

**TRUNK DIAL PULSE TRANSMITTER (SD-2H122)  
AND RECEIVER (SD-2H123) CIRCUIT TEST  
NO. 2 AND NO. 2B ELECTRONIC SWITCHING SYSTEMS**

**1. GENERAL**

**1.01** This section describes the method of testing the trunk dial pulse transmitter (SD-2H122) and receiver circuit (SD-2H123) used in the No. 2 and No. 2B Electronic Switching Systems (ESS).

**1.02** This section is reissued to cover the No. 2B ESS. Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

**1.03** The trunk dial pulse transmitter circuit provides a means for the system to transmit dial pulse information to another office.

**1.04** The trunk dial pulse receiver circuit is used to receive information in the form of dial pulses over a trunk from a common control central office.

**1.05** The tests in this section are to be performed when a malfunction of one of the circuits is suspected.

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

**1.07 Lettered Steps:** A letter a, b, c, etc, added to a step number in Part 3 and 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.

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

**1.09** The following tests will be performed:

**A. Circuit State:** This test verifies the operation of circuit relays.

**B. Scan Point Operation:** This test verifies the saturation of ferrod sensors associated with the trunk dial pulse transmitter and receiver.

**C. Dial Pulse Transmission:** This test verifies the operation of logic gates and associated circuits generating dial pulses to be transmitted.

**2. APPARATUS**

**2.01** A P2B cord, 3 feet long, with a 310 plug on each end.

**2.02** A 453A Tektronix oscilloscope or equivalent with test leads.

**2.03** A 262B plug.

**2.04** KS-2348 cord repair tool.

**NOTICE**

Not for use or disclosure outside the  
Bell System except under written agreement

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**3. PREPARATION**

**3.01** Refer to office records to obtain the trunk group number (TGN), member number (MEMN), and directed scan point number (DSP) of the trunk dial pulse transmitter and receiver circuits.

**3.02** Verify DSP for the trunk dial pulse receiver circuit obtained from office records as follows:

At maintenance TTY type in:

A VY: SVC: aaa bbb!

Where: aaa = TGN

bbb = MEMN

The system response is as follows:

AR VY SVC aaa bbb  
TEN nn gcsl

PDB cxzy b  
DSP ss rrb

ss = scanner number

rr = row number

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.).

**3.03** Repeat 3.02 to verify DSP for the trunk dial pulse transmitter circuit obtained from office records. Refer to input message manual (IM-2H200) and output message manual (OM-2H200) for interpretations of machine language.

**3.04** For all tests, 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 on 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 to gain access to the trunk dial pulse transmitter.	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 steadily if connection was successful.
4a	If the P & E lamp is not lighted steadily— At ACCESS TRUNK 1 CONTROL— Depress RLS key.	<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.

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.
7	At telephone set— Operate access trunk 2 key.	At MISC TEST CONTROL— P & E lamp remains lighted.
8	Lift handset off-hook or operate TRFR key at TEL CKT on TTP if using headset.	At telephone set— Access trunk 2 lamp lighted. At ACCESS TRUNK 2 CONTROL— SUPV lamp lighted. At TEL CKT— TRFR lamp lighted if TRFR key is operated.
9	At TOUCH-TONE dial— Dial 1 + TGN + MEMN + ST to gain access to the trunk dial pulse receiver.	At ACCESS TRUNK 2 CONTROL— EQPT ST lamp lighted steadily or flashing at a rate of 120 interruptions per minute.
		<b>Note:</b> If the EQPT ST lamp and the P & E lamp are flashing, the TTP is not connected to the circuit to be tested.
10b	If the P & E lamp is flashing— At ACCESS TRUNK 2 CONTROL— Depress RLS key.	
11b	Repeat Steps 9 and 10b until connection is successful.	
12	Place handset on-hook or release TRFR key.	At telephone set— Access trunk 2 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.

