RINGING CIRCUIT FOR INDIVIDUAL, TWO-PARTY, COIN AND PBX LINES (SD-2H116-02)—TESTS NO. 2/2B ELECTRONIC SWITCHING SYSTEM

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1. GENERAL

1.01 This section describes the procedure for testing the ringing circuit for individual, two-party, coin, and PBX lines (SD-2H116-02) used in the No. 2/2B Electronic Switching System (ESS).

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 The tests described are:

(a) ***Circuit State and Scan Point Operation:*** This test verifies the operation of the circuit relays and saturation of the ferrod sensors associated with this circuit.

(b) ***Leakage Test:*** This test verifies the saturation of ferrod sensor 1 when excessive leakage exists in the test states.

1.04 These tests are performed whenever 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 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 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 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. When a condition does not apply, all steps designated by the letter should be omitted.

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

1.09 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. The old codes are common to all previous No. 2/2B 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.

2. APPARATUS

2.01 A 35F-type test set (current flow meter) or equivalent. Equivalent apparatus must have a current metering range of 15 millamperes. Current flow data must be obtained by means of a rheostat.

2.02 A 2P4A cord assembly consisting of a P2B cord 3 feet long and two 310 plugs.

2.03 A test lead with alligator clips at both ends.

2.04 A 2500-type telephone set.

2.05 A 3000-ohm resistor connected across the tip and ring of a 310 plug.

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) Scan point number (SPN)

(d) Directed scan point number (DSP).

3.02 Verify the scan point numbers obtained in paragraph 3.01 as follows:

At maintenance TTY:
Type in:

A VY:SVC:aaa bbb!

aaa = TGN
bbb = MEMN

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

AR VY SVC aaa bbb
TEN nn gcsl
.
.
.
DSP ss rrbb
SPN ss rrbb

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

AR VY SVC aaa bbb
OE nn gcsl
.
.
.
DSP ss rrbb
SP ss rrbb

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

The bb bit represents the ferrod sensor (0 for DSP or 1 for SPN) in the scanner row that is associated with the specific circuit. Refer to the output message manual (OM-2H200) for an explanation of other data fields, if required.

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

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.

STEP	ACTION	VERIFICATION
		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. ***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.
7	Use the TTY printout from paragraph 3.02 to determine the trunk scanner and scanner row of the SPN. The SPN is associated with ferrod sensor 1 of the ringing circuit.	
8	At maintenance TTY— For No. 2 ESS offices Type in: UBRL TS:RSN:ssrr! ss = Number of trunk scanner for SPN from Step 7 in decimal (0-11) rr = Number of scanner row for SPN from Step 7 in decimal (0-63) For No. 2B ESS offices Type in: MON:TSSN aabb; RDT LAMPS! aa = Number of trunk scanner for SPN from Step 7 in decimal (00-11 for the 2B-EF-1 generic program) or (00-30 for the 2B-EF-2 and later generic programs). bb = Number of scanner row for SPN from Step 7 in decimal (0-63). RDT LAMPS = Direct the result to the display buffer.	At DISPLAY BUFFER— Scanner row containing specific scan points displayed on DISPLAY BUFFER. Lamp associated with ferrod sensor 1 of circuit under test lighted.

4. METHOD

4.01 If the verification procedure fails or if a malfunctioning circuit is indicated during any part of this test, proceed as follows:

(1) Discontinue the test.

(2) Troubleshoot the circuit that failed.

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

(4) Repeat the test step that failed. If verification indicates that the faulty circuit has been repaired, continue the test.

A. Circuit State and Scan Point Operation

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.	FEMF lamp lighted. At VOLTMETER— Meter indicates 0.
12	Release TR REV key.	TR REV lamp extinguished. At VOLTMETER— Meter indicates 0.
13	Depress MET VM key.	FEMF lamp extinguished. MET VM lamp lighted.
14	Set PD GROUP switch to 0-5 position.	
15	At PERIPHERAL DECODER POINTS— Operate 0 and 1 keys.	At PERIPHERAL DECODER POINTS— 0 and 1 lamps lighted.
16	Depress AT 1 key.	At circuit under test— Relay A (opto-isolator U1) and B operated. At VOLTMETER— Meter indicates between 42.75 and 52.50 volts on 120-volt scale.
17	At front of writing shelf— Connect telephone set to ACCESS TRK-1 jack. ***Note:*** Telephone set on TTP and test telephone set must be on-hook.	

