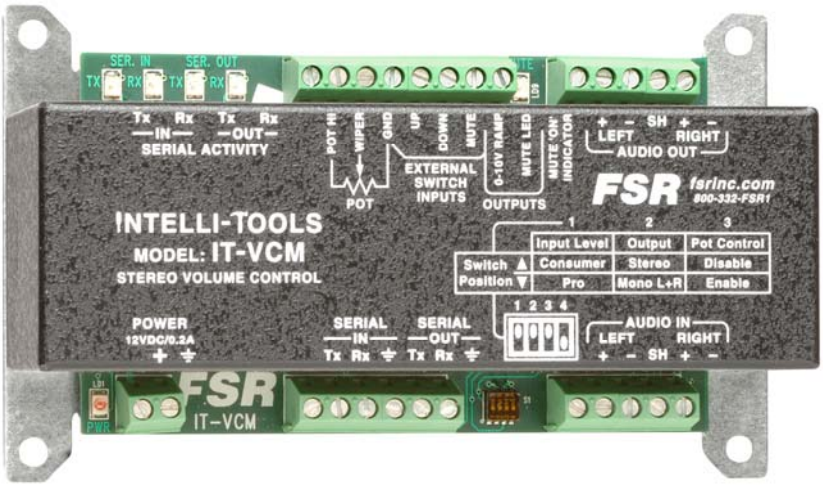
Operating Guide

INTELLI-TOOLS
IT- VCM



ASCII or Hardwire Controlled Line Level Volume Control Module with Serial Loop Through

244 Bergen Blvd West Paterson NJ 07424 1-800-332-FSR1 http://www.fsrinc.com/

Warranty Policy

This product is warranted against failures due to defective parts or faulty workmanship for a period of five years after delivery to the original owner. During this period, FSR will make any necessary repairs or replace the unit without charge for parts or labor. Shipping charges to the factory or repair station must be prepaid by the owner, return-shipping charges, via UPS / FedEx ground, will be paid by FSR.

This warranty applies only to the original owner and is not transferable. In addition, it does not apply to repairs done by other than the FSR factory or Authorized Repair Stations.

This warranty shall be cancelable by FSR at its sole discretion if the unit has been subjected to physical abuse or has been modified in any way without written authorization from FSR. FSR's liability under this warranty is limited to repair or replacement of the defective unit.

FSR will not be responsible for incidental or consequential damages resulting from the use or misuse of its products. Some states do not allow the exclusion of incidental or consequential damages, so the above limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Warranty claims should be accompanied by a copy of the original purchase invoice showing the purchase date (if a Warranty Registration Card was mailed in at the time of purchase, this is not necessary). Before returning any equipment for repair, please read the important information on service below.

SERVICE

Before returning any equipment for repair, please be sure that it is adequately packed and cushioned against damage in shipment, and that it is insured. We suggest that you save the original packaging and use it to ship the product for servicing. Also, please enclose a note giving your name, address, phone number and a description of the problem.

NOTE: all equipment being returned for repair must have a Return authorization (RMA) Number. To get a RMA Number, please call FSR Tech Support (973-785-4347). Please display your RMA Number prominently on the front of all packages.

CONTACT INFORMATION
FSR Inc.
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Product Overview

The IntelliTools IT-VCM is a stereo or mono line level volume control module. The IT-VCM accepts a balanced or unbalanced stereo audio line level source and provides a balanced stereo output. The module is able to sum the stereo inputs to mono.

The unit can be used in any application where remote control of the audio level is desired, such as between the pre-out and main-in jacks of integrated amplifiers or receivers that were built without remote control.

The IT-VCM responds to RS-232 commands, including volume up/down ramping, audio levels, treble, balance, bass, muting and serial loop output port baud rate. The IT-VCM can provide feedback on all the above as well as dip switch, pro/consumer, stereo/mono and pot enable settings status.

Switches control only volume up/down and mute. They may be used concurrently with serial control.

The potentiometer can be used for volume control only. In this mode, the volume up and volume down button terminals as well as the Volume serial commands are disabled. (See IT-VCM Operation for details)

