

Genesis Reference Amplifier 30th Anniversary Monoblocks

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Please write the serial number and purchase details of your Genesis Reference Amplifier here for future reference.

Serial Nos.: _____

Bought at: _____

Date: _____

Address: _____

Tel: _____

The Story Behind the GRamp

When I originally designed the Genesis Reference Amplifier, that was all that it was supposed to be: a laboratory reference to help in my loudspeaker design projects. However, once a dealer played with it at a show, there was no going back, and I turned it into a commercial product.

In the design laboratory, I was sometimes unable to figure out if the bottleneck to better transparency, detail retrieval, and macro- and micro-dynamics was in the amplifier, or the crossover I was working on at the moment. Also, I kept blowing up my reference amplifiers at the time as I was soldering on components in the crossovers as music was playing.

Since we already used the Hypex Class D amplifier module in our servo-amplifiers, I simply built two into a stereo amplifier. Although it was surprisingly good, it was far from satisfactory. It took some thinking, but I figured that it was in the power supply. Once the new power supply was designed (see the technical section), I loved listening to music through the new amplifier even more than through the Genesis M60 tube monoblocks.

Soon, reviewers started to say that Class D finally arrived for the audiophile market (even though many confused Class D as “digital amplifier”). Class D has reached maturity with the Genesis Reference Amplifier, bringing musicality and eliminating the myth that it is only good for bass. This was 2007 to 2008!

Over the years, I’ve continuously improved the design as it is something that I live with every day. It married the control of mega-power solid-state amplifiers with sweet tube-like tonal textures and zero listener fatigue. This is the amplifier that I can spend 8 hours a day in the listening lab designing a loudspeaker, and take home and spend another 4 hours enjoying music with my family.

The 30th Anniversary Monoblocks are the ultimate expression of that amplifier. Unflappably powerful, yet elegant and delicate. Absolutely tailored especially to drive a pair of Genesis loudspeakers!

Thank you very much for buying my latest design.

Gary L. Koh
CEO and Chief Designer

Set-up and Safety Information

Please read this set-up guide and safety information before you proceed.

Unpacking and Setting Up

Some assembly is required as the amplifier comes in 2 parts – the amplifier module itself and a transformer power supply. It is important that this product is never used near water or sources of water. Avoid bathrooms, washbowls, kitchen sinks, swimming pools, etc.

The Genesis Reference Amplifier is designed with a HMWA “acoustic suspension foot” to allow the amplifier to be placed directly on the floor, or on any piece of furniture or equipment rack. The Acoustic Suspension ships attached to the amplifier module. It comes with 1-inch spikes. If the amplifier is going to be used on thick-pile carpet and the supplied 1-inch spikes are not long enough, Genesis can optionally supply longer ones.

The amplifier should not be subject to vibration of any sort. Do not place them directly in front of, or on top of your loudspeakers. Despite the vibration and resonance control measures already taken, we are not able to completely eliminate all incoming vibration.

Once you decide on the placement of the amplifier module, connect everything up before you plug the power transformer into the wall. **Always connect up the system towards the power source.**

First, connect the blue PowerCon of the supplied power umbilical to the amplifier module. Then, the grey PowerCon to the Power Transformer Module. The Power Umbilical will only go in one way so the assembly should be obvious. Align the plugs, insert and twist until the lock “clicks”. Next, connect the IEC plug of the power cord to the Power Transformer Module. Finally, insert the power plug into the wall outlet.

Please note that the Neutrik PowerCon connectors used for the Power Umbilicals are designed for passing current, and not for making/breaking current. Hence, ***always unplug the Power Transformer from the wall outlet before connecting/disconnecting the PowerCon connectors.***

Before you plug the power cord in the power transformer, please make sure that you have the power transformer with the proper voltage for the country you are in. Taiwan, Japan and North America will require the 115V version. Most European countries and other Asian countries will require the 230V version. Even if you are in the US, you would benefit from the 230V version if that is an option – get a electrician to drop a 230V line to your music room!

