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VCA1A Voltage Controlled Attenuator

User Instructions

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Important - Please Read:

The information in this guide is subject to change without notice.

CIE-Group shall not be liable for any errors contained herein. Nor shall it be liable for incidental or consequential damages resulting from the unit, its performance, or use of this material.

It is important that you read and understand the instructions before attempting to install and set up the system. Serious damage may result to loudspeakers if the installation instructions and warnings are not fully understood and adhered to.

Contents:

Introduction:

The **VCA-1A**, like its predecessor the VCA-1, is a two-channel voltage controlled attenuator designed for the purpose of controlling the gain of a PA or music system by a wired remote control.

Each channel utilises low noise, low distortion circuitry and comprises an audio input attenuator stage with mute facility, a restoration stage and an output stage with selectable gain jumper.

Terminals are provided for a line level audio input signal and also for the controlled audio output signal. Channel attenuation in the range 0dB to -44dB is by means of a single-gang potentiometer provided. It is possible by jumper settings to control the two channels individually with two separate potentiometers or to control both channels simultaneously with one potentiometer.

Facility is provided for muting the audio signal outputs and also for overriding the signal attenuation of both channels.

An additional feature of the VCA-1A is that it does not require the use of screened cable for the remote control inputs as the unit has built-in hum and noise immunity.

Features:

- Provides remote level control for each channel individually or simultaneously.
- Controlled attenuation of each channel in the range 0dB to -44dB using the wall-mount potentiometer plates provided.
- Facility to mute the audio outputs of both channels.
- Facility to override the remote level controls and restore the audio channel outputs to unity gain.
- Facility to double the gain of each channel's output stage. This may be useful in applications where the signal input levels may be lower than required or a larger output level is required.
- No special cable requirements for the remote level control wiring.
- The VCA-1A can be powered by 230v AC and/or 24v DC.

Connection details:

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All connections are via knock-out holes on the sides of the box and onto plug-in screw terminals located on the VCA-1A printed circuit board.

Terminal Block	Designation	Description
TB1	**Supply**	
	L	Mains live connection
	N	Mains neutral connection
	E	Mains earth connection (system ground)
TB2	-	24 volt negative input
	+	24 volt positive input
TB3	**Channel 1**	
	REM VOL	Connection to control potentiometer
	REM VOL	Connection to control potentiometer
	GND	Signal output ground (this is not the case ground)
	SIG OUT	Signal output
	GND	Signal output ground (this is not the case ground)
	SIG IN	Signal input
TB4	**Channel 2**	
	REM VOL	Connection to control potentiometer
	REM VOL	Connection to control potentiometer
	GND	Signal output ground (this is not the case ground)
	SIG OUT	Signal output
	GND	Signal output ground (this is not the case ground)
	SIG IN	Signal input
TB5	**Restoration**	
	REST SW	Switch closure across the two restoration terminals will override the Control Potentiometer(s) and restore full signal output of both channels.
TB5	**Mute**	
	MUTE SW	Switch closure across the two mute terminals will mute the signal output of both channels.

Jumper settings:

JP-1	1 & 2 =	Channel one and channel two controlled independently.
	2 & 3 =	Channel one and channel two controlled from channel one control input. (Note, JP-1 jumper setting must be the same as that chosen for JP-5).
JP-2	1 & 2 =	Input and output grounds not connected to mains earth.
	2 & 3 =	Input and output grounds connected to mains earth.
JP-3	1 & 2 =	Channel 1 gain x 1
	2 & 3 =	Channel 1 gain x 2
JP-4	1 & 2 =	Channel 2 gain x 1
	2 & 3 =	Channel 2 gain x 2
JP-5	1 & 2 =	Channel one and channel two controlled independently.
	2 & 3 =	Channel one and channel two controlled from channel one control input.

• Note, JP-5 jumper setting must be the same as that chosen for JP-1.

Installation:

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• IMPORTANT:

It is important that you read and understand the following installation guide before completing the setup of the system. It cannot cover every aspect of installation under every possible condition but it will offer guidance to a typical system installation.

