CIRCUIT DESCRIPTION

CD-96463-01
Issue 3-B
Appendix 4-D
Dwg. Issue 11-D

COMMON SYSTEMS
4 WIRE TERMINATING CIRCUIT

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Circuit is reissued to provide for connecting to 2-way intertoll trunk circuit or V3 telephone repeater line and balancing application schematic. This change is required for project 660 (BMEWS).

D.2 External connections between terminals 5 and 6 of the 1C padsin Fig. 6 were changed to internal connections to conform with W.E.Co specifications.

4. CONNECTING CIRCUITS

Add

4.18 2-way Intertoll Trunk Circuit - SD-68525-01.

4.19 V3 Tel Rep Appl Schematic - SD-95144-01.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2324-HIB-AOA-AP

COMMON SYSTEMS
4 WIRE TERMINATING CIRCUIT

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Prior to issue 10-D the title read

COMMON SYSTEMS
4 WIRE TERMINATING CIRCUITS
FOR CIRCUITS TERMINATING IN
TOLL SWITCHBOARDS NO. 1, 3, 3C OR 3CL
IN SAME BUILDING
OR FOR USE WITH
CROSSBAR TANDEM TRUNK CIRCUITS

D.2 Reference to Toll Sw. System No. 4, 4A or 4M aux. It. Trunk Ckt. for emergency access to No. 1,3,3C or 3CL Swbds. in Figs. 6, 55, 57 and 60 formerly read "Toll Swbd.No. 1, 3C or 3CL AUX. I.T. TRK CKT.

D.3 Reference to Toll Sw. System No. 4A or 4M Toll Sw. Trk. Ckt. was made in Figs. 6,9,55,57,59, and 60.

D.4 Reference to Signaling Converter Ckt. or Dial Long Line Ckt. is made in Figs. 7, 9, 56, 59 and 60.

4. CONNECTING CIRCUITS

Add

4.14 Toll Sw. Sys. No. 4A or 4M Toll Sw. Trk. Ckt. - SD-68513-01.

4.15 Dial Long Line Circuit (for subscriber's end) - SD-96251-01.

4.16 Dial Long Line Circuit (for central office end) - SD-96252-01.

4.17 Signaling Converter Circuit - SD-95060-01.

All other headings, no change

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2324-HIB-AOA-TG

COMMON SYSTEMS
4 WIRE TERMINATING CIRCUITS
FOR CIRCUITS TERMINATING IN
TOLL SWITCHBOARDS NO. 1, 3, 3C OR 3CL
IN SAME BUILDING
OR FOR USE WITH
CROSSBAR TANDEM TRUNK CIRCUITS

CHANGES

E. CHANGES IN TRANSMISSION REQUIREMENTS

E.1 Note 7 is added and the minimum deviation for the 100 and 200 cycle test for Fig.7 or 9 is changed.

E.2 Reference is made to note 2 for the 1000 cycle test for Figs. 9 and 4 and Figs. 9 and 8.

All other headings, no change

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2324-HIB-AOA-TG

COMMON SYSTEMS
4 WIRE TERMINATING CIRCUITS
FOR CIRCUITS TERMINATING IN
TOLL SWITCHBOARDS NO. 1, 3, 3C OR 3CL
IN SAME BUILDING
OR FOR USE WITH
CROSSBAR TANDEM TRUNK CIRCUITS

CHANGES

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Circuit reissued to add crossconnection Fig. 60 for use when this circuit is mounted on duct type frames.

D.2 Reference to Fig. 60 is added in Note 203 and as connecting figure in Figs. 52, 53, 55, 56 and 57.

D.3 Caption for Fig. 59 is changed.

D.4 Reference to Toll Switching System No. 4A Toll Switching Trunk Circuit is added as connecting circuit for Fig. 9 and reference to Toll Swbd. No. 1, 3, 3C or 3CL Auxiliary Intertoll Trunk Circuit is added as connecting circuit for Fig. 6.

