

Widescreen REVIEW

Facebook.com/WidescreenReview

Custom Home
Design

CES 2019

Gary Reber's Video Report
Joe Kane's Notes

CEDIA EMEA Level II Winner

Equipment Reviews

Sony MASTER Series XBR-65Z9F

Hegel C-55 Power Amplifier

Bryston SP4 Preamp/Processor

THE GIRL IN THE SPIDER'S WEB



8 4K UHD And Blu-ray Reviews



\$5.99 US \$7.99 Canada
Volume 28, Number 2
Issue 236, February 2019



Hegel C-55

Five-Channel Power Amplifier

Doug Blackburn

Hegel may be a new manufacturer name for a lot of *Widescreen Review* readers. They are a Norwegian company that has previously focused on the two-channel stereo music market. Hegel was founded in 1997 by Bent Holter after attending Norway's Technical Institute in Trondheim in the late 1980s. Bent's early focus, even before Hegel existed as a company, was to eliminate distortions that exist in various high-end stereo audio components. Until recently, Hegel has focused on stereo playback only, but the home theatre market is a great opportunity for expanding without having to start from scratch. Hegel has made preamps, amplifiers, integrated amplifiers, DACs, and CD players. Expertise in those components is a great foundation for creating worthy home theatre products. Holter's design focus has been finding solutions to specific problems "designed-in" to audio components by the nature of their circuits. Each time Hegel improved a circuit successfully, the techniques became part of the growing list of Hegel innovations. Today there are seven of these circuit design innovations, and Hegel uses as many as are pertinent to any given product. The C-55 five-channel amplifier incorporates four of those circuit design improvements. The Hegel name came from Holter's metal-rock band, for which he built their amplifiers, since it was so much cheaper to build them than buy commercial amplifiers. That was well before Hegel existed, so his love of audio goes all the way back to at least the 1980s. Hegel's expansion into the home theatre market is supported by Hegel America, Inc. in Hampden, Massachusetts, where their products are distributed and dealers are supported. In addition, two U.S. service locations have been set up to support equipment that may require repair.

Hegel is covering all bases for making the C-5x amplifier series

available to the widest possible customer base. You can get one of these multi-channel amplifiers from any authorized Hegel dealer. Hegel is also building a network of custom install, custom design/build, and custom integrator businesses, so those going the full-on home theatre route also have these amazing amplifiers as an option.

Hegel decided the first step to a great multi-channel amplifier would be to design a single amplifier channel assembly... one part that included everything to operate as a mono amplifier. The amplifier channel is built somewhat like a Formula One race car. There is a front chassis and a small rear chassis, and they are both bolted to the extruded aluminum heat sink, using the heat sink as a "stressed member" of each amplifier channel. The front holds a toroidal transformer with multiple windings, so each of the mono amplifier assemblies include three power supplies required by the amplifier circuit. The separate power supplies are for the input circuit, the voltage gain stage, and the current gain stage. Hegel intentionally designed the amplifier circuit to do the voltage gain and current gain separately to improve audible performance—part of their "SoundEngine" circuit design technique. The result is each 150-Watt amplifier channel is stable, driving loudspeakers with impedance specs of 2 Ohms to 8 Ohms or higher. Home theatre audio systems will most often have 5, 6, 7, 9, 11, or 12 loudspeakers—or more if active/external crossovers are used. To be able to power various numbers of active channels, Hegel created the modular C5 amplifier chassis. This allowed them to configure amplifiers with 3, 4, or 5 channels without having to manufacture three different chassis. The resulting three models have easy-to-remember names; C-53, C-54, and C-55. Whatever

number of amplifier channels you choose, all of them are rated at 150 Watts per channel into 8 Ohms

Hegel is so proud of these mono amplifier modules that they shipped one of them separately in a second box just so I could see the circuit outside of the amplifier. I have to say, they did a thorough design rundown to get everything to fit in a surprisingly compact amount of space. It's not overly crowded, but everything there is well laid out. The transformer is at the front of the amplifier module. The circuit board with mounted heat sink is next, and the output switching and connections are at the back edge of the amplifier module. The few wires needed inside the amplifier module are all fairly short and secured, so they can't rub on an adjacent amp module once assembled into the chassis. Output devices, where most of the heat comes from in class AB amplifiers like this, are mounted directly to the heat sink. Very nice-looking "Hegel" branded power supply capacitors are cleverly mounted at the end of the circuit board closest to the transformer where a less space-conscious design might have left empty space. A temperature sensor is connected directly to one of the heat sink fins to insure the amplifier can't be damaged by excess heat.

