OUTGOING TRUNK CIRCUIT TO CROSSBAR TANDEM, STEP BY STEP CAMA OR TSPS NO. 1 HIGH-LOW AND REVERSE BATTERY SUPERVISION (SD-2H144)—TESTS NO. 2 AND ▸NO. 2B◂ ELECTRONIC SWITCHING SYSTEMS

1. GENERAL

1.01 This section describes the method of testing the outgoing trunk circuit to crossbar tandem, step-by-step CAMA or TSPS No. 1 high-low and reverse battery supervision (SD-2H144) used in the No. 2 and No. 2B Electronic Switching Systems (ESS).

1.02 This section is reissued to cover the No. 2B ESS.

1.03 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.

1.04 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.

1.05 The tests will be performed from the trunk test panel (TTP) in conjunction with the maintenance 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.

1.06 The keys on the TTP may be either a locking or a nonlocking type. In order to differentiate betwween 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 the 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.

1.07 ***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.

1.08 Whenever the term TOUCH-TONE® telephone service is used, it refers to the equipment required to provide this service to the customer.

2. APPARATUS

Note: Equivalent apparatus may be substituted.

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

2.02 One 2W6A cord assembly consisting of a W2C cord at 10 feet long with a 310 plug on one end and two 59-type cord tips on the other.

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

2.04 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.

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

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) 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 the protector frame.

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

At maintenance TTY, type in:

A VY:TRK:aaa bbb!

aaa = TGN

bbb = MEMN.

The system response is as follows:

AR VY TRK aaa bbb
.
.
.
SPN ss rrbb

ss = scanner number

rr = scanner row

bb = bit in row

The bb bit represents the first ferrod sensor (0) 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, 1, 2, etc). Refer to the output message manual (OM-2H200) for explanation of other data fields, if required.

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

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 the protector frame, open the tip and ring leads into the trunk circuit in accordance with local procedures.

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.

