting of a P2B cord 3 feet long and two 310 plugs.

2.04 Two 2W6A cord assemblies consisting of a W2C cord 10 feet long with a 310 plug on one end and two 59-type cord tips on the other.

2.05 One 262C-type (900 ohm) plug.

2.06 Transmission measuring set (TMS), 23D. Equivalent apparatus must be capable of measuring power in 900-ohm circuits at 1 kHz. The accuracy must be ± 0.1 dB from -15 dBm to +10.0 dBm at 1 kHz.

NOTICE

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Note: This item will not be required if the TTP is equipped with a TMS.

bbb = MEMN

The system response is as follows:

AR VY TRK aaa bbb

DSP ss rrb
SPN ss rrb

ss = scanner number

rr = scanner row

bb = bit in row

The bb bit represents the first ferrod sensor (0 for SPN and 2 for DSP) in the scanner row that is associated with the specific circuit. All other ferrod sensors assigned to the same circuit follow in consecutive order (0 and 1 for SPN or 2 and 3 for DSP). Refer to the output message manual (OM-2H200) for explanation of other data fields, if required.

3. PREPARATION

3.01 Refer to the office records to obtain the following information about the circuit to be tested:

- (a) Trunk group number (TGN)
- (b) Member number (MEMN)
- (c) Supervisory scan point number (SPN)
- (d) Directed scan point number (DSP)
- (e) The protector block assignment for the outgoing trunk circuit at the protector frame.

Note: When the trunk enters the office through carrier equipment, it will not appear at a protector block.

3.02 Verify the scan point numbers obtained from the office records as follows:

At the maintenance TTY, type in:

A VY:TRK:aaa bbb!

aaa = TGN

3.03 Before proceeding with PREPARATION, instruct the switchboard operator that the trunk circuit under test is maintenance busy.

3.04 The following is a step-by-step procedure to make the outgoing trunk circuit traffic busy and connect it to the TTP (Fig. 1).

STEP	ACTION	VERIFICATION
All Tests		
1	At telephone set on TTP— Operate access trunk 1 key.	
2	Lift handset off-hook, or operate TRFR key at TEL CKT on TTP if using headset.	At telephone set— Access trunk 1 lamp lighted. At ACCESS TRUNK 1 CONTROL— SUPV lamp lighted. At TEL CKT— TRFR lamp lighted if TRFR key is operated.
3	At TOUCH-TONE® dial— Dial 1 + TGN + MEMN + ST.	At ACCESS TRUNK 1 CONTROL— EQPT ST lamp lighted steadily or flashing at a rate of 120 interruptions per minute. At MISC TEST CONTROL— P & E lamp lighted if connection was successful.

STEP	ACTION	VERIFICATION
		<i>Note:</i> If the EQPT ST lamp is flashing and the P & E lamp is not lighted steadily, the TTP is not connected to the circuit to be tested.
4a	If the P & E is not lighted steadily— At ACCESS TRUNK 1 CONTROL— Depress RLS key.	
5a	Repeat Steps 3 and 4a until connection is successful.	
6	Place handset on-hook, or release TRFR key.	At telephone set— Access trunk 1 lamp extinguished. At TEL CKT— TRFR lamp extinguished.
4. METHOD		(2) Troubleshoot the circuit which failed
4.01	If the verification procedure fails or if a malfunctioning circuit is indicated during any part of these tests, proceed as follows:	(3) Replace faulty circuit components using standard repair procedures
	(1) Discontinue the test	(4) Repeat the test that failed. If verification is successful, continue the test.

STEP	ACTION	VERIFICATION
A. Circuit State and Scan Point Operation		
7	Use the TTY printout from 3.02 to determine the trunk scanner and number of the scanner row of the DSP. The DSP is associated with ferrod sensors 2 and 3 of the outgoing trunk circuit.	
8	At maintenance TTY— For No. 2 ESS offices type in: UBRL TS:RSN:ssrr! ss = number of trunk scanner for DSP in decimal (0-11) from Step 7. rr = number of scanner row for DSP in decimal (0-63) from Step 7.	
	For No. 2B ESS offices type in: MON:TSSN ssrr;RDT LAMPS! ss = number of trunk scanner in decimal (0-11) from Step 7. rr = number of scanner row in decimal (0-63) from Step 7. RDT LAMPS = Direct the results to the DISPLAY BUFFER.	At maintenance for No. 2 ESS or the System Status Panel (SSP) for No. 2B ESS— Scanner row containing specific scan points displayed on DISPLAY BUFFER lamps. Lamps associated with ferrod sensors connected to circuit under test lighted.

