

# TMC SPECIFICATION

NO. S 1227

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SHEET

OF

TITLE:

TEST PROCEDURE  
FOR  
LFE-1 and LFE-2

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TEST PROCEDURE

LFE-1

## 1. Equipment Used

- A. Signal Generator H.P. Model 606A.
- B. Scope Tektronix Model 541A or equivalent.
- C. Spectrum Analyzer Lavoie Laboratories Inc. Model LA-40A
- D. Audio Generator H.P. 200CD or equivalent.
- E. Ballantine VTVM Model 314 or equivalent.
- G. 0-10V, DC Power Supply
- H. Telonic D-550 Attenuator or equivalent.
- I. Millivolt Meter, Millivac MV-28B or equivalent.
- J. VTVM Hewlett-Packard Model 410B.

## 2. Preliminary Test (1mc and 3mc Oscillators inserted)

- A. With AC line cord removed, no cards inserted and power switch to "ON" position, measure resistance from Pin 1 J101 to ground. (100 ohms minimum.)
- B. Measure resistance from J115 Pin F to ground. (5K ohms minimum)
- C. Measure resistance from J114 Pin 9 to ground. (14K ohms minimum)
- D. Turn power switch to "STANDBY" position and insert PC-329 and PC-330 into unit. (Before inserting PC-330, turn R3 and R12 fully cw)
- E. Check for any visible shorts.
- F. Plug in AC line cord. The standby lamp should light.
- G. Turn power switch to "ON" position. The red "POWER" lamp should light.
- H. Measure DC voltage at Pin 6 at J304 (approximately 50V)

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- I. Insert all cards\*
- J. Allow fifteen (15) minutes warm-up.

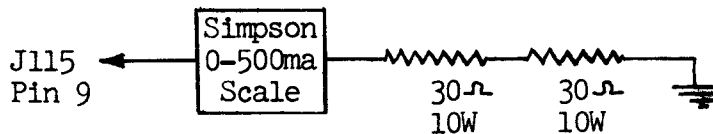
NOTE: In Test Procedure all pin numbers refer to their respective connectors.

## I. PC-329 Power Supply Board "A"

- A. Using Simpson 260A measure DC voltage level at J304 Pin A (approximately +50V).
- B. Measure DC voltage level at Pin E. (approximately +25V).

## II. PC-330 Power Supply Board "B"

- A. Measure DC voltage level at J303 Pin E (approximately +25V).
- B. Measure DC voltage level at Pin A (approximately +50V). Turn R3 and R12 fully cw.
- C. Measure DC voltage at Pin F. Adjust R8 for exactly 12.0V (All cards tested and inserted\*). Connect scope to Pin F. Maximum AC ripple should be 5mv. Adjust R3 until voltage level just starts to drop. Back off slightly to full voltage.
- D. Measure DC voltage at Pin 4. Adjust R18 for exactly 24.0V. Connect scope to Pin 4. Maximum AC ripple should be 2mv. Adjust R12 until voltage level just starts to drop. Back off slightly to full voltage.
- E. Measure DC voltage at J301 Pin E (28-30V).
- F. Turn power switch to standby position and meter switch to Q1 position. Adjust R106 meter adjust control (located at rear of meter switch) for equal readings on front panel meter and Simpson Model 260, in following set-up:



- \* Do not insert RF output card PC-391 until, XIII of test procedure has been followed.

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### III. PC-383 (J101) Spectrum Generator Card

1 MC A. Set lmc switch (S108) on rear panel to internal position. Place scope between Pin A and ground and adjust T1 for maximum output. (Place cards PC-304, PC-300 and PC-302 into unit for lmc load)

1 MC B. Place scope between Pin 3 and ground and adjust R60 for 0.6vpp output.

C. Measure level at collector of Q3 with scope (lmc spectrum of 1.5vpp).

D. Measure level at Pin D of J101 (100Kc spectrum of 1.0vpp).

12 MC E. Place scope to TP3 and ground. Adjust T2 and C12 for maximum output. (PC-392 inserted and lmc switch of front panel set to position 1. All other switches on front panel set to 0 positions.)

12 MC F. Place scope to Pin 8 and ground lead to Pin J. Adjust T3 for maximum output. (approximately 0.4vpp)

13 MC G. Place scope between TP6 and ground. Adjust C50 and T8 for maximum signal. All switches to "0".

13 MC H. Place scope between Pin P and ground lead to Pin R. Adjust T9 for maximum output, approximately .4 vpp).

8 MC I. Place scope between TP9 and ground. Adjust C73 and T10 for maximum output.

8 MC J. Place scope between Pin S and ground lead to Pin 15. Adjust T11 for maximum output. Output should be approximately 1.5vpp.

