



Krell S-550i

INTEGRATED AMPLIFIER

Long ago I had my heart set on buying a high-power amplifier but could not decide between a Mark Levinson and a Threshold. But I was dreaming rather than saving, because I couldn't afford either. Then in 1980 along came the Krell KSA-100, a stereo Class-A amplifier that could deliver 1,600-watts into a single ohm. This power output level was unheard of at the time (and is still rare!). I heard a KSA-100 at an Australian Hi-Fi Show in Sydney, and wanted one, because it sounded fabulous. I wanted one so badly I started saving seriously, but another romance intervened, and the money was re-purposed by she who would in time become my better half.

Since then, Krell prices have easily kept pace with inflation and other costs, so few have been able to afford one. However, the introduction first of the Krell S-300i (a 150-watter), and now the Krell S-550i (rated at 275-watts per channel), have been game-changers for this US-based company, because

for the first time, Krell amplifiers have become affordable. The S-550i is still not exactly what you'd call 'inexpensive' but it's certainly within the reach of any audiophile who's being paid a smidgin more than the 'average' Australian wage.

THE EQUIPMENT

Krell has always eschewed 'pretty' chassis in favour of stark 'industrial' exteriors, to the extent that its early power amplifiers—such as the aforementioned KSA-100—were all sharp edges and unfinished aluminium. The S-550i isn't quite as industrial as the KSA-100, but it's also not exactly pretty... its looks fall somewhere between the two, so let's compromise on the expression that it looks 'business-like'.

Although the Krell comes with a remote control (and what a remote it is, about which more later!), everything you could sensibly expect to control on the amplifier is able to be controlled via the front

panel alone, which is eminently sensible. Pushbuttons let you switch between five different inputs, labelled S1, S2, S3, B1 and iPod. The 'S' (Source) buttons select the associated unbalanced RCA input terminals on the rear panel. The 'B' button selects a pair of balanced XLR input terminals on the rear panel and the iPod input selects a balanced stereo iPod input via a locking 30-pin connector on the rear panel. Krell provides an iPod dock to plug into this, so unlike many amplifiers, no 'extra' purchase is required. The dock will accommodate only older iDevices, and not any of the newer Apple devices with Lightning connectors. (And don't bother waiting for an S-550i with a Lightning connector: Krell says it currently has no plans to make such a dock.) When you select any input, your choice is displayed in the dot-matrix display panel at the right of the front panel.

To the right of the source selector buttons is a mute button that instantly mutes the

speaker outputs of the S-550i without affecting the volume control setting. This is a 'push to mute', 'push again to un-mute' button but it lacks any 'smarts' so if you turn the volume control up via the front panel control or the remote while the amplifier is muted, it will not automatically un-mute, which is a poor design choice. De-mute should happen automatically whenever a volume control is adjusted. (Specifically, adjusted upwards: If a volume control is turned down, muting could stay active, but 'dual-action' muting circuits such as this are difficult and expensive to implement.)

Below the Mute button is a 'Menu' button that allows access to the various menu features, the most significant of which is the balance control that allows you to adjust the left/right channel balance by 10dB (± 5 dB range for each channel) and an input trim, which allows you to adjust the input sensitivity of each input to compensate for different source components having different output levels (which they mostly do!), so that you won't get any variations in volume level when you're switching from one source component to another. You can also add your own labels for each input, so you could have 'CD' displayed when you select S1, and 'DV' when you select S2, and so on. Very nice. Initially I was a bit confused as to why Krell had bothered to include a dedicated 'Menu' button in the first place, since the manual said it could also be accessed by pressing the front-panel volume control, but it turned out that this was not the case: you need to use either the front panel Menu button or the one on the remote. I do think the front panel would have looked much 'cleaner' if Krell had omitted the Menu button, and let you push the front-panel control to access the Menu, but presumably Krell had its reasons for not doing this.

You also need to access the Menu in order to select the Krell S-550i's 'Theatre Throughput' mode, whereby you can use the S-550i to drive the front two channels of a multi-channel home theatre system, with other amplifiers driving the other channels. Other 'non-core' electronic functions fitted to this Krell include 12-volt triggers, RC-5 input and RS-232 connectivity.

