FOREIGN EXCHANGE TRUNK CIRCUIT (SD-2H174)

TESTS

NO. 2 AND NO. 2B ELECTRONIC SWITCHING SYSTEMS

1. GENERAL

1.01 This section describes the method of testing the foreign exchange trunk circuit (SD-2H174) used in the No. 2 and No. 2B Electronic Switching Systems (ESS).

1.02 This section is reissued to include changes due to the EF-2 and 2B EF-2 generic programs.

1.03 ⧫New (conventional) service order codes were adopted for use with the EF-2 and 2B-EF-2 generic programs. However, the translations can be configured with the old (No. 2 ESS unique) service order codes as an option. These old codes are common to all previous No. 2 and No. 2B ESS generic programs. The EF-2 and 2B-EF-2 generic programs can be arranged to recognize either option. In this section the term "conventional (new)" or "No. 2 ESS unique (old)" is used to identify the service order code for the keywords in each TTY input message given.⧫

1.04 The foreign exchange trunk circuit is used to handle incoming and outgoing calls. These calls may originate or terminate locally, or they may be switched tandem through the office.

1.05 The following tests will be performed:

A. Circuit State and Scan Point Operation: This test verifies the operation of circuit relays and saturation of ferrod sensors associated with the foreign exchange trunk circuit.

B. Transmission Loss Measurements: This test verifies the transmission loss of the foreign exchange trunk circuit in the various states.

1.06 The tests in this section are to be performed on a periodic basis as prescribed by the No. 2 and No. 2B ESS equipment test list or when a malfunction of one of the circuits is suspected.

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

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

1.08 ***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 a 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.

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

2. APPARATUS

2.01 Transmission measuring set (TMS) 23D, or equivalent with appropriate test leads. Equivalent apparatus must be capable of measuring power in 900-ohm circuits at 1 kHz. The accuracy

must be ±0.1 dB at 1 kHz at normal room temperature and the range from -15 dBm to +10.0 dBm.

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

2.02 One 2W6A cord assembly consisting of a W2C cord, 10 feet in length or longer, with a 310 plug on one end and two 59-type cord tips on the other end.

2.03 One 2P4A cord assembly consisting of a P2B cord 3 feet in length or longer, with a 310 plug on each end.

2.04 One 1000-ohm resistor.

2.05 Two 1W13A cord assemblies consisting of an 893 type cord, 3 feet in length or longer, with a 360A tool on one end and a KS-6278 connecting clip on the other end.

2.06 ▶One 262B type plug.◀

3. PREPARATION

3.01 Refer to office records to obtain the trunk group number (TGN), member number (MEMN), and scan point number (SPN) of the foreign exchange trunk circuit (SD-2H174).

3.02 Verify the SPN obtained from office records as follows:

At maintenance TTY type in:

A VY:TRK:aaa bbb!

aaa = TGN

bbb = MEMN

▶***The system response for offices using No. 2 ESS unique (old) code is as follows:***◀

AR VY TRK aaa bbb
.
.
.
SPN ss rrbb
ss = scanner number

▶***The system response for offices using conventional (new) code is as follows:***

AR VY TRK aaa bbb
.
.
.
SP ss rrbb

ss = scanner number
rr = scanner row
bb = bit in row◀

The bb field represents the first ferrod (0) in the scanner row; all other ferrods follow in consecutive order, i.e., (0, 1, 2, etc)

Refer to input message manual (IM-2H200) and output message manual (OM-2H200) for interpretation of machine language.

3.03 Inform the attendant operator that the foreign exchange trunk circuit is going to be maintenance busy while tests are being performed on that circuit.

3.04 Use the following procedure for gaining access to the circuit under test.

STEP	ACTION	VERIFICATION
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

STEP	ACTION	VERIFICATION
		a rate of 120 interruptions per minute. At MISC TEST CONTROL— P & E lamp lighted steadily 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 lamp 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

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.