The chassis is finished in black. The internal heat sinks are partially visible through ventilation slots in the bottom and top of the amplifier. The front is featureless except for the two strong handles, power switch, an active LED for each channel installed, and the Hegel logo. The back has an IEC power cord socket, and inputs with both RCAs and XLRs for all channels. There are switches to invert polarity (channel by channel) and a switch to select the amount of gain (also channel by channel) at 29 dB or 23 dB. Another switch selects the RCA or XLR input for each channel individually. The last points of interest on the back of the amplifier are the fuse holder, one jack for 12 VDC trigger input, and a second jack for 12 VDC trigger output. There are no feet or rack ears installed when the amplifier arrives. The C-5x amplifiers ship with both rack ears and four feet. You install, whichever you prefer.

The surface area taken up by the C-55 is pretty big, but it still fits in racks that can accommodate an amplifier that is a hair shy of 20 inches wide and 20.5 inches deep. It is not too tall (3U rack height), and that helps keep the weight from getting out of control. It weighs 82 pounds, so most people won't have too much trouble moving it around. It's heavy but manageable by a single, fit person. Protruding "ears" on the back of the amplifier protect the binding posts from touching a hard surface if you pick the amplifier up by the front handles and want to set it on the floor standing up rather than laying it flat. Those "ears" are also slotted and can be used as two more extra handles if needed, though, the sheet-metal-thick ears dig into non-calloused hands uncomfortably, but gloves or a small towel can make the amp easy to carry by the rear-mounted "ears" if needed.

Four different Hegel-designed circuit enhancements/improvements are used in the design of each channel of the C-55 amplifier. Most amplifiers do voltage and current amplification in a single step. Hegel's "DualAmp" feature means there are separate parts of the amplifier circuit for current amplification and voltage amplification. The "DualPower" feature includes separate circuits within the amplifier module for current amplification and voltage amplification. Hegel uses independent power supplies for each function, while most amplifiers run all gain circuits with a single power supply. Next up is Hegel's Organic Sound design technique, the culmination of 10 years of research and testing. The Organic Sound designation covers minor and major improvements throughout

Features — Hegel C-55 Five-Channel Amplifier

Five individual amplifier modules
Independent multi-winding toroidal transformer for each channel
Separate transformer windings for each of the three power supplies in the amp
Each channel has both an RCA jack and XLR input connectors
Invert phase of each channel separately
12 VDC Trigger In and Out
Front rack ears and back rack support bracket included
No negative feedback design
Selectable gain at 23 dB or 29 dB, channel by channel
Internal heat sinks
Includes exclusive Hegel design features: DualAmp, DualPower, Organic Sound, SoundEngine2
Sturdy front handles
Drives loudspeakers with impedances as low as 2 Ohms

Specifications — Hegel C-55 Five-Channel Amplifier

Dimensions (WHD In Inches): 19 x 5.2 x 20.5
Weight (In Pounds): 82
Power requirement: 115 VAC / 60 Hz
Power consumption: Standby-not specified; Maximum-1610 (Watts)
Frequency response: 5 – 100,000 Hz
Distortion: 0.01 percent at 100 Watts, 8 Ohms, 1,000 Hz
Signal to Noise: Better than 100 dB
Output power: 150 Watts at 8 Ohms
Warranty: 3 years
MSRP: \$8,000 for C-55, \$7,000 for C-54, \$6,000 for C-53

Manufactured In Norway and China By:

