

ALARM SENDING AND TRANSFER CIRCUITS TESTS

NO. 1 CROSSBAR OFFICES

1. GENERAL

PAGE

1.01 This section describes a method of testing the alarm sending circuit and alarm transfer circuit, SD-95417-01 and SD-25885-01 respectively, in No. 1 crossbar offices.

signals to the receiving circuit. It also checks the preference feature for sending these signals. 7

1.02 This section is reissued to revise Table G and add information to Table I for testing the new transfer relays for major data bank, maintenance data transmitter, and billing data transmitter alarms. The Equipment Test List is not affected.

D. Tone Sending and Preference Features of Alarm Sending Circuit (Sending Circuit Arranged to Transmit Distinctive Tones): This test checks the ability of the sending circuit to transmit ten different tones. It also checks the preference feature for sending these signals. 10

1.03 The tests and features tested are:

PAGE

A. Alarm Transfer Features of Alarm Sending Circuit: This test checks that the sending circuit can transfer the local alarms to a receiving circuit either by the transfer key of the sending circuit or by remote control from the receiving circuit. It also checks that the sending circuit prepares the office alarm circuits for the transfer of alarms and disconnects the local audible alarms. 5

E. Alarm Transfer and Cutoff Features of Alarm Transfer Circuit: This test checks the ability of the alarm transfer circuit to transfer the local alarms to an alarm sending circuit by the operation of a key in the sending circuit in the local office. 12

B. Circuit and Cable Failure Features of Alarm Sending Circuit (2-Wire Transmission of Alarms): This test checks that an open tip and/or ring conductor or an operated fuse in the sending circuit is indicated at the receiving circuit. 6

F. Alarm Release Features of Alarm Transfer Circuit by Remote Control: This test checks that locked-in alarms are released at the transfer circuit by remote control from the receiving circuit. 22

C. Alarm Sending and Group Alarm Preference Features of Alarm Sending Circuit: This test checks the ability of the sending circuit to transmit seven different dc alarm

G. No-Voltage Alarms: This test checks the ability of the sending circuit to operate the local alarms in the event of either a failure of the +130V or CC+ supply, or failure of the -48V battery supply. 30

H. Alarm Indication of Falsely Operated Alarm Release Relay: This test checks the ability of the sending circuit to operate the local alarms in the

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PAGE

event of a falsely operated alarm release relay. 30

1.04 The alarm sending circuit, the alarm receiving circuit, and the alarm transfer circuit are referred to in this section as the sending circuit, the receiving circuit, and the transfer circuit, respectively.

1.05 Tests A, B, C, D, and F require action and verification at the receiving circuit, which is used as a test circuit in performing these tests.

1.06 Tests E, F, and H require action and verification at the transfer circuit.

1.07 In the sending circuit, the FA relay may be either a U-624 or a U-143, depending on the option provided. In Part 4 where insulation of, or connection to contacts of this relay are required, the contact involved is shown opposite the relay code.

1.08 **Lettered Steps:** A letter a, b, c, etc, added to a step number in Parts 3 and 4 of this section, indicates an action which may or may not be required depending on local conditions. The condition under which a lettered step or a series of lettered steps should be made is 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.

2. APPARATUS

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

2.02 893 cord, 3 feet long, equipped with two 360A tools (1W13A cord) and two 419A tools.

2.03 893 cord, 6 feet long, equipped with two 360A tools (1W13B cord) and two KS-6278 tools.

2.04 716C receiver attached to a W2AB cord, equipped with two 360A tools (2W21A cord), a 411A tool, and a KS-6278 tool.

TABLE A

APPARATUS	TESTS							
	A	B	C	D	E	F	G	H
Testing cord (2.02)	1	1	3	3	5	4		
Testing cord (2.03)			7	7				
Testing receiver (2.04)					1	1		
Plug (dummy) 258C or 258D							1	
Tool (2.05)	✓	✓	✓	✓	✓	✓	✓	✓

✓ As required

2.05 Blocking and insulating tools as required. Use tools and apply as covered in Section 069-020-801.

3. PREPARATION

3.01 The alarm sending circuit transmits one of seven lamp signals, and if provision to transmit tones is made, one of ten distinctive tones. The lamp signal causes one of lamps A0 to A7 to be lighted at the receiving circuit. The ten tone signals are described for reference by numbers as follows:

TONE	TIME IN SECONDS
	0.0 0.5 1.0 1.5 2.0 2.5 3.0
T0 Continuous low tone	← Low Tone →
T1 Battery clicks (fast)	x x x x x x x x x x x x x
T2 Interrupted low tone	← Tone → ← Tone → ← Tone →
T3 Battery clicks and low tone	x x x x x ← Low Tone → x x
T4 Continuous ringing tone	← Continuous Ringing Tone →
T5 Machine ringing tone	← Machine Ringing MR-R1 →
T6 Intermittent ringing tone	← Ringing Tone →
T7 Battery clicks and intermittent ringing tone	x x x → Ringing Tone → x
T8 Battery clicks (slow)	x x x x x x x
T9 Battery clicks and silent interval	x x x x x x x

x Indicates battery click

3.02 The alarm signals are received and released either at a switchboard or at a lamp cabinet. The local alarms are also silenced from either of these locations. The following procedures should be used:

- (a) To listen for tone signals at a switchboard, plug an answering cord into one of the A0 to A7 jacks and operate the cord listening key; at a lamp cabinet, operate the TN key and use the lamp cabinet head receiver provided.
- (b) To operate the alarm release feature at a switchboard, plug an answering cord into the AR jack; at a lamp cabinet, operate the AR key.
- (c) To operate the alarm cutoff feature which silences the local alarms at a switchboard, plug an answering cord into one of the A0 to A7 jacks; at a lamp cabinet, operate the ACO key.

3.03 In this section reference is made to tones T0 to T9. When the alarm sending circuit is not arranged to transmit tone signals, disregard all steps requiring verification of tones.