As for that remote, it's a beauty! Whereas many other high-end manufacturers are trying to cut costs by providing only an el-cheapo plastic remote control, or providing their components without remotes, and charging you extra if you want one, Krell's remote is a beautifully made, solid metal unit with high-quality pushbuttons. It looks great (all black), feels wonderful when you're using it, and works perfectly. In short, it's superb. The remote's only failing is that when you

open the case to insert the two AA batteries supplied by Krell (good quality brand name Alkaline ones, too!) there is no indication in the battery compartment of which way around the batteries should go. For the record, you should orient each battery so its negative terminal is the one that comes in contact with the spring.

The rear panel has all the inputs I have mentioned so far, but also sports a pre-amplifier output. I was also rather surprised to find two speaker output fuses accessible via the front panel. It's not surprising that the Krell has fuses to help protect your speakers (and the amplifier itself), but it is surprising that they're accessible via old-fashioned 'retro' fuse holders on the rear panel. Most manufacturers include such fuses, but they fit them inside the amplifier, where they're only able to be changed by an authorised service centre. I didn't blow either of the fuses during my sessions, but if I had I would have found the Instruction Manual pretty light-on with replacement instructions. In any event, use only correctly rated 'fast-blow' fuses (i.e. not 'slow-blow'), and always turn off the amplifier before starting the replacement process. The other unusual fitting on the rear panel is a 'circuit-breaker' style mains power switch. I initially presumably this was linked to some form of electronic protection (over current, d.c. etc) inside the S-550i, but when I asked, Krell's Peter Mackay advised that other than the two rear-panel fuses, the only other protection inside the amplifier is thermal.

The S-550i might be an integrated amplifier, but the specifications look more like they come from one of Krell's high-end power amplifiers, with a power output rating of 275-watts per channel into 8 Ω and 550-watts per channel into 4 Ω , a frequency response of 2Hz to 140kHz (-3 dB) and a signal-to-noise ratio of 96dB A-weighted.

If you were to open the amplifier (don't do this at home: you'll void the warranty!), you wouldn't see any signs of cost-cutting in either the circuitry or the components that are used inside the S-550i. All circuitry is direct-coupled (no capacitors in the signal path) and the volume control isn't the usual rotary variable resistor, but simply an encoder for a balanced ladder-resistor network. Surface-mount devices are used extensively, and Krell is using proprietary current mirrors that have far higher open-loop linearity than most other designs. The power supply is fed by an enormous 1,750-watt toroidal transformer that feeds a capacitor bank with a total rating of 68,000 μ F, which between the bank and the transformer are what contribute most to the amplifier's incredible weight (the S-550i tips the scales at a substantial 29kg).

The chassis itself certainly doesn't add much weight. Unlike many high-end amplifiers, whose massive cast chassis are what gives them much of their mass, the casing of the S-550i is constructed from a fairly light-weight alloy. The amplifier measures 438 \times 148 \times 450mm (WHD).

If you're familiar with Krell and its history, you might be wondering how this US company, famous because of its founder, Dan D'Agostino*, as well as for building its amplifiers entirely in the USA, has managed to build the S-550i so economically. The answer is that unlike Krell's higher-end amplifiers, the S-550i is built for Krell in China, something that's clearly and honestly stated on the rear panel. After having examined the S-550i very carefully, both inside and out, I'm here to tell you that

KRELL S-550i INTEGRATED AMPLIFIER

Brand: Krell

Model: S-550i

Category: Integrated Amplifier

RRP: \$7,995

Warranty: Five Years

Distributor: Audio Marketing Pty Ltd

Address: Unit 14L, 175

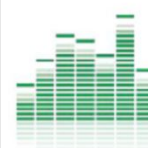
Lower Gibbes Street

Chatswood NSW 2067

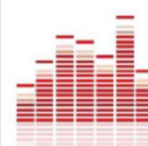
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- Tremendously powerful
- Incredible sound
- Superb remote



- Cosmetic finish
- Muting logic

LAB REPORT

Readers interested in a full technical appraisal of the performance of the Krell S-550i Integrated Amplifier should continue on and read the LABORATORY REPORT published on page 24. Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.



Lab Report on page 24

it's every bit as high quality as the Krell amplifiers that are made in the US, so if Krell hadn't put a 'Made in China' label on the rear panel, no-one would ever have been any the wiser.

