

DATE 12/4/63

SHEET 1 OF 8

TMC SPECIFICATION NO. S -775

B

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TITLE:

APPROVED

[Signature]

TESTING OF THE LFA-4

DATE 12/4/63

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TITLE: TESTING OF THE LFA-4

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A. TEST EQUIPMENT REQUIRED

1. Distortion analyser Model LP-1A.
2. Hewlett Packard VTVM Model 410B.
3. Oscilloscope.
4. 50 ohm 20W load.
5. (1) each, signal generator, Model 85 or equivalent.
6. Counter, Hewlett packard Model or equivalent.
7. ~~SBE-3~~

B. GENERAL INSPECTION

1. Inspect the unit for mechanical imperfections: knobs, switches, shafts, etc.
2. Inspect the unit for electrical imperfections: wiring, cables, tubes, etc.
3. Check for proper placement of tubes.
4. Check for proper crystal in Z3001.
5. Set Balance Modulator adj.(R-3018) approx. in the center.

C. B+ CHECK

1. Connect power, AC input of 115 VAC.
2. Connect load(50ohm) to J-3004.
3. Turn on power and B+ switch.
4. Observe if all tubes are lit and measure B+ voltage at pin 7 and pin 8 of V3004 and at pin 7 and pin 8 of V3005.
5. Measure and record voltage at CR3005(1N3011). It must be 150[±]15 VDC.
6. Turn off the B+ switch(to avoid overdriving the power output).
7. Allow 15 minutes of warm up period.

D. ALIGNMENT OF OSCILLATOR/DOUBLER

1. Set standard switch, S3002 in "internal" position.
2. Connect RF VTVM to terminal 3 of T3003.
3. Tune slugs of T3004 for maximum output.
4. Lock the slugs.
5. Record RF voltage. It must be 3 [±]₅ V.
6. Disconnect VTVM and connect counter to the same point. (Do not connect counter directly to pin 3 of V3002; use same terminal T3003).
7. Tune C3004 for 2,000,000[±]5cps.
8. Record the frequency obtained in step 7.
9. Turn standard switch S-3002 to "External" position.
10. Connect RF signal generator to J3002 set at 1V and 1 MC.
11. Set signal generator for 2,000,000 ~~±~~ 1,000 cps, n count r.
12. Disconnect counter and connect RF VTVM to the same point(terminal 3 of T5003).

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- *13. Measure and record voltage; it must be $3_{-.5}^{+1}$ V.
14. Disconnect signal generator and VTVM.

E. BALANCED MODULATOR

1. Connect VTVM to junction of R3025 and C3026.
2. Set standard switch S-3002 to "Internal" position.
3. Adjust Modulator Balance R3018 for minimum and lock it.
4. Disconnect VTVM.

F. PARAPHASE AMPLIFIER

1. Connect signal generator to J3001 set at approx. 2.25 mcs.
2. Connect VTVM to pin 2 of V3004.
3. Turn on B+ switch.
4. Turn output control fully clockwise.
5. Adjust the output from the signal generator for IV on the VTVM.
6. Move VTVM to pin 2 of V3005.
7. Adjust Paraphase balance(R3030) for IV on the VTVM.
8. Repeat steps 2, 5, and 6.
9. If the VTVM is not showing exactly IV, repeat steps: 7, 2, 5,6, and 9 as many times as it is necessary.
10. Disconnect VTVM.

G. FREQUENCY RESPONSE

1. Connect VTVM across the 50 ohm load.
2. Connect counter across to monitor output.
3. Set generator to 2.250 mcs and adjust the output level of the generator for 16V out at the VTVM.
4. Record the input level at J3001 on the report sheet. The input level must be 2 to 3 volts.
5. Keeping the recorded generator level constant, vary output frequency between 5KCS(2.005MCS input) and 600KCS(2.600MCS input). The output must not drop below 11 V. out.
6. Record the output levels at: 5KCS, 30KCS, 250KCS,600KCS.
7. Disconnect counter and signal generator.

H. DISTORTION TEST

1. Connect SBG-1 system to input of unit under test.
2. Set the SBG-1 for 2.250 MCS output with two(2) equal tones.
3. Set the output control of the SBG-1 system for "5" on the output meter.
4. Set the output control of the unit under test for 16V out on the H.P. VTVM.
5. Connect distortion analyzer to monitor output.

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6. Record the third (and/or fifth) order distortion level on the report sheet.
7. Repeat step 6 at 2.030MCS and 2.550MCS input (30KCS and 550KCS output).
8. Disconnect all equipment. This unit is now ready for shipment.

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LFA-4 VOLTAGE CHART

All voltages referenced to Ground

- Conditions: (1) Gain control full CCW
 (2) "EXT." "INT." switch on "EXT."
 (3) Use HP 410B VTVM or equivalent

TUBE TYPE & CKT. SYMBOL		PIN NUMBER								
		1	2	3	4	5	6	7	8	9
V3001 6BK7 Amplifier & Osc./Doub.	AC	8.5	6.0	0	6.2	0	4.0	4.5	0	N.C.
	DC	+255	0	+8.1	0	0	+44	-5.4	0	N.C.
V3002 6BK7 Bal. Modulator	AC	0	0.34	3.6	6.2	0	0	3.6	0.34	N.C.
	DC	+165	-0.05	+2.1	0	0	+165	0	+5.0	N.C.
V3003 6BK7 Paraphase Amp	AC	0	0	0	6.2	0	0	0	0	
	DC	+205	0	+2.9	0	0	+215	0	+2.9	N.C.
V3004 6GK6 Power Amp.	AC	0	0	0	6.2	0	N.C.	0	0	0
	DC	+12.5	0	N.C.	0	0	N.C.	+320	+320	+12.5
V3005 6GK6 Power Amp.	AC	0	0	0	6.2	0	N.C.	0	0	0
	DC	+12.5	0	N.C.	0	0	N.C.	+320	+320	+12.5
CR3003	AC	160	280	0	280					
	DC	+360	+180	0	+180					

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LFA-4 VOLTAGE CHART

All voltages referenced to Ground.