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STEP	ACTION	VERIFICATION
9	At ACCESS TRUNK 1 CONTROL— Depress VM key.	At ACCESS TRUNK 1 CONTROL— VM lamp lighted. At VOLTMETER CONTROL— 100K lamp lighted. At VOLTMETER— Meter indicates 0.
10	At VOLTMETER CONTROL— Operate TR REV key.	At VOLTMETER CONTROL— TR REV lamp lighted. At VOLTMETER— Meter indicates 0.
11	Depress FEMF key.	At VOLTMETER CONTROL— FEMF lamp lighted. 100K lamp extinguished. At VOLTMETER— Meter indicates 0.
12	Release TR REV key.	At VOLTMETER CONTROL— TR REV lamp extinguished. At VOLTMETER— Meter indicates 0.
13	Depress MET VM key.	At VOLTMETER CONTROL— FEMF lamp extinguished. MET VM lamp lighted. At VOLTMETER— Meter indicates 0.
14	Establish a connection to the switchboard from the local office to perform the following tests. Advise operator that a test is being conducted and assistance is required.	
15	Request switchboard operator to apply positive voltage to tip.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 2 extinguished. Lamp associated with ferrod sensor 3 lighted. At circuit under test— Relay CN operated.
16	Request switchboard operator to remove voltage from tip.	Lamps associated with ferrod sensor 2 lighted. At circuit under test— Relay CN released.
17	Request switchboard operator to apply positive voltage on ring.	At DISPLAY BUFFER— Lamps associated with ferrod sensors 2 and 3 extinguished. At circuit under test— Relays RC and CN operated.
18	At test and control unit— Set PD GROUP switch to 0-5 position.	

STEP	ACTION	VERIFICATION
19	At PERIPHERAL DECODER POINTS— Operate 2 key.	At PERIPHERAL DECODER POINTS— 2 lamp lighted.
20	Depress AT 1 key.	At switchboard— Low impedance signal on tip and ring leads At circuit under test— Relay C operated. Relays RC and CN remain operated.
21	At PERIPHERAL DECODER POINTS— Release 2 key.	At PERIPHERAL DECODER POINTS— 2 lamp extinguished.
22	Depress AT 1 key.	At circuit under test— Relay C released.
23	Request switchboard operator to remove voltage from ring.	At DISPLAY BUFFER— Lamps associated with ferrod sensors 2 and 3 lighted. At circuit under test— Relays RC and CN released.
24	Use the protector block assignment from 3.01 to locate and remove the protector block assigned to the outgoing trunk circuit. <i>Note:</i> In order to perform these tests, the tip and ring leads coming into the circuit must be open. If the trunk circuit does not appear a protector block, open the tip and ring leads into the trunk circuit in accordance with local procedures.	
25	Using a 2W6A cord connect the trunk side appearance of the tip and ring of the outgoing trunk circuit to the SP jack nearest the protector block. <i>Note:</i> Make sure no other connection is made to the SP jack in the office. If transmission measurements cannot be made via SP jack, connect test equipment to trunk side appearance of the tip and ring instead of using SP jack.	
26	At maintenance TTY— For No. 2 ESS offices type in: UB SY:CLB! For No. 2B ESS offices type in: STOP:UTIL!	
27	Use the TTY printout from 3.02 to determine the trunk scanner and number of the scanner	

STEP	ACTION	VERIFICATION
	row of the SPN. The SPN is associated with ferrod sensors 0 and 1 of the outgoing trunk circuit.	
28	<p>At maintenance TTY— For No. 2 ESS offices type in: UBRL TS:RSN:ssrr! ss = number of trunk scanner for SPN in decimal (0-11) from Step 27. rr = number of scanner row for SPN in decimal (0-63) from Step 27.</p> <p>For No. 2B ESS offices type in: MON:TSSN ssrr;RDT LAMPS! ss = number of trunk scanner in decimal (0-11) from Step 27. rr = number of scanner row in decimal (0-63) from Step 27. RDT LAMPS = Direct the results to the DISPLAY BUFFER.</p>	
29	At PERIPHERAL DECODER POINTS— Operate 0 key.	At PERIPHERAL DECODER POINTS— 0 lamp lighted.
30	Depress AT 1 key.	<p>At circuit under test— Relay A operated. At VOLTMETER— Meter indicates between 42.75 and 52.5 volts on the 120-volt scale.</p>
31	<p>At front of writing shelf— Insert 262C-type (900 ohm) plug into ACCESS TRK-1 jack.</p>	<p>At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 extinguished.</p>
32	Remove 262C-type (900 ohm) plug from ACCESS TRK-1 jack.	Lamp associated with ferrod sensor 0 lighted.
33	At PERIPHERAL DECODER POINTS— Operate 1 key.	At PERIPHERAL DECODER POINTS— 1 lamp lighted.
34	Depress AT 1 key.	<p>At circuit under test— Relay B operated. Relay A remains operated. At VOLTMETER— Meter indicates between 42.75 and 52.5 volts on the 120-volt scale.</p>
35	<p>Connect VOM to SP jacks with 2W6A assembly. Use test leads to connect positive side of the VOM to ring and negative side to tip of the 59-type cord tips on 2W6A cord assembly.</p>	<p>At VOM— Meter indicates between 42.75 and 52.5 volts on the 60-volt scale.</p>

