

Owner's Manual for the Anthony Gallo Acoustics Reference³ SA

Thank you for purchasing our Subwoofer Amplifier (hereafter referred to as the SA). It is a high-quality audio component meticulously designed and reliably manufactured to enhance the long-term enjoyment of your favorite full-range music. To familiarize yourself with the SA's unique flexibility and feature set, please read the following instructions carefully *before* installing it.

But first, remember that the SA is a high-power piece of active electronics that runs warm to the touch and can get moderately hot if you run its bass-boost EQ circuit in the max position. You should not expose the SA to direct sun light, water or moisture. Getting fluids inside the SA could shorten out its circuitry and cause irreparable damage that will not be covered under warranty. The SA does include short-circuit protection but you should still exercise the utmost caution when you make all initial connections *while the amplifier is powered off*.

The SA contains a bridgeable stereo amplifier, a high-quality active crossover and a sophisticated equalization circuit in one single chassis to

1. Optimize bass performance of our own Gallo Acoustics Nucleus Reference³ loudspeakers in both 2-channel music and multi-channel HomeTheater movie applications
2. Power two of our own Gallo Acoustics MPSB/DV passive subwoofers
3. Bi-amp bi-wirable loudspeakers from other manufacturers or
4. Power one or two passive subwoofers from other companies.
5. Power a pair of passive speakers with the SA as the main amp.

Be sure to install the SA with sufficient ventilation space and no obstructions to its chassis vents to insure optimal self-cooling of the internal heatsinks (a thermostat-controlled whisper fan will kick in automatically once these heatsinks reach a preset temperature). We will now describe hookups for each of the stated applications in the sequence listed above. Even if your application is #2, #3, #4 or #5 (e.g. not with our own speakers), do read the entire manual. Much of what is covered under section 1 also applies to sections 2, 3, 4 and 5 and thus isn't repeated in the subsequent chapters.



1a/ Anthony Gallo Acoustics Nucleus Reference³ speakers + Reference³ SA xover/amplifier (stereo music mode):

Our Reference³ full-range speakers offer a unique feature. They sport a separate pair of loudspeaker input terminals for their woofer's 2nd voice coils. Because this feature is so unique and different from the norm, allow us to explain it in detail. This twin set of binding posts on the lower rear of the Reference³s may look like a biwire arrangement but it's *not*. Note how the upper pair is labeled 'speaker in'. The lower pair says 'sub in'. 'Sub' obviously stands for subwoofer. But where *is* this hidden subwoofer? Wait a minute and you'll see.

The upper 'speaker in' terminals are conventional inputs. They connect the incoming full-range amplifier signal to the *entire* speaker. The 10" side-firing woofer, dual 4" mids and our unique 300° dispersion CDT² tweeter are all operated together from this one input. To enjoy music, that's all you need. You never have to use the second input at all. But what if you wanted true subwoofer bass *without* a separate subwoofer? That's where the 'sub in' terminals enter the picture.

They connect *directly* and *separately* to the woofer's 2nd voice coil. That's because our 10" woofers in the Reference³ speakers are outfitted with *two* voice coils. Those can be independently amplified or bi-amped. As you would assume, the 1st or main voice coil is driven from your main stereo amplifier via the 'speaker in' input like any other ordinary speaker. The 2nd voice coil can be driven with a second 'bi-amp' amplifier. This 'twin drive' scheme extends the speaker's reach into true 22Hz subwoofer territory. Hence this input is labeled 'sub in'. But why do you need the SA for that? Wouldn't any other amplifier (or two additional channels on a multi-channel amp) do the trick? Not *exactly*. Here's why.

Remember that we just mentioned how this input drives the 2nd voice coil *directly*? That means this lower input bypasses the crossover behind the 'speaker in' upper inputs. That crossover network inside the speaker chassis sends frequencies below 150Hz to the woofer and everything above 150Hz to the midranges and tweeter. The 'sub in' terminals of our Reference³ don't use *any* crossover.