SD-2H122 TRUNK DIAL PULSE TRANSMITTER AND  
SD-2H123 RECEIVER CIRCUIT TEST

## A. Circuit State

STEP	ACTION	VERIFICATION
13	At ACCESS TRUNK 2 CONTROL— Depress VM key.	At ACCESS TRUNK 2 CONTROL— VM lamp lighted. At VOLTMETER CONTROL— 100K lamp lighted.
14	At VOLTMETER CONTROL— Operate GRD key.	At VOLTMETER CONTROL— GRD lamp lighted. At VOLTMETER— Meter indicates 0. A deflection on voltmeter indicates a resistance between the tip and ring leads.
15	Operate TR REV key.	At VOLTMETER CONTROL— TR REV lamp lighted. At VOLTMETER— Meter indicates 0.
16	Depress FEMF key.	At VOLTMETER CONTROL— FEMF lamp lighted. 100K lamp extinguished. At VOLTMETER— Meter indicates 0.
17	Release TR REV key.	At VOLTMETER CONTROL— TR REV lamp extinguished. At VOLTMETER— Meter indicates 0.
18	Release GRD key.	At VOLTMETER CONTROL— GRD lamp extinguished. FEMF lamp remains lighted.
19	At STATE CHANGE CONTROL— Set PD GROUP switch to 0-5 position.	
20	At PERIPHERAL DECODER POINTS— Operate 0 key.	At PERIPHERAL DECODER POINTS— 0 lamp lighted.
21	At VOLTMETER CONTROL— Operate TR REV key.	At VOLTMETER CONTROL— TR REV lamp lighted.
22	At PERIPHERAL DECODER POINTS— Depress AT 2 key.	At VOLTMETER— Meter indicates between 42.75 and 52.50 volts on 120-volt scale. At circuit under test— Relay A for receiver circuit operated.
23	At PERIPHERAL DECODER POINTS— Release 0 key.	At PERIPHERAL DECODER POINTS— 0 lamp extinguished.

STEP	ACTION	VERIFICATION
24	Depress AT 2 key.	At circuit under test— Relay A for receiver circuit released.
25	At VOLTMETER CONTROL— Release TR REV key.	At VOLTMETER CONTROL— TR REV lamp extinguished.
26	At PERIPHERAL DECODER POINTS— Operate 1 key.	At PERIPHERAL DECODER POINTS— 1 lamp lighted.
27	Depress AT 2 key.	At VOLTMETER— Meter indicates between 42.75 and 52.50 volts on 120-volt scale. At circuit under test— Relay B for receiver circuit operated.
28	At PERIPHERAL DECODER POINTS— Release 1 key.	At PERIPHERAL DECODER POINTS— 1 lamp extinguished.
29	Depress AT 2 key.	At VOLTMETER— Meter indicates 0. At circuit under test— Relay B released.

#### B. Scan Point Operation

13	Use TTY printout information from 3.02 for input to the following message.	
14	At maintenance TTY— For No. 2 ESS offices type in: UBRL TS:RSN:ssrr! ss = Number of trunk scanner in decimal (0-11). rr = Number of scanner row to be displayed in decimal.  For No. 2B ESS offices type in: MON:TSSN ssrr;RDT LAMPS! ss = Number of trunk scanner in decimal (0-11). rr = Number of scanner row to be displayed in decimal (0-63). RDT LAMPS = Direct the result to the DISPLAY BUFFER.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 for trunk dial pulse receiver displayed on display buffer and is lighted.
15	At front of writing shelf on TTP— Plug patch cord into ACCESS TRK-1 and ACCESS TRK-2.  <b>Note:</b> This patch cord is connecting the trunk dial pulse transmitter to the trunk dial pulse receiver.	At VOLTMETER CONTROL— FEMF lamp extinguished because voltmeter is disconnected from the circuit under test.

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STEP	ACTION	VERIFICATION
16	At STATE CHANGE CONTROL— Set PD GROUP switch to 0-5 position.	
17	At PERIPHERAL DECODER POINTS— Operate 0 key.	At PERIPHERAL DECODER POINTS— 0 lamp lighted.
18	Depress AT 1 and AT 2 keys.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 for receiver circuit extinguished. At circuit under test— Relay A operated in trunk dial pulse transmitter. Relay A operated in trunk dial pulse receiver.
19	At PERIPHERAL DECODER POINTS— Release 0 key.	At PERIPHERAL DECODER POINTS— 0 lamp extinguished.
20	Depress AT 1 and AT 2 keys.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 for receiver lighted. Relay A released in transmitter. Relay A in receiver released.
21	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.
22	Use TTY printout information from 3.03 for input to the following message.	
23	At maintenance TTY— For No. 2 ESS offices type in: UBRL TS:RSN:ssrr! ss = Number of trunk scanner in decimal (0-11). rr = Number of scanner row to be displayed in decimal (0-63).  For No. 2B ESS offices type in: MON:TSSN ssrr;RDT LAMPS! ss = Number of trunk scanner in decimal (0-11). rr = Number of scanner row to be displayed in decimal (0-63) RDT LAMPS = Direct the result to the DISPLAY BUFFER.	At DISPLAY BUFFER— Lamp associated with ferrod sensor 0 for the trunk dial pulse transmitter displayed and is lighted.
24	At PERIPHERAL DECODER POINTS— Operate 0 key.	At PERIPHERAL DECODER POINTS— 0 lamp lighted.