Before applying power to the VCA-1A unit for the first time; Ensure that the small factory-fitted 47KΩ resistor has been removed from the terminals marked 'REM VOL' and replaced by the remote level control 47KΩ potentiometer which must be set to its minimum level. Failure to do this may cause an audio signal level greater than 0dB to be sent to the connected output zone and serious damage may occur to the loudspeakers.

• Installation:

Figure 1 shows a typical installation example (See page 12).

1 Wiring the VCA-1A Remote Level Control:

- Install a suitable single-gang back box for the remote level control potentiometer plate.
- Run an unshielded single pair cable (Belden 8442 or equivalent) from the back box to the VCA-1A unit.
- At the remote level control, connect the potentiometer cable wires as shown in figure 2 (See page 13).
- At the VCA-1A, connect the potentiometer cable wires as shown in figure 1 (See page 12).

2 Wiring the VCA-1A Audio Signal In:

- Run two screened cables from the Audio Signal Source to the VCA-1A unit, one for the channel 1 (LEFT) signal and one for the channel 2 (RIGHT) signal.
- At the VCA-1A end, connect the signal wires to the terminals marked 'SIG IN' and the screens to the adjacent terminals marked 'GND'. Depending on the system wiring it may be necessary to disconnect one of the screens to prevent an earth loop, which manifests itself as a continual audio hum.
- At the Audio Signal Source end, connect the screened cables to the appropriate audio outputs using suitable connectors.

3 Wiring the VCA-1A Audio Signal Out:

- Run two screened cables from the Audio Amplifier to the VCA-1A unit, one for the channel 1 (LEFT) signal and one for the channel 2 (RIGHT) signal
- At the VCA-1A end, connect the signal wires to the terminals marked 'SIG OUT' and the screens to the adjacent terminals marked 'GND'. If it is necessary to connect the VCA-1A case to the signal ground, short pins 2 and 3 on JP2.
- At the Audio Amplifier end, connect the screened cables to the appropriate amplifier input using suitable connectors.

4 Wiring the VCA-1A Restoration Switch (if required):

- Install a normally open switch at a suitable location for the restoration control.
- Run an unshielded single pair cable (Belden 8442 or equivalent) from the restoration switch to the VCA-1A unit.
- At the switch end, connect the cable to the Normally Open terminals of the switch.
- At the VCA-1A end, connect the cable to the terminals marked 'REST SW' as shown in figure 1. (See page 12).

5 Wiring the VCA-1A Mute Switch (if required):

- Install a normally open switch at a suitable location for the mute control.
- Run an unshielded single pair cable (Belden 8442 or equivalent) from the mute switch to the VCA-1A unit.
- At the switch end, connect the cable to the Normally Open terminals of the switch.
- At the VCA-1A end, connect the cable to the terminals marked 'MUTE SW' as shown in figure 2 (See page 13).

6 VCA-1A Power requirement:

- The VCA-1A can be powered by 230v AC and/or 24v DC. Terminals are provided for both supplies.

• Setup:

The VCA-1A unit used with the default settings of JP-3 & 4 and installed correctly will attenuate the audio signal between the Audio Source and the Audio Amplifier; it does not amplify the audio signal. Before setting up the system, the installer must have knowledge of the power rating of the loudspeakers and the audio amplifier in order to prevent irreparable damage to the speakers.

The procedure below is purely a guide to help the installer achieve the best settings for the system so that the VCA-1A can attenuate the audio signal from those settings.

Figures 1 shows a typical installation and for this setup guide we will look at the system as shown in figure 1 (See page 12).

1 Whilst power to the system is off, set the VCA-1A remote level control(s) fully anticlockwise (minimum level).

2 Set the audio amplifier's master volume control to minimum level.

3 Set the Audio Signal Source to minimum level.

4 Turn on the power to the system, i.e., Audio Amplifier, VCA-1A and the Audio Signal Source. No sound will be heard through the loudspeakers yet.

5 Set the audio amplifier's master volume control to the maximum setting that the end user expects to use.

6 Set the VCA-1A remote level control fully clockwise (maximum level). This sets the overall gain of the VCA-1A to unity. Little or no sound will be heard through the loudspeakers yet.

