

SMART Devices GC-120

The Garbage Collector

DOUG BLACKBURN

Balanced Power

SMART Devices has joined the surprisingly crowded AC power conditioning field with the effective GC-120. Rather than selling a box with some filters and outlets and calling it a power line conditioner, SMART decided to go several steps farther. They made the GC-120 a balanced power line conditioner. They made it about as powerful as it can be and still be connected to a standard 15 amp 120 volt electrical outlet. This required a 32 pound transformer in order to be able to deliver enough power to supply amplifiers. The GC-120's surge suppression is more reliable than the MOV's found in most power conditioning equipment.

Before we get into the specifics of the GC-120, it would be a good thing to understand what balanced power is compared to the normal power from a 120 volt 60 Hz electrical outlet. (A detailed article describing balanced power appeared in *Widescreen Review*, Issue 51, August 2001. I won't cover all of that territory here again, but I will touch on the basics in case you aren't one who saves back issues.)

In the 120 volt and even 230 volt realm, the power company delivers electricity to one prong of the electrical outlet. The other prong is the "neutral" line, which is the return line to complete the electrical circuit. This neutral line is similar to but not quite the same thing as "ground." Ground is the third connection in the electrical outlet. Ground is there for safety.

When hot/neutral power is converted to balanced power, 60 volts will be on one prong and 60 volts will be on the other prong. If a trick was not applied, no work could be done by this connection. In producing the 60 volts/60 volts electrical power for balanced power, the two voltages are mirror images of each other. When one 60-volt line is peaking out on the positive side of the sine wave, the other 60-volt line is peaking out at the negative maximum. When you measure the potential between the two out-of-phase AC lines, you get the same potential you get with "normal" power systems delivering 120 volts and neutral. So the 60 volt/60 volt balanced configuration can do the same amount of work as the standard 120-volt/neutral system we get from the power company.

What's the advantage of balanced power then? Reduction of electrical noise-common mode noise to be specific. When you convert the power to 60 volts and 60 volts and connect a system component to the balanced power, the portion of the noise on the AC power line that is present in identical amounts on both 60 volt lines is cancelled. You don't have to have any filters or other tricks to make it go away ... just connect the two 60-volt lines together through a load-a component of some type-and the noise that is "common" to both lines disappears because of the cancellation provided by the two out-of-phase 60-volt lines.

Common mode noise is not the only type of noise present on the power line, however. There is also differential noise. Differential noise has different components and magnitudes on the two 60-volt lines or on the 120 volt/neutral lines. It cannot be cancelled. It has to be filtered in some way to eliminate it. SMART does this with two filter modules inside the GC-120. The larger module filters the power coming into the GC-120 before it goes to the large transformer that supplies the balanced power.



The smaller filter module goes between the balanced power transformer and the AC outlets assigned to digital and video components. This filter stops noise going in both directions so the components that generate the most electrical noise, digital and video components, can't produce noise that appears at the outlets for amplifiers.

Product Description

The GC-120's front panel consists of a black panel with rack mount holes, over laid with a smaller silver panel housing the meter that reads line voltage or power consumption in watts. A rocker switch turns the entire GC-120 on and off. All of the AC outlets on the back panel are switched on and off by this switch.

On the rear panel you'll find four hospital grade 20-amp outlets for Processing/Digital components. Another four of the same type of outlet are labeled for Amplifiers/High Power. The hospital-grade outlets provide a very strong grip on the prongs of connected power cords as well as having isolated grounds. They also have considerably beefier internal construction than standard electrical outlets. Finally, there is a resettable ground fault module. Ground fault detectors sense current leakage between AC lines. When leakage reaches the threshold allowable by the ground fault module, the internal contacts open, removing power to the connected device. This additional level of protection is available on few, if any, other power line conditioning products. It doesn't clean the power or make your video images any better, but it could prevent electrical shocks if something goes wrong with a connected power cord or component.

Other features include the balance power transformer itself, custom made by SMART's own in-house transformer manufacturing division. The transformer includes epoxy impregnated core, a grounded copper Faraday shield between primary and secondary windings, and Kapton® insulation between the primary and secondary windings. The sturdy industrial-grade construction makes the GC-120 suitable not only for home theatre but for such pro applications as recording studios, soundstages, projection booths, editing facilities, and digital effects studios. Surge suppression is provided not by problematic-but-inexpensive MOV's used in many power conditioning products. SMART chose TransZorb® avalanche transient surge suppressors which do not slowly degrade with each power line surge until they become useless as MOV's do. A 14-gauge shielded power cord with IEC connector is provided, but you may wish to use an even larger power cord for higher powered amplifiers.

