4

ELECTRONIC SWITCHING SYSTEMS

NO. 1
ARRANGED WITH 4-WIRE FEATURES

CODE "102" AND "106"
TEST TRUNK CIRCUIT

CHANGES

D. Description of Changes

D.1 CAD 3 has been changed to agree with the manufactured product.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5663-GRC-PKG

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ARRANGED WITH 4-WIRE FEATURES

CODE "102" AND "106" TEST TRUNK CIRCUIT

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SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 This circuit is provided as a service circuit for transmission measuring and other testing. It is designed to perform two functions:

(a) When used as a code 102 trunk the circuit provides access to a 1000-cycle milliwatt supply at a -2 dBm signal level referenced to the -2 transmission level point (TLP). The incoming T and R receive pair at this circuit is terminated in 600 Ω.

(b) When used as a code 106 trunk this circuit provides a timed access to a 1000-cycle milliwatt supply (-2 dBm referenced to -2 TLP) for a 10-second interval with the incoming T and R leads terminated in 600 Ω, followed by a loop-around condition in which the incoming T and R leads are connected directly to the T1 and R1 leads. Timing is provided by central control.

SECTION II - DETAILED DESCRIPTION

1. STATES OF THE CIRCUIT

1.01 This circuit has two relays designated A and B operated from the associated coupler circuit. These relays, when operated or released in various combinations, can place the circuit in four different states. Only three states are used, however. These are: 0 - both relays released (circuit normal), 1 - A operated, and 2 - B operated.

1.02 Information Note 301 on the schematic diagram displays the circuit states pictorially.

2. PURPOSE OF CIRCUIT COMPONENTS

2.01 Resistor R2 serves to terminate the incoming T and R leads. Resistor R1 serves to terminate, and thereby present a constant load, to the 1000-cycle milliwatt supply when it is not being used.

2.02 Resistors R3, R4, and R5 constitute a network which compensates for envelope delay distortion, return loss, and insertion loss. The "102" circuit has the following specifications:

(a) Envelope delay distortion is less than

3 μs at	1000-2600 Hz
8 μs at	800-2800 Hz
15 μs at	600-3000 Hz
30 μs at	500-3200 Hz

(b) Return loss is greater than 26 dB at the switching network

(c) Insertion loss of this circuit, coupler circuit, and wiring is between 2.00 and 2.45 dB. Thus the milliwatt supply (output of 0.00 to 0.45 dBm 0) will maintain the signal level to -2.00 dBm ± 0.03 dBm at the -2 TLP on the incoming side of the switching network.

2.03 The code "106" loop-around circuit has the following specifications:

(a) Envelope delay distortion is better than the "102"

(b) Return loss is the same as the measuring trunk that is connected to the "106"

(c) The insertion loss is less than 0.1 dB.

3. DESCRIPTION OF CIRCUIT STATES

STATE 0, IDLE

3.01 Relays A and B are released. The circuit presents a 600 Ω load to the milliwatt supply.

STATE 1, MILLIWATT SUPPLY

3.02 Relay A is operated. Relay B is released. Resistor R1 is removed from the circuit and the milliwatt supply is transferred to output leads T1 and R1. This circuit also presents a 600-Ω load to the milliwatt supply since it is terminated in 600 Ω at the coupler circuit.

STATE 2, LOOP AROUND

3.03 Relay B is operated. Relay A is released. Resistors R2, R3, R4, and R5 are isolated from the circuit. The incoming T and R leads are connected directly to the T1 and R1 leads. The milliwatt supply is terminated in 600 Ω by resister R1.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 The maximum total external conductor loop resistance including that between this circuit and the 1000-cycle milliwatt supply, and between this circuit and the -2 TLP should be 35 Ω or less.

2. FUNCTIONAL DESIGNATIONS

2.01

Designation	Meaning
Lead T, R	Tip and Ring

3. FUNCTIONS

3.01 The functions which this circuit can perform are determined by program control which operates the circuit in the sequence of states described in Section II.

4. CONNECTING CIRCUITS

(a) Universal Trunk Frame Coupler Circuit - SD-2A014-01.

(b) Transmission Measuring Milliwatt Distributing Circuit - SD-95277-02.

(c) Miscellaneous Circuit for All Frames - SD-1A129-01.

5. ALARM INFORMATION

5.01 This circuit is fused, four circuits with one 1-1/3 ampere fuse to the -48 volt supply. If this fuse blows it will cause the FA relay in the frame miscellaneous circuit to operate a major alarm.

6. MANUFACTURING TESTING REQUIREMENTS

6.01 All wiring in the circuit should be checked for continuity.

6.02 With the A relay operated, the 1000-cycle loss should measure 1.3 dB between the 600-Ω terminations T1, R1 on the coupler side and T, R on the milliwatt source side.

7. TAKING EQUIPMENT OUT OF SERVICE

7.01 This circuit is taken out of service by following the directions given in CD-2A017-01.

7.02 Power is removed from this circuit by removing the associated -48 volt fuse for this circuit, and the -48 volt fuses for each of the four associated coupler circuits.

7.03 DC power should never be applied to the T, R leads toward the milliwatt distributing circuit.

7.04 The 600-Ω termination for the milliwatt distributing circuit, resistor R1, should never be opened, nor should this circuit be either added to or removed from a milliwatt distributing circuit without first changing the strapping of the adjusting resistors for the milliwatt supply. Refer to the appropriate BSP for information on this procedure.

SECTION IV - REASONS FOR REISSUE

B. Changes in Apparatus

Removed	Replaced By
4 - Pads P1, 1C - Fig. 1	4 - Resistors R3, 19LR 34.5 Ω - Fig. 1 4 - Resistors R4, 19LR 34.5 Ω - Fig. 1 4 - Resistors R5, 19YL 2985 Ω - Fig. 1

D. Description of Changes

D.1 A new mounting plate design (J2A003-BK-2) has been provided to facilitate assembly.

D.2 The title has been changed to agree with current standards.

D.3 The rating has been changed to AT&TCo Provisional.

D.4 CADs 1, 3, and 4 have been changed to reflect new cabling to the trunk switch frame and the universal coupler.

D.5 The apparatus has been changed by replacing each IC pad by a resistor network (R3, R4, R5). Each of the four circuits on a mounting plate uses one such resistor combination.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5661-GRC-HNS