CD-31779-01
ISSUE 5D
APPENDIX 3B
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7

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A, OR 35E97
OUTGOING REPEATER CIRCUIT
BATTERY AND GROUND OR LOOP PULSING
LOOP SUPERVISION
ARRANGED FOR 2 REPEATERS PER BASE
AND FOR TEMPORARY USE TO
CALL INDICATOR OFFICE

CHANGES

C. Changes on Circuit Requirement Tables Not Covered By Changes in Apparatus

C.1 Test Notes 1 & 7 Circuit Requirement Table, page 2, sheet 3, changed to read "15 Grams, instead of 10 Grams".

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-GFC
WECO DEPT 2311-RWH-WEA

CD-31779-01
ISSUE 5D
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STEP-BY-STEP SYSTEMS
NO. 1, 350A, 360A OR 35-E-97
OUTGOING REPEATER CIRCUIT
BATTERY AND GROUND OR LOOP PULSING
LOOP SUPERVISION
ARRANGED FOR TWO REPEATERS PER BASE
AND FOR TEMPORARY USE TO
CALL INDICATOR OFFICE

Changes

D. Description of Changes

D.1 Note 307 is rerated "Mfr. Disc."

D.2 Note 308 is added to clarify the application of Option ZR.

D.3 Note 102 is changed to clarify the application of Options V, Q & Z1.

BELL TELEPHONE LABORATORIES, INCORPORATED

Dept 5245-GFC
WECO Dept 5152-RWH-WEA

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 360A OR 35-E-97
OUTGOING REPEATER CIRCUIT
BATTERY AND GROUND OR LOOP PULSING
LOOP SUPERVISION
ARRANGED FOR TWO REPEATERS PER BASE
AND FOR TEMPORARY USE TO
CALL INDICATOR OFFICE

Changes

Description of Changes

D.1 Option ZR, which was shown in error, above and to the left of jack point 10, sheet 1 removed without record.

D.2 The note that was added as note 113 changed to note 114 and A&M note 113 changed to reflect option W and ZW changes.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-LCB
WECO DEPT 5152-RWH-WEA

STEP-BY-STEP SYSTEMS NO. 1, 350A, 355A, 360A OR 35-E-97 OUTGOING REPEATER CIRCUIT BATTERY AND GROUND OR LOOP PULSING LOOP SUPERVISION ARRANGED FOR TWO REPEATERS PER BASE AND FOR TEMPORARY USE TO CALL INDICATOR OFFICE

SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 This circuit is used for repeating dial pulses from a step-by-step office to another step-by-step office, a call indicator office, a crossbar office, or an ESS No. 1 office. Pulsing is on a battery and ground basis to all offices except when dialing over trunks to a DP terminating sender in No. 1 crossbar office, pulsing is on a loop basis.

2. GENERAL DESCRIPTION OF OPERATION

2.01 This circuit, when seized by the subscriber, places a polarized relay in series with the distant office relay as a loop seizure signal. Battery and ground pulsing is used to repeat the dialed number to the distant office except, a DP terminating sender in a No. 1 crossbar office requires loop pulsing.

2.02 Reverse battery supervision , if returned by the distant office, is repeated to the calling station.

SECTION II - DETAILED DESCRIPTION

1. SEIZURE

1.01 When this circuit is seized by an out trunk switch or a selector, relay A will operate over the subscriber loop.

1.02 Relay A operated:

(a) Closes the loop to the distant office.

(b) Operates relay B.

1.03 Relay B operated:

(a) Grounds lead S to preceding circuit and lead S to subsequent circuit (option T).

(b) Prepares a path for operating relay C.

(c) Removes battery from lead S (option W).

(d) Grounds the polarizing winding of relay D. Relay D will not operate at this time as the two windings are opposing each other.

2. PULSING

BATTERY GROUND PULSING

2.01 When dial pulses are received, relay A will respond to the pulses and interrupt the circuit to the pulsing relay in the distant office. The first pulse of each digit releases A and operates C, which, being slow to release will remain operated during the series of pulses. Relay B is also slow to release and remains operated during the time A is pulsing. The operation of C connects ground through resistor A to the ring side of the circuit and battery through resistor B to the tip side. At the end of the digit C releases and performs the following functions in order:

(a) Bridges resistor D across the tip and ring.

(b) Disconnects battery and ground from the tip and ring.

(c) Bridges the front winding of relay D across the tip and ring in parallel with resistor D.

(d) Opens the circuit through resistor D.

This sequence of operations insures against falsely operating relay D momentarily at the end of the digit.

LOOP PULSING (A&M Only)

2.02 Where loop pulsing is employed, the operation is similar to the above

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up to the operation of relay C. This relay in operating arranges the circuit so that 6-7 of relay A, shunted by resistor A in series with capacitor A, will pulse the switches in the distant office. At the end of the digit relay C releases first connecting resistor D across the tip and ring of the trunk, then connecting the front winding of relay D in parallel with resistor D and finally opening the circuit of resistor D leaving the front winding of relay D across the trunk to hold the circuit in the distant office.

2.03 The tip and ring leads are reversed (option ZR) to prevent a false operation of the distant office pulse receiving relay during the time the dial pulsing contact is open and relay A has not released.