D.5 Note 104 which read "When this circuit connects to a DX signaling circuit, which in turn connects to an incoming crossbar tandem trunk circuit, transmission considerations dictate that this connection be used for terminal traffic only" is removed.

E. CHANGES IN TRANSMISSION REQUIREMENTS

E.1 Note 1 is revised to add reference to the use of 1.07 to 1.09μf capacitor.

E.2 Reference to Fig. J is added.

4. CONNECTING CIRCUITS

Add

4.12 Toll Swbd. No. 1, 3, 3C or 3CL Aux. Intertoll Trunk Circuit - SD-68516-01.

4.13 Toll Sw. Sys. No. 4A Toll Switching Trunk Circuit - SD-68514-01.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2324-JB-AOA-EO

COMMON SYSTEMS
4 WIRE TERMINATING CIRCUITS
FOR CIRCUITS TERMINATING IN
TOLL SWITCHBOARDS NO. 1, 3, 3C OR 3CL
IN SAME BUILDING
OR FOR USE WITH
CROSSBAR TANDEM TRUNK CIRCUITS

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded / Superseded by

Superseded	Superseded by
A and B Repeat Coil - 120P - Fig. 1	A and B Repeat Coil - 120P - Fig. 7
A and B Repeat Coil - 120N - Fig. 2	A and B Repeat Coil - 120N - Fig. 9
N Capacitor - 1.07 - 1.09 uf - Figs 1 and 2 "ZU" and "ZQ" Options respectively	N Capacitor - 1.07 - 1.09 uf - Figs. 7 and 9 "YF" Option
	or
	N Capacitor 4.28 - 4.36 uf Figs. 7 and 9 "YG" Option
A and B Capacitors 1.07 - 1.09 uf Fig. 2	A and B Capacitors 2.14 - 2.18 uf Fig. 9
A1 and B1 Capacitors - 1. - 1.25 uf; A and B Capacitors - 1.05 - 1.08 uf; A1 and B1 Resistors - 200 ohms - 145A — Fig. 1 "ZX" Opt.	A and B Capacitors - 2.14 - 2.18 uf Fig. 7
or	
A and B Capacitors 0.735 - 0.765 uf Fig. 1 "X" Option	

B.2 Removed

A and B Retard Coils - 307J
Figs. 1 and 2

B.3 Added

S and T Resistors 8250 ohms ± 1% - 145A Figs. 7 and 9	C Capacitor 4.28 - 4.36 uf Fig. 8

D. DESCRIPTION OF CIRCUIT CHANGES

D.01 In order to meet the revised transmission requirements for two-wire switching offices Figs. 1, 2, C and F are rated "Mfr. Disc." and replaced by Figs. 7 and 9 rated "Std."

D.02 In order to provide sufficient filtering for an associated DX Signaling Circuit, the C Capacitor Fig. 8, is provided on an optional basis.

D.03 The value of the N Capacitor Figs. 7 and 9 is made optional to provide means for matching the value of the mid-point capacitor of the two-wire side. "YG" Option 4.28 - 4.36 uf is provided when connection to a DX Signaling Circuit is required. "YF" Option 1.07 - 1.09 uf is provided whenever the connecting circuit is other than DX Signaling Equipment.

D.04 "YD" and "YE" Options Fig. 7, provide means for obtaining the correct turns ratio in the repeating coils for matching the 600 ohm impedance of the four-wire side to the impedance of the office or trunk circuit connected to the two-wire side. When office or trunk impedance is greater than 735 ohms but less than 1200 ohms provide "YD" Option. When office or trunk impedance is greater than 1200 ohms, provide "YE" Option.

D.05 Reference to Figs. 7, 8 and 9, Options YD, YE, YF, and YG is added to Circuit Note 101.

D.06 Circuit Note 104 is added.

D.07 Reference to Figs. 7, 8 and 9, Options YD, YE, YF and YG is added to "Options Used" table.

D.08 Prior to this issue, Figs. 1, 2, C and F, Options ZU, ZQ, ZW, Y, ZX, and X were rated "Std." now rated "Mfr. Disc."