### IV. PC-304, Comb Filter A (J102) All following Front Panel Switches In Blank Position (100Hz, 1KHz, 10KHz and 100KHz). Comb Filter "B" Removed From Unit.

1.0 MC A. Place scope on TP9. Adjust C43 and T9 for maximum output.

1.0 MC B. Place scope on Pin J. Adjust T10 for maximum output. Adjust R35 for 0.7vpp.

1.2 MC C. Place scope on TP7. Adjust C32 and T7 for maximum output.

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- 1.2 MC D. Place scope on Pin P. Adjust T8 for maximum output. Adjust R28 for 0.7vpp.
- 1.4 MC E. Place scope on TP5. Adjust T5 and C22 for maximum output.
- 1.4 MC F. Place scope on Pin F. Adjust T6 for maximum output. Adjust R21 for 0.7vpp.
- 1.6 MC G. Place scope on TP4. Adjust T3 and C11 for maximum output.
- 1.6 MC H. Place scope on Pin L. Adjust T4 for maximum output. Adjust R14 for 0.7vpp.
- 1.8 MC I. Place scope on TP1. Adjust C10 and T2 for maximum output.
- 1.8 MC J. Place scope on Pin 4. Adjust T1 for maximum output. Adjust R3 for 0.7vpp.
- V. PC-304, Comb Filter B (J103) Set 100Hz, 1KHz, 10KHz and 100KHz. Switches in Blank Position. Comb Filter "A" removed from Unit.
- 1.1 MC A. Follow same procedure as IV A and B. Substitute 1.1MC.
- 1.3 MC B. Follow same procedure as IV C and D. Substitute 1.3MC.
- 1.5 MC C. Follow same procedure as IV E and F. Substitute 1.5MC.
- 1.7 MC D. Follow same procedure as IV G and H. Substitute 1.7MC.
- 1.9 MC E. Follow same procedure as IV I and J. Substitute 1.9MC.
- VI. PC-300 (J104 & J105) Double Mixer Divider Cards
- 8 MC A. Place scope probe from cathode side of CR1 to ground. Adjust the 100Hz switch to a blank position. Adjust T1 for maximum output. Place scope on TP1. Adjust R9 for minimum output. Output at cathode of CR1 should be 0.5vpp minimum.
- 9-  
9.09MC B. Place scope probe on cathode side of CR3 and ground lead to ground. Set 1Kc switch to blank position. Adjust 100Hz switch to position 5. Adjust T2, T3, T4, T5 and T6 for maximum output. Place probe on TP5 and adjust R23 for minimum output. Output at cathode of CR3 should be 0.5vpp minimum in 100Hz switch position from 0 through 9.

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10-  
10.99 MC

C. Rotate 100Hz switch to the blank position. Place signal generator through a 220 ohm resistor to TP5. Adjust generator output for 10.4mc and terminate generator line with a 47 ohm resistor.

1. Place scope probe at TP5. Ground lead to ground. Short TP6 to ground and adjust T7 for maximum output. Remove short from TP6 and adjust T8 for minimum output.
2. Place scope probe at TP7 with a ground lead grounded near this point. Short TP8 to ground. Adjust T9 for maximum output. Remove short from TP8 and adjust T10 for minimum output.
3. Place scope probe between TP9 and ground. Adjust T11 for maximum indication. With a generator input of 10mv rms the output should be 0.2vpp minimum for the range of 10mc to 11mc.

1-  
1.099MC

D. Disconnect generator. Place scope probe on the junction of L4 and R46. With the 100Hz switch in position 5, rotate the 10Hz switch from position 0 to position 9. The output should be 0.6vpp.

8 MC

E. Rotate the 1KHz switch to a blank position. Place the scope probe between the cathode end of CR6 and ground. Adjust T12 for maximum output. Place scope probe at TP10. Adjust R54 for minimum output. Output at cathode of CR6 should be 0.5vpp minimum.

9-  
9.099MC

F. Place scope probe between cathode side of CR8 and ground. Rotate the 1KHz switch to position 5. Adjust T13, T14, T15, T16 and T17 for maximum output. With the 1KHz switch in position 5, place the scope probe between TP14 and ground. Adjust R69 for minimum indication. Output at cathode of CR8 should be 0.5vpp minimum with the 100Hz switch in positions 0 through 9.

