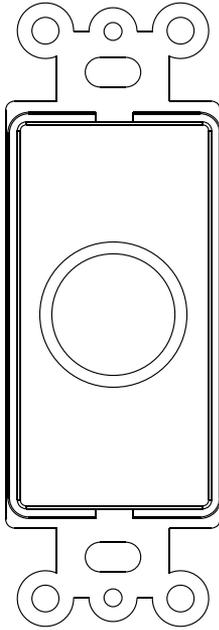


# INSTRUCTIONS



## **VC-302** **Impedance Matching Volume Control**

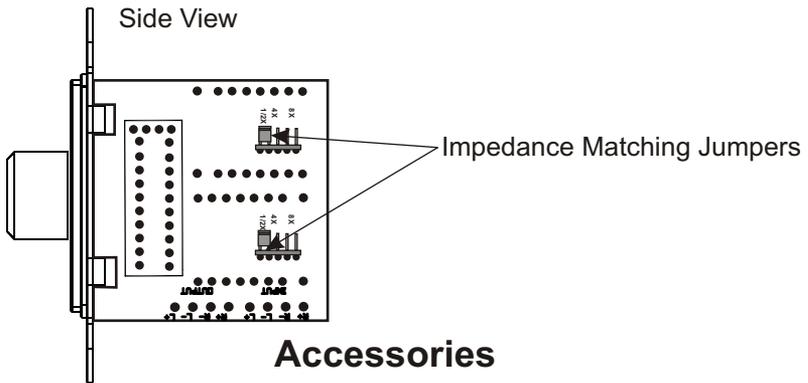
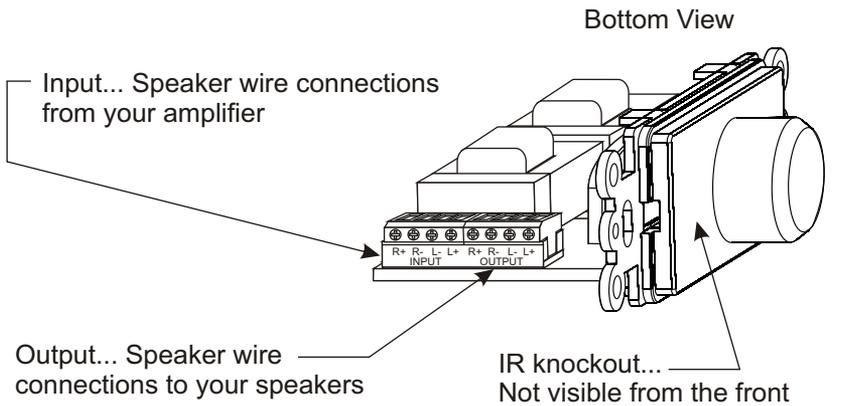
 CHANNEL VISION™

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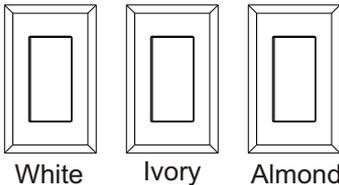
The **VC-302** is an impedance matching volume control with an IR receiver knockout. The knockout allows Channel Vision's IR-2400 to be integrated with the volume control for applications that require IR repeating. The VC-302 comes with white, ivory, and almond knobs and face plates to easily match other wall plates in the room.

**Features:**

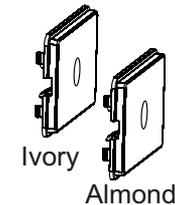
- Protects your amplifier against low impedance loads
- Knockout for mounting Channel Vision's IR-2400
- Supports up to 8 pairs of speakers
- Fits in a single-gang low-voltage ring or open-back j-box
- Supports 14 - 20 AWG speaker wire



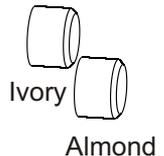
**Trim Plates**



**Face Plates**

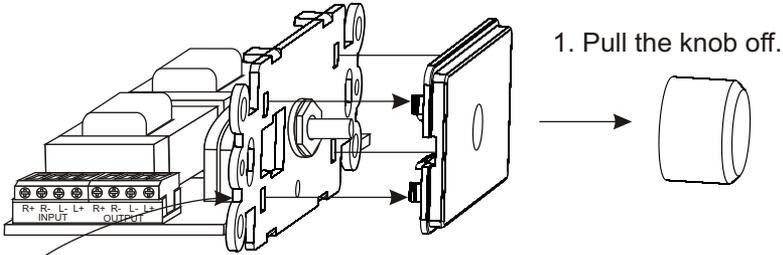


**Knobs**



# Changing the Knob & Face Plate Color

Remove the existing knob and face plate.



Gently press tabs from back side using a flat blade screwdriver.

2. Remove the face plate by pressing on the 4 tabs that protrude through the metal plate.

To install the new knob and face plate, simply reverse the process shown above.

