

## TRAFFIC USAGE RECORDER SD-95738-01

### 1. GENERAL

**1.01** This section describes a method of testing the traffic usage recorder SD-95738-01.

**1.02** This section is reissued to add Test K and to make minor changes in Tests B, D, and J.

**1.03** The tests covered are:

**A. Continuity Test of Circuits Connected to Scan Crossbar Switches:** This test checks:

- (1) Assignment of circuits to crosspoints of scan crossbar switches.
- (2) Assignment of register punchings to circuits.
- (3) Register groupings.
- (4) Busy detection.
- (5) False grounds and crosses on register and scan switch crosspoints.

**B. Continuity Test from Register Switch to Usage Registers:** This test checks:

- (1) Correct number of register operations.
- (2) Crosses on register leads.

**C. Camera Control, Cycle Timing and Cycle Count:** This test checks:

- (1) Duration of one scanning cycle.
- (2) Half-hour and 1 hour photograph of registers.

**D. Trouble Alarms:** This test checks the alarm features of the traffic usage recorder frame.

**E. Verification of Register Assignment:** This test checks that the proper usage register operates from each assigned REG punching.

**F. Test of Steering Controls:** This test checks the proper operation of the switch, select magnet, and hold magnet steering circuits.

**G. Miscellaneous Tests:** This test checks:

- (1) Idle trunk test feature in No. 4 type crossbar systems.
- (2) Detector group usage feature.

**H. Cross Detection between Stationary Springs of Scan Switches:** This test provides a manual check for crosses between stationary springs of scan switches.

**I. Cross Detection between Stationary Springs of Register Switches:** This test provides a manual check for crosses between stationary springs of register switches.

**J. Verification of Cross Connections:** This test provides a rapid check of cross connections following rearrangement of trunks, links, junctors, etc, or traffic registers associated with the traffic usage recorder.

**K. Automatic Cross Detection:** This test checks that the automatic cross detection feature is functioning properly.

**1.04** Test A requires that each circuit connected to the scan switches be in the idle condition when seized for test. Busy circuits must be passed by to be retested when they become idle.

**1.05** Test A requires action at the make-busy location for the circuit under test.

**1.06** In Test A where reference is made to placing a busy condition on a circuit under test, it is assumed that this action will be carried out in the approved manner. Depending upon the nature of the circuit involved, this may mean placing a make-busy plug, opening a contact to remove the idle condition, etc.

**1.07** Tests C, E, and G require verification at the traffic register bay.

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**1.08** In Tests H and I the figure numbers referred to are figures in the circuit drawing for the traffic usage recorder, SD-95738-01.

**1.09 Lettered Steps:** A letter a, b, c, etc, added to a step number in Part 4 of this section indicates an action which may or may not be required, depending on local conditions. The conditions under which a lettered step or series of lettered steps should be made are given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

**1.10** Local instructions should be followed with reference to recording any register operations caused by performing these tests.

**2. APPARATUS**

**2.01** The apparatus required for each test is shown in Table A. The details of each item are covered in the paragraph indicated by the number in parentheses.

**TABLE A**

APPARATUS	TESTS						
	A	C	F	H	I	J	K
No. 32A (Remote Control) Test Set	1		1				
No. 322 (Make-busy) Plug	1						
Testing Cord (2.02)	2	1				2	
Test Lamp (2.03)	1					1	
14E Register						1	
KS-3008 Stop Watch (or equivalent)		1					
KS-14510 Portable Volt-ohm-milliammeter (or equivalent)				1	1		
→Testing Cord (2.04)							1

**2.02** Testing cord, No. 893 cord, 6 feet long, equipped with two No. 360A tools (No. 1W13B cord), a No. 419A (test connector) tool, and two KS-6278 connecting clips (for use in connecting 48-volt test battery to test lamp and test lamp to punching in Test A and for supplying ground to relay contacts in Test C. Also used in Test J for connecting 48-volt test battery to 14E register and 14E register to punching as required).

**2.03** Insert a No. 2Y lamp into a No. 12 lamp socket (or equivalent). Connect one terminal of socket to 48-volt test battery. The other terminal of socket is to be connected to punchings as required.

**2.04** Testing cord, No. 893 cord, 6 feet long, equipped with two No. 360A tools (No. 1W13B cord) and two No. 419A (test connector) tools (used for connecting R punchings together when making Test K).

