2400- OR 2600-HZ E1B, E2B, E3B, OR E4B SINGLE-FREQUENCY SIGNALING CIRCUITS OUT-OF-SERVICE TEST USING TESTING CIRCUIT SD-96519-01 OR SD-96519-02 AND 4A SIGNALING TEST SET SD-1C244-01

1. GENERAL

1.01 This section describes a method of making out-of-service tests of 2400- or 2600-Hz single-frequency signaling circuits SD-98085-01, SD-98090-01, SD-98124-01, SD-98124-02, or SD-98124-03 using testing circuit SD-96519-01 or SD-96519-02. It also describes a method of making potentiometer adjustments to correct changes in the characteristics of some circuit elements. If the requirements of this section cannot be met after readjustment of potentiometers or relays, the units should be returned to a repair center because special techniques are involved in testing and clearing trouble on some of the components.

> ***Note:*** 291- and 303-type relays shall be maintained in an upright position for not less than 1 minute before beginning any tests.

1.02 This section is reissued to reflect numerous changes. Due to the extensive number of changes, change arrows have been omitted. This reissue does not affect the Equipment Test List.

1.03 The tests covered are:

1.04 The 2400- or 2600-Hz single-frequency signaling unit is referred to in this section as an SF unit.

1.05 The J94021A (21A) transmission measuring set is referred to in this section as the TMS.

1.06 The 4A signaling test set is referred to in this section as the 4A test set.

1.07 The J98613AY test panel (SD-96519-01 or SD-96519-02) is referred to in this section as the test circuit.

1.08 Two values of transmitted power are specified in Test C and four values of attenuator settings are specified in Test I. The values to be used depend upon whether the transmission facilities have transmission level points (TLP) of +4 and -13 or +7 and -16 and whether the office has 4-wire or 2-wire arrangement.

1.09 The +4 or +7 TLP is the point at which the signal receiver is connected to the circuit and the -13 or -16 TLP is the point at which the signal transmitter is connected to the circuit.

1.10 ***Lettered Steps:*** A letter ***a, b, c,*** etc, added to a step number in Part 3 or 4 of this section indicates an action which may or may not be required depending upon local conditions. The condition under which a lettered step or a series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

2. APPARATUS

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

2.02 Testing circuit, J98613AY (SD-96519-01 or SD-96519-02) includes folding test fixture J98613AC.

2.03 The 4A test set, J94743A (SD-1C244-01), equipped with E&M interface unit, J94743AD and SF interface unit, J94743AA.

2.04 The J94021A (21A) transmission measuring set (TMS).

2.05 Testing cord, P3N cord, 6 feet long, equipped with a 241A plug and a 310 plug (3P17B cord assembly).

2.06 W2CF cord, 1 foot long, equipped with one 310 plug, one 360B tool, and one 360C tool (2W17D cord assembly).

2.07 P3E slate cord, 6 feet long, equipped with two 310 plugs (3P7A cord assembly).

2.08 The 725A tool, used to gain mechanical advantage in prying loose the signaling units from connectors.

2.09 The 603A tool, used for removing 291- or 303-type relays. Use in accordance with Section 040-263-501.

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

3. PREPARATION

STEP	ACTION	VERIFICATION
All Tests		
1	On test circuit— Set all keys to normal. ***Note:*** The twist keys in the test circuit are operated when the white line is in a vertical position and normal when the white line is in a horizontal position.	
2	Obtain release of signaling circuit in accordance with approved procedures.	
3	Remove signaling unit from its in-service position, using 725A tool, as shown in Fig. 1 or 2.	
4	Plug signaling unit into folding test fixture of test circuit.	
5a	If test circuit is mounted in REVERTIVE-TERMINATING bay, J98613AP— Turn CT key to operate position.	
Tests B, C, D, E, F, H, and I		
6	Connect 241 plug of 3P17B cord assembly to input jack of TMS. ***Note:*** TMS should be calibrated per Section 103-221-100.	
7	Connect 310 plug of 3P17B cord assembly to SF SUP jack of test circuit.	If testing -13 TLP lines— TMS meter indicates -11.6 to -13.1 dB. If testing -16 TLP lines— TMS meter indicates -14.6 to -16.1 dB.
8	Disconnect plug from SF SUP jack and connect to AMP OUT jack of test circuit.	
9	At test circuit— Set RECEIVER switch to position 2.	TMS indicates 0 dB. See Step 10b.
10b	If requirement of Step 9 is not met— Adjust gain control of MON AMPL to exactly 0 dB.	
11	Disconnect plug from AMP OUT jack and connect to TMS jack of test circuit.	