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TITLE: TEST PROCEDURE LFE-1

(PC-300, J105)

- 10-10. 999 MC G. Rotate the 1KHz switch to the blank position. Connect the signal generator through 220 ohm resistor to TP14 and connect the ground lead to ground. Make sure the signal generator lead is terminated with 47 ohms.
1. Place scope probe between TP5 and ground. Adjust signal generator for 10.4mc. Short TP6 to ground. Adjust T7 for maximum output. Remove short from TP6 and adjust T8 for minimum output.
  2. Place scope probe between TP7 and ground. Short TP8 to ground. Adjust T9 for maximum output. Remove short from TP8. Adjust T10 for minimum output.
  3. Place scope probe between TP9 and ground. Adjust T11 for maximum output. With a generator input of 10mv rms in, the output should be 0.2vpp minimum for the range of 10mc to 11mc.
- H. Repeat Steps D, E and F above. Substitute 10Hz switch with 1KHz switch and 100Hz switch with 10KHz switch.
- 1.0-1. 0999 MC I. Disconnect generator and rotate 100KHz switch to position 5. Place scope probe at Pin 15 and ground lead to Pin R. Rotate 10KHz switch from position 0 through position 9. Output should be 0.6vpp over a frequency variation from 1.0 to 1.0999mc.
- VII. PC-302 (J107) Final Mixer Card
- 8 MC A. Place scope probe from cathode end of CR2 to ground. Rotate 10KHz switch to the blank position. Rotate the 100KHz switch to position 5. Adjust T1 for maximum output. Place scope probe at TP1 and adjust R7 for minimum output. Place short between Pin H and Pin E. Output at cathode of CR2 should be 0.5vpp minimum.
- 9-9. 0999Mc B. Rotate the 1KHz and 10KHz switches to position 5. Place the scope probe between the cathode of CR3 and ground. Adjust probe between junction CR4 and CR3 and ground. Adjust R18 for minimum output. Output at cathode of CR3 should be 0.5vpp minimum.
- 10-10. 9999Mc C. Rotate 10KHz switch to a blank position. Connect generator through a 220 ohm resistor to TP5. Connect ground lead to ground. Adjust signal generator for 10.4Mc. Rotate 100KHz switch to position 4.

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TEST PROCEDURE LFE-1

1. Connect probe to TP5. Short TP7 to ground. Adjust T7 for maximum output. Remove short from TP7 and adjust T8 for minimum output.
2. Place scope probe between TP8 and ground. Short TP9 to ground. Adjust T9 for maximum output. Remove short from TP9 and adjust T10 for minimum output.
3. Remove PC-392, the translator card, from unit. Place a 47 ohm resistor between Pin 12 and 13 of J107. Place scope probe on TP10. Place short across secondary of T12. Rotate the 100KHz switch to position 5. Adjust generator for a frequency of 10.75mc. Adjust T11 for maximum output. Remove short from T12 and adjust T12 for minimum output.
4. Rotate 100KHz switch to position 4. Adjust generator frequency for 10.lmc. Short secondary of T12. Adjust C36 for maximum output. Remove short from T12 and adjust C48 for minimum output.

10-10.9999MC

5. Place scope across 47 ohm resistor. Set generator for 10.5mc 100Mv rms out. With 100KHz switch in position 4, output should be at least 0.2vpp with generator frequency of 10mc to 10.5mc. With the 100KHz switch in position 5, output should be at least 0.2vpp with a frequency input of 10.5mc to 11mc.

10-10.  
9999MC

- D. Remove generator input and set 10KHz switch to position 5. Remove short from Pin H and E. Rotate 100KHz switch from position 0 to position 9. Output should be a minimum of 0.2vpp. Remove 47 ohm resistor from Pin 12 and 13. Replace PC-392 the translator card to J108.

## VIII. PC-339 (J112) Carrier Generator Card

1 MC

- A. Adjust R27 fully ccw, exciter switch "ON", mode switch to "AM" position. Place scope at TP-1. Voltage should be 10.0vpp.



