KS-13834 PERFORATOR AND TROUBLE RECORDER CIRCUIT TESTS NO. 5 CROSSBAR OFFICES

1. GENERAL

1.01 This section is reissued for the following reasons:

(a) To revise Test J to specify the optional use of interposer magnets IX0-3.

(b) To revise Test K to delete the reference of the numbers of the single- and double-sided trouble recorder cards.

(c) To revise Test L to provide two separate pattern tests using the T0-T11 keys.

(d) To make minor changes as required.

1.02 This reissue does not affect Equipment Test Lists.

1.03 The tests covered are:

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1.04 Unless otherwise specified, all keys, jacks, and lamps referred to in this section are located in trouble recorder section of the master test frame control bay or trouble recorder frame.

1.05 ***Lettered Steps:*** A letter a, b, c, etc, added to a step number in Part 3 or 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.

1.06 Local instructions should be followed for recording and reporting plant register operations caused by performing Tests A, C, E, F, I, J, K, and L.

2. APPARATUS

Tests A, B, C, and I

2.01 KS-3008 stopwatch or equivalent.

Tests A, B, F, G, H, and M

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

Tests D, M

2.03 ▶67C test set or equivalent, equipped with one KS-6278 connecting clip, and one 518B tool (for use in checking for the presence or absence of battery or ground).◀

Tests D, F, G, and H

2.04 Testing cord, 893 cord, 6 feet long, equipped with two 360A tools (1W13B cord) and two KS-6278 connecting clips (for establishing test connections on the terminal strip).

Tests F, M

2.05 322A make-busy plug.

3. PREPARATION

STEP	ACTION	VERIFICATION
All Tests		
	Note 1: Refer to 1.03.	
1	At MTF— Restore all keys and switches.	All lamps extinguished.
All Tests Except F, G, H, and M		
2	Operate TST key.	TST, TRMB lamps lighted.
Tests F, G, and H		
3	Block operated TRB relay.	TOS lamp lighted.

STEP	ACTION	VERIFICATION

4. METHOD

STEP	ACTION	VERIFICATION
	A. Number of Records—Counting and Timing Features	
3	Momentarily operate CTOS key.	
4	Operate STC key.	RON, TRC lamps flashed. Count TRC lamp flashes until TOS lamp lighted. Number of TRC lamp flashes depends upon cross-connection used in office.

Tabulation

CROSS-CONNECTION	NO. OF FLASHES
NR to NR-5	4 to 6
NR to NR-10	8 to 12
NR to NR-20	16 to 24

5	Restore STC key.	
6	Momentarily operate CTOS key.	TOS lamp extinguished.
7	Block operated NR relay.	
8	Momentarily operate NRS relay.	TOS lamp lighted. NRS relay held operated. In 24 to 84 seconds— TOS lamp extinguished. NRS relay released.
9	Remove blocking tool from NR relay.	
10	Restore TST key.	TST, TRMB lamps extinguished.
	B. Trouble Recorder Card Completing—Timing and Alarm Features	
3	Insulate 10B of MCO relay.	
4	Operate MCC key.	
5	Operate and hold STR2 relay, ***start timing.***	If L resistor associated with TM timer is 145 type— In 1.9 to 6.9 seconds— Major alarm sounds. If L resistor associated with TM timer is 221 type— In 1.9 to 4.9 seconds—

STEP	ACTION	VERIFICATION
		Major alarm sounds. If MJR lamp is provided— MJR lamp lighted.
6	Release STR2 relay.	
7	Momentarily operate AR key.	Major alarm silenced.
8	Momentarily operate MCOR key.	If MJR lamp is provided— MJR lamp extinguished.
9	Operate and hold ON relay, ***start timing.***	If L resistor associated with TM timer is 145 type— In 1.9 to 6.9 seconds— Major alarm sounds. If L resistor associated with TM timer is 221 type— In 1.9 to 4.9 seconds— Major alarm sounds. If MJR lamp is provided— MJR lamp lighted.
10	Release ON relay.	
11	Momentarily operate AR key.	Major alarm silenced.
12	Momentarily operate MCOR key.	If MJR lamp provided— MJR lamp extinguished.
13	Restore MCC key.	
14	Remove insulator from MCO relay.	
15	Restore TST key.	TST, TRMB lamps extinguished.
C. Motor Control Timing		
3	Operate STS key.	
4	When TRC lamp lights, ***start timing.***	In 4.7 to 16.5 seconds— MCT relay operated momentarily.
5	Restore TST, STS keys.	TST, TRMB lamps extinguished.
D. Alarm Sending Feature—TOS Relay Provided		
3	Operate CTOS key.	No ground present on 2B of NRT relay.
4	Momentarily operate MCO relay.	Major alarm sounded. If MJR lamp is provided— MJR lamp lighted.

