



# **ACTIVE SPEAKER**

# **"GENERAL"**

User Manual - February 2019



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*If you have just purchased some of our speakers then thank you very much for doing so, and we do hope you enjoy using our unique and exclusive products.*

*Best regards, Jon and the RC Audio Systems team.*

## **Application of the GENERAL**

The GENERAL is a high power general purpose active Mid/High speaker with limited full range capability down to 50hz and built in LEVELIZA and LIMITIZA systems.

It is switchable for either maximum output as a mid/high speaker for medium sized events, or can be switched to full range for use for smaller events or monitors or any application requiring a compact full range solution.

The GENERAL is totally unique in having a built in LEVELIZA system, and so is capable of transparently engineering itself to maintain its maximum average loudness at any preset level without pumping or spoiling the dynamic range of the music. From the operators point of view this means you can decide on the maximum loudness that you want from the speakers and then they will subtly engineer themselves accordingly without all the unwelcome audible side effects of using conventional compressors or limiters.

In addition to the Leveliza the GENERAL also has its own dynamics processing and limiter systems and a unique LIMITIZA circuit. The LIMITIZA continually monitors all the limiters for activity. It will ignore soft limiting, but when the speaker is overdriven consistently it will slowly reduce the overall system gain to avoid continuous hard limiting. This means the GENERAL can maintain an outstanding audio performance regardless of how hard it is being overdriven, whereas most other active speakers in this situation would sound strained with audible pumping and reduced dynamic range.

We have found the GENERAL to excel as a high power DJ monitor speaker, where they can simply be plugged straight into the DJ mixer booth output and their maximum loudness can be set with their Leveliza control.

We have also found the GENERAL to excel as a compact mid/high speaker to accompany a bass speaker system, and in that role they can raise a surprisingly high SPL while still retaining a good sound quality and operating headroom.

We have also found the GENERAL to excel as a fast and easy to deploy compact full range speaker system for a small venue, or show, or any application. In this role again the inbuilt Leveliza can be used to restrict the loudness at which they may be operated up to. As a full range speaker of course they have a very limited "sub" response, but they do have sufficient bass capabilities to sound acceptable without the addition of sub bass speakers in many applications, and again they can raise a surprisingly high SPL in such use without compromise on sound quality or headroom.

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## Warnings

- **The General is a heavy unit and will require careful handling. Risk of injury exists to crew if they do not exercise good practice and techniques in lifting and moving the Generals. It is important to ensure for the safety of personnel (and the speakers) that they are only handled by suitably trained and/or experienced crew.**
- **The Generals can produce high sound pressure levels. As with any other powerful audio speaker it is important to ensure that they are operated at safe volume levels for the people exposed to them, taking into account the proximity of the people, otherwise there is a risk that they could damage people's hearing.**
- **The Generals are not waterproof and great care should be exercised in operating them in close proximity to water/rain/liquids, etc. See rigging advice below.**

## Rigging

The Generals are designed to be mounted upright on their base. There is a 35mm pole socket on the bottom of them to be used on tripods and other stands to support them.

If the 35mm fitting is not used and they are simply placed on top of a surface (perhaps a speaker or table or shelf) then they should be secured so they cannot fall off. We would recommend use of a strap or similar to secure them, and this could be passed through the side handles to ensure it is secure.

If there is insufficient height for the Generals then they may be used on their sides, but they should not be used "upside down" with the flare below the LF driver as this would compromise the component cooling.

The Generals are not waterproof, so great care must be taken when operating them in situations where they could get wet. Our advice on this is as follows:-

- The Generals are fairly water resistant from the front provided that no water enters right through the bass ports because there is no internal drain to let the water out again. In that regard if they are being used outside and there is a risk of rain we suggest they are mounted with a slight downward angle so if any rain drops land in the ports then they would tend to run out of the front rather than back into the enclosure.
- The back is not water resistant at all. It contains high voltage electrics and the cooling fan takes air in to cool those electrics. If used outside and there is a risk of rain then the back of the Generals must be well sheltered or covered, allowing of course for some airflow so that the cooling air can still circulate. Again, regarding the point made above about a slight downward angle, this would also have the benefit of ensuring if any water landed on top of the enclosure it would run safely off the front, not over the back.

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# Connections & Controls

## Power



Power in is via a 20amp "Powercon" inlet connector.

Power can be linked out to other units via a "Powercon" outlet connector. Care must be exercised when linking units not to exceed the 20amp total average current rating of the Powercon connectors.