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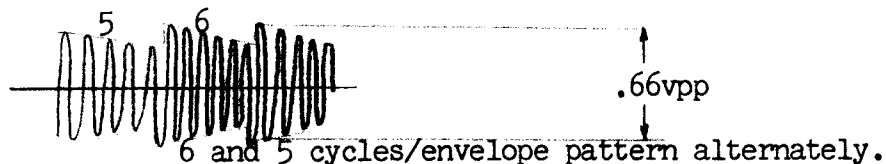
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TITLE: TEST PROCEDURE LFE-1

- 250 KC B. Place scope at TP3 and adjust T1 for maximum level. (approximately 900mvpp)
- 250 KC C. Place scope at TP4 and adjust T2 for maximum level. (approximately 1.4vpp)
- 2.75MC D. Adjust R51 fully cw. Place scope at TP6 and adjust T3 for maximum level of the following waveform. (approximately .66vpp).



- 2.75MC E. Place scope at TP7, adjust T4 for maximum level, and adjust R51 for 70mvpp.
- 250 KC F. Place mode switch in AM position and remove sideband generator card PC-337. Place scope at TP8 and adjust T5 for maximum level (approximately 1.0vpp). Replace sideband generator card PC-337.

## IX. PC-337 (J109) Sideband Generator Card

NOTE: (PC-339 Carrier Generator Card must be aligned and inserted into unit, PC-338 removed and R34 and R60 fully clockwise.)

- A. Connect audio generator with one side grounded to USB terminals on rear of unit.
- B. Set audio generator for 1Kc with output level set to 69mv. (-20dbm)
- C. Set mode switch and meter switch on front panel to USB positions.
- D. Set USB mike/line control for 2/5 of full scale reading on front panel meter.
- E. Place Ballantine 314 meter at TP4. Level should be approximately .013V rms.
- F. Place scope at TP5 and adjust T1 for maximum level. Adjust USB mike/line control for full scale reading on meter.

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TITLE: TEST PROCEDURE LFE-1

- G. Adjust R28 and C52 until, waveform is symmetrical and crossover is sharp and clear as viewed on scope. See the following waveform.



If necessary, change value of C50 and repeat until sharp crossover can be obtained.

- H. Return USB mike/line control to 2/5 full scale reading on meter and adjust R34 for 200mvpp on collector of Q7. Check output of sideband filter for approximately 75mvpp. This pot R34 and R60 of Step I4 below will be set again in Part II, Step C.
- I. Repeat Steps A thru H for LSB using:
1. TP11 for Step E
  2. TP8 and T2 for Step F.
  3. R54, C53 and C51 for Step G.
  4. R60 and Q12 for Step H.
- J. Remove audio generator input to rear panel of unit and connect to mike input on front panel or to Pin E of (J109) and ground.
- K. Set audio generator for 1Kc with output level of 1.0mv as measured with Ballantine 314, and short C49 with short jumper.
- L. Connect Ballantine 314 to TP3 and adjust R9 for a level of 40mv rms.
- X. PC-338 (J111) Frequency Shift Card \*
- A. Remove PC-338 from unit. Place mode switch to ISB position, and adjust R58 fully ccw. Turn carrier control on front panel fully clockwise. (R58 will be readjusted in Part II, Step N.)
- B. Set exciter switch to "ON" position and measure 2.75mc input at J111 Pin C. (approximately 70mvpp). Measure 250Kc input at J111 Pin 2 (approximately 70mvpp). Insert PC-338.
- C. Place scope at TP4 and tune T1 for maximum level.
- D. Place scope at J111 Pin 7 and tune T1 and T2 for maximum level. (approximately 0.4vpp).
- E. Connect frequency counter to vertical output terminals of scope. Place mode switch in FSK position. On rear panel set:
- \* NOTE: Do not attempt the FSK and/or FAX adjustments without a one (1) hours warm-up period for the 3mc oven. (The oven is on as long as the LFE line cord is plugged in.)

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TITLE: TEST PROCEDURE LFE-1

1. R101 to mid-range
2. Frequency shift switch to  $\pm 425$ cps (maximum) shift position.
3. Sense switch to + (up) position.

F. Adjust R56 for maximum level indication on scope. Note location of adjustments as follows: (These are 25 turn potentiometers).



- G. Insert card into unit (not on extender). Set R35 and R36 fully ccw.
- H. Adjust R37 for 3,000,000cps reading on frequency counter.
- I. Adjust R36 for 2,999,575cps reading on frequency counter.
- J. Set sense switch to (-) down position, and adjust R35 for 3,000,425cps reading on frequency counter.
- K. Repeat Steps I and J until frequencies are within 5cps.
- L. Set frequency shift switch to  $\pm 212$  position (rear panel) and set sense switch to (+) up position. Counter should read 2,999,788  $\pm 15$ cps.
- M. Set sense switch to (-) down position counter should read 3,000,212  $\pm 15$ cps.
- N. Repeat steps L and M for  $\pm 106$  shift position. Spec is  $\pm 10$ cps.
- O. Repeat Steps L and M for  $\pm 53$  shift position. Spec is  $\pm 7$ cps.
- P. Place mode switch in FAX position and set R25 fully cw.
- Q. Apply 0-10V power supply to FAX terminals on rear panel and set for 1.0V input.
- R. Adjust R27 for 2,999,600  $\pm 5$ cps reading on counter.
- S. Reset input to 10.0V and adjust R25 for 3,000,400  $\pm 5$ cps reading on counter.