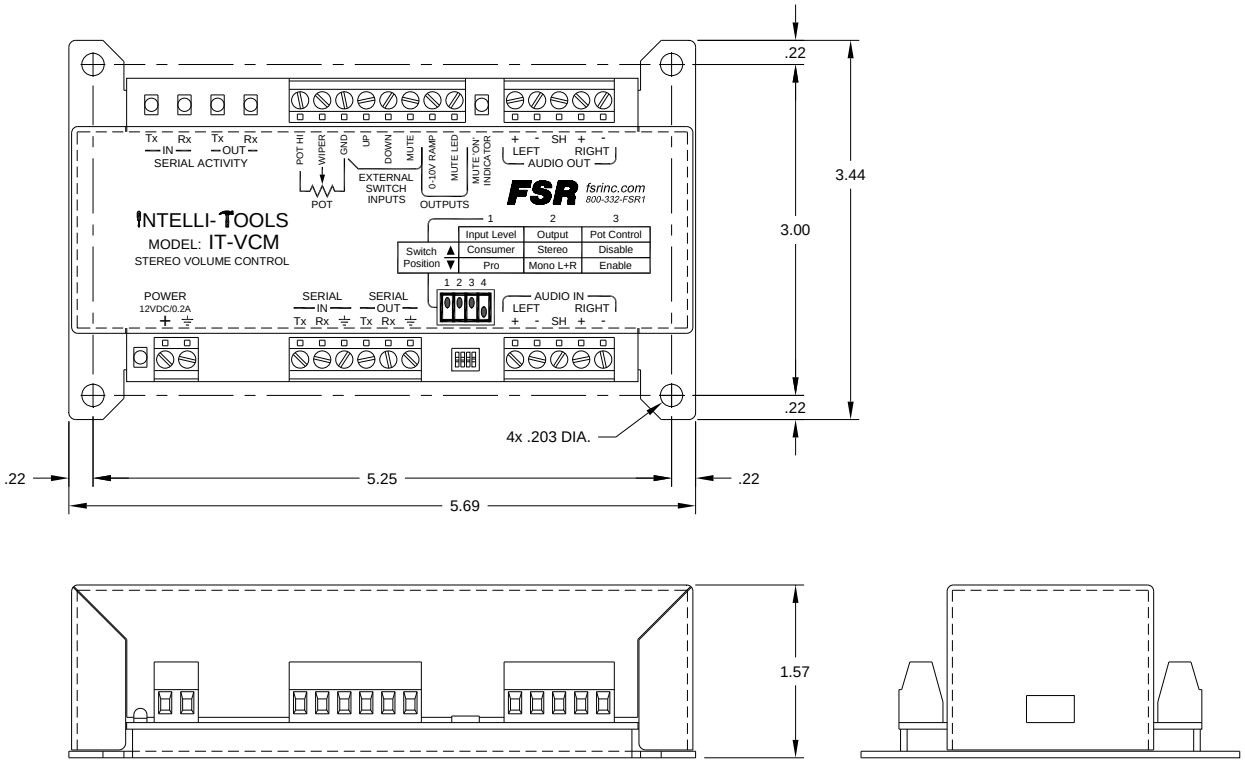
The module delivers a 0- 10v ramp output that can drive a bar graph indicator (not provided). A mute output is also provided to drive an LED.

To control multiple sources, the IT-VCM modules can be "daisy-chained," This means that with only one source you can change the volume level in the different rooms individually. Most RS-232 devices including FSR's other IntelliTools modules can also be controlled.

Flanges on the base, along with the supplied screws, permit easy mounting to flat surfaces.