IN USE AND LISTENING SESSIONS

The first thing to be aware of before installing the Krell is that its 240V power plug is so large that you won't be able to plug anything in alongside it if you're using a standard double power point or a power distribution board of any kind. The reason is that the three wires in Krell's power cable are so hugely thick that they won't fit into a standard 15-amp 240V plug. I suspect it's also a physical reminder of something Krell points out in its Set-Up Guide, where it says: *'Because of its powerful amplifier channels and high-capacity power supply, the S-550i will benefit from a dedicated a.c. circuit. Avoid connections through extension cords or multiple a.c. adapters. Use only the power cord provided with the S-550i to make the connection to AC power. Operation with a power cord other than the one supplied by Krell can induce noise, limit current, or otherwise impair the ability of the integrated amplifier to perform optimally.'*

The second thing of which you'll already be aware is that the Krell is a high-power amplifier and it uses a Class-AB output stage strongly biased towards Class-A, so unless it's properly ventilated, it may become 'overly warm'. My advice is to again follow the advice in Krell's Set-Up Guide which specifies that the S-550i: *'requires at least 2.54cm of clearance on each side and at least 5cm of clearance above to provide adequate ventilation. Installations inside cabinetry may need extra ventilation.'* Although low-powered integrated

amplifiers don't often require you to be too particular about ventilation, amplifiers rated at 550-watts per channel demand that you do follow the ventilation guidelines.

For some reason, I didn't get the detailed instruction manual that's supposed to come with each amplifier, only the Set-Up Guide, and I couldn't find an electronic one on the company's website either... though I did find one for the S-300i. However, it's a measure of how intuitive it is to program the Krell S-500i that I was able to do everything any typical user might want to do: adjust balance, input trim, label the inputs etc, without recourse to a manual. I was a little annoyed that you aren't actually able to name each input, as I'd initially imagined when I heard you could program the inputs. Instead you only get to choose from a pre-programmed list of names Krell has stored in the S-500i's memory... though if you can't find one you want from the 78 that are in the amplifier's memory, I'd be surprised. (Note to Krell's design department: many audiophiles with high-end components like to label their inputs so that, for example, when they select the 'Phono 1' input, the front panel display on the amplifier shows 'Linn' or 'LP12' or the name of whatever other turntable they may own. In other words, it would be nice if S-550i owners were able to program their own alpha-numeric, rather than just pick the most appropriate one from a list... even if it is a long list.) The other thing I'd like Krell to eliminate is the turn-on thump. It's not particularly aggressive, but it's certainly noticeable.

If I were to use one word to describe the sound of the Krell, that word would certainly be 'effortless', (though I did spend some time agonising whether that word would be effortless or transparent), because no matter what type of music you're listening to, or how loudly or softly you're playing it—and certainly irrespective of the speakers you're using!—the Krell S-550i never seemed to be doing any work at all. When I asked, it delivered. No fuss, no bother. It really was as if the amplifier were not in the chain of components at all (which is why I was sorely tempted to use the word transparent to describe it). This ability is certainly the mark of a superior amplifier: one where you can't really tell it's there at all, except that you know it must be, otherwise your speakers would not be producing such glorious sound.

Needless to say (though here I am saying it), you won't ever need more amplifier power than is available from the Krell S-550i... I didn't even begin to approach the maximum levels of which it's capable before I had a neighbour knocking on the door to tell me to turn it down... and then coming around the back to wave at the window, because I

didn't hear him knocking at the door. Another neighbour phoned... and I didn't hear that either. And when you're not using the Krell's maximum power (that is, you're only playing back your music at ordinary to low levels), the S-550i is as sweet-sounding as a Class-A tube amp, with no harshness, no 'rough' edges, and with a perfectly silent background, so that notes decay into the silence of your own room, and not into the noise floor of the circuitry.


But even if you are playing at low levels, you'll 'hear' the power of the Krell because of the incredible dynamics enabled by the power capability. For example, the sound of a kick drum, whose initial transient can be squashed by lower-powered amplifiers (those whose power output tops out at two figures), is delivered perfectly by the S-550i. There's no impression of 'loudness' *per se*, because the transient is so short in duration: what you *perceive*... rather than *hear*... is sonic realism. It's as if you're hearing a kick drum in your room, and not some recorded facsimile of a kick drum.