STEP	ACTION	VERIFICATION
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Tests A, B, C, D, E, and F

- | | |
|----|--|
| 1 | Establish talking line between sending circuit and receiving circuit. |
| 2a | If lamps of receiving circuit used in test are located in switchboard—
Operate ORL or AL key to receive alarms. |

STEP	ACTION	VERIFICATION
3	Check position of sending circuit transfer key and take action as specified in Table B for particular key position.	
4	At sending circuit— Operate transfer key to NTR position.	At sending circuit— TR lamp lighted.
5	Momentarily operate RS key.	TR lamp extinguished. If equipped, LO lamp momentarily lighted. At receiving circuit— A0 to A7 lamps remain extinguished. No tone heard.

Tests A, B, C, D, and F

- 6b If sending circuit under test is being served by receiving circuit in one receiving center, and circuit in another center is to be used for test—
Block nonoperated TR relay in first receiving circuit.

Tests A, B, C, and D

- 7c If TR/NTR transfer key is provided—
Insulate 1T contact of A relay.
- 8d If SB/NTR/DB key is provided—
Insulate 8B contact of A relay.
- 9 Block A3 relay nonoperated.

Tests B, C, and D

- 10 At sending circuit—
Block AR relay nonoperated.

TABLE B

TRANSFER KEY FURNISHED	TRANSFER KEY POSITION	CONNECT	INSULATE
TR/NTR	NTR TR	7B,8B (A relay)	7B (A relay)
SB/NTR/DB — When DB and DB1 relays are furnished.	NTR DB or SB	8B,9B (DB1 relay)	8B (DB1 relay)
SB/NTR/DB — When DB and DB1 relays are not furnished.	NTR DB or SB	8T,9T (A relay)	8T (A relay)

STEP	ACTION	VERIFICATION
4. METHOD		
STEP	ACTION	VERIFICATION
A. Alarm Transfer Features of Alarm Sending Circuit		
10c	If TR/NTR transfer key is provided— At sending circuit— Operate key to TR position.	At receiving circuit— A0 to A7 lamps remain extinguished. Tone T0 heard.
11d	If SB/NTR/DB transfer key is provided— When receiving circuit used is in same building as sending circuit under test— Operate transfer key to SB position, otherwise to DB position.	At receiving circuit— A0 to A7 lamps remain extinguished. Tone T0 heard.
12	Operate transfer key to NTR position.	At sending circuit— TR lamp lighted.
13	Momentarily operate RS key.	At sending circuit— LO lamp, if provided, momentarily lighted. TR lamp extinguished.
14	At receiving circuit— Operate alarm release for minimum period of 10 seconds.	At sending circuit— TR lamp lighted. At receiving circuit— A0 to A7 lamps remain extinguished. Tone T0 heard.
15	At sending circuit— Momentarily operate RS key.	At sending circuit— LO lamp, if provided, momentarily lighted. TR lamp extinguished. At receiving circuit— A0 to A7 lamps remain extinguished. No tone heard.
16	Remove test connection or insulators placed in accordance with Table B. <i>Caution: Office alarms occurring when the TR and TR1 relays are released will be transferred to the receiving circuits. For this reason, Steps 17 through 19 should be made as rapidly as possible.</i>	At associated receiving circuits— All TR or TR1 relays operated.
17	Operate transfer key to position used in Step 10c or 11d.	At associated receiving circuits— All TR or TR1 relays released.
18	Operate transfer key to NTR position.	At sending circuit— TR lamp lighted.

STEP	ACTION	VERIFICATION
19	Momentarily operate RS key.	At sending circuit— LO lamp, if provided, momentarily lighted.
20	At receiving circuit being used in test— Remove blocking tool from TR relay.	TR relay operated.
21	Remove insulator from 1T or 8B contact of A relay.	
22	Remove blocking tool from A3 relay.	
23	Operate transfer key to position in which it was found at beginning of test.	
B. Circuit and Cable Failure Features of Alarm Sending Circuit (2-Wire Transmission of Alarms)		
<i>Note:</i> Action takes place at sending circuit unless indicated otherwise. Verification alternates between sending and receiving circuits as indicated.		
11e	If NV ₂ relays are provided— At sending circuit— Block NV2 relay nonoperated.	
12c	If TR/NTR transfer key is provided— Insulate 10B, 11B, 12B of A relay.	At sending circuit— In less than 10 seconds— TR lamp lighted. At receiving circuit— A7 lamp lighted. Tone T0 heard. Major alarm sounded.
13d	If SB/NTR/DB transfer key is provided— Insulate 11T, 12T, 13T of A relay.	Same as Step 12c.
14	Remove insulators from A relay inserted in Step 12c or 13d.	At receiving circuit— A7 lamp extinguished. Tone T0 heard. Major alarm silenced.
15	Momentarily operate RS key.	At sending circuit— LO lamp, if provided, momentarily lighted. TR lamp extinguished.
16	Insulate contact of FA relay as follows— U-624 1T U-143 4T	At sending circuit— In less than 10 seconds— TR lamp lighted. At receiving circuit— A0 lamp lighted.

STEP	ACTION	VERIFICATION
		Tone T0 heard. Major audible alarm sounded.
17	Remove insulator from FA relay.	A0 lamp extinguished. Tone T0 heard. Major alarm silenced.
18	Momentarily operate RS key.	At sending circuit— LO lamp, if provided, momentarily lighted. TR lamp extinguished.
19	Insulate contact of FA relay as follows— U-624 1B U-143 3B	At receiving circuit— A4 lamp lighted. Major audible alarm sounded.
20	Remove insulator from FA relay.	A4 lamp extinguished. Major alarm silenced.
21	Remove blocking tools from AR, A3, and NV2 relays.	
22	Remove insulators and test connections from A or DB1 relays.	
23	Operate transfer key to position in which it was found at beginning of test.	
24c	If TR/NTR transfer key is provided— At receiving circuit— Remove blocking tool from TR relay.	

