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Q-tron Audio PA12B4 OTL amplifier user manual

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Fig 1 Front view



Fig 2 Rear view

1 Introduction

Thank you for choosing the PA12B OTL amplifier from Q-tron Audio. The PA12B is a new improved OTL amplifier with a fully balanced input and 10 times lower distortion than other OTL amplifiers of similar output power.

The PA12B4 version described in this manual is equipped with an automatic bias calibrator that eliminate any need for manual adjustment.

2 Content of delivery

- Amplifier PA12B4
- Tubes 6C33C 4 pcs
- Tubes 6H2n-EB 5 pcs
- Tubes 6H6P-I 2 pcs

3 Unpacking

Put the wooden box on a table or other steady surface. Make sure that the box is oriented correctly, i.e. that the side marked top is facing upwards. Open the box by bending the metal flaps and holding the top lid using a screwdriver.

Unpack all tube cartons.

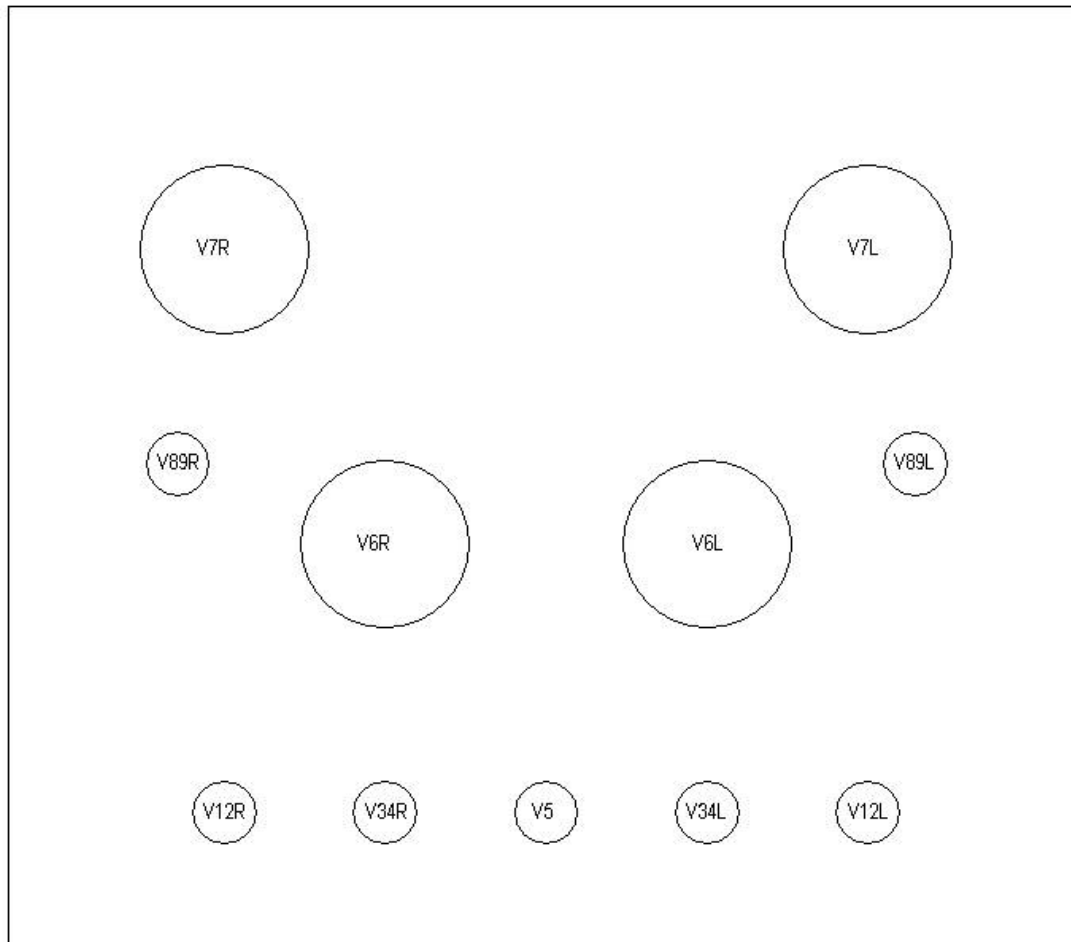
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Lift the amplifier out of the box, be aware of the weight and handle the amplifier carefully.

Put the amplifier on a steady surface with the front panel facing towards you. Unpack all tubes one by one and put them into the correct tube sockets as indicated by the figure.

NOTE! each power tube is marked with 1 - 4 red colour dots on the base and there are corresponding yellow colour dots on each tube socket.

Please make sure that the power tubes are inserted in the correct position, i.e. the tube with 1 red dot should be inserted into the tube socket with 1 yellow dot and so on.



