

## RINGING CIRCUIT FOR CODED, SUPERIMPOSED REVERTING AND RURAL RINGING OFF- AND ON-HOOK RINGBACK

### (SD-2H126-01 AND SD-2H126-02)—TESTS

#### NO. 2 AND NO. 2B ELECTRONIC SWITCHING SYSTEMS

##### 1. GENERAL

**1.01** This section describes the procedure for testing the ringing circuit for coded, superimposed reverting and rural ringing off- and on-hook ringback (SD-2H126) used in the No. 2 and No. 2B Electronic Switching Systems (ESS).

**1.02** This section is reissued to include changes since the last issue and additional information due to No. 2B ESS.

**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 where 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 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 insure 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 the 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

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

**2.02** A 2P4A cord assembly consisting of a P2B cord at least three 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 KS-14510 L1 volt-ohm-milliammeter (VOM) or equivalent.

**2.06** Two KS-14510 L3 test leads (one red and one black).

##### NOTICE

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- 2.07** A 2W6A cord assembly consisting of a W2C cord, at least 10 feet long, with a 310 plug on one end and two 59-type cord tips on the other.
- 2.08** 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 3.01 as follows:

At maintenance TTY, type in:

A VY:SVC:aaa bbb!

aaa = TGN 007

bbb = MEMN

**All Tests**

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 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

The system response is as follows:

AR VY SVC aaa bbb

TEN nn gcs1

DSP ss rrb

SPN ss rrb

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 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 and 2).