Funnily enough, this manifests as a type of 'softness' to the bass, but I think this is because so many amps go into clipping in this situation, which creates a 'hard' sound so if you're used to listening to recorded music, rather than live, and you have an amplifier with a fairly low power output, you might have become used to the 'hard' bass (caused by your amplifier clipping) and not realised that the 'soft' bass sound is actually more realistic.

The same is true of the midrange sound of the Krell: but here it's not that the amplifier has a 'sound'—it doesn't. It's just that the music and vocals are delivered so true-to-life that your brain is not having to build any sonic constructs... you're hearing the music effortlessly, which means you can relax, which in turn means greatly improved enjoyment of what you're listening to.

In addition to enjoying what you're hearing more, you can also appreciate it more keenly, because the Krell is so accurate that you're not missing out on anything. Even the most microscopic details of micro-dynamics are delivered precisely: you'll hear every inflection in a vocal, every nuance in a melody line. In short, amazing detail.

CONCLUSION

Your time has come. If you've always lusted after a Krell, now is the time to consummate your desires. It may not be the prettiest amplifier in town, but it's certainly one of the most powerful. Its lineage and ancestry are impeccable and it will entertain your aural senses like no other amplifier. And best of all, the parents aren't asking for much of a dowry!  **Lesley Swan**

Krell

Although Dan D'Agostino founded Krell in 1980, and acted as its chief designer for many years, he no longer works for Krell, although he reportedly still has a minority shareholding in the company. He reputedly named the company after an extinct race of advanced beings that lived on the planet Altair IV, as shown in the classic 1956 science fiction film *Forbidden Planet*. He did so because the first Krell amplifier, the KSA-100, was dubbed 'the first high power, high-current, true Class-A biased stereo power amplifier available to audiophiles' and, in the movie, the Krell had reached a stage of technological and scientific development so advanced that they were able to construct a machine that delivered 'virtually unlimited' power.

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LABORATORY TEST RESULTS

Power output has always been a strong point of Krell amplifiers, and you can see from the results of *Newport Test Labs'* testing, as shown in the table that accompanies this review, that the S-550i maintains that tradition. When driving 8Ω loads, the S-550i delivered 315-watts per channel, both channels driven, at all three test frequencies: 20Hz, 1kHz and 20kHz. This is not only higher than specification, it's also excellent performance. When driving 4Ω loads, and with both channels driven, *Newport Test Labs* measured the S-550i as delivering 524-watts at 20Hz and 20kHz, and 529-watts at 1kHz. This meant that into 4Ω loads, the S-550i's output was a little lower than Krell's specification of 550-watts, but the difference is minuscule (0.1dB). The performance into 2Ω loads speaks for itself: 800-watts per channel, at all frequencies across the audio band. This is more than sufficient to power even the most inefficient loudspeakers, even those with very low impedances. When a single-channel is driven into a 4Ω load, the Krell S-550i will deliver almost 1-kilowatt of power!

The Krell S-550i's wideband frequency response was very flat and extraordinarily extended, being just 1dB down at 4Hz and 86kHz. The 3dB down-points were measured at 2.5Hz and 151kHz. Frequency response across the audio band is shown in

Graph 5, where the black trace shows the response into a standard laboratory-grade non-inductive 8Ω load, which is exactly at reference level at 20Hz then rises to around +0.08dB at 100Hz, before falling to +0.01dB at 1kHz, to reference again at 8kHz, then rolling off above 10kHz to be about -0.05dB at 20kHz. Overall, normalised, this puts the measured frequency response at 20Hz to 20kHz ±0.06dB. The red trace on this graph plots the S-550i's frequency response

■ When a single-channel is driven into a 4Ω load, the Krell S-550i will deliver almost 1-kilowatt of power!

when driving a reactive load that simulates the impedance of a two-way bookshelf loudspeaker. This is a little more irregular than the response into a resistor, but overall the response is 20Hz to 20kHz ±0.09dB. This is excellent performance. Channel separation was not quite so excellent, but still far more than required to deliver pin-point imaging and proper stereo staging, so the figures are somewhat academic, particularly since the



