

**DIRECT INWARD DIALING**  
**LINE CIRCUITS SD-27752-01 AND SD-27753-01**  
**TESTS USING DID TEST CIRCUIT SD-27766-01**  
**NO. 1 CROSSBAR SYSTEM**

**1. GENERAL**

**1.01** This section describes a method of testing line circuits used for LLP-DID by means of the DID test circuit.

**1.02** This issue affects the Equipment Test List.

**1.03** The tests covered are:

**A. Operational Test:** This test checks the operation of an individual line circuit. The supervisory functions are monitored in this test. . . . .

**B. Voltmeter Tests:** This test describes the method of making voltmeter tests on line circuits. The tests include continuity, ballistic capacity resistance, and trouble conditions. . . . .

**C. Marginal Relay and Originating Call:** This test describes the method of making marginal tests of the supervisory relays of 2-way line circuit SD-27753-01. It also checks the ability of the trunk to receive a request from the PBX and establish a dial tone connection to a subscriber sender. . . . .

**1.04** The operational test connects the line circuit to a DID PBX station. Assistance at this station is required in order to complete the test.

**1.05** Consult office records to obtain directory numbers and number group addresses associated with the line circuits under test.

**1.06 Lettered Steps:** A letter a, b, c, etc, added to a step number in Parts 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.

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**2. APPARATUS**

**All Tests**

**2.01** DID test circuit SD-27766-01.

**2.02** Patching cord, P3F cord, 4 feet long, equipped with one 309 plug and one 310 plug (3P12A cord).

**Tests A and C**

**2.03** Telephone set.

**3. PREPARATION**

STEP	ACTION	VERIFICATION
<b>Tests A, B, and C</b>		
1	Operate MBR key.	

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<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
2	Insert patching cord between MBR jack and MB jack of line circuit under test.	
3	Set TH, H, T, and U switches to directory number accessible via the line circuit under test.	
4	Set F switch according to incoming frame number.	
5a	If incoming frame number is 10 or over— Operate F10 key.	
6b	If number series is required— Set NS switch according to required number series.	
7c	If multioffice indication is required— Set 0A/0B switch as required.	
8c	Operate 0B key if required.	
9	Operate TRT key.	
10	Set TRTH, TRH, TRT, and TRU switches according to number group address of line circuit under test.	

**Tests B and C**

- 11 Operate ND, OST, and SH keys.
- 12 Set DL switch to position 4A.
- 13 Set CR switch to position 10.

**4. METHOD**

<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
<b>A. Operational Test</b>		
11	Set CR switch per Table A.	
12	Set DL switch per Table A.	
13	Operate S1, TLK, TLK1, and ST1 keys.	Audible ringing heard in telephone receiver. When assistant answers— CS1 lamp lighted.
14	Request assistant to disconnect.	CS1 lamp extinguished.

STEP	ACTION	VERIFICATION
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TABLE A

	STATION NUMBER				ATTENDANT		
	5	4	3	2		1	
Digits Outpulsed to PBX	5	4	3	2		1	
CR Switch	*	10	10	10	10	10	*
DL Switch	0	0	1	2	3	4	4A

\* Consult office records.

- 15 Restore all keys and switches to normal.
- 16 Remove patching cord between MBR jack and MB jack of line circuit.

**B. Voltmeter Tests**

- |     |  |   |
|-----|--|---|
| 14  | Operate ST1 key.   |   |
| 15  | Operate VM3 key.   | Meter deflection indicates potential on ring side with respect to +100 volt test battery. |
| 16d | If continuity test is to be made—<br>Operate FEMF key.                 | Meter deflection indicates negative potential on ring side with respect to tip side.      |
| 17d | Operate REV or VM REV key.   | Meter deflection indicates negative potential on tip side with respect to ring side.      |
| 18d | Restore keys operated in Steps 16d and 17d.                            |   |
| 19e | If ballistic capacity test is to be made—<br>Have trunk opened at PBX. |   |
| 20e | Operate G key.   | Meter needle momentarily deflected.   |
| 21e | Operate REV key.   | Meter needle momentarily deflected proportional to capacity of tip side.                  |
| 22e | Restore REV key.   | Meter needle momentarily deflected proportional to capacity of ring side.                 |
| 23e | Repeat Steps 21e and 22e several times.                                |   |
| 24e | Restore G key.   |   |
| 25e | Close trunk which was opened in Step 19e.                              |   |

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<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
26f	If tests for short circuit, foreign battery, and ground are to be made— Operate keys as shown in Table B.  <i>Note:</i> Tests should be made in the order shown.	See Table B.
27f	Restore all keys operated in Step 26f.	
28g	If resistance tests are required— Operate keys as shown in Table C.	See Table C.
29	Restore all keys and switches to normal.	

**TABLE B**

<b>KEYS OPERATED</b>	<b>VM READING</b>	<b>CONDITION</b>
G, (REV operated and restored)	Up to 100	Short circuit.
FEMF	Voltage	Value of negative potential ring side with respect to tip side.
FEMF, VM REV, REV	Voltage	Value of negative potential tip side with respect to ring side.
FEMF, VM REV, G	Voltage	Value of positive potential ring side with respect to ground.
FEMF, VM REV, G, REV	Voltage	Value of positive potential tip side with respect to ground.
FEMF, G	Voltage	Value of negative potential ring side with respect to ground.
FEMF, G, REV	Voltage	Value of negative potential tip side with respect to ground.
NONE	100	Ground ring side.
NONE	0	Ring clear.
NONE	Other	Potential on ring side with respect to +100 volt battery.
REV	100	Ground tip side.
REV	0	Tip clear.
REV	Other	Potential on tip side with respect to +100 volt battery.

STEP	ACTION	VERIFICATION
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TABLE C

RESISTANCE TO BE MEASURED	KEYS OPER	READ SCALE	R	V
over 10,000 ohms	—	0-120V	100,000	100
2000 - 200,000 ohms	20,000	0-24V	20,000	20
10 - 10,000 ohms	1,000	0-24V	1,000	20
less than 2,000 ohms	AM	0-1.2 ma	—	48

Compute the unknown resistance as follows when reading voltage:

$$r = \frac{R(V-v)}{v}$$

R = resistance in series (resistance key operated; use 100,000 if neither key is operated).

V = test battery voltage

v = voltage indicated by voltmeter

r = unknown resistance

Compute the unknown resistance as follows when using the AM scale:

$$r = \frac{V - 203i}{i}$$

V = test battery voltage

i = milliammeter reading

r = unknown resistance

- 30 Remove patching cord between MBR jack and MB jack of line circuit.

### C. Marginal Relay and Originating Call

- |    |                                     |                                   |
|----|-------------------------------------|-----------------------------------|
| 14 | Operate TST, S1, and ST1 keys.      | SS lamp lighted.                  |
| 15 | Operate MRT key.                    | INT and CS1 lamps lighted.        |
| 16 | Operate RLT key.                    | INT and CS1 lamps extinguished.   |
| 17 | Release MRT, RLT, S1, and ST1 keys. |                                   |
| 18 | Operate TLK and ORC keys.           | Dial tone heard in telephone set. |
| 19 | Release ORC key.                    | Dial tone silenced.               |

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<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
20	Restore all keys and switches to normal.	
21	Remove patching cord between MBR jack and MB jack of line circuit.	