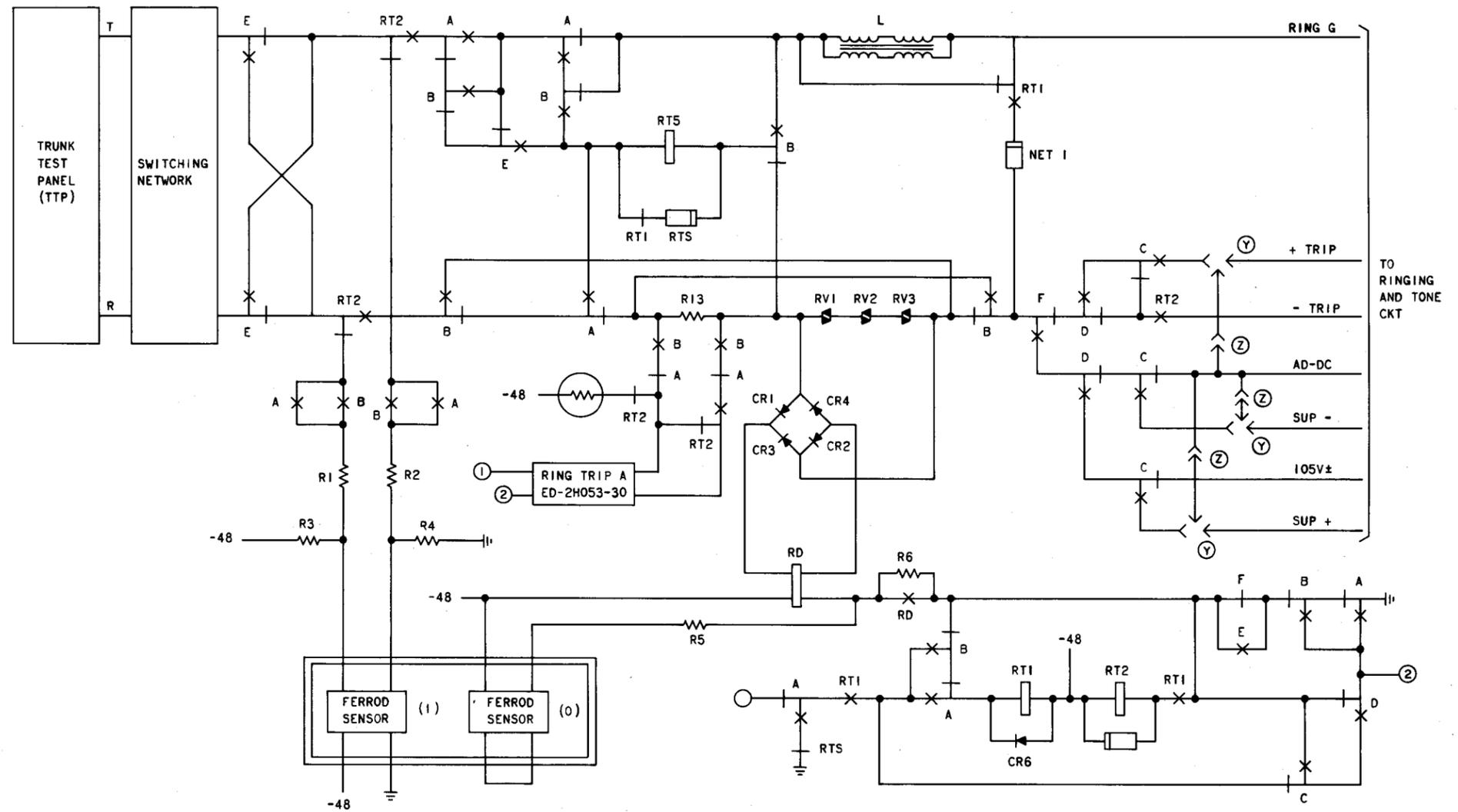


Fig. 1—Special Ringing Circuit (SD-2H126-01)

