

# ***IR Vol Commando***

## **OPERATIONS and SETUP MANUAL**

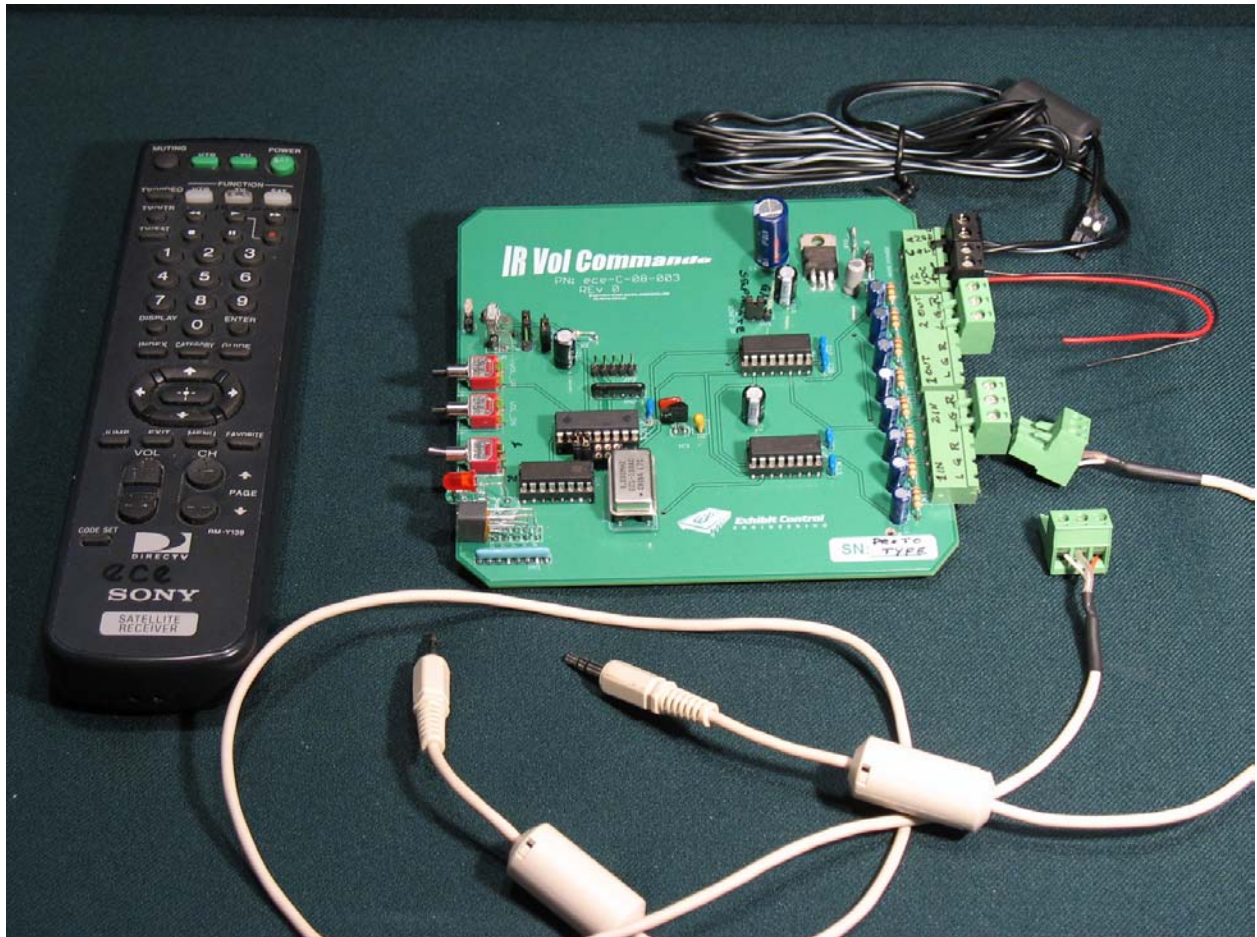


***Exhibit Control***  
ENGINEERING

102 WATERVIEW CIRCLE  
FOREST, VA 24551  
(434) 385-4144  
EXHIBIT\_CONTROL@YAHOO.COM  
WWW.EXHIBIT-CONTROL.NET

*JULY 1, 2008*

## OVERVIEW



The IR Vol Commando is an infrared controllable line level volume controller. It is capable of controlling two separate unbalanced stereo channel pairs for a total of four channels of volume. It can be controlled via an IR hand-held remote. But, its real purpose is to provide a method for controlling a conference room audio-video system's program and microphone volumes via any number of integrated IR control systems on the market today.