**C. Alarm Sending and Group Alarm Preference
Features of Alarm Sending Circuit**

11c	If TR/NTR transfer key is provided— Operate key to TR position.	At receiving circuit— A0 to A7 lamps remain extinguished. Tone T0 heard.
12d	If SB/NTR/DB transfer key is provided— When receiving circuit used as test circuit and sending circuit under test are in same building— Operate key to SB position, otherwise to DB position.	Same as Step 11c.
13f	If alarms are transmitted on 2-wire basis (FA relay furnished)— At sending unit terminal strip— Connect ground to C9 or M3-16 punching.	At receiving circuit— A6 lamp lighted. Minor and/or auxiliary alarm sounded.

STEP	ACTION	VERIFICATION
14f	Operate alarm cutoff key.	At receiving circuit— A6 lamp remains lighted. Audible alarm silenced.
15f	Connect or remove ground at terminal strip and operate alarm cutoff in accordance with the first three columns of Table C.	At receiving circuit— Lamp and audible signals operated in accordance with the last five columns of Table C.
16f	Operate alarm release key.	At receiving circuit— A0 lamp extinguished.
17g	If alarms are transmitted on multiwire basis (FA relay not furnished)— At sending unit terminal strip— Connect ground to punching M3-16.	At receiving circuit— A6 lamp lighted. Minor and/or auxiliary audible alarm sounded.

TABLE C

GROUND	OPERATE ALARM CUTOFF		RECEIVING CIRCUIT LAMP			AUDIBLE ALARM	
	CONNECT	REMOVE	LIGHTS	REMAINS LIGHTED	EXTINGUISHED	SOUNDS	SILENCED
C22 or M3-15			A5	A6		Major	
		✓		A5			
		C9 or M3-16		A5	A6		Major
C3 or M3-14			A4	A5		Major	
		✓		A4	A5		Major
		C22 or M3-15		A4			
See Note 1			A3	A4		Major	
		✓		A3	A4		Major
		C3 or M3-14		A3			
C8 or M3-12			A2	A3		Major	
		✓		A2	A3		Major
		See Note 2		A2			
C19 or M3-11			A1	A2		Major	
		✓		A1	A2		Major
		C8 or M3-12		A1			
C20 or M3-10			A0	A1		Major	
		✓		A0	A1		
		C19 or M3-11		A0			
		C20 or M3-10		A0			

Notes:

1. Remove blocking tool from A3 relay and note that it operates.
2. Block A3 relay nonoperated.

STEP	ACTION	VERIFICATION
18g	Operate alarm cutoff key.	At receiving circuit— Audible alarm silenced.
19g	Connect or remove ground at terminal strip and operate alarm cutoff in accordance with the first three columns of Table D.	At receiving circuit— Lamp and audible signals operated in accordance with the last five columns of Table D.
20	Remove all test connections and insulators used in test.	
21	Remove blocking tools from AR and A3 relays.	
22	Remove blocking tool from TR relay.	
23	Restore transfer key to position in which it was found at beginning of test.	

TABLE D

CONNECT	GROUND		OPERATE ALARM CUTOFF	RECEIVING CIRCUIT LAMP			AUDIBLE ALARM	
	CONNECT	REMOVE		LIGHTS	REMAINS LIGHTED	EXTINGUISHED	SOUNDS	SILENCED
M3-15			✓	A5	A5	A6	Major	Major
		M3-16			A5			
M3-14			✓	A4	A4	A5	Major	Major
		M3-15			A4			
See Note 1			✓	A3	A3	A4	Major	Major
		M3-14			A3			
M3-12			✓	A2	A2	A3	Major	Major
		See Note 2			A2			
M3-11			✓	A1	A1	A2	Major	Major
		M3-12			A1			
M3-10			✓	A0	A0	A1	Major	Major
		M3-11			A0			
		M3-10				A0		

Notes:

1. Remove blocking tool from A3 relay and note that it operates.
2. Block A3 relay nonoperated.

STEP	ACTION	VERIFICATION
D. Tone Sending and Preference Features of Alarm Sending Circuit (Sending Circuit Arranged to Transmit Distinctive Tones)		
11c	If TR/NTR transfer key is provided— Operate key to TR position.	At receiving circuit— A0 to A7 lamps remain extinguished. Tone T0 heard.
12d	If SB/NTR/DB transfer key is provided— When receiving circuit used as test circuit and sending circuit under test are in same building— Operate key to SB position, otherwise to DB position.	Same as Step 11c.
13	At sending circuit terminal strip— Connect ground to C9 or M3-16 punching.	At receiving circuit— A6 lamp lighted. Tone T0 heard. Minor audible alarm sounded.
14	Operate alarm cutoff key.	At receiving circuit— Minor audible alarm silenced. A6 lamp remains lighted.
15	At sending circuit terminal strip— Connect ground to punching B69 or TD69.	At receiving circuit— Tone T9 heard.
16	Connect or remove ground at terminal strip in accordance with Table E.	At receiving circuit— Check that tones are received in accordance with Table E.
17	Remove ground from C9 or M3-16 punching. If alarms are transmitted on 2-wire basis— Operate alarm release.	At receiving circuit— A6 lamp extinguished. A0 to A5 and A7 lamps remain extinguished. Tone T0 heard.
18	Repeat Steps 13 through 17, using punchings in Table F.	At receiving circuit— Lamps in Table F lighted and tones T9 to T0 for units punchings 9 to 1, respectively, as in Table E, are heard.
19	Remove all test connections and insulators used in test.	
20	Remove blocking tool from AR relay.	
21	Remove blocking tool from TR relay.	
22	Restore transfer key to position in which it was found at beginning of test.	