Hegel America, Inc.
336 Wilbraham Road
Hampden, Massachusetts 01036
Phone: 413 224 2480
Email: info@hegel.com
Web site: hegel.com

each amplifier module in a variety of locations. The intent is to remove as many things as possible that "damage" or alter the input signal on its path to the amplifier's output posts. Aside from using their knowledge of audio and video hardware and designs to optimize audio performance, Hegel has also done research into integrated circuits, telecommunications, and broadcasting to learn more about what sorts of devices might be available that, while not necessarily designed for audio amplifiers, might be useful in audio circuits designed to remove problems in conventional amplifier circuits. Finally Hegel's "SoundEngine" design techniques remove more large and small problems that alter the audio signal as it passes through different parts of the amplifier circuit. They use what is essentially error-canceling design techniques, but not just in one place, they do this for each stage in the amplifier circuit. Hegel says these techniques reinforce the strengths of class A and class AB amplifiers (the modes the C-55 operates in) while minimizing the deficiencies in more conventional versions of these amplifier topologies. One of Hegel's "SoundEngine" features is removing one of the significant concerns in the design of class AB amplifiers; distortions that happen when the electrical signal "crosses zero (volts)." Hegel says they eliminate as many of the design problems present in class AB and class A amplifiers. Most

EQUIPMENT REVIEW

Hegel C-55 Five-Channel Amplifier

class AB amplifiers operate in Class A mode at lower output levels and switch to class AB when more power is needed. Hegel says their “SoundEngine” technology does not use any type of global negative feedback that’s often blamed for making sound less life-like and/or less engaging. Instead, they use local and adaptive feed-forward techniques.

Hegel has priced the C-5x amplifiers as you might expect for a very well-designed amplifier with a three-year warranty. The C-53 version with three amplifier modules installed is \$6,000. The C-54 with four amplifier channels is \$7,000, and the C-55 reviewed here with five amplifier channels is \$8,000. So this isn’t quite the right amplifier for systems being built on a modest budget. On the other hand, you could pay \$5,000 to \$10,000 per amplifier channel in a system with an unlimited budget, so Hegel’s prices of \$1,600 per channel in the five-channel amplifier definitely widens the appeal.

Associated equipment for this review: Bryston SP4 surround processor (circa \$14,000); SVS Ultra loudspeakers (Tower, Center, Bookshelf); Vandersteen loudspeakers (3A Signature, VCC-5 center, VSM on-wall, VCC-1 overhead); Amazon FireTV puck Gen3, OPPO BDP-205 disc player; Cyberpower PC; DISH Hopper3 DVR; and two Netgear ReadyNAS 42x (Network Attached Storage) RAID hard disk subsystems connected to my gigabit-speed Ethernet network. The hard disks send movies and music to the OPPO BDP-205. The disc player sends video and sound to the processor via HDMI for decoding and distribution.

Subjective Evaluation

This is an impressive-sounding amplifier. It has the ability to not just float the sound of a musical instrument in space, it puts the instrument itself right there in 3D space... if the recording is done in such a way as to preserve the full natural sound of the instrument. This may sound nit picky and of minor consequence, but it is very pervasive and is quite obvious, especially if you are familiar with the sound of the system with a good but different amplifier. Music lights up with detail and textures you never hear until your amplifier reaches this level of performance. I heard new detail in so many recordings—heck in every recording—that things would pop into such focus that I realized for the first time that the sound I thought was a single instrument was actually two or three instruments (or perhaps one instrument doubled or tripled with slight time differences). You might think that less well-recorded music albums might not provide pleasant sound with all this detail coming out, but I was surprised that a recording like *The James Gang Rides Again* is full of great music recorded with middlin’ quality. The Hegel amplifier made similar improvements and didn’t make the album sound worse by showing off the deficiencies in recording quality. It is still obvious that the recording quality isn’t fabulous, but everything sounded a bit better in spite of there not being as much to work with compared to “better”-quality recordings.

