

STEP-BY-STEP SYSTEMS
NO. 1 OR 350A
TRAFFIC REGISTER CIRCUIT

8

CHANGESB. Changes in Apparatus (Components)B.1 SupersededC Diode 426AH -
Fig. 15, S OptionSuperseded ByA Diode 446F -
Fig. 15, N Option

B.2 For field modification of the existing equipment, 426AH type diode of option S may be reused in place of 446F type diode of option N.

D. Description of Changes

D.1 Fig. 15 is modified to prevent activation of Overflow Register Relays by surge currents from the sleeve of an associated rotary hunting connector upon calling party disconnect. Such activation was previously experienced with option S in the circuit.

D.2 This change includes rerating of present options S and Q to Mfr. Disc., and superseding them with N wiring and apparatus rated Standard.

D.3 Connecting information is added for use of Fig. 1 and Fig. 4 with CAMA Pretranslator and Pretranslator connector circuit.

D.4 Notes 103 and 104 are changed, note 113 is rated Mfr. Disc. and note 114 is added to reflect the above changes.

D.5 Maintenance BSP is added to Supporting Information.

F. Changes in Description of Operation

F.1 In Paragraph 15.01, Section II, delete the third sentence, and add the following:

"The arrangement of option N prevents the possibility of activation of relay F on surge currents from the sleeve, experienced previously with Option S. The use of resistors A, option T, was discontinued when 221KE and 307C types of J position relays were introduced in the rotary hunting connector circuits."

F.2 Add to paragraph 4.01, Section III:

(bg) Pretranslator and Pretranslator Connector Circuit - SD-32513-01.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-ICB
WECO DEPT 5152-JS-WEA

CIRCUIT DESCRIPTION

CD-30896-01
ISSUE 9D
APPENDIX 2D
DWG. ISSUE 26D

STEP-BY-STEP SYSTEMS
NO. 1 OR 350A
TRAFFIC REGISTER CIRCUIT

CHANGES

D. Description of Changes

D.1 Connecting information is added to Note 103 to allow connection to SD-1C297-01, a Coin Station Test Line Circuit.

F. Changes in CD Section

F.1 Add to Section 4. CONNECTING CIRCUITS:
(bp) Coin Station Test Line Circuit - SD-1C297-01.

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DEPT 5225-LCB
WECO DEPT 5152-JMS-WEA

STEP-BY-STEP SYSTEMS
NO. 1 OR 350A
TRAFFIC REGISTER CIRCUIT

CHANGES

C. Changes in Circuit Requirements Other
Than Those Caused by Changes in
Apparatus

- C.1 Missing information is added to insulate contact spring 3T of relay F1. Fig. 15 when testing the winding of this relay alone.
- C.2 Complete testing information is added for F1 relay when option Q is used.

D. Description of Changes

- D.1 Provision is made to assure the proper operation of the Overflow Register Relay for Rotary Hunting Connectors, Fig. 15 with all vintage Rotary Hunting Connectors by increasing the holding current through primary winding of the F1 relay.
- D.2 For this purpose, option R is designated and rated MFR. DISC. while a new wiring, option Q is added and rated Std.
- D.3 Circuit Note 104 is changed and Note 113 is added to show the use of options R and Q.

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DEPT 5225-LCB
WECO DEPT 5152-JS-WEA