Why not? Because the 'sub out' or '0.1 out' of a surround sound receiver or preamp/processor (pre-pro) already comes with its own low-pass crossover. That's usually fixed to the THX standard of 80Hz. More on that hookup scheme from a pre-pro or multi-channel receiver in a moment. For right now, let's stay with a stereo system which will use a preamp or integrated amplifier instead.

This preamp/integrated (via a second pair of pre-outs or a Y-adaptor) would send a *full-range* signal to whatever amplifier would power the Reference³'s 2nd voice coil if you didn't have the SA. Can you imagine what would happen? Without a crossover on the 2nd voice coil, the woofer would now receive frequencies way above 150Hz, in the range the midranges and tweeter already reproduce. This would wreck havoc with our speaker's carefully calibrated tonal balance. You would hear murky thickness from the mid-bass on up, as though you had maxed out a bass tone control while cutting the matching treble control to zero. Not good.

What you need to use these 'sub in' inputs properly and as intended are two additional features besides just another amplifier. You need an adjustable low-pass filter (crossover) to restrict the 2nd voice coil signal to the proper frequency range below 150Hz. You also need an independent attenuator for this second input to match the amount of low-frequency support beneath what your main amplifier already provides. This allows adjustments so that the full-range response plus bass augmentation of your Reference³ speakers add up to a flat and linear frequency response in your room.

And that is exactly why our SA isn't merely an amplifier but includes a continuously variable low-pass crossover and gain/volume functions. It even adds phase and EQ boost facilities which we'll visit in a moment. For now, let's inspect the front panel. Except for the gain controls (one per channel), all other front-panel adjustments of the SA are recessed so that kids or curious visitors can't twirl with the knobs and undo the calibration you (or a dealer or installer) have spent time on setting up to your satisfaction. Simply use a slotted screwdriver to make the adjustments - the controls move very easily. Let's explore all controls in detail now and how to set them up:



Where do I set the crossover control which is continuously adjustable from 40-200Hz?

Remember that the natural acoustical roll-off of our Ref³ woofer occurs at approximately 40Hz. It still reproduces sounds as low as 20Hz but those are significantly reduced in output and thus barely audible. To boost those rolled-off frequencies in the lowest octave, you probably don't want to set the SA crossover much higher than 40Hz. This avoids undue overlap and excessive warmth or bass heaviness. However, the *exact* amount of perfect fill-in is also a function of room size and how far away from the rear wall you have positioned the speakers. The farther into the room you pull the speakers, the less boundary reinforcement support they receive. But the farther you pull them into the room, the more spectacularly they will soundstage.

Conventionally, full-range speaker positioning always revolves around this compromise, between the best (fullest and most linear) bass response on the one hand and the best disappearance act of 'just sound and no speakers' on the other. With the Reference3s and the matching SA, this common compromise ends once and for all. Whatever bass slam, impact and weight you will sacrifice in the best soundstaging position can be added back by the SA. Not only that, you can extend bass reach *below* what the Reference³ will produce even in the most optimal 'bass position' of your room.

That's why the SA offers crossover points above 40Hz. It accounts for variables of rooms, setups and personal preferences. Simply adjust the crossover control by ear and to taste and start with the lowest possible setting at 40Hz.



Why do you offer crossover points up to 200Hz if 40Hz is the natural speaker rolloff?

Because you can also use the SA with other makers' passive subwoofers or speakers which may require bringing the SA in well above 40Hz – more on that below.

Do I need to worry about the phase controls?

Usually you will set these phase controls to 0. This avoids bass cancellation and timing errors. The Ref³ loudspeakers are minimum-phase time-coherent designs. They don't require any phase adjustments to exhibit their remarkably transparent performance. Like the higher crossover frequencies, this feature is only included for applications with speakers other than our own – *with one exception*.