The song “Angel” (written by Jimi Hendrix, appeared on the album *The Cry Of Love* in 1971) appears on an interesting 1995 album by Dee Carstensen called *Regarding The Soul*. Dee

Carstensen revisualizes the song into something you would never expect. She plays harp (no, not the harmonica/harp, an actual harp) beautifully, and this song sounds great with the harp driving the melody. The recording is well done and has a large apparent size, which aided the cloud of resonances and decays of plucked strings that form a sonic cloud of beauty around the harp while it is being played. It is quite impressive and matches my memory of hearing a harp played (pretty well) in a large sitting room in an older city home. I was amazed at that live performance, about how the harp sounded even bigger than it looked. It was a very pleasant hour, hearing that live harpist play music that was not the old boring flowery harp music you may associate with the harp from the Marx Brothers’ movies. With the Hegel C-55 I can get that sort of harp sound right there in the room in front of me. If only more people were playing “modern” music on the harp.

A recording artist from Oakland, California named Frank Harris made an interesting album filled with interesting sounds. Vocals are by Frank Harris on some tracks and Maria Marquez on other tracks. Most every other sound on the album was created with synthesizers. The album is titled *daboa—from the gekko* and was released in 1997.

Somehow, whether by accident or intent, Frank Harris created a rather remarkable sense of sonic space on many tracks of this album, especially Maria Marquez’ version of “Bein’ Green” (which I’d never heard before, having not been into Muppets at all, so I had no association of the song with Kermit). But some of the other sounds

remind me of steel drums made out of ice, or gigantic mortars banging into large pestles, and the list goes on. The C-55 revealed textures in some of the synthesizer sounds I’ve only heard from the very best and most expensive amps that have been here for review. It’s like seeing a green tree branch reflected by dark blue paint on a car for the first time in a movie scene you’ve seen many times on other displays, without that green tint in the reflection being visible. This ability to reveal previously unheard detail is obvious enough that anybody should be able to hear examples in just about any music familiar to them.

As usual, hearing the benefits of the Hegel C-55 while watching movies with 12-channel sound and engrossing visuals, detracts quite a bit from the mental focus required for critical listening. I’ve started to build a library (in my head) of several different scenes from movies with complex sound mixes in scenes that last no more than five minutes or so. This “library” is created from repeat plays of these few scenes with the video turned off and eyes closed. I will limit the active channels to five so I can hear the scene with a single five-channel amplifier, like the C-55, so each listen will have the same number of active channels. Using that method, I hear exactly the same sorts of things I mentioned while describing how the Hegel amplifier reproduces music. Noises of metal banging on metal, for example, get extremely “sharp-edged” yet solid sounding at the same time. The “bang” of the two objects becomes a presence in the room and is more startling than it is on other multi-channel amps anywhere near the price of the C-55.



“This Is An Impressive-Sounding Amplifier.”

Another critical factor for me is how faithful to the original sound the amplifier can get. Hegel's C-55 produced more “now that's how a _____ (fill in any instrument name) really sounds” moments than any amplifier I remember, except the SAE 2HP, rated at 1 horsepower per channel into 8 Ohms (near 800 Watts—not that I ever used anywhere near 800 Watts—right at \$20,000 for two channels). The only things that the SAE amplifier was better at was driving big-current-hungry loudspeakers in big rooms and its better than -130 dB noise floor that has been measured and verified. That low noise floor was the first time I'd heard that level of quiet in my room. Every sound came out of total background silence. But -100 dB or better, like Hegel's C-5x series amplifiers, sounds very quiet in its own right. I wouldn't have expected -130 dB or better would be detectable by human ears (compared to -100 dB or better), but, somehow, it is. To get noise levels that low, you have to use fully balanced amplifier circuits. That means Hegel's C-55 amplifier would have to have 10 amplifier modules in it instead of five amplifier modules, driving the cost up considerably. The balanced (XLR) connections on the C-5x amplifiers are converted to a single audio signal before being amplified.

