



HEGEL H590

By greg borrowman

INTEGRATED NETWORK AMPLIFIER

Hegel is a small company based in Norway that had been flying under the radar for more than twenty years, until about five years ago it became a huge blip on the screens of audiophiles right around the world, and sales of its amplifiers went through the roof. Which was a problem at the time, because the company was literally too small to meet demand. It now manages to keep up with demand... just... but the company is still very small — currently just nine people, according to Anders Ertzeid, Hegel's VP of Marketing and Sales — though he was quick to point out that that figure does not include those whose job it is to assemble its products... and if you take a peek inside one of those products you'll immediately realise that some of Hegel's 'employees' are in fact very sophisticated robots!

One reason the company flew under the radar for so long is that it isn't at all interested in gimmicky marketing slogans or self-promotion, and seemingly not even overly interested in the appearance of its products, all of which look pretty much identical. In fact, when asked to describe Hegel's corporate ethos, Ertzeid had to think for a moment before saying: "All we have is good sound quality: There is nothing else."

Pushed to elaborate further on this mission statement, he thought a while more before adding: "It's a no-nonsense product. Everything is measurable and quantifiable. And, for the high end, it's very reasonably priced."

If you've glanced at the price of the Hegel H590 you might be wondering about it being 'very reasonably priced'... or you might until you find that not only is it an extremely powerful integrated amplifier, one rated with an output of 301 watts per channel into eight ohms, but that it's also a full-featured DAC (with MQA... though only via USB), Spotify and AirPlay, as well as a full-featured streamer. So you're getting rather more for your money than would first appear to be the case.

EQUIPMENT

There's certainly nothing nonsensical about the front panel of the Hegel H590. As you can see, there are just two rotary controls and a front panel display, Hegel having decided to hide the main 'Power' switch underneath the amplifier. This is, as Ertzeid said, a 'no-nonsense product.'

The rotary control on the left side of the front-panel display is an encoder that allows you to select the input you wish to listen to, offering a choice of five line-level analogue inputs — two balanced (via XLR connectors), and three unbalanced (RCA) — and seven digital inputs: one coaxial BNC, one coaxial RCA, three optical Toslink, one USB Type B, and one network (RJ45). You can, if you wish, change one of the analogue inputs to be a 'home theatre' input, to facilitate using the Hegel H590 to drive the front left and right speakers in a multi-channel home theatre system. (If you do this, you need to exercise caution, because it bypasses the Hegel's volume control.)

HEGEL H590 ■ INTEGRATED NETWORK AMPLIFIER

The rotary control on the right is the volume control encoder (that is, it's not a standard potentiometer, but digitally controls a switched resistor network). This control has two really neat features. The first one is that you can set the switch-on volume so that whenever you bring the amplifier out of standby, the volume level will be the same level... not the level you were last using. The second neat feature is that you can set a maximum level. Once this is set, it doesn't matter how far you (or more importantly, someone else!) rotates the volume control to the right, you won't run the risk of overpowering your loudspeakers... or of upsetting the neighbours.

As you can probably tell from the photographs accompanying this review, the front panel display is blue on black, and shows the selected input (XLR1, XLR2, etc.) at the left and the selected volume level — shown as numerals from 0 (no sound) to 99 (maximum output) — at the right. When the amplifier is muted, the numerals flash.

The Hegel H590 comes standard with the same Hegel RC8 remote control that is supplied with Hegel's other products, so it can control them as well as the H590, but means that in some cases, some of the buttons on it do nothing when operating the H590. However, because Hegel is using standard infra-red command codes, it's likely you'll be able to use it to control play and pause functions on many products that are not made by Hegel. What the Hegel RC8 remote definitely allows you to do is control the H590's volume, switch inputs, mute the amplifier's output and switch the Hegel H590 in and out of its Standby mode. There are no 'direct access' buttons on the remote, so in order to select an input you have to step through them one by one, using the IN- and IN+ buttons. Also, the 'DISP' button on the remote control does nothing at all. I was rather expecting that it would either dim the Hegel H590's display or turn it off. Instead it did neither. Presumably it dims or switches the display on some other Hegel component, so surely it couldn't be too hard to arrange it to do the same for the H590?

