Programmable Frequency Match & Crossover Module Resistor Values

AudioControl products use resistor modules for frequency programming (crossover or PFM frequency). All modules are constructed the same, with the exception of the actual value of the resistors used. In each module, ALL resistor values are equal. The resistor value for any given frequency is chosen (applies both to home as well as autosound products) according to the following equation:

\[
\text{Resistor (kilohms)} = \frac{7200}{\text{frequency (Hz)}}
\]

Example: To find the resistors needed for 1000 Hz.

\[
R (\text{kilohms}) = \frac{7200}{1000} = 7.2 \\
R = 7.2 \text{ K} = 7200 \text{ ohms}
\]

**Frequencies by Resistor Value**

Five-percent resistors are available in 24 standard values per decade (this means that from 10 to 100 ohms, there are 24 values). The following table lists the crossover frequencies that result from using these standard 5% values.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Value</th>
<th>Frequency</th>
<th>Value</th>
<th>Frequency</th>
<th>Value</th>
<th>Frequency</th>
<th>Value</th>
<th>Frequency</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.9 KHz</td>
<td>910 Ω</td>
<td>1.7 KHz</td>
<td>4300 Ω</td>
<td>362 Hz</td>
<td>20 KΩ</td>
<td>79 Hz</td>
<td>91 KΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.2 KHz</td>
<td>1000 Ω</td>
<td>1.5 KHz</td>
<td>4700 Ω</td>
<td>329 Hz</td>
<td>22 KΩ</td>
<td>72 Hz</td>
<td>100 KΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.6 KHz</td>
<td>1100 Ω</td>
<td>1.4 KHz</td>
<td>5100 Ω</td>
<td>301 Hz</td>
<td>24 KΩ</td>
<td>66 Hz</td>
<td>110 KΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0 KHz</td>
<td>1200 Ω</td>
<td>1.3 KHz</td>
<td>5600 Ω</td>
<td>268 Hz</td>
<td>27 KΩ</td>
<td>60 Hz</td>
<td>120 KΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.6 KHz</td>
<td>1300 Ω</td>
<td>1.2 KHz</td>
<td>6200 Ω</td>
<td>241 Hz</td>
<td>30 KΩ</td>
<td>56 Hz</td>
<td>130 KΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.8 KHz</td>
<td>1500 Ω</td>
<td>1.1 KHz</td>
<td>6800 Ω</td>
<td>219 Hz</td>
<td>33 KΩ</td>
<td>48 Hz</td>
<td>150 KΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.5 KHz</td>
<td>1600 Ω</td>
<td>965 Hz</td>
<td>7500 Ω</td>
<td>201 Hz</td>
<td>36 KΩ</td>
<td>45 Hz</td>
<td>160 KΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.0 KHz</td>
<td>1800 Ω</td>
<td>822 Hz</td>
<td>8200 Ω</td>
<td>185 Hz</td>
<td>39 KΩ</td>
<td>40 Hz</td>
<td>180 KΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.6 KHz</td>
<td>2000 Ω</td>
<td>795 Hz</td>
<td>9100 Ω</td>
<td>168 Hz</td>
<td>43 KΩ</td>
<td>36 Hz</td>
<td>200 KΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.3 KHz</td>
<td>2200 Ω</td>
<td>723 Hz</td>
<td>10 KΩ</td>
<td>154 Hz</td>
<td>47 KΩ</td>
<td>33 Hz</td>
<td>220 KΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0 KHz</td>
<td>2400 Ω</td>
<td>658 Hz</td>
<td>11 KΩ</td>
<td>142 Hz</td>
<td>51 KΩ</td>
<td>30 Hz</td>
<td>240 KΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.7 KHz</td>
<td>2700 Ω</td>
<td>603 Hz</td>
<td>12 KΩ</td>
<td>129 Hz</td>
<td>56 KΩ</td>
<td>27 Hz</td>
<td>270 KΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4 KHz</td>
<td>3000 Ω</td>
<td>556 Hz</td>
<td>13 KΩ</td>
<td>117 Hz</td>
<td>62 KΩ</td>
<td>24 Hz</td>
<td>300 KΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2 KHz</td>
<td>3300 Ω</td>
<td>482 Hz</td>
<td>15 KΩ</td>
<td>106 Hz</td>
<td>68 KΩ</td>
<td>22 Hz</td>
<td>330 KΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0 KHz</td>
<td>3600 Ω</td>
<td>452 Hz</td>
<td>16 KΩ</td>
<td>96 Hz</td>
<td>75 KΩ</td>
<td>20 Hz</td>
<td>360 KΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 KHz</td>
<td>3900 Ω</td>
<td>402 Hz</td>
<td>18 KΩ</td>
<td>88 Hz</td>
<td>82 KΩ</td>
<td>15 Hz</td>
<td>470 KΩ</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Standard Module Frequencies