STEP	ACTION	VERIFICATION
Tests A, B, C, F, and G		
12	Connect 4A test set to 110V power, operate POWER switch to ON.	
13	Equip 4A test set with E&M and SF interface units.	
14	Patch LINE/R jack of 4A test set to E jack and M jack of test circuit with 3P17B cord assembly, with notched side of 241 plug toward E jack.	
15	AT 4A test set— Set MS RANGE switch to 999.	
16	Set SELECTOR switch to NORM.	
17	Set FUNCTION switch to MSEC BK or MSEC MK. *Note:* When verification calls for an indication in ms break or ms make, set the FUNCTION switch accordingly to obtain the proper indication.	
18	Set READ switch to MSEC UPDATE.	
19	Set RECEIVER switch to EM.	
20	Set SEND switch to EM.	
21	Set PULSE MODE switch to CONT.	
22	Operate GEN SUPV key to OFF HK.	
23	At E&M interface unit— Set E&M/CX—S/R switch to E&M/CX.	
24	Operate PULSE/MEAS key to LINE.	
25	Operate TWD DROP key to ON HK.	

4. METHOD

STEP	ACTION	VERIFICATION
A. Pulsing of Transmitter M Relay		
26	Set PULSE PERIOD switch to 100.	
27	Set PULSE WIDTH switch to 45.	

STEP	ACTION	VERIFICATION
28	At test circuit— Set KEYERS switch to position 1.	
29	Set RECEIVER switch to position 1.	
30	Operate M key.	
31	At 4A test set— Operate OPERATE-CLEAR and START-STOP keys. ***Note:*** The OPERATE-CLEAR key and the START-STOP key are released when the lamp behind the key is extinguished and is operated when the lamp is lighted.	
32	At E&M interface unit— Operate TWD LINE key to OFF HK.	At SF unit— M relay pulses. HL relay operates and holds during pulsing. At 4A test set— Display indicates between 44 and 53 ms make. ***Note:*** Any time the M relay does not meet its pulsing requirement, adjust the armature back tension and, if necessary, change R105 resistor as specified in circuit notes of SD. The relay must still meet the requirements as specified in circuit requirements table of SD.
33	Operate TWD LINE key to ON HK.	At SF unit— M, HL relays release.
34	At 4A test set— Set PULSE WIDTH switch to 70.	
35	Operate TWD LINE key to OFF HK.	At SF unit— M relay pulses. HL relay operates and holds during pulsing. At 4A test set— Display indicates between 65 and 72 ms make. (See note in Step 32).
36	Operate TWD LINE key to ON HK.	M, HL relays release.
37	At test circuit— Restore M key.	
38c	If no other tests are to be made— Restore all circuits to normal.	