STEP	ACTION	VERIFICATION
36	Remove the cord from the SP jack.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 lighted.
37	Insert the 262C-type (900 ohm) plug into the SP jack.	Lamp associated with ferrod sensor 0 extinguished.
38	Remove 262C-type (900 ohm) plug from the SP jack.	Lamp associated with ferrod sensor 0 lighted.
39	At PERIPHERAL DECODER POINTS— Operate 2 key.	At PERIPHERAL DECODER POINTS— 2 lamp lighted.
40	Depress AT 1 key.	At circuit under test— Relay C operated. Relays A and B remains operated.
41	At front of writing shelf— Insert 262C-type (900 ohm) plug into ACCESS TRK-1 jack.	At DISPLAY BUFFER— Lamp associated with ferrod sensors 0 and 1 extinguished.
	<i>Note:</i> Relays H, RC and CN have high and low impedance windings which are used to provide on-hook and off-hook signals to the switchboard under the control of relay C. Operation of relay CN saturates (extinguishes) ferrod sensor 2, while the operation of relay RC saturates (extinguishes) ferrod sensor 3.	
42	Remove 262C-type (900 ohm) plug from ACCESS TRK-1 jack.	Lamp associated with ferrod sensors 0 and 1 lighted.
43	At PERIPHERAL DECODER POINTS— Release 0, 1 and 2 keys.	At PERIPHERAL DECODER POINTS— 0, 1 and 2 lamps extinguished.
44	Depress AT 1 key.	At circuit under test— Relays A, B and C released.
45	Operate 3 key.	At PERIPHERAL DECODER POINTS— 3 lamp lighted.
46	Depress AT 1 key.	At circuit under test— Relay D operated.
		At switchboard— Trunk answer lamp lighted.
	When operator answers.	Trunk answer lamp extinguished.
		At DISPLAY BUFFER— Lamp associated with ferrod sensor 1 extinguished.

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STEP	ACTION	VERIFICATION
47	At PERIPHERAL DECODER POINTS— Release 3 key.	At PERIPHERAL DECODER POINTS— 3 lamp extinguished.
48	Depress AT 1 key.	At circuit under test— Relay D released.
49	Operate 4 key.	At PERIPHERAL DECODER POINTS— 4 lamp lighted.
50	Depress AT 1 key.	At circuit under test— Relay E operated. At VOLTMETER— Meter indicates between 42.75 and 52.5 volts on the 120-volt scale.
51	Release 4 key.	At PERIPHERAL DECODER POINTS— 4 lamp extinguished.
52	Depress AT 1 key.	At circuit under test— Relay E released.
53	At front of writing shelf— Connect headset to SP jack.	
54	At PERIPHERAL DECODER POINTS— Operate 5 key.	At PERIPHERAL DECODER POINTS— 5 lamp lighted.
55	Depress AT 1 key.	At headset— Audible ring tone present. At circuit under test— Relay F operated.
56	Release 5 key.	At PERIPHERAL DECODER POINTS— 5 lamp extinguished.
57	Depress AT 1 key.	At circuit under test— Relay F released.
58	At front of writing shelf— Remove headset from SP jack.	
59	At PERIPHERAL DECODER POINTS— Operate 1 key.	At PERIPHERAL DECODER POINTS— 1 lamp lighted.
60	Depress AT 1 key.	At circuit under test— Relay B operated.
61	At VOLTMETER CONTROL— Depress 1K key. Operate GRD key.	At VOLTMETER— Meter indicates between 9.6 and 10.4 volts on 24-volt scale.