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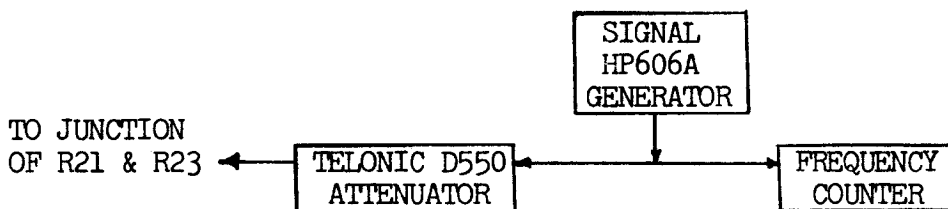
TITLE: TEST PROCEDURE LFE-1

- T. Repeat Steps Q thru S.
- U. Check for linearity by varying input from 1.0 to 10.0 volts. Counter should change 89  $\pm$  50cps for every 1.0 volts change from 1.0V to 10.0V.

VOLTS	FREQUENCY	VOLTS	FREQUENCY
1	2,999,600 $\pm$ 5cps	6	3,000,045 $\pm$ 50cps
2	2,999,689 $\pm$ 50cps	7	3,000,134 $\pm$ 50cps
3	2,999,778 $\pm$ 50cps	8	3,000,223 $\pm$ 50cps
4	2,999,867 $\pm$ 50cps	9	3,000,312 $\pm$ 50cps
5	2,999,956 $\pm$ 50cps	10	3,000,400 $\pm$ 5cps

XI. PC-392 (J108) Translator Card

- A. Remove RF output card PC-306 from unit. Set all frequency dials on front panel to blank positions.
- B. Connect signal generator 606A between junction of R21 and R23 and ground. Set up as indicated below:



- C. With full attenuation on the toggle switch attenuator, adjust generator for 1 volt output at frequency of 13.3000mc. Set 100KHz switch on front panel to position 3.

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- D. Connect short jumper across secondary of T6 and Millivac MV-28B across primary of T5 observing proper ground. Set meter to .01 volt range.
- E. Remove attenuation from telonic attenuator until midscale reading is observed on meter. (Maintain reading on .01 scale of meter using attenuator, for the following steps.)
- F. Adjust T5 for peak indication on meter.
- G. Remove jumper from T6 and adjust T6 for dip on meter.
- H. Connect short jumper across secondary of T8 and re-connect millivac meter across secondary of T7 observing proper ground.
- I. Change attenuation of telonic attenuator for mid-scale reading on meter and adjust T16 for peak reading on meter.
- J. Remove jumper from T8 and adjust T8 for dip on meter.
- K. Connect meter to TP3 and adjust T9 for maximum indication on meter.
- L. Repeat Steps C thru K using:
1. Position 8 and 13.8000mc for Step C.
  2. T11 and T10 respectively for Step D.
  3. T10 for Step F
  4. T11 for Step G
  5. T13 and T12 respectively for Step H
  6. T12 for Step I
  7. T13 for Step J
  8. TP5 and T14 for Step K
- M. Remove 606A generator and turn mode switch to AM position. Set frequency dials on front panel to 1.50000mc and turn exciter switch to "ON" position.
- N. Using scope, check for 10.5mc signal at level of .2vpp minimum on J108 Pin K and for 3mc signal of approximately 90mvpp on J108 Pin M. (Depending on setting of R58).
- O. Adjust R19 to mid-position and tune T3 for maximum indication on meter. (meter still on TP3 or TP5).