Krell S-550i Integrated Amplifier - Power Output Tests

| Channel | Load (Ω) | 20Hz (watts) | 20Hz (dBW) | 1kHz (watts) | 1kHz (dBW) | 20kHz (watts) | 20kHz (dBW) |
|---------|----------|--------------|------------|--------------|------------|---------------|-------------|
| 1 | 8 Ω | 320 | 25.0 | 320 | 25.0 | 317 | 25.0 |
| 2 | 8 Ω | 315 | 24.9 | 315 | 24.9 | 315 | 24.7 |
| 1 | 4 Ω | 564 | 27.5 | 566 | 27.5 | 564 | 27.5 |
| 2 | 4 Ω | 524 | 27.1 | 529 | 27.2 | 524 | 27.1 |
| 1 | 2 Ω | 924 | 29.6 | 924 | 29.6 | 924 | 29.6 |
| 2 | 2 Ω | 800 | 29.0 | 800 | 29.0 | 800 | 29.0 |

Note: Figures in the dBW column represent output level in decibels referred to one watt output.

Krell S-550i Integrated Amplifier - Laboratory Test Results

| Test | Measured Result | Units/Comment |
|---------------------------------------|--------------------|-----------------------------------|
| Frequency Response @ 1 watt o/p | 4Hz - 86kHz | -1dB |
| Frequency Response @ 1 watt o/p | 2.5Hz - 151kHz | -3dB |
| Channel Separation (dB) | 88dB / 80dB / 65dB | (20Hz/1kHz/20kHz) |
| Channel Balance | 0.049 | dB @ 1kHz |
| Interchannel Phase | 0.06 / 0.08 / 0.98 | degrees (20Hz / 1kHz / 20kHz) |
| THD+N | 0.049% / 0.005% | @ 1-watt / @ rated output |
| Signal-to-Noise (unweighted/weighted) | 64dB / 73dB | dB referred to 1-watt output |
| Signal-to-Noise (unweighted/weighted) | 87dB / 96dB | dB referred to rated output |
| Input Sensitivity (S3 Input) | 76mV / 1.2V | (1-watt / rated output) |
| Output Impedance | 0.07Ω | |
| Damping Factor | 114 | @1kHz |
| Power Consumption | 1.6 / 92 | watts (Standby / On) |
| Power Consumption | 136 / 990 | watts at 1-watt / at rated output |
| Mains Voltage Variation during Test | 243 - 249 | Minimum - Maximum |

'worst' result is 65dB at 20kHz. Channel balance was superb, at 0.049dB.

Distortion at an output of one-watt into 8Ω and 4Ω loads was low, but not as low as I sometimes see for solid-state amplifiers, and the distortion components were almost entirely odd-harmonic, so that into 8Ω, there was a 3rd harmonic at -70dB (0.0316% THD), a fifth at -83dB (0.0070% THD), a seventh at -92dB (0.0025% THD), and a ninth at -105dB (0.0005% THD). Driving 4Ω loads, the levels of all the odd harmonics rose slightly, and there's also a second-order component at -97dB (0.0014% THD) and an eleventh at 106dB (0.0005% THD). Although these levels are higher than I might have expected, the overall THD+N figure measured by *Newport Test Labs* was just 0.049%, as you can see in the tabulated test results, which is so low that it would be completely inaudible to the human ear.

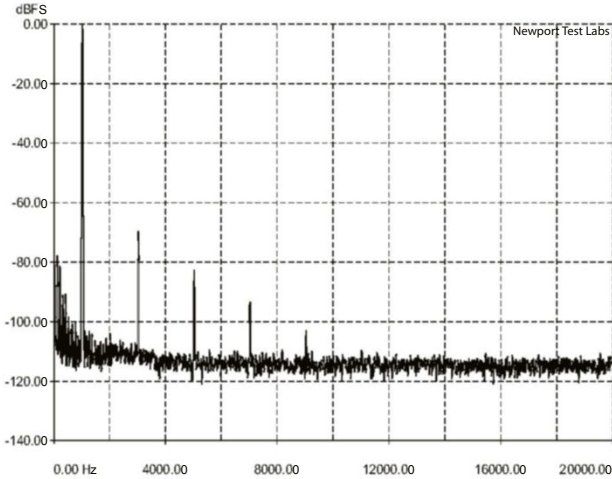
At rated output, either into 8Ω loads (275-watts) or 4Ω (550-watts) the distortion spectrum becomes more as I'd have expected, with both even-order and odd-order harmonic distortion components. Interestingly, distortion actually drops at

these higher output levels, with a second, third and fifth harmonics all at around -85-90dB (0.0056-0.0031% THD) down, and all the higher-order harmonics 100dB (0.0010% THD) or more down when driving 8Ω loads. Despite the presence of even-

