

Opera Quinta

System

The Opera Quinta differs from the previous model of the same name by having a new cabinet, new components and new crossover. The cabinet is slightly larger than before, with an internal volume of around 60 litres and is divided into two chambers; the lower chamber, of roughly 40 litres houses two bass drivers. The upper chamber, of roughly 20 litres houses the upper bass driver. The three reflex ports are mounted on the loudspeaker's rear panel. There are 4 gold plated terminal connectors and the speaker is bi-wirable if required.

Cabinet

All Linea Classica models have their cabinets in shaped MDF, with sides veneered and lacquered using real wood, while the remaining sides are finished in leather. The size of the front panel, following Opera's tradition, is large enough to hold the loudspeakers. The inside of the cabinet is divided into two separate chambers, which not only reinforces the structure but also raises the frequency of the first normal resonance mode. The inside of the cabinet is filled with quality acrylic wadding, which helps eliminate internal reflections and resonance and assists bass frequency damping. The bass reflex ports are placed on the rear panel.

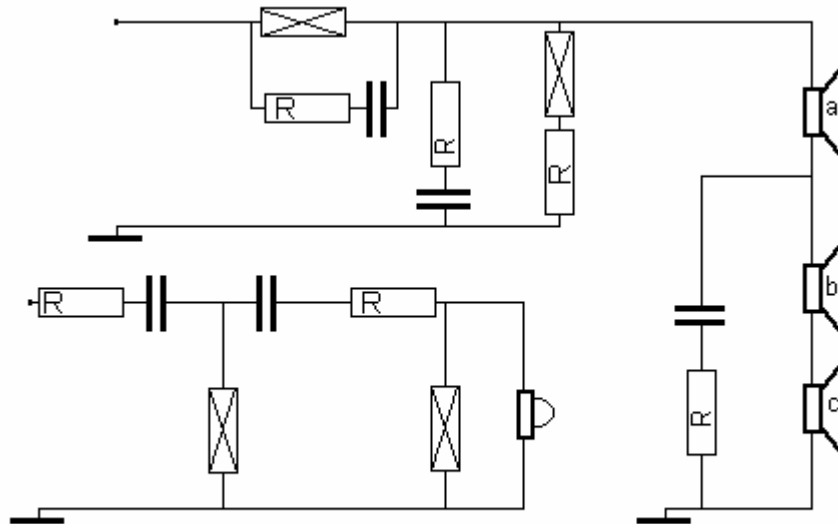
Components

All models of the Linea Classica Series use the same drive units; the one inch tweeter (the same used in the Callas SP) is a silk dome unit, with ferrofluid in the air gap and having a wide rear decompression chamber. The qualities of this SEAS tweeter are well known and appreciated. The woofer, also made by SEAS, was developed specially for this line of loudspeakers. It is a 6.5 inch unit with 18cm chassis, 38mm voice coil, aluminium diaphragm and rubber outer suspension. It has a dynamic mass appreciably higher than the norm, and an impedance of 4 ohm. Two copper rings are fitted above and below the T-shaped pole piece, which both reduce distortion and stabilize the magnetic flux. Finally, the bullet-shaped phase plug in ABS helps to dissipate heat and overcomes compression effects associated with normal dust-caps. It also improves emission at the high-frequency end of the unit's range. The cast chassis, of aerodynamic design, is fully open even beneath the inner suspension.