STEP

ACTION

VERIFICATION

TABLE E

	PUNCHING ON B OR TD TERMINAL STRIP		TONE HEARD AT RECEIVING CIRCUIT
	CONNECT GROUND	REMOVE GROUND	
68			T8
		69	T8
67			T7
		68	T7
66			T6
		67	T6
65			T5
		66	T5
64			T4
		65	T4
63			T3
		64	T3
62			T2
		63	T2
61			T1
		62	T1
		61	T0

TABLE F

PUNCHINGS FOR STEPS 13 AND 17	ASSOCIATED LAMPS	PUNCHINGS FOR STEPS 15 AND 16
C22 or M3-15	A5	B or TD 59 to 51
C3 or M3-14	A4	B or TD 49 to 41
C6 or M3-13	A3	B39 to 36 and A35 to 31 or TD39 to 31
C8 or M3-12	A2	A or TD 29 to 21
C19 or M3-11	A1	A or TD 19 to 11
C20 or M3-10	A0	A or TD 09 to 01

STEP	ACTION	VERIFICATION
E. Alarm Transfer and Cutoff Features of Alarm Transfer Circuit		
6	At sending circuit— Block L relay operated.	
7c	If TR/NTR transfer key is provided— At terminal side of sending circuit— Connect 3T terminal of A6 relay to FA relay terminal as follows— U-624 2T U-143 5T Connect 3B terminal of A6 relay to FA relay terminal as follows— U-624 2B U-143 4B	
8h	If SB/NTR/DB transfer key and FA relay are provided— Connect 9T terminal of A6 relay to FA relay terminal as follows— U-624 2T U-143 5T Connect 5B terminal of A6 relay to FA relay terminal as follows— U-624 2B U-143 4B	
9e	If NV_ relays are provided— Block NV2 relay nonoperated.	
10	Block FA relay nonoperated.	
11i	If FA relay is not provided— Insulate 10T contacts of relays A0 to A6.	
12c	If TR/NTR transfer key is provided— Operate TR/NTR transfer key to TR position.	At transfer circuit— CK relay operated.
13h	If SB/NTR/DB transfer key and FA relay are provided— Operate SB/NTR/DB transfer key to DB position.	Same as Step 12c.
14i	If FA relay is not provided— Operate SB/NTR/DB transfer key to SB position.	Same as Step 12c.

Caution: Office alarms occurring when the transfer key is not in the NTR position will be transferred to the sending circuit making the alarms

STEP	ACTION	VERIFICATION
	<i>inoperative. For this reason, make the tests in Steps 14 and 15 as rapidly as possible.</i>	
15	At transfer circuit— Momentarily insulate 1B contact of AT relay.	At transfer circuit— AT1, AT2, CK relays released.
16	Momentarily insulate relay contacts as shown in Table G.	Relays release momentarily as shown in Table G.
17	At sending circuit— Operate transfer key to NTR position.	
18	Momentarily operate RS key.	At transfer circuit— All AT relays and CK relay released.
19	At transfer circuit— Block operated AT15 relay.	
20	Manually operate the following relays— MJ, MN, PMN, SF, PS, MJ1, MN1, MJ2, MN2, CT1, MT, R, AMJ, AMN, LO1, LO2, and LO3.	Relays listed in Action column lock operated.

TABLE G

MOMENTARILY INSULATE CONTACT	RELAY	RELAYS THAT RELEASE MOMENTARILY
3B	AT	AT3, AT4, CK
5B	AT	AT5, AT28, CK
7B	AT	AT6-, CK
9B	AT	AT7-, CK
11B	AT	AT8-, CK
3T	AT	AT9-, AT9A, CK
5T	AT	AT10-, CK
7T	AT	AT11-, CK
9T	AT	AT12-, CK
11T	AT	AT29, ATA, ATB, CK
1B	ATA	AT13, AT14, → AT31, AT33, DBA, ← CK
3B	ATA	AT15, CK
5B	ATA	AT16-, CK
7B	ATA	AT17, → AT32, ← CK
9B	ATA	AT18, AT19, CK
11B	ATA	AT20, CK
1T	ATA	AT21, AT22, CK
3T	ATA	AT23, CK
5T	ATA	AT24, CK
7T	ATA	AT25, CK
9T	ATA	AT26, CK
11T	ATA	AT27, CK

SECTION 216-771-501

STEP	ACTION	VERIFICATION
21	Momentarily operate AR relay.	Relays listed in Step 20 released.
22	Remove blocking tool from AT15 relay.	
23	Block CK relay operated.	
24j	If U1158-A relay is provided— At sending circuit— Connect together 8B and 9B contacts.	
25k	If U1193-A relay is provided— Connect together 9T and 10T contacts.	
26	At transfer circuit— Block AT1 relay operated.	
27	At transfer circuit terminal strip— Connect ground to punching 10.	At sending circuit— A0 relay operated. At transfer circuit terminal strip— No ground on punching 20. No battery on punchings 30 and 100.
28	Remove test cord (used to connect ground to terminal strip punching) from punching 10.	At sending circuit— A0 relay released.
29	Connect ground to punching 80.	At sending circuit— A0 relay operated. At transfer circuit terminal strip— No ground on punching 90.
30	Remove test cord (used to connect ground) from punching 80.	At sending circuit— A0 relay released.
31	Remove blocking tool from AT1 relay.	
32	Block relays operated and connect ground to punchings as shown in Table H.	Relays operated and battery or ground conditions are as shown in Table H.
	Caution: When testing relays AT21 to AT25 inclusive, use the test prod so as to move the contact springs as little as possible.	
33	Block relays operated and connect ground to relay contacts as indicated in Table I.	Note relay operations and verify conditions on relay springs as shown in Table I.
34l	If AT26 relay is provided— Block AT7 and AT26 operated.	
35l	Connect ground to punching 700.	At transfer circuit— Ground on 3B contact of AT26 relay.

