

Controlling audio volume with up/down buttons, or from a control system using relays

Preamble:

The Cloud RL-I* is a standard Cloud accessory, compatible with several models of Cloud mixer, mixer-amplifier and zoner, that permits the level in one audio channel be adjusted from a remote location, typically in the area where the loudspeakers are installed. It connects to a dedicated Remote Level port (usually per-channel) on the Cloud base unit. The RL-I is a simple passive panel with a single rotary control. In some situations where remote level control is required, adjustment from a panel with two “nudge” buttons - “Up” and “Down” - is preferred over adjustment by a knob.

This modification describes how to control the audio level in a channel of a Cloud amplifier, zoner, etc., with a pair of momentary push-buttons, such that one button will increase the volume while it is being pressed, and the other will decrease it. This modification is also applicable when the Cloud unit is to be controlled by relay closure in a third-party control system (e.g., Crestron, AMX, etc.) In this case, two relays within the control system are simply used to simulate the action of a pair of manual push-buttons

The modification utilises a readily-available, third-party ramp generator module. This produces a DC output voltage which increases linearly while a short-circuit is applied across an “Up” input port. The output voltage similarly decreases while a separate “Down” port is shorted. The module requires a 24V DC power supply, but only consumes 40 mA.

Applicable products:

Compatible Cloud products are any fitted with a Remote Level port designed to accept an RL-I Remote Music Level Control plate. Multi-channel products will have a Remote Level port for each controllable channel. (The precise rear panel wording may vary slightly between products).

Required Skill Level: Medium. Depending on the type of push-buttons used, some soldering may be necessary.

Tools required: Small wire-cutters, small pliers, small screwdriver. Small soldering iron (max 25 W) if push-buttons have solder tags.

Suitable current Cloud products are:

TYPE	PRODUCT	REMOTE PORTS
Zoners	Z4II	4
	Z8II	8
	CX163	2
	CX263	3
	CX261	1
Audio System Controller	CX462	2
Zoner/Mixer-amplifiers	36/50	2
	46/50	4
Mixer-amplifiers	MPA60	1
	MPA120	1
	MPA240	1
	MA60	1
	MA60 Media	1
Power Amplifiers	CXV-225*	2
	CXV-425*	4
	CX-A450*	4
	CX-A850*	8
	CX-A6*	6
	VTX4120	4
	VTX4240	4
	VTX4400	4

*The RL-IA is a mechanically different variant which fits USA-size electrical boxes.

Limitations and remarks:

1. With the exception of the CX163, the zoners and mixer-amplifiers in the above list will also accept the RSL-6 (or RSL-6A) Remote Music Source and Level control plate, which permits remote control of input selection as well as level. The modification described in this Technical Note makes no provision for remote source selection by push buttons or relays; only level adjustment is covered.
2. All models that provide remote control of source selection should be set to “Remote” mode by the rear panel switch on the channel(s) concerned. In addition, these models should also be configured to retain their front panel source selection controls. This is achieved by use of internal jumpers. Full details of jumper settings are provided in the manual for each particular model.
3. The power amplifier models marked with

an asterisk in the list above are not fitted with a Remote Control connector as standard. In order to apply this modification to these models, VCA cards must first be installed for the channel(s) to be controlled. Please see the amplifier manual for full details.

4. CXA6 only – this six-channel amplifier is designed to be fitted with up to three two-channel VCA cards to permit stereo operation. See the amplifier manual for full details.

5. CX163 Zoner only – this is a stereo unit; the up/down buttons will control both left and right channels if they are connected to both VCA inputs in parallel (see Procedure below). The front panel level control on this model will remain active unless disabled by moving internal jumpers. See the CX163 manual for full details.

Parts required:

- RDL (Radio Design Labs) Model ST-RGI Ramp Generator module (see Note 1)
- 24V DC 40 mA stabilised power supply (see Note 2)
- 2 x momentary-action, press-to-make, single-pole push-buttons (see Note 3)
- Mounting hardware for push-buttons (see Note 4)
- 4-way multicore cable, length to suit push-button location
- Twin-and-screen cable, length to suit module location

Notes to Parts list

1. Refer to end of this Technical Note for details of manufacturer.
2. A suitable source of DC power may be available from elsewhere in the audio system, particularly if the Cloud unit is being interfaced to a control system. Otherwise, obtain a suitable “plug-top” type PSU.
3. Type, etc., at installer’s discretion, likely to be dictated by cosmetics. Push-buttons will not be required if the Cloud unit is being interfaced to a control system.
4. Again, this will be determined by the nature of the installation.

Procedure:

Fig. 1 below shows the connections to the ST-RGI module. Terminals shown as not connected are not needed for this application.