The following are standard modules available from AudioControl:

### 18 dB/octave (14 pin)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 Hz</td>
<td>200 Hz</td>
</tr>
<tr>
<td>25 Hz</td>
<td>270 Hz</td>
</tr>
<tr>
<td>35 Hz</td>
<td>350 Hz</td>
</tr>
<tr>
<td>40 Hz</td>
<td>500 Hz</td>
</tr>
<tr>
<td>45 Hz</td>
<td>725 Hz</td>
</tr>
<tr>
<td>50 Hz</td>
<td>950 Hz</td>
</tr>
<tr>
<td>60 Hz</td>
<td>1.5 KHz</td>
</tr>
<tr>
<td>65 Hz</td>
<td>2.0 KHz</td>
</tr>
<tr>
<td>70 Hz</td>
<td>2.6 KHz</td>
</tr>
<tr>
<td>80 Hz</td>
<td>3.0 KHz</td>
</tr>
<tr>
<td>90 Hz</td>
<td>3.5 KHz</td>
</tr>
<tr>
<td>100 Hz</td>
<td>4.0 KHz</td>
</tr>
<tr>
<td>120 Hz</td>
<td>4.5 KHz</td>
</tr>
<tr>
<td>130 Hz</td>
<td>5.5 KHz</td>
</tr>
<tr>
<td>150 Hz</td>
<td>6.0 KHz</td>
</tr>
<tr>
<td>170 Hz</td>
<td>7.0 KHz</td>
</tr>
</tbody>
</table>

### 24 dB/octave (16 pin)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 Hz</td>
<td>250 Hz</td>
</tr>
<tr>
<td>25 Hz</td>
<td>350 Hz</td>
</tr>
<tr>
<td>35 Hz</td>
<td>450 Hz</td>
</tr>
<tr>
<td>40 Hz</td>
<td>500 Hz</td>
</tr>
<tr>
<td>45 Hz</td>
<td>750 Hz</td>
</tr>
<tr>
<td>50 Hz</td>
<td>950 Hz</td>
</tr>
<tr>
<td>60 Hz</td>
<td>1.5 KHz</td>
</tr>
<tr>
<td>65 Hz</td>
<td>2.5 KHz</td>
</tr>
<tr>
<td>70 Hz</td>
<td>3.5 KHz</td>
</tr>
<tr>
<td>80 Hz</td>
<td>4.5 KHz</td>
</tr>
<tr>
<td>90 Hz</td>
<td>7.0 KHz</td>
</tr>
<tr>
<td>100 Hz</td>
<td>10.0 KHz</td>
</tr>
<tr>
<td>120 Hz</td>
<td>12.0 KHz</td>
</tr>
<tr>
<td>130 Hz</td>
<td>15.0 KHz</td>
</tr>
<tr>
<td>150 Hz</td>
<td>20.0 KHz</td>
</tr>
<tr>
<td>170 Hz</td>
<td>25.0 KHz</td>
</tr>
</tbody>
</table>

**Note:**
- Center Resistor is absent.

Building Modules

18 dB per octave modules require 6 resistors mounted on a 14-pin DIP header. 24 dB per octave modules require 8 resistors mounted on a 16-pin DIP header. In the 14-pin modules, the middle resistor position is unused and may be left unconnected. We recommend 5% ¼ watt carbon film resistors, or if you really want to be spot-on, 1% metal-film resistors (difficult to get).

Richter Scale modules always use 1% resistors.

The DIP headers are available from Radio Shack or other electronic parts distributor. Radio Shack seems to carry more 16-pin headers than 14-pin, so you may have to manufacture a 14-pin unit by cutting off the last 2 pins. It will make things easier if you buy a 16-pin IC socket as well. You can chuck the socket in your vise and have a handy fixture to hold the header while you solder.

**Note:** All resistors in a given module must be the same value. The crossover design derives its high-pass and low-pass outputs from the same set of frequency-determining resistors. It is not possible to overlap or underlap crossover frequencies with any AudioControl crossover. Besides, this is something better handled with an equalizer.