You can use the remote to reset the H590 to its factory default settings for switch-on level, source and so on. All you need to do is hold down the DAC+ button and then press and hold the Mute button. This will clear all user-defined settings, including IP settings.

The remote control uses two AAA batteries which Hegel does not install inside it at the factory in order to "avoid damage to the remote control by leakage from the batteries during transport and storage." The only problem is that the two batteries Hegel does supply so you can



install them yourself are not particularly good quality. I would recommend you don't use them at all, and instead buy and install two high-quality Eveready alkaline batteries. A word of general advice here, which is that it's a good idea to replace all the batteries in all your remote controls on January 1 each year to avoid the potential for the batteries to leak and possibly damage the remote. Doing them all at once makes it easy to remember, and allows you to buy one of the 'bulk packs' of AAA batteries at a discounted price.

Because the Hegel RC8 is not a cheap, plastic 'off-the-shelf' remote, and has a substantial black metal case, you'll need to use a Phillips screwdriver to remove the screws underneath the remote control to install (and replace) the batteries. You'll need to supply your own screwdriver, because Hegel doesn't supply one. Rather disappointingly, although the company specifically warns against tightening these screws too much "as this can damage the screws and the soft metal chassis of the remote control" two of the screws on the remote I was supplied were so tight I had difficulty undoing them.

The bottom edge of the remote is curved, which makes for a more attractive appearance, but meant that I could not stand the remote on its end to make it easier to find, and to pick up. (The other end of the remote — the one that appears to be 'flat' — has an IR transmitter bulb protruding through it, so you can't stand it on that end either.)

The Hegel H590 has sophisticated protection circuitry built in that will protect against excessive current and over-heating. Unlike some such circuits, Hegel's is self-resetting, so when the event that required the protection to activate is no longer present, the amplifier will switch itself back on, but with the volume set at '0'. I was rather amused by the display that shows if the amplifier over-heats: it simply says 'HOT!' Speaking of which, because all the heatsinking is inside the amplifier, you do need to make sure the amplifier is well-ventilated and placed on a hard surface that allows plenty of ventilation underneath.



Hegel makes many claims for its H590... ordinarily, I'd dismiss such claims as advertising puffery, except that in this case, the company is absolutely correct.

Hegel

THE BACK STORY

Hegel is a Norwegian company which had a rather strange beginning. 'Way back in 1988, Bent Holter, a young electrical engineering student studying at the Technical University in Trondheim (NTNU) was paying his way through his university degree by playing in a heavy



metal band called 'The Hegel Band'. As the band became more successful and started playing larger venues, it needed more powerful amplifiers, so Holter decided to save the band some money by building them himself, using a new amplifier topology based on a circuit he'd developed for a thesis in which he'd proved that it was possible to

reduce distortion in an audio amplifier without adversely affecting other performance parameters — in particular frequency response and damping factor. That circuit is now trademarked by Hegel as 'SoundEngine Technology'.

Rather than build 'one-off' amps, Holter decided the circuit was so good it deserved to be built into commercial products. Of course the new company required a name, so Holter decided on using his band's name for both the name of the company and the brand name of the amplifiers.

As for the 'SoundEngine' circuit itself, for which Bent holds a patent (US6275104B1), it appears to be a unique implementation of a technique called 'feed-forward' that was first proposed and used by Harold S. Black in 1923 when he was working at Western Electric, after which Seidel and Beurrier worked on it for Bell Laboratories in the late 60s, and of course none other than John Vanderkooy and Stanley Lipshitz (University of Waterloo) also applied themselves to improving it in the early eighties. The version Bent patented uses several series-connected amplifier stages with each one having its own voltage and current gain function, as well as its own local error correction. Distinctively, correction is applied dynamically so that no correction at all is applied under a threshold level, in which circumstance the gain stages work as cascaded local feedback gain stages with the specified voltage and current gain. Stages that are error-corrected are able to apply different amounts of voltage and current gain.