STEP	ACTION	VERIFICATION
B. Hold of HL Relay and, for all E2B, E3B, and E4B Units, Release of CO Relay		
HL Relay		
26	At 4A test set— Set PULSE PERIOD switch to 333.	
27	Set PULSE WIDTH switch to: 100 for E1B, E2B, E3B, E3B-2 through E3B-6 units; to 267 for E1B-( ), E2B-( ), E3B-7 or higher, and E4B-( ) units; or to 67 for all other units.	
28	At test circuit— Set KEYERS switch to position 2.	
29	Set RECEIVER switch to position 1.	
30	Operate M key.	
31	At 4A test set— Operate OPERATE-CLEAR key.	
32	Operate TWD LINE key to OFF HK.	At SF unit— M relay pulses. HL relay operates and holds during pulsing.
33	At 4A test set— Release OPERATE-CLEAR key.	At SF unit— M, HL relays operated.
34	At 4A test set— Operate TWD LINE key to ON HK.	At SF unit— M relay releases. HL relay releases in less than one second.
CO Relay		
35	Set PULSE PERIOD switch to 125.	
36	Set PULSE WIDTH switch to 50.	
37	At test circuit— Operate CO key.	TMS indicates between -19 and -22 dB.
38	At 4A test set— Operate OPERATE-CLEAR key.	
39	Operate TWD LINE key to OFF HK.	M relay pulses. HL relay operated on E3B-12, E3B-15 through E3B-18, E3B-22 or higher, and E4B-( ). HL relay may not operate on all other units. TMS indicates no tone being transmitted.

STEP	ACTION	VERIFICATION
40	At 4A test set— Operate TWD LINE key to ON HK.	At SF unit— M, HL relays released.
41	At 4A test set— Set PULSE WIDTH switch to 95.	
42	Operate TWD LINE key to OFF HK.	At SF unit— M relay pulses, HL relay operated during pulsing. TMS indicates no tone being transmitted.
43	At 4A test set— Operate TWD LINE key to ON HK.	At SF unit— M, HL relays released.
44	At 4A test set— Set PULSE PERIOD switch to 250.	
45	Set PULSE WIDTH switch to 200.	
46	Operate TWD LINE key to OFF HK.	At SF unit— M relay pulses. HL relay operates. TMS indicates no tone being transmitted.
47	At 4A test set— Operate TWD LINE key to ON HK.	At SF unit— M, HL relays released.
48	At test circuit— Restore M, CO keys.	TMS indicates between -25 and -35 dB.
49	At SF unit— Manually operate RG relay.	TMS indicates less power than -45 dBm.
50	Release RG relay.	TMS indicates between -25 and -35 dB.
51	At 4A test set— Release OPERATE-CLEAR key.	
52c	If no other tests are to be made— Restore all circuits to normal.	

C. Transmitter Voice Path and Transmitted Tone Level

Transmitter Voice Path

26	At test circuit— Operate M key.	
27	Operate 1000~A key.	
28	Set KEYERS switch to position 2.	

STEP	ACTION	VERIFICATION
29	Set RECEIVER switch to position 2.	
30	At 4A test set— Operate PULSE/MEAS key to DROP.	
31	Operate TWD LINE key to OFF HK.	At SF unit— M, HL relays operated.
32	Operate OPERATE-CLEAR key.	
33	At test circuit— Simultaneously depress TMS A, TMS B keys.	TMS indicates between 0 and -.2 dB.
34	Release TMS A, TMS B keys.	
35	Set RECEIVER switch to position 1.	
36	Restore 1000 ~ A key.	
37	At 4A test set— Operate TWD LINE key to ON HK.	At SF unit— M, HL relays released.
Transmitted Tone Level		
38	At test circuit— Set KEYERS switch to position 3.	
39	Simultaneously depress TMS A, TMS B keys.	If testing -13 TLP lines— TMS indicates between -32 and -34 dB. If testing -16 TLP lines— TMS indicates between -35 and -37 dB.
40	Release TMS A, TMS B keys.	
41	At SF unit— Block operated HL relay.	
42	At test circuit— Simultaneously depress TMS A, TMS B keys.	If testing -13 TLP lines— TMS indicates between -19.5 and -22.5 dB. If testing -16 TLP lines— TMS indicates between -22.5 and -25.5 dB.
43	Release TMS A, TMS B keys.	
44	Set KEYERS switch to position 4.	At SF unit— M relay operated. TMS indicates less power than -45 dBm.
45	Remove blocking tool from HL relay.	HL relay remains operated. TMS indicates same as in Step 44.