STEP	ACTION	VERIFICATION
		At VOLTMETER CONTROL— MET VM lamp extinguished. 1K lamp lighted. GRD lamp lighted.
62	At PERIPHERAL DECODER POINTS— Release 1 key.	At PERIPHERAL DECODER POINTS— 1 lamp extinguished.
63	Depress AT 1 key.	At circuit under test— Relay B released.
64	At VOLTMETER CONTROL— Depress 100K key. Release GRD key.	At VOLTMETER CONTROL— 1K lamp extinguished. GRD lamp extinguished. 100K lamp lighted.
65	At maintenance TTY— For No. 2 ESS offices type in: UB SY:CLB! For No. 2B ESS offices type in: STOP:UTIL <i>Note:</i> If transmission loss measurements are to be performed, proceed to Test B, Step 9.	At DISPLAY BUFFER— Scanner row display removed.
66	At ACCESS TRUNK 1 CONTROL— Depress RLS key.	At ACCESS TRUNK 1 CONTROL— SUPV lamp extinguished. EQPT ST lamp extinguished. VM lamp extinguished. At MISC TEST CONTROL— P & E lamp extinguished. At VOLTMETER CONTROL— 100K lamp extinguished.
67	At telephone set on TTP— Operate green release key.	
68	At protector frame— Remove 2W6A cord from SP jack and the trunk side appearance of the tip and ring of the outgoing trunk circuit.	
69	Replace the protector block or connections opened in preparation.	

B. Transmission Loss Measurements

- 7 Use the protector block assignment from 3.01
to locate and remove the protector block
assigned to the outgoing trunk circuit.

STEP	ACTION	VERIFICATION
	<p>Note: In order to perform these tests, the tip and ring leads coming into the circuit must be open. If the trunk circuit does not appear at a protector block, open the tip and ring leads into the trunk circuit in accordance with local procedures.</p>	
8	<p>Using a 2W6A cord connect the trunk side appearance of the tip and ring of the outgoing trunk circuit to the SP jack nearest the protector block.</p> <p>Note: Make sure no other connection is made to the SP jack in the office. If transmission measurements cannot be made via SP jack, connect test equipment to trunk side appearance of the tip and ring instead of using SP jack.</p>	
9	<p>At the front of the writing shelf— Use 2P4A cord to connect TRANS MEAS-DBM-0 jack to SP jack.</p>	
10	<p>At ACCESS TRUNK 1 CONTROL— Depress XMSN key.</p>	<p>At ACCESS TRUNK 1 CONTROL— XMSN lamp lighted.</p>
11	<p>At TRANSMISSION MEASURING CONTROL— Set TEST SET switch to TMS position. Set MEASURE switch to MEAS 1 position. Set SEND switch to OFF position.</p>	
12b	<p>If TTP is not equipped with TMS— At front of writing shelf— Use 2P4A cord to connect external TMS to TRANS MEAS-TM-1 jack.</p>	
13	<p>At TMS— Set ADD DBM switch to 0 position.</p>	
14	<p>At test and control unit— Set PD GROUP switch to 0-5 position.</p>	
15	<p>At PERIPHERAL DECODER POINTS— Operate 4 key.</p>	<p>At PERIPHERAL DECODER POINTS— 4 lamp lighted.</p>
16	<p>Depress AT 1 key.</p>	<p>At TMS— Meter indicates 0 to -0.5 dB. Record level for reference use. At circuit under test— Relay E operated.</p>

STEP	ACTION	VERIFICATION
17	At PERIPHERAL DECODER POINTS— Release 4 key. Operate 0 and 2 keys.	At PERIPHERAL DECODER POINTS— 4 lamp extinguished. 0 and 2 lamps lighted.
18	Depress AT 1 key.	At TMS— Meter indicates between 0 and 0.85 dB less than reference level in Step 16. At circuit under test— Relay E released. Relays A and C operated.
19	At PERIPHERAL DECODER POINTS— Operate 1 key.	At PERIPHERAL DECODER POINTS— 1 lamp lighted.
20	Depress AT 1 key.	At TMS— Meter indicates between 0 and 0.5 dB less than reference level in Step 16. At circuit under test— Relay B operated. Relays A and C remain operated.
21	At PERIPHERAL DECODER POINTS— Release 0, 1, and 2 keys.	At PERIPHERAL DECODER POINTS— 0, 1, and 2 lamps extinguished.
22	Depress AT 1 key.	At circuit under test— Relays A, B, and C released.
23	At front of writing shelf— Remove 2P4A cord from SP jack and 0 DBM jack.	
24b	If TTP is not equipped with TMS— Remove 2P4A cord from TM1 jack and external TMS.	
25	At protector frame— Remove 2W6A cord from SP jack and the trunk side appearance of the tip and ring of the outgoing trunk circuit.	
26	Replace the protector block or connections opened in preparation.	
27	At ACCESS TRUNK 1 CONTROL— Depress RLS key.	At ACCESS TRUNK 1 CONTROL— SUPV lamp extinguished. EQPT ST lamp extinguished. XMSN lamp extinguished. At MISC TEST CONTROL— P & E lamp extinguished.
28	At telephone set— Operate green release key.	