A. Circuit State and Scan Point Operation

STEP	ACTION	VERIFICATION
7	At ACCESS TRUNK 1 CONTROL— Depress VM key.	At ACCESS TRUNK 1 CONTROL— VM lamp lighted. At VOLTMETER CONTROL— 100K lamp lighted.
8	At VOLTMETER CONTROL— Operate GRD key.	At VOLTMETER CONTROL— GRD lamp lighted. At VOLTMETER— Meter indicates 0. A deflection on the voltmeter indicates a resistance between the tip and ring leads.
9	▸At VOLTMETER CONTROL— Release GRD key.	At VOLTMETER CONTROL— GRD lamp extinguished. FEMF lamp remains lighted.
10	At VOLTMETER CONTROL— Operate TR REV key.	At VOLTMETER CONTROL— TR REV lamp lighted.

STEP	ACTION	VERIFICATION
		At VOLTMETER— Meter indicates 0.
11	At VOLTMETER CONTROL— Depress FEMF key.	At VOLTMETER CONTROL— FEMF lamp lighted. 100K lamp extinguished. At VOLTMETER— Meter indicates 0.
12	At VOLTMETER CONTROL— Release TR REV key.	At VOLTMETER CONTROL— TR REV lamp extinguished. At VOLTMETER— Meter indicates 0.
13	At VOLTMETER CONTROL— Depress MET VM key.	At VOLTMETER CONTROL— MET VM lamp lighted. FEMF lamp extinguished. At VOLTMETER— Meter indicates 0.◀
14	At STATE CHANGE CONTROL— Set PD GROUP switch to 0-5 position.	
15	From the TTY printout obtained in 3.02, determine the scanner number and the row number of the scan points assigned to the circuit under test.	
16	At maintenance TTY— For No. 2 ESS offices— Type in: UBRL TS:RSN:ssrr! ss = Scanner number of trunk in decimal (00-11). rr = Number of scanner row in decimal (00-63)	
	For No. 2B ESS offices type in: MON:TSSN ssrr;RDT LAMPS! ss = Number of trunk scanner in decimal ▶(00-11 for offices using the 2B-EF-1 generic program) or (00-30 for offices using 2B-EF-2 generic program)◀	At DISPLAY BUFFER— Scanner row containing specific scan points is displayed on DISPLAY BUFFER. Lamps associated with ferrod sensors connected to circuit under test are lighted.
17	At PERIPHERAL DECODER POINTS— Operate 2 key.	At PERIPHERAL DECODER POINTS— 2 lamp lighted.
18	▶At front of writing shelf on TTP— Plug 262B type plug into ACCESS TRK-1 jack. ***Note:*** The voltmeter is disconnected from the circuit when ACCESS TRK-1 jack is used.◀	

STEP	ACTION	VERIFICATION
19	At PERIPHERAL DECODER POINTS— Depress AT 1 key.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 extinguished. At circuit under test— Relay C operated. At VOLTMETER— Meter indicates between 42.75 and 52.5 volts on the 120-volt scale.
20	At PERIPHERAL DECODER POINTS— Operate 0 key.	At PERIPHERAL DECODER POINTS— 0 lamp lighted.
21	Depress AT 1 key.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 lighted. At circuit under test— Relay A operated. Relay C remains operated. At VOLTMETER— Meter indicates 0.
22	At PERIPHERAL DECODER POINTS— Release 0 and 2 keys.	At PERIPHERAL DECODER POINTS— 0 and 2 lamps extinguished.
23	Depress AT 1 key.	At circuit under test— Relays A and C released.
24	▶At front of writing shelf on TTP— Remove 262B-type plug from ACCESS TRK-1 jack.◀	
25	At protector frame— Locate the test points (TP) for the tip and ring (T and R) leads of the foreign exchange trunk circuit.	
26	Connect 1000-ohm resistor across T and R leads with 1W13A cord assembly at appropriate TPs as shown in Fig. 1.	
27	At PERIPHERAL DECODER POINTS— Operate 1 key.	At PERIPHERAL DECODER POINTS— 1 lamp lighted.
28	Depress AT 1 key.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 1 extinguished. At circuit under test— Relay B operated.
29	At PERIPHERAL DECODER POINTS— Operate 3 key.	At PERIPHERAL DECODER POINTS— 3 lamp lighted.
30	Depress AT 1 key.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 1 lighted. At circuit under test—

