

**HIGH SEAS AND OVERSEAS RADIO  
WESTINGHOUSE LINEAR AMPLIFIER  
TYPE MS AND TYPE MS (MODIFIED)  
TESTS**

The MS linear amplifier is tested for normal operation with the LD-T2 transmitter. Test signals are generated and measured with the 40B transmission measuring set (TMS).

If a test cannot be completed as specified, determine if the trouble is in the MS amplifier and refer to Section 403-331-502 (alignment) or to Section 403-331-503 (trouble location). Tests should be performed in the order specified.

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**APPARATUS:**

- 1—40B Transmission Measuring Set
- 4—Patch Cords, 6 ft long, Belden No. 8412 shielded wire, with type 241 plugs
- 1—Coaxial Patch Cord (provided with LD-T2 transmitter)

**CHART 1  
TEST OF MONITOR GAIN**

The signal monitor (LD-T2 transmitter) is adjusted for use with the MS linear amplifier. The 40B TMS and patch cord are used in this test.

## CHART 1 (Cont)

STEP	PROCEDURE
	<b>Caution:</b> Section 403-331-502 is prerequisite to this test.
1	Place the LD-T2 transmitter and the MS amplifier in operation.
2	At the LD-T2 transmitter, set the following controls: LOAD CONTROL switch to IN GROUP A key to TEST TONE GROUP B key to SPLIT CARRIER RESUPPLY switch to -20 DB HF INPUT SELECTOR switch to EXT AMP
3	At the jack field of the transmitter, patch the MON OUTPUT jack to the REC 600 OHMS jack of the 40B TMS.
4	At the LD-T2 transmitter and the MS linear amplifier, set CONTROL keys (K3) to REMOTE.
5	At the master control panel, set the CONTROL key (K4) to LOCAL.
6	At the master control panel, select the lowest operating frequency.
7	At the transmitter, adjust HF GAIN control to obtain proper test tone values on RF OUTPUT and CATHODE meter (setup card).  <b>Requirement:</b> Record audio output level on 40B TMS.
8	Repeat Steps 6 and 7 for each operating frequency.
9	Select the operating frequency with the lowest audio output measured on the 40B TMS.  <b>Requirement:</b> On the MONITOR, adjust the HP INPUT control for -10 dBm on the 40B TMS.
10	Disconnect all test connections; set test controls to normal.

## CHART 2

## SSB SIGNAL-TO-DISTORTION MEASUREMENT

Third order intermodulation products (2A-B) are measured in this test. The 40B TMS and patch cords are used.

## CHART 2 (Cont)

STEP	PROCEDURE
1	<p><b>Caution:</b> <i>The test equipment, the LD-T2 transmitter, and the MS linear amplifier must be warmed up for at least 15 minutes prior to this test.</i></p> <p>At the LD-T2 transmitter, set the following controls:</p> <p>LOAD CONTROL switch to OUT</p> <p>CARRIER RESUPPLY switch to -20 DB</p> <p>HF INPUT SELECTOR switch to EXT AMP</p>
2	<p>On the 40B TMS, set the MEAS key to OSC and adjust the FREQ, OUTPUT, and ATTEN controls for an output of 375 Hz at -25 dBm (Fig. 1).</p> <div data-bbox="607 910 1257 1144" data-label="Diagram"> </div> <p style="text-align: center;"><b>Fig. 1</b></p>
3	<p>On the 40B TMS, set FILT key to IN, connect the AMP FILTER, and adjust the MEAS AMP control for a gain of 32 dB (Fig. 2).</p> <p><b>Requirement:</b> +7 dBm</p> <p><b>Note:</b> Trim the FREQ control for maximum indication before setting the gain of the amplifier.</p> <div data-bbox="434 1527 1339 1810" data-label="Diagram"> </div> <p style="text-align: center;"><b>Fig. 2</b></p>
4	<p>Disconnect the AMP FILTER.</p>

CHART 2 (Cont)

STEP	PROCEDURE
5	<p>At the 40B TMS, set the <b>FREQ</b> dial to 1625 Hz, the <b>ATTEN</b> control to zero, and patch the <b>ATTEN OUT</b> jack to the <b>REC 600 OHMS</b> jack; adjust the oscillator output level.</p> <p><b>Requirement:</b> +11 dBm</p>
6	<p>Set the <b>MEAS</b> key to 1000 CY; adjust the oscillator output level.</p> <p><b>Requirement:</b> +11 dBm</p>
7	<p>On the 40B TMS, set the following controls:</p> <p style="padding-left: 40px;"><b>MEAS</b> key to 1000 CY + OSC</p> <p style="padding-left: 40px;"><b>FILT</b> key to OUT</p> <p style="padding-left: 40px;"><b>ATTEN</b> to 2 dB</p>
8	<p>Make the following test connections between the LD-T2 transmitter and the 40B TMS (Fig. 3).</p> <p style="padding-left: 40px;"><b>GROUP A</b> input jack to <b>ATTEN OUT</b> jack</p> <p style="padding-left: 40px;"><b>MON</b> jack to <b>DIST MEAS IN</b> jack</p> <p style="padding-left: 40px;"><b>DIST MEAS OUT</b> jack to <b>REC 600 OHMS</b> jack</p> <p><b>Requirement:</b> Record the 2-tone output from the monitor.</p>