Each stereo pair's volume can be adjusted from 78db to 0db in 62 steps. Total harmonic distortion is typically 0.005 percent and cross talk between channels should be attenuated by 100db. The unit should be placed between the audio source's line level outputs and the audio amplifier. If the system has a switcher or mixer, it should be placed between those devices and the applicable amplifier.

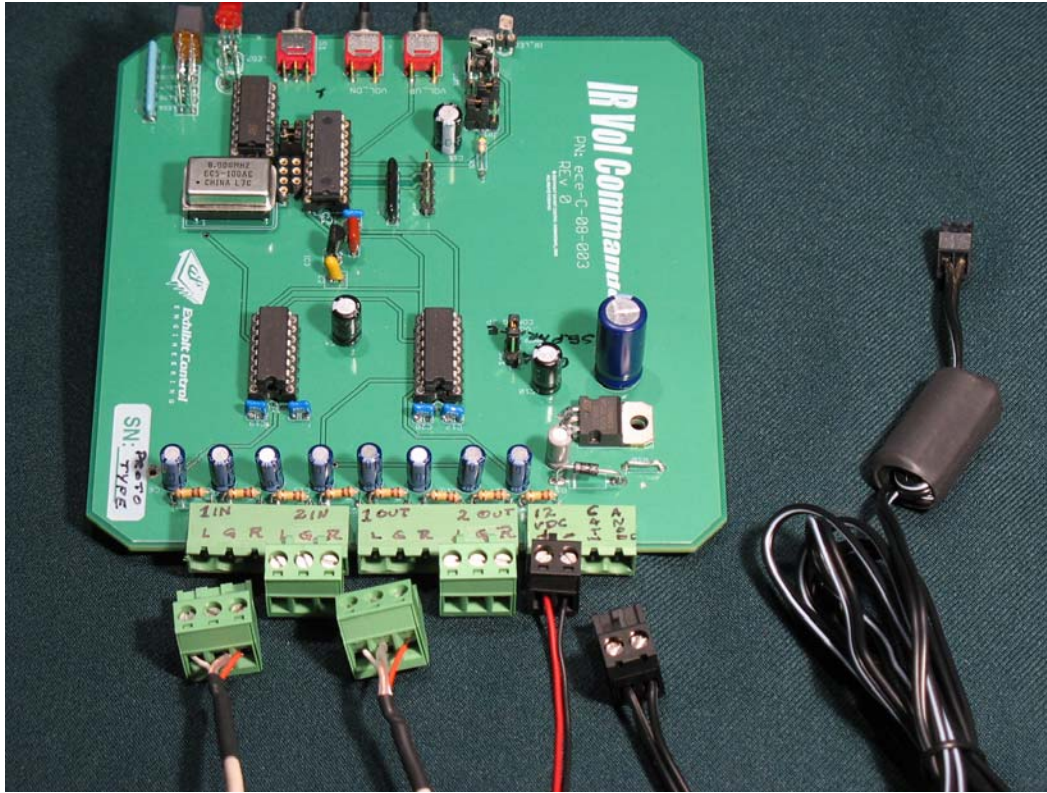
Although there is at least one other device on the market today which can provide this same functionality, the IR Vol Commando has numerous advantages. First it provides four channels of audio control versus only two by its competitor. This allows you, for example, to control both a program stereo audio pair and a mixed microphone speech enhancement audio channel separately with one unit. Second advantage is you don't need to buy an expensive, limited-use hand-held remote control to program your IR control system (usually over one hundred dollars in cost). The Commando uses the very available Sony TV remote protocol. Don't have a Sony TV remote? Buy an inexpensive (usually less than twenty dollars) universal remote and program it for Sony TV (usually program 2) and you have the remote both to control the Commando and train your IR control system. What happens if your IR control system goes on the blink? The other IR volume controller does not provide any manual way to adjust volume. The Commando allows you to adjust either stereo pair with manual volume up and down buttons on the front panel. Ever wonder what the IR volume is set to? With the other volume controller, the only way to tell is to listen. The Commando has a five-LED bar graph to indicate the relative level of the volume of either stereo pair, and it will also go totally dark indicating the Commando is muting all audio.

Another advantage of the Commando gets rid of one of the most problematic characteristics of IR control systems. In those systems you have to attach a little "IR Bug" from the control

device to the IR window of the device under control. These have a real problem with getting knocked, pulled or just falling off. Since the Commando was intended to be used in an IR system, it has its own internally mounted (soldered on the PCB) IR emitter. So you can hardwire the control into a Phoenix style screw terminal which will only come off when you want it to come off. Old school? You can still peel the IR window cover off (no guessing where the receiver is) and stick your IR bug on like all the other Cro-Magnon manufacturers would have you do.