STEP	ACTION	VERIFICATION
18	At PERIPHERAL DECODER POINTS— Release 0 key.	At PERIPHERAL DECODER POINTS— 0 lamp extinguished.
19	Depress AT 1 key.	At circuit under test— Relay A (opto-isolator U1) released. Relay B remains operated. At telephone— Ringing is present.
20	At front of writing shelf— Disconnect telephone set from ACCESS TRK-1 jack.	
21	Insert a 310 plug with 3000 ohm resistor across tip and ring into ACCESS TRK-1 jack.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 1 extinguished.
22	Remove 310 plug with 3000 ohm resistor from ACCESS TRK-1 jack.	Lamp associated with ferrod sensor 1 lighted.
23	At VOLTMETER CONTROL— Operate TR REV key.	At VOLTMETER CONTROL— TR REV lamp lighted.
24	At PERIPHERAL DECODER POINTS— Release 1 key. Operate 2 key.	At PERIPHERAL DECODER POINTS— 1 lamp extinguished. 2 lamp lighted.
25	Depress AT 1 key.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 1 lighted. At circuit under test— Relay B released. Relay C operated.
26	At PERIPHERAL DECODER POINTS Operate 0 and 1 keys.	At PERIPHERAL DECODER POINTS— 0 and 1 lamps lighted.
27	Depress AT 1 key.	At circuit under test— Relays A (opto-isolator U1) and B operated. Relay C remains operated. At VOLTMETER— Meter indicates between 42.75 and 52.50 volts on 120-volt scale.
28	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 removed from DISPLAY BUFFER.
29	Use the TTY printout from paragraph 3.02 to determine the trunk scanner and scanner	

STEP	ACTION	VERIFICATION
	row of the DSP. The DSP is associated with ferrod sensor 0 of the ringing circuit.	
30	For No. 2 ESS offices Type in: UBRL TS:RSN:ssrr! ss = Number of trunk scanner for DSP from Step 29 in decimal (00-11) For No. 2B ESS offices Type in: MON:TSSN aabb; RDT LAMPS! aa = Number of trunk scanner for DSP from Step 29 in decimal (00-11 for the 2B-EF-1 generic program) or (00-30 for the 2B-EF-2 and later generic programs) bb = Number of scanner row for DSP from Step 29 in decimal (0-63). RDT LAMPS = Direct the results to the DISPLAY BUFFER.	Scanner row containing specific scan points displayed on DISPLAY BUFFER. Lamp associated with ferrod sensor 0 of circuit under test lighted.
31	At PERIPHERAL DECODER POINTS— Release 0 key.	At PERIPHERAL DECODER POINTS— 0 lamp extinguished.
32	At front of writing shelf— Connect telephone set to ACCESS TRK-1 jack.	
33	Depress AT 1 key.	At circuit under test— Relay A (opto-isolator U1) released. Relays B and C remain operated. At telephone— Ringing is present. At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 extinguished when ringing begins.
34	At telephone— Lift receiver off-hook.	At telephone— Ringing stops. At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 remains extinguished.
35	At PERIPHERAL DECODER POINTS— Release 1 and 2 keys.	At PERIPHERAL DECODER POINTS— 1 and 2 lamps extinguished.
36	Depress AT 1 key.	At circuit under test— Relays B and C released. At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 lighted.
37	At front of writing shelf— Disconnect telephone set from ACCESS TRK-1 jack.	

STEP	ACTION	VERIFICATION
38	At VOLTMETER CONTROL— Release TR REV key.	At VOLTMETER CONTROL— TR REV lamp extinguished.
39	At ACCESS TRUNK 1 CONTROL— Depress RLS key.	At ACCESS TRUNK 1 CONTROL— VM lamp extinguished. SUPV lamp extinguished. EQPT ST lamp extinguished. At MISC TEST CONTROL— P&E lamp extinguished.
40	At maintenance TTY— For No. 2 ESS office Type in: UB SY:CLB! For No. 2B ESS Type in: STOP:UTIL!	Ferrod sensor display removed from DISPLAY BUFFER.

B. Leakage Tests

	Note: Repeat Steps 1 through 8.	
9	Set PD GROUP switch to 0-5 position.	
10	At PERIPHERAL DECODER POINTS— Operate 0 and 1 keys.	At PERIPHERAL DECODER POINTS— 0 and 1 lamps lighted.
11	Depress AT 1 key.	At circuit under test— Relays A (opto-isolator U1) and B operated.
12	At 35F test set— Connect the GRD terminal to system ground (frame) with a test lead with alligator clips.	
13	Operate the BATT & GRD CO key.	
14	Insert one 310 plug of 2P4A cord assembly into top T&R jack of the front of 35F test set.	
15	At front of writing shelf— Insert other 310 plug 2P4A cord assembly into ACCESS TRK-1 jack.	
16	At 35F test set— Operate No. 1 telegraph key.	
17	Move No. 1 coarse (red) rheostat slider to left until meter indicates at least 3 ma current flow on 15 MIL AMP scale.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 1 remains lighted.