**3. PREPARATION**

**3.01** From the office records, obtain a list of the circuit or circuits associated with each usage register. This list should contain cross-point contact number and crosspoint number assigned to each circuit, register grouping (RG-) for each circuit, and the location where each circuit may be made busy. The type of detector used for the circuit group under test should also be determined.

**3.02** Where traffic registers not associated with the traffic usage recorder are included in the same camera group with registers that are associated with the traffic usage recorder, the PC key shall be operated to supply battery to the registers not associated with the traffic usage recorder. Also, where a camera group consists only of registers not associated with the traffic usage recorder, the PC key for these registers shall be operated.

STEP	ACTION	VERIFICATION
→ PREPARATION FOR TESTS A, B, C, H, I, J, AND K		

- 1 At control panel —  
Note position of all keys and switches.
- 2 Restore all keys and switches to normal.

#### 4. METHOD

STEP	ACTION	VERIFICATION
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##### A. Continuity Test of Circuits Connected to Scan Crossbar Switches

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|----|---|--|
| 3  | Select a group of circuits that are associated with one particular usage register and determine type of detector used with circuit group to be tested.  |  |
| 4  | At control panel —<br>Operate RG- key or set RG switch for circuit group to be tested.  |  |
| 5  | At traffic usage recorder frame —<br>Connect test lamp to REG- punching associated with circuit group being tested.   |  |
| 6  | Operate and lock white button on No. 32A test set.  |  |
| 7  | Insert plug of No. 32A test set into TST jack.<br><br><i>Note 1:</i> Traffic usage recorder can be advanced automatically by releasing white button on No. 32A test set. Locking white button will stop automatic advance. Red button will advance recorder step by step.<br><br><i>Note 2:</i> Allow 30 seconds for electron tubes to become stabilized. | At control panel —<br>TBL lamp lights.   |
| 8  | Step traffic usage recorder by means of No. 32A test set to crosspoint containing circuit in group being tested.<br><br><i>Note:</i> To facilitate testing, it is desirable to select circuit appearing on lowest numbered crosspoint.  | At traffic usage recorder frame —<br>D- or DA- lamp will light if associated circuit is busy. No lamp will be lighted if associated circuit is idle. |
| 9a | If D- lamp is lighted and circuit being tested is associated with a relay type detector —<br>Wait one minute for lamp to be extinguished.   |  |

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STEP	ACTION	VERIFICATION
10b	If D- or DA- lamp is lighted and circuit being tested is associated with an electron tube detector — Wait one minute. Momentarily operate RR key.	
11c	If lamp was not extinguished in Step 9a or 10b — Repeat Steps 8, and 9a or 10b until idle circuit is found.	
	<i>Note:</i> Keep record of busy circuits passed by for retest.	
12	On idle circuit thus selected — Simulate <i>service busy</i> condition in approved manner.	
13a	If relays are used as detectors — Observe lamp indications.	Test lamp lights. D- lamp lights for detector number of selected circuit.  <i>Note:</i> If two D- lamps light in synchronism there may be a trouble cross.
14a	If relays are used as detectors — Remove busy condition.	Test lamp extinguished. D- lamp for detector number of selected circuit extinguished.
15b	If electron tube detectors are used — Momentarily operate RR key and observe lamp indications.	Test lamp lights. D- or DA- lamp for detector number of selected circuit lights.  <i>Note:</i> If two D- or DA- lamps light in synchronism there may be a trouble cross.
16b	If electron tube detectors are used — Remove busy condition. Momentarily operate RR key.	Test lamp extinguished. D- or DA- lamp for detector number of selected circuit extinguished.
17	Repeat Steps 12 through 16b.	
	<i>Note:</i> The purpose of this action is to determine whether a D- or DA- lamp which may be operated in addition to the one associated with the circuit being tested represents a trouble cross or a legitimate busy.	
18d	If the circuit group under test includes intertoll trunks arranged to differentiate between a service busy condition and a plugged busy or patched busy condition — Operate PBR key.	