Bent's patented circuit has multiple advantages, including increased immunity to radio frequency interference, higher tolerance to reactive speaker loads, reduced levels of harmonic, intermodulation and transient intermodulation distortions, stable phase across the audio frequency range, and increased linearity at high voltage/current levels, particularly at high frequencies.

The rear panel of the Hegel H590 is nicely laid out, with high-quality connectors used for all inputs and outputs. The layout has obviously been thought-through, but looks a little weird if you're looking directly at the rear of the amplifier, because all the left-channel inputs and outputs are on the 'right' side of it, and all the right-channel inputs and outputs are to the 'left' side. As I said, this looks odd if you're looking directly at the back of the amplifier, but makes perfect sense if you're leaning over the amplifier from the front, because then the 'left' inputs and outputs are on your left, and the 'right' inputs and outputs are on your right. Maybe it would have been less weird if Hegel had gone the whole hog and printed the type on the rear panel upside down as well as right-side up, as some other manufacturers do.

It is well worth making special note of the fact that at a time when many manufacturers have so-called 'balanced' XLR inputs that are in reality only unbalanced inputs with XLR connectors, Hegel's balanced inputs are not only true balanced inputs, but also use very high precision discrete instrumentation amplifiers with high CMMR.

WEBSITE AND MANUAL

I feel the need to commend Hegel on its website, which is an object lesson in what I think the website of a manufacturer of audio equipment should look like. Each product gets its own page on which there's an excellent, easy-to-read description of the product's capabilities, plus a complete set of specifications, links to reviews, links to explanations of the technologies used in the product, links to dealers, plus a link to a dedicated support page that then contains links to the Owner's Manual, IR and IP codes, firmware upgrades, drivers and helpful guides on UPnP, Tidal and more. There are no fancy sliders, overlays or dissolves, just a fast, informative, and easy-to-navigate site. For example, if you're connecting a computer to the Hegel H590 you won't need a driver if you're using Windows 10 or Mac OS... or even Linux, but if you're using an old version of Windows you will need a driver, and this can be downloaded from the support page.

And, as you'd expect from the professionalism of Hegel's website, the Owner's Manual provided with the amplifier (also available online) is also outstandingly good... very high-quality printing, well-written, well laid out, and with useful and informative illustrations — even, on page 9, a bit of light relief! The website and the manual certainly give you confidence in the product.

IN USE & LISTENING SESSIONS

Your first quest will be to find the main power switch. Luckily, it's a huge rectangular push-button and although it's underneath the amplifier, Hegel has located it midway across the amplifier and very close to the front panel, so it's really easy to find and operate. I say this specifically because some of the manufacturers that hide their power switches put them in really inconvenient locations.

Once you've powered up the Hegel H590, the display briefly flashes 'Hegel' before taking a few seconds to go through a 'self-check' routine that presumably makes sure you haven't accidentally made a misconnection. During this time, the output is muted. If the amplifier passes the self-check it defaults to Volume 20, and the source last used.

The volume and source selection rotary controls operate almost noiselessly, and rotate very smoothly, and both have a 'soft' feel that came as a very pleasant surprise.

Hegel has designed its muting circuit correctly, so that if it's muted, the amplifier will automatically unmute itself and restore



THE REAR PANEL OF THE HEGEL H590 IS NICELY LAID OUT, WITH HIGH-QUALITY CONNECTORS USED FOR ALL INPUTS AND OUTPUTS.

normal operation if either the front panel volume control is moved, or one or the other of volume controls on the remote control is pressed. This is an excellent safety feature, and prevents anyone from turning up the volume whilst the muting circuit is active. Hegel has also made sure that the amplifier stays muted when you're switching from one source to another, which is very useful, and very rarely implemented. Curiously, the 'unmute' action is not instantaneous, as I would have expected, but it's quick enough to be effective.

Speaking of switching from one source to another, I did find it a bit tedious stepping through inputs, because if you're playing back an analogue source via XLR1, for example, and want to listen to a digital source via the coaxial input, you need to press the remote IN+ button six times. But in my experience this is only a nuisance when I am reviewing equipment, in which case I am switching inputs far more often than I would normally. In real life, I tend to leave my amplifier switched to one source or another for very long periods of time.