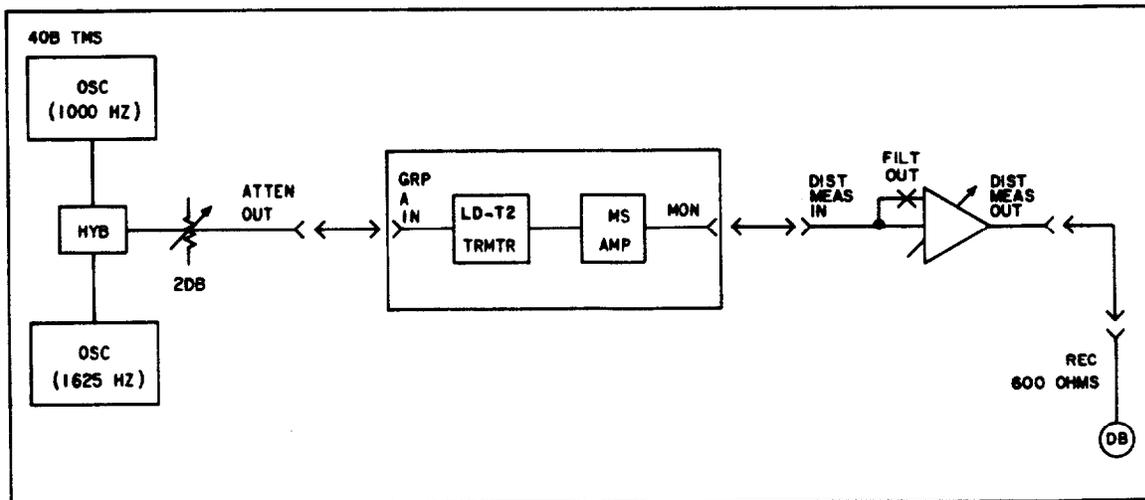


Fig. 3

## CHART 2 (Cont)

STEP	PROCEDURE
9	On the 40B TMS, set the FILT key to IN and measure the 375-Hz distortion product.
10	<p>Calculate the signal-to-distortion (S/D) ratio as follows:</p> $S/D = 2\text{-tone output (Step 8)} - 375\text{-Hz output (Step 9)} + \text{gain of AMP FILTER (Step 3)} - 2 \text{ dB.}$ <p><i>Example:</i> Step 8: -10 dBm  Step 9: -15 dBm  Step 3: +32 dB  <math>S/D = -10 - (-15) + 32 - 2 = 35 \text{ dB}</math></p>
11	On the 40B TMS, increase loss in the attenuator in 2-dB increments to 10 dB (4 steps) repeating Steps 8, 9, and 10.
12	<i>Requirement:</i> S/D ratio as specified per LD-T2 transmitter.
	Disconnect all test connections; set test controls to normal.

## CHART 3

## SIGNAL-TO-NOISE MEASUREMENT

The signal-to-noise ratio is measured using the 40B TMS and patch cords equipped with type 241 plugs.

STEP	PROCEDURE
1	Place the LD-T2 transmitter and the MS linear amplifier in operation.
2	<p>At the LD-T2 transmitter, set the following controls:</p> <p>GROUP A key to SPLIT</p> <p>GROUP B key to SPLIT</p> <p>CARRIER RESUPPLY switch to -10 DB</p>
3	Prepare the 40B TMS as follows (Fig. 4):

CHART 3 (Cont)

STEP

PROCEDURE

MEAS key to 1000 CY

MEAS AMP IN patched to RF OUTPUT (MS ampl)