STEP	ACTION	VERIFICATION
18	Move No. 1 coarse (red) rheostat slider to left until meter indicates approximately 6 ma current flow on 15 MIL AMP scale. ***Note:*** Lamp associated with ferrod sensor 1 must not be extinguished. If lamp extinguished, reduce current flow.	
19	Move No. 1 fine (black) slider to left until lamp associated with ferrod sensor 1 extinguished. ***Note:*** Do not exceed 20 ma current flow.	At 35F test set— Meter indicates less than 7.9 ma current flow on 15 MIL AMP scale.
20	Release No. 1 telegraph key.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 1 lighted.
21	Remove 310 plug from 35F test set and ACCESS TRK-1 jack.	
22	At PERIPHERAL DECODER POINTS— Release 0 and 1 keys.	At PERIPHERAL DECODER POINTS— 0 and 1 lamps extinguished.
23	Depress AT 1 key.	At circuit under test— Relays A (opto-isolator U1) and B released.
24	At ACCESS TRUNK 1 CONTROL— Depress RLS key.	At ACCESS TRUNK 1 CONTROL— SUPV lamp extinguished. EQPT ST lamp extinguished. At MISC TEST CONTROL— P&E lamp extinguished.
25	At maintenance TTY— For No. 2 ESS offices Type in: UB SY:CLB! For No. 2B ESS offices Type in: STOP:UTIL!	Ferrod sensor display removed from DISPLAY BUFFER.
26	At telephone set on TTP— Operate green release key.	

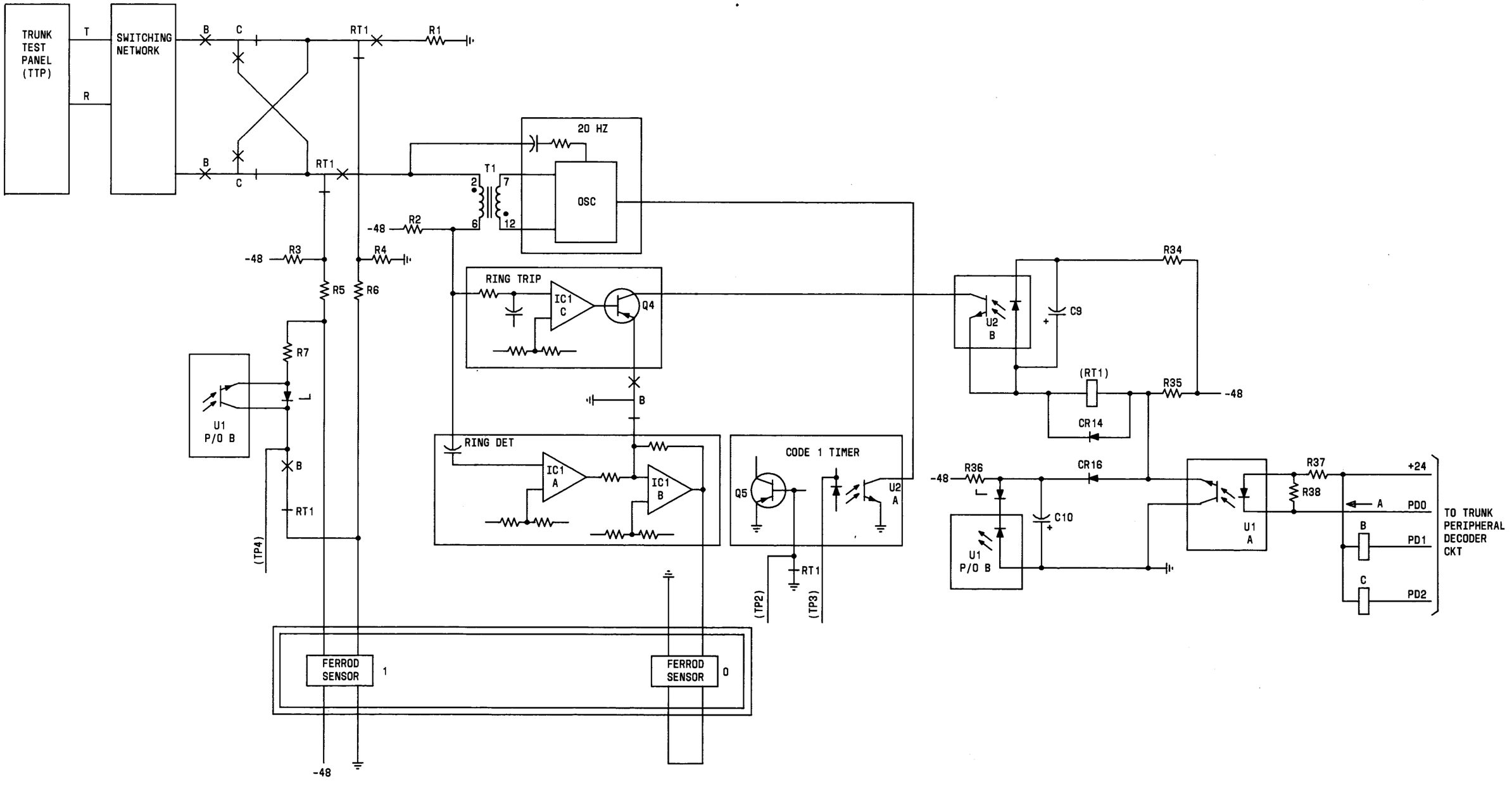

Fig. 1—Test Configuration Using Trunk Test Panel When Testing Ringing Circuit (2H116-02)