STEP-BY-STEP SYSTEMS
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TABLE OF CONTENTS	PAGE	
<u>SECTION I - GENERAL DESCRIPTION</u>	1	<u>1. WORKING LIMITS</u>
<u>1. PURPOSE OF CIRCUIT</u>	1	<u>2. FUNCTIONAL DESIGNATIONS</u>
<u>SECTION II - DETAILED DESCRIPTION</u>	1	<u>3. FUNCTIONS</u>
<u>1. GENERAL</u>	1	<u>4. CONNECTING CIRCUITS</u>
<u>2. BATTERY CONTROL RELAY - FIG. 2 AND</u> <u>BATTERY PULSE RELAY - FIG. 6</u>	1	<u>SECTION IV - REASONS FOR REISSUE</u>
<u>3. OVERFLOW REGISTER RELAY FOR</u> <u>BRANCH OFFICES - FIG. 3</u>	2	<u>SECTION I - GENERAL DESCRIPTION</u>
<u>4. DIRECT BATTERY SUPPLY - FIG. 4</u>	2	<u>1. PURPOSE OF CIRCUIT</u>
<u>5. DIAL TONE SPEED REGISTER START</u> <u>RELAY - FIG. 5 OR 16</u>	2	1.01 This circuit provides connections, with auxiliary relays where required, between circuits requiring traffic register and the common systems traffic register cabinet.
<u>6. LAST TRUNK BUSY REGISTER - FIG. 7</u>	2	<u>SECTION II - DETAILED DESCRIPTION</u>
<u>7. ALL TRUNKS BUSY - FIG. 8, 17 OR</u> <u>18, AND C</u>	2	<u>1. GENERAL</u>
<u>8. ALL TRUNKS BUSY AND BUSYING PORT</u> <u>SELECTING ROTARY OUT TRUNK SWITCHES -</u> <u>FIG. 18 AND FIG. A, B, OR C</u>	2	1.01 This circuit provides connections between step-by-step circuits requiring traffic register and the Traffic Register Cabinet Circuit. Where a toll office is housed in the same building with the step-by- step office, the two systems may use the same traffic register cabinet but separate con- necting circuits are provided for each sys- tem. Where automatic ticketing is used in a step-by-step office, a separate circuit is used to provide connection between the auto- matic ticketing circuits and the Traffic Register Cabinet Circuit. Where the connect- ing circuit provides a suitable closure for directly operating a 600-ohm register, the direct pulse lead of Fig. 1 is used to provide this connection.
<u>9. PEG COUNT REGISTER RELAY FOR</u> <u>SUBSCRIBER LINES WITH ROTARY LINE</u> <u>SWITCH - FIG. 10</u>	2	<u>2. BATTERY CONTROL RELAY - FIG. 2 AND</u> <u>BATTERY PULSE RELAY - FIG. 6</u>
<u>10. OVERFLOW REGISTER FOR ROTARY</u> <u>HUNTING CONNECTORS - FIG. 11</u>	3	2.01 Fig. 2 provides battery for the operation of peg count registers and the associated relays of Fig. 10 and 12. The battery is placed under control of a relay since the peg count registers are operated only on days when it is desired to record peg count. The first Fig. 2, with Y option, also closes the circuit for the battery pulse relay of Fig. 6. This relay operates regis- ters in the register cabinets each 6 seconds. The readings of these registers thus will indicate minutes and tenths of minutes elapsed time while the peg count key is operated.
<u>11. PEG COUNT FOR SELECTORS WHICH</u> <u>ABSORB ALL FIRST DIGITS AND PEG</u> <u>COUNT ON RELEASE - FIG. 12</u>	3	
<u>12. LAST TRUNK BUSY REGISTER -</u> <u>FIG. 13</u>	3	
<u>13. CONNECTION OF REGISTERS TO ASSOCI-</u> <u>ATED CIRCUITS - NOTE 103</u>	3	
<u>14. DETECTOR GROUP USAGE - FIG. 14</u> <u>(MAGNETIC COUNTER) AND FIG. 1</u> <u>AND 4 (REGISTERS)</u>	3	
<u>15. OVERFLOW REGISTER FOR ROTARY</u> <u>HUNTING CONNECTORS - FIG. 15</u>	3	
<u>16. LAST TRUNK BUSY REGISTER RELAY</u> <u>FOR AN ANY OUTGOING TRUNK -</u> <u>FIG. 18 AND C</u>	3	
<u>SECTION III - REFERENCE DATA</u>	3	

3. OVERFLOW REGISTER RELAY FOR BRANCH OFFICES - FIG. 3

3.01 When all the main office trunks associated with a group of selector repeaters are busy and the main office call is dialed, the calling station receives busy tone in series with the R relay which operates, in turn operating SR which is slow in releasing in order to hold over dial pulses, and SR operates the traffic register in the cabinet.

4. DIRECT BATTERY SUPPLY - FIG. 4

4.01 This figure provides battery for the operation of a maximum of 10 registers where these registers are for overflow, all trunks busy, or other purposes where the register should be capable of operation at any time. In order to insure satisfactory operation of the registers, maximum resistance in this lead between battery and the traffic register cabinet should not exceed 10 ohms.

5. DIAL TONE SPEED REGISTER START RELAY - FIG. 5 OR 16

5.01 This relay when operated connects ground to the T and R leads to start the dial tone speed register circuit testing. A register in the cabinet operates from ground over the D1 to D40 leads as indicated in Note 103, to record the number of trials over the delay limit and other registers operate over the T1 and T10 leads to indicate the total number of trials made. Where Fig. 16 and option V are used the operation of the DT relay also places battery on the DT lead to a guard lamp at the Traffic Register Cabinet Circuit.