*We have  
2H126-02*

849

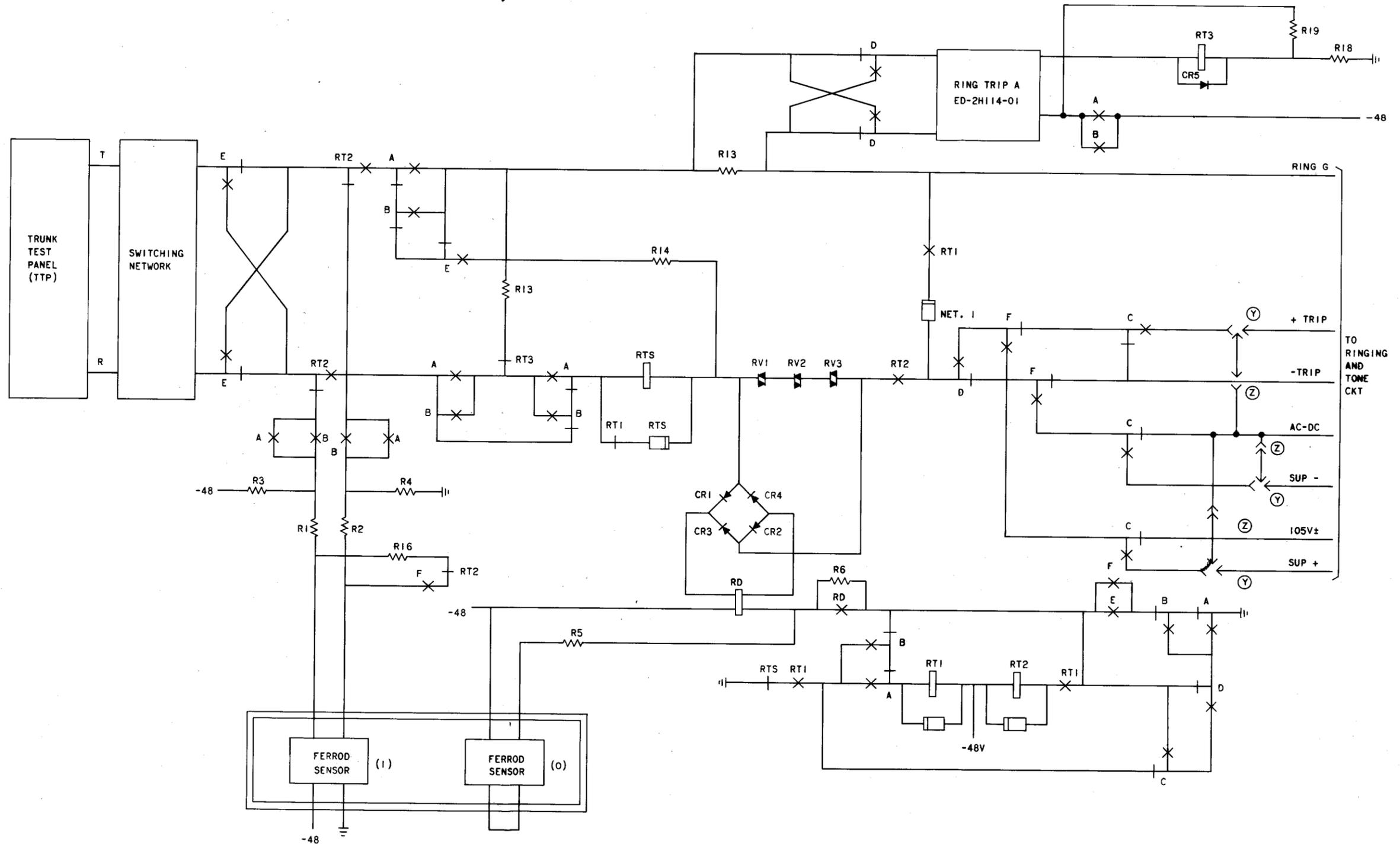


Fig. 2—Special Ringing Circuit (SD-2H126-02)

STEP	ACTION	VERIFICATION
		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 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	<p>At maintenance TTY—</p> <p><del>◆For No. 2 ESS offices type in:◆ UBRL TS:RSN:ssrr! ss = Number of trunk scanner for SPN in decimal (0-11) from Step 7. rr = Number of scanner row for SPN in decimal (0-63) from Step 7.</del></p> <p>◆For No. 2B ESS offices type in: MON:TSSN ssrr;RDT LAMPS! ss = Number of trunk scanner for SPN in decimal (0-11) from Step 7. rr = Number of scanner row for SPN in decimal (0-63) from Step 7. RDT LAMPS = Direct the result to the DISPLAY BUFFER.◆</p>	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 which failed.
- (3) Replace faulty circuit components using standard repair procedures.
- (4) Repeat the test step which failed. If verification indicates that the faulty circuit has been repaired, continue the test.

STEP	ACTION	VERIFICATION
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**A. Circuit State and Scan Point Operation**

9	At ACCESS TRUNK 1 CONTROL— Depress VM key.	At ACCESS TRUNK 1 CONTROL— VM lamp lighted.
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STEP	ACTION	VERIFICATION
		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— 100K lamp extinguished. FEMF lamp lighted. 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.
14	Set PD GROUP switch to 0-5 position.	
15	At PERIPHERAL DECODER POINTS— Operate 1 key.	At PERIPHERAL DECODER POINTS— 1 lamp lighted.
16	Depress AT 1 key.	At VOLTMETER— Meter indicates between 42.75 and 52.50 volts on 120-volt scale. At circuit under test— Relay B operated. <i>AT 3 also.</i>
17	At front of writing shelf— Connect test telephone set to ACCESS TRK-1 jack.  <i>Note:</i> Telephone set on TTP and test telephone set must be on-hook.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 1 lighted.
18	At PERIPHERAL DECODER POINTS— Operate 3 key.	At PERIPHERAL DECODER POINTS— 3 lamp lighted.
19	Depress AT 1 key.	At circuit under test— Relay D operated. <i>RT1 also</i> Relay B remains operated. <i>RT3</i>
20	At PERIPHERAL DECODER POINTS— Release 3 key.	At PERIPHERAL DECODER POINTS— 3 lamp extinguished.

Send to:

Bell System Practices Coordinator  
American Telephone and Telegraph Company  
Room 3345H1  
295 North Maple Avenue  
Basking Ridge, New Jersey 07920

Date: 5-17-78

Please type or print clearly:

The following comments pertaining to Bell System Practices should be considered in connection with:

(a) Revision of Section Number 232 - 155 - 503, Iss. No. 03

(b) Preparation of a new section on the following subject:

(c) Review by AT&T of Operating Company - prepared section,  
number      -      -          , titled \_\_\_\_\_

which may have system wide application. Attach three copies of section, duplicate E-3973 not required. Acknowledged only upon request.