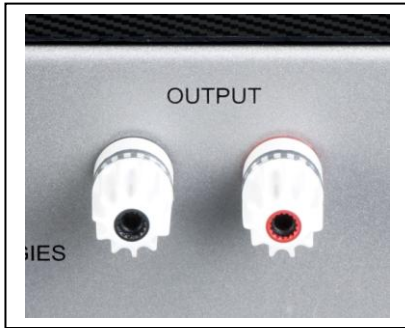
Connect the loudspeakers to the 5-way binding posts using good quality loudspeaker cables. Do not over tighten the speaker connectors. They are designed to be finger tightened only (not with tools). Using the appropriate RCA or XLR interconnect, connect to the pre-amplifier. Flick the switch towards the input being used – RCA or XLR. The XLR input is ALWAYS live, so if you are using RCA inputs, disconnect the XLR input.

Safety Information

1. Never try to disassemble the amplifier as you may be exposed to dangerous voltages. Even after turning the amplifier off and unplugging it from the wall socket, it will retain a lethal electrical charge for a long time. There is huge energy storage in the power supply capacitors.
2. Do not attempt to modify the amplifier. The device has been tested and adjusted for optimal operation and should give you years of trouble-free service.
3. Do not connect/disconnect the power supply and power transformer from the amplifier module without turning the amplifier off and unplugging the power transformer from the wall outlet first.
4. Before turning the amplifier on, both inputs and outputs should be properly connected. Do not run the amplifier without appropriate loudspeakers connected to it.
5. While the Genesis Reference Amplifier runs very cool due to its high efficiency, some ventilation and airflow is necessary for reliable operation.
6. Do not connect or disconnect the inputs to the amplifier while it is playing – you may damage your loudspeakers. Turn the preamplifier and power amplifier off, wait a few seconds, then make/break any connections.
7. Do not connect or disconnect the loudspeakers from the amplifier while it is playing. Turn the amplifier off, and wait a few seconds before making any connections.
8. In general, a hifi system should be turned ON starting at the source components towards the power amplifier, and turned OFF starting at the power amplifier towards the source components. This is so that just in case there is any turn on/turn off electrical instability, it will not damage your system.

Set-up and Operation

Speaker Connections



One pair of 5-way insulated binding posts is provided on the rear of your amplifier. While they allow bare wire to be used, we recommend that firstly spades, or secondly bananas be used instead of bare wire. Make sure that your speaker cables are firmly connected before turning the amplifier on.

The binding posts are WBT NextGen™ for improved signal transfer, enhanced sonic performance, and a faster, more direct connection. The positive terminal is identified by the red ring on the base and tip; and the negative terminal is identified by the black ring on the base and tip.

If you are using spade lugs, unscrew the binding posts, insert the spades, and hand tighten. Do not use pliers or other tools to tighten the binding posts as you may strip the plastic threads on the posts. These WBT binding posts are designed to fully tighten without the use of tools. If you are using banana plugs, just insert into the hole at the end.

DO NOT SHORT THE TERMINALS TOGETHER AND DO NOT GROUND EITHER LOUDSPEAKER TERMINALS

Unlike many other Class D amplifiers, the output terminals of the GR-Amp do not “float” at a significant voltage above ground potential – which makes the GR-Amp useable with all loudspeakers, including those with built-in powered subwoofers and electrostatic designs. However, this does NOT mean that you can ground the negative terminal of the speaker outputs. As a fully balanced amplifier, both terminals are “live”.

Input Connections

Use a pair of high-quality interconnects to hook up the output of your preamplifier to the input of the amplifier. The 30th Anniversary Monoblock is a fully balanced, differential amplifier, and hence, a true-balanced source is crucial for top performance.

The balanced input of the GR-Amp uses the standard configuration for the XLR input of pin 2 “hot” or +ve. Pin 1 is signal ground, and pin 3 is the signal -ve. The Genesis Reference Amplifier preserves phase, hence if the input XLR pin 2 is positive, the speaker output red binding post will be positive.

Both single-ended and balanced inputs are provided. A switch above the inputs selects RCA or XLR input. However, in the interest of not putting any more circuitry than is absolute necessary, the balanced XLR input is always “live” even when RCA is selected. Hence, do not connect both inputs at the same time.



Playing Music

Make sure that your power cord is properly connected to a high-current power outlet then plug in the Power Transformer.

Before you turn the amplifier module on, check that the speaker connections and inputs are properly hooked up and tightened. Make sure that you turn down the volume control on your preamplifier or place it in mute first.