6. LAST TRUNK BUSY REGISTER - FIG. 7

6.01 When last trunk busy registration is required, the relay of Fig. 7 is connected to the sleeve of the last trunk of the selector level. A relay is required instead of direct connection of the register to the sleeve since the resistance of the registers in the cabinet is too low for direct connection. This relay is slow to operate so that it will not operate on a ground impulse received from a selector arranged to restrict service on certain levels as the selector passes over the tenth terminal. Where trunks are arranged to test busy after the originating party disconnects, and until the called party disconnects, a separate lead from the trunk circuit is provided for register operation. Hence no relay is required in this circuit and the register in the cabinet is operated over Fig. 1.

7. ALL TRUNKS BUSY - FIG. 8, 17 OR 18, AND C

7.01 On each circuit associated with Fig. 8, 17 or 18, and C, a normally closed contact grounds the lead to the AB or ABL relay which is normally operated. When all trunks of a group are busy, this relay releases and closes the path for operating the associated register in the cabinet. In Fig. 17 or 18, the release of relay AB or ABL grounds lead A to the Rotary Out Trunk Switch Circuit. The continuity-transfer contacts of relay AB or ABL permit testing the relay by insulating these contacts, and avoid the necessity for unsoldering the lead.

8. ALL TRUNKS BUSY AND BUSYING PORT SELECTING ROTARY OUT TRUNK SWITCHES - FIG. 18 AND FIG. A, B, OR C

8.01 Fig. 18 provides the all trunks busy register relay for post selecting rotary out trunk switch circuits. In Fig. 18 with Fig. A, the all trunks busy register relay ABL corresponds to the trunk subgroup which is common to all the rotary out trunk switch groups. Relay ABL is held normally operated and releases only when all the trunks of the common subgroup become busy. It functions to ground leads B and C which connect to Fig. B. The remaining subgroups of trunks that are associated with only one rotary out trunk switch group will have one all trunks busy register relay ABL (see Fig. 18 and B associated with each trunk subgroup). These ABL relays are normally operated and release only when all the trunks of the subgroups they are associated with become busy. It functions then to relay ground on leads B and C, if present, to leads A and P. This causes the make-busy circuit of rotary out trunk switch group to function and also operates the associated register in the cabinet.

8.02 When Fig. 18 and C are used, the all trunks busy register relay ABL is held normally operated and releases only when all the trunks of the subgroup or group it is associated with becomes busy. It functions to ground leads A and P.

9. PEG COUNT REGISTER RELAY FOR SUBSCRIBER LINES WITH ROTARY LINE SWITCH - FIG. 10

9.01 When peg count readings are to be taken, a key in the cabinet is operated, in turn operating relay BC of Fig. 2 which connects battery to the relays of Fig. 10. Each time a rotary line switch restores to normal, battery is momentarily connected to the M lead operating the L relay which locks in series with the L resistor and in turn operates L1. L1 operates the register and short circuits L which will release, in turn releasing L1 and restoring the circuit to normal. L1 is slow in releasing in order to insure sufficient time for operation of the register in the cabinet.

10. OVERFLOW REGISTER FOR ROTARY HUNTING CONNECTORS - FIG. 11

10.01 When all the trunks of a PBX group are busy, the connector finding this condition momentarily places battery through a relay on the TM lead and ground on the OS lead, operating relay F. This relay locks up in series with F1 which operates. The resistor A prevents false registration when a connector passes over the last trunk of the group which is busy, but is not in the group dialed, or when the last trunk of the group dialed is seized. F operates the register in parallel with F1 but F1 is slow in operating to allow time for the register to operate. When F1 finally operates, it short circuits F which releases, in turn opening the circuit to the register and releasing F1.

11. PEG COUNT FOR SELECTORS WHICH ABSORB ALL FIRST DIGITS AND PEG COUNT ON RELEASE - FIG. 12

11.01 Selectors of the type described above operate the release magnet twice on each call. The relays of Fig. 12 are arranged to operate the associated register in the cabinet circuit once on each call as follows. When ground is connected to lead R, DA operates. When the ground is removed from lead R, DB operates in series with DA. The next time ground is connected to lead R, DC operates in series with the primary winding of DB. DC opens the circuit through the secondary winding of DB and the winding of DA, allowing DA to release, but DB holds on its primary winding. When ground is finally removed from lead R, DB and DC release, releasing the register in the cabinet circuit.

12. LAST TRUNK BUSY REGISTER - FIG. 13

12.01 When last trunk busy registration is required, the relay of Fig. 13 is connected to the sleeve of the last trunk of the selector level. A relay is required instead of direct connection of the register to the sleeve since the resistance of the registers in the cabinet is too low for direct connection. The A thermistor is used to slow down the operation of the LT relay so that it will not operate while a selector arranged for restricted service passes over a number of terminals multiplied to the last trunk. Delay is also required to prevent operation of the register of the last trunk on overthrow when selecting the next to last trunk.