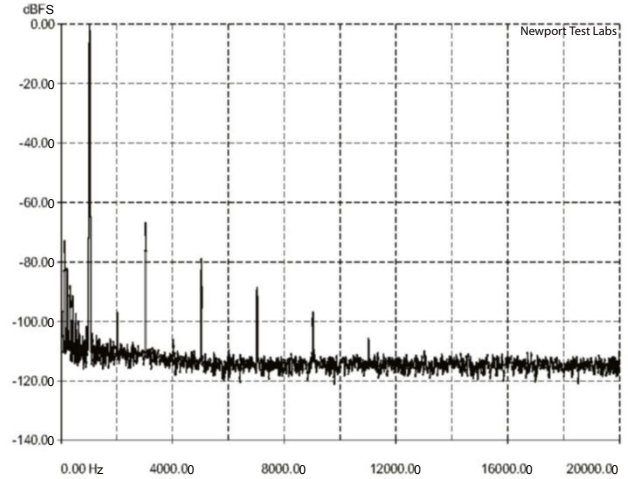
order harmonics, odd-order components still dominate the output spectrum. The 4Ω result is very similar to the 8Ω result, though the 'grass' visible down on the noise floor at the extreme left of the graph indicates that the power supply is working hard to deliver

550-watts into 4Ω loads. Again, overall THD+N percentages were very low, as you can see from the tabulated figures. *Newport Test Labs* measured 0.005% THD+N, far better than Krell's own specification.

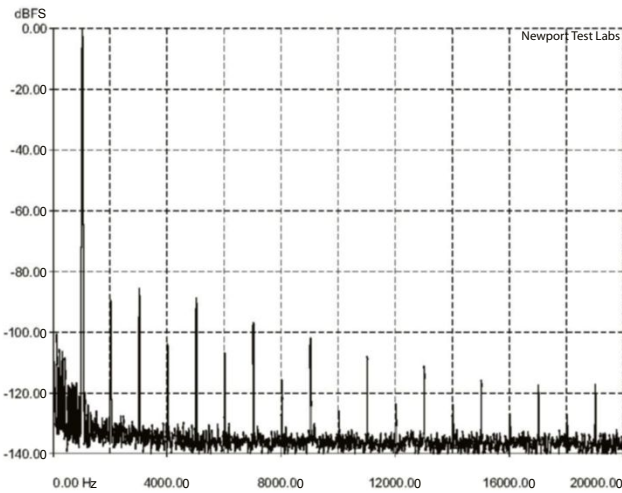
Intermodulation distortion (CCIF-IMD) is



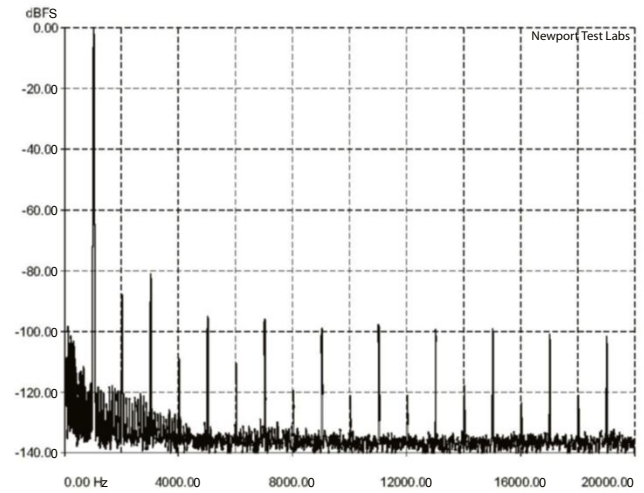
Graph 1: Total harmonic distortion (THD) at 1kHz at an output of 1-watt into an 8-ohm non-inductive load, referenced to 0dB. [Krell S-550i]