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TITLE: TEST PROCEDURE LFE-1

- P. Turn exciter switch to "PTT" position, and connect millivac meter to junction of R21 and R23, observing proper ground.
- Q. Adjust R19, for minimum indication on meter, and return all frequency dials on front panel to zero positions.
- R. Connect scope to J108 Pin C & B (for 13Mc) for 12Mc (Position "1" of 1MHz switch on front panel) and 13Mc (position "0" of 1MHz switch on front panel). Level should be approximately .4vpp.
- S. Position R5 to mid-range and connect scope to collector of Q1. Adjust T1 for equal indications on scope in positions "0" and "1" of the 1MHz switch on front panel.
- T. Connect scope to J108 Pin E and turn exciter switch to "ON" position. Set frequency dials on front panel to 1.99999Mc and remove RF output card PC-391 from unit. The scope should indicate a 125mvpp signal.
- U. Connect a 0-10 volts power supply between J108 Pin 13 (+) and ground (-). Increase the voltage from 0 to 10 volts. The output level indication on scope should drop to zero as the voltage increases from 6.5 to 8.5 volts.

## XII. PC-391 RF OUTPUT CARD\*

- A. Before inserting card into unit, adjust R2 and R4 for maximum resistance. Turn RF output control on front panel fully ccw. Set mode switch to AM and turn exciter switch on. Turn carrier control fully cw. Insert RF card into units. Recheck power supply voltages and readjust as per section II of test procedure.
- B. Turn meter switch to Q1 position. On RF output card, adjust R4 until meter on front panel reads in the green region marked Q1.
- C. Turn meter switch on front panel to Q2 and adjust R2 until meter on front panel reads in the green region marked Q2.
- D. Turn meter switch on front panel to "OFF" position.

\* NOTE: Do not attempt to adjust RF card without first having followed Section II F of test procedure.

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- E. Connect 50 ohm load to RF output connector on rear panel of unit and a Hewlett Packard Model 410B VTVM across the load. Turn ALDC control on rear panel fully ccw and set frequency of unit to 1.99999mc. Place short jumper from Pin P of J115 to Pin B of J114.
- F. Connect Ballantine Model 314 meter to Pin B of J115 and set to 1-10mv scale. Turn RF control on front panel until Ballantine Meter reads 10mv rms. Hewlett-Packard Meter should read 3V approximately. Remove jumper and insert PC-417 into J114. Output should not change more than 0.2V.
- G. Using Simpson Model 260 meter, measure the DC voltage on Pin 8 of J115. It should vary from 0-12VDC with the ALDC adjust control on rear panel of unit. Return ALDC control fully ccw.

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LFE-1 FINAL TEST SPEC.

## Preliminary Settings

1. Check power supply voltages and readjust if necessary as per Part II of Test Procedure.
2. All cards aligned and inserted.
3. RF control fully ccw.
4. Output frequency set to 1.99999mc.
5. Carrier control fully ccw.
6. Mode Switch to ISB position.
7. Exciter switch to "ON" position.
8. Two-tone generator connected to both sidebands on rear panel.
9. Mike/line controls to zero.
10. Meter switch to Q1 position.
11. ALDC control on rear panel fully ccw.

PART I With Lavoie analyzer, neutralize spectrum generator card and comb filter cards as follows:

- A. Place PC-383 (J101) on extender card and connect Lavoie Model LA-40 spectrum analyzer to J101 Pin 8 and ground lead to Pin J. Adjust analyzer for 12mc display. Adjust C56 so that 11mc and 13mc are at least -80db from 12mc level.
- B. Set frequency on front panel to 0.99999mc and connect analyzer to J101 Pin P and ground lead to Pin R. Display 13mc. Adjust C80 so that 12mc and 14mc are at least -80db from 13mc level. Return frequency to 1.99999mc.
- C. Connect analyzer to J101 Pin S and ground lead to Pin 15. Display 8mc. Adjust C64 so that 7mc and 9mc are at least -80db from 8mc level.
- D. Place PC-383 into unit and place PC-304 comb filter "A" on extender card. Remove PC-304 comb filter "B" from unit. Connect analyzer to J102 Pin J and ground lead to Pin 8. Display 1mc. Adjust C68 so that 100Kc spurs above and below 1mc are at least -80db from 1mc level.
- E. Repeat Step D using:  
1.2mc, Pin P and ground lead to Pin 13, and C69.
- F. Repeat Step D using:  
1.4mc, Pin F and ground lead to Pin 5, and C70.



