

CIRCUIT DESCRIPTION

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TOLL SYSTEMS
TRANSMISSION MEASURING
1U AMPLIFIER RECTIFIER
WITH BATTERY SUPPLY

CHANGES

B. Changes in Apparatus (Components).

B.1 Removed

Capacitors G, H, J, K
475 BR 0.045 uf (Mfr Disc)
(Option V)

Replaced By

Capacitors G, H, J, K
535 KT 0.045 uf
(Option T)

B.2 Added

Capacitor AA
542 W, 0.0511 uf
(Option S)

D. Description of Changes

- D.1 Option T was added to cover capacitors G, H, J, K;
Option V is rated Mfr Disc.
- D.2 Option S was added to cover capacitor AA to allow for
suppression of unwanted response around 90 kHz that affects
measurements made on J68853A-A5 channel modem.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 9233-JJC-EJR

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TOLL SYSTEMS
TRANSMISSION MEASURING
1U AMPLIFIER RECTIFIER
WITH BATTERY SUPPLYSECTION I - GENERAL DESCRIPTION1. PURPOSE OF CIRCUIT

1.01 The purpose of this circuit is to measure gain and loss on voice transmission circuits. The input power in dBm is indicated on an output meter. Used with Transmission Measuring Circuit(s) SD-59432-01 and SD-95900-01, this circuit is capable of measuring transmission test power from -35 to +25 dBm, over a frequency range from 35 to 8000 Hz.

2. GENERAL DESCRIPTION OF OPERATION

2.01 The circuit on which test levels are measured is connected to the 1U amplifier-rectifier through SD-95900-01 and SD-59432-01. The measured test power is amplified, rectified, and read on a dB meter. The 1U amplifier may be bridged on the measured circuit or serve also as the 600-ohm termination.

2.02 Transmission measurements are made in terms of dBm (dB referred to 1 milliwatt). The sensitivity of the 1U is changed by operating relays in the amplifier. Control of the sensitivity and the output meter may appear at several remote test positions.

2.03 In sections of the Circuit Description, SD-59432-01 and SD-95900-01 will be referred to as the "transmission measuring circuit."

SECTION II - DETAILED DESCRIPTION1. AMPLIFIER-RECTIFIER PANEL

1.01 The 1U shown in Fig. 1 is a 2-stage vacuum tube amplifier with the means to change the gain using the B, C, and D relays. These relays are controlled through the connecting transmission measuring circuit by grounding the B, F, and E leads with sensitivity control keys or switches at remote test positions. Operating the B and C relays decreases the amount of negative feedback by bypassing resistor I, the CAL 2 potentiometer, and resistor K in the cathode circuit of the first stage. Operating relay D changes the effective step-down of the input transformer and decreases the amplifier gain by 25 dB. The measurement sensitivity for the various combinations of relays operated is given in Table A.

TABLE A

Sensitivity Key Operated	Relay Operated	Meter Scale	Measurement Sensitivity
			dBm
B +20	C	B	-35 to -20
B +10	B	B	-25 to -10
B	None	B	-15 to 0
A	B, D	A	0 to +15
A +10	D	A	+10 to +25

1.02 Operation of the A relay connects the G resistor across the input T and R leads as a 600-ohm termination for the circuit under test. Relay A is not operated for bridging measurements when the circuit termination is provided in the connecting transmission measuring circuit. Relay A may be operated either by grounding the A lead or by connecting office battery to the C lead.

1.03 The filament current jack provides a means of measuring the filament current of the two vacuum tubes. Potentiometers A and B in the filament circuit are adjusted to obtain the proper filament current and voltage as specified in the circuit notes.

1.04 The networks connected across the windings of the B, C, and D relays, and the A diode across the A relay suppress transients which result when these relays are deenergized.

1.05 The output from the amplifier is rectified by varistors and connected to the output meter.

2. OUTPUT METER

2.01 The output meter, connected to output terminals A14 and A15, indicates the measured noise level. A projection-type or bracket-mounted panel is used, both of which are electrically the same. The meter has two scales. One scale, designated B and marked in black, reads 15 to 0 dB from left to right. The other scale, designated A and marked in red, reads from 0 to 15. The scale used depends on the sensitivity range (see 1.01). The meter reading is added to the designation on the sensitivity key operated in the transmission measuring

circuit controlling the 1U amplifier-rectifier.

3. DESCRIPTION OF OPERATION

3.01 Access to the 1U amplifier-rectifier from the circuit on which transmission levels are measured is through either of two connecting circuits: SD-95900-01 (Transmission and Noise Measuring Circuit) for toll test boards and maintenance centers, or SD-59432-01 (Transmission Measuring Circuit) for use at voice-frequency patching bays and repeater bays.

3.02 The measured transmission level is determined by the output-meter scale reading added to the designations on the sensitivity controls which must be operated to obtain the reading. The sensitivity control designations and the corresponding output meter sensitivity are given in Table A.

4. CALIBRATION

4.01 Calibrating the 1U amplifier-rectifier requires several input levels of 1 kHz to provide the greatest accuracy at about the same input levels that measurements are made. The CAL1 potentiometer is adjusted with an input level of -16 dBm on the -10 to -25 dBm sensitivity range; CAL2 is adjusted with an input level of -5 or 0 dBm on the 0 to -15 dBm sensitivity range; and CAL3 is adjusted with an input level of +7 dBm on the 0 to +15 dBm sensitivity range.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

None.

2. FUNCTIONAL DESIGNATIONS

None.

3. FUNCTIONS

3.01 The circuit functions are explained in SECTION I.

4. CONNECTING CIRCUITS

4.01 This circuit may be connected to the following:

- (a) Transmission Measuring Circuit - SD-59432-01.
- (b) Transmission and Noise Measuring Circuit - SD-95900-01.
- (c) Transmission Measuring Circuit - SD-1G073-01.

SECTION IV - REASONS FOR REISSUE

B. Changes in Apparatus

<u>B.1 Superseded</u>	<u>Superseded By</u>
Capacitor D - Aerovox EEM, 25uf	Capacitor D - KS-14237, 25uf
Capacitor B - Aerovox EEM, 25uf	Capacitor B - KS-14237, 25uf
Resistor S - Option D, KS-13653, 1000 ohms	Potentiometer S (CAL3) - KS-19608,L5, 1000 ohms
Resistor I - 106C, 337.6 ohms	Resistor I - 106A, 287 ohms, Potentiometer (CAL2) KS-19608,L5, 100 ohms

D. Description of Changes

D.1 Options M and L were added to cover potentiometers CAL2 and CAL3 and resistor I; option D is rated Mfr Disc.

D.2 Circuit Notes 105, 106, 107, and 108 were rated Mfr Disc., and Notes 114, 115, and 116 were added to show the 328A and 329A vacuum tubes as preferred for both 24- and 48-volt battery.

D.3 Number "1" was added to the CAL designation in Fig. D and E.

D.4 Fig. A was rated Mfr Disc., and the designation on Fig. B was changed from "non-regulated" battery to "24-volt" battery.

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