If your room were heavily asymmetrical, one Ref³ speaker might end up being positioned far closer to a sidewall than its mate. This would cause bass reinforcement in one speaker but not the other. To overcome *some* of this audible imbalance, a careful adjustment on the phase control of the imbalanced speaker (together with the appropriate crossover frequency) will introduce some deliberate frequency-specific out-of-phase *cancellation*. Set correctly, this can address the most severe frequency response peak. However, this is an advanced application that will require lengthy experimentation by ear to get right. Ideally, a dealer or custom installer who takes some acoustical on-site frequency response measurements to scientifically assist in the process should perform it.

What about the EQ function?

The SA includes an EQ cut/boost from –3dB to +6dB and in 1dB increments. This includes 0 or bypass. Careful employ of this feature can extend bass response of our Ref³ to 22Hz *flat*. That is true no-compromise subwoofer bass in full stereo. With the SA, you categorically do not need a separate external subwoofer. The EQ only affects the frequency range *below* the crossover frequency you've selected on the front panel. In most cases, this will merely be the bottom octave of 20-40Hz (unless you decide to set the crossover frequency higher). Depending on your room and speaker positioning, you may not need any additional bass boost outside of driving the 2nd voice coils directly. Remember that our 'twin-drive' scheme already is a major bass boost in and of itself. It will be sufficient in most environments. Whether you need/want to set the EQ control into the active gain range above 0 will depend on your room. It will also depend on your main amplifier that drives the speakers' upper input. If your main amplifier is unusually bass-shy or a lower-power tube design with limited bass response, the usual flat-to-40Hz extension of the Ref³ *without* a second amp could already be compromised. In such a case, the additional boost of the EQ circuit can restore this lost bass. However, adjust by ear and to personal taste just as with the crossover control setting

What about the volume controls?

Next to the crossover control, this is the most important feature of the SA. Whenever you bi-amplify even in a regular scenario, you must have a means of trimming gain on the second amplifier if it isn't identical to your main unit. Because the bi-amp scheme of our Ref³ speakers is far from conventional, this attenuator feature becomes even more important. Let us highlight another unique aspect of our approach to bi-amping (which, unfortunately, only works with our speakers).

Have you ever heard of the old “tubes on top, solid-state on the bottom” idea? In a nutshell, it refers to capturing the “sweetness” of tubes for the midrange and treble and the “muscle, grunt and control” of high-current high-power transistor amps in the bass. Besides issues with gain matching (which can be overcome with amplifiers that have their own level controls), this mix-and-match approach of different output devices and sonic signatures creates very audible discontinuities of harmonic envelope, timbre and texture in a speaker that is supposed to speak with one single voice, not many different ones.

Our SA's unique flexibility complements your main amp to perfection and *without* creating sonic discontinuity. How so? Remember that your main amp runs the speakers full-range. That includes the woofer to as low as it reaches (40Hz flat and lower depending on room and setup, all from the 1st voice coil alone). The sonic signature of your main amp of choice (tube, solid-state or digital, high-power or low-power) thus affects all frequencies seamlessly top-to-bottom. The SA merely fills in the very lowest octave with high-current, high damping-factor transistor muscle. In audiophile speak, it runs in “parallel” or *simultaneously* with your main amp

but does so only over a very *limited* frequency range where our human hearing is the least sensitive to timbre and tone. Using our SA within this unique twin-drive scheme doesn't create *any* audible discontinuities or discrepancies even if your main amplifier was a low-power triode design with a very distinctive sonic signature.