STEP	ACTION	VERIFICATION
46	On test circuit— Restore M key.	M, HL relays released.
47	At 4A test set— Operate PULSE/MEAS key to LINE.	
48	Release OPERATE-CLEAR key.	
49c	If no other tests are to be made— Restore all keys to normal. Remove all cords. Restore all circuits to normal.	

D. Gain of Receiver Voice Amplifier and Insertion of Band-Elimination Filter.

Receiver Voice Amplifier

12	Set KEYERS switch to position 5.	
13	Set RECEIVER switch to postion 2.	
14	Operate M key.	At SF unit— M, HL relays operated.
15	At test circuit— Operate 1000~B key.	TMS indicates 0 dB. ***Note:*** If 0 dB requirement is not met, adjust RCV (REC on some units) potentiometer on SF unit to obtain 0 dB.
16	Set KEYERS switch to position 6.	
17	Set RECEIVER switch to position 1.	
18	Restore 1000~B key.	
19	Set attenuator to 18.6.	
20	Using a 3P7A cord assembly, patch 1000-0-600 jack to SF TST jack.	TMS indicates +7, ±0.5 dB.
21	Set RECEIVER switch to position 2.	TMS indicates same as in Step 20, ±0.3 dB.
22	Set KEYERS switch to position 5.	
23	Remove patch from 1000-0-600 and SF TST jacks.	
24	Operate 1000~B key.	TMS indicates 0 db.

STEP	ACTION	VERIFICATION
Band Elimination Loss at 1000 Hz		
25	At SF unit— Manually operate RG relay.	TMS indicates between 0 and -0.7 dB. ***Note:*** RG relay may possibly remain operated.
26	At test circuit— Restore 1000~B key.	RG relay will release if it remained operated in Step 25.
27	Set KEYERS switch to position 6.	
28	Set RECEIVER switch to position 4.	At SF unit— M, HL relays released.
29	Set attenuator to 10.	TMS indicates 0 dB, ±0.2 dB. ***Note:*** If 0 dB requirement is not met, adjust gain control of TEST AMPL to obtain 0 dB.
Electronic Cut Operation		
	Caution: RG relay should not be blocked in nonoperated position with blocking tool, as continued application of high-level tone can damage transistors and/or resistors. As soon as verification of Step 30 has been made, allow RG relay to operate.	
30	At SF unit— Hold RG relay nonoperated.	
31	At test circuit— Set RECEIVER switch to position 3.	TMS indicates less power than -35 dBm.
32	Allow RG relay to operate. ***Note:*** Operation of RG relay depends on proper setting of SS potentiometer. If it does not operate, perform Test E, then repeat Test D, Steps 27 through 32.	
Band Elimination Loss at 2600 Hz		
33	At test circuit— Set RECEIVER switch to position 2.	TMS indicates -30 dBm or less power. (-28 dBm or less if test circuit is mounted in a REVERTIVE-TERMINATING bay and CT key is operated.)
34	Restore M key.	

STEP	ACTION	VERIFICATION
35c	If no other tests are to be made— Restore all circuits to normal.	

E. Operate Sensitivity of Receiver Signaling Amplifier

Note: This test should be performed if Tests G and H are to be performed or if the receiver of the SF unit is connected in a 4-wire, +7 line office. It is important to have the test amplifier properly adjusted per Test D Steps 27 and 28. The operation and release of the G relay, in those units having one, depends upon the release and operation of the RG relay. See Test G.

12	At test circuit— Set KEYERS switch to position 6.	
13	Set RECEIVER switch to position 4.	
14	Set attenuator to 33.	
15	Set RECEIVER switch to position 3.	At SF unit— RG relay should not operate. ***Note:*** If RG relay does operate, adjust SS potentiometer slightly counterclockwise until RG relay releases.
16	At test circuit— Set attenuator to 32.	At SF unit— RG relay should operate. ***Note:*** If RG relay does not operate, adjust SS potentiometer slightly clockwise until RG relay operates.
17	Repeat Steps 14 through 16 until requirements are met.	
18	At test circuit— Set attenuator to 40.	RG relay released.
19c	If no other tests are to be made— Restore all circuits to normal.	

