

Quad and mono blocking

These term, monoblocking, is used when a two channel amplifier (stereo) is converted to a single channel (mono) amplifier.

The two (simplified) variants of a monoblock.

A serial monoblock delivers twice the voltage, a parallel monoblock twice the current. In both cases it is suggested that the output power quadrupled.

But the real effect on the power output depends on the value of the load, current limiters, internal output resistance of the amplifier, the power supply and so on.

In most cases the parallel monoblock will be used. Modern speakers are more current hungry than their predecessors. But even the original Quad ESL's and the Quad 63 have very low impedance dips at certain frequencies.

Serial

Building a serial monoblock is more complicated. The loudspeaker is connected between the two positive output terminals. The two inputs are driven in anti phase, to do this you need a suitable input transformer or a special electronic circuit. In principle the double voltage will only be delivered in twice the load impedance. So the serial monoblock will be less adapted to the modern low ohmic speakers of today. The internal resistance of the serial monoblock is doubled, so the power output concerning load differences will be worse than the single amplifier! Also the subjective loudness gain of a serial monoblock is small. Remember: to double the loudness experience you need ten times the power.

A advantage of a serial monoblock is the reduction of distortion. Some distortion products will be also in anti phase and cancelled out!

Parallel

The parallel monoblock is simple in principle. Connect the inputs together and the outputs, that's it! To prevent large output currents from one amplifier to another, two measures have to be taken. First the output voltage of the two channels has to be matched, this is done by placing a volume pot meter in the input circuit. Second, some output resistors per channel are used to form a so called current sharing circuit. Some drawbacks, by connecting the input channels in parallel, the input impedance is halved, not all pre amplifiers like that. Also there is no loudness gain, the output voltage of the amplifier stays the same. It is better suited to low impedances, distortion as a result of clipping will be reduced.

A 303 example

Due to lower than modern amplifiers, channel separation, and reduced power output in low ohmic loads a popular Quad to parallel monoblock is the 303. A standard 303 will deliver 28W in 4 Ohm loads, instead of the expected 90W. This is the result of the very strict current limiters, a 303 is short circuit proof. In monoblock mode the output will be around 55W in 4 Ohm. In a 303 a current sharing circuit is not necessary, a 303 has output capacitors, so no DC current can flow from one amplifier to the other. Only the channel matching must be done.

If you use a single amplifier, by removing one channel from the amplifier, the output will still be 28W, the limitation is not the power supply, but the current limiter. Of course the current limiter can be adjusted.

But the parallel monoblock will always outperform a single amplifier, given the same adjustments or modifications are applied. The serial monoblock option can be used with original LS3/5a 15 Ohm speakers or other high impedance speakers.

Improved designs

A more modern way to implement parallel monoblocks and avoiding a second chassis, was the Quad 520/606/707/909 design, the output transistors were doubled/tripled in parallel but using the same class A stage to drive them. In this way the internal output resistance was lowered and the power bandwidth concerning difficult loads increased.

Because of this multiple transistor design (low internal impedance), a 520 and the rest is better suited for serial monoblocking than their single output transistor counterparts like the 240, 303, 306 and 405.

Quad had a serial monoblocked 909 in their catalogue, but it was cancelled.

Some considerations

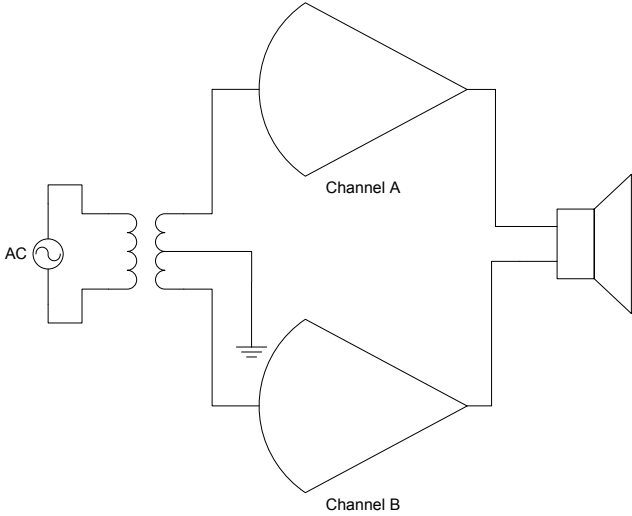
Although it should work in standard form, my personal opinion concerning monoblocking the 240, 306, 520f, 606, 707 and 909 is as follows. All these amplifiers make use of the so called virtual earth technology in their power supply's. My advice is to combine the two power supplies of the two channels and remove one regulator circuit. In this way you will end up with one power supply with only one circuit that is responsible for the regulation of the virtual earth (mass).

The 520 and 240 range of amplifiers have volume pot meters on the front panel. Don't use them for adjusting the levels when you built a parallel or serial mono block. They are very "coarse" and can't be secured in a reliable way. Always use a multi-turn miniature pot in the inside of the cabinet and disconnect the volume pot meters on the front.

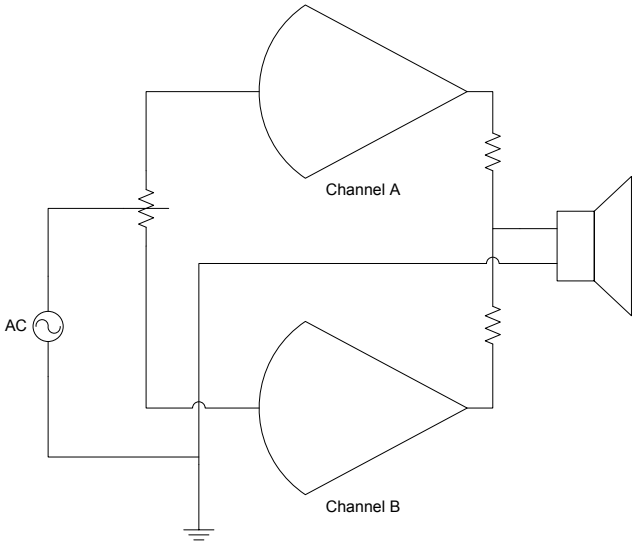
The single channel amplifiers: Quad 50E/D and 510 with output transformers

Although you can't speak of monoblocking, multiple 510 or 50E amplifiers can be combined to one single amplifier. A standard 50E has no input transformer, so some precautions have to be taken when combining two or more 50E's. If the output is configured in the same way, they can be combined very easily. You only have to "watch" the polarity of the output connection. You can connect the outputs serial or parallel, depending on the application.

Serial monoblock with a transformer



Parallel monoblock with input pot meter



A serial monoblock with op amps