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4 Safety Precautions

4.1 *Installation and use*

The amplifier should be installed in a well-ventilated space. It is important that air can freely flow in through the holes of the bottom plate therefore the amplifier must not be placed on something that hinders air circulation. As the electronic tubes get very hot in normal operation there must be at least 20 cm from the space above the amplifier and anything burnable. The amplifier must be placed out of reach for children or pets.

The amplifier is a class 1 device that must be connected with a 3-wire mains cable with a grounded plug and connected to a grounded mains outlet. Never remove the earth connection from the plug. It is there to ensure your safety.

Connect speakers to the speaker connectors and connect a source, (CD player or pre-amplifier) to the input connectors.

Always switch the unit off before removing or inserting interconnects. Doing this with the amplifier switched on can damage the amplifier and the equipment connected to it.

If you ever spill water or any other liquid onto the amplifier: Do not touch the case!
Remove the plug from the wall outlet and contact your dealer or our service department.

4.2 *Replacing Main fuses*

The main fuses are in the combined mains inlet power switch at the backside of the amplifier. To change fuses, remove the power cord and pry out the fuse lid using a small flat-blade screwdriver, replace fuses only with fuses of the same rating, for 230V mains voltage 4A slow blow.

4.3 *Service and maintenance*

Service and maintenance must be performed by trained service personnel. Do not try to open the amplifier, there are no serviceable parts located inside and high voltages are present at several locations. **Opening the amplifier will make the manufacturer's warranty void!**

5 Setup

- Connect the amplifier to the mains voltage with a standard IEC 320 mains cable
- Connect speakers to the isolated binding posts
- Connect a preamplifier to the connectors marked input

5.1 *Function*

The amplifier is equipped with XLR and phono connectors for the input signal and isolated binding posts for connecting speakers. The amplifier is equipped with an output-offset voltage protection circuit that protects connected speakers in case the amplifier would give too high voltage output. A fail-safe soft-turn-on-circuit is also included.

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5.2 Start-up procedure

Switch on the mains and switch on the back panel to position 1.

Push in the front panel push button, after approximately 1.5 seconds the area around the push button will be lit with a green dim light, then release the button.

After 90 seconds the area around the front panel push-button will change to brighter green and the amplifier is ready for operation.

In case the offset voltage protection circuit is activated this is indicated by the green area around the front panel push-button is not brightly lit after waiting for more than 90 seconds, also the LEDs on the back panel will be lit as described in "Controls and connectors" 6.6 . To deactivate the offset voltage protection the amplifier must be completely shut off for at least 1 minute by setting the mains to switch on the back panel to position 0. After the 1-minute delay, the normal start-up procedure can be followed.

NOTE! The amplifier must be connected to speakers or other loads to operate correctly, if not the offset voltage protection circuit will switch off the amplifier automatically directly after the start-up sequence has been completed.

5.3 Switch off procedure

5.3.1 If the amplifier has been switched on for less than 60 minutes:

When the front panel push-button is pressed the amplifier will switch off immediately.

5.3.2 If the amplifier has been switched on for more than 60 minutes:

When the front panel push-button is pressed the green light around the push button will first be dimmed and will continue to be so until the automatic bias calibration has been completed when the green light will be extinguished, and the amplifier will be switched off.

If the mains switch on the back panel is in the ON position the control circuits are energised and the power consumption is about 5W. In the OFF position, all circuits in the amplifier are switched off and there is no power consumption

6 Controls and connectors

6.1 Front panel

On the switch with an integrated indicator, is a switch button which that is pushed and will start the switch-on-sequence of the amplifier.

6.2 Back panel

Input connectors left and right

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Phono These connectors accept standard RCA phono plugs

XLR These connectors accept standard XLR plugs

6.3 *Unbalanced/balanced switch*

This switch should be in the U position when using the RCA connectors and in the B position when using the XLR connectors. NOTE! Do not connect both RCA and XLR connectors at the same time.

6.4 *Speaker connectors*

Left live, left ground, right ground and right live. These connectors accept 4mm banana-type plugs, bare wire, and spade-type connectors.












6.5 *Mode*

This connector is used to set the mode of the amplifier, normal or tuning mode. The tuning mode is activated by connecting the tuning plug.

NOTE! Do not connect the monitor box that was used with earlier versions of the PA12, nor connect anything else to the Mode connector except the tuning plug when needed.

6.6 *Indication LEDs*

These LEDs indicate fault conditions as described in the table.