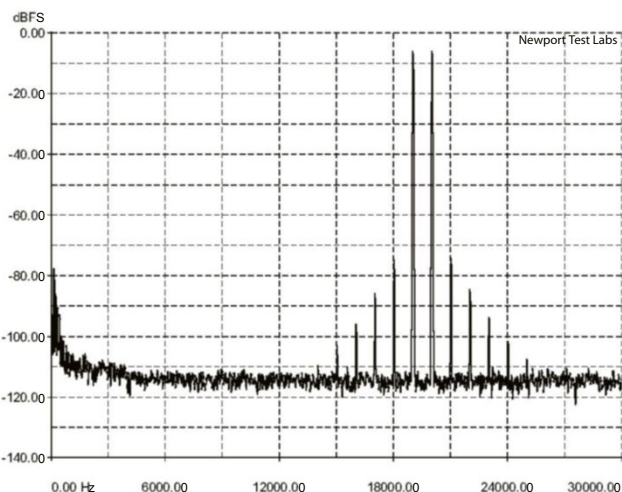
Graph 2: Total harmonic distortion (THD) at 1kHz at an output of 1-watt into a 4-ohm non-inductive load, referenced to 0dB. [Krell S-550i]



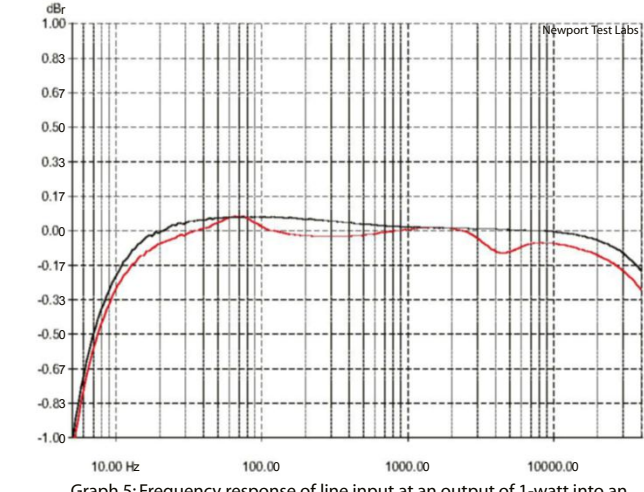
Graph 3: Total harmonic distortion (THD) at 1kHz at an output of 275-watts into an 8-ohm non-inductive load, referenced to 0dB. [Krell]



Graph 4: Total harmonic distortion (THD) at 1kHz at an output of 550-watts into a 4-ohm non-inductive load, referenced to 0dB. [S-550i]



Graph 5: Intermodulation distortion (CCIF-IMD) using test signals at 19kHz and 20kHz, at an output of 1-watt into an 8-ohm non-inductive load, referenced to 0dB. [Krell S-550i Integrated Amplifier]