- Conditions: (1) Gain control full CW.
(2) "EXT." "INT." switch on "EXT."
(3) Enough two-tone input for 15V. (into 50 ohm) output.

TUBE TYPE & CKT. SYMBOL		PIN NUMBER								
		1	2	3	4	5	6	7	8	9
V3001 6BK7 AMP. Osc./Doub.	AC	9.2	6.0	0	6.2	0	4.0	4.5	0	N.C.
	DC	+255	0	+8.2	0	0	+44	-5.4	0	N.C.
V3002 6BK7 Bal. Mod.	AC	0.22	0.52	3.7	6.2	0	0.22	3.7	.53	N.C.
	DC	+165	-0.10	+2.1	0	0	+165	0	+5.0	N.C.
V3003 6BK7 Paraphase Amp.	AC	3.5	0.15	0	6.2	0	3.5	0.15	0	N.C.
	DC	+200	0	+2.9	0	0	+215	0	+2.9	N.C.
V3004 6GK6 Power Amp.	AC	0	3.5	N.C.	6.2	0	N.C.	105	0	0
	DC	+12.5	0	N.C.	0	0	N.C.	+320	+320	+12.5
V3005 6GK6 Power Amp.	AC	0	3.5	N.C.	6.2	0	N.C.	105	0	0
	DC	+12.5	0	N.C.	0	0	N.C.	+320	+320	+12.5

LFA-4 VOLTAGE CHART

All voltages referenced to Ground.

- Conditions: Same as above except "EXT". "INT". standard switch on "INT."

TUBE TYPE & CKT. SYMBOL		PIN NUMBER								
		1	2	3	4	5	6	7	8	9
V3001 6BK7 Amp. Osc./Doub.	AC	8.4	4.8	0	6.2	0	3.2	21	13.5	N.C.
	DC	+255	0	+7.6	0	0	+72	-12	+0.04	N.C.
V3002 6BK7 BAL. Mod.	AC	0.17	0.48	3.2	0	0	0.17	3.2	0.48	N.C.
	DC	+168	-0.17	+2.1	0	0	+168	0	+4.8	N.C.
V3003 6BK7 Paraphase Amp.	AC	3.5	0.15	0	6.2	0	3.5	0.15	0	N.C.
	DC	+200	0	+2.9	0	0	+215	0	+2.9	N.C.
V3004 6GK6 Power Amp.	AC	0	3.5	N.C.	6.2	0	N.C.	105	0	0
	DC	+12.5	0	N.C.	0	0	N.C.	+320	+320	+12.5
V3005 6GK6 Power Amp.	AC	0	3.5	N.C.	6.2	0	N.C.	105	0	0
	DC	+12.5	0	N.C.	0	0	N.C.	+320	+320	+12.5

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RESISTANCE CHARTS

All switches in ON position

AVC in on SLOW position

SELECTOR switch in on Internal position. Reading referenced to Ground.

	PIN NUMBER								
	1	2	3	4	5	6	7	8	9
V3001 6BK7 Amp. Osc./Doub.	44K	95K	900 3	.2 ohm	0	90K	200K	27 ohm	N.C.
V3002 6BK7 Bal. Mod.	70K	10K	160 ohm	.2 ohm	0	200 ohm	100 ohm	1K	N.C.
V3003 6BK7 Paraphase Amp.	25K	46K	150 ohm	.2 ohm	0	115K	110 ohm	150 ohm	N.C.
V3004 6GK6 Power Amp.	250	100K	N.C.	.2 ohm	0	N.C.	100K	100K	250 ohm
V3005 6GK6 Power Amp.	250	100K	N.C.	.2 Ohm	0	N.C.	100K	100K	250 ohm
CR-3003	+48K								

SELECTOR switch in External position

	PIN NUMBER								
	1	2	3	4	5	6	7	8	9
V3001 6BK7 Amp. Osc./Doub.	44K	95K	900 Ohm	.2 ohm	0	90K	18K	0	N.C.

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APPROVED			

THE TECHNICAL MATERIEL CORPORATION

Mamaroneck, New York

TEST REPORT SHEET

LFA-4

ACCEPT

- | | | |
|------------------------------------|-------|------------------|
| B. General Inspection | _____ | OK |
| C. B+ Check | _____ | VOLTS |
| D. Alignment of Oscillator/Doubler | _____ | |
| 5. RF Voltage | _____ | VOLTS |
| 8. Oscillator Frequency | _____ | CPS |
| 13. Osc/Doubler Voltage | _____ | VOLTS |
| E. Balanced Modulator | _____ | OK |
| F. Paraphase Amplifier | _____ | OK |
| G. Frequency Response | _____ | |
| 4. Input level for full output | _____ | (2 TO 3 VOLTS) |
| 6. Output levels (Min. 16 volts): | | |
| 5KCS | _____ | VOLTS |
| 30KCS | _____ | VOLTS |
| 250KCS | _____ | VOLTS |
| 600KCS | _____ | VOLTS |

H. Distortion Test

- | | | | |
|--------------------------------------|---|--------------------------|-------|
| 6. Third and/or fifth order @ 250KCS | - | db(39db from each tone) | _____ |
| 7. Third and/or fifth order @ 30KCS | - | db(39db from each tone) | _____ |
| Third and/or fifth order @ 550KCS | - | db(39db from each tone) | _____ |

TESTED BY _____

DATE _____

MFG. NO. _____

SERIAL NO. _____