Setup And Use

There's nothing tricky about setting up the GC-120. However, it might pull enough current under full load to trip a marginal 15 amp circuit breaker. If you really want to give the GC-120 everything it needs to perform the best it possibly can, connecting it to a 20 amp circuit would provide some headroom for turn-on surges as well as for delivering lots of power to high-powered solid-state amplifiers or AV receivers used in mid-range to high-end home theatres.

The floor is not the best place to put power conditioning equipment. The GC-120 produced better sounding audio up off the floor on an equipment rack shelf. There was no detectable difference in video quality when the GC-120 was on the floor or in a rack. Only audio is affected. Speaking of racks ... the wide ears on the GC-120 front panel permit installation in racks commonly used in pro applications and in some custom home installations.

When the review sample arrived, the ground fault circuit breaker was tripped and there was no power to any of the outlets on the back of the GC-120. Firmly pressing the reset button on the ground fault detector on the back of the GC-120 applied power to the connected components.

The only glitch in the operation of the GC-120 I experienced was transformer noise. I live in a neighborhood that is still growing, but slowly. Every year two or three or more houses are completed, and that loads the transformer that feeds my house a little bit more. Sometime earlier this year, we reached the point where the transformer that feeds us is being asked to deliver more power than it was designed for. Consequently, I have some problems with transformers, especially toroidal transformers, producing mechanical hum. The GC-120 was not immune. In fact, since the GC-120 has the largest toroidal transformer that has ever been in the reference system, the amount of hum was also the largest experienced to date. While I'd rather the GC-120 didn't hum here, I understand the reasons for the hum. The hum is loud enough to intrude on enjoying movies in a quiet home theatre. Placed away from the listening environment in a home theatre, studio or commercial theatre, the noise is inconsequential to the performance of the GC-120.

Audio Performance

The audio benefits do not all appear the moment you turn the system back on after inserting the GC-120. Like my experiences in the past, it takes the system about 24 hours of operating on balanced power for the sound quality to peak out. There are some improvements immediately. But come back the next night for another listen and the improvement has doubled or tripled. When using balanced power from the GC-120, the benefits I hear are a reduction in overall system noise level and improved reproduction of space, air, echo, reverberation, and decay of sounds. With balanced power, it's as if the system can simply do things it cannot do when running on normal wall outlet power. With the best quality music and movie sound, the sense of large spaces existing in your room is more convincing. You can hear the room breathe. The Diva scene in *The Fifth Element* ... as she appears on stage, there is a much more palpable hush in the theatre before she begins to sing when using the GC-120.

You feel the scope of the large theatre and you feel the tension in the air. These things are detectable when using wall power, but balanced power heightens your ability to suspend your disbelief. The flyover in *Star Wars: Episode 1* when the invasion of Naboo starts ... a large ship flies overhead back-to-front and rotates as it lands. With balanced power, the low-frequency sound of the ship takes perhaps one second longer to fade out as it settles down and stops moving.

Amplifiers require big hulking gouts of current-but only for about half the time the amplifier is working. The other half of the time, amplifiers draw zero current. Some amplifier manufacturers would like to see you overrate the circuit powering amplifiers by four times the average current the amplifier pulls when operating the amp near its limits in order not to experience any limiting in the current domain. The reasoning is that an amplifier pulling "10 amps" is never actually drawing 10 amps from the power line. It is drawing either zero amps or 20-30 amps depending on the point in time you measure the instantaneous current, the design of the amp, and the power rating of the amp.

I torture tested the GC-120 by connecting a 250 watt per channel Belles/Power Modules 350A stereo amp, a 150 watt Parasound mono amp, and a pair of Vandersteen 2Wq subwoofers, each with a 300 watt amplifier. Total wattage-1,250. That's just the output power rating. Amplifiers draw considerably more power than they produce. This set of amplifiers is usually connected to a 30 amp circuit. I could hear some problems when trying to drive this much amplifier power through the GC-120. Because of the subwoofers, bass reproduction suffered the most. I would hear shorter versions of the same sounds. The initial impacts would sound about right but the decay/aftermath would be truncated to an obvious degree. Music could make the shortfall more obvious because of the longer periods of time music tends to demand peak power compared to movies.

Removing the subwoofers nearly eliminated any sense of power to amplifiers being limited. But it wasn't until the 350A stereo amplifier was running alone from the Amplifiers/High Current outlets that I lost the ability to reliably detect any loss of impact, decay or anything else that would signal that current limiting was taking place. This 250 watt per channel stereo amplifier pulls as much or more current than typical five-to seven-channel AV receivers so using an AV receiver with the GC-120 is a definite possibility and is recommended. The message the amplifier torture test should leave you with is that the GC-120 is powerful but has its limits, and you'll experience those limits with amplifiers faster than any other type of component. Though some of the large CRT projectors can be fairly current hungry also. If you aren't doing perfectionist listening, you probably would not even notice the limiting present when the full 1,250 amplifier output watts were connected to the GC-120. Things don't fall apart in any obvious way and you still get the benefits of quieter silences, bigger spaces, and better reproduction of decay, echo, reverberation, and air.



