Components List, High-Quality Bass and Treble Control

C1: 4nF
C2: 400pF

R1,R2: 200kΩ
R3-R6: 100kΩ
R7-R11: 10kΩ

VR1-VR3: 0-10-100kΩ LOG :

VR1: Bass (Corner: 200Hz)
VR2: Treble (Corner: 2kHz)
VR3: Volume

R3-R6: Precision Resistors

Corner Attenuation: -3db
Max Attenuation: Full

At the corner frequency, the Low-Pass or High-Pass Filter has an in-phase component that is ½ amplitude, and a 90^0-shifted component that is also ½ amplitude. This would seem to give the Bass and Treble channels a 45^0 phase-shifted wave with an amplitude, the square root of ½. But the subtraction will also seem to give the mid-range channel two components, that are of ½ amplitude and 90^0 out-of-phase with each other, resulting in a hypotenuse the square root of ½.

In effect, the mid-range response that will result from turning the Bass and Treble controls to zero, will correspond to another first-order filter, that rolls off at -6db /Octave, as far as the frequencies extend below or above each corner frequency.