STEP	ACTION	VERIFICATION
19d	At circuit under test — Simulate plugged busy or patched busy condition.	
20d	At traffic usage recorder frame — Momentarily operate RR key.	D- or DA- lamp for detector number of selected circuit lights. Test lamp lights.
21d	At circuit under test — Remove simulated plugged busy or patched busy condition.	
22d	At traffic usage recorder frame — Momentarily operate RR key.	D- or DA- lamp for detector number of selected circuit extinguished. Test lamp extinguished.
23	Repeat Steps 8 through 22d until all circuits in group have been tested.	
24	Disconnect test lamp from REG- punching.	
25	Remove plug of No. 32A test set from TST jack.	At control panel — TBL lamp extinguished.
26	Repeat Steps 3 through 25 until all groups of circuits assigned to the traffic usage recorder have been tested.	
27	Restore all keys and switches to position noted in Step 1.	At traffic usage recorder frame — All crossbar switches restore to normal.
<b>B. Continuity Test from Register Switch to Usage Registers</b>		
3	At traffic register bay — Record readings of all usage registers.	
4a	At control panel — If cameras are provided, photograph of usage registers may be taken by momentarily operating MCC key.	
5	Operate RG1 key or set RG switch to RG1 position for frame 0.	
6	Operate TST key.	At control panel — TST lamp lights.
→ 7	Operate MAN key.	ON lamp lights.
8	When CYC register operates — Operate STOP key.	READ lamp lights. When scanning stops — READ lamp extinguished.

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<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
9	When READ lamp is extinguished — Restore MAN key.	ON lamp extinguished.
10	Restore STOP key.	
11	Repeat Steps 7 through 10.	
12	At traffic register bay — Record readings of all usage registers.	At traffic register bay — Each usage register operated twice for each circuit in register group 1 associated with a register.
13a	At control panel — If cameras are provided, photograph of usage registers may be taken by momentarily operating MCC key.	Each usage register operated twice for each circuit in register group 1 associated with a register.
→ 14b	If in the register group being tested there are trunks arranged to differentiate between a service busy condition and a plugged busy or patched busy condition — Operate PBR key and repeat Step 3 or 4a and Steps 7 through 13a. Photograph of usage registers may be taken by momentarily operating MCC key.	Each usage register operated twice for each circuit in register group 1 associated with a register.
15	Restore RG1 key or RG switch to normal.	
16c	If register grouping is provided — Repeat Steps 7 through 14b for each register group provided.	
17	Restore all keys and switches to position noted in Step 1.	

**C. Camera Control, Cycle Timing and Cycle Count**

3	At control panel — Operate RG1 key or set RG switch to RG1 position for frame 0.	
4	Operate MAN key.	At control panel — ON lamp lights. Time interval between first and second advance of CYC register is between 98.5 and 100 seconds. At traffic register frame — Proper GCC registers advance once for each advance of CYC register.

STEP	ACTION	VERIFICATION
5	After second CYC registration — Operate STOP key.	READ lamp lights. When scanning stops — READ lamp extinguished.
6	When READ lamp is extinguished — Restore MAN key.	ON lamp extinguished.
7	Restore all keys and switches to position noted in Step 1.	
8	At frame 0 — Block operated CT relay and start timing.	Between 5 and 7 seconds after CT relay is operated — CT1 relay operates.
9	Remove block from CT relay.	Approximately 100 seconds after CT relay is operated — CT and CT1 relays release.
10	Using No. 893 Cord — Connect ground to 9B of ON relay.	
11	For each condition in column 1 of Table B — Perform corresponding action specified in column 2. Apply each condition in succession starting with condition 1.	Proper relays operated and released for each condition as specified in column 3 of Table B.
12a	If cameras are provided — At control panel — Operate 1/2 HR key.	
13a	Operate RG1 (or set RG switch to RG1 position) and MAN keys and start timing.	96 to 98 seconds after MAN key is oper- ated — Lights flash in camera.
14a	After READ lamp lights — Operate STOP key.	100 seconds after camera lights flashed in Step 13a — Camera lights again flash.
15a	When READ lamp is extinguished — Restore MAN key.	

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<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
16a	Restore 1/2 HR and STOP keys and RG1 key or RG switch.	
17a	Repeat Step 11.	
18a	At control panel — Operate 1 HR key.	
19a	Repeat Steps 13a through 15a.	
20a	Restore 1 HR and STOP keys and RG1 key or RG switch.	
21b	If cameras are not provided — For each condition in column 1 of Table C — Perform corresponding action specified in column 2. Apply each condition in succession starting with condition 1.	Proper relays operated and released for each condition specified in column 3 of Table C.
22	Remove ground from 9B of ON relay.	
23	Restore all keys and switches to position noted in Step 1.	
24c	If register grouping is provided — Operate RG- keys or set RG switches and repeat in turn Steps 4 through 7 for each equipped register group.	