TABLE H

NOTES	BLOCK RELAY OPERATED	TRANSFER CIRCUIT			GROUND	TRANSFER CIRCUIT TERMINAL STRIP PUNCHINGS	
		REMOVE BLOCKING TOOL FROM RELAY	APPLY GROUND TO TERMINAL STRIP PUNCHING	SENDING CIRCUIT RELAYS OPERATED		NO GROUND	NO BATTERY
	AT2		38 320 450	A1, T2 A3, T1 A3, T1		48 330	
		AT2					
	AT3		66 67 68 09 333	A5 A5 A5 A5 A3, T2		76 77 78 19 343	
1		AT3					
2	AT4		02 300 301 197	A5 A4, T1 A4, T1 A3, T2		12 198	
2							
2							
1,2							
2		AT4					
3	AT4, AT5					302, 303 304, 305 306, 307 308, 309 299, 239	
3,4			300				
3,5			300	A4, T1			
		AT4, AT5					
	AT6-1		344 324 383 369 460	A3, T1 A3, T1 A2 A3, T1 A3, T5		354 334 393 379	369
		AT6-1					
1	AT6-2		345 365 385 400 460	A2 A3, T1 A3, T1 A3, T1 A3, T5		355 375 395 410	400
		AT6-2					
1	AT6-3		327 347 386 420 460	A3, T1 A3, T1 A2 A3, T1 A3, T5		337 357 396 430	420
		AT6-3					
1	AT6-4		348 368 388 401 460	A2 A3, T1 A3, T1 A3, T1 A3, T5		358 378 398 411	401
		AT6-4					

TABLE H (Contd)

NOTES	TRANSFER CIRCUIT			TRANSFER CIRCUIT			
	BLOCK RELAY OPERATED	REMOVE BLOCKING TOOL FROM RELAY	APPLY GROUND TO TERMINAL STRIP PUNCHING	SENDING CIRCUIT RELAYS OPERATED	GROUND	NO GROUND	NO BATTERY
	AT7-1		364	A6, T2		374	
			384	A6, T2		394	
12			736	A4		726	
		AT7-1				789	
1	AT7-2		326	A6, T2		336	
			346	A6, T2		356	
12			735	A4		725	
		AT7-2				788	
1	AT7-3		367	A6, T2		377	
			387	A6, T2		397	
12			734	A4		724	
		AT7-3				787	
1	AT7-4		329	A6, T2		339	
			349	A6, T2		359	
12			733	A4		723	
		AT7-4				786	
	AT8-1		81		141	101	
			82		142	102	
			83		143	103	
			84		144	104	
			85		145	105	
		AT8-1					
1	AT8-2		86		146	106	
			87		147	107	
			88		148	108	
			89		149	109	
			160		220	180	
		AT8-2					
1	AT8-3		161		221	181	
			162		222	182	
			91		151	111	
			92		152	112	
			93		153	113	
		AT8-3					
1	AT8-4		94		154	114	
			95		155	115	
			96		156	116	
			97		157	117	
			98		158	118	
		AT8-4					
1	AT8-5		99		159	119	
			170		230	190	
			171		231	191	
			172		232	192	
		AT8-5					

TABLE H (Contd)

NOTES	BLOCK RELAY OPERATED	TRANSFER CIRCUIT			TRANSFER CIRCUIT		
		REMOVE BLOCKING TOOL FROM RELAY	APPLY GROUND TO TERMINAL STRIP PUNCHING	SENDING CIRCUIT RELAYS OPERATED	GROUND	NO GROUND	NO BATTERY
	AT9		01	A5		11	
			21	A5		31	
			41	A5		51	
			61	A5		71	
			17	A5		27	
		AT9					
	AT10-1		350	A3, T1		360	
			370	A3, T1		381	
			321	A3, T1		331	
			341	A3, T1		351	
			361	A3, T1		371	
		AT10-1					
1	AT10-2		381	A3, T1		391	
			322	A3, T1		332	
			342	A3, T1		352	
			362	A3, T1		372	
			382	A3, T1		392	
		AT10-2					
1	AT11						44, 25
			14	A1		24	
			35	A1		45	
9							44, 45
9			14	A1		24	
9			15	A1		25	
9			801			810	
9			820			821	
9			800	A2, T8			
10		AT11					
	AT12-1		121	A5		131	
			122	A5		132	
			123	A5		133	
			124	A5		134	
			125	A5		135	
		AT12-1					
1	AT12-2		126	A5		136	
			127	A5		137	
			128	A5		138	
			129	A5		139	
			200	A5		210	
		AT12-2					

TABLE H (Contd)

NOTES	BLOCK RELAY OPERATED	TRANSFER CIRCUIT		TRANSFER CIRCUIT		
		REMOVE BLOCKING TOOL FROM RELAY	APPLY GROUND TO TERMINAL STRIP PUNCHING	SENDING CIRCUIT RELAYS OPERATED	GROUND	TERMINAL STRIP PUNCHINGS NO GROUND
	AT13, AT14		280	A0	290	281, 291
			282			293, 294, 295
			285			283, 284
			286			287
			292			283, 284, 285
			295			293, 294
			296			297
8			283	A0, T2		
8			284	A0, T3		
8			293	A0, T2		
8			294	A0, T3		
		AT13, AT14				
	AT15		03			13
			22			32
			23			33
			42			52
			43			53
			62			72
			63			73
						00, 203, 213
		AT15				
1	AT16-1		204	A5		214
			205	A5		215
			224	A5		234
			225	A5		235
			206	A5		216
		AT16-1				
	AT16-2		207	A5		217
			208	A5		218
			226	A5		236
			227	A5		237
			228	A5		238
		AT16-2				
	AT17		421	A5		440, 431
			441			451
			409			439
			366	A5		376
		AT17				
	AT18		325	A3, T3		335
			328	A6, T3		338
			444	A3, T3		454
			464	A6, T6		474
			453	A3, T3		443
		AT18				
	AT19		04	A3, T3		05
			06	A6, T3		07
1			353	A3, T2		363

TABLE H (Contd)

NOTES	BLOCK RELAY OPERATED	TRANSFER CIRCUIT			TRANSFER CIRCUIT		
		REMOVE BLOCKING TOOL FROM RELAY	APPLY GROUND TO TERMINAL STRIP PUNCHING	SENDING CIRCUIT RELAYS OPERATED	GROUND	NO GROUND	NO BATTERY
		AT19					
	AT20		720 or H1T			729 or H9B	
			740 or H3T			730 or H2T	
			760 or H5T			750 or H4T	
			721 or H7T			770 or H6T	
			741 or H9T			731 or H8T	
			761 or H11T			751 or H10T	
			722 or H13T			771 or H12T	
			742 or H15T			732 or H14T	
		AT20				752 or H16T	
11	AT26		835	A5, T7 or A4, T9		836	
			833	A3, T9		834	
			828	A4, T4		829	
		AT26					

Notes:

1. When relay is installed or punching is wired.
2. If the transfer circuit is equipped with a PS relay.
3. If the transfer circuit is equipped with a PSO relay.
4. Momentarily apply ground until the total number of grounds applied is one less than the number required to bring an overflow signal.
5. Momentarily apply ground once.
6. Insulate the 7B, 4B, 1B, and 1T contacts of the AT14 relay.
7. Remove insulators from the 7B, 4B, 1B, and 1T contacts of the AT14 relay.
8. Connect battery to the terminal strip instead of ground.
9. When U947 relay is provided for calling line identification.
10. Momentarily operate AR9 relay to release CLI relay.
11. Sending circuit relays A4, T9 operate if alarm receiving office is arranged for registration of load alarms.
12. When wide band remote signal circuit is installed in the office.

