

3

ELECTRONIC SWITCHING SYSTEMS
NO.1
LOOP-AROUND-TEST CIRCUIT

CHANGES

D. Description of Changes

- D.1 This circuit is rated Mfr Disc. It is replaced by SD-1A225-01.
- D.2 J1A032FB is rated Mfr Disc.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 2422-FSD-AF

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ELECTRONIC SWITCHING SYSTEMS
NO. 1
LOOP AROUND TEST CIRCUITSECTION I - GENERAL DESCRIPTION1. PURPOSE OF CIRCUIT

1.01 This circuit provides a low insertion loss path which the system may insert between two No. 1 ESS incoming trunk circuits by means of the switching network and the signal distributor for transmission testing by a distant office test man.

2. GENERAL DESCRIPTION OF OPERATION

2.01 A distant office test man measures loss on trunks connecting his outgoing trunk circuits and No. 1 ESS incoming trunk circuits. The loss may differ for the two directions of transmission on each trunk. To measure the loss for transmission from ESS to his office, the test man makes use of the transmission measuring milliwatt distributing circuit in No. 1 ESS. To find the loss for transmission from his office to ESS on one trunk, he must use a second trunk for which he knows the loss from ESS to his office. When he dials the loop around code on each trunk, ESS will connect the incoming trunk circuits to the No. 1 ESS loop around test circuit. The test man may now transmit a milliwatt reference tone on the first trunk, and the loop around circuit will pass the attenuated tone back on the second trunk. The loss measured will be the sum of the known loss on the second trunk and the loss in question.

2.02 The loop around circuit is simply a low loss transmission path with two appearances on the Trunk Switching Circuit and dc bridges for supervision. When the network paths have been established, the system, acting through the signal distributor circuit, operates a relay on the loop around circuit to complete the loop. Supervision is maintained by scans of the ferrod sensors associated with this circuit or those associated with the incoming trunk circuits.

SECTION II - DETAILED DESCRIPTION1. STATES OF THE CIRCUIT

1.01 This circuit has one magnetic latch relay designated A which can be operated and released by the Universal Trunk Frame Signal Distributor Circuit. The loop around circuit has only two possible states.

2. PURPOSE OF CIRCUIT COMPONENTS

2.01 Capacitors C1, C2, C3, and C4 prevent the flow of dc from one connected trunk circuit to the other. They provide a low impedance path between connected circuits for 1000 cps tone.

2.02 Resistors R1 and R2 limit the current supplied from battery in the connected circuits. They also provide discharge paths for current in the ferrod sensors when the circuit is returned to the idle state.

2.03 Inductors L1 and L2 present a high impedance to 1000 cps tone and a low impedance to supervisory direct current.

2.04 Resistors R3 and R4 provide discharge paths for current in the inductors to prevent sparking at the contacts of the A relay when the circuit is returned to the idle state.

3. STATE DESCRIPTIONS

3.01 State 0, Idle: Both tip and ring pairs toward the Trunk Switching Circuit are open. Inductors L1 and L2 discharge through resistors R3 and R4.

3.02 State 1, Cut Through: Both tip and ring pairs are cut through to the Trunk Switching Circuit. A dc bridge is connected to each network appearance, and current from battery and ground in the connected trunk circuits saturates the ferrod sensors in those circuits and the ferrod sensors in the loop around circuit.

SECTION III - REFERENCE DATA1. WORKING LIMITS

- 1.01 Maximum external circuit resistance - 625 ohms.
- 1.02 Minimum central office battery - 42.75 volts.
- 1.03 Minimum insulation resistance - 30,000 ohms.

2. FUNCTIONAL DESIGNATIONS

None.

3. FUNCTIONS

3.01 Provides a transmission path from one trunk circuit to another for use in one-man, 2-way transmission testing.

3.02 Provides off-hook supervision in both directions after connections are established to both ends of the loop around circuit.

4. CONNECTING CIRCUITS

(a) Trunk Switching Circuit - SD-1A107-01.

(b) Universal Trunk Frame Scanner Circuit - SD-1A116-01.

(c) Universal Trunk Frame Signal Distributor Circuit - SD-1A127-01.

5. TAKING EQUIPMENT OUT OF SERVICE

5.01 Instructions for taking this circuit out of service are covered in CD-1A132-01.

SECTION IV - REASONS FOR REISSUE

D. Description of Changes

D.1 Transmission and working requirement are added.

D.2 Title of circuit is changed to Loop Around Test Circuit.

D.3 Information Note 302 is changed to state table information.

D.4 Nomenclature changes are made, ie, lead designations T1(A), T1(B), and R1(A), R1(B) are changed to T(A), R(A), and T(B), R(B) on FS-1, CAD 1, 2, and lead index sheets.

D.5 Capacitors C1 and C3 are interchanged.

D.6 The values of R1 and R2 are changed to maintain supervision.

D.7 Signal distributor leads are terminated to suppress noise.

D.8 Cabling information is added to permit frame connection.

D.9 Magnetic latch relay circuit requirements and test notes are added.

D.10 Resistors R3 and R4 are added to provide a current discharge path.

D.11 AM2 relay is changed to AM1. EMB transfers are required to provide a discharge path across the inductor when the circuit is released.

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