TABLE B

COLUMN 1 TEST CONDITION	COLUMN 2 GROUND AT 1T CT3	COLUMN 3 RELAYS
1	ON	W operated
2	OFF	Z, A operated
3	ON	W released
4	OFF	Z released
5	ON	W, B operated
6	OFF	Z operated
7	ON	W released
8	OFF	Z, A released
9	ON	W, C operated
10	OFF	Z operated
11	ON	W, B released
12	OFF	Z released
13	ON	W operated
14	OFF	Z, A operated
15	ON	W released
16	OFF	Z released
17	ON	W, B operated
18	OFF	Z, D operated
19	ON	W released
20	OFF	Z, A released
21	ON	W operated
22	OFF	Z operated
23	ON	W, B released
24	OFF	Z released
25	ON	W operated
26	OFF	Z, A operated C released
27	ON	W released
28	OFF	Z released
29	ON	W, B operated
30	OFF	Z operated
31	ON	W released
32	OFF	Z, A released
33	ON	W operated
34	OFF	Z operated

TABLE C

COLUMN 1 TEST CONDITION	COLUMN 2 GROUND AT 1T CT3	COLUMN 3 RELAYS
1	ON	E operated W, B released
2	OFF	F operated Z, D released
3	ON	W operated
4	OFF	Z, A operated
5	ON	W released
6	OFF	Z released
7	ON	W, B operated
8	OFF	Z operated
9	ON	W released
10	OFF	Z, A released
11	ON	W, C operated
12	OFF	Z operated
13	ON	W, B released
14	OFF	Z released
15	ON	W operated
16	OFF	Z, A operated
17	ON	W released
18	OFF	Z released
19	ON	W, B operated
20	OFF	Z, D operated
21	ON	W released
22	OFF	Z, A released
23	ON	W operated
24	OFF	Z operated
25	ON	W, B released
26	OFF	Z released
27	ON	W operated
28	OFF	Z, A operated C released
29	ON	W released
30	OFF	Z released
31	ON	W, B operated
32	OFF	Z operated
33	ON	W released
34	OFF	Z, A released
35	ON	W operated
36	OFF	Z operated
37	ON	W, B, E released
38	OFF	Z, D, F released

STEP	ACTION	VERIFICATION
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#### D. Trouble Alarms

- |      |   |  |
|------|---|--|
| 1    | At traffic usage recorder frame 0 —<br>Block operated MSC relay.  |  |
| 2a   | If alarm guard feature (ARG lamp) is provided —<br>Block operated ON1 relay.  |  |
| → 3  | At traffic usage record frame under test —<br>Block operated IS and SC1 relays.   | At control panel —<br>TBL lamp lights.<br>At traffic usage recorder frame under test —<br>TBL-FA or TBL lamp lights.<br>Minor alarm sounds.                            |
| 4    | Remove block from IS and SC1 relays.  |  |
| 5b   | If alarm guard feature is not provided —<br>Momentarily operate AR key.<br>At control panel —<br>Momentarily restore AUTO or MAN key. | TBL-FA or TBL lamp extinguished.<br>Minor alarm silenced.<br>At control panel —<br>TBL lamp extinguished.  |
| → 6a | If alarm guard feature is provided —<br>Momentarily operate AR key.   | At control panel —<br>TBL lamp remains lighted.<br>At traffic usage recorder frame —<br>ARG lamp lighted.<br>TBL-FA or TBL lamp extinguished.<br>Minor alarm silenced. |
| → 7a | At traffic usage recorder frame 0 —<br>Block CT1 and SPC relays operated in order named.  |  |
| 8a   | Remove block from CT1 and SPC relays in order named.  | ARG lamp extinguished.<br>At control panel —<br>TBL lamp extinguished.   |
| 9a   | Remove block from ON1 relay.  |  |
| 10   | Remove block from MSC relay.  |  |
| 11   | Repeat Steps 1 through 10 for all equipped frames.  |  |

#### E. Verification of Register Assignment

- |   |   |  |
|---|---|--|
| 1 | At traffic usage recorder frame —<br>Momentarily connect ground to REG-punching associated with a register. | At traffic register frame —<br>Proper usage register operates. |
|---|---|--|