## How Impedance Matching Works

Amplifiers have minimum impedance specifications for the speakers that will be connected to them. This is usually 8 or 4 ohms. Most speakers are either 8 or 4 ohms. Thus, most amplifiers are designed to drive one pair of speakers. When additional speakers are connected in parallel (wired to the same amplifier terminals) the resulting impedance is reduced. This is why impedance matching volume controls are used.

The VC-302 provides three impedance magnifier settings: 1/2x, 4x, and 8x. These settings are used to magnify or compensate for low impedance loads that result from wiring multiple speakers in parallel. Although the calculations needed to determine the correct magnifier setting are simple, you can use the chart below as guide to quickly find the correct setting for your application. (Note: when no impedance matching is required, use the 1/2x setting).

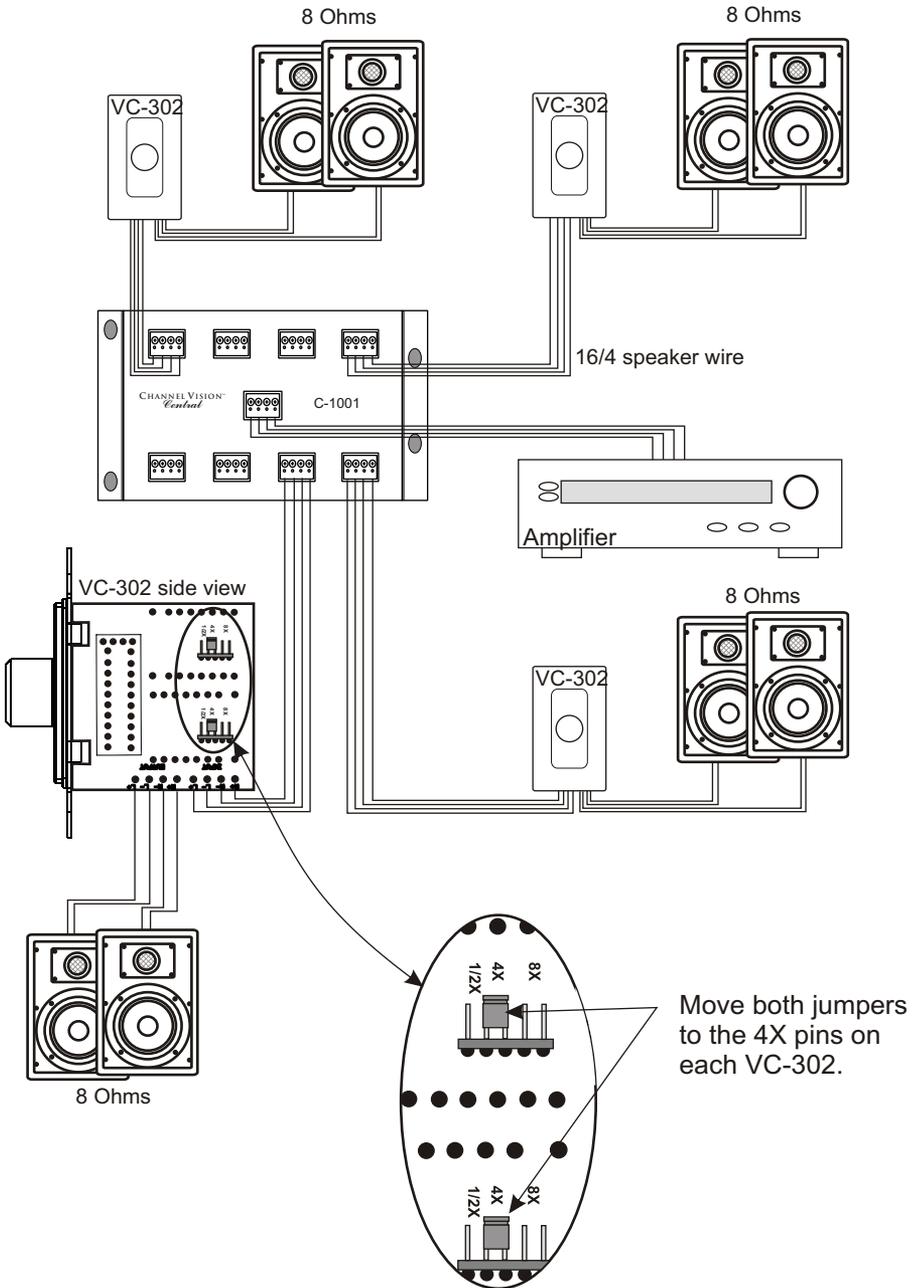
See chart for more information.