STEP	ACTION	VERIFICATION
5	Connect ground to terminal 14 on MISC B or B terminal strip.	Major alarm silenced. Ground present on 2B of NRT relay.
6	Momentarily operate MCOR key.	If MJR lamp is provided— MJR lamp extinguished.
7	Remove ground from MISC B or B terminal strip.	
8	Restore CTOS, TST keys.	TST, TRMB lamps extinguished.
E. Unused Card Bin Near Empty—Warning and Alarm Features		
3	Remove all but about 40 trouble recorder cards from in-bin.	WAR lamp lighted.
4	Operate STS key.	Minor alarm sounded. TRC lamp lighted.
5	Restore STS key.	TRC lamp extinguished.
6	Replace trouble recorder cards removed in Step 3.	
7	Momentarily operate AR key.	Minor alarm silenced. WAR lamp extinguished.
8	Restore TST key.	TST, TRMB lamps extinguished.
F. Trouble Recorder Make-Busy Features		
4	Momentarily operate TST3 relay.	TST, TRMB lamps lighted momentarily.
5	Block nonoperated TST3 relay.	
6	Momentarily operate TST2 relay.	TRMB lamp lighted momentarily.
7	Remove blocking tool from TST3 relay.	
8	Block nonoperated TST2 relay.	
9	Operate TST1 relay.	TRMB lamp lighted.
10	Momentarily operate TST3 relay.	TRMB lamp extinguished.
11	Block nonoperated TST1 relay.	
12	Momentarily operate TST relay.	TRMB lamp lighted momentarily.
13	Remove blocking tools from TST1, TST2 relays.	

STEP	ACTION	VERIFICATION
14	Momentarily operate PA relay.	TRMB lamp lighted momentarily.
15	Momentarily operate RT1 relay.	TRMB lamp lighted momentarily.
16	Momentarily operate LDT relay.	TRMB lamp lighted momentarily.
17	Momentarily operate MCO relay.	TRMB lamp lighted. Major alarm sounded.
18	Momentarily operate MCOR key.	TRMB lamp extinguished. Major alarm silenced.
19	Insert make-busy plug into TRMB jack.	TRMB lamp lighted.
20	Remove make-busy plug from TRMB jack.	TRMB lamp extinguished.
21	Connect terminal 78 to terminal 22 on MISC B or B terminal strip.	
22	Operate ON relay for less than 2 seconds.	RON, TRMB lamps lighted momentarily.
23	Insulate 9B of ST relay.	
24	Block operated ST relay.	TRMB lamp lighted.
25	Block nonoperated TST2 relay.	
26	Insulate 9T, 9B of TST1 relay.	
27	Momentarily operate TST1 relay.	TRMB lamp extinguished momentarily.
28	Operate TRC relay.	TRMB lamp extinguished.
29	Remove blocking tool from ST relay.	TRC relay released.
30	Remove insulator from ST relay.	
31	Move connection from terminal 22 to terminal 23 on MISC B or B terminal strip.	
32	Block operated TRC relay.	TRMB lamp lighted.
33	Momentarily operate TST1 relay.	TRMB lamp extinguished momentarily.
34	Remove blocking tool from TRC relay.	TRMB lamp extinguished.
35	Remove blocking tool from TST2 relay.	
36	Remove insulators from TST1 relay.	
37	Move connection from terminal 23 to terminal 24 on MISC B or B terminal strip.	TRMB lamp lighted.

STEP	ACTION	VERIFICATION
38	Remove blocking tool from TRB relay.	TOS, TRMB lamps extinguished.
39	Remove connections from terminal strip.	
G. Time-of-Day Information Control		
4	Block nonoperated MC, TM relays.	
5	Connect terminal 78 to terminal 10 on MISC B or B terminal strip.	
6	Insulate 6B of STR2 relay.	
7	Momentarily operate STR2 relay.	TRMB, RON lamps lighted momentarily.
8	Remove insulator from STR2 relay.	
9	Move connection from terminal 10 to terminal 11 on MISC B or B terminal strip.	
10	Insulate 4T of STR2 relay.	
11	Block operated STR2 relay.	TRMB, RON lamps lighted.
12	Momentarily operate ON relay.	TRMB lamp extinguished momentarily.
13	Insulate 6B of MCO relay.	
14	Operate MCO relay.	TRMB lamp extinguished. Major alarm sounded.
15	Momentarily operate MCOR key.	Major alarm silenced. TRMB lamp lighted.
16	Remove insulator from MCO relay.	
17	Remove blocking tool from STR2 relay.	TRMB, RON lamps extinguished.
18	Remove insulator from STR2 relay.	
19	Remove blocking tools from MC, TM, TRB relays.	TOS lamp extinguished.
20	Remove connections from terminal strip.	
H. Continuity of Start Leads		
4	Insulate 5T of ON relay.	
5	Connect ground to terminal 20 on MISC B or B terminal strip.	

