

**RECORDER AND RECORDER CONNECTOR CIRCUITS SD-25872-01
TESTS**

**NO. 5 CROSSBAR OFFICES
ARRANGED FOR LAMA OR CAMA PAPER TAPE**

1. GENERAL

PAGE

1.01 This section describes a method of testing regular and emergency recorder and recorder connector circuits in No. 5 crossbar offices arranged for local automatic message accounting (LAMA) or for centralized automatic message accounting (CAMA), using the recorder test portion of the master timing circuit SD-25633-01, master test frame connector circuit SD-25805-01, master test control circuit SD-25800-01, trunk test circuit SD-25918-01, and miscellaneous test equipment. For testing the recorder and recorder connector in offices equipped with billing data transmitters, refer to the section titled, Recorder and Recorder Connector Circuit SD-25872-01 Operation Tests CAMA and AMA Offices Equipped with Billing Data Transmitters.

to the emergency recorder. While the transfer is in effect, no other call identity indexer can be transferred, and a charge guard entry is perforated. (2) In offices equipped with the trunk transfer circuit, the trunk associated with either of the recorders can be transferred to the other recorder, and a charge guard entry is perforated.

6

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes. Equipment Test Lists are affected.

B. Make-Busy Features: The following features are checked: (1) When the regular recorder is made busy, the associated call identity indexer cannot be transferred to the emergency recorder. (2) When the regular recorder is made busy, the call identity indexer associated with any other regular recorder not made busy can be transferred to the emergency recorder. (3) In all offices the service busy, trouble busy, and extended timing leads from the regular recorder to each transverter and the master timing alarm release feature in the regular recorder make-busy circuit.

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- (a) To add addendum issue 1 and 2 changes.
- (b) To revise tests F and S (paper jam feature)
- (c) To make minor revisions as required.

1.03 The tests covered are:

REGULAR RECORDER

PAGE

A. Transfer Features: The following features are checked: (1) In offices equipped with an emergency recorder, the call identity indexer associated with the regular recorder can be transferred

C. Operational Test: The following features are checked: (1) End of tape information is correctly perforated on tape. (2) Operation of the perforator magnets of the regular recorder by perforating the tape in a distinctive diamond-shaped pattern. (3) Normal operation of the recorder on an initial entry and on answer and disconnect entries, (4) Operation of the 2-out-of-5 check relays. (5) Operation of the OTO and RCK relays. (6) False battery on

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	PAGE		PAGE
the OT lead. (7) False ground on the XTC lead. (8) Trouble grounds on the OT and TCO leads.	13	encountered. (3) The recorder busy features function when a break in the tape, or end of tape is encountered.	38
D. Synchronizing Features: The following features are checked: (1) Feature for detecting when the timing selectors in the regular recorder are out of synchronism with the master timing circuit. (2) Feature for synchronizing the recorder selectors with the master timing circuit.	17	G. Trouble Timing Feature: This test checks that the recorder times out and brings in an alarm in approximately 2 seconds upon the failure of entries originated by the recorder and an associated call identity indexer.	40
E. Recorder Number, Minutes Timing, and Hour Alarm Features (6-Second Timing): The following features are checked: (1) Perforator magnet leads from the timing selectors of the regular recorder. (2) Perforator magnet leads from the RN (recorder number), HRT (hour trouble), ADT (answer-disconnect trouble), TCT (talking charge trouble), and AT (advance tape) relays. (3) Selector timing switch positions that bring in the hour entry, hour trouble entry, and hour alarm.	19	H. AG Lead Alarm and Locking Features: The following features are checked: (1) Operation of a TA_ or TB_ relay in the call identity indexer starts the timing feature in its associated regular recorder. (2) Locking paths for the RD and IPA relays.	42
E.1 Recorder Number, Minutes Timing, Seconds Timing, and Hour Alarm Features (1-Second Timing): The following features are checked: (1) Perforator magnet leads from the timing selectors and relay counters of the regular recorder. (2) Perforator magnet leads from the RN (recorder number), HRT (hour trouble) ADT (answer-disconnect trouble), TCT (talking charge trouble), and AT (advance tape) relays. (3) Selector timing switch and relay counter positions that bring in the hour entry, hour trouble entry, and hour alarm.	28	I. Transient Operation of Perforator Magnets and Series Relay Locking Features: The following features are checked: (1) Operation of a perforator magnet while the regular recorder is idle causes a trouble entry to be perforated. (2) The locking circuit for all perforator magnet series relays.	44
F. Splice, Break-In Tape, and Paper Jam Feature: The following features are checked: (1) The regular recorder perforates window pattern entries upon encountering a splice in the tape, a break in the tape, or the end-of-tape supply. (2) The no-paper alarm feature functions when a break in the tape, end of the tape supply, or paper jam is		J. Trouble Cross-Detecting Features: The following features are checked: (1) Operation of the alarm feature if a failure occurs in the preference relay chain circuit of the regular recorder or in the tens or units relay chain circuit in the associated call identity indexer. (2) Operation of the alarm feature due to falsely grounded TC, RB, and EXT leads.	45
		K. Test for False Continuity and Crosses of TC_ Relays: This test checks for false continuity and crosses on the contacts of the transverter-connector relays in the regular recorder.	50
		L. Deleted:	
		M. Trunk Identifying Leads: This test checks for transpositions in the trunk identifying leads from the call	

	PAGE		PAGE
identity indexer to the perforator magnets of the associated regular recorder.	54	battery on the OT lead. (7) False ground on the XTC lead. (8) Trouble grounds on the OT and TCO leads.	60
N. Preference Relays—Operating and Lockout Features: This test checks the order of preference and locking features of the IP, HP, TP, and MTP relays. This test also checks the operation of the RIP and RTL relays. When applicable, Fig. 27 is provided.	54	Q. Synchronizing Features: The following features are checked: (1) Feature for detecting when the timing selectors in the emergency recorder are out of synchronism with the master timing circuit. (2) Feature for synchronizing the emergency recorder selectors with the master timing circuit.	62
N.1 Dynamic Test of Preference Relays: This test checks that the preference relays operate in the proper sequence. When applicable, Fig. 27 is provided.	55	R. Recorder Number, Minutes Timing, and Hour Alarm Features (6-Second Timing): The following features are checked: (1) Perforator magnet leads from the timing selectors of the emergency recorder. (2) Perforator magnet leads from the RN, HRT, ADT, TCT, and AT relays. (3) Selector timing switch positions that bring in the hour entry, hour trouble entry, and hour alarm.	64
N.2 Detection of falsely Grounded DJ₁ Lead: This test checks that a falsely grounded DJ ₁ lead in the call identity indexer on a timing entry will cause a trouble condition at the associated recorder, if option T is provided in the call identity indexer and option WN in the recorder.	58	R.1 Recorder Number, Minutes Timing, Seconds Timing, and Hour Alarm Features (1-second Timing). The following features are checked: (1) Perforator magnet leads from the timing selectors and relay counters of the emergency recorder. (2) Perforator magnet leads from the RN, HRT, ADT, TCT, and AT relays. (3) Selector timing switch and relay counter positions that bring in the hour entry, hour trouble entry, and hour alarm.	67
EMERGENCY RECORDER		S. Splice Break-In Tape, and Paper Jam Feature: The following features are checked: (1) The emergency recorder will perforate window pattern entries upon encountering a splice in the tape, a break in the tape, or the end-of-tape supply. (2) The no-paper alarm feature functions when a break in the tape, end of the tape supply, or paper jam is encountered. (3) The emergency recorder busy features function when a break in the tape, or end of tape is encountered.	68
O. Make-Busy Feature: The following features are checked: (1) When the emergency recorder is made busy, no call identity indexer can be transferred from its associated regular recorder to the emergency recorder. (2) Service busy feature. (3) While the call identity indexer is connected to the emergency recorder, the emergency recorder can be made busy.	58		
P. Operation Test: The following features are checked: (1) End of tape information is correctly perforated on tape. (2) Operation of the perforator magnets of the emergency recorder by perforating the tape in a distinctive diamond-shaped pattern. (3) Normal operation of the emergency recorder on an initial entry and on answer and disconnect entries. (4) Operation of the 2-out-of-5 check relays. (5) Operation of the OTO and RCK relays. (6) False			

	PAGE		PAGE
T. Trouble Timing Feature: This test checks that the emergency recorder times out and causes an alarm in approximately 2 seconds upon the failure of entries originated by the recorder and an associated call identity indexer.	70	AA. Preference Relays—Operating and Lockout Features: This test checks the order of preference of the IP, HP, TP, and MTP relays and their locking features.	81
U. AG Lead Alarm and Locking Features: This test checks that the operation of a TA_ or TB_ relay in the call identity indexer starts the timing feature in the emergency recorder. It also checks the locking paths for the RD and IPA relays.	71	AB. Exercising Routine: This test checks the operation of the emergency recorder with each call identity indexer.	82
V. Transient Operation of Perforator Magnets and Series Relay Locking Features: This test checks that the operation of a perforator magnet while the emergency recorder is idle will cause a trouble entry to be perforated. It also checks the locking circuit for all perforator magnet series relays.	73	AC. Dynamic Test of Preference Relays: This test checks that the preference relays operate in the proper sequence. When applicable, Fig. 27 is provided.	84
W. Trouble Cross-Detecting Features: The following features are checked: (1) Operation of the alarm feature if a failure occurs in the preference relay chain circuit of the emergency recorder or in the tens or units relay chain circuit in the associated call identity indexer. (2) Operation of the alarm feature due to falsely grounded TC, RB, and EXT leads.	74	AD. Detection of Falsely Grounded DJ_ Lead: This test checks that a falsely grounded DJ_ lead in the call identity indexer on a timing entry will cause a trouble condition at the emergency recorder, if option T is provided in the call identity indexer and option WN in the emergency recorder	85
X. Test for False Continuity and Crosses of TC_ Relays: This test checks for false continuity and crosses on the contacts of the transverter-connector relays in the emergency recorder.	79	1.04 Since end-of-tape entries are perforated at 3 a.m., do not perform tests between 2:55 a.m. and 3:30 a.m.	
Y. Deleted:		1.05 All tests require that either a regular or an emergency recorder shall be made busy.	
Z. Trunk Identifying Leads: This test checks for transpositions in the trunk identifying leads from the call identity indexer to the perforator magnets of the associated emergency recorder.	79	1.06 All tests except M, Z, and AB require actions and verifications at different locations at the same time.	
		1.07 If Test C, G, P, or T indicates trouble in a timing network, check the timing interval as covered in the circuit requirements table.	
		1.08 In offices equipped with regular and emergency recorders or offices equipped with a trunk transfer circuit, where six second timing is used, transfers should not be made more than once during the same hour entry. Where one second timing is used, transfers should not be made more than once during the same ten minute entry. More than one transfer during a period may make it impossible to associate the entries for two or more calls on a trunk which has the initial entry on one tape and the answer and disconnect entries on the	

other tape. Information concerning precautions to limit stoppages at the accounting center caused by central office tape irregularities is included in the Section titled, Central Office Automatic Message Accounting Equipment, Precautions to Limit Stoppages in No. 1 Accounting Center No. 5 Crossbar Offices.

1.09 In offices equipped for one-second timing, it is suggested that each test be read by the employee before actually performing the test. This is intended to familiarize the employee with test steps that must be done in rapid succession.

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

1.11 Local instructions should be followed for recording and reporting any RTR or REC-PC plant register operations caused by performing these tests.

1.12 The TPC traffic register will operate on all tests.

1.13 Tests A, B, C, E, E1, G, I, and K requiring transfer between recorders should be performed only during periods of light traffic to avoid sender timeout.

1.14 Where the office is equipped with the paper jam detector feature and the PJD (paper jam detector) counter is provided, the following caution must be complied with.

Caution: *When performing maintenance on the perforator and the slack take-up arm is stored in its holder, after 200 counts of the paper jam counter:*

- (1) *A major alarm will sound*
- (2) *The NP lamp at recorder frame associated with the perforator lights*

In order to prevent the above, monitor the PJD counter. When the counter nears 200, release the take-up arm from its holder which allows the paper take-up motor to operate, in turn resetting the PMD counter to 0.

2. APPARATUS

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

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

2.03 Testing cord, 893 cord, 6 feet long, equipped with two 360A tools (1W13B cord), one KS-6278 connecting clip, and one 419A (test connector) tool.

2.04 Testing cord, 893 cord, 6 feet long, equipped with two 360A tools (1W13B cord) and two 419A (test connector) tools or one KS-6278 connecting clip and one 509A tool.

2.05 Testing cord, 893 cord, 6 feet long, equipped with two 360A tools (1W13B cord) and two KS-6278 connecting clips or one KS-6278 connecting clip and one 411A (test pick) tool.

2.06 Recorder test portion of the master timing circuit, SD-25633-01.

2.07 Trunk test circuit, SD-25918-01.

2.08 Master test control circuit, SD-25800-01.

2.09 KS-14343 tape reader (for checking arrangement of perforations).

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

2.11 Esterline Angus 20-pen Event Recorder, or any 4-brush recorder with high impedance inputs.

2.12 Testing cord, 893 cord, 6 feet long, equipped with two 360A tools (1W13B cord), one 364 tool, and one 419A test connector or one 624A terminal connector.

3. METHOD

STEP	ACTION	VERIFICATION
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REGULAR RECORDER

A. Transfer Features

Refer to paragraph 1.13.

With Emergency Recorder

- | | | |
|----|---|--|
| 1 | At jack, lamp, and key circuit—
Check that emergency recorder is not in service. | No make-busy plug in any TN jacks associated with recorders. |
| 2 | At perforator cabinet associated with emergency recorder—
Mark tape (refer to paragraph 1.08). | |
| 3 | At jack, lamp, and key circuit—
Insert make-busy plug into TN jack associated with recorder under test. | At recorder frame—
EW lamp lighted.
At recorder under test—
RNT, NS, all TN_ relays operated.
RT, RT1 relays released.
Ground absent on 2B of MB relay. |
| 4a | If options G and P are provided—
Check for ground on 8B of TNS relay. | Ground present. |
| 5b | If options G and R are provided—
Check for ground on 12T of TNS relay. | Ground present. |
| 6 | At jack, lamp, and key circuit—
Insert make-busy plug into TST jack associated with recorder under test. | |
| 7 | At perforator cabinet line-up—
Insert plug of 32A test set into R jack. | |
| 8 | Momentarily operate white (ST) button of 32A test set.