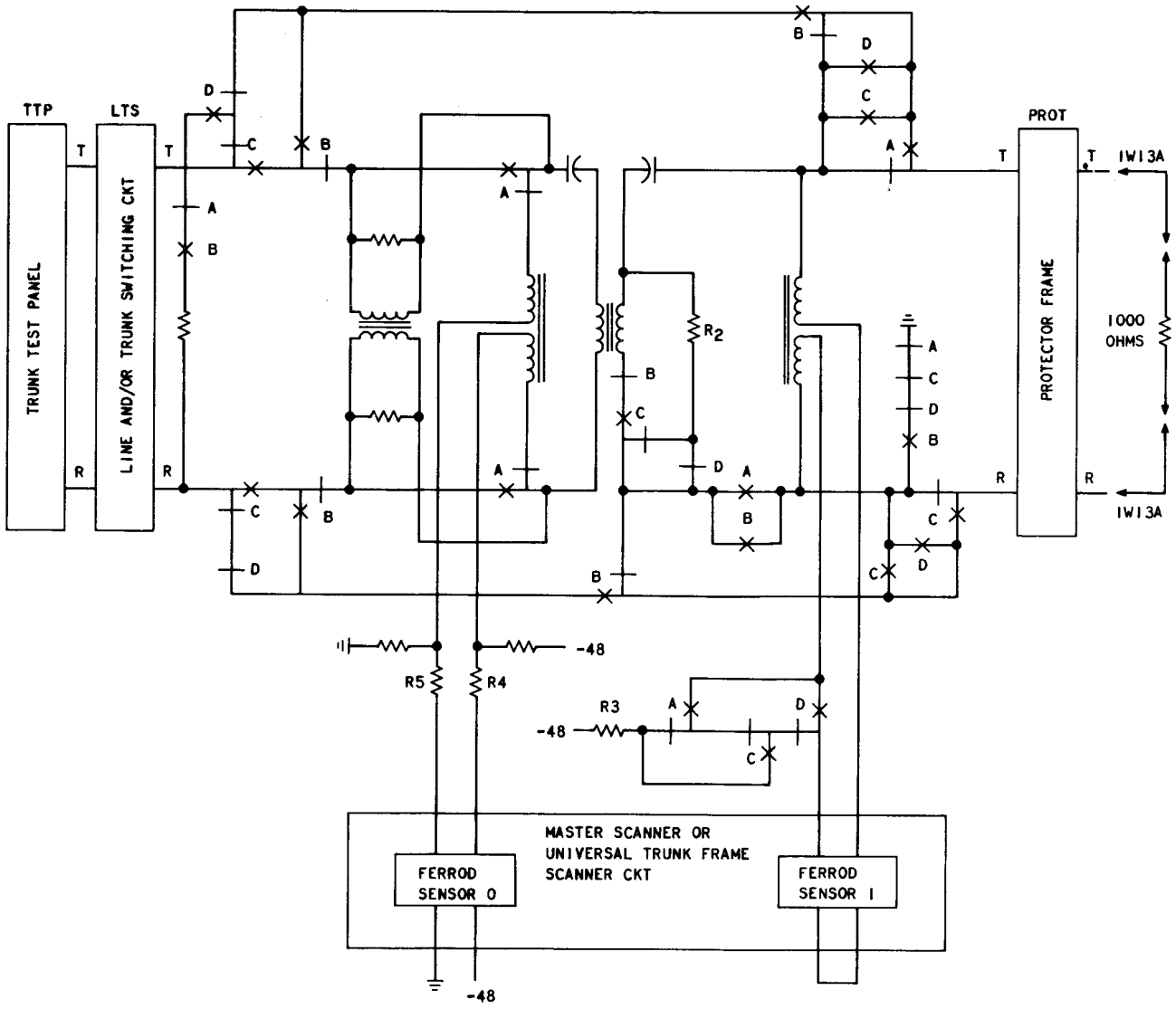

Fig. 1—Foreign Exchange Trunk Circuit Test Connection

STEP	ACTION	VERIFICATION
		Relay D operated. Relay B remains operated.
31	At PERIPHERAL DECODER POINTS— Release 1 and 3 keys.	At PERIPHERAL DECODER POINTS— 1 and 3 lamps extinguished.
32	Depress AT 1 key.	At circuit under test— Relays B and D released.
33	At protector frame— Remove resistor from tip and ring test points.	
34	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— Ferrod sensor display cleared from DISPLAY BUFFER lamps.