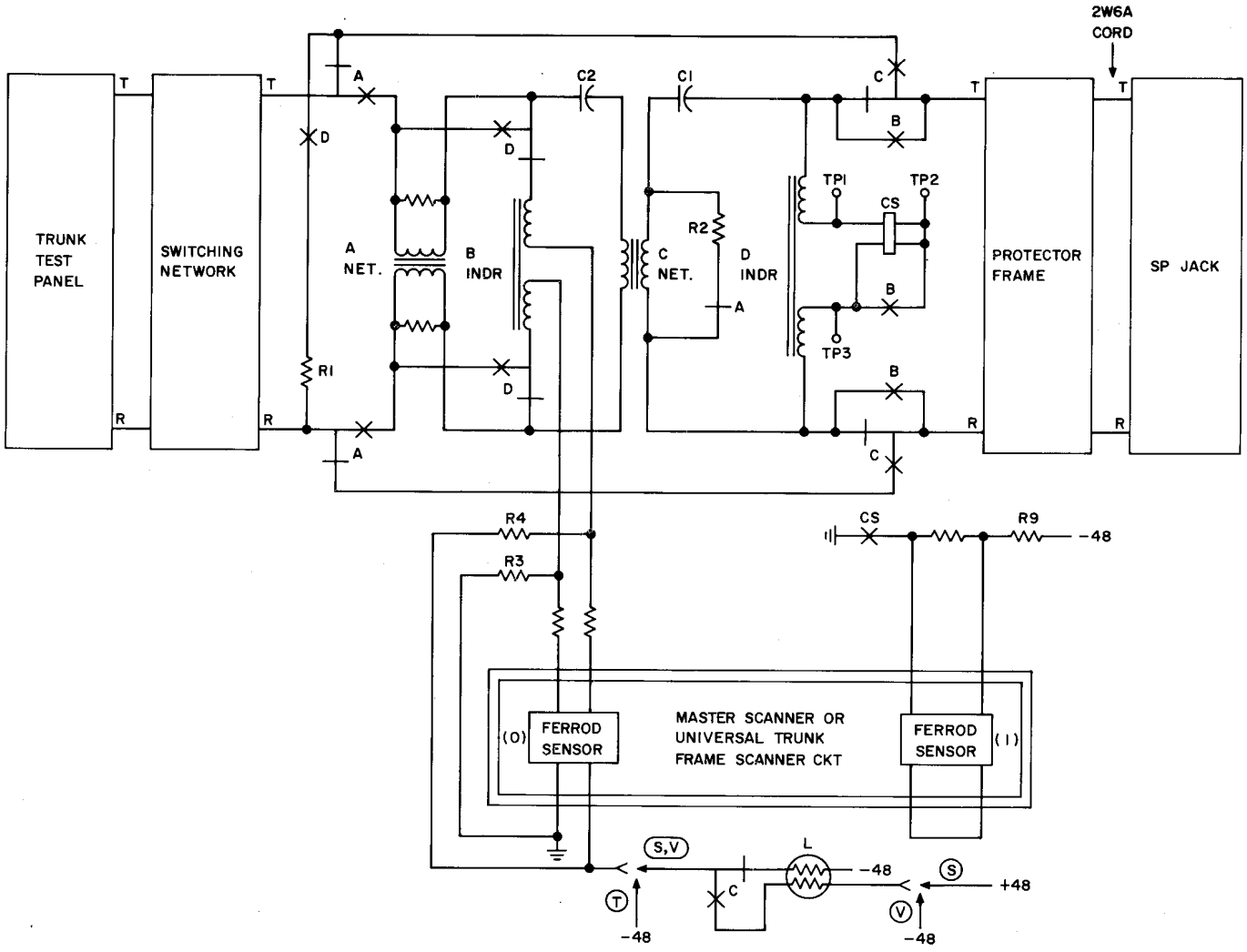

Fig. 1—Outgoing Trunk Circuit (SD-2H144)

STEP	ACTION	VERIFICATION
		At MISC TEST CONTROL— P & E lamp lighted if connection was successful. ***Note:*** 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.	

STEP	ACTION	VERIFICATION
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

4.01 If the verification procedure fails or if a malfunctioning circuit is indicated during any part of these tests, proceed as follows.

(1) Discontinue the test.

(2) Troubleshoot the circuit which failed.

(3) Replace faulty circuit components using standard repair procedures.

(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 TTP printout from 3.02 to determine the trunk scanner and number of the scanner row associated with the scan points assigned to the outgoing trunk circuit.	
8	At maintenance TTY— ▶For No. 2 ESS offices type in:◀ UBRL TS:RSN:ssrr! ss = Number of trunk scanner in decimal (0-11) from Step 7. rr = Number of scanner row 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 result to the DISPLAY BUFFER.◀	At DISPLAY BUFFER— Scanner row containing specific scan points displayed on DISPLAY BUFFER lamps. Lamps associated with ferrod sensors connected to circuit under test lighted.
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.

STEP	ACTION	VERIFICATION
		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	Set PD GROUP switch to 0-5 position.	
15	At PERIPHERAL DECODER POINTS— Operate 0, 1, 2, and 3 keys.	At PERIPHERAL DECODER POINTS— 0, 1, 2, and 3 lamps lighted.
16	Depress AT 1 key.	At circuit under test— Relays A, B, C, and D operated.
17	At PERIPHERAL DECODER POINTS— Release 0, 1, and 2 keys.	At PERIPHERAL DECODER POINTS— 0, 1, and 2 lamps extinguished.
18	Depress AT 1 key.	At circuit under test— Relays A, B, and C released. Relay D remains operated.
19	At VOLTMETER CONTROL— Depress 1K key. Operate GRD key.	At VOLTMETER— Meter indicates between 9.6 and 10.4 volts on 24-volt scale. At VOLTMETER CONTROL— MET VM lamp extinguished. 1K lamp lighted. GRD lamp lighted.
20	Release GRD key. Depress MET VM key.	GRD lamp extinguished. 1K lamp extinguished. MET VM lamp lighted. At VOLTMETER— Meter indicates 0.
21	At PERIPHERAL DECODER POINTS— Release 3 key. Operate 0 key.	At PERIPHERAL DECODER POINTS— 3 lamp extinguished. 0 lamp lighted.

STEP	ACTION	VERIFICATION
22	Depress AT 1 key.	At VOLTMETER— Meter indicates between 42.75 and 52.5 volts on 120-volt scale. At circuit under test— Relay D released. Relay A operated.
23	At front of writing shelf— Insert 262C-type (900 ohm) plug into ACCESS TRK-1 jack.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 extinguished.
24	At PERIPHERAL DECODER POINTS— Release 0 key.	At PERIPHERAL DECODER POINTS— 0 lamp extinguished.
25	Depress AT 1 key.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 lighted. At circuit under test— Relay A released.
26	At front of writing shelf— Remove 262C-type (900 ohm) plug from ACCESS TRK-1 jack.	
27b	If circuit is equipped with option V— At PERIPHERAL DECODER POINTS— Operate 0 and 2 keys.	At PERIPHERAL DECODER POINTS— 0 and 2 lamps lighted.
28b	Depress AT 1 key.	At VOLTMETER— Meter indicates between 42.75 and 52.5 volts on 120-volt scale. At circuit under test— Relays A and C operated.
29b	At PERIPHERAL DECODER POINTS— Release 0 and 2 keys.	At PERIPHERAL DECODER POINTS— 0 and 2 lamps extinguished.
30b	Depress AT 1 key.	At VOLTMETER— Meter indicates 0. At circuit under test— Relays A and C released.
31c	If circuit is equipped with option S— At VOLTMETER CONTROL— Operate VM REV key.	At VOLTMETER CONTROL— VM REV lamp lighted.
32c	At PERIPHERAL DECODER POINTS— Operate 0 and 2 keys.	At PERIPHERAL DECODER POINTS— 0 and 2 lamps lighted.
33c	Depress AT 1 key.	At VOLTMETER— Meter indicates between 42.75 and 52.5 volts on 120-volt scale.

