

**REPLACING PAGE ADDENDUM
Filing Instructions:**

1. REMOVE FROM THE SECTION THE PAGES NUMBERED THE SAME AS THOSE ATTACHED TO THIS PINK SHEET.
2. INSERT THE ATTACHED PAGES INTO THE SECTION IN THEIR PLACE.
3. PLACE THIS PINK SHEET AHEAD OF PAGE 1 OF THE SECTION.

**906A DATA DISTORTION TEST EQUIPMENT
TEST, INSPECTION, AND ALIGNMENT**

1. GENERAL

1.001 This addendum supplements Section 107-302-500, Issue 1. The attached pages must be inserted in the section in accordance with the filing instructions given above.

1.002 This addendum is issued to correct testing information and test procedures.

4. OVER-ALL OR SECTIONALIZING TEST

The following changes apply to Part 4 of this section:

(a) Table A — Revised

(b) 4.26(c) — Revised

(c) 4.29(b) — Revised

5. TROUBLE LOCATING TESTS

The following changes apply to Part 5 of this section:

(a) Table H (step 6) — Revised

Attached

**Page 5/6 dated April 1974, Revised
Page 7/8 dated April 1974, Revised
Page 9/10 dated April 1974, Revised
Page 11/12 dated April 1974, Revised
Page 13 dated April 1974, Reissued
Page 14 dated April 1974, Revised
Page 31 dated April 1974, Reissued
Page 32 dated April 1974, Revised**

TABLE A

20A Toll Testboard Controls											Distortion Calibrator Panel						
Keys							Switches										
REAR KEYS	DMS BIAS	TMR	FRR	LEV-OUT HI		TMS	CHAN SEL	GEN SPEED	DIST CTR	GEN MODE	FREQ			MULT	Action	Expected Results	Action If Test Fails
	DTA			NOR							OFF	CONT	MDM	SGL			
	SUPV	SND LEV	FRS CHK	LO	SEND SUPV	TMR					TST	INT	SG	BIAS			
FRONT KEYS	DLY DIST+	TST	TMS														
	DLY DIST-	DMO	SND	SUB AGC	DATA READ	READ											
TEST	SETTINGS																
All keys initially normal. Where no setting is indicated, key and switch positions remain the same as previous test.																	
	REAR KEYS	DTA	SND LEV	NOR			1	95.5	4	ALL POS	OFF	INT	MDM	SGL			
1. F1, normal level	REAR KEYS														Hold READ key operated.	Read -14.9 ±1 dbm on transmission measuring equipment. (LEV1 and LEV2 relays released)	Perform tests 2 to 6.
	FRONT KEYS		TST	SND		*											
2. F1, high level	REAR KEYS			LEV-OUT HI						RDM					Hold READ key operated.	Read -9.9 ±1 dbm on TME. LEV2 relay operated.	If 1 to 6 fail, troubleshoot modulator section.
	FRONT KEYS					*											
3. F1, low level	REAR KEYS			LO											Hold READ key operated.	Read -26.9 ±1 dbm on TME. LEV1 operated.	If 1 to 4 fail, troubleshoot CP31.
	FRONT KEYS					*											
4. F1, below AGC level	REAR KEYS			NOR											Hold READ key operated.	Read -35.9 ±1 dbm on TME. LEV1 and LEV2 relays operated.	If any of 1 to 4 fails, check operation of LEV1 and LEV2 relays.
	FRONT KEYS			SUB AGC		*											
5. F2, normal level	REAR KEYS			NOR											Hold READ key operated. Plug rear terminal test cord into GS jack.	Read -9.9 ±1 dbm on TME.	If 5 fails, troubleshoot CP31.
	FRONT KEYS					*											

* See Action column for key setting.

TABLE A (Cont)

20A Toll Testboard Controls											Distortion Calibrator Panel							
Keys							Switches											
REAR KEYS	DMS BIAS	TMR	FRR	LEV-OUT HI		TMS	CHAN SEL	GEN SPEED	DIST CTR	GEN MODE	FREQ			MULT				
	DTA			NOR							OFF	CONT	MDM	SGL				
	SUPV	SND LEV	FRS CHK	LO	SEND SUPV	TMR					TST	INT	SG	BIAS				
FRONT KEYS	DLY DIST+	TST	TMS															
	DLY DIST-	DMO	SND	SUB AGC	DATA READ	READ												
TEST	SETTINGS																	
Return all keys to normal (center) position.																		
6. SUPV, normal level	REAR KEYS					SEND SUPV	TMR	SUPV	95.5	4	RDM	OFF	INT	MDM	SGL	Action	Expected Results	Action If Test Fails
	FRONT KEYS						*											
Return all keys to normal (center) position.							Unplug LD test cord.											
7. F1, mark frequency	REAR KEYS							1	95.5	4	MK	OFF	INT	MDM	SGL	Turn on KS-19247, List 1, electronic counter. Set control to 1 sec.	Read frequency of 1270 ±1 cps.	Perform all tests 7 to 12. If all fail, troubleshoot CP33.
	FRONT KEYS			SND														
8. F1, space frequency											SP					Plug rear terminal test cord into GS jack.	Read 1070 ±1 cps.	
9. F2, space frequency	FRONT KEYS		TST													Plug rear terminal test cord into GS jack.	Read 2025 ±1 cps.	If 7, 8, 9, or 10 fails, troubleshoot CP31.
10. F2, mark frequency											MK						Read 2225 ±1 cps.	