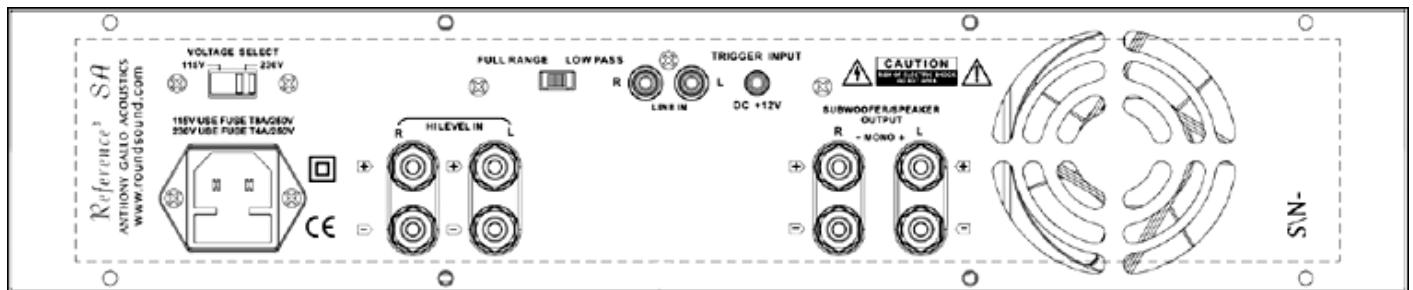
For once, you can actually implement the “tubes on top, solid-state on the bottom” ideal without suffering the usual compromises. And should you deal with asymmetrical loudspeaker response due to unusual room geometries, the SA's independent gain controls for each channel double as a balance control. You can trim the gain of the speaker whose closer wall or furniture reinforcement gives it an acoustic room boost.

The volume controls on the SA operate very much like a bass tone control on a receiver, except that it's far more precise and allows independent adjustments for each channel. Listening to your favorite albums, you can easily set the tonal balance and the subjective amount of bass exactly to your liking. You could even have *multiple* settings such as 'flat' for Classical and 'phat' for Pop and Rock, Reggae and Rap. Why not? It's as easy as turning up the two gain controls by a predetermined amount that still sounds coherent, just a little bit stronger in the low bass than is perfectly flat (but great fun).

What about the other two front-panel adjustments, the stereo/mono and auto on/off switches?

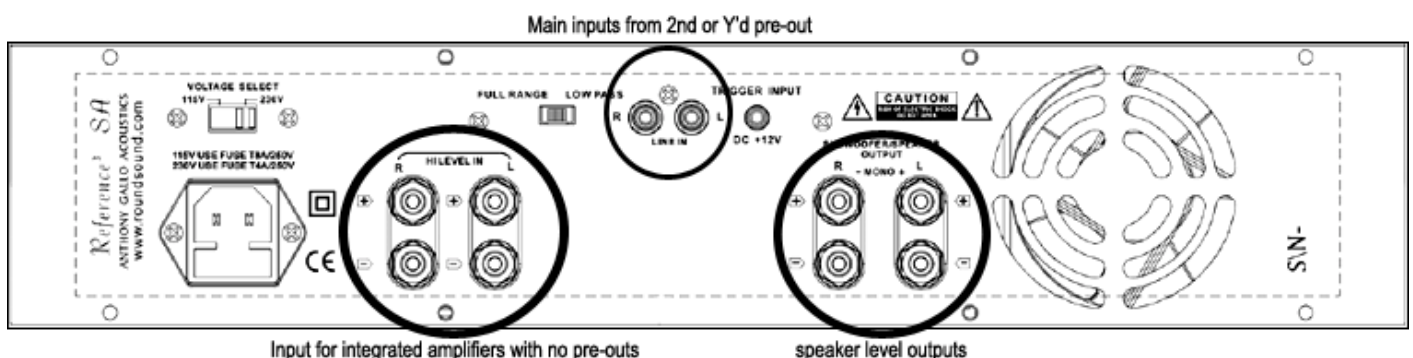
In the Ref³ main speaker setup, the stereo switch must be set to 'stereo' so that each speaker receives its own bass-boost signal. The 3-position off/auto/on front panel selector setting depends on whether you want the SA to automatically turn off whenever it doesn't sense a signal or be powered up by the 12-volt rear-panel trigger.

- In 'off' mode, the 12-volt trigger will turn on the SA (the main power switch must be set to on).
- In 'auto' mode, the SA switches into signal-sensing mode and turns on automatically when it detects an input signal, then turns off when no signal is present (the main power switch must be set to on).
- In 'on' mode, the SA is *always* on unless you set the main power switch to off.