STEP	ACTION	VERIFICATION
6	Operate STR1 relay.	STR1 relay held operated.
7	Block nonoperated TST1 relay.	
8	Momentarily operate TST relay.	STR1 relay released.
9	Remove blocking tool from TST1 relay.	
10	Operate STR1 relay.	STR1 relay held operated.
11	Momentarily operate TST3 relay.	STR1 relay released.
12	Operate STR1 relay.	STR1 relay held operated.
13	Move connection from terminal 20 to terminal 21 on MISC B or B terminal strip.	STR1 relay released momentarily.
14	Block nonoperated TST1 relay.	
15	Momentarily operate TST relay.	STR1 relay released momentarily.
16	Remove blocking tool from TST1 relay.	
17	Momentarily operate TST3 relay.	STR1 relay released momentarily.
18	Remove connections from terminal strip.	STR1 relay released.
19	Remove insulator from ON relay.	
20	Remove blocking tool from TRB relay.	TOS lamp extinguished.

I. Motor Speed and Accuracy of Perforation

3	Record number registered on SPC register.	
4	Operate STC key.	
5	After perforator motor has attained full speed— Operate SPC key for 1 minute.	
6	Restore STC key.	
7	Record number registered on SPC register.	Revolutions per minute recorded between 475 and 580.
8	Operate U0-9, T0-11 keys (operated is out position).	
9	Operate LDT, STC keys.	

STEP	ACTION	VERIFICATION
10	After perforator motor has attained full speed— Operate SPC key for 1 minute.	
11	Restore STC key.	
12	Record number registered on SPC register.	Revolutions per minute recorded between 475 and 580. Check several trouble recorder cards for complete perforation, noting that each perforation is accurately placed with relation to its designation.
13	Restore TST, U0-9, T0-11 keys.	TST, TRMB lamps extinguished.

J. Pattern Test

Interposer Magnets ▶IX0-3◀ Not Provided

3	Operate T0 key.	
4	Operate STS key.	Trouble recorder card ejected. ***Note:*** The 12 trouble recorder cards perforated in Steps 4 through 9 are in accordance with Fig. 1 ▶or2.◀
5	Restore T0 key.	
6	Operate T1 key.	
7	Momentarily restore STS key.	Trouble recorder card ejected.
8	Restore T1 key.	
9	Repeat Steps 6 through 8 for remaining T_ keys.	

Interposer Magnets ▶IX0-3◀ Provided

10	Operate T2, IX0 keys.	
11	Operate STS key.	Trouble recorder card ejected. ***Note:*** The trouble recorder cards perforated in Steps 11 through 16 are in accordance with Fig. 2.
12	Restore T2, IX0 keys.	
13	Operate T3, IX1 keys.	

STEP	ACTION	VERIFICATION
14	Momentarily restore STS key.	Trouble recorder card ejected.
15	Restore T3, IX1 keys.	
16	Repeat Steps 13 through 15 for T8, IX2 keys, and T9, IX3 keys.	
All Tests		
17	Restore STS, TST, PA keys.	TST, TRMB lamps extinguished.

K. Selector Magnet Release Test

▶Single-Sided Trouble Recorder Card (Early Version)◀

3	Operate RT1_, U_, T0 keys.	
4	Operate STC key until three trouble recorder cards have been ejected.	Each trouble recorder card perforated on rows R0, 2, 4, 6 in position indicated in Table A.
5	Repeat Steps 3, 4 for each U_ key.	
6	Repeat Steps 3, 4, 5 for T1 through T5 keys.	
7	Restore U_, T5 keys.	
8	Operate U_, T6 keys.	
9	Operate STC key until three trouble recorder cards have been ejected.	Each trouble recorder card perforated on rows S0, 2, 4, 6 in position indicated in Table A.
10	Repeat Steps 8, 9 for each U_ key.	