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- G. Repeat Step D using:  
1.6mc, Pin L and ground lead to Pin 10, and C71.
- H. Repeat Step D using:  
1.8mc, Pin 4 and ground lead to Pin D, and C72.
- I. Place PC-304 comb filter "B" on extender card and remove comb filter "A" from unit. Connect analyzer to J103 Pin J and ground lead to Pin 8. Display 1.1mc. Adjust C68 so that 100Kc spurs above and below 1.1mc are at least -80db from 1.1mc level.
- J. Repeat Step I using:  
1.3mc, Pin P and ground lead to Pin 13, and C69.
- K. Repeat Step I using:  
1.5mc, Pin F and ground lead to Pin 5, and C70.
- L. Repeat Step I using:  
1.7mc, Pin L and ground lead to Pin 10, and C71.
- M. Repeat Step I using:  
1.9mc, Pin 4 and ground lead to Pin D, and C72.
- N. Front panel meter should read in the green region marked Q1.
- O. Turn meter switch to Q2 position. Front panel meter should read in the green region marked Q2.
- P. Turn meter switch to **off** position. **Front panel meter should read zero.**
- Q. Using Ballantine 314 meter, adjust audio input to rear panel to 69mv (-20dbm) single tone.
- R. Connect scope to TP11 of PC-337 sideband generator card and set LSB mike/line control for .09vpp.
- S. Set meter switch on front panel to LSB position. The front panel meter must read 2/5 of full scale. Return LSB mike/line control to zero.
- T. Connect scope to TP4 of PC-337 sideband generator card and set USB mike/line control for .09vpp.

# TMC SPECIFICATION

NO. S 1227

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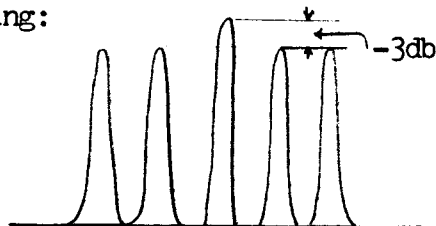
SHEET 17 OF 21

TITLE: TEST PROCEDURE LFE-1

- U. Set meter switch on front panel to USB position. The front panel meter must read 2/5 of full scale. Return USB mike/line control to zero.
- V. Connect Lavoie spectrum analyzer (LA-40) to monitor jack on rear panel of unit.
- W. Connect RF VTVM Hewlett-Packard 410B to RF output jack across 47 ohm load resistor.
- X. Set carrier control on front panel fully cw and adjust RF output control on front panel for 3.5 volts on VTVM.
- Y. Adjust T1 on PC-392 translator card for equal output in 0 and 1 positions of 1MHz switch on front panel.
- Z. Connect scope to output of unit. Displayed waveform should be a sharp undistorted sine wave with no modulation signal appearing in any position of the time/cm dial of the scope.

## PART II

- A. Turn carrier control on front panel fully ccw and mode switch to ISB position. Switch audio input to two tones. Adjust mike/line controls for 4/5 full scale readings on meter in appropriate meter switch positions (both sidebands). Adjust RF control for 5.0 volts output indication on Hewlett-Packard 410B meter.
- B. Display 5.0 volt output signal on analyzer and adjust R5 and R19 on PC-392 translator card alternately for four (4) clean tones. Readjust RF control for 2.2 volts, during the following: Check distortion in sideband positions of mode switch. Should be (-40db minimum). Check carrier suppression in USB, LSB and ISB, should be (-55db minimum).
- C. Touch up level of tones for equal display by decreasing R34 (USB) or R60 (LSB) on PC-337 sideband generator card.
- D. Repeat Step B. Return mode switch to ISB position.
- E. Attenuate display -3db using input attenuator of analyzer. Turn carrier control on front panel fully cw and adjust R27 on PC-339 carrier generator card for center tone at top line of analyzer. See the following:



# TMC SPECIFICATION

NO. S 1227

REV: 0 A

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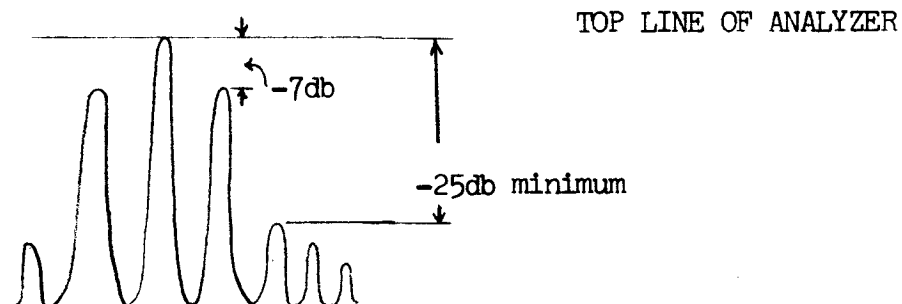
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SHEET 18 OF 21