The DAC inside the Hegel H590 is the AKM AK4490, which has selectable filters of which Hegel has implemented the minimum phase/fast roll-off implementation. Using the digital inputs is straight-forward — nothing required other than to input PCM up to 32-bit/384kHz, or DSD64/DSD128/DSD256 (via DoP). Using Spotify is equally simple: just connect the H590 to your network, open the Spotify app on your device (phone, tablet or laptop) using the same local network, choose 'Hegel H590' from 'Devices Available' and start listening. Using AirPlay is similarly straightforward — once the H590 is networked via the Ethernet socket on the rear, it will automatically receive an IP address, after which all AirPlay-compatible devices will show the H590 in their list of 'Speakers'. As already noted, the Hegel H590 supports up to MQA 8x (352.8kHz/384kHz) but only via its USB input.

Streaming music from a NAS drive, computer or the internet requires a little more effort because the H590 is a renderer and requires that you download and install one of the many free media servers that are available, such as MinimServer, Asset uPnP, Kinsky or Twonky. I won't go into too much detail about this because if you already know your way around media servers, I'd be telling you how to suck eggs, and if you don't, I'd recommend you get your hi-fi dealer to install and set up their preferred media server for you, after which it can become your preferred media server on whatever device you're using.

One advantage of having its heatsinks inside the chassis, rather than outside it, is that the Hegel H590 comes up to its optimum operating temperature very quickly, so there's no need to leave it switched on all the time; you can leave it in its standby mode whenever you're not using it... saving money, and extending product life.

The Hegel H590 demonstrated its ability to deliver enormous levels of power, and its ability to control even the largest-coned, lowest-impedance loudspeakers right from the outset, while I was playing Sara Bareilles's 'The Blessed Unrest' from a few years back. Listening to *Brave*, I turned the volume right up to glory in the drumming, the bass lines and Bareilles' sparse piano chords, and no matter how far I went, the Hegel H590 just responded instantly and accurately. The abrupt conclusion to the song made me realise how quiet the amplifier is, too; it went from ear-shatteringly loud to total and complete silence. It's eerily satisfying when I hear an amp do this... because not many can.

I admired the Hegel H590's tonal transparency first with Bareilles' voice on her song *Hercules*, where she demonstrates her vocal range, and the Hegel demonstrates that no matter where she is in it, it will reproduce it perfectly. I followed on in track order not least to play my favourite track on this album, *Manhattan*, which



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SPECIFICATIONS

HEGEL H590

Power output: 301 watts per channel into 8Ω

Frequency response: 5Hz–100kHz

Signal-to-noise ratio: >100dB

Channel separation: >100dB

THD: <0.01% (50W/8Ω/1kHz)

IMD: <0.01% (CCIF)

Damping factor: >4,000

Analogue inputs:

2 × balanced (XLR),

3 × unbalanced (RCA)

Digital inputs: 1 × BNC 75Ω

S/PDIF, 2 × coaxial S/PDIF,

3 × optical S/PDIF, 1 × USB,

1 × RJ45 Ethernet

Line-level output:

2 × unbalanced variable (RCA)

Digital outputs:

1 × BNC 75Ω S/PDIF

Dimensions (HWD):

171 × 430 × 445mm

Weight: 22kg

Price: \$15,995

Contact: Advance Audio

Australia on 02 9561 0799

or visit

www.advanceaudio.com.au

is a beautiful piano ballad on which Bareilles demonstrates her delicate touch on the keyboard, and the Hegel got to demonstrate that it can deliver piano sound as exactly as if you were listening to the instrument live, complete with growly notes in the lower octaves and gloriously tinkling ones in the higher octaves. The sustain pedal is left pressed down for long periods for much of this track, so the sounds become mixed, but I heard exactly what was going on thanks to the clarity of the Hegel H590's delivery. The sound effects of *Satellite Call* made my listening room sound like an echo chamber and highlighted the smoothness of the Hegel H590's delivery with a completely sustained soundfield.