DIST MEAS OUT patched to REC 600 OHMS

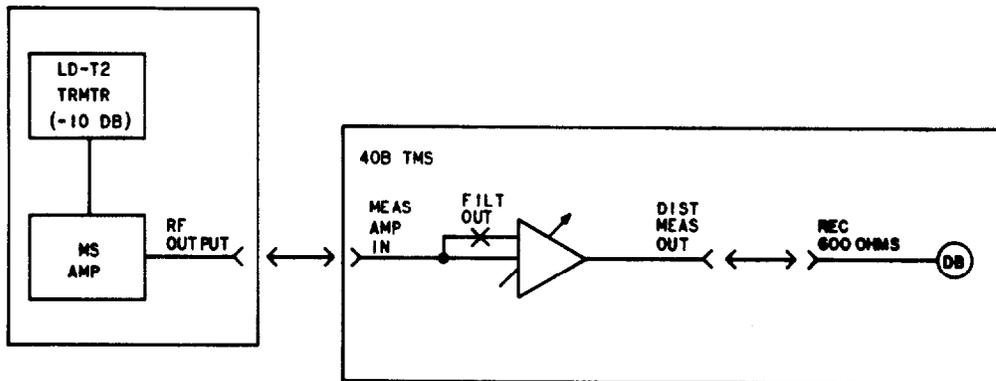


Fig. 4

- 4 On the 40B TMS, set FILT key to OUT.
- 5 Adjust MEAS AMP gain for a noise reading of  $-20$  to  $-30$  dB; record.
- 6 At the LD-T2 transmitter, set GROUP A key to normal (center position).
- 7 At the 40B TMS, disconnect the MEAS AMP patches.
- 8 Patch the ATTEN OUT jack to the REC 600 OHMS jack (Fig. 5); adjust attenuator for an output of  $-17$  dBm.

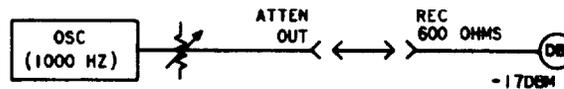


Fig. 5

- 9 Disconnect the patch of Step 8; connect the 1000-Hz output of the 40B TMS to the GROUP A input of the LD-T2 transmitter and measure the output of the MS amplifier RF OUTPUT jack (Fig. 6).

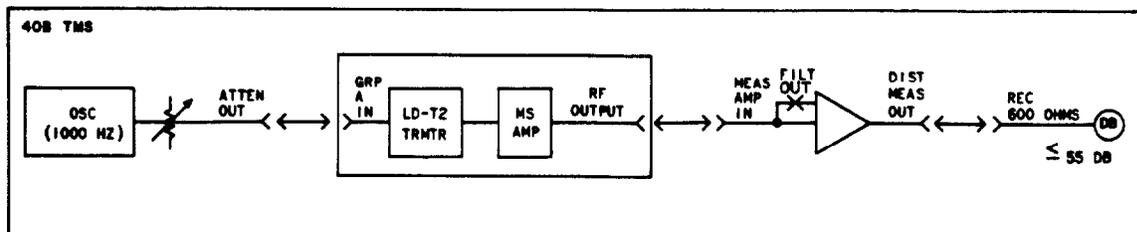


Fig. 6

## CHART 3 (Cont)

STEP	PROCEDURE
10	Calculate the S/N ratio as follows: $\text{S/N ratio} = \text{Step 9} - \text{Step 5} + 26 \text{ dB}$ <p><b>Requirement:</b> S/N ratio greater than 50 dB.</p> <p><b>Example:</b> Step 9: +7 dBm            Step 5: -22 dBm  <math display="block">\text{S/N} = +7 - (-22) + 26 = 55 \text{ dB}</math></p>
11	Disconnect all test connections; set test controls to normal.

## CHART 4

## FREQUENCY RESPONSE MEASUREMENT

Frequency response of the MS amplifier is measured at selected frequencies from 100 to 6000 Hz. The 40B TMS and patch cords are used.

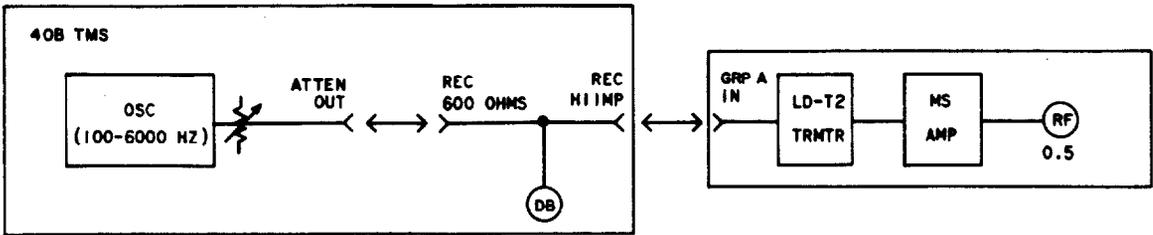
STEP	PROCEDURE
1	Place the LD-T2 transmitter and the MS linear amplifier in operation on the frequency to be tested.
2	At the LD-T2 transmitter, set the following controls: <p style="text-align: center;">LOAD CONTROL switch to OUT</p> <p style="text-align: center;">GROUP A key to NORMAL</p> <p style="text-align: center;">CARRIER RESUPPLY switch to -20 DB</p>
3	Connect the 40B TMS as shown in Fig. 7. <div style="text-align: center;">  </div>

Fig. 7

## CHART 4 (Cont)

STEP	PROCEDURE
4	<p>At the 40B TMS, set the MEAS key to OSC; adjust the FREQ and ATTEN controls to obtain an indication of 0.5 on the RF OUTPUT meter of the MS amplifier for each of the following test tones: 100, 200, 500, 1000, 2000, 3000, 4000, 5000, and 6000 Hz. Record the input level for each tone.</p> <p><b>Requirement:</b> Difference between maximum and minimum input levels not greater than 2 dB.</p>