* See Action column for key setting.

TABLE A (Cont)

20A Toll Testboard Controls												Distortion Calibrator Panel				Action	Expected Results	Action If Test Fails								
Keys						Switches						FREQ	CONT	MDM	MULT											
REAR KEYS	DMS BIAS	TMR	FRR	LEV-OUT HI		TMS	CHAN SEL	GEN SPEED	DIST CTR	GEN MODE	OFF										SGL					
	DTA			NOR		TST					INT								SG	BIAS						
	SUPV	SND LEV	FRS CHK	LO	SEND SUPV	TMR																				
FRONT KEYS	DLY DIST+	TST	TMS																							
	DLY DIST-	DMO	SND	SUB AGC	DATA READ	READ																				
TEST												SETTINGS														
Return all keys to normal (center) position.																										
11. SUPV, mark frequency	REAR KEYS					SEND SUPV	*											Unplug rear terminal test cord. Operate READ key.	Read 385 ±1 cps.	If 11 or 12 fails, troubleshoot CP32.						
	FRONT KEYS							SUPV	9.5	4	MK	FREQ	INT	MDM	SGL											
12. SUPV, space											SP								Read 315 ±1 cps.							
Return all keys to normal (center) position.												Calibrate distortion meter (use CAL, HI, CAL LO key).														
13. Meter calibration check overflow lamp check	REAR KEYS	SUPV																Operate COUNT switch on display panel. Rotate DIST potentiometer slowly to right until message register just begins to count.	Distortion meter reads 4 ±0.5%. When counter counts OVERFLOW lamp comes on and will not stay out when RESET-START button is pushed.	If no distortion is indicated, troubleshoot CP8. If distortion is indicated but tests fail otherwise, troubleshoot distortion measuring set.						
	FRONT KEYS		** DMO					SUPV	95.5	4	RDM	TST	CONT	SG	MULT											
14.																		Repeat test 13.	Meter reads 8 ±0.5%.							
15.			** DMO															Repeat test 13.	Meter reads 12 ±0.5%.							
16.																		Repeat test 13.	Meter reads 16 ±0.5%.							
17.																		Repeat test 13.	Meter reads 20 ±0.5%.							
18.																		Turn COUNT switch off. Turn potentiometer switch counter-clockwise. Rotate potentiometer smoothly and slowly maximum clockwise.	Meter needle advances without any jumps.							

* See Action column for key setting.

** The TST-DMO key must be released to change the GEN SPEED, then DMO operated.

TABLE A (Cont)

20A Toll Testboard Controls											Distortion Calibrator Panel				Action	Expected Results	Action If Test Fails
Keys						Switches											
REAR KEYS	DMS BIAS	TMR	FRR	LEV-OUT HI		TMS	CHAN SEL	GEN SPEED	DIST CTR	GEN MODE	FREQ			MULT			
	DTA			NOR		OFF					CONT	MDM	SGL				
	SUPV	SND LEV	FRS CHK	LO	SEND SUPV	TMR					TST	INT	SG	BIAS			
FRONT KEYS	DLY DIST+	TST	TMS														
	DLY DIST-	DMO	SND	SUB AGC	DATA READ	READ											
TEST											SETTING						
19. Single hit calibration	Rear Keys	SUPV					SUPV	200	20	RDM	TST	INT	SG	SGL	Rotate DIST potentiometer clockwise until a single hit is just registered periodically on register.	Meter reads peaks of 19 to 20%. OVERFLOW lamp stays out when RESET-START button is pushed.	Troubleshoot distortion measuring set.
	Front Keys		DMO														
20. Sync Logic		DTA							20						Push SYN RESET button.	OUT SYN lamp goes out and stays out.	Troubleshoot distortion measuring set.
21. Signal generator timing check	Rear Keys	SUPV	**					95.5	16						After setting GEN SPEED operate TST-DMO to DMO.	Time between hits = 7.2 to 7.3 seconds.	Troubleshoot signal generator.
	Front Keys		DMO														
22. Hit counter check		SUPV												MULT	Press RESET START button between bursts. DIST potentiometer counter-clockwise until register stops counting.	Register registers 5-10-15-20, etc. When switched to DTA mode, register counts 1-2-3-4, etc. Register should stop counting single hits when meter reads less than 19. 0 to 5%.	Troubleshoot hit counter.
23. Demodulator	Rear Keys	DTA			NOR										Push SYN RESET button.	OUT SYN lamp goes out and stays out. Distortion meter reads 0 to 5%.	
	Front Keys		**				1	200			OFF		MDM				