The Hegel C-55 was a kick in the pants during the beach combat scenes in *Edge Of Tomorrow*. The sounds of weapon fire was fantastic, with sharp initial transients. When Gatling gun bullets were being fired, you got a wonderful combination of sharp sounds of bullets firing, mechanical clanging, the sound of shell casings falling on various surfaces, and the whirring of the quickly rotating barrels of the Gatling guns. Bullet and energy weapon impacts were entertainingly sharp and resonant. The sound of aircraft was also impressively detailed and dynamic.

With all of those good sonic characteristics, the C-55 wouldn't be for me if it had some sort of “house sound” rather than being perfectly balanced from the lowest bass to the highest treble. There are no tendencies to make treble louder than it should be naturally and as captured on recordings that strive to sound natural. Through the midrange, the amplifier does nothing detectable to the sound other than amplifying it. Bass takes me back to one of my all-time favorite stereo amplifiers, the Belles Power Modules 350A amplifier. It controlled the bass of every loudspeaker much better than any other amplifier I had used. I've had that amplifier since the early 2000s, and it still makes any loudspeaker's bass quality sound like it has had a major upgrade. Talking to the Belles amplifier's designer/manufacture, Dave Belles, about how/why the amplifier sounds as good as it does through the bass octaves, he said for the first time he had figured out how to design-in a very high-damping factor, and one of the benefits that brings is better resistance to back-emf generated by the drivers in loudspeakers. That is most noticeable in the bass because large-diameter drivers with large voice coils and magnets are more difficult to control precisely compared to much lower-mass midrange driver surfaces and tweeters. Belles says the damping factor in the 350A amplifier measured over 2,000 while most amplifiers are closer to 600 or so. It's interesting that I thought the bass produced by the Hegel C-55 sounded just like the bass of the Belles amplifier. So I checked to

see if Hegel publishes a damping factor for the C-55 and, sure enough, it's shown as being greater than 2,000. Certainly, damping factor is not the only parameter controlling sound quality in the bass octaves. But damping factor may be a more important design feature than many amplifier designers are willing to admit. It should be mentioned that tube amplifiers, especially those known for bass that's not particularly well controlled (most of them), have damping factors that measure in the range of 10 to 35, depending on the design of the amplifier circuit. It's a mistake to say any one measurable performance specification has some sonic signature or another. But there can be general “effects” of various design parameters that can be obvious or not, depending on how the rest of the amplifier is designed.

Editor Gary Reber's latest Immersive Sound music disc release with Native Auro-3D 9.1 encoding, 5.1 DTS-HD MA 24/96, 5.1 LPCM 24/96, and 2.0 LPCM 24/96 stereo made a great multi-channel music listening experience. Released on Dig•It Recordings, it is or will be available in most any music format you can imagine: LP, Blu-ray Disc (with all audio formats listed above), and via download. The title is *Bern Bern Bern* with Bernie Dresel (drums and leader) and The BBB. This is a studio recording, while Gary's previous production *Live N' Bernin'* by The BBB Featuring Bernie Dresel was a live performance recording released on Monster Music. The 5.1 LPCM version was spectacular, driving both the SVS Ultra loudspeaker system and the Vandersteen loudspeaker system I use when not reviewing loudspeakers for *Widescreen Review*. Talk about in-the-room presence! I saw and heard most of this album played live in a club in Burbank, California and I have to say, the recording gives up none of the excitement of the live performance, even though it was done in the studio. The immediacy of the instruments when you hear them played live comes right through at home with the C-55.

Conclusion

If I was creating a home theatre from scratch and my amplifier budget was up to \$2,000 per channel, I would go with as many C-55 amplifiers as needed for the number of channels and save a bit of my budget to use elsewhere. At this point, in early 2019, there's no other amplifier I would even consider in that price range. Used in an appropriately sized room with any “reasonable” loudspeaker load, I don't know of any other amplifier that makes movies or music sound better than Hegel's C-55 without spending much more to get it. **WSR**

Reprinted with permission by:

**Widescreen
REVIEW** & Custom Home
Theatre Design

For more, visit WidescreenReview.com