Comments: Test A Step 31. The Lamp<sup>ASSOC</sup> with Ferrod Sensor 0 would be extenguished on step 23 thru 27. Lighted again at Step 28. So when the Display is monitored at Step 31 it will be lighted. Step 36 it is already lighted. Step 61, The C Relay is still operated from Step 54 and 55 so you only get about 90 V (AC-DC Lead). If you want 100-110 V. AC the 2 key must be released to release C Relay.

(use separate sheet if required)

Classification

- Urgent
- Necessary
- Deferrable

For further information, contact

Name: Mr. R. A. Hall

Tel. No.: 316 - 268 - 2618

Send reply to:

Name: Mr. R. A. Hall

Title: Chief Switchman 2 B ESS

Company: Southwestern Bell

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Wichita, Kansas 67204

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Attached:

Duplicate copy  
with attachments



**Western Electric**

Data Design

2400 Reynolda Road  
Winston-Salem, N. C. 27106  
919 727-3100

September 5, 1978

Mr. R. A. Hall  
Chief Switchman 2BESS  
Southwestern Bell  
3920 Arkansas  
Witchita, Kansas 67204

Dear Mr. Hall:

Re: Bell System Practice 232-155-503, Issue 1,  
Ringing Circuit for Coded, Superimposed Reverting and  
Rural Ringing Off-and On-Hook Ringback  
(SD-2H126-01 and SD-2H126-02) -  
Tests No. 2 and No. 2B Electronic Switching System, Form 3973

Thank you for your comments of May 17, 1978, concerning BSP Section  
232-155-503.

Your comments concerning Steps 23-28, 31 and 61 will be incorporated  
in an Issue 2 Addendum on the section.

Concerning your comment on Step 36, since the A and E relays were  
operated in Step 34 a path exists that allows ferrod sensor  $\emptyset$   
to saturate. With ferrod sensor  $\emptyset$  saturated, the lamp associated  
with it would extinguish. The lamp would not light until Step 36  
as stated in the section.

If you have any additional comments on this section, please contact  
me at 919-727-3962.

Yours truly,

C. J. Jones, Jr.  
Technical Writing Assistant

STEP	ACTION	VERIFICATION
21	Depress AT 1 key.	At circuit under test— Relay D released. Relay B remains operated. <i>RT2</i>
22	At PERIPHERAL DECODER POINTS— Operate 5 key.	At PERIPHERAL DECODER POINTS— 5 lamp lighted.
23	Depress AT 1 key.	At test telephone— Continuous ringing present. At circuit under test— Relay F operated. Relay B remains operated.
24	◆ At front of writing shelf— Disconnect test telephone set from ACCESS TRK-1 jack.	
25	Insert 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.
26	Remove 310 plug with 3000 ohm resistor from ACCESS TRK-1 jack.	If circuit is <u>SD-2H126-02</u> — Lamp associated with ferrod sensor 1 remains extinguished. <del>If circuit is SD-2H126-01— Lamp associated with ferrod sensor 1 lighted.</del>
27	At PERIPHERAL DECODER POINTS— Release 1 and 5 keys.	At PERIPHERAL DECODER POINTS— 1 and 5 lamps extinguished.
28	Depress AT 1 key.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 1 lighted. At circuit under test— Relays B and F released.
29	At maintenance TTY— For No. 2 ESS offices type in: <del>UB SY:CLB!</del>  For No. 2B ESS offices type in: STOP:UTIL!	At DISPLAY BUFFER— Ferrod sensor display removed from DISPLAY BUFFER. <i>all relays are released at this point. ok. to here</i>
30	Use the TTY printout from 3.02 to determine the trunk scanner and scanner row of the DSP. The DSP is associated with ferrod sensor 0 for the ringing circuit.	
31	For No. 2 ESS offices type in: <del>UBRL TS:RSN:ssrr!</del> ss = Number of trunk scanner for DSP in decimal (0-11) from Step 30. rr = Number of scanner row for DSP in decimal (0-63) from Step 30.	Scanner row containing specific scan points displayed on DISPLAY BUFFER. Lamp associated with ferrod sensor 0 of circuit under test extinguished. <i>would be extinguished from step 23 thru 27. It is lit now.</i>