Locate the power toggle switch on the back next to the power umbilical inlet and **flick it upwards** to turn the amplifier ON. (Down is OFF.)

In less than a second, you will hear a faint click to indicate that the soft-start circuit has engaged and the LED under the amplifier will glow.

Unlike most power amplifiers, the power switch is a low-voltage, low-power trigger that switches in a pair of high-current hermetically sealed relays with silver contacts that is the actual power switch.

Flicking the switch up energizes a low-power circuit that then trips the two high-current relays that turn the power amplifier on, and a split second later, unmutes the amplifier. Flicking the switch down releases the low-power circuit and turns off the two high-current relays.

Give your amplifier a warm-up period of at least 10 seconds for the circuits to stabilize before attempting to play any music. Because of special “stay warm” circuitry, as long as the Power Transformer plugged in, it will warm up almost instantly*, and be ready to play the moment you turn it on. The “stay warm” circuits consume about as much power as a night-light, and even when powered on and playing music, the Genesis Reference Amplifier consumes less than 25W during continuous play.

* Why do we keep the amplifier on “standby” and hence “waste” electricity? We believe that it is preferable to turning on an inefficient amplifier for an hour to warm up before listening. An equivalent amplifier might consume 3,000W of power just at idle. Leaving the Genesis Reference Amplifier on for 10 days consumes about the same amount of electricity. Leaving the unit on stand-by also extends the life of the electronics. When you are ready to go on vacation or a business trip, turn the system off by unplugging the Power Transformer.



About Your Amplifier

Background

The Genesis Reference Amplifier uses proprietary designs and circuits, high quality components, and state-of-the-art Class D amplifier modules to deliver sonic performance rivaling amplifiers costing much, much more. The design brief was to deliver a load-invariant, wide-bandwidth amplifier that would deliver the musicality, emotion, and tonal colors and timbre of a low-powered valve amplifier with the reliability, power, and control of a high power solid-state design.

A valve amplifier matched with an appropriate loudspeaker can produce a sound that we can only call magical. The hard, brittle, and edgy presentation of many transistor amplifiers is contrasted with the rich, lush and silky sound of the tube amplifier. Often, valve amplifiers offer much better imaging and sound stage presentation compared to an equivalently priced solid-state amplifier. It is more musical, and the performance seems almost *alive*.

However, a solid-state amplifier often offers better control and dynamics, is easier to set-up and to own (without having to change tubes every so often). Except for Class A solid state amplifiers, they also run much cooler and consume less electricity than valve amplifiers. Solid-state amplifiers are also able to drive a far wider range of loudspeakers than most valve amplifiers.

The Genesis Reference Amplifier (GRamp) offers the best of both worlds, without the disadvantages of either.

Design and Construction

The GRamp challenges the status quo of music amplifiers by marrying the advantages of tube (emotion, imaging, soundstage, and portrayal of tonal colors) with solid state (control, dynamics and accuracy). It uses a modified Class D power amplifier module with ground-breaking power supply technologies, and resonance and vibration control to achieve this.

Dynamic Power Delivery Supply (DPDS)

Traditional DC power supplies developed with established design principles are usually specified into a constant steady current draw with a resistive load. However, except for Class A amplifiers (and Class AB at low power), the load is not linear. The power supply is hence specified for the maximum current drawn, but such a huge power supply is often slow. Resulting in a dark, brooding, muscle-bound sound.

The Genesis DPDS, on the other hand, is designed to deliver current into a non-linear, dynamic, rapidly changing musical load, leading to a sense of

power with finesse. The result is that the Genesis Reference Amplifier has the dynamics, extension and drive of high-power transistor amplifiers without the muscle-bound sound, and the elegance, emotion and tonal colors of flea-powered single-ended triode vacuum tube amplifiers without being weak or flaccid.

The origins of the DPDS comes from the principles of tube amplifier design – some of the qualities of tube amplifiers were as much to do with power supply design as the choice of tubes over transistors. Because of the high voltages involved, tube amplifiers use relatively small capacitors and chokes to produce smooth DC power.