STEP	ACTION	VERIFICATION
		At circuit under test— Relays A and C operated.
34c	At PERIPHERAL DECODER POINTS— Release 0 and 2 keys.	At PERIPHERAL DECODER POINTS— 0 and 2 lamps extinguished.
35c	Depress AT 1 key.	At VOLTMETER— Meter indicates 0. At circuit under test— Relays A and C released.
36c	At VOLTMETER CONTROL— Release VM REV key.	At VOLTMETER CONTROL— VM REV lamp extinguished.
37	At PERIPHERAL DECODER POINTS— Operate 1 and 2 keys.	At PERIPHERAL DECODER POINTS— 1 and 2 lamps lighted.
38	Depress AT 1 key.	At circuit under test— Relays B and C operated.
39	At MISCELLANEOUS UNIT (power connections)— Connect 59-type tips of 2W6A cord to −48 volts and ground. Use appropriate test leads to connect −48 volts to tip (white wire) and ground to ring (blue wire).	
40	At front of writing shelf— Connect 310 plug of 2W6A cord to ACCESS TRK-1 jack.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 1 extinguished. At circuit under test— Relay CS operated.
41	Remove 2W6A cord connecting ACCESS TRK-1 jack to −48 volts and ground.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 1 lighted. At circuit under test— Relay CS released.
42	At PERIPHERAL DECODER POINTS— Release 1 and 2 keys.	At PERIPHERAL DECODER POINTS— 1 and 2 lamps extinguished.
43	Depress AT 1 key.	At circuit under test— Relays B and C released.
44	At maintenance TTY— ◗For No. 2 ESS offices type in:◖ UB SY:CLB! ◗For No. 2B ESS offices type in: STOP:UTIL!◖	At DISPLAY BUFFER— Scanner row display removed.
	Note: If transmission loss measurements are to be performed, proceed to Test B.	

STEP	ACTION	VERIFICATION
45	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.
46	At telephone set on TTP— Operate green release key.	
47	Replace the protector block or connection opened in preparation.	

B. Transmission Loss Measurements

7	At the protector frame— Use 2W6A cord to connect the trunk side appearance of the tip and ring of the outgoing trunk circuit to the SP jack nearest the protector frame. ***Note:*** Make sure no other connection is made to the SP jacks 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.	
8	At the front of the writing shelf— Use 2P4A cord to connect TRANS MEAS—DBM-0 jack to SP jack.	
9	At ACCESS TRUNK 1 CONTROL— Depress XMSN key.	At ACCESS TRUNK 1 CONTROL— XMSN lamp lighted.
10	At TRANSMISSION MEASURING CONTROL— Set TEST SET switch to TMS position. Set MEASURE switch to MEAS 1 position. Set SEND switch to OFF position.	
11b	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.	
12	At TMS— Set ADD DBM switch to 0 position.	
13	At PERIPHERAL DECODER POINTS— Operate 2 key.	At PERIPHERAL DECODER POINTS— 2 lamp lighted.

STEP	ACTION	VERIFICATION
14	Depress AT 1 key.	At TMS— Meter indicates 0 to −0.5 dB. Record level for reference use. At circuit under test— Relay C operated.
15c	If circuit is equipped with option X— At PERIPHERAL DECODER POINTS— Release 2 key. Operate 0 key.	At PERIPHERAL DECODER POINTS— 2 lamp extinguished. 0 lamp lighted.
16c	Depress AT 1 key.	At TMS— Meter indicates between 0 and 0.85 dB less than reference level in Step 14. At circuit under test— Relay C released. Relay A operated.
17d	If circuit is equipped with option W— At PERIPHERAL DECODER POINTS— Release 2 key. Operate 0 and 1 keys.	At PERIPHERAL DECODER POINTS— 2 lamp extinguished. 0 and 1 lamps lighted.
18d	Depress AT 1 key.	At TMS— Meter indicates between 0 and 0.85 dB less than reference level in Step 14. At circuit under test— Relay C released. Relays A and B operated.
19	At PERIPHERAL DECODER POINTS— Operate 3 key.	At PERIPHERAL DECODER POINTS— 3 lamp lighted.
20	Depress AT 1 key.	At TMS— Meter indicates between 0 and −0.5 dB less than reference level in Step 14. At circuit under test— Relay D operated. If circuit is equipped with option X— Relay A remains operated. If circuit is equipped with option W— Relays A and B remain operated.
21	At PERIPHERAL DECODER POINTS— Release all keys.	At PERIPHERAL DOCODER POINTS— All lamps extinguished.
22	Depress AT 1 key.	At circuit under test— All relays released.
23	At front of writing shelf— Remove 2P4A cord from SP jack and 0 DBM jack.	

STEP	ACTION	VERIFICATION
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.	