

Model 2

# Power Amplifier

The Marantz Power Amplifier has been designed and constructed to give a long, trouble-free life of fine listening quality. Here is the type of performance and workmanship that previously was found only in high quality Broadcast or Laboratory equipment. A built-in metered test instrument permits simple, accurate adjustments for optimum performance.

## POWER OUTPUT

40 Watts (80 Watts Peak) "Ultra-Linear" operation. 20 Watt Triode Operation. Switch changes output connections to protect speakers of low-power rating.

## OUTPUT CONNECTIONS

4, 8 and 16 ohms from Ground Return. 4, 8 and 16 ohm Variable Damping returns.

## INPUT SENSITIVITY FOR 40 WATTS

2 High Gain inputs: 0.7 volts RMS into 105K. 1 Preamp input: 2.0 volts RMS into 285K.

## RESPONSE:

At 40 Watts: Within 0.1db from 20 cps to 20 kc. Within 1db from 15 cps to 45 kc. At 1/2 Watt: ±1db from 2 cps to 50 kc. Response has been deliberately rolled off approximately 5db at 100 kc to control transient response. Subsonic Filter: In "Preamp" and "High-Gain Filtered" inputs, response is slowly rolled off below 20 cycles (Less than 1db at 20c; -10db at 3c; etc.)

## DISTORTION

Total Harmonic Distortion at 40 Watts: Less than 0.1% at mid-frequencies. Less than 0.5% from 20c to 10 kc. Less than 1.5% at 20 kc with resistive load (Far less at equivalent voltages with inductive speaker loads). Intermodulation Distortion at 40 Watts equivalent (80 Watt Peak) Less than 0.5% (60c/12kc., 4:1); (I.M. measurement of typical amplifier: 40 W. equiv., 0.35%; 20 W. equiv., 0.19%; 10 W. equiv., 0.11%). Distortion below 30 W. is largely of 2nd order and reduces rapidly with signal level.

## DAMPING FACTORS

Greater than 20 from 20c to 20kc (without Variable Damping connections). Continuously Variable from 5 to 1/2 with Variable Damping connections.

## INVERSE FEEDBACK AND STABILITY

23 1/2 db of overall feedback. (20db in triode position). Great care has been taken to ensure stability and low distortion under widely varying loads, both resistive and reactive, such as are encountered in loudspeaker systems. Power supply surges are balanced out of signal channels providing excellent recovery from strong transients. Will not oscillate under any condition of open circuit capacitive load.

## HUM

Better than 90 db below 40 Watts containing proportionately little of high order components.

## METERED TESTS AND ADJUSTMENTS

Bias, D.C. Balance, A.C. Balance (drive) All accurately adjustable with built-in D'Arsonval meter and test switch.

## POWER SUPPLY

The use of a transmitting-type oil input condenser, choke, telephone quality electrolytic and the new type 6AU4-GTA as heater-cathode rectifiers provide: protection from starting surge voltages, improved regulation and thorough filtering.

## POWER REQUIREMENTS

Design center: 117 volts, 60 cycles. Range: 105-125 volts. 150 Watts at zero signal; 200 Watts at maximum signal.

## TUBE COMPLEMENT

1-12AX7/ECC83, 1-6CG7, 2-6CA7/EL34, 2-6AU4GTA

## SIZE

15" x 9 1/2" x 6 1/2"

## SHIPPING WEIGHT

47 lbs.

\$ 219.00

West of the Mississippi—\$229.00

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No. 18

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#### PRELIMINARY

The perforated protective grille is held in place by four spring clamps. It can be removed most easily with a light outward pull on it's bottom edges. Do not attempt to pry along top or sides with tools or damage to the finish may result. Remove all protective packing around the tubes and replace grille after carefully positioning flush with top and sides. A little pressure will snap it back into place.

Input and output cables may be attached and dressed down the front and under the amplifier where it can then be led out the back. The grille will then hide all wires, tubes, etc.

#### OPERATING LINE VOLTAGE:

117 Volts, 60 cycles (for A.C. operation only). All specifications are based on this voltage. The usable range is from 105 to 125 volts, 50-60 cycles.

#### INPUT CONNECTIONS:

There is a choice of three input connections to the Marantz Power amplifier;

- 1.- PREAMP- This input is recommended for most preamplifiers. At this connection a 2 volt signal will drive the amplifier to it's full output. A subsonic filter rolls off frequencies below 20 cycles so as to suppress speaker "breathing" and other subsonic disturbances.
- 2.- HIGH GAIN, FILTERED- For preamplifiers that have a low output voltage capability. Also may be used where loudspeaker has very low efficiency. A signal of 0.7 volts is required here for full 40 watt output. Subsonic filtering is also in effect.
- 3.- HIGH GAIN, UNFILTERED- Same as above in sensitivity but without the subsonic filter, response being maintained to below 2 cycles. This input is direct to the input grid and is used in testing frequency response or for special applications where subsonic response is needed.

#### OUTPUT CONNECTIONS:

When not using Variable Damping:

- 1.- Use "Ground Return" (center terminal) on loud speaker output terminal strip together with impedance tap on right which matches speaker.
- 2.- Variable Damping control must be switched off for proper operation.

To Use Variable Damping:

- 1.- Instead of usual ground return, connect to corresponding "Variable Damping Return".  
For Example: An 8 ohm speaker will have one lead on the 8ohm tap to right and the other on D3 tap to the left.
- 2.- Turn "Variable Damping" control on and adjust to desired damping factor.