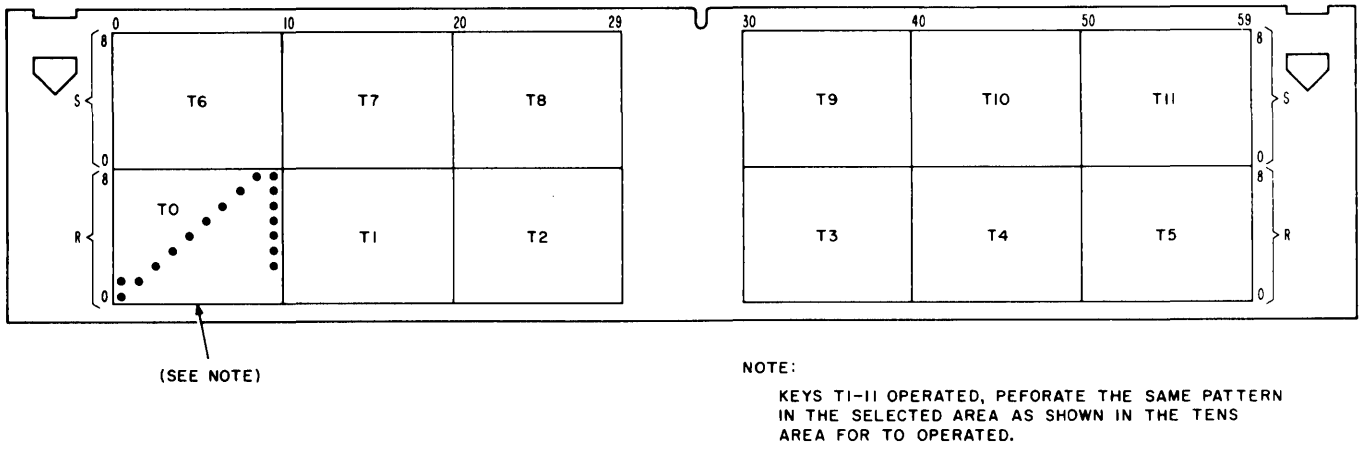
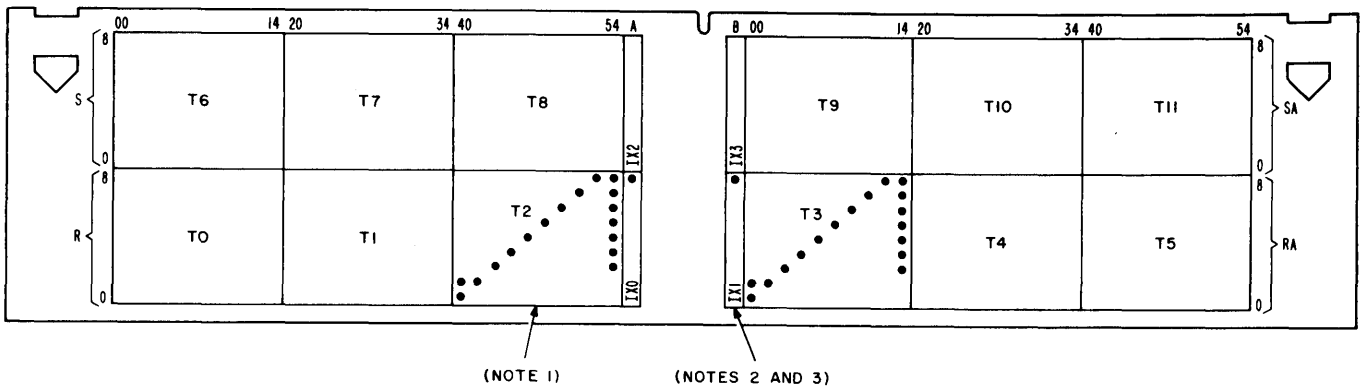


Fig. 1—▶Single-Sided Trouble Recorder Card (Early Version)—Typical Perforation Pattern◀

STEP	ACTION	VERIFICATION



NOTES:

1. KEYS T0, T1, AND T4-11 OPERATED, PERFORATE THE SAME PATTERN IN THE SELECTED AREA AS SHOWN IN THE TENS AREA FOR T2, T3 OPERATED.
2. KEYS T8, IX2 AND T9, IX3 OPERATED, PERFORATE THE SAME PATTERN AS SHOWN FOR T2, IX0 AND T3, IX1 OPERATED RESPECTIVELY.
3. PERFORATIONS IN THE AREAS DESIGNATED IX0-3 ARE CONTROLLED BY THE INTERPOSER MAGNETS IX0-3.