R	Alarm	Service	L	Indication
				The power tubes in the right channel are out of specification, change the power tubes for the right channel
				Power tubes in right channel worn, time for service
				The power tubes in the left channel are out of specification, change the power tubes for the left channel
				Power tubes in left channel worn, time for service
				Offset alarm, switch off the amplifier and switch off the switch at the rear, and switch on the amplifier after 2 minutes. If the condition persists amplifier must be serviced

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6.7 Mains power inlet with integrated fuse holder and mains switch.

The power inlet accepts a standard power cord with an IEC320 plug. The 2 mains fuses can be accessed if the power cord is removed and the fuse cover/holder is removed, replace the fuses only with fuses of the same rating, (for 230VAC mains power fuse rating is 4A slow blow and for 120VAC mains power fuse rating is 6.3A slow blow). The mains switch power up the amplifier if it is set to position 1, in position 0 the amplifier is disconnected from the mains power.

7 Q-tron Audio Automatic Bias Calibrator

Automatically control bias and offset in our OTL amplifiers and automatically tune to correct bias when installing new power tubes.

- Automatically tune bias and output offset voltage to optimal values
- Controls the **real quiescent, (idle)** current, see <https://qtron.se/en/articles/q-tron-audio-bias-calibrator-technical-background> for a complete in-depth analysis and explanation).
- Automatic tuning of bias when replacing power tubes

The circuit automatically measures and if necessary, adjusts the quiescent current and output DC offset and works in the following manner:

If the amplifier has been on for less than 60 minutes, it will turn off instantly when the power switch is pressed. If the amplifier has been switched on for more than 60 minutes and the power switch is pressed to switch off the amplifier the microprocessor circuit will start measuring the quiescent current and output DC offset, this is indicated by that the area around the switch-on button change from being brightly lit to dim light.

Most times the bias values don't need to be adjusted and then the amplifier will switch off almost immediately indicated by the area around the switch-on button becoming dark.

If adjustments are necessary, these will be performed automatically and when these values are correct the amplifier will switch off. The values for bias are stored in non-volatile memory.

When the amplifier next time is switched on, the stored values for bias will be applied.

If the power tubes start to get worn so that they need very different bias voltage an orange "Service" LED will be lit at the back panel, the amplifier can then still be used but will not be optimally tuned.

If any value is completely out of specification even after adjustments, (as in the case that a tube catastrophically has failed or got too weak) there will be a red "alarm" LED lit and the amplifier can then not be used for playing music, (the inputs and outputs will be shorted) until the fault has been corrected.

7.1 Automatic bias tuning of new power tubes

The bias auto calibrator also automatically sets the correct operating parameters for new power tubes.

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Procedure:

1. Switch off the amplifier completely, also with the switch on the rear.
2. Set the amplifier in tuning mode by connecting the tuning plug to the connector on the rear panel
3. Put a new balanced pair of power tubes in the channel where they should be replaced
 - Note! the new power tubes must be matched to within 2V difference in grid bias at 200mA anode current and 160V anode voltage, e.g., 2 tubes that need -50V and -48V are OK. The grid voltage of power tubes must be in any case between -45 and -70V. Tubes don't need to be matched between the left and right channels.
4. Switch on the amplifier by first switching on the switch at the rear to the on position and then by pushing the front push-button until the area around the switch will be lit with a dim green light.

The amplifier will switch on and then heat the amplifier to stable conditions, (it takes 60 minutes) and then start to automatically adjust the bias and the offset to correct values which will be automatically stored, (this procedure can take up to 10 minutes). When the amplifier next time is switched on the stored values for bias are applied.

NOTE!

The user cannot adjust bias in any other way than by the built-in automatic bias controller. There are no potentiometers or any other means to adjust bias inside the amplifier.

8 Performance data

Output power in 8 ohm load	2 x 25W at 1% distortion at 1kHz
Output power in 4 ohm load	2 x 20W at 1% distortion at 1kHz
Output impedance	<0.4ohm
Harmonic Distortion	0.01% at 1kHz and 1W output power 0.1% at 1kHz and 10W output power
Power bandwidth	10 – 100000 Hz -3dB
Noise and hum	90 dB below 25W output power, (10 – 200000Hz) 100 dB below 25W output power, A-weighting filter
Line voltage	230V or 120V \pm 10%
Power consumption	600W maximum
Dimensions chassis	430 x 130 x 400 mm, (W x H x D)
Dimensions overall	430 x 240 x 400 mm, (W x H x D)
Tube complement	11 tubes in total, (6C33C x 4, 6H6PI x 2, 6H2n-EB x 5)
Input connectors	Gold plated phono and XLR

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Output connectors	CE-approved isolated binding posts accepting 4mm banana connectors, spades and bare wire
Line voltage connectors	IEC320 jack with integrated mains switch and dual fuses
Weight	21kg

9 Contact information

Manufacturer	Q-tron Audio Sweden www.qtron.se	sales@qtron.se
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