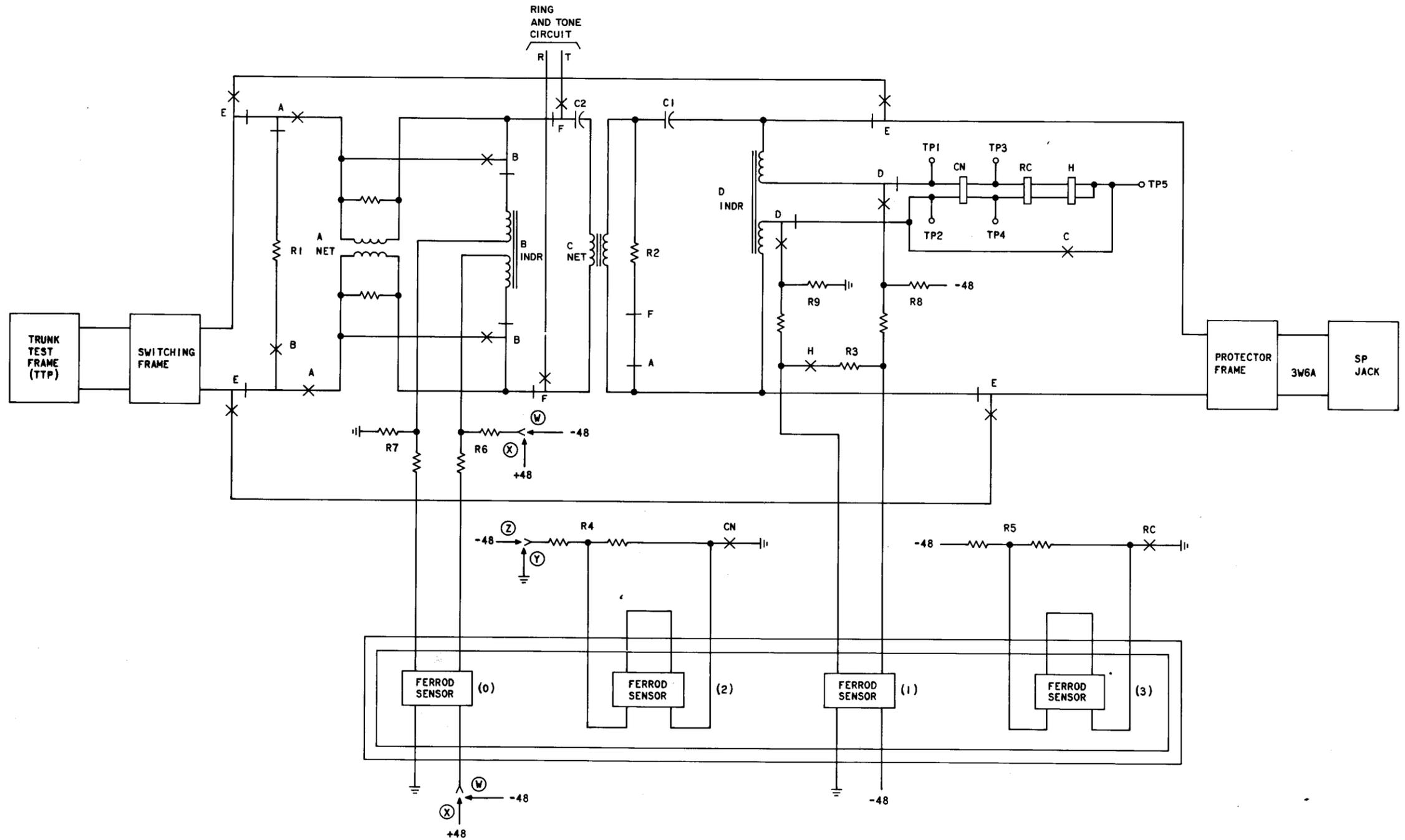


Fig. 1—Outgoing Trunk Circuit (SD-2H105)