With no impedance matching		With impedance matching volume control VC-302	
Number of 8 Ohm speakers in parallel	Impedance (Ohms)	Magnifier Setting	Resulting Impedance (Ohms)
2	4	1/2X	8
3	2.66	4X	10.64
4	2	4X	8
5	1.6	8X	12.8
6	1.33	8X	10.64
7	1.14	8X	9.12
8	1	8X	8

### Example:

If you have 4 pairs of 8-ohm speakers connected in parallel, then move the jumpers to the 4X position as on the following page.

# Typical Installation Diagram



# Understanding Impedance Calculations

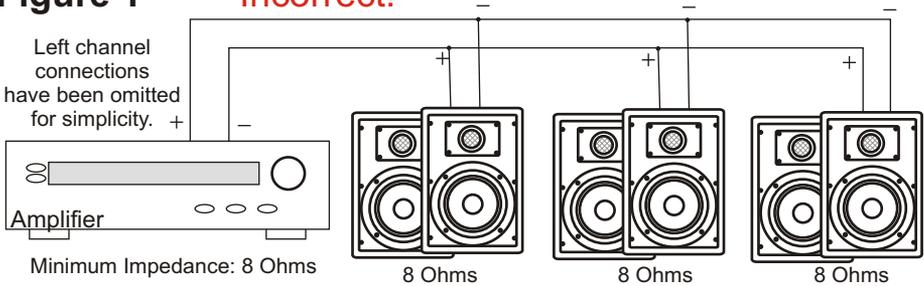
Let's examine a hypothetical system:

Joe Blow has one amplifier and he decides to hook 3 pairs of 8-ohm speakers in parallel to it. (see Figure 1)

The amplifier is rated for a minimum load of 8 ohms.

Result: Joe Blow, blows up his amplifier (or at least puts it into thermal overload).

**Figure 1** Incorrect!



There are two approaches that Joe could have taken:

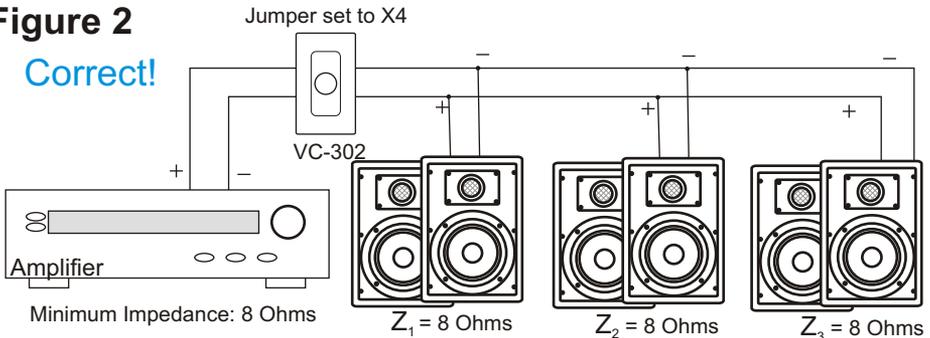
1. Buy one impedance matching volume control and hook 3 speakers up to it. (see Figure 2)

2. Buy 3 impedance matching volume controls and connect one in line before each pair of speakers. (see Figure 3)

Suppose Joe Blow chooses option one and buys one VC-302 volume control and connects it in line between his amp and 3 pairs of 8-ohm speakers.

**Figure 2**

Correct!



Joe needs to do the math: He remembers that he can calculate the total parallel impedance ( $Z_{\text{Total}}$ ) by finding the reciprocal of the sum of reciprocals.

$$\text{Thus: } Z_{\text{Total}} = \frac{1}{\left(\frac{1}{Z_1} + \frac{1}{Z_2} + \frac{1}{Z_3}\right)} = \frac{1}{\left(\frac{1}{8} + \frac{1}{8} + \frac{1}{8}\right)} = \frac{1}{\frac{3}{8}} = \frac{1}{0.375} = 2.66 \text{ Ohms}$$

2.66 Ohms is much lower than the 8-Ohm minimum that he was supposed to connect to his amp Joe sets the jumpers on his VC-302 to the X4 position.

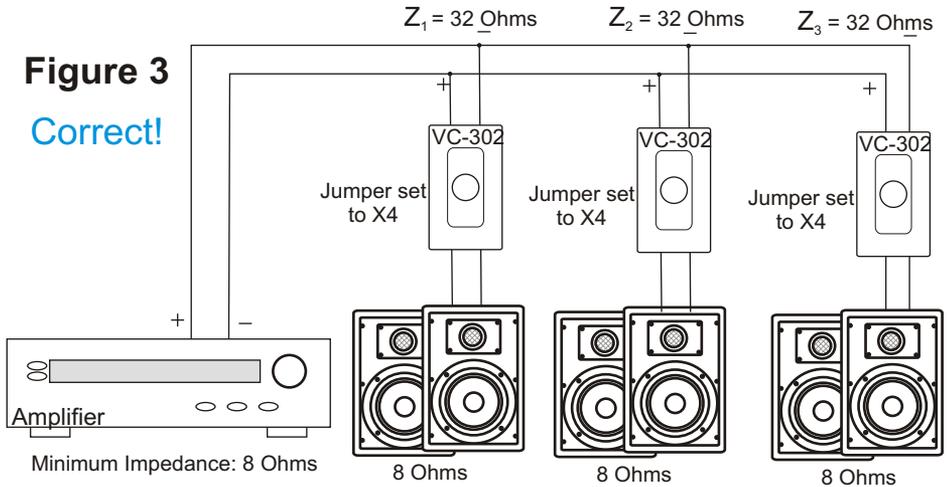
This magnifies the impedance times 4.

