

# Vacuum Tube Balanced Mono-block Power Amplifier

## Model VM60



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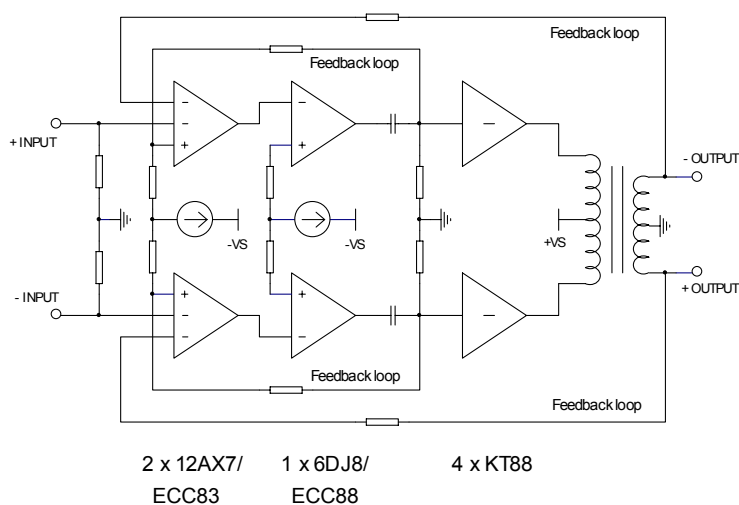
When developing the VM60, JE AUDIO took a fresh look at the entire design of vacuum tube power amplifiers. As a consequence, the VM60 was developed to amplify balanced signals to the near ideal operation from input to output. The balanced operation will effectively cancel external electromagnetic noise picked up by audio cables. With the additional enhanced linearity offering by the patented Dual Balanced Feedback Topology (DBFT), the sonic result is an improved sound quality with three-dimensional images in a natural acoustic landscape. Single-ended input signal via the RCA socket can also be benefited by the balanced operation.

The full balanced operation is achieved by employing the DBFT as shown in the diagram below. The +INPUT and -INPUT signals are first fed to the input stage that is formed by 2 x 12AX7/ECC83. Each 12AX7 contains two small signal triodes in the same glass casing. Therefore, the first stage is formed by four small signal triodes. They are configured in such a way that the first stage will amplify the input signals as well as two pairs of feedback signals in a well orderly manner.

The second stage is formed by 1 x 6DJ8/ECC88. It is to further amplify the signals from the first stage and provides low output impedance to driving the output stage. The output stage contains 4 x KT88 and a balanced output transformer. The feedback signals are taken in pairs so that balance can be maintained.

The first feedback pair is taken from the outputs of the second stage. Small amount of feedback is used so that the bandwidth, distortion and output impedance of the first two stages combined are improved. This small amount of feedback also sets the signal gain of the combined first two stages. A second feedback pair is taken from the transformer outputs. Again, small amount of feedback is used to further improve the bandwidth, distortion and output impedance of the overall amplifier.

On the other hand, JE AUDIO has spent extensive hours to select the best available vacuum tubes in the markets based upon their sonic merits and operation stability. All tubes are burned in for at least 50 hours before they are tested for electrical characteristics so that matched tubes can be obtained.



Block diagram of the VM60 balanced power amplifier employing Dual Balanced Feedback Topology (DBFT).

## Features

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- Fully balanced input (also has separate RCA input).
- Fully balanced output (no loudspeaker terminal is connected to a ground terminal).
- Patented Dual Balanced Feedback Topology (DBFT) improves signal linearity and audio fidelity.
- Mono-block 60W output (4 x KT88 power tubes) with premium mono power supply.
- C-core filtering choke and premium capacitors are used in power supply filtering circuit.
- Output transformer uses premium grade M6 silicon steel imported from the United States. The primary side is connected in the Ultra-linear configuration and the secondary side in a proprietary full balanced configuration.
- Power transformer uses premium grade Z11 silicon steel imported from Japan. Oversized design ensures minimum temperature rise from the power transformer.
- Premium grade copper foil paper in oil type signal capacitors for signal coupling.
- Auto biasing applies to all power tubes. No manual biasing is needed. At all time, the auto-biasing circuit monitors and reduces any mismatch of power tubes biasing current to nearly zero.
- Soft power-up circuit reduces the inrush current when switching on. It also ensures that in the first 60 seconds a reduced supply voltage is applied to small signal vacuum tubes but zero supply voltage to power vacuum tubes. This prolongs life of all rectifying diodes, power supply filtering capacitors and vacuum tubes.



## Specifications

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CIRCUIT DESIGN:	Dual Balanced Feedback Topology (DBFT)
VACUUM TUBES:	2 x 12AX7/ECC83, 1 x 6DJ8/ECC88, 4 x KT88
OUTPUT POWER:	60W (< 1% THD @ 1kHz, 8 Ω load)
TOTAL HARMONIC DISTORTION:	< 0.1% @ 10W, 1kHz, 8 Ω load < 1% @ 60W, 1kHz, 8 Ω load
FREQUENCY RESPONSE:	20Hz to 20kHz
INPUT SENSITIVITY:	1.0V
INPUT IMPEDANCE:	> 47k ohm (RCA - singled-end input) > 94k ohm (XLR - balanced input)
S/N RATIO:	> 85dB (Balanced input)
POWER CONSUMPTION:	180W
DIMENSION:	H=120mm, W=325mm, D=395mm
NET WEIGHT:	20.5 kg /45 Pounds

(Specifications subject to change without prior notice.)

