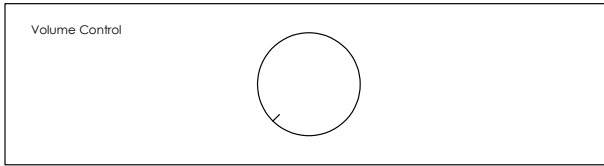


TT-IMP100WV

Impedance Matching Volume Control



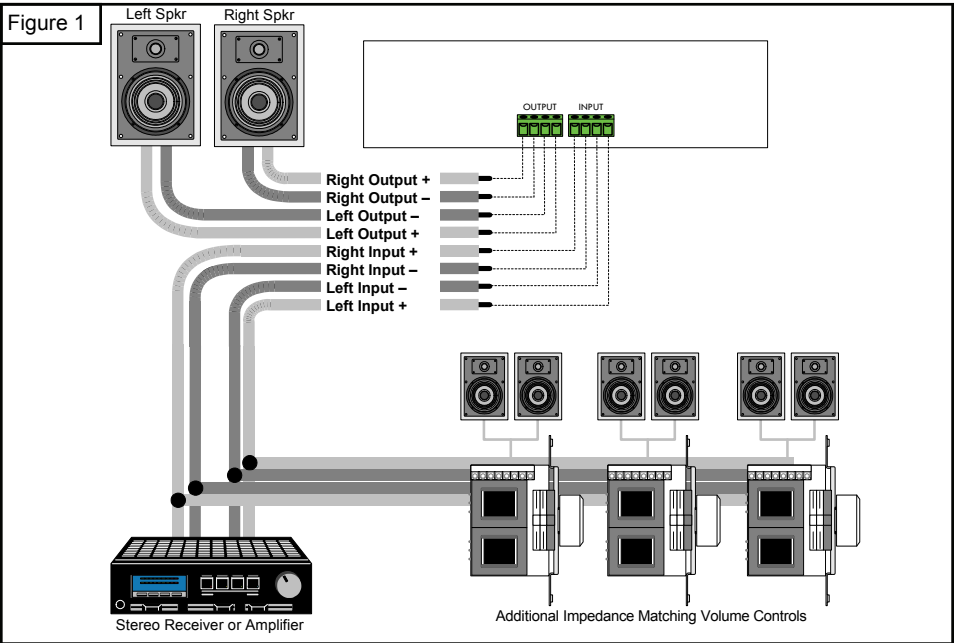
Specifications:

- 100 Watts RMS Power Handling per channel
- 1X, 2X, 4X, 8X & 16X Impedance Multiplier
- 12 Volume positions including one Off position

- 1X position allows use in ordinary applications
- Easy installation with easy-to-read instructions
- Removable Input/Output terminal strip
- Stereo Control (Can be used in Mono Applications.)
- Suitable for residential & commercial applications
- Limited Lifetime Warranty

Features:

- Protects amplifier by maintaining safe impedance



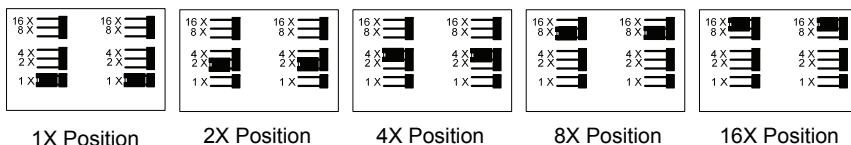
Introduction

The TT-IMP100 is an **impedance matching** volume control that is intended to compensate for the decreasing impedance associated with connecting multiple pairs of speakers to a single audio amplifier. It does this by multiplying the impedance of the speakers. To change the multiplier, simply remove the access panel on the bottom of the unit, slip the jumpers off of the pins and re-install them onto the pins with the appropriate multiplier. (See **Figure 2**) All jumpers on all controls within a system should be set to the same position. Be certain that both jumpers on each control are also set to the same position. In this manual, a system is defined as any combination of volume controls and speakers connected to a single receiver or amplifier.

Installation

Set the position of the jumpers. (See "Jumper Selection" for determining proper position.) Connect the left & right channel outputs of the amplifier or receiver to the input of the volume control as shown in **Figure 1**. Connect the left & right channel outputs of the control to the speaker inputs. Initial testing of the system should be done at low volume settings of both the amplifier and the volume controls.

Figure 2



Jumper Selection:

There are two methods for determining the proper jumper position — Chart Method and Calculated. The chart method is easiest due to its simplicity. Calculating can be more accurate, but is more difficult.