◆ TABLE I ◆

NOTES	BLOCK RELAY OPERATED	REMOVE BLOCKING TOOL FROM RELAY	APPLY GROUND TO RELAY SPRING	SENDING CIRCUIT RELAYS OPERATE	RELAY SPRINGS	
					NO GROUND	NO BATTERY
1	*AT9A	AT9A			6T, 9T	
	*AT21					3B, 6B
			2T		3T	
			8B	A5	9B	
		AT21				
	*AT22		2B	A5	3B	
			5B	A5	6B	
			8B	A5	9B	
			2T	A5	3T	
			5T	A5	6T	
		AT22				
*AT23		2B	A5	3B		
		5B	A5	6B		
		8B	A5	9B		
		2T	A5	3T		
		AT28				
*AT24		2B		3B		
		5B	A1, T2	6B		
		8B		9B		
		AT24				
*AT23		2B	A5	3B		
		5B	A1	6B		
		8B	A0	9B		
		5T	A2, T8	6T		
2		AT23				
3	*AT29		2B		1B	
			4B		3B	
			6B		5B	
			8B		7B	
			10B		9B	
			2T		1T	
			4T		3T	
			6T		5T	
			8T		7T	
			10T		9T	
		AT29				
	*AT30		2B	A2, T8	3B	
2			5B	A2, T8	6B	
2			8B	A2, T8	9B	
2			2T	A2, T8	3T	
2			5T	A2, T8	6T	
		AT30				

◆ TABLE I (Contd) ◆

NOTES	BLOCK RELAY OPERATED	REMOVE BLOCKING TOOL FROM RELAY	APPLY GROUND TO RELAY SPRING	SENDING CIRCUIT RELAYS OPERATE	RELAY SPRINGS NO GROUND	NO BATTERY
	*AT31		5T	A2, T9		
	*	AT31				
	*AT32			A4		
			2T	T2		
		AT32				
4	*AT33		2T	A0, T3		
			5T	A0		
			8T	A0		
			10T	A0, T2		
		AT33				

* When relay is equipped.

Notes:

1. Check for resistance battery at 1T relay spring.
2. When trouble ticket recording is required with calling line identification.
3. Momentarily operate AR9 relay to release CLI relay.
4. Apply ground using the 716C test receiver.

SECTION 216-771-501

STEP	ACTION	VERIFICATION
36l	Insulate 1T contact of MNA relay.	No ground on 3B contact of AT26 relay.
37l	Remove blocking tool from AT7 relay.	
38l	Remove insulator from 1T contact MNA relay.	
39l	Remove test cord from punching 700.	
40l	Block operated AT6 relay.	
41l	Connect ground to punching 701.	Ground on 3T contact of AT26 relay.
42l	Insulate 1T contact of MJA relay.	No ground on 3T contact of AT26 relay.
43l	Remove testing cord from punching 701.	
44l	Remove insulator from 1T contact of MJA relay.	
45l	Remove blocking tools from AT6 and AT26 relays.	
46	At sending circuit— Remove blocking tools from FA and L relays.	
47e	If NV_ relays are provided— Remove blocking tool from NV2 relay.	
48	Remove testing cords or insulators from A, A6, and FA relays.	
49i	If FA relay is not provided— Remove insulators from 10T contacts of relays A0 to A6.	
50	At transfer circuit— Remove blocking tool from CK relay.	
51	Restore transfer key to position it was in at start of test.	

F. Alarm Release Features of Alarm Transfer Circuit by Remote Control

Caution: If a central office alarm is received while performing this test, discontinue the test until the alarm has been retired.

- 7 At sending circuit—
Operate transfer key to position which will

STEP	ACTION	VERIFICATION
	cause alarms to be transmitted to receiving circuit being used in test.	
8	At receiving circuit— Operate alarm release for at least 1 second.	At transfer circuit— AT and AR 19 relays momentarily operated. At TS A or B on announcement alarm release unit— Ground on punchings 13 and 23.
9	At sending circuit— Operate transfer key to NTR position.	
10	Momentarily operate RS key.	
11	At transfer circuit— Momentarily operate AR relay as many times as required to satisfy verification portion of this step.	At transfer circuit— AR1 to AR8, AR10, AR11, and AR13 to AR18 relays momentarily operated.
12	Connect ground to punching 412.	MJL relay operated.
13	Momentarily operate AR relay.	AR9 and AR12 relays momentarily operated.
14	Remove ground from punching 412.	MJL relay released.
15	Connect ground to punching 432.	MNL relay operated.
16	Momentarily operate AR relay.	AR9 and AR12 relays momentarily operated.
17	Remove ground from punching 432.	MNL relay released.
18	At sending circuit— Block operated L relay.	
19c	If TR/NTR transfer key is provided— At terminal side of sending circuit— Connect 3T terminal of A6 relay to FA relay terminal as follows— U-624 2T U-143 5T Connect 3B terminal of A6 relay to FA relay terminal as follows— U-624 2B U-143 4B	
20h	If SB/NTR/DB transfer key and FA relay are provided— Connect 9T terminal of A6 relay to FA relay terminal as follows— U-624 2T U-143 5T Connect 5B terminal of A6 relay to FA relay	

