TRAINING MANUAL

THE

STEP-BY-STEP

DIAL SWITCHING SYSTEM

VOLUME II

SEQUENCE CHARTS & OPERATIONAL SKETCHES

THE AMERICAN TELEPHONE AND TELEGRAPH COMPANY

OPERATING AND ENGINEERING DEPARTMENT

PLANT OPERATION DIVISION
THE NUMBER ONE STEP BY STEP DIAL SWITCHING SYSTEM

TRAINING MANUAL

VOLUME II

SEQUENCE CHARTS AND OPERATIONAL SKETCHES

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For Training Purposes Only

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This provisional training material represents a preliminary step toward improving the "learning" literature for the Number One Step-by-Step System.

The material is divided into two volumes.

Volume I contains a general description of the system, which should aid the learner in gaining a good understanding of the basic principles. The aim is to introduce the learner to the subject by explaining the fundamentals in simple non-technical language.

Volume II contains a series of typical circuit diagrams. These are drawn in the simplified style which is used in teaching the complex 'Common Control' switching systems now in current use. This method makes use of sequence charts and operational sketches, and this volume contains a chart and sketch for each of the typical circuits.

Since the drawings are intended to be used in the study of the Number One System in general, and do not necessarily conform to any particular office, it may be necessary to consider the regular Schematic Drawings (SD's) and Circuit Descriptions (CD's) when preparing learners to work in a specific office. Also, those employees who must make mechanical or electrical adjustments of the apparatus should have actual practice on typical switches. In this connection a review of the Bell System training film "The Step-by-Step Switch" will be found helpful.

Students should be cautioned that the particular circuits contained in this manual are intended to be used only as training aids, and are not necessarily applicable for maintenance.
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**NOTE:** General information concerning legends etc. on Sequence Charts and Operational Sketches will be found in B.S.P. A128.801.

* Added in May 1954
Seizure by subscribers shunt

1st Pulse

Pulsing

Intermediate and Last Pulses

Repeat for additional busy trks. to succeeding cct.

For Training Purposes Only

Sequence Chart for
SD-30200-01
Selector

9/2/52 N.A.Uitlow Issue 220

TCI Library - http://www.telephonecollections.info/
### Sequence Chart for SD-30215-01

**Local Rotary Connector**

**9/2/52**

**Number 1 Step By Step System**

#### Seizure by subscriber shunt

- A
- B
- Grds. Slv.
- C
- Vert. Mag.
- X
- VON
- X

#### Rotary hunting and idle line seizure

- Grd. on S & H
- E
- G
- Rot. Mag.
- G
- Rot. Mag.
- Repeat for additional busy trks. except last trk.
- Last trk. busy (Grd. on "S" only)
- Individual line busy (Grd. on "S" only)
- H
- Idle trk. (No S or H grd.)
- X
- K
- Rings cld. pty.
- Cld. pty. ans.
- F
- D
- Conversation
- E
- D (Cld. pty. first to disc.)
- Clg. pty. ans.
- A
- B
- X
- E
- F
- A
- B
- Rot. Mag.
- X
- Rot. Mag.
- X
- A
- Busy test made during this period
- Rot. Mag.

#### For Training Purposes Only

**Issue 19 D 2**

**R.A. Dillow**

**TCI Library - http://www.telephonecollectors.info/**
Seizure by
Grid on slv. &
Operator's shunt

Vertical Pulses
First Pulse
X A
X VON
X Vert Mag.
X C
X Rot Mag.

Last Pulse
First Pulse
X A
X Vert Mag.
X C
X Rot Mag.
X E
X Rot Mag.
X E

For Training Purposes Only
Number 1 Step By Step System
Sequence Chart For
SD-31114-01
Toll Rotary Connector

9/2/52 R.A. Ditlow Issue 16 D 7
Seizure
grd. on S & C leads
shunt by operator's trk.

\[ \begin{align*}
\text{Pulsing} \\
\text{A} \\
\text{C} \\
\text{Vert. Mag.} \\
\text{VON} \\
\text{E} \\
\text{A} \\
\text{Vert. Mag.} \\
\text{A} \\
\text{Vert. Mag.} \\
\end{align*} \]

First Pulse

\[ \begin{align*}
\text{A} \\
\text{C} \\
\text{Vert. Mag.} \\
\text{VON} \\
\text{E} \\
\text{A} \\
\text{Vert. Mag.} \\
\end{align*} \]

Last Pulse

\[ \begin{align*}
\text{A} \\
\text{C} \\
\text{Vert. Mag.} \\
\text{A} \\
\text{Vert. Mag.} \\
\end{align*} \]

Repeat for additional busy trks. to succeeding cct.

Grd. on slv. bank term.

Rot. Mag.

Grd. on slv. bank term.

Rot. Mag. (Busy trk.)

No grd. on slv. bank term.

Rot. Mag. (Idle trk.)

\[ \begin{align*}
\text{A} \\
\text{B} \\
\end{align*} \]

Locks to grd. on slv.

from bat. thru E

Transfers "T","R","S","C", to succeeding cct.

Disconnect (Grd. off slv.)

All trks. busy

Splits "S" & "C"

11th Rot. Step Spgs.

Busy flash to oper.

Disconnect (Grd. off slv.)