13. CONNECTION OF REGISTERS TO ASSOCIATED CIRCUITS - NOTE 103

13.01 The table of Note 103 indicates the connection of Fig. 1, 3, 5, 6, 8, 10, 11, 12, 13, 15, or 17 to the associated circuits, indicating what figure of this circuit should be used and the designation of the lead in

the connecting circuit, as well as the quantities to be provided.

14. DETECTOR GROUP USAGE - FIG. 14 (MAGNETIC COUNTER) AND FIG. 1 AND 4 (REGISTERS)

14.01 Fig. 1 and 4 and Fig. 14 show connections to a counter for recording detector group usage.

15. OVERFLOW REGISTER FOR ROTARY HUNTING CONNECTORS - FIG. 15

15.01 When all the trunks of a PBX group are busy, the connector finding this condition momentarily places battery through a relay on the TM lead and ground on the OS lead operating relay F. This relay locks up in series with F1 which operates. The resistor A, option T or the diode C, option S prevents false registration when a connector passes over the last trunk of the group which is busy but is not in the group dialed, or when the last trunk of the group is seized. F1 operates the register and short circuits the F, which releases. The release of the F releases the F1, which in turn releases the register. The F1 resistor is used to make the F1 relay slow in releasing (a) to prevent possible double registration in the event of connector overthrow and (b) to allow the register sufficient time to operate.

16. LAST TRUNK BUSY REGISTER RELAY FOR AN ANI OUTGOING TRUNK - FIG. 18 AND C

16.01 When last trunk busy registration is required, the relay of Fig. 18 is connected to the register lead of the last choice trunk in each group. When this trunk becomes busy, ground is removed from this lead and this releases the ABL relay which operates the register. The continuity-transfer contacts of relay ABL permit testing the relay by insulating these contacts, avoiding the necessity of unsoldering the lead.

SECTION III - REFERENCE DATA1. WORKING LIMITS

1.01 Maximum resistance leads S of Fig. 2 and 4 to traffic register cabinet: 10 ohms.

1.02 Maximum resistance lead P from traffic register cabinet to ground, Fig. 1, 3, 6, 7, 8, 10, 11, 12, 15, and 17: 30 ohms.

2. FUNCTIONAL DESIGNATIONS

None.

3. FUNCTIONS

3.01 Provides a direct pulse lead from the connecting circuit to the traffic register cabinet, Fig. 1.

3.02 Provides a battery control relay to control the operation of peg count register, Fig. 2.

3.03 Provides for overflow registration of rotary and level hunting connectors and branch office selector repeaters, Fig. 11, 15, 1, and 3.

3.04 Provides for last trunk busy registration, Fig. 7.

3.05 Provides for all trunks busy registration, Fig. 8 and 17.

3.06 Provides a battery pulse relay for operating a register to count elapsed time in connection with peg counts, Fig. 6.