7 Slowly increase the Audio Source signal level until the system's volume is at the maximum value you want it to operate at. Bear in mind the power rating of the speakers. If the sound from the system's loudspeakers is distorted, decrease the output level of the audio source.

8 The system's volume limit is now set and from now on the Audio Source signal level must not be disturbed from its current position.

9 Activate (close) the Mute switch (if installed). The VCA-1A audio output of both channels will be muted and no sound will be heard through the loudspeakers.

10 Release (open) the Mute switch (if installed) and the system's sound level will revert back to the volume limit.

11 Set the VCA-1A remote level control to a position somewhere between mid way and fully counterclockwise. The audio signal will be attenuated, resulting in reduced sound level through the loudspeakers.

12 Activate (close) the Restoration switch (if installed). The attenuated audio signal of the VCA-1A will be overridden and the sound level through the loudspeakers will be restored to the system's volume limit.

13 Release (open) the Restoration switch (if installed) and the system will revert back to the attenuated sound level.

14 The VCA-1A remote level control is now ready for use and can be set to any level between off and the volume limit.

Figure 1:

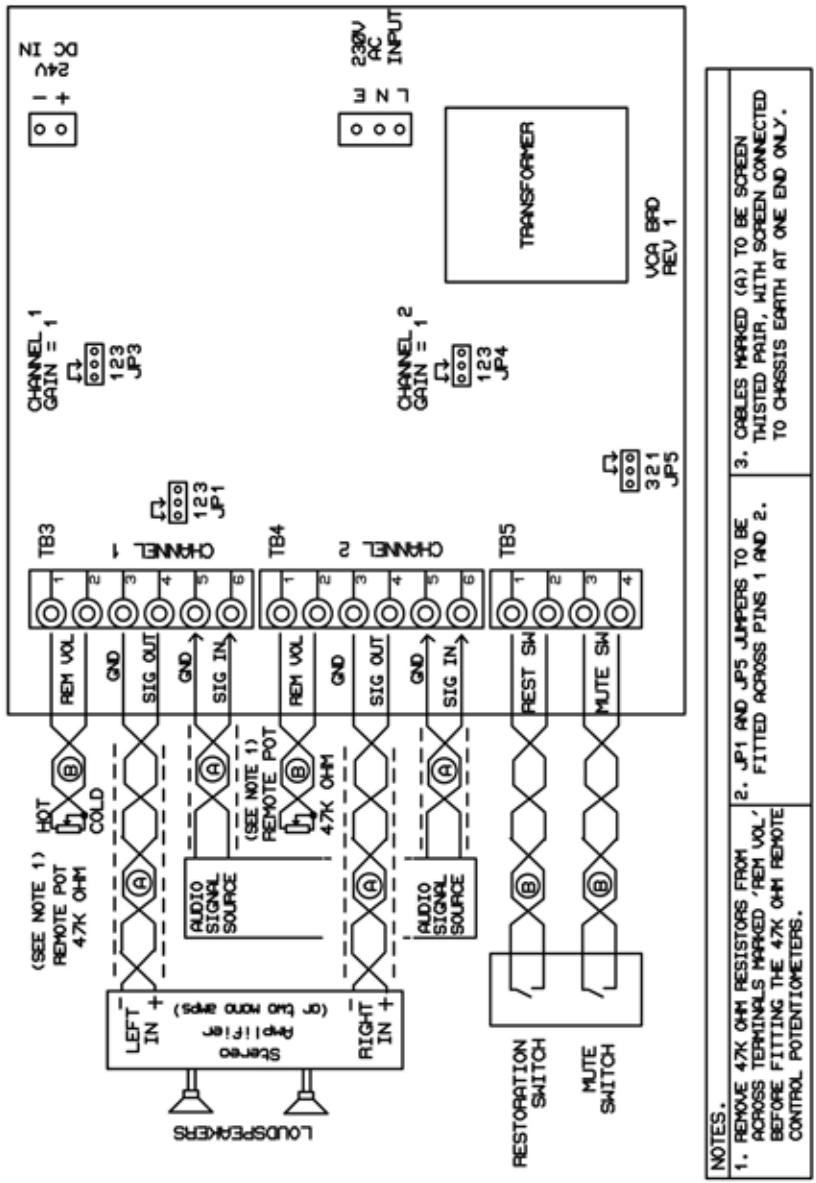

Figure 1. Example system deployment with two audio signal lines individually controlled by two external potentiometers.