Crossover

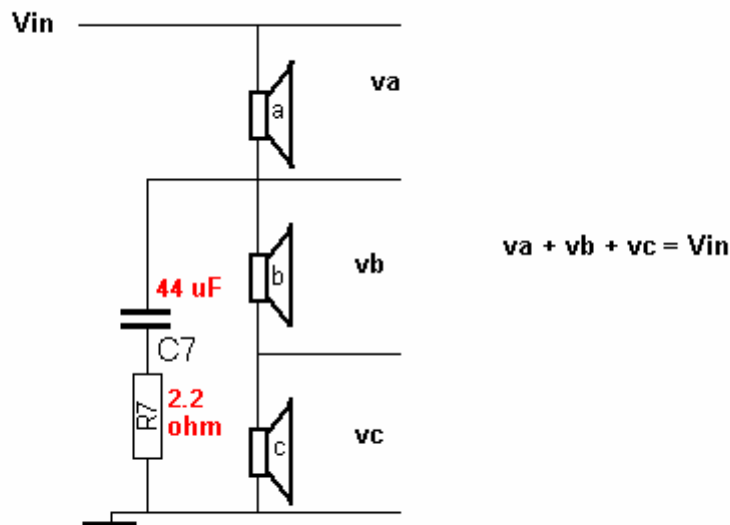
In designing the new Classic Series, particular attention has been paid to electrical impedance. This is to ensure that the loudspeaker will present a load compatible with every type of amplifier. The minimum impedance for a nominally 6 Ohm loudspeaker under DIN regulations is not less than 4.8 Ohms at the lowest point of the impedance curve. Opera Quinta adhere to this norm. The electrical impedance curve of the Opera Quinta is in fact always above 5.9 Ohm (5.54 Ohm real impedance at 20KHz) and although not completely resistive it is extremely regular with phase rotations close to zero over a wide range of frequencies from 200Hz upwards. This ease of drive makes the Opera Quinta a rarer breed, opposed to prevailing tendencies in loudspeaker design. Sensitivity is 89Db (2.83V/1 metre). It should be mentioned that this value is obtained at a high and almost purely resistive impedance. At Opera we believe that the cost of a loudspeaker should be considered together with the cost of a suitable amplifier to drive it; it is of little use to have an attractive price for the loudspeaker if a very expensive amplifier is then required to give good results.

The Opera Quinta is a very easy loudspeaker to drive, and best results can be achieved with any type of amplifier whether valve or solid-state.
 The crossover of the Opera Quinta is a `two-and-a-half-way`, with three bass units connected in quasi-series



Opera Quinta : cross-over

As can be seen from the diagram above the three bass drivers are connected in series but the two lower units (b & c) are shunted by an RC series network. In this way each drive unit receives one-third of the applied electrical power up to approx. 400Hz. In the next octave, between 400Hz and 800Hz there is a transition zone which sees the emission of the top bass driver increase and that of the two lower drivers decrease. Beyond 800Hz the lower units are attenuated by approx. 6dB per octave. Note that the sum of the voltage drop at the three bass units is mathematically equal to the voltage applied (see diagram below) which guarantees correct phase relationship; the drop in emission from the two lower bass units is compensated by the increase in SPL produced by the upper bass unit and, at least in the far-field, the three bass units behave as if they were only one (but with a greatly superior dynamic capacity). The acoustic centre of emission of the system, at low frequencies, coincides with the middle bass unit (b) and moves progressively until finally coinciding with the upper bass unit at the mid-frequencies, at which the crossover point to the treble unit is situated.

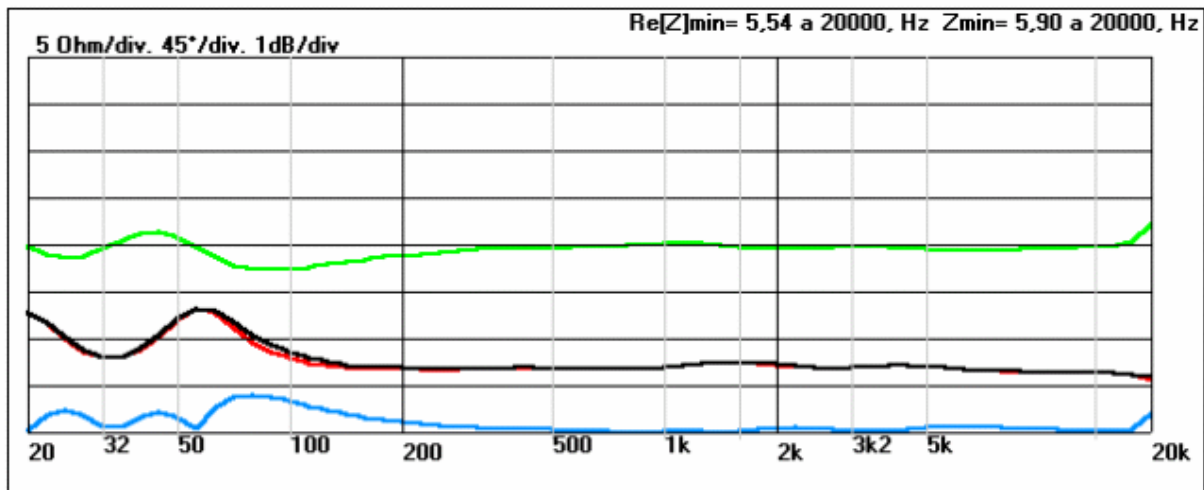


This topology is actually a variation of the progressive low-pass filter (as used in the Opera Divina), less sophisticated but equally effective in the sense that the listener perceives the sound as if everything comes from the upper bass unit. The coherence of the mid-bass frequencies is practically that of a two-way, while the effective radiating surface at low frequencies is the equivalent of a loudspeaker unit of slightly larger than 10 inches nominal diameter ($SD = 126\text{cm}^2 \times 3 = 378\text{cm}^2$.) In this way high power handling is obtained together with associated high dynamics and low distortion.