** The TST-DMO key must be released to change the GEN SPEED, then DMO operated.

4.23 To check the operation of this portion of the circuit, perform the following test:

- (a) Connect output of 600-ohm balanced oscillator (OSC jack) to LD cord and ground sleeve of cord. This can be done by using the BRIDGE GS jacks if available. Operate key **FREQ-NSE** to **FREQ** and block key **READ** operated. Set oscillator for 640 ± 2 cps reading on frequency counter. This is the mark frequency for channel 1.
- (b) Restore **FREQ-NOISE** key and operate key **TMR-TMS** to **TMR**. Adjust oscillator for reading of $906 - 24.0 \pm 0.1$ dbm.
- (c) Disconnect LD cord and connect oscillator to MON cord through circuit for Fig. 1. The OSC IN and MON TEST jacks may be used if they are available. Set switch **CHAN SEL** to 1. (Relay CH1 operates.) Record to nearest 0.1 db the reading on the transmission measuring set.

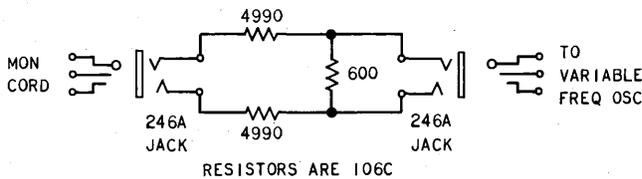


Fig. 1 — Jack Circuit

- (d) Repeat (a) through (c) for a frequency of 840 cps, which is the space frequency for channel 1. This reading must be within 0.8 db of that in (c); if not see 5.28.
- (e) Average of recorded readings should be within 0.4 db of the reading in (b).
- (f) Repeat (a) through (e) for the following settings of the **CHAN SEL** switch and pairs of frequencies:

CHAN SEL	Mark	Space	Relay Operated
	cps		
2	1118	1318	CH2
3	1595	1795	CH3
4	2073	2273	CH4
5	2550	2750	CH5
6	3028	3228	CH6
SUPV	315	385	CH7

Note: When finished, return all keys to normal.

4.24 If any of the averages of the mark and space power are not within 0.4 db of the input power, see 5.15 through 5.30. The operation of the relays may be checked using SD-73022-01, Sheet B7.

CHANNEL DEMODULATOR

4.25 This section describes the test for checking the circuitry that shifts the frequency band of the data channel, selected as in 4.20 and 4.21 to the F2 band so that the data distortion may be measured. The portion of the circuit that performs this function consists of a channel demodulator on CP51, low-pass filters included in FL5, 6, and 7, a channel amplifier on CP51, the channel selector relays CH1 through CH7, and relays TMC and DDC. The channel demodulator, which shifts the frequency band, is supplied with the necessary carrier frequencies from a B1 data carrier supply unit. The carrier frequency appropriate to the selected channel is connected to the channel demodulator by the channel selector relays.

4.26 The output of the channel amplifier is connected to the F1/F2 demodulator (4.16 through 4.18) and the data distortion is then measured as in the over-all tests. Therefore, it is necessary that the data demodulator and distortion measuring circuit are working properly so that sectionalizing data distortion measurements may be made. Thus, it is assumed that these tests are satisfied before performing the test de-

scribed below, since it checks the signal only as far as the input to the data demodulator.

- (a) Adjust the output power of the 600-ohm balanced oscillators (OSC jack) to -24 ± 1 dbm.
- (b) Connect oscillator to MON cord through circuit of Fig. 1 or use 906 OSC IN and MON TEST jacks. Connect a terminal test cord to the 906 DEMOD INPUT MEAS jack. Operate key SUPV-DATA to DATA and block operated key DATA READ.
- (c) Set oscillator frequency to 740 ± 20 cps and CHAN SEL switch to 1 and hold operated key TMR-SND LEV to TMR. Operate DMO-TST key to TST. (Relays DDC, TMC, and CH1 are operated.) On the transmission measuring set, read -19 ± 3 db for an oscillator output of -24 dbm.
- (d) Release key TMR-SND LEV and hold operated key FRR-FRS CHK to FRR. Read 2125 ± 20 cps on the electronic counter. Release key FRR-FRS CHK.
- (e) Repeat (c) and (d) for the following frequencies and settings of the CHAN SEL switch:

CHAN SEL	CPS	Relays Operated
2	1218	DDC, TMC, CH2
3	1695	DDC, TMC, CH3
4	2173	DDC, TMC, CH4
5	2650	DDC, TMC, CH5
6	3128	DDC, TMC, CH6

- (f) Set switch GEN SPEED to each of its positions. Each time the position is changed, momentarily release the DATA READ key. For each position, the lamps corresponding to the switch setting should light.
- (g) When finished, return all keys to normal.

