

OCT 31 1980
RAC

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

B. Changes in Apparatus

B.01	<u>Removed</u>	<u>Replaced By</u>
	A Diode 426AH - Fig. 3	A Diode 813BA - Fig. 3

D. Description of Changes

D.01 Figure 3 has been changed to show the addition of options ZX and ZY which optionally provide for step-by-step reserved number intercept and measured rate service.

D.02 Figure 3 is modified to reflect the apparatus change noted in B.01.

D.03 Circuit Note 102 has been modified for the addition of options ZX and ZY.

D.04 Circuit Note 104 is revised for added options ZX and ZY and for apparatus changes noted in B.01.

D.05 The CAD Fig. 70 is added and CAD Fig. 51, 52, 53, 54, 55, 60, 61, and 67 are changed to reflect the above.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5413-DAJ

WE DEPT 45230-JPW-JTT-VLF

MAY 04 1977

DRAWING NOTICE

TITLE 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

SD-31779-01
CD ISSUE 5D APPX 3B ADD.
RATING AT&TCo Standard-A&M Onl
for 350A, 360A and 35E9
SYSTEM SXS
DATE 08-20-76
DRAWING DISTRIBUTION CODE: 1D99

ISSUE 27B

DESCRIPTION

- 6.1 Project: None
- 6.2 Reissued sheets: A and 3
(Total reissued sheets: 2)
- 6.3 This change for TELCO consideration is to change the test requirement for the spring tension on the 2-3 springs of relay C from 10 grams to 15 grams.
- 6.31 No wiring or apparatus is required to implement this change.
- 6.4 This B change does not require WECO notification to TELCO.
- 6.5 Transmission is not affected by changes in this issue.
- 6.6 Direct Current Drain Data is not affected by this issue.
- 6.7 Equipment information is not affected.
- 6.8 Equipment Design Requirements are not affected.

13

CIRCUIT DESCRIPTION

CD-31779-01
ISSUE 5D
APPENDIX 3B
DWG ISSUE 27B
DISTN CODE 1D99
DATED 8-20-76

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 355A, 360A, OR 35E97
OUTGOING REPEATER CIRCUIT
BATTERY AND GROUND OR LOOP PULSING
LOOP SUPERVISION
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CALL INDICATOR OFFICE

NOV 11 1976

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

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AMERICAN TELEPHONE AND TELEGRAPH COMPANY

195 BROADWAY, NEW YORK, N.Y. 10007

DRAWING NOTICE

TITLE	Step-by-Step Systems - No. 1, 350A, 355A, 360A or 35E97 - 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	SD-31779-01 CD ISSUE 5D RATING AT&TCo Standard-A&M Only for 350A, 360A and 35E97 SYSTEM SXS DATE 3 - 5 - 76 DRAWING DISTRIBUTION CODE: 1D99	ISSUE 26B APPX 2B ADD.
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DESCRIPTION

- 6.1 Project: None
- 6.2 Reissued sheets: A and 1
(Total reissued sheets: 2)
- 6.3 This change is to add and change
circuit notes to clarify the application of options ZR, ZI,
V and Q.
- 6.31 No new apparatus is required as a result of this change.
- 6.4 This B change does not require WECO notification to TELCO.
- 6.5 Transmission is not affected by changes in this issue.
- 6.6 Direct Current Drain Data is not affected by this issue.
- 6.7 Equipment information is affected and will be covered by
WECO drawings ED-31779-() which will be available about 2Q76.
- 6.8 Equipment Design Requirements are not affected.

MAY 24 1976

CD-31779-01
ISSUE 5D
APPENDIX 2B
DWG ISSUE 26B
DATE 3-5-76
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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

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195 BROADWAY, NEW YORK, N.Y. 10007

DRAWING NOTICE

SD-31779-01

ISSUE 25B

CD 5B

APP. 1B

RATING AT&TCo Standard

SYSTEM SXS

DATE August 28, 1974

DWG DIST CODE: 1D99

TITLE

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

DESCRIPTION

- 6.1 PROJECT: None
- 6.2 Reissued sheets: A. 1
(Total reissued sheets: 2)
- 6.3 This change for TELCO consideration is to correct a drafting error, change the number of a note and change an option application.
- 6.31 Option ZR located adjacent to Option ZP above and to the left of jack punching 10 is removed.
- 6.32 Two Note 113's appeared on the drawing. The note in the lower left hand corner is changed from 113 to 114.
- 6.33 The last line of Note 113 A&M (for Fig. 3) under App. or WIR was changed from H,W to H,ZW to agree with Note 105.
- 6.4 This B change does not require WECO notification to TELCO.
- 6.5 Transmission is not affected by changes in this issue.
- .6 Direct Current Drain Data is not affected by this issue.
- 6.7 Equipment information is not affected.
- 6.8 Equipment Design Requirements are not affected.

STEP-BY-STEP SYSTEMS
NO. 1, 350A, 360A OR 35-E-97
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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.

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DEPT 5245-LCB
WECO DEPT 5152-RWH-WEA

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
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DRAWING NOTICE

SD-31779-01 ISSUE 24D
CD 5D APP.
RATING AT&T Co. Standard
SYSTEM SXS
DATE January 30, 1974
DRAWING DIST. CODE: 1D99

TITLE

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

DESCRIPTION

- 6.1 PROJECT: None
- 6.2 Reissued sheets: A, 1, 2, 3, 4
 (Total reissued sheets: 5)
- 6.3 This change requires coordination with another circuit,
 specifically: ES-32506-01
- 6.31 This change for TELCO consideration is to incorporate the
 field modification of this circuit by ES-32506-01, as a
 standard option. ES 32506-01 field modification was applied
 when pulsing failures due to AC power interference were
 encountered.
- 6.32 One 426 type diode, two 446 type diodes and one 144 type
 resistor are required, with minor wiring changes, to
 implement the changes.
- 6.4 This change also covers: Manufacturing change
- 6.5 This D change does not require WECO notification to TELCO.
- 6.6 Transmission is not affected by changes in this issue.
- 6.7 Direct Current Drain Data is not affected by this issue.
- 6.8 Equipment information is affected and will be covered by
 WECO drawing ED-31779-() which will be available about 2Q74.
- 6.9 Equipment Design Requirements are not affected.

JUN 25 1974

4

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

JAN 30 1974
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SECTION I - GENERAL DESCRIPTION1. 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 DESCRIPTION1. 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. PULSINGBATTERY 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

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 relay 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:

<u>Supervision</u>	<u>Incoming A Relay</u>	<u>Outgoing D Relay</u>
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".

CD-31779-01 - ISSUE 5D

D.7 Option ZV is added and rated Standard.

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

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

F. Changes in the Body of the CD:

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

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-LCB
WECO DEPT 5152-RWH-WEA