Thus: 2.66 ohms x 4 = 10.64 ohms. This is more than the 8-ohm minimum so the amplifier should operate safely.

Suppose Joe Blow buys three VC-302 volume controls and connects each one in line before each pair of speakers. In this case the impedance of each pair of speakers is magnified so the impedance presented to the amplifier is more than the speaker's nominal value. Suppose that Joe sets the jumper to the X4 position. This will magnify the 8 ohm speakers to look like a 32 ohm load for the amplifier.

$$\text{Thus: } Z_{\text{Total}} = \frac{1}{\left(\frac{1}{Z_1} + \frac{1}{Z_2} + \frac{1}{Z_3}\right)} = \frac{1}{\left(\frac{1}{32} + \frac{1}{32} + \frac{1}{32}\right)} = \frac{1}{\frac{3}{32}} = \frac{1}{0.9375} = 10.66 \text{ Ohms}$$

10.66 Ohms is more than the 8-ohm minimum so the amplifier should operate safely.



### What if you don't like Math?

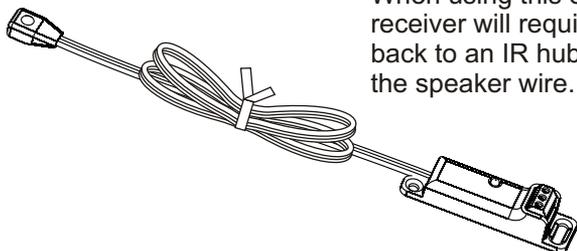
If you don't want to be a mathematician, then you can always set the magnifier to the X8 setting, but the speakers won't be as loud.

To avoid doing the math shown on the previous pages, simply follow the chart on page 3.

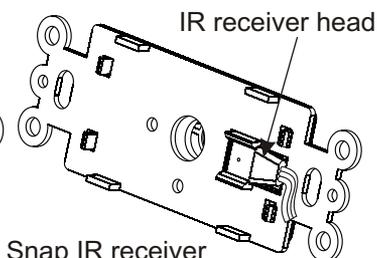
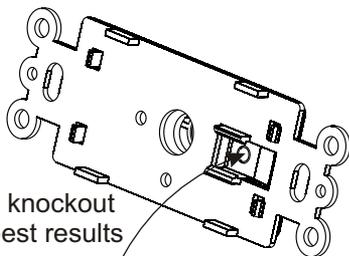
## Integrating an IR Receiver

The IR-2400 can be easily mounted inside the VC-302 to provide inconspicuous IR repeating. When using this option remember that the IR receiver will require its own wiring to connect back to an IR hub. IR signals will NOT run on the speaker wire.

IR-2400 IR receiver

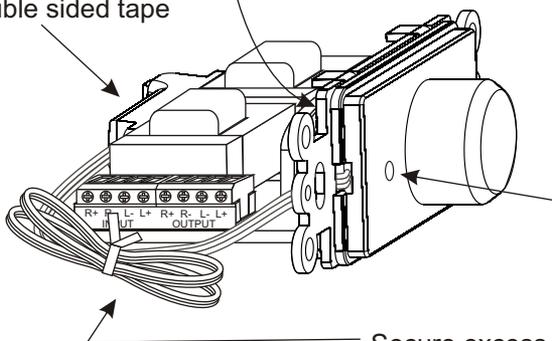


Remove the IR knockout  
Use a drill for best results



Snap IR receiver  
head into place as shown

Attach IR-2400 with  
double sided tape



IR knockout hole

Secure excess wire with wire tie

For details regarding IR system connections please refer to the IR-2400 manual.



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**10 Year Limited Warranty**

Channel Vision Technology will repair or replace any defect in material or workmanship which occurs during normal use of this product with new or rebuilt parts, free of charge in the USA, for ten years from the date of original purchase. This is a no hassle warranty with no mail in warranty card needed. This warranty does not cover damages in shipment, failures caused by other products not supplied by Channel Vision Technology, or failures due to accident, misuse, abuse, or alteration of the equipment. This warranty is extended only to the original purchaser, and a purchase receipt, invoice, or other proof of original purchase date will be required before warranty repairs are provided.

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