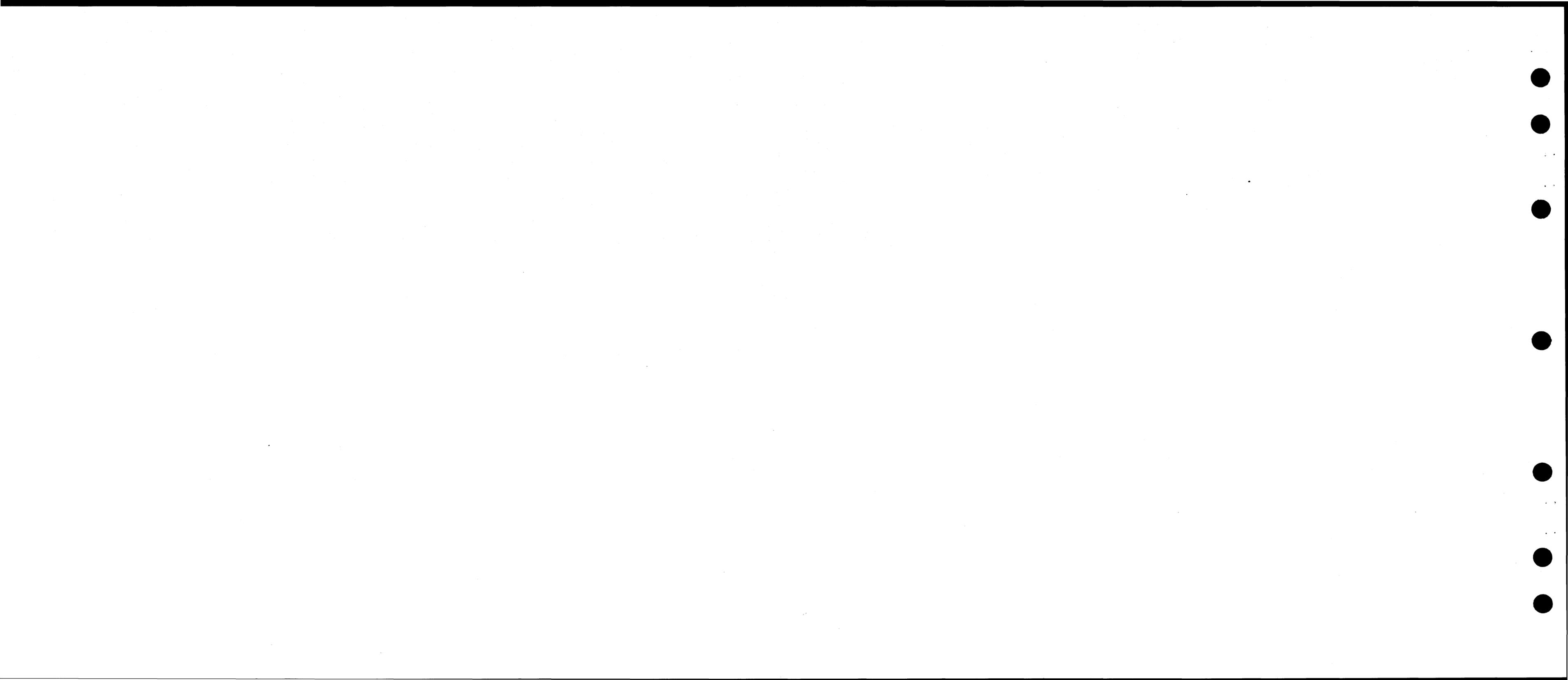
<i>Note:</i> If a trouble is encountered while applying the test pattern, as indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring the recorder to service. | RUT lamp lighted.
When test is completed—
RUT lamp extinguished.

<i>Note:</i> If the RW lamp is lighted, wait until the RW lamp is extinguished and then momentarily reoperate the white (ST) button of the 32A test set. Wait several seconds and again momentarily operate white (ST) button. |
| 9 | At perforator cabinet line-up—
Remove plug of 32A test set from R jack and mark tape (refer to paragraph 1.08). | |

TABLE A

APPARATUS	TESTS																																
	A	B	C	D	E	E.1	F	G	H	I	J	K	M	N	N.1	N.2	O	P	Q	R	R.1	S	T	U	V	W	X	Z	AA	AB	AC	AD	
322A (make-busy Plug)	2	√	2	√	2	2	√	2	√	2	√	2	√			√	√	2	2	2	2	2	2	√	1	2	2	√		1	1	√	
32A Test Set	1	1	1	1	1	1	1	1	1	1	1	1				1	1	1	1	1	1	1	1	1	1	1	1					1	
716C Test Receiver (2.02)	1	1		1			1	1				1				1		1				1	1				1						
Cord (2.03)		1			3	3					1	1		2						3	3					1	1		2				
Cord (2.04)										1		1													1		1						
Cord (2.05)							1															1											
KS-3008 Stopwatch or equivalent								1															1										
Master Timing Circuit (2.06)		1	1	1	1	1	1	1	1	1	1	1				1	1	1	1	1	1	1	1	1	1	1	1					1	
Test Circuit (2.07)													1																1				
Control Circuit (2.08)													1																1				
Tape Reader (2.09)			1															1															
Tools (2.10)		√		√	√	√	√	√	√	√	√	√						√	√	√	√		√	√	√	√	√	√	√				
Pen Recorder (2.11)															1																		1
Cord (2.12)															4																		4

√ As required.



STEP	ACTION	VERIFICATION
10	At jack, lamp, and key circuit— Remove plug from TST jack.	
11	At jack, lamp, and key circuit— Insert make-busy plug into TN jack of any other recorder.	At associated recorder— TNS relay <i>not</i> operated.
12	At jack, lamp, and key circuit— Remove make-busy plug from TN jack used in Step 11.	
13	Remove make-busy plug from TN jack of recorder under test.	At recorder frame— EW lamp extinguished. At recorder under test— RNT, NS, all TN_ relays released.
With Trunk Transfer Circuit		
14	At jack, lamp, and key circuit— Observe that recorder under test is in service.	R_ lamp associated with recorder under test extinguished.
15	At perforator circuit associated with recorder being transferred to— Mark tape (refer to paragraph 1.08).	
16	Insert make-busy plug into TN jack associated with recorder under test.	R_ lamp associated with recorder under test lighted. If recorder 0 is under test— At transfer circuit— TR0_ relays operated. If recorder 1 is under test— At transfer circuit— TR1_ relays operated.
		Note: DL lamp is lighted and a minor alarm sounds. Alarm can be silenced by operating the TRR_AR key at the jack, lamp, and key circuit.
17	At jack, lamp, and key circuit— Insert make-busy plug into TST jack associated with recorder under test.	
18	At perforator cabinet line-up— Insert plug of 32A test set into R jack.	
19	Momentarily operate white (ST) button of 32A test set.	RUT lamp lighted. When test is completed— RUT lamp extinguished.
	Note: If a trouble is encountered while applying the test pattern, as indicated by RIT lamp lighted, clear the trouble and apply a	Note: If the RW lamp is lighted, wait until the RW lamp is extinguished and then

SECTION 218-174-501

STEP	ACTION	VERIFICATION
	good test pattern before restoring the recorder to service.	momentarily reoperate the white (ST) button of the 32A test set. Wait several seconds and again momentarily operate white (ST) button.
20	When perforator stops operating— Repeat Step 12 to advance tape for reading.	If recorder 0 was transferred to 1, read charge guard entry 285440 for trunks 00-49. If recorder 1 was transferred to 0, read charge guard entry 285450 for trunks 50-99. Note: Use KS-14343 tape reader to examine tape. Caution: Exercise care not to mutilate tape in any manner, and under no circumstances cut the tape.
21	At perforator cabinet line-up— Remove plug of 32A test set from R jack.	
22	At jack, lamp, and key circuit— Remove plug from TST jack.	
23	Remove plug from TN jack associated with recorder under test.	R_ lamp associated with recorder under test extinguished. If recorder 0 is under test— At transfer circuit— TR0_ relays released. If recorder 1 is under test— At transfer circuit— TR1_ relays released. Note: The DL lamp is lighted and a minor alarm sounds. Alarm can be silenced by operating the TRR_AR key at the jack, lamp, and key circuit.
24	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
25	Repeat Steps 14 through 24 for other recorder.	

B. Make-Busy Features

Refer to paragraph 1.14.

- 1 Remove from service all trunks associated with recorder under test.
- 2 At recorder under test—
Block nonoperated XT relay.

STEP	ACTION	VERIFICATION
3	Insulate 3B of RD relay.	
4	At jack, lamp, and key circuit— Insert make-busy plug into MB jack associated with recorder under test.	R_ lamp associated with recorder under test lighted. At recorder under test— NS relay operated. RT, RT1 relays <i>not</i> operated. At each LAMA transverter— Ground present on 1B of associated RST_ relay. Ground absent on 6T of associated RST_ relay. At each CAMA transverter— Ground present on 4M of associated RST_ relay. Ground absent on 11M of associated RST_ relay.
5	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
6	At recorder under test— Block nonoperated TA relay.	
7	Block operated ON relay.	At each LAMA transverter— Ground present on 6T of associated RST_ relay. At each CAMA transverter— Ground present on 11M of associated RST_ relay.
8	At recorder under test— Remove blocking tool from ON relay.	
9	Remove blocking tool from TA relay.	
10a	If emergency recorder is provided— At jack, lamp, and key circuit— Check that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with recorders.
11a	Insert make-busy plug into TN jack associated with recorder under test.	At recorder frame— EW lamp <i>not</i> lighted.
12	At recorder under test— Insulate 2T of RT relay.	
13	Connect ground to 2T of RT relay.	At each LAMA transverter— Ground present on 4B of associated RST_ relay. At each CAMA transverter— Ground present on 10M of associated RST_ relay.

SECTION 218-174-501

STEP	ACTION	VERIFICATION
14	At recorder under test— Remove ground from 2T of RT relay.	At each LAMA transverter— Ground absent on 4B of associated RST_ relay. At each CAMA transverter— Ground absent on 10M of associated RST_ relay.
15	At recorder under test— Remove insulator from 2T of RT relay.	
16a	If emergency recorder is provided— At jack, lamp and key circuit— Remove plug from TN jack associated with recorder under test.	
17a	Insert make-busy plug into TN jack associated with any other recorder not made busy.	At recorder frame— EW lamp lighted.
18a	At jack, lamp, and key circuit— Remove make-busy plug from TN jack associated with transferred recorder.	At recorder frame— EW lamp extinguished.
19	At jack, lamp, and key circuit— Remove make-busy plug from MB jack associated with recorder under test.	At recorder under test— NS relay released. Ground absent on 8B of TN1 relay, 2B of TN6 relay.
20	Block nonoperated MBR relay.	
21	At jack, lamp, and key circuit— Insert make-busy plug into MB jack associated with recorder under test.	At recorder frame— MTR lamp lighted. At recorder under test— RT, RT1 relays released. Major alarm sounds.
22	Remove blocking tool from MBR relay.	
23	Operate MBR relay.	MBR relay locked operated.
24	At recorder frame— Momentarily operate AR key.	MTR lamp extinguished. Major alarm silenced.
25	At recorder under test— Remove insulator from 3B of RD relay.	
26	Remove blocking tool from XT relay.	
27	At jack, lamp, and key circuit— Insert make-busy plug into TST jack associated with recorder under test.	
28	Insert plug of 32A test set into R jack.	

STEP	ACTION	VERIFICATION
29	Momentarily operate white (ST) button of 32A test set. <i>Note:</i> If a trouble is encountered while applying the test pattern, as indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring the recorder to service.	RUT lamp lighted. When test is completed— RUT lamp extinguished.
30	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
31	At jack, lamp, and key circuit— Remove make-busy plug from TST jack associated with recorder under test.	
32	Remove plug of 32A test set from R jack.	
33	Remove make-busy plug from MB jack associated with recorder under test.	At perforator cabinet— Make-busy pattern perforated. At jack, lamp, and key circuit— R_ lamp associated with recorder under test extinguished.
34	Restore to service all trunks associated with recorder under test.	

C. Operational Test

Refer to paragraphs 1.07 and 1.13.

1a	If emergency recorder is provided— At jack, lamp, and key circuit— Check that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with recorders.
2b	If emergency recorder is not provided— At jack, lamp, and key circuit— Observe that recorder under test is in service.	R_ lamp associated with recorder under test extinguished.
3	Insert make-busy plug into TN jack associated with recorder under test.	If emergency recorder is provided— At recorder frame— EW lamp lighted. If emergency recorder is not provided— At jack, lamp, and key circuit— R_ lamp associated with recorder under test lighted.
		<i>Note:</i> If emergency recorder is not provided, the DL lamp is lighted and a minor alarm sounds. Alarm can be silenced by operating

SECTION 218-174-501

STEP	ACTION	VERIFICATION
4	At perforator cabinet— Mark tape (refer to paragraph 1.08).	the TRR_AR key at the jack, lamp, and key circuit.
5	At jack, lamp, and key circuit— Insert make-busy plug into TST jack associated with recorder under test.	
6	At perforator cabinet line-up— Insert plug of 32A test set into R jack.	
7	<p>Momentarily operate white (ST) button of 32A test set.</p> <p><i>Note:</i> If a trouble is encountered while applying the test pattern, as indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring the recorder to service.</p>	<p>RUT lamp lighted. When test is completed— RUT lamp extinguished.</p> <p><i>Note:</i> If the RW lamp is lighted, wait until the RW lamp is extinguished and then momentarily reoperate the white (ST) button of the 32A test set. Wait several seconds and again momentarily operate white (ST) button.</p>
8	When perforator stops operating— Repeat Step 7 to advance tape for reading.	
9	Read transfer entry.	Entries perforated as follows:

STEP

ACTION

VERIFICATION

TIMING	DIGIT					E	F
	A	B	C	D			
	2	8	2	1		DAY X X T U	
6 sec.	2	8	1	1		HOOR X X	
1 sec.	2	8	1	2		X X T U	
	2	8	5	X 5 or 7		O O	
	2	8	0	5		RECORDER X X T U	
6 sec.	2	8	3	DAY X UNIT		MONTH X X	
1 sec.	2	8	3	MINUTE TENS		X X	
	2	8	4	X *		X X †T †U	

*Round, Day Tens, Recorder Group Hundreds

†Marker or Recorder Group

Note: Digits marked X will vary depending on office options, time of day, day of month, etc. A check of office records will be necessary to determine certain information that should be perforated in the end of tape entry.

Note: Use KS-14343 tape reader to examine tape.

Caution: Exercise care not to mutilate tape in any manner, and under no circumstances cut the tape.

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Read test pattern.

Perforations on tape arranged exactly the same as pattern shown in Fig. 1.
No light or irregular perforations.

STEP	ACTION	VERIFICATION
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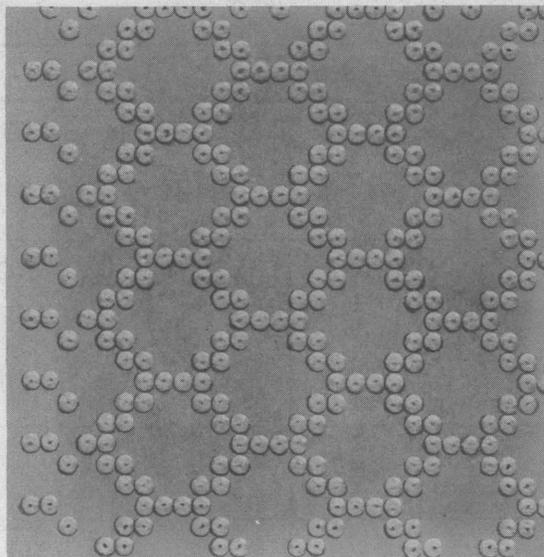


Fig. 1—Fig. 1

- | | | |
|-----|--|--|
| 11 | Remove plug of 32A test set from R jack. | |
| 12 | At jack, lamp, and key circuit—
Remove plug from TST jack. | |
| 13 | Remove plug from TN jack associated with recorder under test. | <p>If emergency recorder is provided—
At recorder frame—
EW lamp extinguished.</p> <p>If emergency recorder is not provided—
At jack, lamp, and key circuit—
R_ lamp associated with recorder under test extinguished.</p> <p>Note: If emergency recorder is not provided, the DL lamp is lighted and a minor alarm sounds. Alarm can be silenced by operating the TRR_AR key at the jack, lamp, and key circuit.</p> |
| 14a | If emergency recorder is provided—
At emergency perforator—
Repeat Step 9. | |
| 15b | If emergency recorder is not provided—
At perforator associated with recorder not under test—
Repeat Step 9. | |

STEP	ACTION	VERIFICATION
16	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
D. Synchronizing Features		
1	Remove from service all trunks associated with recorder under test.	
2	Mark tape (refer to paragraph 1.08).	
3	At recorder under test— Block nonoperated XT relay.	
4	Insulate 3B of RD relay.	
5	Operate and release UH relay.	Within 1 minute— Major alarm sounds. At master timing frame— SSF lamp lighted.
6	Operate CKL key.	OS_ lamp associated with recorder under test lighted.
7	At jack, lamp, and key circuit— Insert make-busy plug into MB jack associated with recorder under test.	R_ lamp associated with recorder under test lighted.
8	At master timing frame— Momentarily operate AR key.	Major alarm silenced. At recorder under test— If option YE is provided— Ground present on operating spring 15 of TIB relay when CA relay is released. Ground absent on operating spring 15 of TIB relay when CA relay is operated If option YF is provided— Ground present on fixed contact 15 of TIB relay when CA relay is released. Ground absent on fixed contact 15 of TIB relay when CA relay is operated. At master timing frame— SSF lamp extinguished.
9	Momentarily operate S key.	OS_ lamp associated with recorder under test extinguished.
10	Restore CKL key.	At recorder under test— If option YE is provided— Ground absent on operating spring 15 of TIB relay. Ground present on operating spring 9 of TIB relay when CA relay is released. Ground absent on operating spring 9 of TIB

SECTION 218-174-501

STEP	ACTION	VERIFICATION
		relay when CA relay is operated. If option YF is provided— Ground absent on fixed contact 15 of TIB relay. Ground present on fixed contact 9 of TIB relay when CA relay is released. Ground absent on fixed contact 9 of TIB relay When CA relay is operated.
11	At jack, lamp, and key circuit— Remove plug from MB jack associated with recorder under test.	
12	At recorder under test— Operate and release TH relay.	Within 1 minute— Major alarm sounds. At master timing frame— SSF lamp lighted.
13	Repeat Steps 6 through 11.	
14	At recorder under test— Momentarily operate HH relay.	Within 1 minute— Major alarm sounds. At master timing frame— SSF lamp lighted.
15	Repeat Steps 6 through 10.	
16	At recorder under test— Remove insulator from 3B of RD relay.	
17	Remove blocking tool from XT relay.	
18	At jack, lamp, and key circuit— Insert make-busy plug into TST jack associated with recorder under test.	
19	Insert plug of 32A test set into R jack.	
20	Momentarily operate white (ST) button of 32A test set. <i>Note:</i> If a trouble is encountered while applying the test pattern, clear the trouble and apply a good test pattern before restoring the recorder to service.	RUT lamp lighted. When test is completed— RUT lamp extinguished.
21	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
22	At jack, lamp, and key circuit— Remove plug from TST jack associated with recorder under test.	