The versatility of the IntelliTools family is limited only by your imagination

IT-VCM Dimensions

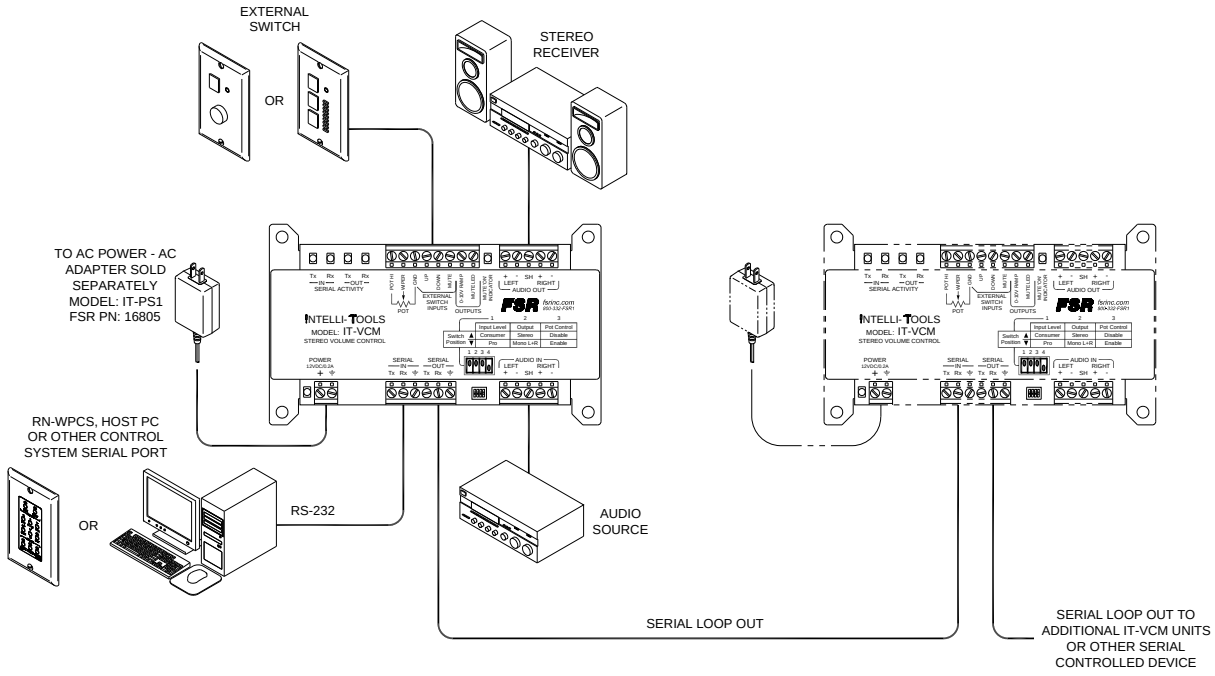


Typical Applications

Typical Applications include:

- Home Theater
- Audio Source Muting
- Audio level status
- Remote volume control
- Up to five IT-VCM's can be daisy chained together

NOTE: Multiple serial controlled devices can be daisy chained together through a serial loop through port without sacrificing a control port on the control system.



IT- VCM Operation

The IT- VCM audio input and output may be wired for balanced or unbalanced applications. Bridging inputs allow either high or low impedance sources. The output is line-level, low-impedance balanced.

Depending on the "POT CONTROL" dipswitch setting, the IT- VCM can be set for two operating modes. When set to DISABLE, the audio level is controlled by normally open momentary pushbuttons (not provided) connected to the SWITCH INPUT terminals for ramp up and ramp down the audio level. If either button is held in, the audio level will ramp automatically. If a button is pulsed (< ½ second), the audio level will increment or decrement one step. In this mode theVolume serial commands can also be used to control the volume level.

When the "POT CONTROL" dipswitch is set to ENABLE, the potentiometer terminals are activated and the audio level is controlled by a remote 10 kΩ linear taper pot or by an externally applied 0 to 12 VDC. In this mode, the volume up and volume down button terminals as well as the Volume serial commands are disabled

Terminals provide a 0 to 10 VDC output ramp. The ramp output can be used to drive an LED bar graph display to indicate the current audio level.

A momentary closure between the MUTE and GROUND terminals will mute the audio source. A second closure will un-mute (toggle action). An on board LED and an LED output terminal indicate when the IT- VCM audio level is muted.

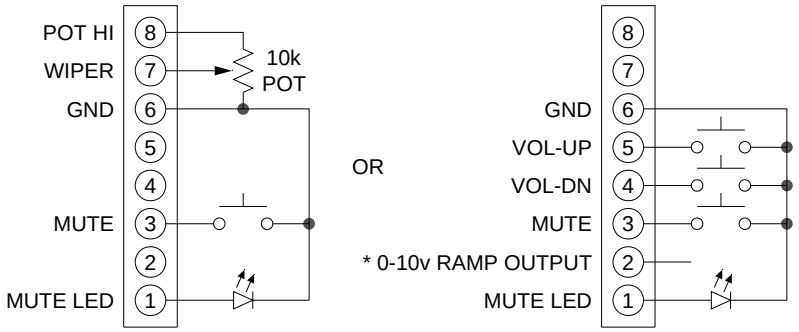
Settings retention: All current settings are saved in non-volatile flash memory upon power loss. Settings include: Volume, Bass, Treble, Balance, Mute and settings

There are additional control features such as bass, balance and treble adjustments that are available through the RS-232 control input and are discussed in the RS-232 protocol section.

Dipswitch Settings

SWITCH 3 - POT ENABLED
THIS CONFIGURATION ALLOWS FOR THE USE OF AN ADJUSTABLE 10k POT TO CONTROL THE VOLUME.