TITLE: TEST PROCEDURE LFE-1

- F. Attenuate display -3db using input attenuator of analyzer. Turn mode switch to cw position and key unit by front panel key or by rear panel jumper across key terminals. Adjust R20 on PC-339 carrier generator card for top line on analyzer. Unkey unit. Output should drop to 0 (-60db minimum). Key unit.
- G. Adjust R47 on PC-339 carrier generator card until just before signal starts to decrease.
- H. Turn mode switch to FSK position and adjust R56 on PC-338 frequency shift card for top line on analyzer. Turn mode switch to FAX position. Level should remain the same.
- I. Return mike/line controls to zero positions, switch audio input to single tone and turn mode switch to AM position. Remove 3db of attenuation from input attenuator of analyzer.
- J. Adjust R69 on PC-339 carrier generator for top line on analyzer.
- K. Using LSB or USB mike/line control, modulate displayed carrier so that sidebands (as measured with input attenuator of analyzer) are 7db below carrier.
- L. Repeat Steps J and K until the following is obtained: Distortion should be -25db minimum below carrier as shown.



- M. Return mike/line controls to zero and turn carrier control fully cw. Turn meter switch to carrier position. Meter should read approximately 4/5 full scale. Turn meter switch to RF position. Meter should indicate approximate RF output in volts.
- N. Adjust R58 on PC-338 frequency shift card for an output voltage of 5.0 volts on Hewlett-Packard 410B meter, when RF output and carrier controls are fully cw, at frequency producing the lowest output across the band.

# TMC SPECIFICATION

NO. S 1227

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TITLE:

TEST PROCEDURE

LFE-1

## PART III

- A. Connect 0-10 volt power supply to ALDC connector on rear of unit. (+ to ground - to ALDC jack).

Output of unit should drop to zero with between -3 and -8 volts of ALDC input.

- B. Connect counter to vertical output terminals of scope and turn mode switch to FSK position. Check FSK and readjust if necessary as outlined in alignment procedure for PC-338 frequency shift generator card, except center frequency will be selected by frequency dials on front panel of unit. Check contact keying by shorting and unshorting contact key terminals at rear panel of unit.
- C. Turn mode switch to FAX position and connect 0-10 volt DC supply to FAX terminals at rear of unit. Check FAX and readjust if necessary as outlined in alignment procedure for PC-338 frequency shift generator card, except center frequency will be selected by frequency dials on front panel of unit.
- D. Fill out test data sheet at end of procedure as per customer requirement and unit operation.







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Mamaroneck, New York 10543

## TEST DATA

TRANSLATOR Z108

(A-4621/PC392)

- |       |                               |       |    |
|-------|-------------------------------|-------|----|
| 1. a. | 10-11 MHz Amplifier Tuning T3 | _____ | OK |
|       | b. R19 Mixer Balance          | _____ | OK |
| 2. a. | 13-13.5 MHz Amplifier         | _____ | OK |
|       | b. 13.5-14 MHz Amplifier      | _____ | OK |
| 3. a. | 12 & 13 MHz Adjustment        | _____ | OK |
|       | b. R5 Mixer Balance           | _____ | OK |
| 4.    | Output to 1.99990 MHz         | _____ | OK |
| 5.    | ALDC                          | _____ | OK |

TESTER: \_\_\_\_\_

DATE: \_\_\_\_\_



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## TEST DATA

RF OUTPUT Z115

(A-4620/PC391)

R8 Adjustment (350 mA)	_____	OK
R2 Adjustment (150 mA)	_____	OK
Output to 1.99990 MHz	_____	OK
ALDC	_____	OK
RF Meter Circuit	_____	OK

TESTER: \_\_\_\_\_

DATE: \_\_\_\_\_

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## TEST DATA

SPECTRUM GENERATOR Z101

(A-4619/PC383)

1 MHz Adjustment T1	_____	OK
R60 Adjustment	_____	OK
1 MHz Spectrum	_____	Vpp
100 kHz Spectrum	_____	Vpp
12 MHz	_____	OK
13 MHz	_____	OK
8 MHz	_____	OK

TESTER: \_\_\_\_\_

DATE: \_\_\_\_\_



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## TEST DATA

OUTPUT FILTER (B) Z114

(A-4624/PC395)

Relay Operation	_____	OK
30-45KHZ	_____	OK
45-65KHZ	_____	OK
65-100KHZ	_____	OK
100-150KHZ	_____	OK
150-200KHZ	_____	OK

TESTER: \_\_\_\_\_

DATE: \_\_\_\_\_