STEP	ACTION	VERIFICATION
23	Remove plug of 32A test set from R jack.	
24	Remove plug from MB jack associated with recorder under test.	R_ lamp associated with recorder under test extinguished.
25	Restore to service all trunks associated with recorder under test.	
E. Recorder Number, Minutes Timing, and Hour Alarm Features (6-Seconds Timing)		
Refer to paragraph 1.13.		
<i>Caution: Do not start test 5 minutes before or after hour entry.</i>		
1a	If emergency recorder is provided— At jack, lamp, and key circuit— Observe that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with recorders. EW lamp not lighted.
2b	If emergency recorder is not provided— At jack, lamp, and key circuit— Observe that recorder under test is in service.	R_ lamp associated with recorder under test extinguished.
3	Insert make-busy plug into TN jack associated with recorder under test.	If emergency recorder is provided— At recorder frame— EW lamp lighted. If emergency recorder is not provided— At jack, lamp, and key circuit— R_ lamp associated with recorder under test lighted.
4	At perforator cabinet for recorder under test— Disconnect perforator plug from its jack by raising front of perforator to clear stop screws, then pulling perforator forward approximately 1 inch.	
5	At recorder under test— Block nonoperated HS, HRA, C, PTC relays.	
6	Insulate 7T of RN relay.	
7	Operate and release HH, TH, UH relays as required to step H, T, U selectors to position 1.	

Note: If emergency recorder is not provided, the DL lamp is lighted and a minor alarm sounds. Alarm can be silenced by operating the TRR_AR key at the jack, lamp, and key circuit.

SECTION 218-174-501

STEP	ACTION	VERIFICATION
8	Operate and hold M, RN relays for several seconds.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. REC, DR_ designations perforated corresponding to recorder number. B', C', D' designations perforated as indicated in Table B on line corresponding to H, T, U selector positions. E', F' designations perforated indicating recorder number tens, units digits, respectively.
9	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm is silenced.
10	At recorder under test— Operate and release HH, TH, UH relays as required to advance H, T, U selectors to next position.	
11	Operate and hold M relay for several seconds.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. B', C', D' designations perforated as indicated in Table B.
12	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
13	Repeat Steps 10 through 12 for each position of the H, T, U selectors. <i>Note:</i> The H selector does not stop at position 7 or 14 but automatically advances to position 8 or 15, respectively.	
14	At recorder under test— Check that H, T, U selectors are on position 1.	
15	Block nonoperated TA, HRT, UH relays.	
16	Block operated IPA, CA relays.	
17	Remove insulator from 7T of RN relay.	
18	Remove blocking tool from C relay.	Within 7 seconds— C relay locked operated.
19	Remove blocking tool from IPA relay.	C relay released.
20	Block nonoperated C, TC1 relays.	

STEP

ACTION

VERIFICATION

TABLE B

SELECTOR POSITIONS			NUMBERS INDICATED BY TROUBLE RECORDER CARD DESIGNATIONS PERFORATED		
H	T	U	B'	C'	D'
1	1	1	0	0	0
2	2	2	1	1	1
3	3	3	2	2	2
4	4	4	3	3	3
5	5	5	4	4	4
6	6	6	5	5	5
8	7	7	0	6	6
8	8	8	0	7	7
9	9	9	1	8	8
10	10	10	2	9	9
11	11	11	3	0	0
12	12	12	4	1	1
13	13	13	5	2	2
15	14	14	0	3	3
15	15	15	0	4	4
16	16	16	1	5	5
17	17	17	2	6	6
18	18	18	3	7	7
19	19	19	4	8	8
20	20	20	5	9	9
1	1	1	0	0	0

- 21 Remove blocking tools from CA, UH relays.
- 22 Block operated HPA relay. HR1, HR2 relays operated.
- 23 Release HR3 relay, if operated, by opening 1B.
- 24 Operate and release UH relay once. U selector advanced to position 2.
- 25 Remove blocking tool from HRA relay.
- 26 Connect ground to 3T of NS relay. At recorder frame—
HR lamp lighted.
Major alarm sounds.

SECTION 218-174-501

STEP	ACTION	VERIFICATION
27	At recorder under test— Operate and release UH relay.	U selector advanced to position 3.
28	At recorder frame— Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
29	At recorder under test— Momentarily operate CK relay.	HR3 relay operated.
30	Operate and release HH, TH, UH relays as required to advance H, T, U selectors to positions 6, 10, 8, respectively.	
31	Connect ground to 4T of C relay.	HR3 relay released.
32	Operate and release UH relay to advance U selector to position 9.	
33	Operate HR3 relay.	HR3 relay locked operated. At recorder frame— HR lamp lighted. Major alarm sounds.
34	At recorder under test— Insulate 10T of PTS relay.	
35	Remove blocking tools from HPA, HS relays.	HR1, HR2 relays released.
36	Insulate 1T of HS relay.	
37	Block nonoperated HPA relay.	
38	Remove blocking tool from PTC relay.	
39	Operate and release UH relay to advance U selector to position 10.	HS relay operated.
40	At recorder frame— Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
41	At recorder under test— Operate and release HH, TH, UH relays as required to advance H, T, U selectors to positions 8, 11, 12, respectively.	HS relay released.
42	Momentarily apply ground to 4B winding terminal of HR3 relay.	HR3 relay released. At recorder frame— HR lamp lighted. Major alarm sounds.

STEP	ACTION	VERIFICATION
43	At recorder under test— Operate and release UH relay to advance U selector to position 13.	
44	At recorder frame— Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
45	At recorder under test— Operate and release HH, TH, UH relays to advance H, T, U selectors to positions 13, 20, 19, respectively.	
46	Momentarily operate HR3 relay.	HR3 relay locked operated. At recorder frame— HR lamp lighted. Major alarm sounds.
47	At recorder under test— Operate and release UH relay to advance U selector to position 20.	HS relay operated.
48	At recorder frame— Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
49	At recorder under test— Operate and release HH, TH, UH relays to advance selectors to positions 15, 1, 12, respectively.	HS relay released.
50	Momentarily apply ground to 4B winding terminal of HR3 relay.	HR3 relay released. At recorder frame— HR lamp lighted. Major alarm sounds.
51	At recorder under test— Operate and release UH relay to advance U selector to position 13.	
52	At recorder frame— Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
53	At recorder under test— Momentarily operate HR3 relay.	HR3 relay locked operated.
54	Operate and release HH, TH, UH relays to advance selectors to positions 20, 10, 18, respectively.	HR3 relay released.
55	Operate and release UH relay to advance U selector to position 19.	

SECTION 218-174-501

STEP	ACTION	VERIFICATION
56	Momentarily operate HR3 relay.	HR3 relay locked operated. At recorder frame— HR lamp lighted. Major alarm sounds.
57	At recorder under test— Operate and release UH relay to advance U selector to position 20.	HS relay operated.
58	At recorder frame— Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
59	At recorder under test— Operate and release TH relay to advance T selector to 11.	HS relay released.
60	At recorder under test— Operate and release TH relay to advance T selector to position 20.	HS relay operated.
61	Momentarily operate HH relay.	H, T, U selectors advanced to position 1. HS relay released.
62	Momentarily apply ground to 4B winding terminal of HR3 relay.	HR3 relay released.
63	Remove ground from 4T of C relay, 3T of NS relay.	
64	Remove insulators from 10T of PTS relay, 1T of HS relay.	
65	Remove blocking tools from C, HRT, TA relays.	
66	Block nonoperated PTC relay.	
67	Momentarily operate HRT, HTA relays, if provided.	ON relay operated. Minor alarm sounds. At trouble recorder frame— Trouble record taken.
68	At jack, lamp, and key circuit— Momentarily operate TRR-AR key.	Minor alarm silenced.
69c	If HTA relay is not provided— At recorder under test— Remove blocking tool from TC1 relay and examine trouble recorder card perforated in Step 67.	At trouble recorder frame— Trouble record taken. A' through F' digit designations perforated, indicating numbers 2, 8, 1, 8, 9, 9, respectively.

STEP	ACTION	VERIFICATION
70d	If HTA relay is provided— At recorder under test— Examine trouble recorder card taken in Step 67.	At trouble recorder frame— Trouble record taken. A' through F' digit designations perforated, indicating numbers 2, 8, 1, 9, 9, 9, respectively. At recorder under test— H selector is on 1.
71d	At recorder under test— Momentarily operate PR1 relay.	
72d	Block nonoperated, C, ON relays.	
73d	Block operated HS relay.	
74d	Momentarily apply ground to 4T of C relay.	At recorder frame— HR lamp lighted. Major alarm sounds.
75d	Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
76d	At recorder under test— Operate and release HH relay as required to advance H selector to position 8.	
77d	Momentarily apply ground to 4T of C relay.	At recorder frame— HR lamp lighted. Major alarm sounds.
78d	Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
79d	At recorder under test— Operate and release HH relay as required to advance H selector to position 15.	
80d	Release HR3 relay, if operated, by opening 1B.	
81d	Momentarily apply ground to 4T of C relay.	At recorder frame— HR lamp lighted. Major alarm sounds.
82d	At recorder under test— Block operated HRT, HTA relays.	
83d	Remove blocking tool from TC1 relay.	
84d	Remove blocking tool from ON relay.	ON relay operated. Minor alarm sounds. At trouble recorder frame— Trouble record taken.

SECTION 218-174-501

STEP	ACTION	VERIFICATION
		A' through F' digit designations perforated, indicating numbers 2, 8, 1, 8, 9, 9, respectively.
85d	At recorder under test— Block nonoperated ON relay.	
86d	At recorder frame— Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
87d	At jack, lamp, and key circuit— Momentarily operate TRR-AR key.	Minor alarm silenced.
88d	At recorder under test— Remove blocking tool from HS, HRT, HTA, C relays.	
89	Connect ground to 9B of ON relay.	
90	Block operated ADT relay.	
91	Remove blocking tool from ON relay.	ON relay operated for several seconds, then released. Disregard trouble record.
92	Operate and hold ON relay for several seconds.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. A' through F' designations perforated indicating numbers 2, 8, 7, 1, 0, 0, respectively.
93	At recorder under test— Block nonoperated ON relay.	
94	Remove blocking tool from ADT relay.	
95	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
96	At recorder under test— Remove blocking tool from HPA relay.	
97	Block operated TCT relay.	
98	Remove blocking tool from ON relay.	
99	Operate and hold ON relay for several seconds.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. A' through F' designations perforated indicating numbers 2, 8, 5, 4, 0, 0, respectively.

STEP	ACTION	VERIFICATION
100	At recorder under test— Remove blocking tool from TCT relay.	
101	Remove ground from 9B of ON relay.	
102	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
103	At recorder under test— Block operated AT relay.	
104	Operate and hold ON relay for several sounds.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. A' through F' designations perforated indicating numbers 0, 1, 0, 1, 0, 1, respectively.
105	At recorder under test— Remove blocking tools from AT, PTC relays.	
106	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
107	At perforator cabinet— Restore perforator plug to its associated jack.	
108	At master timing frame— Momentarily operate S key.	
109	At jack, lamp, and key circuit— Insert make-busy plug into TST jack associated with recorder under test.	
110	Insert plug of 32A test set into R jack.	
111	Momentarily operate white (ST) button of 32A test set. <i>Note:</i> If a trouble is encountered while applying the test pattern, as indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring recorder to service.	RUT lamp lighted. When test is completed— RUT lamp extinguished.
112	At jack, lamp, and key circuit— Remove plug from TST jack associated with recorder under test.	
113	Remove plug of 32A test set from R jack.	
114	Remove plug from TN jack associated with recorder under test.	If emergency recorder is provided— At recorder frame—

SECTION 218-174-501

STEP	ACTION	VERIFICATION
		<p>EW lamp extinguished. If emergency recorder is not provided— At jack, lamp, and key circuit— R_ lamp associated with recorder under test extinguished.</p> <p>Note: If emergency recorder is not provided, the DL lamp is lighted and a minor alarm sounds. Alarm can be silenced by operating the TRR_AR key at the jack, lamp, and key circuit.</p>
<p>E.1 Recorder Number, Minutes Timing, Seconds Timing, and Hour Alarm Features (1-Second Timing)</p>		
	<p>Refer to paragraphs 1.09 and 1.13.</p>	
	<p>Caution: Do not start test 1 minute before or after any 10 minute period.</p>	
1a	<p>If emergency recorder is provided— At jack, lamp, and key circuit— Observe that emergency recorder is not in service.</p>	<p>No make-busy plug in any TN jacks associated with recorders. EW lamp not lighted.</p>
2b	<p>If emergency recorder is not provided— At jack, lamp, and key circuit— Observe that recorder under test is in service.</p>	<p>R_ lamp associated with recorder under test extinguished.</p>
3	<p>Insert make-busy plug into TN jack associated with recorder under test.</p>	<p>If emergency recorder is provided— At recorder frame— EW lamp lighted. If emergency recorder is not provided— At jack, lamp, and key circuit— R_ lamp associated with recorder under test lighted.</p> <p>Note: If emergency recorder is not provided, the DL lamp is lighted and a minor alarm sounds. Alarm can be silenced by operating the TRR_AR key at the jack, lamp, and key circuit.</p>
4	<p>At perforator cabinet for recorder under test— Disconnect perforator plug from its jack by raising front of perforator to clear stop screws, then pulling perforator forward approximately 1 inch.</p>	
5	<p>At recorder under test— Block nonoperated HS, HRA, C, PTC relays.</p>	

STEP	ACTION	VERIFICATION
6	Insulate 7T of RN relay.	
7	Operate and release HH, TH relays as required to step H, T selectors to position 1.	
8	Operate and release UH relay as required to advance UA-D counters to indicate 0 seconds. (UD relay operated.)	
9	Operate and hold M, RN relays for several seconds.	<p>Minor alarm sounds. At trouble recorder frame— Trouble record taken. REC, DR_ designations perforated corresponding to recorder number. B', C', D' designations perforated as indicated in Table C on line corresponding to H, T selector positions and UA-D relay counters. E', F' designations perforated indicating recorder number tens, units digits, respectively.</p>
10	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	<p>At recorder frame— Minor alarm silenced.</p>
11	At recorder under test— Operate and release HH, TH, UH relays as required to advance H, T selectors and UA-D counters to their next positions, respectively.	
12	Operate and hold M relay for several seconds.	<p>Minor alarm sounds. At trouble recorder frame— Trouble record taken. B', C', D' designations perforated as indicated in Table C.</p>
13	At jack, lamp and key circuit— Momentarily operate TRR_AR key.	<p>Minor alarm silenced.</p>
14	Repeat Steps 11 through 13 for each position of the H, T selectors and UA-D counter relays.	
	Note: The H selector does not stop at position 7 or 14 but automatically advances to position 8 or 15, respectively.	
15	At recorder under test— Check that H, T selectors are on position 1 and UA-D counter relays indicate 0 seconds. (UD relay operated.)	
16	Block nonoperated TA, HRT, UH relays.	