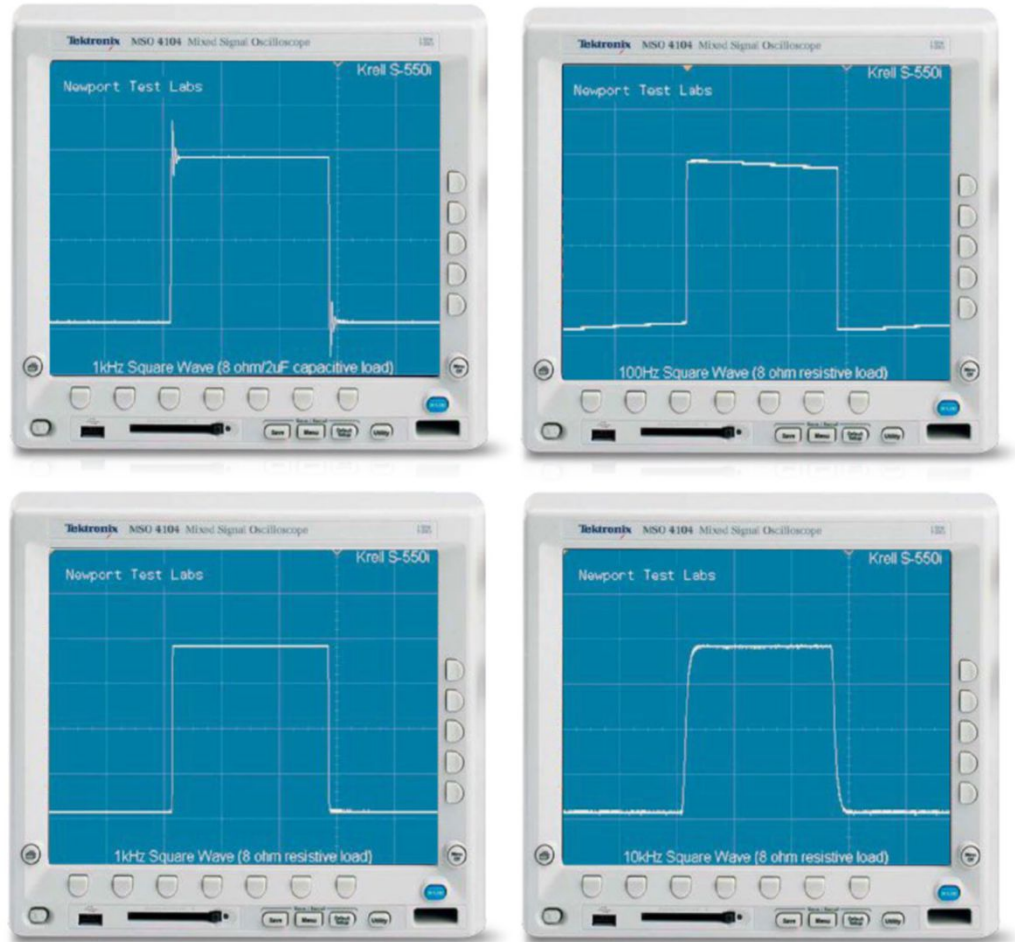


Graph 5: Frequency response of line input at an output of 1-watt into an 8-ohm non-inductive load (black trace) and into a combination resistive/inductive/capacitive load representative of a typical two-way loudspeaker system (red trace). [Krell S-550i Integrated Amplifier]

shown in Graph 5. In an excellent result for the S-550i, there is no regenerated signal visible at 1kHz. The 19kHz and 20kHz test signals do, however, generate some unwanted sidebands, but the first set of these (at 18kHz and 21kHz) are at -75dB (0.0177% THD), the second set at -85dB (0.0056% THD), and the third set at -105dB (0.0005% THD).

Signal-to-noise ratios were measured at 64dB unweighted and 73dB 'A'-weighted referred to an output of one watt, and 87dB unweighted and 96dB 'A'-weighted referred to rated output, this last matching-up well with Krell's own specification of 96dB A-weighted. However, this 96dB result must be viewed in the light of the Krell's extremely high power output, which 'improves' the figure by about 5dB compared to, say, a 100-watt amplifier with the same inherent circuit noise.


Square wave performance was excellent, as you can see from the four oscillograms. The 1kHz and 10kHz results are particularly good, with the 1kHz waveform looking like it came straight from Newport Test Labs' square wave oscillator. The 10kHz wave shows excellent symmetry and almost no rounding on the leading edge, confirming visually the Krell S-550i's extended high-frequency response. The 100Hz shows a little tilt, visual confirmation of the -3dB down-point at 2.5Hz and showing that response stops shy of d.c., but there's no tilt, so there is no l.f. phase shift. (There's very little inter-channel phase shift either, as evidenced by the tabulated results.) The last of the four square waves shows that the Krell will be



unconditionally stable even into highly reactive loads, such as those presented by electrostatic speakers. The Krell will also be able to control unwanted cone movement of any loudspeaker, as evidenced by the high damping factor (114 at 1kHz).

Power consumption in standby mode didn't quite meet the Australian standard for standby power, which is 0.5-watts, but at 1.6-watts, it's fairly low. But when it's operating the Krell S-550i is a little

more power-hungry than most amplifiers, requiring 92-watts whenever it's switched on but not in standby mode, around 136-watts when it's playing music at ordinary levels, and 990-watts when it's performing at its maximum capability.

The Krell performed well in all Newport Test Labs' tests, meeting or exceeding its manufacturers' specifications for it in all areas. It's a very powerful and very well-designed amplifier.  Steve Holding