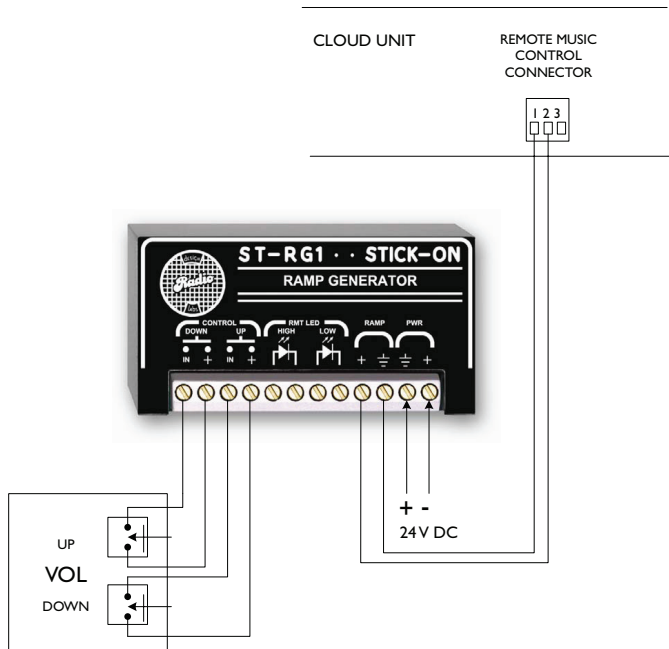


Fig. 1

The RDL ST-RGI module has a self-adhesive back, which makes it simple to attach it to any convenient flat surface. A location close to the Cloud base unit being controlled is recommended, so that only a short cable run between the module and the Cloud unit is necessary.

Important

VCA control polarity: the VCA level control circuits in Cloud products operate over a control voltage range of 0 to +10V DC, where 0 V corresponds to maximum volume, and +10V to “VCA cut-off” – i.e., minimum volume. (In all practical circumstances, the audio can then be considered “muted”). The ST-RGI generates an increasing DC voltage when given an “Up” command, and a decreasing one when given a “Down” command. This is the opposite sense of that required by the VCAs, so the “Up” input of the ramp generator must be connected to the “Volume Down” button for correct operation, so that an increasing control voltage will reduce the volume from the amplifier or zoner, and vice-versa.

Connect the two RAMP pins on the module as shown to pins 1 and 2 of the Remote Level port for the amplifier or zoner channel to be controlled, using the twin-and-screen cable. The module terminal marked ‘+’ is connected to pin 2 on the Cloud device, and that marked with a ground symbol is connected to pin 1. On Cloud models with a 3-pin Remote Level connector, do not connect anything to pin 3. Some stereo models (e.g., CX163) have a 4-pin Remote Control connector; in this case connect the ST-RGI RAMP ‘+’ terminal to BOTH pins 2 and 3, and leave pin 4 unconnected.

Connect the UP and DOWN terminals of the ST-RGI to the DOWN and UP push-buttons respectively (observing note above regarding VCA polarity), using the 4-core multicore cable. Alternatively, if connecting to relays within a control system (e.g., Crestron, AMX, etc.), run the 4-core cable to the control unit. If the relays are fully isolated, wire them as for the push-buttons. If the relays have one side commoned together, connect this to both the UP ‘+’ and DOWN ‘+’ terminals, and the DOWN and UP ‘ground’ terminals to the free side of the two relays.

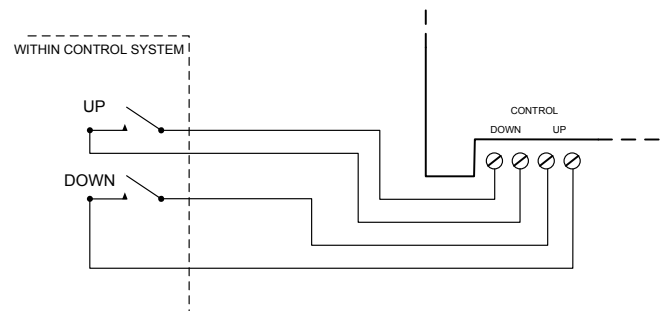


Fig. 2

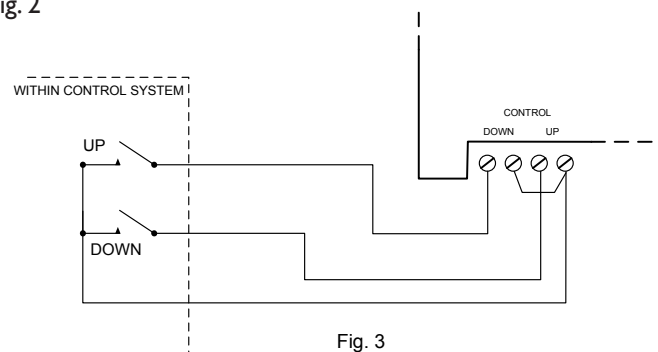


Fig. 3

Fig. 3

Connect the 24 V DC power supply (or alternative source of DC power) to the POWER terminals of the ST-RGI module, taking care of the polarity.

Operation:

The ST-RGI module's RAMP output operates over a range of 0 to 10V, which corresponds to the operating range of the Cloud's VCA circuitry. Pressing either button continuously will ramp the module output from 0 to 10V (or vice-versa) in 5 seconds.

Sourcing the RDL ST-RGI:

The Ramp Generator module is manufactured by Radio Design Systems:

Radio Design Labs

659 N. 6th St.

Prescott, AZ.

USA 86301

+1 928-443-9391

European Sales and Technical Support Centre:
(Amsterdam) (+31) 20-6238 983

See www.rdlnet.com; click on 'Locate International Distributor' on the home page for details of your local supplier.