TABLE C

SELECTOR POSITIONS		TROUBLE RECORDER CARD DESIGNATIONS PERFORATED ACCORDING TO POSITIONS OF T AND H SELECTORS		UA THROUGH UD RELAY COUNTER OPERATIONS	TROUBLE RECORDER CARD DESIGNATIONS PERFORATED ACCORDING TO POSITIONS OF UA THROUGH UD RELAYS
T	H	B'	C'	RELAYS OPERATED	D'
1	1	0	0	UD	0
2	2	1	1	UB, UD	1
3	3	2	2	UB	2
4	4	3	3	UA, UB	3
5	5	4	4	UA, UB, UD	4
6	6	5	5	UA, UB, UC, UD	5
7	+	6	+	UA, UB, UC	6
8	8	7	0	UB, UC	7
9	9	8	1	UB, UC, UD	8
10	10	9	2	UC, UD	9
11	11	0	3	UA THROUGH UD	0
12	12	1	4	RELAYS REPEAT	1
13	13	2	5	ABOVE SEQUENCE	2
14	+	3	+	EVERY TEN	3
15	15	4	0	SECONDS	4
16	16	5	1		5
17	17	6	2		6
18	18	7	3		7
19	19	8	4		8
20	20	9	5		9

+ Indicates the H selector does not stop on terminals 7 or 14 but automatically advances to position 8 or 15, respectively.

STEP	ACTION	VERIFICATION
17	Block operated IPA, CA relays.	
18	Remove insulator from 7T of RN relay.	
19	Remove blocking tool from C relay.	Within 2 seconds— C relay locked operated.
20	Remove blocking tool from IPA relay.	C relay released.
21	Block nonoperated C, TC1 relays.	
22	Remove blocking tools from CA, UH relays.	
23	Block operated HPA relay.	HR1, HR2, relays operated.
24	Release HR3 relay, if operated, by opening 1B.	
25	Operate and release UH relay six times.	UA-D counters indicate 6 seconds, (UA, UB, UC operated).
26	Remove blocking tool from HRA relay.	
27	Connect ground to 3T of NS relay.	At recorder frame— HR lamp lighted. Major alarm sounds.
28	At recorder under test— Operate and release UH relay.	UA-D counters indicate 7 seconds, (UB, UC operated).
29	At recorder frame— Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
30	At recorder under test— Momentarily operate CK relay.	HR3 relay operated.
31	Operate and release HH, TH relays as required to advance H, T selectors to positions 6, 10, respectively.	
32	Operate and release UH relay as required to advance UA-D counters to indicate 6 seconds. (UA, UB, UC relays operated.)	
33	Connect ground to 4T of C relay.	HR3 relay released.
34	Operate and release UH relay to advance UA-D counters to indicate 8 seconds. (UB, UC, UD relays operated.)	
35	Operate HR3 relay.	HR3 relay locked operated. At recorder frame—

SECTION 218-174-501

STEP	ACTION	VERIFICATION
		HR lamp lighted. Major alarm sounds.
36	At recorder under test— Insulate 10T of PTS relay.	
37	Remove blocking tools from HPA, HS relays.	HR1, HR2 relays released.
38	Insulate 1T of HS relay.	
39	Block nonoperated HPA relay.	
40	Remove blocking tool from PTC relay.	
41	Operate and release UH relay to advance UA-D counters to indicate 9 seconds. (UC, UD relays operated.)	HS relay operated.
42	At recorder frame— Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
43	At recorder under test— Operate and release HH, TH relays as required to advance H, T selectors to positions 8, 11, respectively.	
44	Operate and release UH relay to advance UA-D counters to indicate 6 seconds. (UA, UB, UC relays operated.)	HS relay released.
45	Momentarily apply ground to 4B winding terminal of HR3 relay.	HR3 relay released. At recorder frame— HR lamp lighted. Major alarm sounds.
46	At recorder under test— Operate and release UH relay to advance UA-D counters to indicate 7 seconds. (UB, UC relays operated.)	
47	At recorder frame— Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
48	At recorder under test— Operate and release HH, TH relays to advance H, T, selectors to positions 13, 20, respectively.	
49	Operate and release UH relay to advance UA-D counters to indicate 6 seconds. (UA, UB, UC relays operated.)	HS relay released.

STEP	ACTION	VERIFICATION
50	Operate and release UH relay two times to advance UA-D counters to indicate 8 seconds. (UB, UC, UD relays operated.)	HS relay released.
51	Momentarily operate HR3 relay.	HR3 relay operated. Major alarm sounds.
52	Operate and release UH relay to advance UA-D counters to indicate 9 seconds. (UC, UD relays operated.)	HS relay operated.
53	At recorder frame— Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
54	At recorder under test— Operate and release HH, TH relays to advance selectors to positions 15, 1, respectively.	
55	Operate and release UH relay to advance UA-D counters to indicate 6 seconds. (UA, UB, UC relays operated.)	HS relay released.
56	Momentarily apply ground to 4B winding terminal of HR3 relay.	HR3 relay released. At recorder frame— HR lamp lighted. Major alarm sounds.
57	Operate and release UH relay to advance UA-D counters to indicate 7 seconds. (UB, UC relays operated.)	
58	At recorder frame— Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
59	At recorder under test— Momentarily operate HR3 relay.	HR3 relay locked operated.
60	Operate and release HH, TH relays to advance H, T selectors to positions 20, 10, respectively.	
61	Operate and release UH relay to advance UA-D counters to indicate 6 seconds (UA, UB, UC relays operated.)	HR3 relay released.
62	Operate and release UH relay to advance UA-D counters to indicate 8 seconds. (UB, UC, UD operated.)	
63	Momentarily operate HR3 relay.	HR3 relay locked operated. At recorder frame— HR lamp lighted. Major alarm sounds.

SECTION 218-174-501

STEP	ACTION	VERIFICATION
64	At recorder under test— Operate and release UH relay to advance UA-D counters to indicate 9 seconds. (UC, UD operated.)	HS relay operated.
65	At recorder frame— Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
66	At recorder under test— Operate and release TH relay to advance T selector to position 11.	HS relay released.
67	Operate and release TH relay to advance T selector to position 20.	HS relay operated.
68	◆Momentarily apply ground to 5B of the C relay.◆	H, T selectors advanced to position 1. UA-D counters advanced to indicate 0 seconds. (UD only operated.) HS relay released.
69	Momentarily apply ground to 4B winding terminal of HR3 relay.	HR3 relay released.
70	Remove ground from 4T of C relay, 3T of NS relay.	
71	Remove insulators from 10T of PTS relay, 1T of HS relay.	
72	Remove blocking tools from C, HRT, TA relays.	
73	Block nonoperated PTC relay.	
74	Momentarily operate HRT, HTA relays, if provided.	ON relay operated. Minor alarm sounds. At trouble recorder frame— Trouble record taken.
75	At jack, lamp, and key circuit— Momentarily operate TRR-AR key.	Minor alarm silenced.
76c	If HTA relay is <i>not</i> provided— At recorder under test— Remove blocking tool from TC1 relay and examine trouble recorder card perforated in Step 74.	At trouble recorder frame— Trouble record taken. A' through F' digit designations perforated, indicating numbers 2, 8, 1, 5, 9, 9, respectively.
77d	If HTA relay is provided— Examine trouble recorder card taken in Step 74.	At trouble recorder frame— Trouble record taken. A' through F' digit designations perforated, indicating numbers 2, 8, 1, 6, 9, 9, respectively.

STEP	ACTION	VERIFICATION
78	At recorder under test— Block TC1 relay nonoperated.	
79	Block HR relay operated.	
80	Repeat Steps 74 and 75.	
81c	If HTA relay is <i>not</i> provided— At recorder under test— Remove blocking tool from TC1 relay and examine trouble recorder card perforated in Step 74.	At trouble recorder frame— Trouble record taken. A' through F' digit designations perforated indicating 2, 8, 1, 8, 9, 9, respectively.
82d	If HTA relay is provided— Examine trouble recorder card taken in Step 74.	At trouble recorder frame— Trouble record taken. A' through F' digit designations perforated indicating 2, 8, 1, 9, 9, 9, respectively.
83	At recorder under test— Remove blocking tool from HR relay.	
84d	Momentarily operate PR1 relay.	
85d	Block nonoperated C, ON relays.	
86d	Block operated HS relay.	
87d	◆Operate and release relay HH to advance the H selector to position 2.◆	
88d	Momentarily apply ground to 4T of C relay.	At recorder frame— HR lamp lighted. Major alarm sounds.
89d	Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
90d	At recorder under test— Operate and release HH relay as required to advance H selector to position 9.	
91d	Momentarily apply ground to 4T of C relay.	At recorder frame— HR lamp lighted. Major alarm sounds.
92d	Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
93d	At recorder under test— Operate and release HH relay as required to advance H selector to position 16.	

SECTION 218-174-501

STEP	ACTION	VERIFICATION
94d	Release HR3 relay, if operated,, by opening 1B.	
95d	Momentarily apply ground to 4T of C relay.	At recorder frame— HR lamp lighted. Major alarm sounds.
96d	At recorder under test— Block operated HRT, HTA relays.	
97d	Remove blocking tool from TC1 relay.	
98d	Remove blocking tool from ON relay.	ON relay operated. Minor alarm sounds. At trouble recorder frame— Trouble record taken. A' through F' digit designations perforated, indicating numbers 2, 8, 1, 5, 9, 9, respectively.
99d	Block nonoperated ON relay.	
100d	At recorder frame— Momentarily operate AR key.	HR lamp extinguished. Major alarm silenced.
101d	At jack, lamp, and key circuit— Momentarily operate TRR-AR key.	Minor alarm silenced.
102d	At recorder under test— Remove blocking tool from HS, HRT, HTA, C relays.	
103	Connect ground to 9B of ON relay.	
104	Block operated ADT relay.	
105	Remove blocking tool from ON relay.	ON relay operated for several seconds, then released. Disregard trouble record.
106	Operate and hold ON relay for several seconds.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. A' through F' designations perforated indicating numbers 2, 8, 7, 1, 0, 0, respectively.
107	At recorder under test— Block nonoperated ON relay.	
108	Remove blocking tool from ADT relay.	
109	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.

STEP	ACTION	VERIFICATION
110	At recorder under test— Remove blocking tool from HPA relay.	
111	Block operated TCT relay.	
112	Remove blocking tool from ON relay.	
113	Operate and hold ON relay for several seconds.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. A' through F' designations perforated indicating numbers 2, 8, 5, 4, 0, 0, respectively.
114	At recorder under test— Remove blocking tool from TCT relay.	
115	Remove ground from 9B of ON relay.	
116	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
117	At recorder under test— Block operated AT relay.	
118	Operate and hold ON relay for several seconds.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. A' through F' designations perforated indicating numbers 0, 1, 0, 1, 0, 1, respectively.
119	At recorder under test— Remove blocking tools from AT, PTC relays.	
120	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
121	At perforator cabinet— Restore perforator plug to its associated jack.	
122	At master timing frame— Momentarily operate S key.	
123	At jack, lamp, and key circuit— Insert make-busy plug into TST jack associated with recorder under test.	
124	Insert plug of 32A test set into R jack.	
125	Momentarily operate white (ST) button of 32A test set.	RUT lamp lighted. When test is completed— RUT lamp extinguished.

SECTION 218-174-501

STEP	ACTION	VERIFICATION
	<i>Note:</i> If a trouble is encountered while applying the test pattern, indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring recorder to service.	
126	At jack, lamp, and key circuit— Remove plug from TST jack associated with recorder under test.	
127	Remove plug of 32A test set from R jack.	
128	Remove plug from TN jack associated with recorder under test.	If emergency recorder is provided— At recorder frame— EW lamp extinguished. If emergency recorder is not provided— At jack, lamp, and key circuit— R_ lamp associated with recorder under test extinguished.

Note: If emergency recorder is not provided, the DL lamp is lighted and a minor alarm sounds. Alarm can be silenced by operating the TRR_AR key at the jack, lamp, and key circuit.

F. Splice, Break-In-Tape, and Paper Jam Feature

Splice and Break-In-Tape

- 1 Remove from service all trunks associated with recorder under test.
- 2 At perforator cabinet—
Mark tape (refer to paragraph 1.08).
- 3 Cut a window splice in the paper tape at a point just before the tape enters the tape chute.

Caution: *Exercise care not to mutilate the tape in any manner.*

- 4 At jack, lamp, and key circuit—
Insert make-busy plug into MB jack of recorder under test to advance window splice through perforator.

At perforator cabinet—
Make-busy pattern perforated on tape.
At recorder under test—
SP relay operated when window splice is encountered.

Note: More than one make-busy pattern may be needed to advance the window splice through the perforator. This may be accomplished by removing and then reinserting the make-busy

STEP	ACTION	VERIFICATION
	plug into the MB jack associated with the recorder under test.	
5	Block operated SP relay.	In approximately two minutes— NP lamp lighted. Major alarm sounds. At perforator cabinet— Splice pattern perforated.
6	At recorder under test— Remove blocking tool from SP relay.	At perforator cabinet— Make-busy pattern perforated.
7	At recorder frame— Momentarily operate AR key.	Major alarm silenced. NP lamp extinguished.
8a	If no further tests are to be performed— At perforator cabinet— Mark tape (refer to paragraph 1.08).	
9a	At jack, lamp, and key circuit— Restore to service all trunks associated with recorder under test.	
Paper Jam Feature		
Refer to paragraph 1.14.		
10	◆ Remove from service call trunks associated with recorder under test.	
11	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
12	Remove tape from slack tape arm and place arm on holder.	
13	At jack, lamp, and key circuit— Insert make-busy plug into MB jack associated with recorder under test.	At recorder frame— NP lamp lighted. Major alarm sounds. At perforator cabinet— Paper jam detector counter indicates more than two hundred registrations.
Note: More than one make-busy pattern may be needed in order to advance the paper jam detector counter past two hundred registrations.		
14	At recorder frame— Momentarily operate AR key.	NP lamp <i>not</i> extinguished. Major alarm <i>not</i> silenced.

STEP	ACTION	VERIFICATION
15	At perforator cabinet— Remove slack tape arm from holder and verify that tape winds onto take-up reel. Caution: Take care not to mutilate tape in any manner.	Take-up reel stops when slack tape arm activates microswitch on take-up motor. Paper jam detector counter reset. Major alarm silenced. At recorder frame— NP lamp extinguished.
16	At perforator cabinet— Mark tape (refer to paragraph 1.09).	
17	At jack, lamp, and key circuit— Remove make-busy plug from MB jack associated with recorder under test.	
18	Restore to service all trunks associated with recorder under test.♦	
G. Trouble Timing Feature		
Refer to paragraphs 1.07 and 1.13.		
1a	If emergency recorder is provided— At jack, lamp, and key circuit— Check that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with recorder. EW lamp not lighted.
2b	If emergency recorder is not provided— At jack, lamp, and key circuit— Observe that recorder under test is in service.	R_ lamp associated with recorder under test extinguished.
3	Insert make-busy plug into TN jack associated with recorder under test.	If emergency recorder is provided— At recorder frame— EW lamp lighted. If emergency recorder is not provided— At jack, lamp, and key circuit— R_ lamp associated with recorder under test lighted.
Note: If emergency recorder is not provided, the DL lamp is lighted and a minor alarm sounds. Alarm can be silenced by operating the TRR_AR key at the jack, lamp, and key circuit.		
4	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
5	At recorder under test— Insulate 3T of TTIB relay.	
6	Block operated ON relay.	TA, TF relays operated. In approximately 0.5 second—

STEP	ACTION	VERIFICATION
		TB relay operated. Minor Alarm sounds. In approximately 2 seconds— TC, TD, TE, RD relays operated. TA, TF relays released. At jack, lamp, and key circuit— TRR lamp lighted.
7	At recorder under test— Remove blocking tool from ON relay.	TB, TC, TD, TE, RD relays released.
8	Remove insulator from 3T of TTIB relay.	
9	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	TRR lamp extinguished. Minor alarm silenced.
10	At recorder under test— Block operated TTIB relay.	
11	Block operated ON relay, <i>start timing</i> .	TA, TF, TM relays momentarily operated. In approximately 0.5 second— TB, TE relays operated. Minor alarm sounds. Ground on 5T of TBL relay. Ground on 8B of IPA relay.
12	Remove blocking tool from ON relay.	TB, TE relays released. At jack, lamp, and key circuit— TRR, DL_ lamps associated with recorder under test lighted.
13	At recorder under test— Remove blocking tool from TTIB relay.	
14	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	TRR, DL_ lamps associated with recorder under test extinguished. Minor alarm silenced.
15	At jack, lamp, and key circuit— Insert make-busy plug into TST jack associated with recorder under test.	
16	Insert plug of 32A test set into R jack.	
17	Momentarily operate white (ST) button of 32A test set.	RUT lamp lighted. When test is completed— RUT lamp extinguished.
	Note: If a trouble is encountered while applying the test pattern, indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring the recorder to service.	