How about the rear panel connections?

For use with our own Ref³ speakers, connect the RCA inputs of the SA to the second pre-out of your preamplifier or integrated amplifier. If you don't have two pre-outs, use the included Y-adaptor on the main outputs of your preamplifier/integrated. Then connect the 2nd voice coil speaker inputs from the SA speaker outputs. Be careful to observe proper +/- polarity on both ends of the speaker cable. The full-range/low-pass switch on the SA's rear panel must be set to low-pass so the crossover control works.



What if I don't have *any* pre-outs?

This could be the case with an integrated amplifier. What you need now is a second pair of speaker cables or a biwire set. You connect to the SA via the high-level speaker inputs from your main amp's speaker terminals, by 'stacking' two pairs of cables from the same speaker terminals (unless your integrated amplifier has two pairs of terminals per channel). One set of speaker cables will continue to go to your main speakers, the other one will connect to the SA. Think of this as an unusual biwire connection where the second pair of cables doesn't connect to a speaker but the SA instead.

What else?

That's it. Now you're all set. Remember to re-check all cable connections to avoid reversed polarity which would result in bass cancellation. If your main amplifier inverts polarity, be sure to set both phase controls on the SA to 180. If you purchased the SA at the same time as the Ref³ speakers, set the initial EQ boost to +6dB to significantly accelerate break-in. As the speakers break in, you will most likely hear that the +6dB EQ setting is far too high and results in a ponderous bass-heavy presentation. Don't use it for serious listening but only to make the woofers work harder while they're breaking in. Before you play your first track with the SA connected, set the EQ/boost and two gain controls to 0, then open up the gain controls a little bit, listen, open them a little bit more, listen again until you get a perfectly seamless and "invisible" level of bass reinforcement. You shouldn't know that the SA is in the circuit until you turn it off. Then the lower bass disappears and the speakers sound leaner and lighter. If the lowest bass below 30Hz seems a bit light or weak, experiment with adding some EQ boost, moving up from 0 in 1dB steps, listening in-between from your usual seat until you have rock-solid but *even* extension down to the very lowest notes on your recordings.

1b/ Anthony Gallo Acoustics Nucleus Reference³ speakers + Reference³ SA xover/amplifier, multi-channel mode:

Connecting the SA from a preamp/processor or multi-channel receiver

In the setup menu of your pre-pro or surround sound receiver, select "large" for the main speakers. This sends a full-range 'uncut' signal to the Ref³'s main inputs. Connect the SA's RCA inputs to the pre/pro or receiver's 0.1 subwoofer pre-out. Because all 0.1 LF outputs are mono, you will have to use the included Y-adaptor on the SA's end of the interconnect. This will send the LF mono signal to both our Ref³ main speakers for bass augmentation. Most processors adopt the THX low-pass filter value of 80Hz for the subwoofer output.

This allows you to experiment with two different settings.

1. Set the SA to full-range operation. This removes its own filter from the signal path and puts the processor in full control.
2. Set the SA to low-pass and experiment with crossover settings *below* 80Hz. While this puts two crossovers in series (processor + SA), it allows you to lower the filter frequency below the THX value.

Let your ears decide whether you like option 1 or 2 better. Most movie sound effects don't occur in the low but mid bass. The 80Hz setting of option 1 will thus give you an additional boost in the 40-80Hz range where most the movie mayhem sound effects occur. Option 2 will likely be preferable for music listening because it results in a more linear and honest frequency response. The remaining SA volume adjustments are identical to the stereo setup already discussed.

2/ Gallo MPSB/DVs + Reference³ SA xover/amplifier:

Our own MPSB/DV passive outboard subwoofers use the same 10" woofers and enclosures as to what is built into the Ref³ speakers. The only difference is how you connect the outboard subwoofers to the SA. You need

two individual speaker cables (one for each MPSB/DV) which are terminated with bare wire/bananas/spades on the SA end and a ¼" plug on the subwoofer end. You won't be making a double connection (full-range + 2nd voice coil as on the Ref3s) but merely need a *single* cable to each subwoofer.