One last feature to be aware of is an option on how the four channels of volume are controlled. Most systems will probably use it to control two stereo channel pairs separately. However, it can be configured to control all four channels in lock step which might be useful in some surround sound systems. Need more than just four channels of audio with their volume locked together? You can incorporate Vol IV Add-On units, each one adds four more channels of controlled audio volume, for up to a total of 16 channels of audio. This could be useful in systems that have numerous zones of audio for mix-minus distributed audio systems or for surround sound systems with more than four channels.

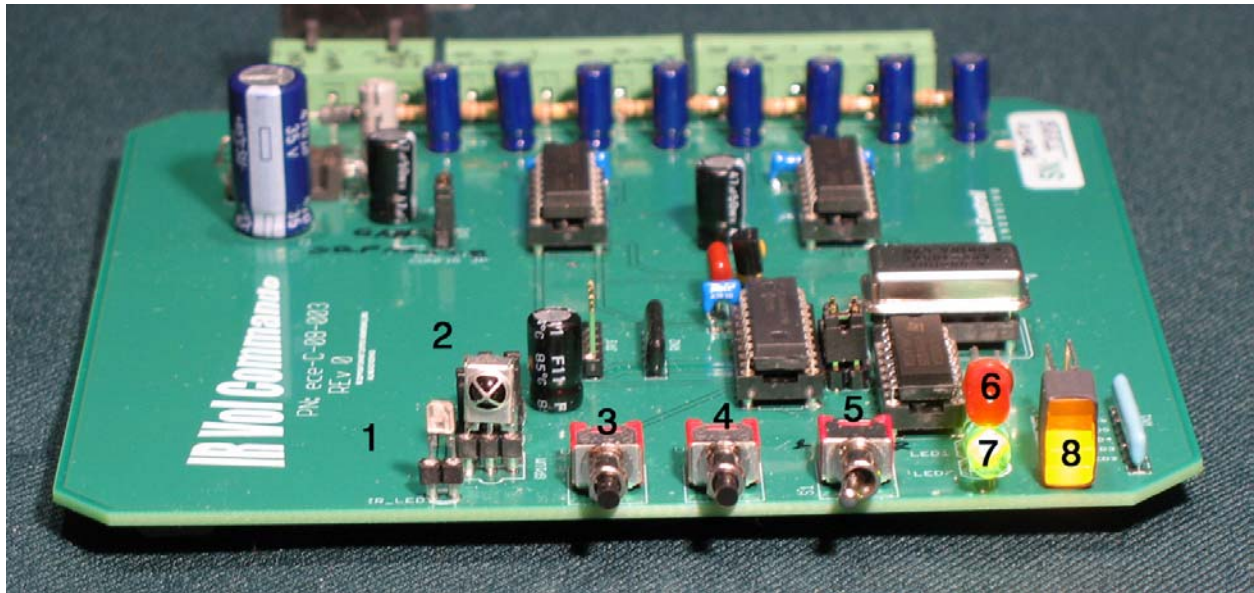
## BACK PANEL CONNECTIONS



Connecting the other audio equipment to the IR Volume Commander is done through Phoenix style screw terminals. Starting on the left, the first two three-pin connectors are used to connect line level audio input signals. A separate connector for each stereo pair input provides a connection for left audio, ground and right audio. Similarly, the next two three-pin connectors are for the controlled volume outputs. Each stereo pair has its own connector with connections for left audio, ground and right audio. The next connector, a two-pin terminal, is for 12vdc power. Please note the polarity: positive on the left; negative or ground on the right. The last two-pin connector is for hardwiring the IR control signal into the unit, should you chose that option. The easiest way to do that is to put a high impedance multi-meter on the terminals of the IR controller's

emitter “bug” connector. Do it twice, once with the red lead on one terminal and then again by reversing the meter’s leads. One way will show an open and the other way will show some mega-ohm reading (~1.0 - 10.0 M-Ohm). The terminal with the red lead when showing the mega-ohm reading is the anode of the IR emitter. Cut the bug off, and attach the wire that would have connected to the “bug’s” anode to anode terminal (marked “A”) which is the right terminal screw and the other wire (which is the cathode, marked “C”) to the left terminal. Don’t want to use the hard wire feature? Peel the cover to the IR window on the front panel and stick your “bug” over it.

## FRONT PANEL CONTROLS



Reference 1: Hard wired IR emitter – no action.

Reference 2: IR receiver – no action.

Reference 3: Volume Up button, press to increase desired volume.

Reference 4: Volume Down button, press to decrease desired volume.