#### 40 WATT-20 WATT SWITCH:

This unit has been designed primarily as a 40 watt Ultralinear Amplifier. Speaker systems of a lower power rating could easily be damaged by unwanted pulses coming through at full power. To protect these systems we have incorporated a switch

systems we have incorporated a switch which changes the output connections to Triode operation limiting the power output to 22 or 25 Watts. This control, located near the output terminal strip, is marked "40 Watt UL" and "20 Watt TRI".

#### METERED TESTS and ADJUSTMENTS:

Each Amplifier is carefully adjusted at the factory for proper operation. Nevertheless the owner should check the operating conditions after 15 minutes when first placed in service and again after the tubes have "aged" perhaps 12 hours. Recheck every few months.

The test and adjustment section of the amplifier comprises the following:

- 1.- An accurate d'Arsonval type meter calibrated on the left for both the AC and the DC Balances and again on the right to indicate the proper 120 milliamperes BIAS condition.
- 2.- Three screwdriver adjustments marked AC BALANCE, DC BALANCE and BIAS. Grouped around the meter, they are protected from accidental shifting of calibration by black plastic screw-on caps.
- 3.- A test switch having four positions marked: NORMAL (playing position), BIAS, D.C. BALANCE and A.C. BALANCE. The latter three are the test positions corresponding to the meter readings and adjustments listed in 1 & 2 above.

#### TEST PROCEDURE:

(Before making these tests be sure to turn the volume control fully down on the signal source connected to the amplifier.)

- 1.- Turn Test Switch to the Bias test position. The meter pointer will swing to the right. Turn the Bias adjustment carefully with a screwdriver until the meter reading is on the BIAS-120 ma mark. (This reading will normally vary slightly with the line voltage used and warmup. In installation the BIAS may have to be reset. A current setting much in excess of 120 ma will tend to decrease tube life.)
- 2.- Switching to the next test position, marked D.C. BALANCE, proceed as before, turning the D.C. BALANCE Adjustment until the needle is centered over the "BALANCE" or zero mark on the left of the meter dial face.
- 3.- The A.C. BALANCE position on the test switch has a spring return so that it will not accidentally be left in this position for any period of time. Holding the knob to this position a few seconds at a time turn the A.C. BALANCE Adjustment so that the needle again is centered over the Balance-Zero mark. In this test the needle will be seen to vibrate gently but it will not be difficult to read the correct position.

The Amplifier is now correctly adjusted and the test Switch should be returned to the NORMAL or playing position. Be sure to replace the protective plastic adjustment caps so that the amplifier will not be accidentally thrown out of calibration.

MARANTZ 40 WATT AMPLIFIER

SERVICE PROCEDURE FOR REPLACEMENT OF METER OR METER CASE

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- 1.-Remove the following from tube chassis:
  - a) Three small mounting screws surrounding meter case.
  - b) One large slotted screw centered between AC BAL and DC BAL.
  - c) 1 Damping Control knob and 3 black plastic control guards on AC BAL, DC BAL and BIAS adjustments, exposing shafts.
  - d) 4 mounting nuts for above controls. Use  $\frac{1}{2}$ " socket wrench.
- 2.-Turn amplifier bottom side up with back (transformer housing) facing nearest edge of workbench and:
  - a) Remove combination bottom and back plate.
  - b) Slide meter illumination socket from its bracket.
  - c) Unsolder, from left edge of center terminal board, 2 blue wires leading to 6CG7 tube.
  - d) Unsolder, from right edge of terminal board, 2 green wires leading to EL34/6CA7 output tubes.
  - e) Remove slotted screw at farthest end of terminal board.
- 3.-Carefully lift terminal board by tilting nearest edge upward without overstraining leads underneath. It will be necessary to push the four controls through their mounting holes to follow board. Note that there is a lockwasher under each control. Remove nearest mounting stud from bottom of board by loosening screw on top.
- 4.-After arranging sufficient clearance carefully push meter through and remove. DO NOT UNSOLDER LEADS UNLESS REPLACING ENTIRE METER.  
  
IMPORTANT NOTE: For later reference take careful note of the relative position of the meter mounting bracket (clamp ring), observing that its center threaded mounting hole is lined up with the top screw near the base of the meter barrel or case. Note also that the edge of the bracket has been positioned so that it touches the heads of all 3 screws in meter case.
  - a) Remove meter bracket after loosening brass screw.
  - b) Remove 3 small mounting screws around edge of case.
  - c) Taking care not to rotate it, lift case off meter.
- 5.-Before installing new case turn its Zero adjustment screw so that inside peg is closest to outer edge of the glass. Install new case taking care that it is so aligned that inside peg engages forked lever on meter movement. Check for proper action of Zero adjustment before replacing case mounting screws.
  - a) Replace meter mounting bracket observing correct alignment and positioning (See NOTE in 4 above).
  - b) Reinstall meter in chassis with its mounting screws.
  - c) Reinstall the 4 controls and their lockwashers. Watch lead dress to avoid catching them under controls.
  - d) Replace mounting stud on terminal board.
  - e) Reinstall terminal board. (Watch lead dress here)
  - f) Resolder blue and green leads to terminal board.
  - g) Replace meter illuminating socket.
- 6.-Turn Amplifier right side up so that meter is accessible
  - a) Adjust meter for accurate Zero reading.
  - b) Turn on Amplifier and run through test procedure in manual.