F. Timing of Receiver R, RG, and G Relays

Note: Test E should be performed before beginning Test F.

26	At 4A test set— Set PULSE PERIOD switch to 100.	

STEP	ACTION	VERIFICATION
27	Set PULSE WIDTH switch to 55.	
28	At test circuit— Set KEYERS switch to position 7.	
29	At 4A test set— Operate OPERATE-CLEAR key.	
30	Operate TWD LINE key to OFF HK.	At test circuit— M relay pulses. At 4A test set— Display indicates 45 ms break. ***Note:*** If 45 ms break requirement is not met, adjust M potentiometer of test circuit until it is met.
31	At test circuit— Set attenuator to 11.	
Adjust OT Potentiometer		
32	At 4A test set— Set PULSE PERIOD switch to 400.	
33	Set PULSE WIDTH switch to 31.	
34	At test circuit— Set KEYERS switch to position 8.	
35	Set RECEIVER switch to position 3.	At SF unit— RG relay does not operate. Display indicates 20 ms break or less. See Step 37d.
36	At 4A test set— Set PULSE WIDTH switch to 35.	At SF unit— RG relay pulses uniformly. At 4A test set— Display indicates 26 ms break or more. See Step 37d.
37d	If requirements of Steps 35 or 36 are not met— At 4A test set— Set PULSE WIDTH switch to 33.	
38d	At SF unit— Adjust OT potentiometer fully clockwise then counter clockwise until RG relay pulses uniformly.	4A display indicates 26 ms break or more.

STEP	ACTION	VERIFICATION
39	Repeat Steps 33 through 36.	
Adjust RT Potentiometer		
40	At test circuit— Set KEYERS switch to position 7.	
41	At 4A test set— Set PULSE PERIOD switch to 100.	
42	Set PULSE WIDTH switch to 45.	
43	At test circuit— Set KEYERS switch to position 8.	At 4A test set— Display indicates 49 ms break for E1B, E2B, and E3B units or 51 ms break for E4B units. ***Note:*** If this requirement is not met, adjust RT potentiometer on SF unit fully counterclockwise then slowly clockwise until requirement is met.
44e	If testing E4B-( ) units— At test circuit— Set KEYERS switch to position 7.	
45e	At 4A test set— Set FUNCTION switch to % BK.	
46e	Set GEN SUP switch to ON HK.	
47e	Set PULSE PERIOD switch to 83.	
48e	Adjust PULSE WIDTH switch for a display readout of 85.0. ***Note:*** If reading goes to 85.5 or greater, reduce PULSE WIDTH switch setting to first display readout of less than 85.0.	
49e	Set FUNCTION switch to MSEC BK.	
50e	Set GEN SUP to OFF HK.	
51e	At test circuit— Set KEYERS switch to position 8.	
52e	At 4A test set— Operate START-STOP switch to OFF position, then to ON position.	Display indicates between 54 and 58 ms break. ***Note:*** If the requirement is not met, adjust PM potentiometer on SF unit until a 56 ms break indication is met.

STEP	ACTION	VERIFICATION
53e	Set PULSE WIDTH switch to 62.	At SF unit— RG relay pulses uniformly. 4A test set display indicates between 49 and 60 ms break. ***Note:*** If requirement is not met, adjust OT potentiometer slightly clockwise until requirement is met.
54e	At 4A test set— Set PULSE WIDTH switch to 42.	At SF unit— RG relay pulses uniformly. 4A test set display indicates between 45 and 54 ms break. ***Note:*** If requirement is not met, adjust OT potentiometer slightly counterclockwise until requirement is met.
55f	If any adjustment of OT potentiometer was made— Repeat Steps 32 through 36.	
56	At test circuit— Set KEYERS switch to position 7.	
G Relay		
57g	If testing E1B-11 or higher, E2B-11 or higher, E3B-11 through -18, E3B-21 or higher, and E4B-( )— At 4A test set— Set PULSE PERIOD switch to 100.	
58g	Set PULSE WIDTH switch to 75.	
59g	At test circuit— Set KEYERS switch to position 8.	At SF unit— RG relay pulses. G relay operated.
60g	Manually release G relay.	RG relay stops pulsing and remains operated.
61h	If testing E1B-( ), E2B-( ), E3B-7 or higher, and E4B-( )— At 4A test set— Set PULSE PERIOD switch 333.	
62h	Set PULSED WIDTH switch to 67.	At SF unit— RG relay pulses. G relay operated.
63h	At 4A test set— Raise PULSE WIDTH switch setting until	At SF unit— RG relay pulses.