Reference 5: Stereo Pair Select Switch: when switched to the left, the manual volume buttons control the volume of Stereo Pair 1 and its relative level is depicted on the yellow LED bar graph (Reference 8). When this switch is to the right, the volume of Stereo Pair 2 is controlled and displayed. This switch has no effect when IR control is being employed.

Reference 6: Volume Adjustment Indicator – flashes on whenever either of the Stereo pair’s volume is being adjusted either with IR control or via the manual volume control buttons.

Reference 7: Power Indicator – on whenever there is power applied to the unit.

Reference 8: Indicates the relative volume level for the Stereo Pair selected by Stereo Pair Select Switch (Reference 5). It is totally off whenever the IR Mute function is in effect.

## HAND HELD IR REMOTE CONTROL

The IR Vol Commando uses the standard Sony TV remote IR protocol. Any Sony remote that has the TV function, will control the Commando. If the remote is a multi-device controller, ensure “TV” is selected when trying to control the Commando. Alternatively, any Universal Remote that can be programmed to a Sony TV program will also work. Use the hand-held device to either control the IR Volume Commando directly or to train the IR control system. If the control system is AMX or Crestron, load the port with the Sony TV control file.

To increase the volume of Stereo Pair 1, use the Volume Up remote control button. Similarly, use the Volume Down button

to decrease this Stereo Pair's volume. To adjust the volume of Stereo Pair 2, use the Channel Up and Down Buttons.

To Mute all volumes, use the remote control's Mute Button (on some remotes it is labeled "Muting"). To un-mute the volume, you can either press the Mute button again (it's a toggle function) which will bring the volume back to where it was at the time of muting. Or, you can kick the Mute Off by using any of the volume adjust buttons.

## AUDIO SYSTEM SETUP

In most audio systems, there will be numerous places (or stages) that either the gain or the volume out can be adjusted. In most circumstances, the best practice is to set all for 0db in and 0db out and use the last amplifier stage to actually adjust the volume emitted from the speakers. The IR Vol Commando should be the second to last audio stage just before the power amplifier. All stages behind the audio feed to the Commando should use this zero-in/zero-out philosophy. If multi-audio sources are to be switched or mixed and then fed into the Commando, then each of their levels should be set such that all of their signal levels when presented to the Commando should be same "level". A starting place for the level of the device which feeds the Commando should be about one third of the maximum.

Once all the others levels are set up, we can start the tweaking process for the Commando. The Commando, upon initial power up, will go to approximately one third of its maximum signal strength. Using either manual controls or a Sony TV IR remote, increase the Commando's volume until four LEDs in the bar graph are illuminated, then decrease the volume slightly, until the fourth LED just goes out. Set the power amplifier to its one third volume level and turn the system on. More than likely the volume will be extremely low. Adjust the process discussed



below if this is not the case. Assuming the volume is not outrageous, let the system settle for about 20 minutes.

After letting the system cook for about 20 minutes, gradually turn the power amplifier's volume up until it is a comfortable level but not more than 80 percent. If you still aren't getting much volume out of the speakers at 80 percent, leave the amplifier's setting there and start increasing the gain of the device feeding the Commando until the volume is a comfortable level. During this process we need to be watchful that we do not over drive the Commando. The telltale symptom when over driving the Commando is you will hear occasional static, crackle or popping noises in the audio. Whenever this occurs, we need to decrease the gain of the device feeding the Commando. Assuming we have achieved comfortable levels of audio in the speakers with no static, we can proceed to the next step.

Now, using either manual controls or a Sony TV IR remote, adjust the Commando's volume to the maximum as indicated by the LED front panel bar graph. Then, increase the power amplifier's gain to the maximum level you want the system to be capable of. If you can't quite get there, you can try adjusting the gain of the input device into the Commando, ensuring you don't get into the over drive condition. Our recommendation here is to use up more of the headroom of the power amplifier rather than being too aggressive with the gain on the input device.

Once the maximum level for the system has been attained, we need to do one more check to ensure the input device's gain is not too high. Using the Mute button on the IR hand control, mute the system's audio. If you cannot hear any audio, the setup is complete. If you can hear any audio at all, decrease the input device's gain until it you cannot hear any audio while the system is muted. If you make adjustments during this process, you might need to go back to the maximum audio out setting process and make some additional changes (increases) to the power amplifier's setting.

This entire procedure needs to be done for both stereo signal pairs. This should conclude any adjustments for the system. However, as the electronics in the system age and/or drift, you might find that the Commando is being over driven (static, crackles and pops) in which case you should decrease input gain to the device feeding the Commando.