SECTION 216-771-501

STEP	ACTION	VERIFICATION
	terminal as follows— U-624 2B U-143 4B	
21e	If NV_ relays are provided— Block NV2 relay nonoperated.	
22	Block FA relay nonoperated.	
23i	If FA relay is not provided— Insulate 10T contacts of relays A0 to A6.	
24	At transfer circuit— Block operated CK relay.	
25j	If U1158-A relay is provided— At sending circuit— Connect together 8B and 9B contacts.	
26k	If U1193-A relay is provided— Connect together 9T and 10T contacts.	
	Note 1: In the following tests, note that the A3 relay in the sending circuit operates each time an AR- relay in the transfer circuit is operated and releases when the AR- relay is released.	
	Note 2: Two sets of punchings are shown for some test steps. If 224A terminal strip is furnished, the first letter (A, B, C, etc), is the designation of the terminal strip. The punching number is next, followed by the letter B or T which designates the top or bottom group of punchings. If the 217 terminal strip is furnished, the punchings are designated by numbers only.	
27	At transfer circuit— Block operated AR1 relay.	
28	At transfer circuit terminal strip— Connect ground to punching 470.	At transfer circuit terminal strip— No ground on these punchings: 29, 50, 54, 56, 57, 58, 64, 461.
29	Remove test cord from punching 470.	
30	Remove blocking tool from AR1 relay.	
31	Perform operations shown in Table J.	Battery, ground, no battery, or no ground on punchings as shown in Table J.

TABLE J

TRANSFER CIRCUIT		CHECK FOR	TRANSFER CIRCUIT TERMINAL STRIP PUNCHINGS
BLOCK OPERATED RELAY	REMOVE BLOCKING TOOL FROM RELAY		
AR2		Ground No Ground	49, 55, 60, 74, 471 39, 59, 65, 75, 196
AR3-1	AR2	Ground	240, 241, 242, 243, 244, 260, 261, 262, 263, 264
*AR3-2	AR3-1	Ground	245, 246, 247, 248, 249, 265, 266, 267, 268, 269
AR4-1 See Note A	AR3-2	Battery No Battery	240, 241, 242, 260, 261 240, 241, 242, 260, 261
*AR4-2 See Note A	AR4-1	Battery No Battery	240, 241, 242, 260, 261 243, 244, 262, 263, 264 243, 244, 262, 263, 264
AR4-3 See Note A	AR4-2	Battery No Battery	243, 244, 262, 263, 264 245, 246, 247, 265, 266 245, 246, 247, 265, 266
*AR4-4 See Note A	AR4-3	Battery No Battery	245, 246, 247, 265, 266 248, 249, 267, 268, 269 248, 249, 267, 268, 269
AR5-1	AR4-4	Battery No Ground	248, 249, 267, 268, 269 267, 248, 268, 249, 269 163, 164, 165, 166, 167, 168, 169, 173, 174, 175
*AR5-2	AR5-1	No Ground	176, 177, 178, 179, 183, 184, 185, 186, 187, 188
*AR5-3	AR5-2	No Ground	189, 193, 194, 195
AR6	AR5-3	Ground No Ground	312, 317 298, 310, 311, 313, 314, 318, 463
AR7	AR6	No Ground	480, 481, 482, 483, 484 *485, *486, *487, *488, *489, or A1T, A2T, A3T, A4T, A5T, *A6T, *A7T, *A8T, *A9T, *A10T
	AR7		

* When relay is installed or terminal is wired.

Note:

- A. Insulate the 1B, 4B, 7B, 2T, 4T contacts of the AR4- relay blocked operated; check the conditions shown; and then remove the insulators.

TABLE J (Contd)

TRANSFER CIRCUIT BLOCK OPERATED RELAY	REMOVE BLOCKING TOOL FROM RELAY	CHECK FOR	TRANSFER CIRCUIT TERMINAL STRIP PUNCHINGS
AR8-1		No Ground	490, 491, *492, *493, 494, 495, 496, 497, *498, *499, or A11T, A12T, *A13T, *A14T, A15T, A16T, A1B, A2B, *D13B, *D14B
*AR8-2	AR8-1	No Ground	510, 511, *512, *513, 514, 515, 516, 517, *518, *519, or B1T, B2T, *B3T, *B4T, B5T, B6T, B7T, B8T, *D15B, *D16B
*AR8-3	AR8-2	No Ground	520, 521, *522, *523, 524, 525, 526, 527, *528, *529, or B9T, B10T, *B11T, *B12T, B13T, B14T, B15T, B16T, *F14B, F15B
AR9-1	AR8-3	No Ground	500, 501, 502, 503, 504, 505, 506, 507, 508, 530 or A3B, A4B, A5B, A6B, A7B, A8B, A9B, A10B, A11B
*AR9-2	AR9-1	No Ground	531, 540, 541, 542, 543, 544, 545, 546, 547, 548, or C1T, C2T, C3T, C4T, C5T, C6T, C7T, C8T, C9T
*AR9-3	AR9-2	No Ground	532, 550, 551, 552, 553, 554, 555, 556, 557, 558, or C10T, C11T, C12T, C13T, C14T, C15T, C16T, C1B, C2B

* When relay is installed or terminal is wired.

TABLE J (Contd)

BLOCK OPERATED RELAY	TRANSFER CIRCUIT		CHECK FOR	TRANSFER CIRCUIT TERMINAL STRIP PUNCHINGS
		REMOVE BLOCKING TOOL FROM RELAY		
AR10-1		AR9-3	No Battery	560, 562, 564, 566, 568, 570, 572, 574, 576, 578, 580, or C3B, C5B, C7B, C9B, C11B, C13B, C15B, D1T, D3T, D5T, D7T.
*AR10-2		AR10-1	No Battery	582, 584, 586, 588, 590, 592, 594, 596, 598, 600, or D9T, D11T, D13T, D15T, D1B, D3B, D5B, D7B, D9B, D11B
*AR10-3		AR10-2	No Battery	602, 604, 606, 608, 610, 612, 614, 616, 618, 620, or E1T, E3T, E5T, E7T, E9T, E11T, E13T, E15T, E1B, E3B
*AR10-4		AR10-3	No Battery	622, 624, 626, 628, 630, 632, 634, 636, 638, 640, 642, or E5B, E7B, E9B, E11B, E13B, E15B, F1T, F3T, F5T, F7T, F9T
*AR10-5		AR10-4	No Battery	762, 764, 766, 768, 772, 774, 776, 778, or J1T, J3T, J5T, J7T, J9T, J11T, J13T, J15T
AR11		AR10-5	No Ground	644, 645, 646, 647, 648, 649, or F11T, F12T, F13T, F14T, F15T, F16T
AR12-1		AR11	No Ground	650, 651, 652, 653, 654, 655, 656, 657, 658, or B1B, B2B, B3B, B4B, B5B, B6B, B7B, B8B, B9B
		AR12-1		

* When relay is installed or terminal is wired.