STEP	ACTION	VERIFICATION
25	Depress AT 1 and AT 2 keys.	At DISPLAY BUFFER— Lamps associated with ferrod sensors 0 and 1 for transmitter extinguished.
26	At PERIPHERAL DECODER POINTS— Release 0 key. Operate 1 key.	At PERIPHERAL DECODER POINTS— 0 lamp extinguished. 1 lamp lighted.
27	Depress AT 2 key.	At DISPLAY BUFFER— Lamp for ferrod sensor 1 lighted. Lamp for ferrod sensor 0 remains extinguished. At circuit under test— Relay A for receiver released. Relay B operated.
28	At PERIPHERAL DECODER POINTS— Release 1 key.	At PERIPHERAL DECODER POINTS— 1 lamp extinguished.
29	Depress AT 1 and AT 2 keys.	At DISPLAY BUFFER— All lamps associated with ferrod sensors lighted. At circuit under test— Relay A for transmitter released. Relay B for receiver released.
30	To clear the DISPLAY BUFFER— 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.
31	At front of writing shelf on TTP— Remove patch cord from ACCESS TRK 1 and ACCESS TRK 2.	

### C. Dial Pulse Transmission

13	At front of writing shelf on TTP— Insert 262B plug into ACCESS TRK 1.  <b>Note:</b> Remove insulating sleeve from 262B plug with KS-2348 cord repair tool to gain access to 600-ohm resistor.	At VOLTMETER CONTROL— FEMF lamp extinguished because voltmeter is disconnected.
14	Connect oscilloscope probe to tip side of resistor in 262B plug. Adjust for horizontal sweep on cathode ray tube (CRT) display. Set for internal trigger.	At oscilloscope— Horizontal sweep line is across middle of CRT.
15	At STATE CHANGE CONTROL— Set PD GROUP switch to 0-5 position.	

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<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
16	At PERIPHERAL DECODER POINTS— Operate 0 and 2 keys.	At PERIPHERAL DECODER POINTS— 0 lamp lighted. 2 lamp lighted.
17	Depress AT 1 key.	At oscilloscope— Observe dial pulses. Establish amplitude and width of pulses. At circuit under test— Relays A and BD operated. Relay P pulsing.
18	At PERIPHERAL DECODER POINTS— Release 0 key and operate 1 key.	At PERIPHERAL DECODER POINTS— 0 lamp extinguished. 1 lamp lighted. 2 lamp remains lighted.
19	Depress AT 1 key.  <i>Note:</i> Sweep position on oscilloscope may need adjusting. Signal should decrease by approximately one-half.	At oscilloscope— Observe decrease in amplitude of dial pulses. At circuit under test— Relay A released. Relay B operated. Relay BD remains operated. Relay P remains pulsing.
20	At PERIPHERAL DECODER POINTS— Release 2 key.	At PERIPHERAL DECODER POINTS— 2 lamp extinguished.
21	Depress AT 1 key.  <i>Note:</i> Sweep position on oscilloscope may need adjusting.	At oscilloscope— Dial pulses no longer present. At circuit under test— P relay released.
22	Operate 2 key.	At PERIPHERAL DECODER POINTS— 2 lamp lighted.
23	Depress AT 1 key.	At oscilloscope— Observe dial pulses. P relay pulsing.
24	Release 2 key.	At PERIPHERAL DECODER POINTS— 2 lamp extinguished.
25	Depress AT 1 key.  <i>Note:</i> Steps 16 through 21 are performed to double-check the proper operation of the flip-flop and logic circuits generating the dial pulses.	At oscilloscope— Dial pulses no longer present. P relay released.
26	At PERIPHERAL DECODER POINTS— Release 1 key.	At PERIPHERAL DECODER POINTS— 1 lamp extinguished.

STEP	ACTION	VERIFICATION
27	Depress AT 1 key.	At circuit under test— Relay B released. BD relay released.
28	At front of writing shelf on TTP— Remove oscilloscope and 262B plug from ACCESS TRK 1.	At VOLTMETER CONTROL— FEMF lamp lighted.
29	At ACCESS TRUNK 1 CONTROL— Depress RLS key.	At ACCESS TRUNK 1 CONTROL— EQPT ST lamp extinguished.
30	At ACCESS TRUNK 2 CONTROL— Depress RLS key.	At ACCESS TRUNK 2 CONTROL— VM lamp extinguished. EQPT ST lamp extinguished. At VOLTMETER CONTROL— FEMF lamp extinguished.
31	At telephone set— Operate green release key.	At ACCESS TRUNK 1 and 2 CONTROL— SUPV lamps extinguished. At MISC TEST CONTROL— P & E lamp extinguished.
32	Repeat all step procedures outlined in this section to test the remaining trunk dial pulse transmitter and receiver circuits.	