SECTION 218-174-501

STEP	ACTION	VERIFICATION
18	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
19	At jack, lamp, and key circuit— Remove plug from TST jack associated with recorder under test.	
20	Remove plug of 32A test set from R jack.	
21	Remove make-busy plug from TN jack associated with recorder under test.	If emergency recorder is provided— At recorder frame— EW lamp extinguished. If emergency recorder is not provided— At jack, lamp, and key circuit— R_ lamp associated with recorder under test extinguished. <i>Note:</i> If emergency recorder is not provided, the DL lamp is lighted and a minor alarm sounds. Alarm can be silenced by operating the TRR_AR key at the jack, lamp, and key circuit.

H. AG Lead Alarm and Locking Features

1	Remove from service all trunks associated with recorder under test.	
2	At jack, lamp, and key circuit— Insert make-busy plug into MB jack associated with recorder under test.	R_ lamp associated with recorder under test lighted.
3	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
4	At jack, lamp, and key circuit— Insert make-busy plug into TRMB R_ jack associated with recorder under test.	
5	At recorder under test— Block nonoperated IP, TE relays.	
6	At call identity indexer associated with recorder under test— Block operated any TA_ or TB_ relay.	Minor alarm sounds.
7	At recorder under test— Operate IPA relay.	
8	Operate RD relay.	RD, IPA relays locked operated.

STEP	ACTION	VERIFICATION
9	At call identity indexer associated with recorder under test— Remove blocking tool from TA_ or TB_ relay.	At recorder under test— RD, IPA relays released.
10	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
11	At call identity indexer associated with recorder under test— Block operated any U_ relay.	
12	At recorder under test— Operate RD relay.	RD relay locked operated.
13	At call identity indexer associated with recorder under test— Remove blocking tool from U_ relay.	At recorder under test— RD relay released.
14	Remove blocking tools from TE, IP relays.	
15	At jack, lamp, and key circuit— Remove make-busy plug from TRMB R_ jack associated with recorder under test.	
16	Insert make-busy plug into TST jack associated with recorder under test.	
17	Insert plug of 32A test set into R jack.	
18	Momentarily operate white (ST) button of 32A test set.	RUT lamp lighted. When test is completed— RUT lamp extinguished.
	<i>Note:</i> If a trouble is encountered while applying the test pattern, indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring the recorder to service.	
19	Mark tape (refer to paragraph 1.08).	
20	At jack, lamp, and key circuit— Remove plug from TST jack associated with recorder under test.	
21	Remove plug of 32A test set from R jack.	
22	Remove plug from MB jack associated with recorder under test.	R_ lamp associated with recorder under test extinguished.
23	Restore to service all trunks associated with recorder under test.	

SECTION 218-174-501

STEP	ACTION	VERIFICATION
I. Transient Operation of Perforator Magnets and Series Relay Locking Features		
Refer to paragraph 1.13.		
1a	If emergency recorder is provided— At jack, lamp, and key circuit— Check that emergency recorder is not in service.	No make-busy plug in any TN jack associated with recorders.
2b	If emergency recorder is not provided— At jack, lamp, and key circuit— Observe that recorder under test is in service.	R_ lamp associated with recorder under test extinguished.
3	Insert make-busy plug into TN jack associated with recorder under test.	If emergency recorder is provided— At recorder frame— EW lamp lighted. If emergency recorder is not provided— At jack, lamp, and key circuit— R_ lamp associated with recorder under test lighted.
Note: If emergency recorder is not provided, the DL lamp is lighted and a minor alarm sounds. Alarm can be silenced by operating the TRR_AR key at the jack, lamp, and key circuit.		
4	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
5	At recorder under test— Connect ground to T winding terminal of A0 relay for several seconds.	A0 relay operated. Minor alarm sounds. Trouble record taken. A'0, RN_ designations perforated associated with recorder under test. A0 relay released.
6	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
7	At recorder under test— Insulate 3B of TE relay, 8T of PTS relay, 9B of TEC relay.	
8	Block nonoperated IP relay.	
9	Momentarily apply ground to T winding terminal of A0 relay.	A0 relay locked operated. PTS relay operated.
10	Momentarily apply ground to B winding terminal of A0 relay.	A0, PTS relays released.

STEP	ACTION	VERIFICATION
11	Repeat Steps 9, 10 for each of A1, A2, B0 through B7, C0 through C7, D0 through D7, E0 through E7, F0 through F7 relays.	
12	Remove insulators from 3B of TE relay, 8T of PTS relay, 9B of TEC relay.	
13	Remove blocking tool from IP relay.	
14	At jack, lamp, and key circuit— Insert make-busy plug into TST jack associated with recorder under test.	
15	Insert plug of 32A test set into R jack.	
16	Momentarily operate white (ST) button of 32A test set. <i>Note:</i> If a trouble is encountered while applying the test pattern, as indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring the recorder to service.	RUT lamp lighted. When test is completed— RUT lamp extinguished.
17	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
18	At jack, lamp, and key circuit— Remove make-busy plug from TST jack associated with recorder under test.	
19	Remove plug of 32A test set from R jack.	
20	Remove plug from TN jack associated with recorder under test.	If emergency recorder is provided— At recorder frame— EW lamp extinguished. If emergency recorder is not provided— At jack, lamp, and key circuit— R ₁ lamp associated with recorder under test extinguished. <i>Note:</i> If emergency recorder is not provided, DL lamp lighted and minor alarm sounded. Alarm can be silenced by operating the TRR_AR key at the jack, lamp, and key circuit.

J. Trouble Cross-Detecting Features

- 1 Remove from service all trunks associated with recorder under test.

SECTION 218-174-501

STEP	ACTION	VERIFICATION
2	At jack, lamp, and key circuit— Check that recorder under test is not transferred.	No make-busy plug in any TN jack associated with recorders.
3	Insert make-busy plug into MB jack associated with recorder under test.	At recorder under test— MBR relay operated. At jack, lamp, and key circuit— R_ lamp associated with recorder under test lighted.
4	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
5	At recorder under test— Insulate 3T, 4B of XPA relay.	
XP Relay		
6	Insulate 3B of IP relay.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. XP1, RN_ designations perforated associated with recorder under test. At recorder under test— XPA relay operated.
7	Remove insulator from 3B of IP relay.	
8	Momentarily open 6T of XPA relay.	XPA relay released.
9	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
10	At recorder under test— Block nonoperated XP1 relay.	
11	Insulate 3T of MTP relay.	XP relay <i>not</i> operated.
12	Insulate 6T of MTP relay.	XP relay operated.
13	Remove insulator from 3T of MTP relay.	XP relay released.
14	Remove insulator from 6T of MTP relay.	
15	Remove blocking tool from XP1 relay.	
XU Relay		
16	At call identity indexer associated with recorder under test— Insulate 3T of any U_ relay.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. XU1, RN_ designations perforated associated with recorder under test.

STEP	ACTION	VERIFICATION
		At recorder under test— XPA relay operated.
17	At call identity indexer associated with recorder under test— Remove insulator from 3T of U_ relay.	
18	At recorder under test— Momentarily open 6T of XPA relay.	XPA relay released.
19	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
20	At recorder under test— Block nonoperated XP1 relay.	
21	At call identity indexer associated with recorder under test— Insulate 3B of any U_ relay.	At recorder under test— XU relay operated.
22	At call identity indexer associated with recorder under test— Remove insulator from 3B of U_ relay.	At recorder under test— XU relay released.
23	Remove blocking tool from XP1 relay.	
XTC and XCO Relays		
24	At call identity indexer associated with recorder under test— Connect ground to 3T of any UA_ relay.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. XTC, RN_ designations perforated associated with recorder under test.
25	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
26	At call identity indexer associated with recorder under test— Remove ground from 3T of UA_ relay.	
27	Block operated A1 relay.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. XTL, XTC, RN_ designations perforated associated with recorder under test. At recorder under test— XTC, XCO relays operated.
28	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.

SECTION 218-174-501

STEP	ACTION	VERIFICATION
29	At call identity indexer associated with recorder under test— Remove blocking tool from A1 relay.	At recorder under test— XTC, XCO relays released.
XT Relay		
30	At recorder under test— Connect ground to 2B of MB relay.	
31	At call identity indexer associated with recorder under test— Insulate IT of any T_ relay.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. XT1, RN_ designations perforated associated with recorder under test. At recorder under test— XT relay operated.
32	At call identity indexer associated with recorder under test— Remove insulator from IT of T_ relay.	At recorder under test— XT relay released.
33	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
34	At recorder under test— Remove insulators from 3T, 4B of XPA relay.	Major alarm sounds. At recorder frame— XRB lamp associated with recorder under test lighted.
35	Momentarily operate AR key.	Major alarm silenced. XRB lamp associated with recorder under test extinguished.
36	At recorder under test— Block nonoperated XP1 relay.	
37	Insulate 3B of RD relay.	XT relay operated.
38	Remove insulator from 3B of RD relay.	XT relay released.
39	Remove blocking tool from XP1 relay.	
40	Remove ground from 2B of MB relay.	
XRB Relay		
41	At recorder under test— Insulate 6B of MBR relay.	
42	Manually release MBR relay.	
43	Block nonoperated MBR relay.	

STEP	ACTION	VERIFICATION
44	Momentarily apply ground to 8B of TN1 relay.	Major alarm sounds. At recorder frame— XRB lamp associated with recorder under test lighted.
45	Momentarily operate AR key.	Major alarm silenced. XRB lamp associated with recorder under test extinguished.
46	At recorder under test— Momentarily apply ground to 2T of RT relay.	Major alarm sounds. At recorder frame— XRB lamp associated with recorder under test lighted.
47	Momentarily operate AR key.	Major alarm silenced. XRB lamp associated with recorder under test extinguished.
48	At recorder under test— Remove blocking tool from MBJ relay.	
49	Operate MBR relay.	MBR relay locked operated.
50	Remove insulator from 6B of MBR relay.	

TL Relay Release

51	At CII— Insulate contact 5B of TO relays.	At recorder— TL relay released.
52	At CII— Remove insulators from all T_ relays.	At recorder— TL relay operated.
53	Repeat Steps 51, 52 for T1 through T9 relays, as provided	
54	At jack, lamp, and key circuit— Insert make-busy plug into TST jack associated with recorder under test.	
55	Insert plug of 32A test set into R jack.	
56	Momentarily operate white (ST) button of 32A test set.	RUT lamp lighted. When test is completed— RUT lamp extinguished.

Note: If a trouble is encountered while applying the test pattern, as indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring the recorder to service.

SECTION 218-174-501

STEP	ACTION	VERIFICATION
57	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
58	At jack, lamp, and key circuit— Remove plug from TST jack associated with recorder under test.	
59	Remove plug of 32A test set from R jack.	
60	Remove plug from MB jack associated with recorder under test.	MBR relay released.
61	Restore to service all trunks associated with recorder under test.	
K. Test for False Continuity and Crosses of TC Relays		
Refer to paragraph 1.13.		
1a	If emergency recorder is provided— At jack, lamp, and key circuit— Observe that emergency recorder is not in use.	No plug in any TN jacks associated with recorders. EW lamp <i>not</i> lighted.
2b	If emergency recorder is not provided— At jack, lamp, and key circuit— Observe that recorder under test is in service.	R_ lamp associated with recorder under test extinguished.
3	Insert make-busy plug into TN jack associated with recorder under test.	If emergency recorder is provided— At recorder frame— EW lamp lighted. If emergency recorder is not provided— At jack, lamp, and key circuit— R_ lamp associated with recorder under test lighted.
Note: If emergency recorder is not provided, the DL lamp is lighted and a minor alarm sounds. Alarm can be silenced by operating TRR_AR key at the jack, lamp, and key circuit.		
4	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
5	At jack, lamp, and key circuit— Insert make-busy plug into associated TV_MB jack of lowest numbered transverter.	At transverter made busy— RK relay released. At recorder unit TC terminal strip— Battery absent on terminals 7, 18, 19, 29, 36, 39, 47, 56. Ground absent on terminals 5, 7, 9 through

STEP	ACTION	VERIFICATION
		15, 25, 27, 35, 36, 49, 56. TVM, CH relays released.
6	At recorder under test— Connect ground to 9B of CH relay.	If CHLK relay is provided— CHLK relay <i>not</i> operated.
7	Remove ground from 9B of CH relay.	
8	Insulate 6B of HRA relay.	At recorder unit TC terminal strip— Battery absent on terminal 45.
9	At recorder under test— Remove insulator from 6B of HRA relay.	
10	Insulate 6T of TVM1 relay.	At recorder unit TC terminal strip— Ground absent on terminal 48.
11	At recorder under test— Remove insulator from 6T of TVM1 relay.	
12	Connect ground to top winding terminal of TC ₋ relay associated with transverter made busy.	
13	Block operated ON1 relay.	At recorder unit TC terminal strip— Ground absent on terminal 0.
14	At recorder under test— Remove ground from top winding terminal of TC ₋ relay.	
15	Remove blocking tool from ON1 relay.	
16	Connect 7B to HS relay to terminal 27 of frame TC terminal strip associated with transverter made busy.	At transverter made busy— IR relay operated.
17	At recorder under test— Remove connection between 7B of HS relay and terminal 27.	At recorder unit TC terminal strip— Both battery and ground absent on terminal 18.
18	At recorder under test— Connect ground to 6B of TBL relay.	At frame TC terminal strip associated with transverter made busy— Ground absent on terminal 29.
19	At recorder under test— Remove ground from 6B of TBL relay.	
20c	If transverter made busy is LAMA transverter— At transverter made busy— Insulate 7T, 3B, 9B of COD relay.	At frame TC terminal strip associated with transverter made busy— Both battery and ground absent on terminals 26, 36, 46, 56.

SECTION 218-174-501

STEP	ACTION	VERIFICATION
21c	At transverter made busy— Remove insulator from 9B of COD relay.	At frame TC terminal strip associated with transverter made busy— Both battery and ground absent on terminals 36, 56.
22c	At transverter made busy— Remove insulators from 3B, 7T of COD relay.	
23c	Insulate 3T, 7B of COD relay.	At frame TC terminal strip associated with transverter made busy— Both battery and ground absent on terminals 16, 55.
24c	At transverter made busy— Remove insulators from 3T, 7B of COD relay.	
25c	Insulate 1T of TOK relay.	At frame TC terminal strip associated with transverter made busy— Battery absent on terminal 47.
26c	At transverter made busy— Insulate 5B of COD relay.	At frame TC terminal strip associated with transverter made busy— Battery absent on terminal 57.
27c	At transverter made busy— Remove insulators from 1T of TOK relay, 5B of COD relay.	
28c	Insulate 9B of COB relay.	At frame TC terminal strip associated with transverter made busy— Both battery and ground absent on terminal 38.
29c	At transverter made busy— Insulate 5T of COD relay.	At frame TC terminal strip associated with transverter made busy— Both battery and ground absent on terminal 58.
30c	At transverter made busy— Remove insulators from 5T of COD relay, 9B of COB relay.	
31c	Insulate 3B of LP relay.	At frame TC terminal strip associated with transverter made busy— Both battery and ground absent on terminal 39.
32c	At transverter made busy— Insulate 5T of TOK relay.	At frame TC terminal strip associated with transverter made busy— Both battery and ground absent on terminal 49.