TABLE J (Contd)

BLOCK OPERATED RELAY	TRANSFER CIRCUIT		CHECK FOR	TRANSFER CIRCUIT TERMINAL STRIP PUNCHINGS
		REMOVE BLOCKING TOOL FROM RELAY		
*AR12-2			No Ground	665, 666, 667, 668, 669, 670, 671, 672, 673, or B10B, B11B, B12B, B13B, B14B, B15B, B16B, F2B, F3B
*AR12-3		AR12-2	No Ground	680, 681, 682, 683, 684, 685, 686, 687, 688, or F4B, F5B, F6B, F7B, F8B, F9B, F10B, F11B, F12B
AR13-1		AR12-3	No Ground	549, 659, 660, 661, 662, 663, 664, 679, 689, 709, or H10B, G1B, G2B, G3B, G4B, G5B, H5B, H6B, H7B, H8B
*AR13-2		AR13-1	No Ground	674, 675, 676, 677, 678, or G6B, G7B, G8B, G9B, G10B
*AR13-3		AR13-2	No Ground	690, 691, 692, 693, 694, or G11B, G12B, G13B, G14B, G15B
AR14		AR13-3	No Ground	288, 289, 298, 299, 315, 316, 538, 539, or G1T, G2T, G15T, G16B, H14B, H15B, H16B
AR18		AR14	Ground No Ground	782, 831 373, 792, 802, 812, 822, 830, 832
AR19		AR18	Ground	16, 18, 25, 27, 36, 38, 45, 47, 54, 56, 58 See Note 1
			No Ground	15, 17, 26, 28, 35, 37, 44, 46, 48, 55, 57 See Note 1
		AR19		

* When relay is installed or terminal is wired.

Note 1: Located on terminal strip A or B on announcement alarm release unit.

STEP	ACTION	VERIFICATION
	<i>Caution: When testing relays AR15 to AR17, use the test prod so as to move the contact springs as little as possible.</i>	
32m	If AR15 relay is furnished— Block operated AR15 relay.	At transfer circuit— Ground on 1B, 4B, 7B contacts of AR15 relay. No ground on 3B, 5T, 6B contacts of AR15 relay.
33m	Remove blocking tool from AR15 relay.	
34n	If AR16 relay is furnished— Block operated AR16 relay.	At transfer circuit— Ground on 1B contact of AR16 relay. No ground on 3B, 6B, 9B contacts of AR16 relay.
35n	Remove blocking tool from AR16 relay.	
36o	If AR17 relay is furnished— Block operated AR17 relay.	At transfer circuit— Ground on 2B contact of AR17 relay. No ground on 3B and 6B contacts of AR17 relay.
37o	Remove blocking tool from AR17 relay.	
38p	If vacant code or overflow trunk circuits SD-96510-01 are provided with voice alarm feature— At voice alarm circuit SD-95959-01— Momentarily open 9B contacts of ALM relay.	At vacant code trunk frame— VCA lamp lighted. Aisle pilot lamp lighted. Major alarm sounded.
39p	At transfer circuit— Momentarily operate ARA relay.	At vacant code trunk frame— VCA lamp extinguished. Aisle pilot lamp extinguished. Major alarm silenced.
40	At sending circuit— Remove blocking tools from FA and L relays.	
41e	If NV_ relays are provided— Remove blocking tool from NV2 relay.	
42i	If FA relay is not provided— Remove insulators from 10T contacts of relays A0 to A6.	
43	Remove testing cords and insulators from A relay.	
44	At transfer circuit— Remove blocking tool from CK relay.	

SECTION 216-771-501

STEP	ACTION	VERIFICATION
45	At sending circuit— Restore transfer key to position it was in at start of test.	
G. No-Voltage Alarms		
1a	If I20 and I60 relays are provided— At sending circuit— Block L relay operated.	
2b	If L0 relay is provided— Insulate 3B contact.	
3	Insulate 5T of A relay.	
4	Insert 258C or 258D dummy plug into TST jack.	Major audible alarm sounded. +130V or CC+ lamp lighted.
5	Remove dummy plug from TST jack.	Major alarm silenced. +130V or CC+ lamp extinguished.
6	Remove insulator from A relay.	
7c	If TR/NTR transfer key is provided— Insulate 10B, 11B, 12B of A relay.	Major audible alarm sounded. -48V lamp lighted.
8d	If SB/NTR/DB transfer key is provided— Insulate 11T, 12T, 13T of A relay.	Same as Step 7c.
9	Remove insulator from A relay.	Major alarm silenced. -48V lamp extinguished.
10a	If I20 and I60 relays are provided— Remove blocking tool from L relay.	
11a	If L0 relay is provided— Remove insulator from L0 relay.	
H. Alarm Indication of Falsely Operated Alarm Release Relay		
1	At alarm transfer circuit— Block nonoperated AR1 through AR18 relays as provided.	
2	Block operated AR relay.	Major audible alarm sounded. White aisle pilot lamp lighted.
3	Remove blocking tool from AR relay.	Major alarm silenced. Aisle pilot lamp extinguished.

STEP	ACTION	VERIFICATION
4	Remove blocking tools from AR1 through AR18 relays.	
5	Manually operate AR1 relay.	Major alarm sounded.
6	Release AR1 relay.	Major alarm silenced.
7	Repeat Steps 5 and 6 for each AR_ relay provided.	