The standard "Generals" are designed to operate on a 230V AC power supply with a +10%/-6% tolerance, so from 216 to 253V AC. Current consumption is directly affected by the music material and output levels, but as a rule they typically consume on average around 3 amps and as a short term maximum running hard up to 6 amps.

A power switch and neon red "power on" indicator is provided in between the connectors.

## Audio Input and Controls



Audio input is via a balanced XLR connector, and this is directly linked to an XLR output connector so that the input signal can be linked to other units.

There is a mode switch for selecting between "Full Range" and "Mid Hi" modes.

There is an Input Gain adjustment which adjusts the speaker's gain from zero (mute) to maximum.

There are three indicators, a green "signal" LED, a red "high level" LED and a blue "Leveliza/Limitiza active" LED.

## Leveliza Control



There is a separate recessed adjustment for the Leveliza threshold.

When fully clockwise (as in this photo) the Leveliza circuit is inactive.

When rotated back from this position the Leveliza becomes active and the adjustment sets the threshold, with the quietest setting being fully anti-clockwise.

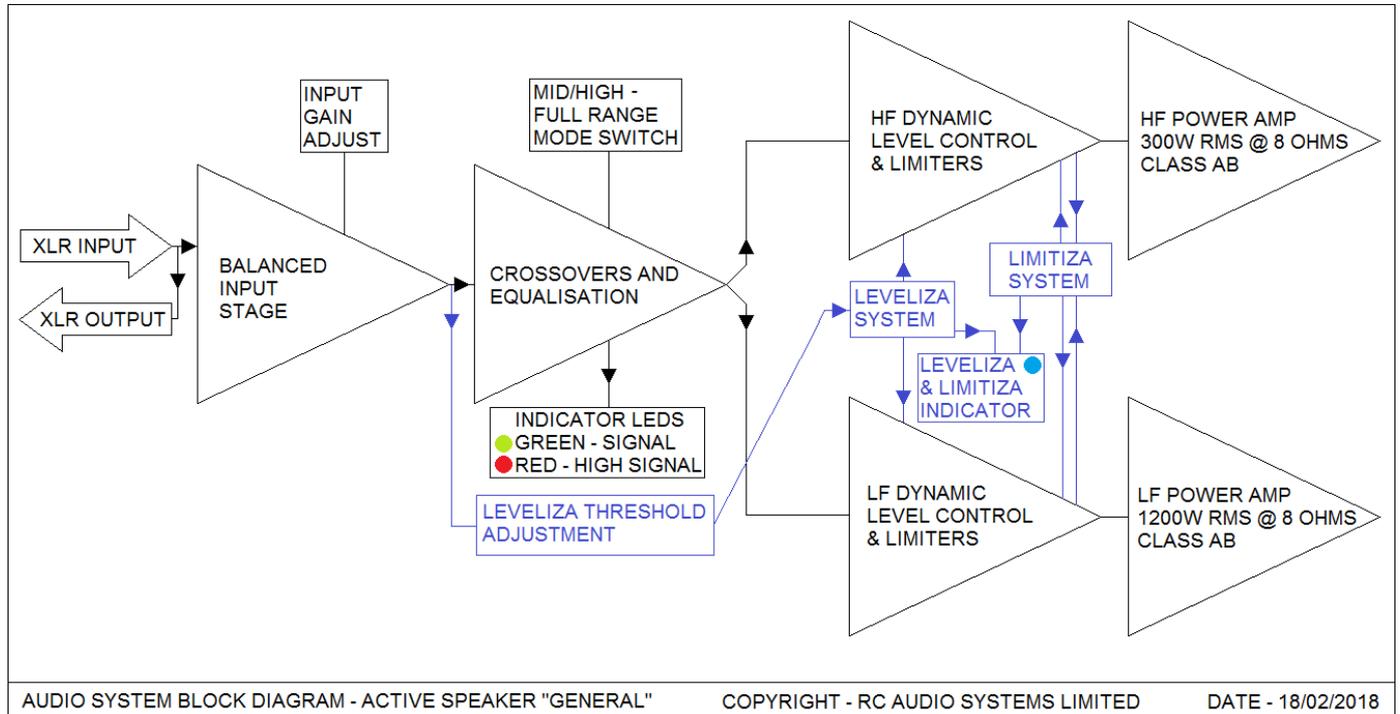
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# Operation

This is the block diagram of the audio path in the Generals:-



## Modes of Operation

There is a switch near the XLR connectors that is used to select the mode of operation.