Rls. Mag.

VON

Rls. Mag.
For Training Purposes Only

Sequence Chart For
SD-90018-01
Test Trunk Circuit
SD-31401-10
Test Distributor Control Circuit

Deskman plugs cord in jack
- Dial key oper. in test desk
  (Shunt on "T" & "R" key, low res. bat. on slv.)
- Grd. on line S X LS
- X SB (Locks to line S)
  X(S(TDC)) X(D(TDC)) X DC X S (TT)
- X SD

Deskman dials in test desk
- Dial key raised in test desk
  (High res. bat. on slv.)
- X(D(TDC)) X LS
- X CT X SC X DC
- X KD

To release test connector only, the relay operation of these ccts. is the same as when advancing test connector. When the conn. rfis. key is oper. on the test desk the tip is opened and bat. is connected to the ring. This releases the "A" rel. in the test dist. which releases the test connector.

To advance test connector
- Operate dial key
  (Low res. slv. bat., shunt on "T" & "R")
  X(S(TDC)) X(S(TT))
  X SD
- X DB

Perm. signal release
- Bat. on "T" & "R", slv. open
  X S (TT)
- X CO

Deskmn dials in test desk
- Dial key oper. in test desk
  (Shunt on "T" & "R" key, low res. bat. on slv.)
- Grd. on line S X LS
- X SB (Locks to line S)
  X(S(TDC)) X(D(TDC)) X DC X S (TT)
- X SD

To rls. C.O. Rel.
- 3 W.O. key oper. in test desk
  X S(TDC) X S(TT)
- X SD

Grds. line T releases Q in test dist. which rem. grd. from cld. line sleeve.

Perm. sig. rls. cycle completed ("EC" lead grd.)
- X PS
  (Starts perm. sig. rls. cct.
   Flash to test desk over "T" wire)

Grd. off line S
- X KD

Operate DIS key
- X(D(TDC)) X(D(TT))

Descmn answers lamp
- XL
  Causes "Sup" lamp to flash

Test cord removed without disconnecting
- Shunt comes on line
  - CO
  - Deskmn answers lamp
    - XL

To advance test connector
- Operate dial key
  (Low res. slv. bat., shunt on "T" & "R")
  X(S(TDC)) X(S(TT))
  X SD
- X DB

Perm. signal release
- B - Oper. by test dist. due to line busy.
  X S (SD)

Operate DIS key
- X(D(TDC)) X(D(TT))

Deskman answers lamp
- XL
  Causes "Sup" lamp to flash

Note A
A steady cord lamp signal on test bd. after perm. sig. rls. cct. has completed its cycle indicates the perm. sig. was not released. No cord lamp signal indicates the perm. sig. was released and the line under test is disconnected from the central office equipment.

LOCAL TEST DESK #14

9/2/52
R.A. Ditlow
Issues 16-0 6-0 10

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Seizure by subscriber's shunt

Rot. Mag.

Rot. step

#2 & #5

Sub Hangs up

A

B

C

A

Rot. Mag. X

X

RON

Rot. Mag.

Rot. Mag.

Rot. Mag.

All other rot. steps

A

B

Rls. Mag.

RON

Rls. Mag.

Starts interrupter relay A to operate Step Magnet at 60 IPM rate

P.U. grd. from interrupter

Answer by Subscriber

Selector Bank Term.

For Training Purposes Only

Number 1 Step By Step System

Sequence Chart For

SD-31647-01
Reverting Call Selector

SD-31501-01
Interrupter and Transfer Key

9/2/52 H.A. Ditlow Issue 10-D 5-D 11

TCI Library - http://www.telephonecollectors.info/
Seizure by subscriber shunt

First Pulse
Vertical Pulsing
Last Pulse
Rotary Pulsing

Called line idle

Called line busy (Reverting call)
Slv. grd. called number

Called line busy (Not reverting call)
Slv. grd. called number

Note A
The J Rel. follows a code grd. from the Ringing Interrupter which is cross connected to the "A" bank multi. term. of the called party. This causes the proper ringing code to be sent to the called party.

Note B
The B Rel. operates twice per code ring from timed grd. on "RS". This provides a signal to the clg. pty. that is connected on the "Reversed Side" from the cld. pty.
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Number 1 Step By Step System

Sequence Chart For
SD-32133-01 Subscribers Line Circuit
SD-31530-01 Line Finder

9/2/52 R.A. Ditlow Issues 7D 2001 14
Seizure by subscriber's shunt

Grd. Slv.

The A rel. follows dial pulses from subscriber and repeats them to succeeding equip. C Rel. does not follow pulses but changes from "Loop Seizure" of Trk. to "B/G Seizure" during pulsing.

Sub. ans.

Operated by B/G reversal from succeeding equip. and repeats all B/G reversals and restorals to preceding equip. If the called pty. disc. first the D will release before the A and B

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Number 1 Step By Step System

Operational Sketch & Sequence Chart For SD-31779-01 Outgoing Repeater Circuit

9/2/52 R.A. Ditlow Issue 12 D 15
Seizure by subscriber's shunt

A

B

RC (Signals oper.)

Oper. answers

X

S

Conversation

Subscriber disc.

Operator disc.

RC

Disconnect supv. to oper.

A

B

RC

CD

BR