Figure 2:

The VCA-1A gain is set to unity by the jumper link settings as shown on JP3 and JP4. Closing the Mute switch, if fitted, will mute both channel outputs. Closing the Restoration switch, if fitted, will override both channel attenuation settings and will set the channel output level equal to the channel input levels. Before fitting the 47KΩ remote pots, remove the two factory fitted 47KΩ resistors from the terminals marked 'REM VOL' on the VCA-1A board.

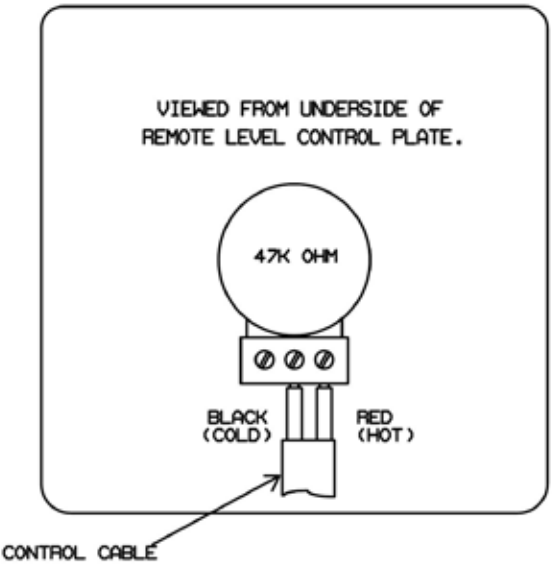

Figure 2. Remote level control potentiometer wiring details.

Trouble Shooting:

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Symptom:	Probable cause/What to do:
VCA-1A control inverted (full volume when control is full counterclockwise)	• **Crossed wiring:** Check VCA-1A control wiring (refer to figures 1, 2 & 3).
No output	• **Mute switch active (closed):** Deactivate it (open). • **VCA-1A remote level control potentiometer at minimum setting:** Increase the setting. • **Audio Amplifier master level control at minimum setting:** Increase the setting (refer to Setup section on page 10～11) • **No audio signal getting to the VCA-1A channel inputs:** Check signal source level. Check cables and connections from signal source for incorrect wiring. • **No audio signal getting to the Audio Amplifier:** Check cables and connections from VCA-1A to Audio Amplifier for incorrect wiring.

Symptom:	Probable cause/What to do:
Signal Distortion	• **Audio signal level too high:** Check the Audio Amplifier's master level control setting for being too high; lower the setting if necessary (refer to Setup section on page 10~11) Check the Signal Source level to the VCA-1A channel inputs for being too high; lower the setting if necessary (refer to Setup section on page 10~11) Check the VCA-1A remote level control potentiometers for being open circuit; replace if necessary. Check the VCA-1A remote level control potentiometer cables and connections for being open circuit; replace or make good as necessary.
Output Hum	• **System ground loop:** Check system input and output connector wiring. Check for system ground loop problem. Check related system equipment grounding to see that all system components are on the same AC ground (earth).

Technical Specifications:

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Specifications:

Power requirements:	230v AC 50/60Hz and/or 24v DC
Power consumption:	25mA using 230v AC supply, 100mA using 24v DC
Input signal level:	Up to 1v (rms), both channels, unbalanced
Input impedance:	5KΩ
Output signal level:	0 ~ 1v (rms), both channels when gain x 1 is set, unbalanced 0 ~ 2v (rms), both channels when gain x 2 is set, unbalanced
Output impedance:	200Ω
Frequency response:	30 ~ 20KHz ± 3dB
Weight:	1kg (approximately)
Dimensions:	185(W) x 125(H) x 55(D) mm

• CIE-Group reserve the right to alter the above specifications without prior notice.

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