STEP	ACTION	VERIFICATION
2	Repeat Step 1 for all assigned REG-punchings.	
<b>F. Test of Steering Controls</b>		
1	Operate and lock white button of No. 32A test set.	
2	At traffic usage recorder frame — Insert plug of No. 32A test set into TST jack.	Select magnets 0 on scan and register switches operate. At control panel — TBL lamp lights.
3	Step circuit (one operation of red button) by means of No. 32A test set to close crosspoint 000 (switch number, horizontal number, vertical number).  <i>Note:</i> The usage recorder can be advanced step by step by operating the red button on the No. 32A test set, one operation per step.	Hold magnets 0 on scan and register switch 0 operate.
4	Step circuit (one operation of red button) to close crosspoint 001.	Hold magnets 0 release and hold magnets 1 operate on scan and register switch 0.
5	Repeat Step 4 for crosspoints 002 through 009.	Hold magnets 2 through 9 operate and release on scan and register switch 0.
6	Step circuit (two operations of red button) to crosspoint 010.	On scan and register switch 0 — Select magnets 0 release, select magnets 1 operate, hold magnets 0 operate.
7	Repeat Steps 2 and 3 for crosspoints 011 through 099.	Proper select and hold magnets operate and release.
8	Step circuit (two operations of red button) to crosspoint 100.	On scan and register switch 1 — Select magnets 0 and hold magnets 0 operate.
9	Repeat Steps 3 through 6 for crosspoints 101 through 199.	Proper select and hold magnets operate and release.
10	Repeat Steps 1 through 7 for crosspoints 200 through 599.	Proper select and hold magnets operate and release.
11	Remove plug of No. 32A test set from TST jack.	At control panel — TBL lamp extinguished.

#### G. Miscellaneous Tests

- 1a If T- relays are provided —  
Operate ITT key.

STEP	ACTION	VERIFICATION
2a	Block operated LP and LP1 relays.	
3a	One at a time and in turn for each T- relay specified in column 1 of Table D — Connect battery or ground of column 2 to DA- terminal of column 3.	Proper D- or DA- lamp lighted as shown in column 4 of Table D.
4a	Remove block from LP and LP1 relays.	
5a	Restore ITT key to normal.	
6b	If detector group usage feature is provided — From office records determine DR- terminals that are cross-connected to A, B, or DGU- terminals and traffic registers.	

TABLE D

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
T-RELAY	CONNECT TO TERM. DA-	TERM. DA-	D0 TO D5 DA6 TO DA11 LAMP LIGHTED
T0	—48V	0	D0
T1	—48V	1	D1
T2	—48V	2	D2
T3	—48V	3	D3
T4	—48V	4	D4
T5	—48V	5	D5
TA6	GRD	6	DA6
TA7	GRD	7	DA7
TA8	GRD	8	DA8
TA9	GRD	9	DA9
TA10	GRD	10	DA10
TA11	GRD	11	DA11

7c	If DR- terminal is cross-connected to DGU- terminals — Momentarily connect ground in turn to each D- or DA- terminal having a correspondingly numbered DR- terminal cross-connected.	Proper DGU- register operates and all other DGU- registers do not operate.
8d	If DUA- and DUB- terminals cross-connect to DGU- terminals — Momentarily connect ground in turn to each D- or DA- terminal having a correspondingly numbered DUA- or DUB- terminal cross-connected.	Proper DGU- register operates and all other DGU- registers do not operate.

STEP	ACTION	VERIFICATION
9d	Repeat Step 8d with DGU- relay blocked operated.	Proper DGU- register operates and all other DGU- registers do not operate.
10e	If DR- terminal cross-connects to A terminal — Connect ground to each D- or DA- terminal having a correspondingly numbered DR- terminal cross-connected.	
11e	One at a time and in turn manually operate and release each HMC- relay.	Proper DGU- register operates once for each A terminal cross-connected.
12e	Remove ground connected in Step 10e.	
13f	If DR- terminal cross-connects to B terminal — Connect ground to each D- or DA- terminal having a correspondingly numbered DR- terminal cross-connected.	
14f	One at a time and in turn manually operate and release each HMC- relay.	Proper DGU- register operates once for each B terminal cross-connected.
15f	Remove ground connected in Step 13f.	