Chart Method

Use the charts to determine the maximum number of speakers that you can connect to your amplifier and for determining the proper jumper position. To use the charts, first select the chart that matches the impedance of your speakers. Move down the first column to the row that matches the minimum impedance capability of your amplifier. Move across the row to the column that matches the number of speaker pairs you wish to use. The value shown is the multiplier that should be selected on every volume control in the system. The values in the gray areas indicate combinations that are slightly below the amplifiers minimum impedance but will likely work*.

Each chart assumes that all the speakers within the system have the same impedance i.e. 8, 6, or 4 Ohm. Most installations use 8 Ohm speakers. Therefore, the Jumper Position Chart for 8 Ohm speakers will most often be used. However, if you have a variety of speaker impedance values in your system, then you should calculate the multiplier position or use the worst case scenario. To use the "worst case," select the 4 Ohm chart if your system contains mostly 4 Ohm speakers and the 6 Ohm chart if it contains mostly 6 Ohm speakers.

Calculating Multiplier

Minimum amplifier impedance capability (Ω)	Jumper Position Chart for 8 Ohm Speakers															
	Number of Speaker Pairs															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
8 Ohms	1X	2X	4X	4X	4X	8X	8X	8X	8X	8X	16X	16X	16X	16X	16X	16X
6 Ohms	1X	2X	4X	4X	4X	8X	8X	8X	8X	8X	16X	16X	16X	16X	16X	16X
4 Ohms	1X	1X	2X	2X	4X	4X	4X	4X	4X	8X	8X	8X	8X	8X	8X	8X
2 Ohms	1X	1X	1X	1X	2X	2X	2X	2X	4X	4X	4X	4X	4X	4X	4X	4X

Minimum amplifier impedance capability (Ω)	Jumper Position Chart for 6 Ohm Speakers															
	Number of Speaker Pairs															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
8 Ohms	2X	4X	4X	4X	8X	8X	8X	16X	16X	16X	16X	16X	16X	16X		
6 Ohms	1X	2X	4X	4X	4X	8X	8X	8X	8X	8X	16X	16X	16X	16X	16X	16X
4 Ohms	1X	2X	2X	4X	4X	4X	4X	4X	8X	8X	8X	8X	8X	8X	8X	8X
2 Ohms	1X	1X	1X	2X	2X	2X	4X	4X	4X	4X	4X	4X	8X	8X	8X	8X

Minimum amplifier impedance capability (Ω)	Jumper Position Chart for 4 Ohm Speakers															
	Number of Speaker Pairs															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
8 Ohms	2X	4X	8X	8X	16X	16X	16X	16X	16X							
6 Ohms	2X	4X	4X	8X	8X	8X	8X	16X	16X	16X	16X	16X				
4 Ohms	1X	2X	4X	4X	4X	8X	8X	8X	8X	8X	8X	16X	16X	16X	16X	16X
2 Ohms	1X	1X	2X	2X	4X	4X	4X	4X	4X	8X	8X	8X	8X	8X	8X	8X

(1) Calculate the net impedance for all your speaker pairs. (2) Determine the minimum safe operating impedance for your amplifier. (See amplifier owner's manual.) (3) Divide the amplifier's minimum impedance by the net speaker impedance that you calculated. The result is the minimum necessary multiplier value that you will need to select on every volume control in the system. The multiplier value you calculated will probably not be exactly 1, 2, or 4, so you will need to round the value you calculated. Round up to the next highest multiplier unless you are within approximately 10% of a multiplier value, as in the example. Below are the formulas for calculating net speaker impedance and the minimum multiplier value along with an example. Z₁, Z₂, and so on, are the impedance values of your speakers. The example uses an 8, 6 and 4 Ohm speaker connected to a system.

Net Spkr Imp. = $\frac{1}{\frac{1}{Z_1} + \frac{1}{Z_2} + \frac{1}{Z_3} + \dots}$ Example: Net Spkr Imp. = $\frac{1}{\frac{1}{8\Omega} + \frac{1}{6\Omega} + \frac{1}{4\Omega}} = \frac{1}{0.125 + 0.167 + 0.25} = \frac{1}{0.542} = 1.85\Omega$

Multiplier Value = $\frac{\text{Minimum Amplifier Impedance}}{\text{Net Speaker Impedance}}$ Example: $\frac{8\Omega}{1.85\Omega} = 4.32 \approx 4$

*OEM assumes no responsibility for damage to any audio equipment due to operation at an impedance below that recommended by the manufacturer.