STEP	ACTION	VERIFICATION
33c	At transverter made busy— Remove insulator from 3B of LP relay, 5T of TOK relay.	
34d	If transverter made busy is CAMA transverter— At transverter made busy— Insulate 5B, 9B of CIP3 relay, 3B of CIP0 relay.	At frame TC terminal strip associated with transverter made busy— Both battery and ground absent on terminals 16, 26, 36, 46.
35d	At transverter made busy— Remove insulators from 5B, 9B of CIP3 relay, 3B of CIP0 relay.	
36d	Insulate 2B of TOK relay.	At frame TC terminal strip associated with transverter made busy— Battery absent on terminal 47.
37d	At transverter made busy— Insulate 6B of CIP0 relay.	At recorder frame TC terminal strip associated with transverter made busy— Both battery and ground absent on terminal 57.
38d	At transverter made busy— Remove insulators from 2B of TOK relay, 6B of CIP0 relay.	
39d	Insulate 6B of CIP3 relay.	At recorder frame TC terminal strip associated with transverter made busy— Both battery and ground absent on terminal 38.
40d	At transverter made busy— Insulate 4B, 8B of CIP3 relay.	At recorder frame TC terminal strip associated with transverter made busy— Both battery and ground absent on terminals 55, 58.
41d	At transverter made busy— Remove insulators from 4B, 6B, 8B of CIP3 relay.	
42d	At recorder frame TC terminal strip associated with transverter made busy— Check for absence of ground on terminal 2.	
43	Check for presence of battery on terminals 18, 29, 37, 39, 47, 59.	
44	At jack, lamp, and key circuit— Remove plug from TV_MB jack associated with transverter made busy.	

SECTION 218-174-501

STEP	ACTION	VERIFICATION
45	Repeat Steps 5 through 44 using next higher numbered transverter until all TC_ relays of recorder under test have been tested.	
46	At jack, lamp, and key circuit— Insert make-busy plug into TST jack associated with recorder under test.	
47	Insert plug of 32A test set into R jack.	
48	Momentarily operate white (ST) button of 32A test set. <i>Note:</i> If a trouble is encountered while applying the test pattern, as indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring the recorder to service.	RUT lamp lighted. When test is completed— RUT lamp extinguished.
49	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
50	At jack, lamp, and key circuit— Remove plug from TST jack associated with recorder under test.	
51	Remove plug of 32A test set from R jack.	
52	Remove plug from TN jack associated with recorder under test.	If emergency recorder is provided— At recorder frame— EW lamp extinguished. If emergency recorder is not provided— At jack, lamp, and key circuit— R_ lamp associated with recorder under test extinguished. <i>Note:</i> If emergency recorder is not provided, DL lamp lighted and minor alarm sounded. Alarm can be silenced by operating the TRR-AR key at the jack lamp, and key circuit.

L. Deleted

M. Trunk Identifying Leads

- 1 Select for test purposes trunks associated with following tens and units relays on call identity indexer associated with recorder under test: tens 0, units 0; tens 1, units 1; tens 3, units 3; tens 6, units 6.

Note: If above trunks cannot be used for this test, select any other trunks with

STEP	ACTION	VERIFICATION
	combinations of tens and units relays on call identity indexer, which will test for transpositions all T(0-7), U(0-7) trunk identification leads to recorder.	
2	At MTF— Select class of service and rate treatment using information obtained from local records for one of the selected trunks.	
3	Select A_ through C_ digits to direct call to trunk under test.	
4	Operate GPA/GPB as required for selected group when trunk is in an allotted subgroup.	
5	Select ringing combination.	
6	Select marker.	
7	Operate IAO, TTL, FS, TS keys.	
8	Operate TLK key.	
9	Momentarily operate ST key.	IE lamp lighted. T_ lamps lighted on 2/5 basis, indicating tens relay of call identity indexer that is associated with trunk used. U_ lamps lighted on 2/5 basis, indicating units relay of call identity indexer that is associated with trunk used.
10	Operate ANS key.	AE lamp lighted.
11	Restore ANS, TLK keys.	DE lamp lighted.
12	Momentarily operate RL key.	All lamps extinguished.
13	Restore all keys and switches not required in next test.	
14	Repeat Steps 3 through 13, using each of other trunks selected in Step 1.	

N. Preference Relays—Operating and Lockout Features

- 1 Remove from service all trunks associated with recorder under test.
- 2 At perforator cabinet—
Mark tape (refer to paragraph 1.08).

SECTION 218-174-501

STEP	ACTION	VERIFICATION
3	At recorder under test— Block nonoperated XP relay.	
4	Insulate 5T of MTP relay.	
5	Connect battery to B winding terminal of IP relay.	IP relay operated.
6	Connect battery to B winding terminal of HP relay.	IP relay remains operated. HP relay <i>not</i> operated.
7	Remove battery from IP relay.	IP relay released. HP relay operated.
8	Reconnect battery to B winding terminal of IP relay.	IP relay operated. HP relay remains operated.
9	Remove battery from IP relay.	IP relay released.
10	Connect battery to B winding terminal of highest numbered TP_ relay.	TP_ relay <i>not</i> operated.
11	Remove battery from HP relay.	HP relay released. TP_ relay operated.
12	Reconnect battery to B winding terminal of HP relay.	HP relay operated. TP_ relay remains operated.
13	Remove battery from TP_ relay.	TP_ relay released.
14	Connect battery to B winding terminal of next highest numbered TP_ relay.	TP_ relay <i>not</i> operated.
15	Remove battery from B winding terminal of HP relay.	HP relay released. TP_ relay operated.
16	Reconnect battery to B winding terminal of HP relay.	HP relay operated. TP_ relay remains operated.
17	Remove battery from B winding terminal of TP_ relay.	TP_ relay released.
18	Repeat Steps 14 through 17, using remaining TP_ relays.	
19	Connect battery to B winding terminal of MTP relay.	MTP relay <i>not</i> operated.
20	Remove battery from B winding terminal of HP relay.	HP relay released. MTP relay operated.

STEP	ACTION	VERIFICATION
21	Reconnect battery to B winding terminal of HP relay.	HP relay operated. MTP relay remains operated.
22	Remove battery from B winding terminals of HP, MTP relays.	HP relay released. MTP relay released.
23	Remove insulator from 5T of MTP relay.	
24	Remove blocking tool from XP relay.	
25a	If recorder preference improvement to reduce single time lines (Apparatus Fig. 27) is provided— At recorder unit SRD terminal strip— Momentarily apply ground to terminal 1.	RIP relay operated.
26a	Repeat Step 25a using terminals 2 through 10.	RIP relay operated.
27a	Insulate 8B of RTL relay.	
28a	Repeat Steps 25a and 26a.	RIP relay <i>not</i> operated.
29a	Remove insulator from 8B of RTL relay.	
30a	Momentarily apply ground to the U winding terminal of RTL relay.	TIA, HS relays not operated.
31a	Momentarily apply ground to the U winding terminal of RIP relay.	At CII— T_ relays not operated.
32a	At recorder under test— Block nonoperated ON1, ON2 relays, as provided.	
33a	Block operated TP_ relay.	RTL relay operated.
34a	Insulate contact 6B of RIP relay.	RTL relay released.
35a	Remove insulator from 6B of RIP relay.	RTL relay operated.
36a	Block operated ON1 relay.	RTL relay released.
37a	Remove blocking tools from ON1, ON2, TP_ relays blocked in Steps 32a, 33a.	
38	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
39	Restore to service all trunks associated with recorder under test.	

STEP	ACTION	VERIFICATION
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N.1 Dynamic Test of Preference Relays

Note 1: Apparatus Fig. 27 provided.

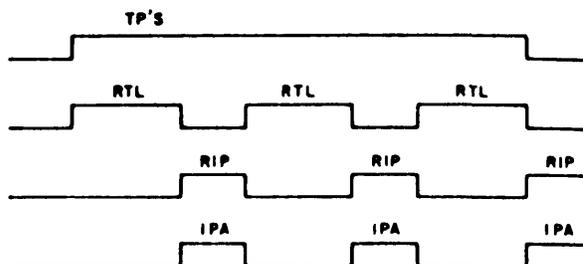
Note 2: Refer to Section 100-133-100 before using Esterline Angus 20-pen event recorder.

Note 3: This test does not affect service and should be made during busy hours so that the recording will reflect conditions when two or more transverters have preference relays operated in order that a timing entry can be shown taking place between initial entries.

Note 4: Connect battery first to prevent tying the leads together through the pen windings of the event recorder; disconnect battery last.

- 1 Connect the recording device to upper windings of RTL, RIP relays, 13T of IPA relay, 6B of CHLK relay.

Satisfactory operation of preference relays will be indicated by a recording as follows:



- 2 Remove connections from RTL, RIP, IPA, CHLK relays.

N.2 Detection of Falsely Grounded DJ_ Lead

Note: This test is made only when T option is provided in the call identity indexer and option WN in the recorder.

- 1 Remove from service all trunks associated with recorder under test.
- 2 Mark tape (refer to paragraph 1.08).

STEP	ACTION	VERIFICATION
3	At jack, lamp, and key circuit— Insert make-busy plug into MB jack for recorder under test.	R_ lamp for recorder under test lighted.
4	At recorder under test— Insulate DS relay 1 and 2T, TBL relay 4 and 5B, and DTKA relay 6 and 7B.	
5	Block ON relay nonoperated.	
6	At CII associated with recorder under test— Connect ground through 18AN resistor (350 ohms) or equivalent, to 5T winding terminal of DJK relay.	
7	At recorder under test— Insulate LC relay 5 and 6T.	
8	Block operated IPA, UL, and DTKA relays.	
9	Block nonoperated M relay.	
10	Strap together 11, 12T of M relay.	DTN relay operated.
11	At CII associated with recorder under test. Remove ground from DJK relay.	DJK relay released. At recorder under test— DTN relay released.
12	Remove blocking tools from IPA, UL, DTKA, M, and ON relays.	
13	Remove strap from 11, 12T of M relay.	
14	Remove insulators from LC, DS, TBL, and DTKA relays.	
15	At jack, lamp, and key circuit— Insert make-busy plug into TST jack of recorder under test.	
16	Insert plug of 32A test set into R jack.	
17	Momentarily operate white (ST) button of 32A test set. <i>Note:</i> If a trouble is encountered while applying the test pattern, as indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring the recorder to service.	RUT lamp lighted. When test is completed— RUT lamp extinguished.

SECTION 218-174-501

STEP	ACTION	VERIFICATION
18	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
19	At jack, lamp, and key circuit— Remove plug from TST jack.	
20	Remove plug of 32A test set.	
21	Remove plug from MB jack.	R_ lamp for recorder under test extinguished.
22	Restore to service all trunks associated with recorder under test.	

EMERGENCY RECORDER

O. Make-Busy Feature

1	At jack, lamp, and key circuit— Observe that emergency recorder is not in service.	No plug in any TN jacks associated with recorders.
2	Remove from service all trunks associated with one regular recorder.	
3	At jack, lamp, and key circuit— Insert make-busy plug into MB jack of emergency recorder.	EMR lamp lighted. At emergency recorder— NS relay operated. RT relay not operated.
4	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
5	At jack, lamp, and key circuit— Insert make-busy plug into TN jack of recorder associated with trunks removed from service.	EW lamp not lighted.
6	Remove plug from TN jack of regular recorder.	
7	Remove plug from MB jack of emergency recorder.	EMR lamp extinguished. At emergency recorder— NS, RT relays released.
8	Block nonoperated XT relay.	
9	Insulate 3B of RD relay.	
10	At jack, lamp, and key circuit— Insert make-busy plug into TN jack of recorder associated with trunks removed from service.	EW lamp lighted.
11	Insert make-busy plug into MB jack of emergency recorder.	At emergency recorder— NS relay operated.

STEP	ACTION	VERIFICATION
		RT relay <i>not</i> operated. At regular recorder— Ground present on 8B of TN1. Ground absent on 2B of TN6.
12	At emergency recorder— Block nonoperated TA relay.	
13	Block operated ON relay.	At regular recorder— Ground present on 2B of TN6.
14	At emergency recorder— Remove blocking tool from ON relay.	
15	Remove blocking tool from TA relay.	
16	At jack, lamp, and key circuit— Remove plug from MB jack of emergency recorder.	At emergency recorder— NS relay released. RT relay <i>not</i> operated.
17	Insulate 4B, 10B of MBR relay.	
18	Block operated MBR relay.	At regular recorder— Ground present on 8B of TN1.
19	At emergency recorder— Remove blocking tool from MBR relay.	
20	Remove insulator from 4B, 10B of MBR relay.	
21	Remove insulator from 3B of RD relay.	
22	Remove blocking tool from XT relay.	
23	At jack, lamp, and key circuit— Remove plug from TN jack of regular recorder.	EW lamp extinguished.
24	Restore to service all trunks removed from service at start of test.	
25	At jack, lamp, and key circuit— Insert make-busy plug into MB jack of emergency recorder.	
26	Insert make-busy plug into TST jack of emergency recorder.	
27	Insert plug of 32A test set into R jack of emergency recorder.	
28	Momentarily operate white (ST) button of 32A test set.	RUT lamp lighted. When test is completed—

SECTION 218-174-501

STEP	ACTION	VERIFICATION
	<i>Note:</i> If a trouble is encountered while applying the test pattern, clear the trouble and apply a good test pattern before restoring recorder to service.	RUT lamp extinguished.
29	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
30	At jack, lamp, and key circuit— Remove plug from TST jack of emergency recorder.	
31	Remove plug of 32A test set from R jack.	
32	Remove plug from MB jack of emergency recorder.	
P. Operation Test		
Refer to paragraph 1.07.		
1	At jack, lamp, and key circuit— Observe that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with recorders.
2	Insert make-busy plugs into MB, TST jacks of emergency recorder.	At emergency recorder— NS relay operated.
3	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
4	Insert plug of 32A test set into R jack.	
5	Momentarily operate white (ST) button of 32A test set. <i>Note:</i> If the RW lamp lights, wait until RW lamp is extinguished, then momentarily reoperate the white (ST) button of 32A test set. Wait several seconds, then again momentarily operate white (ST) button of 32A test set.	Perforator associated with recorder operated. RW lamp <i>not</i> lighted. RIT lamp <i>not</i> lighted.
6	When perforator stops operating— Repeat step 5 to advance tape for reading.	
7	Read make-busy entry.	Entries perforated as follows:

STEP

ACTION

VERIFICATION

DIGIT						
TIMING	A	B	C	D	E	F
	2	8	2	1	DAY X X T U	
6 sec.	2	8	1	1	X	X
1 sec.	2	8	1	2	T	U
	**2	**8	**5	**6	**O	**O
	2	8	0	5	RECORDER X X T U	
6 sec.	2	8	3	DAY X UNIT		MONTH X X
1 sec.	2	8	3	MINUTE TENS		X X
	2	8	4	X *	X †T	X †U

*Round, Day Tens, Recorder Group Hundreds

†Marker or Recorder Group

**Digits indicated in this line will occur only when out of synchronism.

Note: Digits marked X will vary depending on office options, time of day, day of month, etc. A check of office records will be necessary to determine certain information that should be perforated in the end of tape entry.

Note: Use KS-14343 tape reader to examine tape.

Caution: Exercise care not to mutilate tape in any manner, and under no circumstances cut the tape.

8 Read test pattern.

Perforations on tape arranged exactly the same as pattern shown in Fig. 1.
No light or irregular perforations.