Transistor amps use cheaper, larger, and lower-voltage electrolytic capacitors to do much the same job. From this we discover a very simple fact, smaller capacitors usually sound better. This is not only speculation, there is good science to predict that the high frequency performance of large capacitors to be poor. The time-constant, or speed at which a capacitor can deliver its charge is determined by the capacitance (or size) of the capacitor. The larger the capacitor, the slower it is.

There are lots of very small solid-state amplifiers that have excellent sound. They all have tiny power supplies, and the smaller the power supply, the “faster” they sounded. On the other hand, very large power amplifiers with huge capacitors, or even large banks of smaller capacitors in their power supplies tended to sound dark and slow.

The DPDS in the simplest explanation uses the frequency distribution of music, and the Equal Loudness curves to predict the required power delivery to play back music. Then, it uses a Class D amplifier module as a “perfect music-driven faucet” to switch current to the connected loudspeakers.

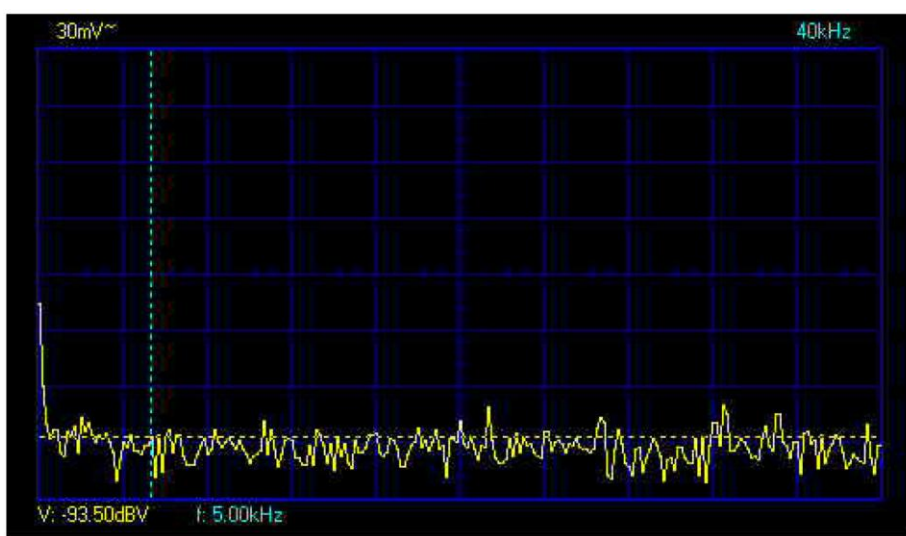
This is the issue of speed vs power. The sprinter is not able to sustain the delivery of power for very long, but the marathon runner is not able to deliver very quick bursts of speed. The DPDS is like a relay team with sprinters, medium-distance, and long distance runners in the team. Thus, it is able to deliver high power, as well as very quick bursts of speed.

Such a “relay team” is what gives the Genesis Reference Amplifier the excellent micro-dynamics, tonal contrasts and timbre textures of low-powered amplifiers, and yet is able to deliver huge dynamics and the sustained deep bass of muscle amps.

Silent Running Voltage Supply¹

We recognized that published specifications for noise rejection of opamps and even discrete small-signal amplification circuits did not always tell the whole story. The problem is that Power Supply Rejection Ratio, or PSRR, is specified at one frequency – usually 1kHz, but the truth is that this rapidly gets worse as the frequency rises. This is likely to have given rise to the often heard audiophile statement that “opamps sound grainy”.

For the GRamp, a new low-current regulated voltage supply was developed that has broad bandwidth noise rejection so that incoming noise does not intrude on your music.



Audio Band Noise Rejection (over -90dB flat all the way up to 40kHz)

The electronics used for regulation have to be noiseless and fast. Generally noiseless is not a problem but fast is a great problem. Most commercial regulators are good for about 100 kHz. Most chokes are good for at least 1 MHz.

The electronic regulator used in the GRamp exceeds the specifications of an excellent choke. It is an exceedingly fast discrete circuit and not a generic design. Spectrum analysis up to 16 MHz implies a very high

bandwidth, as there is no apparent degradation at that frequency. The circuit is of low enough impedance to outperform commercial regulators by at least 10 dB. This is despite the fact that no loop feedback is used in this circuit. To avoid any speculation, it is not a shunt device, it is not a capacitive multiplier, and it does not employ chokes.