The electrical impedance of the three bass units connected in this way presents a capacitive-type curve compensated by the LR winding placed in parallel ($4.8\text{mH} + 15\Omega$) which has the effect of damping the resonance peaks of the reflex, greatly reducing phase rotations. The true low-pass filter consists of the 5 remaining components. The series RLC group at the input cancels out the typical aluminium cone resonance peaks while the parallel RC network enables an over-compensation of impedance towards the higher frequencies. This configuration has proved to be the most suitable to obtain the desired impedance curve. The overall acoustic roll-off applied to the top bass unit is in the order of 12dB per octave.

The high-pass filter for the treble unit, apart from a couple of resistors, is a classic fourth order which enables the acoustic frequency of the cross-over to be lifted to a little over 2kHz. The wave length at the acoustic crossover frequency is therefore equivalent to the distance between the centres of emission of the top bass unit and the tweeter, which makes the emission very similar to that of a small two-way loudspeaker.

The diagram below shows the very regular curve of electrical impedance. In particular, the module and the real part of the impedance in practice coincide from 200Hz upwards.

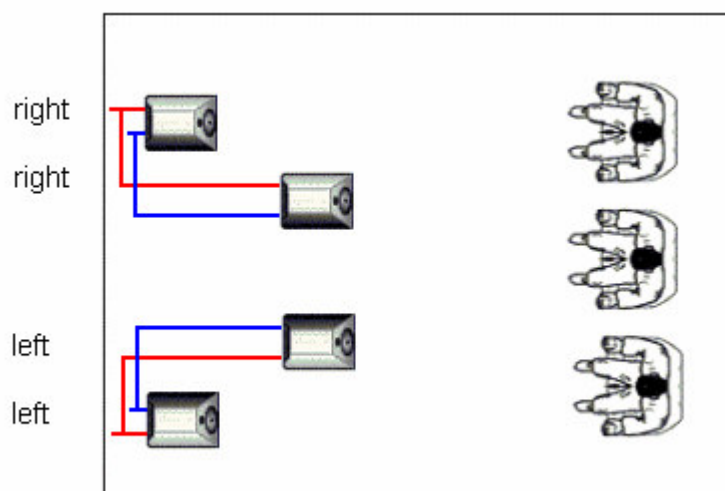


Electical Impedance : Black = Z module, Green =Phase, Red =Real[Z], Cyan Imag[Z]

Room Positioning

Opera Quinta is a floor standing loudspeaker. It is inadvisable to place the loudspeaker in a corner, and the recommended distance from side walls is at least 30cm. As always, the best position within the room will be found by some experimentation. Even though the reflex ports are rear-mounted, it is sufficient to maintain a distance of just a few inches between the rear of the loudspeaker and the rear wall.

The high value of the impedance module allows – assuming a good amplifier is used – two pairs of Opera Quinta in parallel (two for the right channel and two for the left). The impedance of two loudspeakers in parallel remains within 3 to 4 Ohms. Two loudspeakers in parallel produce approx. 95dB SPL with 2.83 volts at one metre and are able to fill even very large listening areas with sound, giving an extremely favourable price/performance ratio. If two pairs of Opera Quinta are used in this way they should be connected in parallel as illustrated in the diagram



Technical Specifications:

Quinta

System:

Floor-standing column two separated reflex loaded chambers

Drive units:

3 x 6.5 inch bass drivers - aluminium cone

1 x 1 inch tweeter - fabric dome

Number of ways:

2 1/2 way

Frequency response:

30-20000 Hz

Cross-over: low pass:

nearly-series for woofers 6 dB low pass

24 dB/octave for the high pass

Crossover frequency 2300 Hz approx

Power handling:

210 watt RMS

Recommended amplifier:

10 to 210 Watt RMS or more

Sensitivity:

89 dB/1watt/1 meter

Nominal Impedance:

6 ohm (8 max and 5.95 min from 100 to 20000 Hz with)

Room positioning:

At least 20 cm from rear room boundary

At least 20-30 cm from side room boundary

Size:

117,5 x 24 x 39,5 cm (h x w x d)

46,3 x 9,5 x 15,5 inch (h x w x d)

Weight:

34 Kg (75 lbs)