4.27 A detailed discussion of the location of causes for failure of the above test is given in 5.31 through 5.36. If any of the measured

frequencies are wrong, there is an error in the carrier frequency being supplied from the B1 data carrier supply unit. (See 4.56.) If any of the measured powers are wrong, make sure that 4.22 is satisfied. If the trouble remains, see 5.32 through 5.35. If no signal gets through at all, see 5.32 through 5.34. The operation of the relays may be checked from SD-73022-01, Sheets B7 and B6.

4.28 If the set fails to measure distortion satisfactorily on B1 system tests even though working on local test (4.15) and the above test, there may be troubles in the channel demodulator. (See 4.35.)

CIRCUIT FOR MEASUREMENT OF DISTORTION ON 4-WIRE WIDE-BAND CIRCUIT

4.29 The signal from the 4-wire facility is connected to the input of the data demodulator by the DMC relay. The output of the demodulator goes to the distortion measuring circuit, and the data distortion is measured as in 4.01 through 4.08. The operation of the F1 relay which controls the frequency of the demodulator is controlled by the F lead. Assuming the tests of 4.15 through 4.17 work, these functions may be checked by the following test.

- (a) Connect a front terminal test cord to a line drop (LD) cord and ground the sleeves of the cords. This can be done using the BRIDGE GS jacks in the 20A if they are available.
- (b) Operate keys and switches as follows:
 - (1) GEN SPEED to 150
 - (2) DATA-SUPV to DATA
 - (3) WBF1 to WBF1
 - (4) SND-TMS to SND and block operated
 - (5) DATA READ block operated
 - (6) TST-DMO to TST
 - (7) GEN MODE to RDM
 - (8) LEV OUT to LO

(Relays A, B, C, GS2, GS3, F, DMC, DDC, and TMC are operated.)

TABLE H—OVER-ALL TESTS FOR 906A DATA DISTORTION TEST EQUIPMENT

Step	Test Conditions	Input To 908A	908A Settings		908A Requirements		Actions	
			Rotary SW	DPDT SW	Meter Reading	Lamp Condition	Upon Success	Upon Failure
NOTE: Before each step, reset all controls to normal.								
1	<i>CP15</i> Set the GEN MODE switch to DOT, the GEN SPEED switch to 200 and the TST DMO key to DMO.	TP2 DI CP15	500 cps	DF	10.0 ±1.0	—	Proceed to the next test.	Either the card is bad or input is not present.
2	Same as above.	TP5 MPI CP15 Use positive pulse procedure.	500 cps	DF	10.0 ±1.0	—	Proceed to the next test.	Replace CP15.
3	Same as above.	TP6 MP2 CP15 Use positive pulse procedure.	500 cps	DF	10.0 ±1.0	—	Proceed to the next test.	Replace CP15.
4	Same as above.	TP4 G2 CP15 Use negative pulse procedure.	500 cps	DF	10.0 ±1.0	—	Proceed to the next test.	Replace CP15.

TABLE H — OVER-ALL TESTS FOR 906A DATA DISTORTION TEST EQUIPMENT (Cont)

Step	Test Conditions	Input To 908A	908A Settings		908A Requirements		Actions	
			Rotary SW	DPDT SW	Meter Reading	Lamp Condition	Upon Success	Upon Failure
5	<p>CP15 (Cont.)</p> <p>(a) Same as above.</p> <p>(b) Ground TP2 G3 CP14.</p> <p>(c) Set DMS key to BIAS.</p>	TP7 MP3 CP15	500 cps	DF	10.0 ±1.0	—	Proceed to the next test.	Replace CP15
6	<p>(a) Set GEN MODE switch to DOT.</p> <p>(b) Operate SEND SUPV key.</p> <p>(c) Operate DMS BIAS-DATA-SUPV key to SUPV.</p> <p>(d) Set GEN MODE switch to DOT.</p> <p>(e) Set GEN SPEED 95.5 bits/sec.</p> <p>(f) Release and set TST-DMO to DMO.</p> <p>(g) Operate DATA READ key.</p>	TP2 DI CP15	500 cps	DF	5.0 ±0.5	—	Proceed to the next test.	Connect input of 908A to TP BID CP62 and repeat this. If test passes, CP15 is bad. Be sure that the SSC relay is operated.