It will not surprise many to know that the avoidance of loop negative feedback is the key to this design. Having established a design, the components used were individually selected by extensive and laborious listening sessions. A discrete design allowed that as each component is hand picked to get the optimum result. Every component on the design was individually chosen, as was the grounding paths.

¹ Genesis would like to credit Engr. Nigel Pearson for the idea behind the design of the SRVS.

Resonance and Vibration Control

With all the emphasis on reducing noise from the power supply coming into the amplifier, it makes no sense if the amplifier itself creates vibration or generates radio frequency interference and electro-magnetic interference. Hence, one key feature of the GRamp is the outboard power transformer.

There is no way to eliminate hum and vibration from a large powerful transformer. This is because even for the best-built transformer, the incoming 50Hz or 60Hz in the coils will shake the steel in the transformer core. Moreover, if the incoming power is not a perfect sinusoidal waveform, the transformer will rattle and buzz even more.

For example, a single switched mode power supply in the same electrical circuit as the transformer will cause asymmetric compression of the power waveform and induce noise into the power transformer. Moreover, noise-generating devices such as light dimmers, electric curling irons, microwave ovens, etc. can also cause the transformer to vibrate at those noise frequencies. Capacitive coupling between the primary and secondary windings of the transformer will result in high frequency noise bleeding through from the input to the output.

A phenomenon that we noted in the design of the transformer is that when the coils are wound so tightly that the transformer does not emit an audible hum, the transformer will vibrate and heat up even more. It is intuitive that the incoming sine wave needs to be dissipated in some way – in the form of sound, heat, or vibration.

With the transformer moved outside of the chassis, the Genesis Reference Amplifier has a much quieter environment in which to operate. To further reduce the vibration/resonance within the chassis, the signal and power circuits are isolated from each other. The signal circuits are “hung” from the top cover of the chassis which is then further damped. The amplifier modules are securely fastened to the bi-metallic face plate.

The power supply PCB is mounted on the bottom plate using differently compliant mounting hardware.

Acoustic Suspension System

A dedicated suspension system completes the resonance and vibration control design of the Genesis Reference Amplifier. It also facilitates the easy placement and location of the amplifier.

Designed like the suspension system of a race car, the acoustic suspension is made of a solid acrylic suspension frame, neoprene shock absorbers, and steel spikes. It isolates the amplifier from floor- or structure-borne vibrations,

and yet at the same time allows any vibration in the amplifier chassis to be “sunk” to ground.

The function of the steel spike is to have a low-impedance point to transfer all frequencies to ground. This is possible because the contact at the point of the spike is smaller than a $\frac{1}{2}$ wavelength of the frequencies of vibration transmitted. Using a steel cup under the spike will defeat this function and as this will only allow passing frequencies have a $\frac{1}{2}$ wavelength larger than the diameter of the steel cup, which is far larger than the point of the spike.

Hence, if the amplifier is to be placed on a hardwood floor, and you do not want to mark the floor, use a thin disc of copper (a copper penny will do) under each spike. The weight of the amplifier on the spike will deform the disc and create a small indentation. The other side of the indentation will form a little nipple to couple to the hardwood floor. Alternatively, use a little square of aluminum foil that is at least 4 layers thick.

Other features that have been incorporated include:

- All signal wiring use silver strands with a copper core and PTFE dielectric.
- Having all critical components toleranced and matched to less than +/- 1% results in a sense of aliveness and ease in the music.
- Special circuitry to “keep things warm” without wasting a lot of electricity means that your system is ready for you to listen to whenever you are.
- High-power, high current relays to switch power instead of typical rocker or toggle switches result in minimal degradation of the power supply path.

Specifications (Each)

- Rated Power Output: ~800w per channel (**@ 4ohm**)
Current limited to 20amps for 20ms
- Frequency Response: 10Hz ~ 50kHz +0dB/-3dB
- Power Bandwidth: 18Hz to 40kHz
- Input Impedance: 35k Ohms (Balanced); (25k Single-ended)
- Damping: 2,000 minimum at 4 ohms
- Gain: +26dB
- Inputs: Balanced XLR or Single-ended RCA
- Output: WBT NextGen™ binding posts