3.07 Provides for peg count on subscriber lines with rotary line switches, Fig. 10.

3.08 Provides for peg count on selectors which absorb all first digits, Fig. 12.

3.09 Provides for starting dial tone speed register circuit, Fig. 5.

4. CONNECTING CIRCUITS

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

- (a) Traffic Register Cabinet Circuit - SD-95531-01.
- (b) Switch Trouble Alarm Circuits.
 - (1) Selector Shelves - SD-32043-01.
 - (2) Connector Shelves - SD-32045-01.
 - (3) Miscellaneous Shelves - SD-32048-01.
 - (4) B Switchboard - SD-31517-01.
 - (5) Line or Trunk Finder - SD-31514-01.
 - (6) Selector Repeater Shelves - SD-32102-01.
- (c) Selector Bank Multiple Circuit - SD-32123-01.
- (d) Connector Bank Multiple Circuit - SD-32128-01.
- (e) Subscriber Line Circuit With Rotary Line Switch - SD-31259-01.
- (f) Dial Tone Speed Register Circuit - SD-96403-01.
- (g) Level Hunting Connector - SD-31088-01.
- (h) PBX Trunk Circuit - SD-31757-01.
- (j) B Switchboard Position Circuit - SD-31160-01.
- (j) Announcement Trunk Circuit - SD-31362-01 (typical).
- (k) Selector Arranged for Peg Count on Cut-Through - SD-31933-01 (typical).
- (l) Repeater Circuit - SD-31609-01 (typical).
- (m) Trunk Circuit - SD-31795-01.
- (n) B Switchboard Link Circuit - SD-31155-01.
- (o) Sleeve Repeating Trunk Circuit - SD-31421-01.
- (p) Rotary Out Trunk Switch - SD-30868-01 (typical).
- (q) Line or Trunk Finder - SD-31530-01 (typical).
- (r) Incoming Intercepting Trunk Circuit - SD-95715-01.
- (s) Outgoing Trunk to Central Information Desk - SD-31163-01 (typical).
- (t) Position Clock Circuit - SD-90409-01.
- (u) 10-IPM Interrupter Circuit - SD-96343-01.
- (v) B Switchboard Sender - SD-31351-01.
- (w) Auxiliary Line Circuit - SD-95607-01.
- (x) Coin Long Line Circuit - SD-32053-01.
- (y) No. 4A Traffic Usage Recorder Circuit - SD-95738-01.
- (z) Traffic Register Camera Control Circuit - SD-95797-01.
- (aa) No. 1 - With AMA Transverter Circuit - SD-32203-01 (typical).
- (ab) No. 1 or 350A - Identifier Circuit - SD-31957-01.
- (ac) No. 1, 350A, 355A, 356A, 360A, 35-E-97, and North Electric Intercepting Trunk Circuit - SD-32202-01.
- (ad) Line Concentrator Identifier Circuit - SD-95739-01.
- (ae) Central Office Group Alerting Circuit - SD-95883-01.
- (af) Answering Time Recorder Circuit - SD-96235-01.

- (ag) Rotary Out Trunk Switch Circuit - SD-32253-01.
- (ah) ANI Outpulser Circuit - SD-95811-01.
- (ai) ANI Outgoing Trunk Circuit - SD-32244-01.
- (aj) No. 1, 350A, or 355A Trunk Circuit - SD-31872-01.
- (ak) No. 1 and 350A Trunk Finder Circuit - SD-31953-01.
- (al) Incoming Register Circuit - SD-32260-01.
- (am) Sender Circuit - SD-32261-01.
- (an) Decoder Circuit - SD-32262-01.
- (ao) Transverter Circuit - SD-32263-01.
- (ap) Position Link Circuit - SD-32264-01.
- (aq) Group and Alarm Relay Circuit - SD-32194-01.
- (ar) No. 2A Traffic Usage Recorder Circuit - SD-96549-01.
- (as) Dial Coin Zone Outgoing Trunk Circuit - SD-32317-01.
- (at) Concentrating Circuit for Dial Coin Zone Trunks - SD-96524-01.
- (au) KS-15947 Totalizer Circuit - SD-95965-01.
- (av) Emergency Reporting System Controller Circuit - SD-98057-01.
- (aw) Incoming Trunk Register and Connector Circuit - SD-96501-01.
- (ax) Register Check and Connector Control Circuit - SD-96504-01.
- (ay) TOUCH-TONE® Calling Signal to Dial Pulse Converter Circuit - SD-32328-01.
- (az) Originating Register Circuit Outpulsing Controller Circuit - SD-32351-01.
- (ba) Converter Finder - SD-33028.
- (bb) Register Trunk and Link Circuit - SD-32353-01.
- (bc) ANI-Type C Outpulser Circuit - SD-32375-01.
- (bd) No. 3B Traffic Usage Recorder Circuit - SD-99359-01.
- (be) Large MJ Mobile Radio Telephone System - Line Circuit - SD-2R002-01.
- (bf) Large MJ Mobile Radio Telephone System - Marker Circuit - SD-2R004-01.
- (bg) Large MJ Mobile Radio Telephone System - Link Circuit - SD-2R008-01.
- (bh) Small MJ Mobile Radio Telephone System - Sender Register - SD-2R051-01.
- (bi) Small MJ Mobile Radio Telephone System - Link Circuit - SD-2R054-01.
- (bj) Small MJ Mobile Radio Telephone System - Line Circuit - SD-2R049-01.
- (bk) No. 1, 350A, or 355A With Common Control - Decoder Circuit - SD-32356-01.
- (bl) No. 1, 350A, or 355A With Common Control - Translator Circuit - SD-32355-01.
- (bm) Non-CAMA Multifrequency Outgoing Trunk Circuit - SD-32369-01.
- (bn) Service Observing Desk No. 12 Telephone Circuit - SD-95528-01.
- (bo) Service Observing Desk No. 7 or 9 Telephone Circuit - SD-96317-01.

SECTION IV - REASONS FOR REISSUE

D. Description of Changes

D.1 Peg count connecting information is added in Note 103 for the Traffic Management System Circuits, SD-95528-01 and SD-96317-01.

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DEPT 5823-WCB-MR