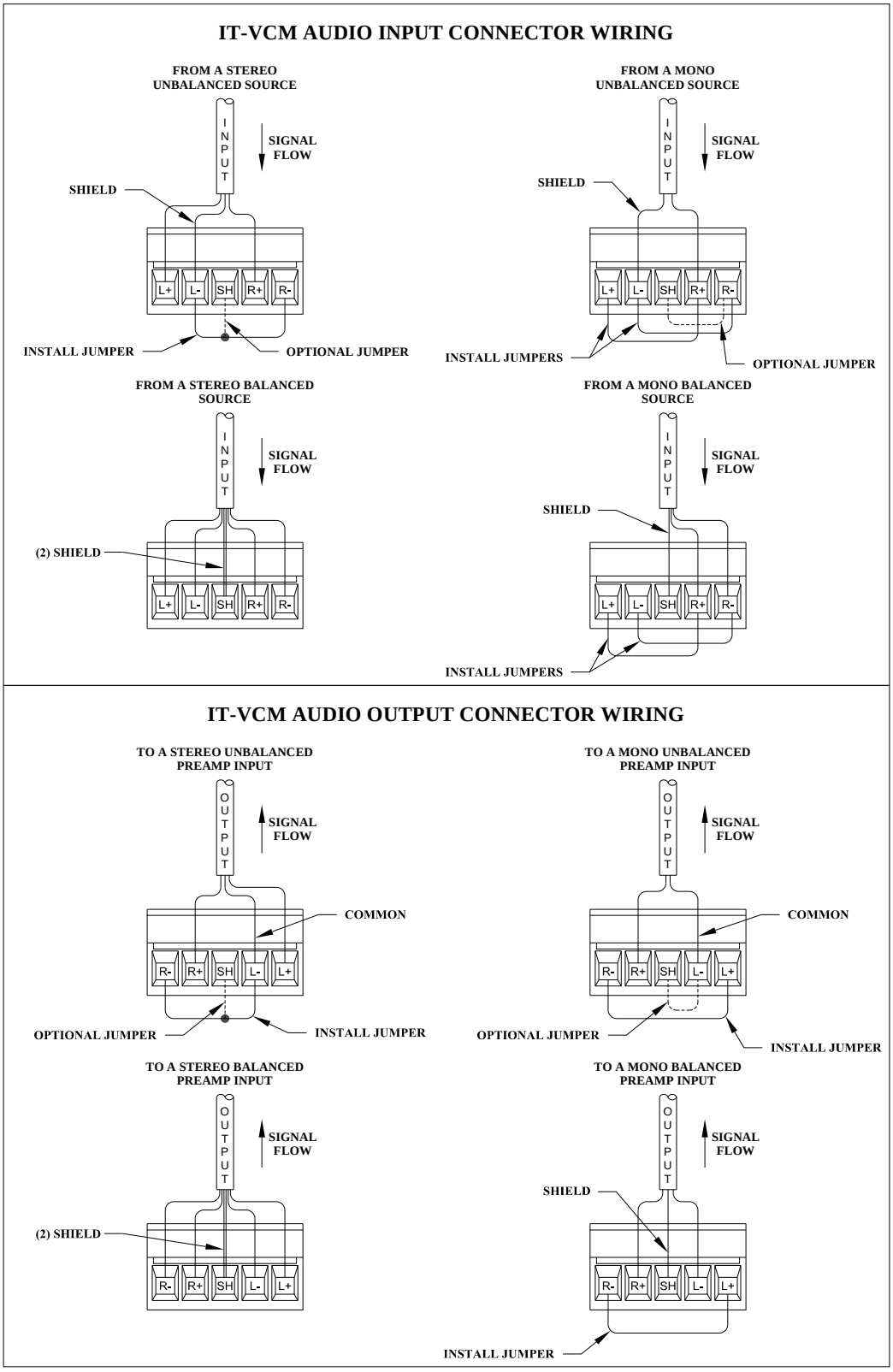
SWITCH 3 - POT DISABLED
THIS CONFIGURATION ALLOWS FOR THE USE OF MOMENTARY PUSH BUTTONS FOR CONTROLLING THE VOLUME.



* 0-10 VOLT RAMP - BUFFERED OUTPUT THAT INDICATES VOLUME LEVEL USED FOR DRIVING A BAR GRAPH OR FOR PROVIDING FEEDBACK TO A CONTROL SYSTEM DESIGNED TO DRIVE A 10k ohm LOAD.