9 Remove plug of 32A test set from R jack.

SECTION 218-174-501

STEP	ACTION	VERIFICATION
10	At jack, lamp, and key circuit— Remove plugs from TST, MB jacks of emergency recorder.	EMR lamp extinguished. At emergency recorder— NS relay released.
Q. Synchronizing Features		
1	At jack, lamp, and key circuit— Observe that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with recorders.
2	At emergency recorder— Operate and release UH relay.	Within 1 minute— Major alarm sounds. At master timing frame— SSF lamp lighted.
3	Operate CKL key.	OS_ lamp associated with emergency recorder lighted.
4	At jack, lamp, and key circuit— Insert make-busy plug into MB jack associated with emergency recorder.	R_ lamp associated with emergency recorder lighted.
5	At master timing frame— Momentarily operate AR key.	Major alarm silenced. At master timing frame— SSF lamp extinguished. At emergency recorder— If option YE is provided— Ground present on operating spring 15 of TIB relay when CA relay is released. Ground absent on operating spring 15 of TIB relay when CA relay is operated. If option YF is provided— Ground present on fixed contact 15 of TIB relay when CA relay is released. Ground absent on fixed contact 15 of TIB relay when CA relay is operated.
6	At master timing frame— Momentarily operate S key.	OS_ lamp associated with emergency recorder extinguished.
7	Restore CKL key.	At emergency recorder— If option YE is provided— Ground absent on operating spring 15 of TIB relay. Ground present on operating spring 9 of TIB relay when CA relay is released. Ground absent on operating spring 9 of TIB relay when CA relay is operated. If option YF is provided— Ground absent on fixed contact 15 of TIB relay. Ground present on fixed contact 9 of TIB

STEP	ACTION	VERIFICATION
		relay when CA relay is released. Ground absent on fixed contact 9 of TIB relay when CA relay is operated.
8	At jack, lamp, and key circuit— Remove make-busy plug from MB jack associated with emergency recorder.	
9	At emergency recorder— Operate and release TH relay.	Within 1 minute— Major alarm sounds. At master timing frame— SSF lamp lighted.
10	Repeat Steps 3 through 8.	
11	At emergency recorder— Momentarily operate HH relay.	Within 1 minute— Major alarm sounds. At master timing frame— SSF lamp lighted.
12	Repeat Steps 3 through 7.	
13	At jack, lamp, and key circuit— Insert make-busy plug into TST jack associated with emergency recorder.	
14	Insert plug of 32A test set into R jack.	
15	Momentarily operate white (ST) button of 32A test set.	RUT lamp lighted. When test is completed— RUT lamp extinguished.
	<p>Note: If a trouble is encountered while applying the test pattern, as indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring the recorder to service.</p>	
16	At jack, lamp, and key circuit— Remove plug from TST jack associated with emergency recorder.	
17	Remove plug of 32A test set from R jack.	
18	Remove plug from MB jack associated with emergency recorder.	
R. Recorder Number, Minutes Timing, and Hour Alarm Features (6-Second Timing)		
1	At jack, lamp, and key circuit— Observe that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with recorders. EW lamp <i>not</i> lighted.

SECTION 218-174-501

STEP	ACTION	VERIFICATION
2	Insert make-busy plug into MB jack associated with emergency recorder.	EMR lamp lighted.
3	At perforator cabinet associated with emergency recorder— Disconnect perforator plug from its jack.	
4	At emergency recorder— Block nonoperated HS, HRA, C, PTC relays.	
5	Insulate 7T of RN relay.	
6	Operate and release HH, TH, UH relays, as required, to advance H, T, U selectors to position 1.	
7	Operate and hold M, RN relays for several seconds.	Minor alarm sounds. Trouble record taken. REC, DR EMG designations perforated; B', C', D' designations perforated indicating numbers on first line of Table B; E', F' designations perforated indicating numbers 4, 0, respectively.
8	Perform Steps 9 through 25 of Test E.	
9	At emergency recorder— Connect ground to 4T of RNT relay.	At recorder frame— HR lamp lighted. Major alarm sounds.
10	Perform Steps 27 through 111 of Test E.	
11	At jack, lamp, and key circuit— Insert make-busy plug into TST jack associated with emergency recorder.	
12	Insert plug of 32A test set into R jack.	
13	Momentarily operate white (ST) button of 32A test set. <i>Note:</i> If a trouble is encountered while applying the test pattern, as indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring the recorder to service.	RUT lamp lighted. When test is completed— RUT lamp extinguished.
14	At MTF— Remove plug from TST jack associated with emergency recorder.	
15	Remove plug of 32A test set from R jack.	

STEP	ACTION	VERIFICATION
16	Remove plug from MB jack associated with emergency recorder.	EMR lamp extinguished.
R.1	Recorder Number, Minutes Timing, Seconds Timing, and Hour Alarm Features (1-Second Timing)	
	<i>Caution: Do not start test 1 minute before or after any 10 minute period.</i>	
1	At jack, lamp, and key circuit— Observe that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with recorders. EW lamp <i>not</i> lighted.
2	Insert make-busy plug into MB jack associated with emergency recorder.	EMR lamp lighted.
3	At perforator cabinet associated with emergency recorder— Disconnect perforator plug from its jack.	
4	At emergency recorder— Block nonoperated HS, HRA, C, PTC relays.	
5	Insulate 7T of RN relay.	
6	Operate and release HH, TH relays, as required, to advance H, T selectors to position 1.	
7	Operate and release UH relay as required to advance UA-D counters to indicate 0 seconds. (UD relay only operated.)	
8	Operate and hold M, RN relays for several seconds.	Minor alarm sounds. Trouble record taken. REC, DR EMG designations perforated; B', C', D' designations perforated indicating numbers on first line of Table C; E', F' designations perforated indicating numbers 4, 0, respectively.
9	Perform Steps 10 through 26 of Test E.1.	
10	Connect ground to 4T of RNT relay.	HR lamp lighted. Major alarm sounds.
11	Perform Steps 28 through 115 of Test E.1.	
12	At jack, lamp, and key circuit— Insert make-busy plug into TST jack associated with emergency recorder.	

SECTION 218-174-501

STEP	ACTION	VERIFICATION
13	Insert plug of 32A test set into R jack.	
14	Momentarily operate white (ST) button of 32A test set. <i>Note:</i> If a trouble is encountered while applying a test pattern, clear the trouble and apply a good test pattern before restoring the recorder to service.	RUT lamp lighted. When test is completed— RUT lamp extinguished.
15	At MTF— Remove plug from TST jack associated with emergency recorder.	
16	Remove plug of 32A test set from R jack.	
17	Remove plug from MB jack associated with emergency recorder.	EMR lamp extinguished.

S. Splice, Break-In-Tape and Paper Jam Features

Splice and Break-In-Tape

1	At jack, lamp, and key circuit— Observe that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with recorders.
2	At perforator cabinet of emergency recorder— Mark tape (refer to paragraph 1.08).	
3	Cut a window splice in the paper tape at a point just before the tape enters the tape chute. <i>Caution: Exercise care not to mutilate the tape in any manner.</i>	
4	At jack, lamp, and key circuit— Insert make-busy plug into MB jack of emergency recorder to advance window splice through perforator. <i>Note:</i> More than one make-busy pattern may be needed to advance the window splice through the perforator. This may be accomplished by removing and then reinserting the make-busy plug into the MB jack associated with the emergency recorder.	At perforator cabinet— Make-busy pattern perforated on tape. At emergency recorder— SP relay operated when window splice is encountered.
5	Block operated SP relay.	In approximately two minutes— NP lamp lighted. Major alarm sounds.

STEP	ACTION	VERIFICATION
		At perforator cabinet— Splice pattern perforated.
6	At emergency recorder— Remove blocking tool from SP relay.	At perforator cabinet— Make-busy pattern perforated.
7	At recorder frame— Momentarily operate AR key.	Major alarm silenced. NP lamp extinguished.
8a	If no further tests are to be performed— At perforator cabinet— Mark tape (refer to paragraph 1.08).	
9	At jack, lamp, and key circuit— Remove make-busy plug from MB jack associated with emergency recorder.	
Paper Jam Feature Refer to paragraph 1.14.		
10	♦At jack, lamp, and key circuit— Observe that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with recorders.
11	At perforator cabinet of emergency recorder— Mark tape (refer to paragraph 1.08).	
12	Remove tape from slack tape arm and place arm on holder.	
13	At jack, lamp, and key circuit— Insert make-busy plug into MB jack associated with emergency recorder.	At recorder frame— NP lamp lighted. Major alarm sounds. At perforator cabinet— Paper jam detector counter indicates more than two hundred registrations.
Note: More than one make-busy pattern may be needed in order to advance the paper jam detector counter past two hundred registrations.		
14	At recorder frame— Momentarily operate AR key.	NP lamp <i>not</i> extinguished. Major alarm <i>not</i> silenced.
15	At perforator cabinet— Remove slack tape arm from holder and verify that tape winds onto take-up reel.	Take-up reel stops when slack tape arm activates micro switch on take-up motor. Paper jam detector counter reset. Major alarm silenced. At recorder frame— NP lamp extinguished.
Caution: Take care not to mutilate tape in any manner.		

SECTION 218-174-501

STEP	ACTION	VERIFICATION
16	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
17	At jack, lamp, and key circuit— Remove make-busy plug from MB jack associated with recorder under test.⚡	

T. Trouble Timing Feature

Refer to paragraph 1.07.

1	At jack, lamp, and key circuit— Observe that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with recorders.
2	Insert make-busy plug into MB jack associated with emergency recorder.	EMR lamp lighted.
3	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
4	At emergency recorder— Insulate 3T of TTIB relay.	
5	Block operated ON relay.	TA, TF relays operated. In approximately 0.5 second— TB relay operated. Minor alarm sounds. In approximately 2 seconds— TC, TD, TE, RD relays operated. TA, TF relays released. At jack, lamp, and key circuit— TRR lamp lighted.
6	At emergency recorder— Remove blocking tool from ON relay.	TB, TC, TD, TE, RD relays released.
7	Remove insulator from 3T of TTIB relay.	
8	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	TRR lamp extinguished. Minor alarm silenced.
9	At emergency recorder— Block operated TTIB relay.	
10	Block operated ON relay.	In approximately 0.5 second— TE relay operated. Minor alarm sounds. Ground on 5T of TBL relay. Ground on 8B of IPA relay.

STEP	ACTION	VERIFICATION
11	Remove blocking tool from ON relay.	TE relay released. At jack, lamp, and key circuit— TRR, DL_ lamps associated with emergency recorder lighted.
12	At emergency recorder— Remove blocking tool from TTIB relay.	
13	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	TRR, DL_ lamps associated with emergency recorder extinguished. Minor alarm silenced.
14	At jack, lamp, and key circuit— Insert make-busy plug into TST jack associated with emergency recorder.	
15	Insert plug of 32A test set into R jack.	
16	Momentarily operate white (ST) button of 32A test set. <i>Note:</i> If a trouble is encountered while applying the test pattern, clear the trouble and apply a good test pattern before restoring the recorder to service.	RUT lamp lighted. When test is completed— RUT lamp extinguished.
17	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
18	At jack, lamp, and key circuit— Remove plug from TST jack associated with emergency recorder.	
19	Remove plug of 32A test set from R jack.	
20	Remove plug from MB jack associated with emergency recorder.	EMR lamp extinguished.

U. AG Lead Alarm and Locking Features

1	At jack, lamp, and key circuit— Observe that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with regular recorders.
2	Remove from service all trunks associated with any one regular recorder.	
3	At jack, lamp, and key circuit— Insert make-busy plug into TN jack of recorder associated with trunks removed from service.	At recorder frame— EW lamp lighted.

SECTION 218-174-501

STEP	ACTION	VERIFICATION
4	At jack, lamp, and key circuit— Insert make-busy plugs into MB, TRMB- EMR jacks associated with emergency recorder.	
5	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
6	At emergency recorder under test— Block nonoperated IP, TE relays.	
7	At call identity indexer associated with emergency recorder— Block operated TA_ or TB_ relay.	Minor alarm sounds.
8	At emergency recorder— Operate IPA relay.	
9	Operate RD relay.	RD, IPA relay locked operated.
10	At call identity indexer associated with emergency recorder— Remove blocking tool from TA_ or TB_ relay.	At emergency recorder— RD, IPA relays released.
11	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
12	At call identity indexer associated with emergency recorder— Block operated any U_ relay.	
13	At emergency recorder— Operate RD relay.	RD relay locked operated.
14	At call identity indexer associated with emergency recorder— Remove blocking tool from U_ relay.	At emergency recorder— RD relay released.
15	Remove blocking tools from IP, TE relays.	
16	At jack, lamp, and key circuit— Remove plug from TRMB_EMR jack associated with emergency recorder.	
17	Insert make-busy plug into TST jack associated with emergency recorder.	
18	Insert plug of 32A test set into R jack.	
19	Momentarily operate white (ST) button of 32A test set.	RUT lamp lighted. When test is completed— RUT lamp extinguished.

STEP	ACTION	VERIFICATION
	Note: If a trouble is encountered while applying the test pattern, as indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring the recorder to service.	
20	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
21	At jack, lamp, and key circuit— Remove plug from TST jack associated with emergency recorder.	
22	Remove plug of 32A test set from R jack.	
23	Remove plug from MB jack associated with emergency recorder.	
24	Remove plug from TN jack.	EW lamp extinguished.
25	Restore to service all trunks associated with recorder under test.	
V. Transient Operation of Perforator Magnets and Series Relay Locking Features		
1	At jack, lamp, and key circuit— Observe that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with recorders.
2	Insert make-busy plug into MB jack associated with emergency recorder.	EMR lamp lighted.
3	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
4	At emergency recorder— Connect ground to T winding terminal of A0 relay for several seconds.	A0 relay operated. Minor alarm sounds. At trouble recorder frame— Trouble record taken. A'0, RN_ designations perforated associated with recorder under test. At perforator cabinet— A0 relay released.
5	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
6	At emergency recorder— Insulate 3B of TE relay, 8T of PTS relay, 9B of TEC relay.	

SECTION 218-174-501

STEP	ACTION	VERIFICATION
7	Block nonoperated IP relay.	
8	Momentarily apply ground to T winding terminal of A0 relay.	A0 relay locked operated. PTS relay operated.
9	Momentarily apply ground to B winding terminal of A0 relay.	A0, PTS relays released.
10	Repeat Steps 8, 9 for each A1, A2, B0 through B7, C0 through C7, C0 through D7, E0 through E7, F0 through F7 relays.	
11	Remove insulators from 3B of TE relay, 8T of PTX relay, 9B of TEC relay.	
12	Remove blocking tool from IP relay.	
13	At jack, lamp, and key circuit— Insert make-busy plug into TST jack associated with emergency recorder.	
14	Insert plug of 32A test set into R jack.	
15	Momentarily operate white (ST) button of 32A test set. <i>Note:</i> If a trouble is encountered while applying the test pattern, as indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring the recorder to service.	RUT lamp lighted. When test is completed— RUT lamp extinguished.
16	Mark tape (refer to paragraph 1.08).	
17	At jack, lamp, and key circuit— Remove plug from TST jack associated with emergency recorder.	
18	Remove plug of 32A test set from R jack.	
19	Remove plug from MB jack associated with emergency recorder.	EMR lamp extinguished.
W. Trouble Cross-Detecting Features		
1	At jack, lamp, and key circuit— Check that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with recorders.
2	At perforator cabinet— Mark tape (refer to paragraph 1.08).	