STEP	ACTION	VERIFICATION
	display indicates 132.	G relay operated. 4A PULSE WIDTH switch indicates 145, ±10 ms break.
64h	At 4A test set— Raise PULSE WIDTH switch setting until display indicates 233.	At SF unit— RG, G relays pulse. 4A PULSE WIDTH switch indicates 225, ±10 ms break.
65h	At 4A test set— Lower PULSE WIDTH switch setting until display indicates 67.	At SF unit— RG relay pulses. G relay operated. 4A PULSE WIDTH switch indicates 75, ±5 ms break.
Rering Response		
66	At 4A test set— Set PULSE PERIOD switch to 250.	
67	Set PULSE WIDTH switch to 70.	
68	At test circuit— Operate M key.	
69	Set RECEIVER switch to position 2.	At SF unit— RG relay pulses. M relay operated. At 4A test set— Display indicates between 65 and 85 ms break.
70	At test circuit— Change attenuator in 2 dB steps from 5 to 17.	Indication should be the same as in Step 69 ±5 ms.
71	Set attenuator to 11.	
72	At 4A test set— Set PULSE WIDTH switch to 125.	Display indicates between 105 and 140 ms break.
73i	If testing E3B-( ) and E4B-( ) units—	
74i	Set PULSE WIDTH switch to 40.	At SF unit— RG relay does not operate.
75	Restore M key.	RG relay pulses.
76	Set RECEIVER switch to position 4.	RG relay stops pulsing.
77j	If no other tests are to be made— Restore all circuits to normal.	

STEP	ACTION	VERIFICATION
G. Voice Amplifier Cutoff Transistor		
26	At test circuit— Disconnect plug from TMS jack	
27	Connect one end of 3P7A cord assembly to TMS jack.	
28	At 4A test set— Connect other end of 3P7A cord assembly to FROM LINE jack on the SF interface unit.	
29	At 4A test set— Set MS RANGE switch to 99.9.	
30	Set RECEIVER switch to SF.	
31	Set PULSE PERIOD switch to 500.	
32	Set PULSE WIDTH switch to 50.	
33	At SF interface unit— Operate PULSE/MEAS key to LINE.	
34	Operate TWD EQPT key to MON.	
35	Operate TWD LINE key to MON.	
36	Set NB-BB switch to NB.	
37	At E&M interface unit— Operate TWD LINE key to OFF HK.	
38	At test circuit— Set KEYERS switch to position 8.	
39	Set RECEIVER switch to position 3.	
40	At 4A test set— Operate START-STOP key.	
41	Operate OPERATE-CLEAR key.	4A display indicates 10 to 25 ms break.
42	At test circuit— Connect 3P17B cord assembly from TMS to TMS jack.	
43c	If no other tests are to be made— Restore all keys, remove all cords, restore all circuits to normal.	