2.04 The 75 volt regulator diode A and resistor A (option ZR) are to prevent bell tapping.

2.05 The diodes in series with relay A (S&P) are used to block surge currents that can falsely operate relay A.

3. CALLED PARTY ANSWERS

3.01 When the called party answers on a charge call, the battery over the trunk circuit is reversed which reverses the current through the front winding of relay D which will thus aid the current in the rear winding and cause the operation of the relay. This reverses the battery to the calling line and also opens the operating circuit of relay C, except on calls to call indicator offices, for the purpose of preventing its operation on any momentary release of relay A. Relay D will hold on its rear winding if its front winding is opened by the release of relay A and will release only by the reversal of current through the front winding, or opening the circuits of both windings.

4. DISCONNECTION ON CALLS TO STEP-BY-STEP OR CROSSBAR OFFICES

4.01 When the calling party disconnects, relay A releases which in turn allows relay B to release, and the circuit is then restored to normal. Relay C operates when relay A releases, and releases when relay B releases.

5. DISCONNECTION ON CALLS TO CALL INDICATOR OFFICES

5.01 On these calls disconnection occurs as described in 4.01 except when ground has been placed on lead K by the make busy circuit during the call. In this case the operation of relay C removes this ground from the sleeve to permit switches ahead to release, and on the release of re-C the ground is replaced to make the circuit busy to incoming calls as long as the associated make busy circuit holds ground on lead K.

6. TEST JACK

6.01 Springs 3 and 4 of the test jack may be used for making the circuit busy, or they may be used in connection with springs 1 and 2 to make a test of the circuit. Springs 5 and 6 are used when making percent break tests of the pulsing relay, or tests of the conductors.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 The working limits are:

Supervision	Incoming A Relay	Outgoing D Relay
Max ext circuit loop	2340 ohms	2560 ohms
Min insulation resistor	30,000 ohms	30,000 ohms

1.02 For pulsing, see keysheets.

2. FUNCTIONAL DESIGNATIONS

None.

3. FUNCTIONS

3.01 To hold the preceding switches operated.

3.02 To repeat pulses to the office beyond.

3.03 To repeat supervision to the originating subscriber or operator when the called party answers on a charge call.

3.04 To make the circuit busy to other circuits.

3.05 To supply talking battery.

3.06 When used to a call indicator office to test busy to other circuits while ground is received over lead K from the make busy circuit.

3.07 Under the condition of 3.06 to permit switches ahead to release at the end of the call if ground is connected while a call is in progress, and then replace ground on the incoming sleeve.

3.08 To restore to normal when the calling station disconnects.

4. CONNECTING CIRCUITS

4.01 When this circuit is listed on a keysheet, the connecting information thereon is to be followed.

(a) Local Selector Circuit - SD-30200-01, SD-31735-01 (typical).

(b) Rotary Out Trunk Switch Circuit - SD-30868-01 (typical).

(c) Make Busy Circuit for Use With Trunks to Call Indicator Office - SD-31225-01.

(d) Make Busy Circuit for Use with Trunks to Panel Office or No. 1 Crossbar Office - SD-30855-01.

(e) Incoming Trunk Circuit at Call Indicator Office - ES-10574-01 (typical).

(f) A-B Toll Preceding Selector Circuit SD-31241-01 (typical).

(g) Trunk Auxiliary Circuit - SD-32032-01.

(h) Message Ticketer Trunk Test Circuit - SD-31944-01.

(i) Auxiliary Trunk Circuit Arranged To Restrict Service - SD-32187-01.

(j) Incoming Trunk (EAS) - Crossbar Tandem - SD-27148-01.

5. MANUFACTURING TESTING REQUIREMENTS

5.01 This repeater circuit shall be capable of performing all of the functions specified in the circuit description, and shall meet all the requirements of the Circuit Requirements Table.

SECTION IV - REASONS FOR REISSUE

B. Changes in Apparatus

B.1 Added

A - 426AH Diode Fig. 3, Option ZR

S - 446F Diode Fig. 3, Option ZR

P - 446F Diode Fig. 3, Option ZR

A - 144B Resistor Fig. 3, Option ZR

B.2

Superseded	Superseded By
179A (B) Network Fig. 3 Option ZS	(B) Network Consisting of 542D Capacitor and KS-13490L2 Resistor, Fig. 3, Option ZT
445(T,R) Capacitor Fig. 3 Option ZU	580A (T,R) Capacitor Fig. 3 Option ZV
82A (B) Resistor Fig. 3	KS-20289L2B, 150 ohm (B) Resistor, Fig. 3
82E (E) Resistor Fig. 3 Option W	KS-20289L2B, 698 ohm (E) Resistor Fig. 3 Option ZW

D. Description of Changes

D.1 Option ZP is rerated "Mfr. Disc".

D.2 Option ZQ is designated and rated "Mfr. Disc".

D.3 Option ZR is added and rated Standard.

D.4 Option ZS is designated and rated "Mfr. Disc".

D.5 Option ZT is added and rated Standard.

D.6 Option ZU is designated and rated "Mfr. Disc".

D.7 Option ZV is added and rated Standard.

D.8 Option W is rerated Mfr. Disc." and option ZW is added and rated "A&M only."

D.9 Resistor B is changed from A 82 type to KS-20289L2B on a line out basis.

F. Changes in the Body of the CD

F.1 The Circuit Description is rewritten to reflect all changes.

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