SMART Devices, Inc. - 5945 Peachtree Corners East Norcross, GA 30071 - (800) 45-SMART or (770) 449-6698 - email:HTinfo@smartdev.com

Video Performance

Here there was no delay when observing improvements made by the GC-120. Using the *Shakespeare In Love* DVD with a direct view monitor, it was apparent from the text that opens the movie that the GC-120 was cleaning up the video in worthwhile ways. The black background was less noisy. The edges of the text were cleaner and sharper and the white portions of the text seemed to be less gray. Scenes in the movie were clearly more dimensional when the GC-120 was in use. Shots looking down a street or alley produced a better sense of the scene disappearing into the distance. Foreground objects were cleaner and clearer. Background objects were clearly hazier and less distinct as in reality. Without balanced power, the foreground and background objects tend to have color pallets and contrast that made their distance from the camera less obvious. Colorful costuming is draped over a railing in one scene. The GC-120 produced more vibrant colors with more reality in the folds in the garments due to more subtle shadings of the fabrics that are visible when using balanced power. Without the GC-120, shots of a person in sharp focus against an out-of-focus background have an overall flat appearance to them. Connect to the GC120 and the in-focus person snaps forward of the soft background in a much more dimensional and involving way-almost as if you can see around the person as you would if you were standing there rather than watching a film. The sharply Focused edges are cleanly defined with the foreground color pallet being rich and pure against the more muted out-of-focus background colors.



Conclusions

The GC-120 is a no nonsense industrial grade product suitable for better home theatre systems and many pro applications. The GC-120's features benefit both audio performance and video performance in subtle but readily observable ways. The video and audio improvements are difficult to give up once you have experienced them. The \$1,995 price is in the higher range for power conditioning products. But the construction, features, and performance of the GC-120 are about what I would expect at this price point. While you can get balanced power products for less than half the price of the GC-120, those products will also be less than one-half the size, have less than one-half the output power capability, and may lack some of the GC-120's features.

Individuals, custom installers, and home theatre dealers often overlook power as an issue for home theatre systems. Balanced power is becoming the defacto standard for Pro applications of many types due to the technical superiority of balanced power. The GC-120 not only improves sound and image quality compared to power directly from the wall, it protects valuable equipment from surge damage. Cross-contamination problems are also minimized. Because of the features, build quality, and performance, the GC-120 is recommendable for both home theatre and pro applications.

Specifications

Input: 15 Amp IEC Connector
Output: 15 Amps Continuous Power From All 8 Outlets Combined
Common Mode Rejection And Noise Rejection: More Than 60 dB 1 Hz To 2 MHz
Full Load Loss: Less Than 1 Volt At 15 Amps
Efficiency: Better Than 98%
Power Consumption At Idle: 17 Watts
Regulation: Typically Less Than 2%
Safety: UL 506, CSA 66, ETL Smetko Certification

Features

Meter: Voltage, Switchable To Watts
Power Switch: Integral Dual Pole Magnetic/Hydraulic 20 Amp Circuit Breaker
Outlets: 8 Hospital Grade Isolated Ground Outlets
Protection: Ground Fault Interrupter And Avalanche Surge Suppression

Mounting: Shelf Or 19-Inch Rack Mount
Weight: 48 Pounds
Dimensions (WHD In Inches): 19 x 5.25 x 12
Warranty: 3 Years, Parts And Labor
Price \$1,995

Also Available: Model GC-240-W For Unbalanced 220/240 VAC Systems
Model GC-240 For North American Balanced 240 VAC
Manufactured In The USA

This review has been reprinted in its entirety from Issue 57 of Widescreen Review®, "The Essential Home Theatre Resource." Take advantage of our no-risk subscription offer: 13 For \$34* - 1 free trial + 12 monthly issues + special edition + full access pass to WSR's paid subscriber Web site-a 56% savings off the monthly newsstand price (over \$43 savings off the cover price)! Phone WSR's Customer Relations Department at 909 676 4914 or 888 WSR SUBS, or fax at 909 693 2960 to order, or request on-line at www.WidescreenReview.com/13. Or you can mail your request to: Widescreen Review, 27645 Commerce Center Drive, Temecula, CA 92590. All major credit cards are accepted.

* Foreign subscription rates are \$40.00US Canada/Mexico, and \$75.00US International. Canada/Mexico and International Special Edition Offer Plus Shipping Cost.