D.09 Record of changes made on this issue is added to Circuit Note 103.

D.10 Prior to this issue destination of Leads "T", "R", "A" and "B" of Figs. 1 and 2 included reference to "incoming trunk circuits". Reference is now made only to "trunk circuits".

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit provides means for connecting a four-wire circuit at a Toll Office to a two-wire circuit at Toll Switchboard No. 1, 3, 3C or 3CL.

1.2 This circuit provides means for connecting a four-wire circuit to a two-wire circuit such as a Crossbar Tandem Office either in the same or different building.

2. WORKING LIMITS

2.1 None

3. FUNCTIONS

3.1 Provides a hybrid transformer arrangement for terminating the four-wire circuit.

3.2 Provides a balancing network for balancing the two-wire circuit.

3.3 Provides pads for adjusting transmission levels.

4. CONNECTING CIRCUITS

4.01 Circuit Patching Jacks - SD-68327-01, SD-55337-01, SD-64724-01.

4.02 Signal Lead Extension Circuit - SD-95488-01.

4.03 Incoming Trunks in Crossbar Tandem Office - SD-25905-01, SD-25909-01.

4.04 Repeat Coil Circuit - SD-95492-01.

4.05 Intertoll Trunks - Toll Switchboard No. 3, 3C, 3CL - SD-56109-01, SD-55852-01.

4.06 Aux. Intertoll Trunk - Toll Switchboard No. 3, 3C, 3CL - SD-62632-02.

4.07 Echo Suppressor Circuit - SD-59031-01.

4.08 S. F. Signaling Circuit - SD-55954-01 or SD-56202-01.

4.09 Line and Balancing Network Circuit - SD-90517-01.

4.10 Aux. Intertoll Trunk Circuit - SD-96384-01.

4.11 DX Signal Lead Circuit - SD-95487-01.

DESCRIPTION OF OPERATION

5. GENERAL

This circuit is used to connect a four-wire circuit to a two-wire circuit by means of a two-coil hybrid. The arrows associated with the four-wire leads indicate the direction of transmission to and from the hybrid coil made up of Repeating Coils (A) and (B). Incoming talking currents on the two-wire side induce a voltage in the repeating coils so that each four-wire branch receives approximately an equal amount. The balancing network equipment receives no energy at this time.

When talking currents enter the hybrid over Leads "T1" and "R1" the induced voltage divides approximately equally between the two-wire side and the balancing network. The four-wire branch from Repeat Coil (B) receives substantially no energy at this time. The (NL) Capacitor and (N) Resistor form the compromise network which balances the impedance of the two-wire circuit.

6. MISCELLANEOUS

6.1 Figs. 1 and 7 are four-wire terminating circuits for use with crossbar tandem circuits. They provide for connection to a crossbar tandem office either in the same or different building. The office or trunk impedance of the circuit to which Fig. 1 or Fig. 7 connects is 735 ohms or greater.

6.2 Figs. 2 and 9 are used for connection to intertoll trunks in a crossbar tandem office and also for connection to intertoll trunks in a toll office. However these figures are to be used with offices or trunks with impedances of less than 735 ohms.

6.3 For adjustment of the desired transmission levels in the transmitting and receiving branches of the four-wire circuit plug-in pads (Fig. 6) rated "Std.", or fixed pads (Figs. A, B, D, E) with trimmer pads (Fig. 5) are provided. Figs. A, B, D, E and 5 are rated "Mfr. Disc."

6.4 The NBO (Fig. J) Condenser is provided to balance the wiring capacitance of the connected circuits.

6.5 Fig. 8 and "YG" Option shall be provided only when this circuit connects to the DX Signaling Circuit. When the associated DX Signaling Circuit connects in turn, to an incoming crossbar tandem trunk, this connection should be used for terminating traffic only. This limitation is imposed by the fact that the 4 ufd midpoint condenser will change the impedance of the two-wire side such that its characteristic impedance is no longer approximately 900 ohms and 2 ufd. On these connections, the insuing unbalance would result in a transmission quality below the standards established for VNL operation.