3/ Non-Gallo bi-wirable speakers + Reference³ SA xover/amplifier:

Connecting the SA to the woofer section of other makers' bi-wirable speakers

The SA is ideally suited to actively bi-amplify multi-way speakers with a second set of loudspeaker terminals for their bass sections. Because such woofer circuits will already include their own internal crossover network, run the SA in full-range mode (crossover bypassed). Then use the SA's gain controls to match your speakers' bass performance to their midrange and treble as driven by your main amplifier. If your preamp/integrated lacks a second set of pre-outs, use the included Y adaptor. If your speakers connect their woofers out-of-phase with the midrange/tweeter, be sure to set the SA phase controls to 180.

Since other speakers lack our Ref3s twin-drive woofer scheme, you can't boost their bass performance via any 2nd voice coils. In the absence of this unique Gallo feature, the SA's EQ boost now becomes your unique tool whereby to augment the bass reach *below* your speakers' natural roll-off frequency, thus turning them into more full-range designs than even their own designer dreamed of. Experiment by ear to achieve the most pleasing and extended response.

4/ Non-Gallo subwoofers + Reference³ SA xover/amplifier:

Connecting the SA to a passive subwoofer or two

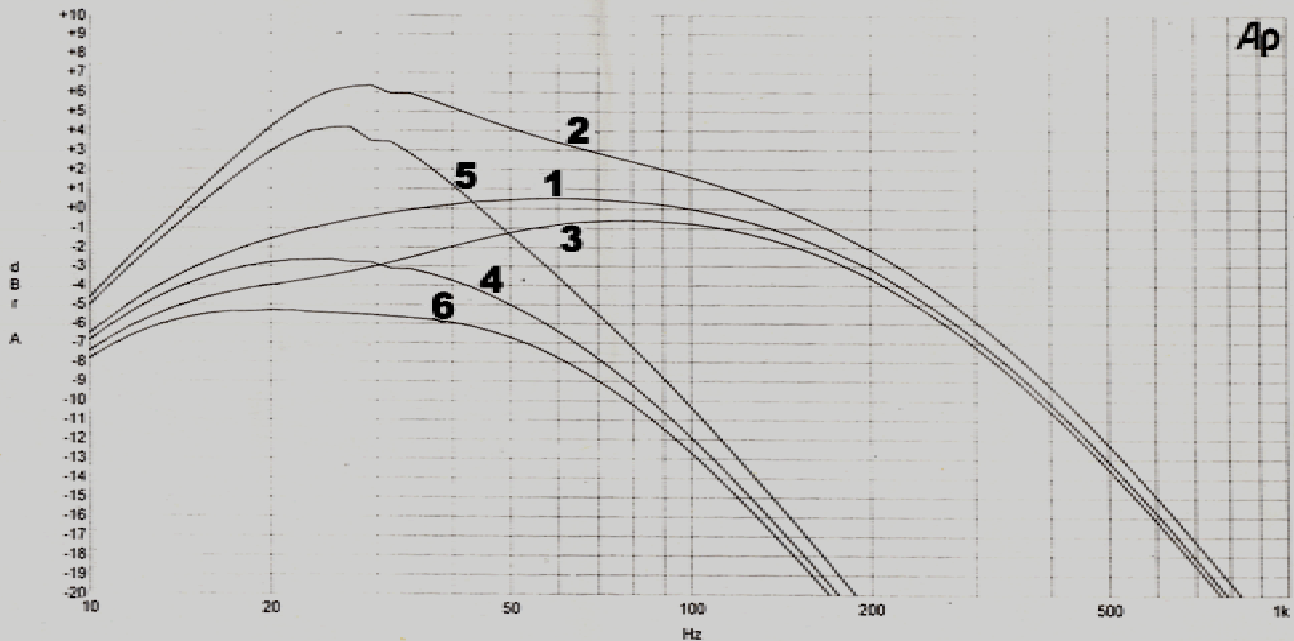
The SA can be used to power one or two passive subwoofers by other makers. Select mono operation for a single sub, stereo operation for two subs and set the SA to low-pass. Take your SA input signal from either a second (or Y'd) pre-out of your preamp/integrated or HomeTheater receiver. Connect the subwoofer/s from the SA's speaker outputs. In mono operation, you'll use only the *left* gain and phase control. Refer to the rear panel silk screen on how to make the mono speaker connection across the two *red* terminals.