STEP	ACTION	VERIFICATION
3	At emergency recorder— Insulate 3T, 4B of XPA relay.	
XP Relay		
4	Insulate 3B of IP relay.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. XP1, RN_ designations perforated associated with emergency recorder. At emergency recorder— XPA relay operated.
5	Remove insulator from 3B of IP relay.	
6	Momentarily open 6T of XPA relay.	XPA relay released.
7	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
8	At emergency recorder— Block nonoperated XP1 relay.	
9	Insulate 3T of MTP relay.	XP relay <i>not</i> operated.
10	Insulate 6T of MTP relay.	XP relay operated.
11	Remove insulator from 3T of MTP relay.	XP relay released.
12	Remove insulator from 6T of MTP relay.	
13	Remove blocking tool from XP1 relay.	
XU, XTC, XCO, XT, XRB Relays.		
14	Remove from service all trunks associated with any one regular recorder.	
15	At jack, lamp, and key circuit— Insert make-busy plug into TN jack of recorder with trunks removed from service.	At recorder frame— EW lamp lighted.
16	At jack, lamp, and key circuit— Insert make-busy plug into MB jack of emergency recorder.	EMR lamp lighted. At emergency recorder— MBR relay operated.
XU Relay		
17	At call identity indexer associated with emergency recorder— Insulate 3T of any U_ relay.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. XU1, RN_ designations perforated associated

SECTION 218-174-501

STEP	ACTION	VERIFICATION
		with emergency recorder. At emergency recorder— XPA relay operated.
18	At call identity indexer associated with emergency recorder— Remove insulator from 3T of U_ relay.	
19	At emergency recorder— Momentarily open 6T of XPA relay.	XPA relay released.
20	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
21	At emergency recorder— Block nonoperated XP1 relay.	
22	At call identity indexer associated with emergency recorder— Insulate 3B of any U_ relay.	At emergency recorder— XU relay operated.
23	At call identity indexer associated with emergency recorder— Remove insulator from 3B of U_ relay.	At emergency recorder— XU relay released.
24	At recorder— Remove blocking tool from XP1 relay.	
XTC and XCO Relays		
25	At call identity indexer associated with emergency recorder— Connect ground to 3T of any UA_ relay.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. XTL, XTC, RN_ designations perforated associated with emergency recorder.
26	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
27	At call identity indexer associated with emergency recorder— Remove ground from 3T of UA_ relay.	
28	Block operated A1 relay.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. XTC, RN_ designations perforated associated with emergency recorder. At emergency recorder— XTC, XCO relays operated.

STEP	ACTION	VERIFICATION
29	At jack, lamp, and key circuit— Momentarily operate TRR_AR key.	Minor alarm silenced.
30	At call identity indexer associated with emergency recorder— Remove blocking tool from A1 relay.	At emergency recorder— XTC, XCO relays released.
XT Relay		
31	At emergency recorder— Connect ground to 2B of MB relay.	
32	At call identity indexer associated with emergency recorder— Insulate 1T of any T_ relay.	Minor alarm sounds. At trouble recorder frame— Trouble record taken. XT1, RN_ designations perforated associated with emergency recorder. At emergency recorder— XT relay operated.
33	At call identity indexer associated with emergency recorder— Remove insulator from 1T of T_ relay.	At emergency recorder— XT relay operated.
34	At jack, lamp, and key circuit— Mometarily operate TRR_AR key.	Minor alarm silenced.
35	At emergency recorder— Remove insulators from 3T, 4B of XPA relay.	Major alarm sounds. At recorder frame— XRB lamp associated with emergency recorder lighted.
36	Momentarily operate AR key.	Major alarm silenced. XRB lamp associated with emergency recorder extinguished.
37	At emergency recorder— Block nonoperated XP1 relay.	
38	Insulate 3B of RD relay.	XT relay operated.
39	Remove insulator from 3B of RD relay.	XT relay released.
40	Remove blocking tool from XP1 relay.	
41	Remove ground from 2B of MB relay.	
XRB Relay		
42	At emergency recorder— Insulate 6B of MBR relay.	

SECTION 218-174-501

STEP	ACTION	VERIFICATION
43	Manually release MBR relay.	
44	Block nonoperated MBJ relay.	
45	At transferred recorder— Momentarily connect ground to 8B of TN1 relay.	Major alarm sounds. At recorder frame— XRB lamp associated with emergency recorder lighted.
46	Momentarily operate AR key.	XRB lamp extinguished. Major alarm silenced.
47	At transferred regular recorder— Momentarily connect ground to 2T of RT relay.	Major alarm sounds. At recorder frame— XRB lamp associated with emergency recorder lighted.
48	Momentarily operate AR key.	Major alarm silenced. XRB lamp extinguished.
49	At emergency recorder— Remove blocking tool from MBJ relay.	
50	Manually operate MBR relay.	MBR relay locked operated.
51	Remove insulator from 6B of MBR relay.	
52	At jack, lamp, and key circuit— Insert make-busy plug into TST jack associated with emergency recorder.	
53	Insert plug of 32A test set into R jack.	
54	Momentarily operate white (ST) button of 32A test set.	RUT lamp lighted. When test is completed— RUT lamp extinguished.
	<i>Note:</i> If a trouble is encountered while applying the test pattern, as indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring the recorder to service.	
55	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
56	At jack, lamp, and key circuit— Remove plug from TST jack associated with emergency recorder.	
57	Remove plug of 32A test set from R jack.	

STEP	ACTION	VERIFICATION
58	Remove plug from MB jack associated with emergency recorder.	EMR lamp extinguished.
59	Remove plug from TN jack associated with transferred regular recorder.	EW lamp extinguished. At emergency recorder— MBR relay released.
60	Restore to service all trunks associated with recorder under test.	
X. Test for False Continuity and Crosses of TC_ Relay		
1	At jack, lamp, and key circuit— Observe that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with recorders. EW lamp <i>not</i> lighted.
2	Insert make-busy plug into MB jack associated with emergency recorder.	EMR lamp lighted.
3	Perform Steps 3 through 46 of Test K.	
4	At jack, lamp, and key circuit— Insert make-busy plug into TST jack associated with emergency recorder.	
5	Insert plug of 32A test set into R jack.	
6	Momentarily operate white (ST) button of 32A test set. <i>Note:</i> If a trouble is encountered while applying the test pattern, as indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring the recorder to service.	RUT lamp lighted. When test is completed— RUT lamp extinguished.
7	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
8	At jack, lamp, and key circuit— Remove plug from TST jack associated with emergency recorder.	
9	Remove plug of 32A test set from R jack.	
10	Remove plugs from MB, TN jacks associated with emergency recorder.	EMR lamp extinguished.
Y. Deleted		
Z. Trunk Identifying Leads		

SECTION 218-174-501

STEP	ACTION	VERIFICATION
1	At jack, lamp, and key circuit— Observe that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with recorders.
2	Insert make-busy plug into TN jack of any regular recorder.	At recorder frame— EW lamp lighted.
3	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
4	Select for test purposes trunks associated with following tens and units relays on call identity indexer associated with recorder under test: tens 0, units 0; tens 1, units 1; tens 3, units 3; tens 6, units 6. <i>Note:</i> If above trunks cannot be used for this test, select any other trunks with combinations of tens and units relays on call identity indexer which will test for transpositions all T(0-7), U(0-7) trunk identification leads to recorder.	
5	At MTF— Select class of service and rate treatment using information obtained from local records for one of selected trunks.	
6	Select A_ through C_ digits to direct call to trunk under test.	
7	Operate GPA/GPA as required for selected group when trunk is in an allotted group.	
8	Select ringing combination.	
9	Select marker.	
10	Operate IAO, TTL, FS, TS keys.	
11	Operate TLK key.	
12	Momentarily operate ST key.	IE lamp lighted. T_ lamps lighted on 2/5 basis, indicating tens relay of call identity indexer that is associated with trunk used. U_ lamps lighted on 2/5 basis, indicating units relay of call identity indexer that is associated with trunk used.
13	Operate ANS key.	AE lamp lighted.

STEP	ACTION	VERIFICATION
14	Restore ANS, TLK keys.	DE lamp lighted.
15	Momentarily operate RL key.	All lamps extinguished.
16	Restore all keys and switches not required for next test.	
17	Repeat Steps 6 through 16, using each of other trunks selected in Step 4.	
18	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
19	At jack, lamp, and key circuit— Remove plug from TN jack associated with transferred regular recorder.	At recorder frame— EW lamp extinguished.
AA. Preference Relays—Operating and Lockout Features		
1	At jack, lamp, and key circuit— Observe that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with regular recorders.
2	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
3	At emergency recorder— Block nonoperated XP relay.	
4	Insulate 5T of MTP relay.	
5	Connect battery to B winding terminal of IP relay.	IP relay operated.
6	Connect battery to B winding terminal of HP relay.	IP relay remains operated. HP relay <i>not</i> operated.
7	Remove battery from IP relay.	IP relay released. HP relay operated.
8	Reconnect battery to B winding terminal of IP relay.	IP relay operated. HP relay remains operated.
9	Remove battery from IP relay.	IP relay released.
10	Connect battery to B winding terminal of highest numbered TP_ relay.	TP_ relay not operated.
11	Remove battery from HP relay.	HP relay released. TP_ relay operated.

SECTION 218-174-501

STEP	ACTION	VERIFICATION
12	Reconnect battery to B winding terminal of HP relay.	HP relay operated. TP_ relay remains operated.
13	Remove battery from TP_ relay.	TP_ relay released.
14	Connect battery to B winding terminal of next highest numbered TP_ relay.	TP_ relay <i>not</i> operated.
15	Remove battery from B winding terminal of HP relay.	HP relay released. TP_ relay operated.
16	Reconnect battery to B winding terminal of HP relay.	HP relay operated. TP_ relay remains operated.
17	Remove battery from B winding terminal of TP_ relay.	TP_ relay released.
18	Repeat Steps 14 through 17, using remaining TP_ relays.	
19	Connect battery to B winding terminal of MTP relay.	MTP relay <i>not</i> operated.
20	Remove battery from B winding terminal of HP relay.	HP relay released. MTP relay operated.
21	Reconnect battery to B winding terminal of HP relay.	HP relay operated. MTP relay remains operated.
22	Remove battery from B winding terminals of HP, MTP relays.	HP relay released. MTP relay released.
23	Remove insulator from 5T of MTP relay.	
24	Remove blocking tool from XP relay.	
25	At perforator cabinet— Mark tape (refer to paragraph 1.08).	

AB. Exercising Routine

1	At jack, lamp, and key circuit— Observe that emergency recorder is not in service.	No make-busy plug in any TN jacks associated with regular recorders. At recorder frame— EW lamp not lighted.
2	Determine which call identity indexer is next in order to be transferred to emergency recorder.	
3	At jack, lamp, and key circuit— Insert make-busy plug into TN jack of recorder	At recorder frame— EW lamp lighted.

STEP	ACTION	VERIFICATION
	connected to call identity indexer selected in Step 2.	
4	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
5	Select for test purposes trunks associated with following tens and units relays on call identity indexer associated with recorder under test: tens 0, units 0; tens 1, units 1; tens 3, units 3; tens 6, units 6. <i>Note:</i> If above trunks cannot be used for this test, select any other trunks with combinations of tens and units relays on call identity indexer which will test for transpositions all T(0-7), U(0-7) trunk identification leads to recorder.	
6	At MTF— Select class of service and rate treatment using information obtained from local records for one of selected trunks.	
7	Select A_ through C_ digits to direct call to trunk under test.	
8	Operate GPA/GPB as required for selected group when trunk is in an allotted group.	
9	Select ringing combination.	
10	Select marker.	
11	Operate IAO, TTL, FS, TS keys.	
12	Operate TLK key.	
13	Momentarily operate ST key.	IE lamp lighted. T_ lamps lighted on 2/5 basis, indicating tens relay of call identity indexer that is associated with trunk used. U_ lamps lighted on 2/5 basis, indicating units relay of call identity indexer that is associated with trunk used.
14	Operate ANS key.	AE lamp lighted.
15	Restore ANS, TLK keys.	DE lamp lighted.
16	Momentarily operate RL key.	All lamps extinguished.

SECTION 218-174-501

STEP	ACTION	VERIFICATION
17	Restore all keys and switches.	
18	Repeat Steps 7 through 17, using each of other trunks selected in Step 5.	
19	Repeat Step 1 through 18, using a different call identity indexer until the tests have been applied to all call identity indexers.	
20	At perforator cabinet— Mark tape (refer to paragraph 1.08).	
21	At jack, lamp, and key circuit— Remove make-busy plug from TN jack.	At recorder frame— EW lamp extinguished.

AC. Dynamic Test of Preference Relays

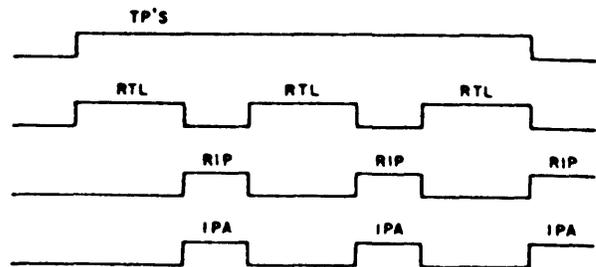
Note 1: Apparatus Fig. 27 provided.

Note 2: Refer to Section 100-133-100 before using Esterline Angus 20-pen event recorder.

Note 3: This test does not affect service and should be made during busy hours so that the recording will reflect conditions when two or more transverters have preference relays operated in order that a timing entry can be shown taking place between initial entries.

Note 4: Connect battery first to prevent tying the leads together through the pen windings of the event recorder; disconnect battery last.

1	At jack, lamp, and key circuit— Insert make-busy plug into TN jack of any recorder.	At recorder frame— EW lamp associated with emergency recorder lighted.
2	Connect recording device to upper windings of RTL, RIP relays, 13T of IPA relay, 6B of CHLK relay.	Satisfactory operation of preference relays will be indicated by a recording as follows:



STEP	ACTION	VERIFICATION
3	Remove connections from RTL, RIP, IPA, CHLK relays.	
4	At jack, lamp, and key circuit— Remove make-busy plug from TN jack of recorder made busy.	At recorder frame— EW lamp extinguished.
AD. Detection of Falsely Grounded DJ Lead		
Note: This test is made only when T option is provided in the call identity indexer and option WN in the recorder.		
1	At jack, lamp, and key circuit— Observe that emergency recorder is not in service.	No make-busy plug in any TN jacks for regular recorders.
2	Remove from service all trunks associated with any one regular recorder.	
3	At jack, lamp, and key circuit— Insert make-busy plug into TN jack of recorder associated with trunks removed from service.	At recorder under test— EW lamp lighted.
4	At jack, lamp, and key circuit— Insert make-busy plug into MB jack of emergency recorder.	
5	At emergency recorder— Insulate DS relay 1 and 2T, TBL relay 4 and 5B, and DTKA relay 6 and 7B.	
6	Block ON relay nonoperated.	
7	At CII associated with transferred recorder— Connect ground through 18AN resistor (350 ohms) or equivalent to 5T winding terminal of DJK relay.	DJK relay operated.
8	At emergency recorder— Insulate LC relay 5 and 6T.	
9	Block operated IPA, UL, and DTKA relays.	
10	Block nonoperated M relay.	
11	Strap together 11, 12T of M relay.	DTN relay operated.

SECTION 218-174-501

STEP	ACTION	VERIFICATION
12	At CII associated with transferred recorder— Remove connection from ST winding terminal of DJK relay.	DJK relay released. At emergency recorder— DTN relay released.
13	Remove blocking tools from IPA, UL, DTKA, M, and ON relays.	
14	Remove strap from 11, 12T of M relay.	
15	Remove insulators from LC, DS, TBL, and DTKA relays.	
16	At jack, lamp, and key circuit— Insert make-busy plug into TST jack of emergency recorder.	
17	Insert plug of 32A test set into R jack.	
18	Momentarily operate white (ST) button of 32A test set. <i>Note:</i> If a trouble is encountered while applying the test pattern, as indicated by RIT lamp lighted, clear the trouble and apply a good test pattern before restoring the recorder to service.	RUT lamp lighted. When test is completed— RUT lamp extinguished.
19	At perforator cabinet of recorder under test— Mark tape (refer to paragraph 1.08).	
20	At jack, lamp, and key circuit— Remove plugs from TST, MB jacks of emergency recorder.	
21	Remove plug from TN jack of recorder associated with trunks removed from service.	EW lamp extinguished.
22	Remove plug of 32A test set from R jack.	
23	Restore to service all trunks associated with recorder used in test.	