Audio Pinout and Wiring

WIRING DETAIL FOR IT-VCM AUDIO

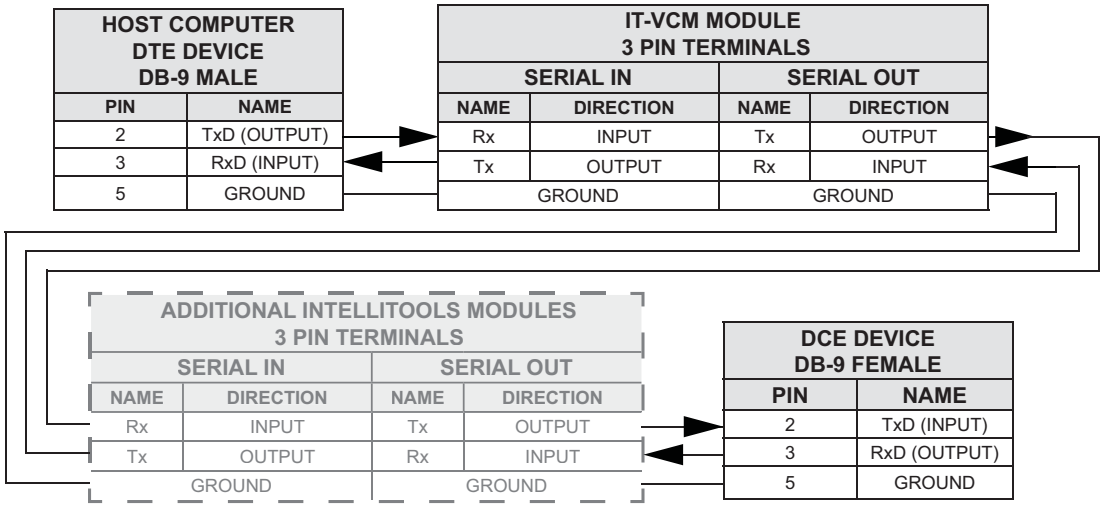


Typical RS-232 Device Interconnections

The table below shows the typical hookup for RS-232 control of the IT-VCM module. Connections for loopthrough applications are included.

The Serial-In port is configured for 38,400 baud, 8 data bits, 1 stop bit, and no handshaking. Serial-In configuration cannot be changed. The Serial Output baud rate can be changed via the Serial 2 baud rate request "SBA".

Information on RS-232 protocol is detailed in the serial protocol manual included.



IT-VCM Specifications

Conditions unless noted: Volume= - 10dB, Bass=0dB, Treble=0dB, Balance=Center, Mode=Stereo Pro 0dBm= 1mW into 600 ohm; 0.775 Vrms

Input Number/Type	1 stereo, balanced or unbalanced
Connector	Fixed 5 position screw terminal
Impedance	20k ohms balanced, 10k ohms unbalanced
Maximum Input Level	+18dBm (Pro mode), +6dBm (consumer mode) Volume set at -10dB
CMRR	>50dB
Input Controls:	
Pro/Consumer mode	Pro mode provides unity gain with volume set to 0 dB. Consumer mode provides +12dB boost.
Mono/Stereo Mode	Mono Mode provides L+R input sum fed to both left and right outputs
Bass	±15dB @ 40Hz in thirty one 1dB steps (with volume =0dB) controllable from serial port only
Treble	± 15dB @ 16kHz in thirty one 1dB steps (with volume =0dB) controllable from serial port only
Balance	Left or Right channel cut by 20dB in thirty one steps controllable from serial port only
Volume	0 to -62dB in 1dB steps. The 63rd step provides full attenuation of at least 70dB controllable from pot, input switches or serial port.
Mute	Attenuates input signal by at least 95dB controllable from input switches or serial port.
Output Number/Type	1 Stereo balanced or unbalanced
Connector	Fixed 5 position screw terminal
Impedance	50 ohm balanced (intended to drive a 600 ohm or higher load)
Maximum output level	+13dBm
Frequency response	20hz-20khz ±0.5dB
S/N	80dB
THD	0.1% @ 1khz @ +2dBm in "Pro" mode
Power	+12 VDC @ 200 mA maximum
Power Supply	Universal input IT-PS1 (12VDC 1A supply available separately and will power up to five IT-VCM modules
Connector	Fixed 2 position screw terminal
On Board LED indicators	Power Input Supervisor, Mute Status, Serial Input Rx/Tx, Serial Output Rx/Tx
Control Inputs	Volume up, Volume down and Mute via contact closure to ground. 3K impedance
Volume Potentiometer (also see NOTE"*" below)	External 10K linear taper pot 3 wire connection (can also accept a 0-12VDC external control voltage)
Mute LED Output	3.3VDC output, 330 ohm impedance (direct drive to an external 10 mA LED
Ramp Output	0-10VDC output, 500 ohm impedance (Intended to drive a high impedance control system analog input or external bar graph display)

NOTES:

*Must enable "Pot Control" mode switch to use pot. Volume Up/Down switches and serial control of volume are disabled when pot is enabled. Serial port can be used to quiry pot level setting. Mute switch is still active when pot is enabled.

Settings retention: All current settings are saved in non-volatile flash memory upon power loss. Setting include: Volume, Bass, Treble, Balance, Mute and settings