To determine the best placement for your subwoofer, set the SA phase control to 0 and the subwoofer into your listening position. Then walk your room while playing bass-heavy music to determine in which place you hear the loudest and most even bass response from the subwoofer. Place the subwoofer into that spot. Now experiment with the SA's phase and volume controls to achieve the most seamless blend between your main speakers and subwoofer/s.

5/ Non-Gallo passive speakers + Reference³ SA xover/amplifier:

In full-range mode (internal crossover bypassed), the SA can be used as either a high-quality stand-alone amplifier or a single-input integrated amplifier. Simply connect your source outputs or preamp pre-outs to the RCA inputs and your speakers to the SA's speaker binding posts. If you use a preamp, set the SA gain controls to max to let your preamp master volume handle the playback level. If you don't use a preamp, the SA gain controls become your dual-mono master volume. Now make sure to set the SA volume controls in their full counter-clockwise or 0 position before you select 'play' on your source for the first time. This will avoid excessive playback volumes until you learn what setting on the SA equates to average sound pressure levels in your room. Remember, the SA is a 240wpc stereo amp. With that amount of power, it will play louder than you might expect so a little movement on the volume controls could go much farther than you think until you learn from experience.

SA Sub-Bass Boost measured with Audio Precision equipment



Sweep	Trace	Line Style	Thick	Data	Axis	Comment
1	1	Solid	3	Antr.Level A	Left	BOOST AT 0dB CROSSOVER AT MAX
2	1	Solid	3	Antr.Level A	Left	BOOST AT 6dB CROSSOVER AT MAX
3	1	Solid	3	Antr.Level A	Left	BOOST AT -3dB CROSSOVER AT MAX
4	1	Solid	3	Antr.Level A	Left	BOOST AT 0dB CROSSOVER AT MIN
5	1	Solid	3	Antr.Level A	Left	BOOST AT 6dB CROSSOVER AT MIN
6	1	Solid	3	Antr.Level A	Left	BOOST AT -3dB CROSSOVER AT MIN

Anthony Gallo Acoustics Reference³ SA Specifications @4ohm

Output power:	240 watts stereo, 650 watts mono
Distortion:	0.08% stereo, 0.1% mono (low-pass @ 100Hz, level and xover at max, EQ at 0dB) 0.1% stereo, 0.17% mono (full-range, level at max)
Input sensitivity:	130mV stereo, 110mV mono
Signal-to-Noise:	93dB stereo, 83 mono (low-pass @ 100Hz, level and xover at max, EQ at 0dB) 91dB stereo, 75dB mono (full-range full-rated power @ 1kHz)
Bass EQ:	1W @ 35Hz (100Hz=0dB, level and xover at max, booster at 6dB) = 6.2dB 1W @ 35Hz (100Hz=0dB, level and xover at max, booster at -3dB) = -3.2dB
Frequency response:	15 - 200Hz low-pass (100Hz=0dB, level and xover at max, booster at 0dB) <10Hz - 28kHz full-range (100Hz=0dB, level and xover at max, booster at 0dB)
Crossover:	40Hz low-pass, xover setting at minimum 200Hz low-pass, xover setting at maximum
Auto-on sensitivity:	5mV
Current draw:	9A stereo, 13.5A mono (level and xover at max, booster at 0dB)
Temp. protect:	60°C +/-5