STEP	ACTION	VERIFICATION
H. Receiver Guard Action and 2-Wire Controls		
	Note: Test F should be performed before beginning Test H.	
12	At test circuit— Set KEYERS switch to position 5.	
13	Set RECEIVER switch to position 6.	TMS indicates between -18.5 and -19.5 dB.
14	Set attenuator to: 31 for E1B, E2B, E3B, E3B-2, and E3B-4; 26 for E1B-( ), E2B-( ), E4B-( ), and E3B-( ), except E3B-2 and E3B-4.	
15	Set RECEIVER switch to position 5.	At SF unit— RG relay released.
16	Set KEYERS switch to position 6.	RG relay remains released.
17	Set KEYERS switch to position 5.	
18	Set attenuator to: 26 for E1B, E2B, E3B, E3B-2, and E3B-4; 21 for E1B-( ), E2B-( ), E4B-( ), E3B-( ), except E3B-2 and E3B-4.	
19	Set KEYERS switch to position 6.	AT SF unit— RG relay operated.
20	Set KEYERS switch to position 5.	RG relay released.
21	Set RECEIVER switch to position 7.	
22	Operate M key.	M and HL relays operated.
23	Set attenuator to: 28 for E1B, E2B, and E3B; 24 for E1B-( ), E2B-( ), E3B-( ), and E4B-( ).	
24	Set KEYERS switch to position 6.	RG relay remains released. F lamp should be lighted, except for E4B-( ) where F lamp remains extinguished.
25	Set KEYERS switch to position 5.	
26	Set attenuator to: 20 for E1B, E2B, and E3B; 17 for E1B-( ), E2B-( ), E3B-( ), and E4B-( ).	

STEP	ACTION	VERIFICATION
27	Set KEYERS switch to position 6.	RG relay operates, extinguishing F lamp, except for E1B-13 through E3B where F lamp remains lighted.
28	Restore M key to normal.	M and HL relays released. On E1B-13 through E3B— F lamp extinguished.
29	Set KEYERS switch to position 5.	
30	Set RECEIVER switch to position 4.	RG relay released. On E1B-13 through E3B F lamp is lighted.
31c	If no other tests are to be made— Restore all circuits to normal.	

I. Final Adjustment of Receiver Sensitivity

Note: This adjustment is made only in 2-wire or 4-wire offices where a +4 receiving level is used or in 2-wire offices where a +7 receiving level is used. It is important to have the test amplifier properly adjusted per Test D, Steps 26 through 28, for this test.

12	Set KEYERS switch to position 6.	
13	Set RECEIVER switch to position 4.	
14	Set attenuator as follows for particular office:	

For 4-wire office with +4 TLP, set attenuator to 36
For 2-wire office with +4 TLP, set attenuator to 37
For 2-wire office with +7 TLP, set attenuator to 35

15	Set RECEIVER switch to position 3.	RG relay should not operate. See Step 16c.
16c	If RG relay does operate— Adjust SS potentiometer slightly counterclockwise until RG relay releases.	
17	Set attenuator as follows for particular office:	RG relay should operate.

For 4-wire office with +4 TLP, set attenuator to 35
For 2-wire office with +4 TLP, set attenuator to 35
For 2-wire office with +7 TLP, set attenuator to 34

STEP	ACTION	VERIFICATION
		See Step 18d.
18d	If RG relay does not operate— Slowly increase setting of SS potentiometer until it operates; repeat Steps 13 through 18d until requirements of these steps are met.	
19	Restore all circuits to normal.	

TABLE A

APPARATUS	TESTS								
	A	B	C	D	E	F	G	H	I
Test circuit (2.02)	1	1	1	1	1	1	1	1	1
4A Test set (2.03)	1	1	1			1	1		
TMS (2.04)		1	1	1				1	1
Cord (2.05)	1	2	2	2	2	2	1	1	1
Cord (2.06)									
Cord (2.07)						1	1		
Tool (2.08)	1	1	1	1	1	1	1	1	1
258D (dummy) plug	1	1	1			1			
Screwdriver, C				1	1	1			1
Tool (2.09)		1			1	1			
Tool (2.10)			✓						

✓ As required.