**Full Range mode** - In this mode the Generals will respond down to about 50hz. Although they can respond to bass down to 50hz, they are primarily designed as a mid/high speaker so their performance on the lower frequencies although "useful" is not particularly strong.

Depending on application their natural bass response may be sufficient, but of course if a slightly stronger bass response is needed then it can be boosted using an eq, or even just a "bass" control on a mixer. However, loud bass takes a lot of power to produce so keep in mind that applying large amounts of bass boost will reduce the maximum output volume capability of the Generals.

**Mid/High mode** - In this mode the Generals respond down to about 150hz with a fairly gentle 12db/octave rolloff, and because they are not having to spend so much power producing bass they are capable of operating significantly louder than in "Full Range" mode.

If an alternative crossover slope or frequency is required to match some particular bass speakers then the Generals can be left in "Full Range" mode and a separate active crossover can be used to feed them instead.

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## **Leveliza**

The Leveliza circuit is controlled by a separate adjustment knob in a round recess.

If the adjustment is turned fully clockwise then the Leveliza circuit is switched "off" and becomes inactive.

From this "off" position if the adjustment is turned anticlockwise the Leveliza circuit is switched on and the position of the adjustment determines the operating threshold of the Leveliza.

When active the Leveliza "listens" to the music/audio continuously to ascertain the average perceived loudness of the signal, and if the loudness exceeds the preset threshold the Leveliza slowly rides the gain in order to try to maintain the average perceived loudness at around the preset threshold. It is not a compressor or limiter and won't affect the dynamic range of the audio, it just very slowly adjusts the gain if require to try to restrict the maximum average perceived loudness to around the preset threshold.

As the Leveliza activates it illuminates the blue "gain reduction" indicator LED on the back of the General to show that it is actively reducing the gain.

When we use the Generals I usually turn a test track/signal up through them until they are slightly louder than the maximum I wish to permit for the application. Then, with this signal playing I slowly turn the Leveliza control from the off position until the blue LED starts to illuminate and hence the gain just begins to reduce. I can then turn off the test signal and know that whatever happens later on the Generals will not perform any louder than they did when I set them up.

## **Limitiza**

This is a unique circuit included in the Generals to solve a problem associated with most active speakers.

**The Problem:-** Most active speakers have limiters built in for their protection, and indeed so do the Generals. However, the person engineering the sound or performing on the active speakers often has no indication locally of when the active speakers are being overdriven. The result is that, particularly late in a night when levels are being pushed, the active speakers are often significantly overdriven hard into their limiters, which results in poor sound quality, audibly reduced dynamic range, audible "pumping" of the sound, spectral imbalance and possibly even reduced reliability.

**The Solution:-** The unique "Limitiza" circuit in the Generals continuously monitors the activity of the limiters. It ignores slight or "soft" limiting, but if it detects any of the limiters are consistently limiting significantly or "hard" then it gently eases back the overall system gain until the limiting action is only soft. When an active speaker is slightly or "soft" limiting it means it is running as loud as it can without significantly compromising it's sound in any way. The Limitiza means that you can try to "overdrive" the Generals as much as you like, but they will just maintain this ultimate 100% output level without compromise in sound quality or losing dynamic range.

The Limitiza is fully automatic and shares the blue "gain reduction" LED with the Leveliza. As the Limitiza actively starts reducing the system gain it illuminates the blue LED.

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## **Indicator LEDs**

**Green** - This signal indicator LED illuminates to show that there is a significant signal going through the Generals.

**Red** - This is a "high signal level" LED. It illuminates to show that the level is high and the General's dynamic processing is working significantly to manage the signal, and as such it is an indication that the speaker is running at about its maximum output level.

The Red LED should not cause any concern, the General can manage its signal and limiters transparently and safely, so there is no need to reduce the input level. However, it does indicate that the speaker is running at its maximum output so there is no benefit to be had by increasing the input signal any further.

**Blue** - This is a "gain reduction" LED and illuminates to show when either the Leveliza or Limitiza circuits are reducing the overall gain of the General.

## **Input Gain**

There is a gain adjustment between the XLR connectors which adjusts the gain from zero (mute) to maximum gain.

As an indication of input sensitivity approx 1V RMS input at 1khz gives an output of approx 121db RMS at one metre with the input gain set to maximum.

# Cooling and Maintenance

## Cooling System

The General has an axial fan that sucks air in through a grill/guard and filter foam near the bottom of the back panel. This air cools the internal components and exhausts through a perforated plate near the top of the back panel.

