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COMMON SYSTEMS SIGNALING DX SIGNALING CIRCUIT FOR SIGNALING BETWEEN TRUNK CIRCUITS OR FOR EXTENDING E&M LEADS FROM TRUNK CIRCUITS

CHANGES

B. Changes in Apparatus

B.1 Added

4MF Capacitor C, G Option, Fig. 2

D. Description of Changes

D.1 Information Notes 310, 311, 312, 313, and 314 are added.

D.2 Circuit Notes 101, 102, 103, and 104 are revised and Table A is removed. Circuit Note 106 is added.

D.3 Option G is added to Fig. 2.

D.4 Options B, E, and F are added.

D.5 In the Options Used Table, B, E, and F options are added.

D.6 Working limits are changed to specify: "For working limits with E repeaters see SD-99421-05" and "For working limits with V4 repeaters see SD-99421-03".

D.7 Information Note 307 is removed, as square box around option symbol indicates nonrecord option.

D.8 Fig. 4 is added and Fig. 3 is made Mfr Disc.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5643-RGM-MR

Printed in U.S.A.

COMMON SYSTEMS
SIGNALING
DX SIGNALING CIRCUIT
FOR SIGNALING BETWEEN TRUNK CIRCUITS
OR FOR
EXTENDING E AND M LEADS
FROM TRUNK CIRCUITS

SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 This circuit is designed as a signaling circuit to be used between trunk circuits on noncomposited lines. It may also be used as a signal lead extension circuit for extending E and M leads from trunk circuits to signaling circuits.

2. GENERAL DESCRIPTION OF OPERATION

2.01 When the conductor loop resistance between a trunk circuit and a signaling circuit exceeds the working limits of either circuit, a signal lead extension circuit must be used at the signaling circuit and a DX signaling circuit must be used at the trunk circuit. Two DX signaling circuits may also be used as a means of signaling directly between two trunk circuits arranged for E and M lead signaling.

SECTION II - DETAILED DESCRIPTION

1. GENERAL

1.01 The R relay has quadded windings which are used in pairs. Terminal 2 is the apex of the 2-4 and 2-3 windings. Terminal 7 is the apex of the 7-1 and 7-8 windings. Winding 2-3 is connected in series with the operating wire. Winding 7-1 is in series with the neutralizing wire. Windings 2-4 and 7-8 are the balancing windings for the 2-3 and 7-1 windings, respectively. Resistor B is a potentiometer which applies -19.2 volts for 48-volt office battery to apex terminal 7. Apex terminal 2 is connected through the A resistor to a pole-changing device in the trunk circuit.

1.02 In the normal released condition, ground is applied to the apex (terminal 2) over the M lead from the trunk circuit. Current will flow through the 2-4 and 7-8 windings of the R relay. This current causes the relay to be operated to contact 6. With the relay thus operated, the E lead to the trunk circuit is open.

1.03 The R relay responds to changes from ground to battery from the contacts of the S relay of the remote extension circuit or from the M lead of the remote DX signaling circuit. Its armature connects ground over the E lead to the trunk circuit.

2. NEUTRALIZATION AND BATTERY CONPENSATION

2.01 The neutralizing wire is similar to the operating wire but is connected to an R relay winding of opposite polarity. Therefore, dc earth potentials are canceled.

2.02 Since the neutralizing winding is held at about half the office battery potential at each end, the effect of office battery variations is partly compensated.

3. Z, W, AND V OPTIONS

3.01 When Fig. 1 is supplied and the A and B leads are connected to a trunk through repeating coil windings and are shunted by a 4-uf capacitor, the Z option is provided to prevent kickoff of the R relay when signals are sent from the trunk circuit.

3.02 When Fig. 2 or 3 are supplied, the W and V options permit the connection of 0-, 4-, or 6-uf capacitor in the biasing network of the R relay to prevent kickoff under various repeat coil and loop conditions.

4. TESTING R RELAYS

4.01 The TST jacks are provided for testing and adjusting the R relay. Current flow tests may be made as indicated in the Circuit Requirements Table.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 The maximum conductor loop resistance is: for Fig. 1, 1500 ohms; for Fig. 2 or 3, 5000 ohms.

1.02 The maximum circuit length is: for Fig. 1, 15 miles; for Fig. 2 or 3, 75 miles; or with E-type repeater, 15 miles.

1.03 The minimum insulation resistance is 100,000 ohms.

1.04 The maximum dc earth potential is ±45 volts.

2. FUNCTIONAL DESIGNATIONS

None.

3. FUNCTIONS

3.01 Receives signals on the M lead from a trunk circuit and transmits them via a DX signaling circuit at the distant end to the E lead of a distant trunk circuit, or via a signal lead extension circuit to a distant signaling circuit.

3.02 Receives signals transmitted on the M lead of a distant trunk circuit via a DX signaling circuit or on the E lead of a distant signaling circuit via a signal lead extension circuit and transmits them to the E lead of the trunk circuit.

3.03 Signals may be transmitted in either direction without interfering with signals being transmitted in the opposite direction.

3.04 Earth potentials and interference are neutralized by the symmetrical arrangement of an operating circuit and a neutralizing circuit.

3.05 Battery potential differences are minimized by the potentials applied to the neutralizing wire.

4. CONNECTING CIRCUITS

4.01 When this drawing is listed on a key-sheet, the connecting information thereon is to be followed.

(a) Signaling Converter Circuit - SD-56131-01.

(b) Trunk and Intertoll Dialing Trunk Circuit - SD-64590-01.

(c) Toll Testboard - Patching, Monitoring, and Testing Jack Circuit - SD-64724-01.

(d) Circuit Patch Bay Jack Circuit - SD-68327-01.

(e) Repeating Coil Circuit - SD-96452-01.

(f) 4-Wire Terminating Circuit - SD-96463-01.

(g) V4 Telephone Repeater Battery Supply and Connecting Circuit -SD-97047-01.

SECTION IV - REASONS FOR REISSUE

B. Changes in Apparatus

B.1 **ADDED:**

4-UF Capacitor C Option G, Fig. 2

B.2

SUPERSEDED	SUPERSEDED BY
Fig. 2	Fig. 3

D. Description of Changes

D.1 The circuit is arranged for use with V4-type repeatered 4-wire metallic facilities and finer adjustments are provided for the network balance capacitors. As a cost reduction item, the TST jack is changed. Fig. 2 is rated MFr Disc. and is replaced by Fig. 3. Where Fig. 2 is installed, options are provided to arrange the Fig. 2 to agree with Fig. 3 insofar as the network is concerned. See Table A.

D.2 Options G, H, J, and K are added and connection to 4-wire terminating set or SX circuit is added.

D.3 Fig. 3 is added.

D.4 Information Notes 308(A) to 308(E) are added.

D.5 Circuit Notes 102, 103, and 104 are expanded for this change.

D.6 Table A is added.

D.7 In the Options Used Table, Fig. 3 and G, H, J, and K options are added.

D.8 The voltage limits are changed to specify 42.75 to 52.5 volts for No. 1 ESS office.

D.9 The working limits are changed to specify 15 miles as the maximum length of circuit where E-type repeater is used.

D.10 In Note 304: "length when E-type repeaters are used is 4000 ohms and 50 miles, respectively." is changed to "15 miles".

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DEPT 2366-FMB-RMW

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