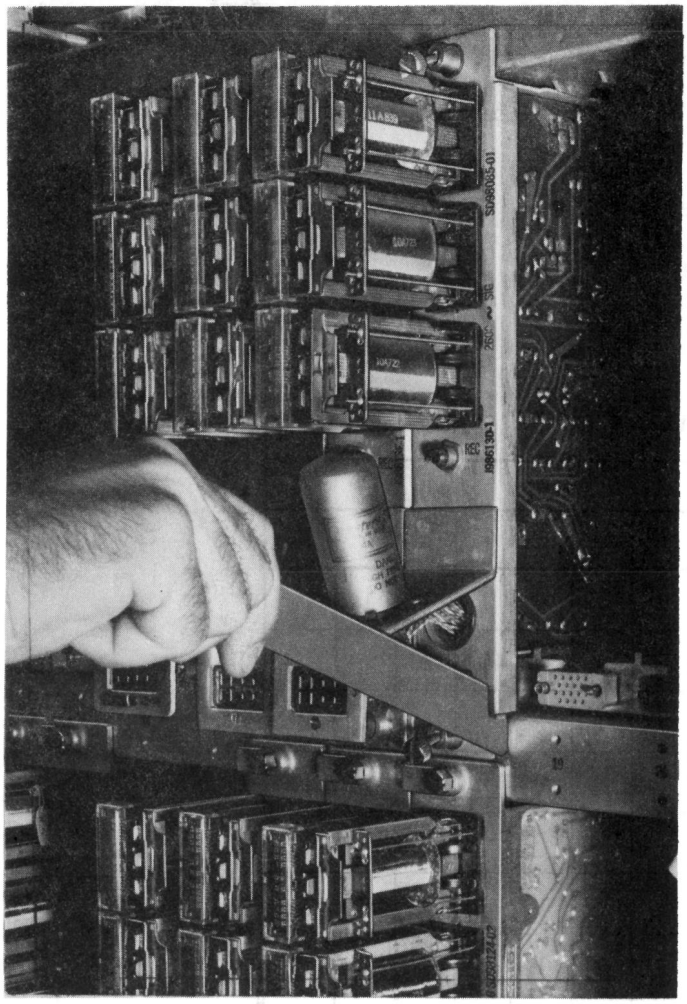

Fig. 1—Method of Removal of Fabricated Chassis

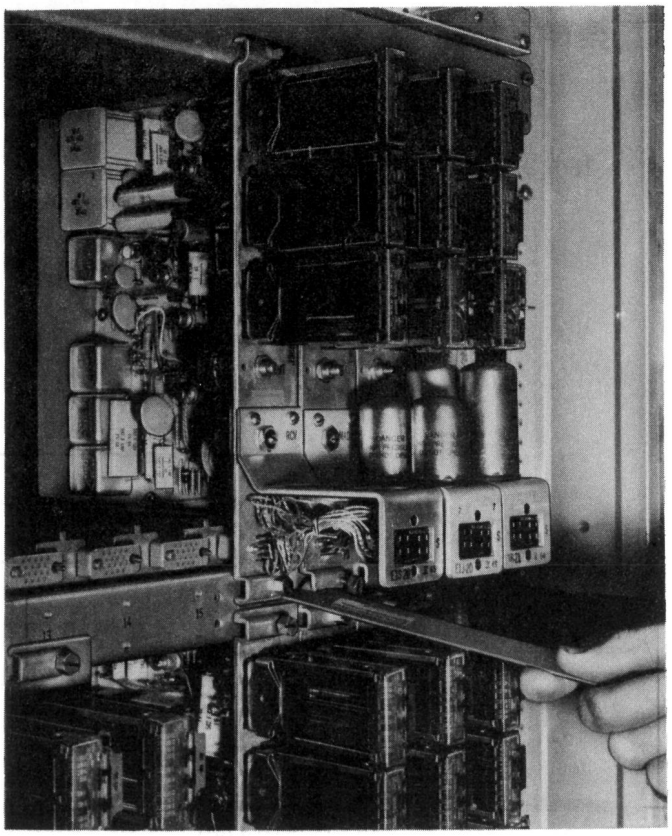

Fig. 2—Method of Removal of Die-Cast Chassis