STEP	ACTION	VERIFICATION
	For No. 2B ESS offices type in: MON:TSSN ssrr;RDT LAMPS! ss = Number of trunk scanner for DSP in decimal (0-11) from Step 30. rr = Number of scanner row for DSP in decimal (0-63) from Step 30. RDT LAMPS = Direct the result to the DISPLAY BUFFER.	
32	At VOLTMETER CONTROL— Operate TR REV key.	At VOLTMETER CONTROL— TR REV lamp lighted.
33	At PERIPHERAL DECODER POINTS— Operate 0 and 4 keys.	At PERIPHERAL DECODER POINTS— 0 and 4 lamps lighted.
34	Depress AT 1 key.	At VOLTMETER— Meter indicates between 42.75 and 52.50 volts on 120-volt scale. At circuit under test— Relays A and E operated. <b>RT3</b>
35	At PERIPHERAL DECODER POINTS— Operate 3 key.	At PERIPHERAL DECODER POINTS— 3 lamp lighted.
36	Depress AT 1 key.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 lighted. At circuit under test— <i>already lit</i> Relay D operated. <b>RT1</b> Relays A and E remain operated. <b>RT3</b>
37	At front of writing shelf— Connect test telephone set to ACCESS TRK-1 jack.  <b>Note:</b> Telephone set on TTP and test telephone set must be on-hook.	
38	At PERIPHERAL DECODER POINTS— Operate 2 key. Release 3 key.	At PERIPHERAL DECODER POINTS— 2 lamp lighted. 3 lamp extinguished.
39	Depress AT 1 key.	At circuit under test— Relay C operated. <b>RT2</b> Relay D released. Relays A and E remain operated. <b>RT1, RT3.</b>
40	At PERIPHERAL DECODER POINTS— Operate 5 key.	At PERIPHERAL DECODER POINTS— 5 lamp lighted.
41	Depress AT 1 key.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 extinguished. At test telephone set—

STEP	ACTION	VERIFICATION
		<p>Ringing is present.            At circuit under test—            Relay F operated.            Relays A, C, and E remain operated. <i>also RT1, RT2, RT3</i></p>
42	At PERIPHERAL DECODER POINTS— Release 5 key. Operate 3 key.	At PERIPHERAL DECODER POINTS— 5 lamp extinguished. 3 lamp lighted.
43	Depress AT 1 key.	<p>At DISPLAY BUFFER—            Lamp associated with ferrod sensor 0 remains extinguished.            At circuit under test—            Relay F released.            Relay D operated.            Relays A, C, and E remain operated.            At telephone—  <del>For Y option—</del>            Ringing stops.  <del>For Z option—</del>            Ringing is present.</p>
44	At PERIPHERAL DECODER POINTS— Operate 5 key.	At PERIPHERAL DECODER POINTS— 5 lamp lighted.
45	Depress AT 1 key.	<p>At telephone—            Ringing is present.            At circuit under test—            Relay F operated.            Relays A, C, D, and E remain operated. <i>also RT3.</i></p>
46	At telephone set— Lift receiver off-hook.	At telephone set— Ringing stops.
47	Place receiver on-hook.	
48	At PERIPHERAL DECODER POINTS— Release 2, 3, 4, and 5 keys. Operate 1 key.	At PERIPHERAL DECODER POINTS— 2, 3, 4, and 5 lamps extinguished. 1 lamp lighted.
49	Depress AT 1 key.	<p>At circuit under test—            Relays C, D, E, and F released.            Relay B operated.            Relay A remains operated. <i>+ RT3.</i></p>
50	At PERIPHERAL DECODER POINTS— Operate 3 key.	At PERIPHERAL DECODER POINTS— 3 lamp lighted.
51	Depress AT 1 key.	<p>At DISPLAY BUFFER—            Lamp associated with ferrod sensor 0 lighted.            At circuit under test—  <i>OK.</i></p>