The super-high synth sounds of *Cassiopeia* didn't faze the Hegel H590 at all, and it separated them from the real instruments with aplomb. Then I got to love how real the Hegel H590 made the sound of my second-favourite tune on this album, *1000 Times*. The sound of Rich Hinman's pedal steel is a standout on this one, as is that of the cello, and the purity of the Hegel H590's delivery is such that you can hear it's Colette Alexander's cello and not Cameron Stone's.

The Hegel H590's astounding transient ability is amply demonstrated on *Eden* with its blips, syncopated beats and stuttering rhythms. Bareilles' usually deft lyrics come up short on this track as she includes some lines that would be better left out... but it's all good, as they say. Her lyrics certainly come good again on the close-out *December*, where she kicks off with *'Afternoon has settled long and heavy on my shoulders/The winter's light feels different on my skin/It doesn't seem to strike as far below the surface so/I have to conclude that shadow won't let it in.'* A gloriously anthemic ending to a fantastic album.

I then extended my examination of the Hegel's power output and bass delivery with Telarc's 'Great Fantasy Adventure Album,' a collection of movie themes and sound effects that includes frequencies down to 10Hz (on *Terminator*) plus you get everything from T. rex footsteps to the interior of a submarine at depth (from *Hunt For Red October*). Listen to this album to be amazed at the dynamic capabilities of the Hegel H590, and even more amazed that this powerhouse amplifier obviously has more — far more — power waiting in reserve. It just delivers and delivers. Even when I tried my unrealistic test of connecting up multiple loudspeakers in parallel, to create an unrealistically low 'killer' load that usually has the protection circuits of most amplifiers cutting in immediately, the Hegel H590 didn't even miss a beat, sounding just as musical, just as rhythmic and delivering even more power to all of them. It was as if the Hegel were asking: 'Is

that all you've got? Give me more!' After hearing how the Hegel performed on my 'killer load' test, I was not at all surprised to learn that Paul Miller measured the dynamic power output of the Hegel H590 at an incredible 2.28 kilowatts (into 1Ω) when he bench-tested one for the UK magazine *Hi-Fi News*.

Of course I had to give the Hegel an enormous symphonic work to sink its teeth into, and it was my favourite version of Tchaikovsky's *Symphony No 4*, with the Leningrad Philharmonic Orchestra under the whip of Evgeny Mravinsky (DG 477 5911) that stepped up to the plate. I say 'whip' rather than baton, because the energy in the playing is palpable — listening to this version is truly exciting. Also exciting is the sound quality, which is superb, so it's doubly exciting to be able to experience a great performance with great sound. You'll know you're in for a true experience right at the start of the first movement, where after the horn and woodwind opening (and then the trumpets) you hear the large, slow syncopated chords and then, out of the blue, two short chords, each fortissimo and each followed by silence. The Hegel seemed born to be used to play this work, with its super-high power and super-low noise floor and its exceptionally low levels of distortion. The whole passage is reprised — even louder, and with added percussion — in the finale, and to even greater effect. Such was the energy of the sound that after the coda died away I felt the amplifier's heatsinks, but they were only warm to the touch, so the sinking is obviously more than adequate. (And if you've never heard Tchaikovsky's Fourth, and the finale sounds familiar when you do, it's because a very short excerpt of it is included in the opening to the track *Wish You Were Here*, from Pink Floyd's album of the same name.)

CONCLUSION

Hegel makes many claims for its H590, including that it's "a master at musicality" and that it's "the commander of any set of loudspeakers", as well as being this Norwegian manufacturer's "ultimate integrated amplifier". Ordinarily, I'd dismiss such claims as advertising puffery, except that in this case, the company is absolutely correct. The Hegel H590 is an immensely powerful, totally musical amplifier that will easily and gracefully drive any loudspeaker load. It's also outstandingly well-designed, beautifully built and packed with circuitry that will enable it to do pretty much everything you need a modern 21st-century hi-fi amplifier to do. The fact that its price reflects all these highly desirable attributes should not come as a surprise. ■