The fan is always running when the power is on to the General. At lower temperatures the fan idles slowly, but when the heatsink temperature rises past about 50 degrees Celsius the fan increases to full speed. Once the temperature falls below about 30 degrees the fan switches back to slow/idle again.

It is important that there is a free flow of cool air available for circulation by the fan behind the General.

In the unlikely event that the heatsink or power supply temperature exceeds about 80 degrees the General will cut out temporarily until the temperature has reduced. During this "thermal shutdown" period the fan will of course continue to run.

## Maintenance

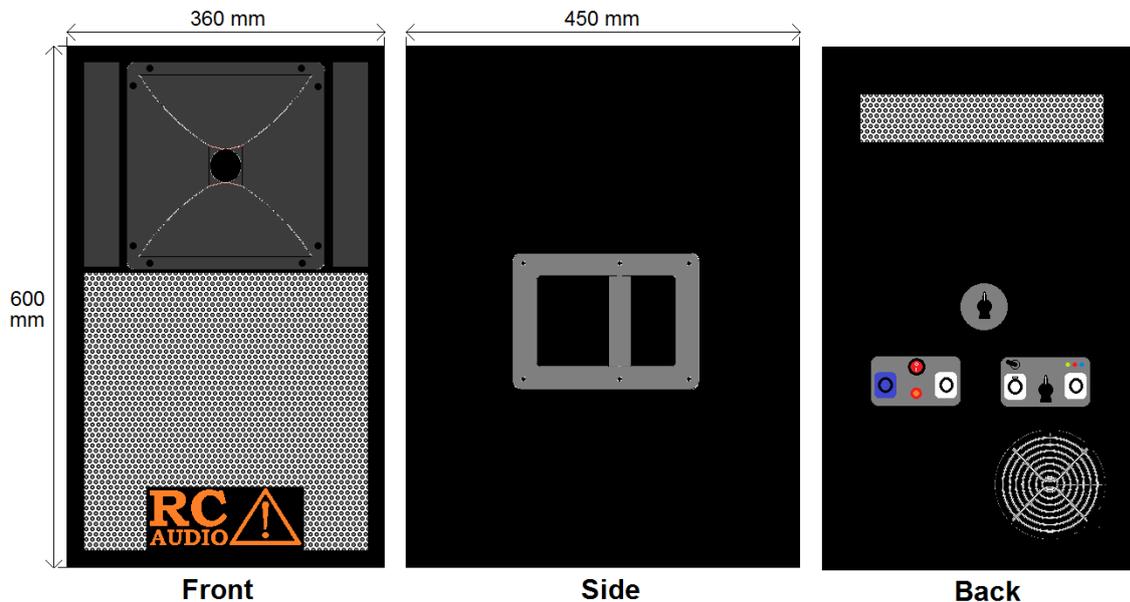
A good clean airflow through the fan is essential for the reliable operation of the Generals. There is a foam dust filter fitted over the fan suction which will need periodically cleaning so that it does not become clogged with dust. This can be superficially done with a vacuum cleaner across the grill/guard. On occasions when it needs a more thorough clean it can easily be removed by unscrewing the grill/guard which is held on by four self tapping screws.

Should any debris ever enter the cabinet through the bass ports then it can be tipped out by inverting/tipping the cabinet.

Otherwise the General does not need any routine maintenance.

## Specification

Dimensions:	360w x 600h x 450d
Weight:	45kg approx
Mounting equipment:	35mm pole socket in base.
Voltage requirement:	230V AC, +10%/-6%
Current requirement:	typically average up to 3amps, max approx 6amps.
Amplifier rating:	Class AB amplifiers, 1200W RMS Low Freq & 300W RMS High Freq
Speaker drivers:	12 inch diameter Low Freq & 1.4 inch throat compression driver High Freq.
Audio Connections:	Signal via XLR in & link out.
Power Connections:	Power via Powercon connectors in & link out.
Controls on rear:	Input gain & Leveliza threshold adjustments, mode switch & power switch.
Frequency response:	approx 50hz-20khz in full range mode or 150-20khz in mid/high mode.
Display on rear:	Green signal present indicator / Red high level signal indicator / Blue Leveliza/Limitiza active indicator / Red power on indicator.



## Warranty

The GENERAL comes with a one year full parts and labour warranty, during which time we will repair any faults if they should develop affecting the performance of the product. This warranty does not cover damage caused by misuse or abuse or tampering with the products.

After the warranty has expired we will continue to support the products into the future, including offering a repair facility, spare parts and technical support should any customers need any assistance.

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