Fig. 2—Double-Sided and Single-Sided (ACD) Trouble Recorder Card-Typical Perforation Pattern

11	Repeat Steps 8, 9, 10 for T7 through T11 keys.	

Double-Sided and Single-Sided (ACD) Trouble Recorder Card

12	Operate RT1, U_, T0 keys.	
13	Operate STC key until three trouble recorder cards have been ejected.	Each trouble recorder card perforated on rows R0, 2, 4, 6 in position indicated in Table B.
14	Repeat Steps 12, 13 for each U_ key.	
15	Repeat Steps 12, 13, 14, for T1, T2 keys.	
16	Restore U_, T2 keys.	
17	Operate U_, T3 keys.	
18	Operate STC key until three trouble recorder cards have been ejected.	Each trouble recorder card perforated on rows RA0, 2, 4, 6 in position indicated in Table B.
19	Repeat Steps 17, 18 for each U_ key.	
20	Repeat Steps 17, 18, 19 for T4, T5 keys.	

STEP	ACTION	VERIFICATION
21	Restore U_, T5 keys.	
22	Operate U_, T6 keys.	
23	Operate STC key until three trouble recorder cards have been ejected.	Each trouble recorder card perforated on rows S0, 2, 4, 6 in position indicated in Table B.
24	Repeat Steps 22, 23 for each U_ key.	
25	Repeat Steps 22, 23, 24 for T7, T8 keys.	
26	Restore U_, T8 keys.	
27	Operate U_, T9 keys.	
28	Operate STC key until three trouble recorder cards have been ejected.	Each trouble recorder card perforated on rows SA0, 2, 4, 6 in position indicated in Table B.
29	Repeat Steps 27, 28 for each U_ key.	
30	Repeat Steps 27, 28, 29 for T10, T11 keys.	
All Tests		
31	Restore all keys of trouble recorder.	TST, TRMB lamps extinguished.

L. Perforator Load Test

3	Operate (out position) LDT, U0-9 keys.
4	Operate (out position) T0, 1, 2, 6, 7, 8 keys.
5a	If interposer magnets IX0-3 are provided— Operate (out position) IX0-3 keys.

→TABLE A←

POSITION PERFORATED—SINGLE-SIDED CARD (EARLY VERSION)

T_ Key Operated	U_ KEY OPERATED									
	0	1	2	3	4	5	6	7	8	9
0 or 6	6*	1	2	3	4	5	6	7	8	9
1 or 7	10	11	12	13	14	15	16	17	18	19
2 or 8	20	21	22	23	24	25	26	27	28	29
3 or 9	30	31	32	33	34	35	36	37	38	39
4 or 10	40	41	42	43	44	45	46	47	48	49
5 or 11	50	51	52	53	54	55	56	57	58	59

STEP	ACTION	VERIFICATION

→TABLE B←

POSITION PERFORATED—DOUBLE-SIDED AND SINGLE-SIDED (ACD) CARD

		U_KEY OPERATED									
		0	1	2	3	4	5	6	7	8	9
T_	0, 3, 6, or 9	00*	01	02	03	04	10	11	12	13	14
Key	1, 4, 7, or 10	20	21	22	23	24	30	31	32	33	34
Operated	2, 5, 8, or 11	40	41	42	43	44	50	51	52	53	54

* The position is the coordinate printed at the top of the trouble recorder card.

6	Operate STC key until three trouble recorder cards have been ejected.	◆Each of the trouble recorder cards perforated in the selected areas on all rows as determined by the operated keys in Step 4.
7	Restore T0, 1, 2, 6, 7, 8 keys.	
8	Operate (out position) T3, 4, 5, 9, 10, 11 keys.	
9	Operate STC key until three trouble recorder cards have been ejected.	Each of the trouble recorder cards perforated in the selected areas on all rows as determined by the operated keys in Step 8.
10	Restore TST, LDT, U0-9, IX0-3, and T3, 4, 5, 9, 10, 11 keys.◆	TST, TRMB lamps extinguished.

M. 1st Trial Failure Indications—Option N Provided

2	Insert make-busy plug into TRMB jack.	Battery not present at terminal 25 on MISC B or B terminal strip.
3	Block operated TRB relay.	TOS lamp lighted. Battery present at terminal 25 on MISC B or B terminal strip.
4	Remove blocking tool from TRB relay.	TOS lamp extinguished. Battery removed from terminal 25.
5	Remove make-busy plug from TRMB jack.	