STEP	ACTION	VERIFICATION
B. Transmission Loss Measurements		
7	At front of writing shelf on TTP— Connect TRANS MEAS—DBM—0 jack to SP jack with a 2P4A cord assembly. ***Note:*** The DBM—0 jack is supplied with a 1 kHz signal from the system equipment. This patch cord allows the signal to be transmitted through the system for convenience.	
8	At ACCESS TRUNK 1 CONTROL— Depress XMSN key.	At ACCESS TRUNK 1 CONTROL— XMSN lamp lighted.
9b	If the TTP is equipped with a TMS— At TRANSMISSION MEASURING CONTROL— Set TEST SET switch to TMS position. Set MEASURE switch to MEAS 1 position.	
10c	If TTP is not equipped with a TMS— At front of writing shelf on TTP— Connect portable TMS to TRANS MEAS—TM—1 jack using appropriate test leads.	
11	At TMS— Set ADD DBM switch to 0 position.	
12	At protector frame— Connect tip and ring test points to the SP jack nearest the protector frame using a 2W6A cord. ***Note:*** Make sure no other connection is made to the SP jack in the office during this test procedure.	
13	At PERIPHERAL DECODER POINTS— Operate 0, 1 and 2 keys.	At PERIPHERAL DECODER POINTS— 0 lamp lighted. 1 lamp lighted. 2 lamp lighted.
14	Depress AT 1 key.	At TMS— Meter indicates between 0 and -0.5 dBm (Record reading for reference use). At circuit under test— Relays A, B, and C operated.
15	At PERIPHERAL DECODER POINTS— Release 1 key. Operate 3 key.	At PERIPHERAL DECODER POINTS— 1 lamp extinguished. 3 lamp lighted. 0 and 2 lamps remain lighted.

STEP	ACTION	VERIFICATION
16	Depress AT 1 key.	At TMS— Meter indicates 0 to -0.5 dBm less than the reference level established in Step 14. At circuit under test— Relay B released. Relay D operated. Relays A and C remain operated.
17	At PERIPHERAL DECODER POINTS— Release 0 key.	At PERIPHERAL DECODER POINTS— 0 lamp extinguished. 2 and 3 lamps remain lighted.
18	Depress AT 1 key.	At TMS— Meter indicates 0 to -0.85 dB less than the reference level established in Step 14. At circuit under test— Relay A released. Relays C and D remain operated.
19	At PERIPHERAL DECODER POINTS— Operate 1 key.	At PERIPHERAL DECODER POINTS— 1 lamp lighted 2 and 3 lamps remain lighted.
20	Depress AT 1 key.	At TMS— Meter reads 0 to -0.6 dBm less than the reference level established in Step 14. At circuit under test— Relay B operated Relays C and D remain operated.
21	At PERIPHERAL DECODER POINTS— Release 1, 2 and 3 keys.	At PERIPHERAL DECODER POINTS— 1, 2, and 3 lamps extinguished.
22	Depress AT 1 key.	At circuit under test— Relays B, C, and D released.
23	At protector frame— Remove cord connection from test points and SP jack.	
24	At front of writing shelf on TTP— Remove cord from SP jack and TRANS MEAS—DBM—0 jack.	
25d	If TTP is not equipped with a TMS— At front of writing shelf on TTP— Remove cord from TRANS MEAS—TM—1 jack.	
26	At ACCESS TRUNK 1 CONTROL— Depress RLS key.	At ACCESS TRUNK 1 CONTROL— VM lamp extinguished. EQPT ST lamp extinguished.

STEP	ACTION	VERIFICATION
		XMSN lamp extinguished. At VOLTMETER CONTROL— FEMF lamp extinguished.
27	At telephone set— Operate green release key.	At ACCESS TRUNK 1 CONTROL— SUPV lamp extinguished. At MISC TEST CONTROL— P & E lamp extinguished.
28	Repeat all step procedures outlined in this section to test the remaining foreign exchange trunk circuits.	