#### H. Cross Detection between Stationary Springs of Scan Switches

3a	At traffic usage recorder frame — If any S0 through S5 punchings are associated with relay type, ground busy detectors (Fig. 12) — Connect ohmmeter to 48-volt test battery and S- punchings so equipped.	Meter reads 30,000 ohms $\pm 10$ per cent.
4b	If any S0 through S5 punchings are associated with tube type, ground busy detectors arranged without detectors to indicate a patched or plugged busy intertoll trunk (Fig. 29 without Fig. 36) — Connect ohmmeter to 48-volt test battery and S- punchings so equipped.	Meter reads .25 megohms $\pm 1$ per cent.
5c	If any S0 through S5 punchings are associated with tube type, ground busy detectors arranged with detectors to indicate a patched or plugged busy intertoll trunk (Fig. 29 with Fig. 36) — Connect ohmmeter to 48-volt test battery and S- punchings so equipped.	Meter reads .275 megohms $\pm 1$ per cent.

STEP	ACTION	VERIFICATION
6d	If any S0 through S5 punchings are associated with tube type detectors which recognize 20 or more volts negative for busy, and open or resistance ground for idle (Fig. 30 and G option) — Connect ohmmeter to ground and S- punchings so equipped.	Meter reads 24,900 ohms $\pm 1$ per cent.
7e	If any S0 through S5 punchings are associated with tube type detectors which recognize open or $-4$ or more volts negative for busy, and direct or resistance ground for idle, respectively (Fig. 30 and H option) — Connect ohmmeter to 48-volt test battery and S- punchings so equipped.	Meter reads .2 megohms $\pm 1$ per cent.
8	Disconnect ohmmeter and restore all keys and switches to position noted in Step 1.	

#### I. Cross Detection between Stationary Springs of Register Switches

3	At traffic usage recorder frame — Block operated RG- relays as provided.	
4a	If any R0 through R5 punchings are associated with relay type, ground busy detectors (Fig. 12) — Connect ohmmeter to 48-volt test battery and any R- punchings so equipped.	Meter reads 33,000 ohms $\pm 5$ per cent.
5b	If any R0 through R5 punchings are associated with tube type detectors which recognize ground busy, battery busy, or a patched or plugged busy intertoll trunk (Fig. 29, 30 or 36). Insulate all back contacts of DGU- relay, if provided.	
6b	Connect ohmmeter to punching R0 and test in turn punchings R1 through R5.	Meter reads not less than .25 megohms.
7b	Connect ohmmeter to punching R1 and test in turn punchings R2 through R5.	Meter reads not less than .25 megohms.
8b	Connect ohmmeter to punching R2 and test in turn punchings R3 through R5.	Meter reads not less than .25 megohms.
9b	Connect ohmmeter to punching R3 and test in turn punchings R4 and R5.	Meter reads not less than .25 megohms.

STEP	ACTION	VERIFICATION
10b	Connect ohmmeter to punching R4 and test punching R5	Meter reads not less than .25 megohms.
11	Disconnect ohmmeter.	
12	Remove block from RG- relays as provided.	
13b	Remove insulators from DGU- relay.	
14	Restore all keys and switches to position noted in Step 1.	
<b>J. Verification of Cross Connections</b>		
3	At traffic usage recorder — Connect test register (14E) to 48-volt test battery and REG- punching for circuit group being tested.	
4	Note reading of test register.	
5	At control panel — Operate RG- key or set RG switch for circuit group being tested.	
↗ 6	Operate TST and MAN keys.	At control panel — TST and ON lamps light.
↘ 7	When CYC register operates — Operate STOP key.	
8	Restore TST, MAN and STOP keys in order named. Restore RG- key or RG switch. Restore all other keys and switches to position noted in Step 1.	
9	At traffic usage recorder — Note reading of test register.	At traffic usage recorder — Number of operations of test register indicates number of circuits connected in group tested.

#### K. Automatic Cross Detection

↗ 3	At traffic usage recorder frame 0 — Using testing cord — Connect R00 punching to R10 punching (associated with register switch 0).
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<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
4	At control panel — Operate RG1 key or set RG switch to RG1 position.	
5	Operate MAN key.	At control panel — ON lamp lights. When one cycle of scanning is completed — TBL lamp lights. At traffic usage recorder frame 0 — TBL-FA and XV lamps light. Minor alarm sounds.
6	At traffic usage recorder frame 0 — Remove testing cord.	
7	At control panel — Restore all keys and switches to normal.	
8	At traffic usage recorder frame 0 — Momentarily operate AR key.	All lamps extinguished. Minor alarm silenced.
9	Repeat Steps 3 through 8 for remaining traffic usage recorder frames.	