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STEP	ACTION	VERIFICATION
		Relay D operated. Relays A and B remain operated. <i>RT1 also.</i>
52	At PERIPHERAL DECODER POINTS— Release 3 key.	At PERIPHERAL DECODER POINTS— 3 lamp extinguished.
53	Depress AT 1 key.	At circuit under test— Relay D released. Relays A and B remain operated. <i>RT1, RT2, RT3 also up at this point.</i>
54	At PERIPHERAL DECODER POINTS— Operate 2 and 5 keys.	At PERIPHERAL DECODER POINTS— 2 and 5 lamps lighted.
55	Depress AT 1 key.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 extinguished. At telephone— <i>O.K.</i> Ringing is present. At circuit under test— Relays C and F operated. Relays A and B remain operated. <i>RT - also up.</i>
56	At PERIPHERAL DECODER POINTS— Release 5 key.	At PERIPHERAL DECODER POINTS— 5 lamp extinguished.
57	Depress AT 1 key.	At telephone set— Ringing stops. At circuit under test— Relay F released. Relays A, B, and C remain operated.
58	At front of writing shelf— Disconnect test telephone set from ACCESS TRK-1 jack.	
59	Connect VOM between the tip of ACCESS TRK-1 jack and GROUND using 2W6A cord. Set VOM to read 100 to 110 volts ac. <i>be sure you get</i>	
60	At PERIPHERAL DECODER POINTS— Release 0 and 1 keys. Operate 3, 4, and 5 keys.	At PERIPHERAL DECODER POINTS— 0 and 1 lamps extinguished. 3, 4, and 5 lamps lighted.
61	Depress AT 1 key.	At VOM— Meter indicates between 100 and 110 volts ac. At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 remains extinguished. <i>O.K.</i> At circuit under test— Relays A and B released. Relays D, E, and F operated. <i>C remains operated unless 2 key released + only get about 90V.</i>

STEP	ACTION	VERIFICATION
62	At front of writing shelf— Move VOM connection from the tip of ACCESS TRK-1 jack to the ring of ACCESS TRK-1 jack.	At VOM— Meter indicates between 100 and 110 volts ac.
63	At PERIPHERAL DECODER POINTS— Release 3, 4, and 5 keys.	At PERIPHERAL DECODER POINTS— 3, 4, and 5 lamps extinguished.
64	Depress AT 1 key.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 lighted. At circuit under test— Relays D, E, and F released.
65	At front of writing shelf— Remove 2W6A from ACCESS TRK-1 jack and VOM.	
66	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.
67	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.

#### B. Leakage Test

**Note:** Repeat Steps 1 through 8.

9	Set PD GROUP switch to 0-5 position.	
10	At PERIPHERAL DECODER POINTS— Operate 1 key.	At PERIPHERAL DECODER POINTS— 1 lamp lighted.
11	Depress AT 1 key.	At circuit under test— Relay 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 and the G (ground) keys.	

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<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
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 of 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.
18	Move No. 1 coarse (red) rheostat slider to left until meter indicates approximately 6 ma current flow on 15 MIL AMP scale.  <i>Note:</i> Lamp associated with ferrod sensor 1 must not be extinguished. If lamp extinguished, reduce current flow.	
19	Move No. 1 fine (black) rheostat slider to left until lamp associated with ferrod sensor 1 extinguished.  <i>Note:</i> Do not exceed 20 ma current flow.	At 35F test set— Meter indicates less than 6.96 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 1 key.	At PERIPHERAL DECODER POINTS— 1 lamp extinguished.
23	Depress AT 1 key.	At circuit under test— Relay 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!	Ferrod sensor display removed from DISPLAY BUFFER.

STEP	ACTION	VERIFICATION
26	◆For No. 2B ESS offices type in: STOP:UTIL◆  At telephone set on TTP— Operate green release key.	