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**EXCLUSIVE!**

## AMP CHAMPS

Are Krell's Evolution amplifiers the best known to mankind?

**FIRST TEST INSIDE**

**THE TOP 10!**  
Ken Kessler picks the best new hi-fi



**£40k READER SYSTEM**  
Huge Westminster Royals dominate



**CLASSIC KIT**  
Apogee's super Scintillas



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# Straight to Krell

Has Krell built the best ever amp system known to man with its Evolution Series? In a *Hi-Fi News* EXCLUSIVE Martin Colloms tests out the Evolution One pre-amp and Evolution Two power amplifiers

**T**hese days, high-end products not only have to sound good, they have to look the part as well. Plain alloy boxes just aren't good enough, now the equivalent of audio jewellery is required. In appearance the new Evolution Series is simply dazzling. It's hard to imagine a more eye-catching stack of audio components than this – and I do mean 'a stack'.

## EIGHT UNITS

Each channel of the power amp comes in two parts; the amplifier proper and the matching power supply. The pre-amplifier is monaural, a single-channel build, and also arrives in two sections, power supply and actual pre-amp. This means a total of eight units are required for a stereo pre-power! The Evolution One and Two boxes form a complementary pair but they can also be used independently. For this review they were evaluated in both situations.

Quoting the old line 'if you need to ask the price, you can't afford it', the price of the Evolution One and Evolution Two is roughly equivalent to buying

a Porsche 911 Turbo, the exact cost depending on territory and exchange rates – a retail price of \$90,000 in the US for the eight-box stereo system.

The fascias are fabricated in 'diamond cut silver' with a mirror finish and with near-invisible labelling, presumably so as not to dilute the considerable visual impact. Blue LED back-lighting, flood lighting, interior lighting and pin lighting form a somewhat blue theme. The power amplifiers are also floodlit in blue, distinguished by largely decorative, illuminated 'power meters'. When the complete system is powered up the effect is quite special. ▶

## DETAILS

	Krell Evolution One & Two amps
	€48,000 (pair) €38,450 (pair)
	<a href="http://www.krellonline.com">www.krellonline.com</a>
	020 8971 3909
	Sonic and bling statement
	High price, bright sound

## TECHNOLOGY

## EVOLUTION ONE



This mono plateau bias Class A power amplifier is two units. The amplifier mounts directly onto the matching power supply, using locating spurs. Power connection between the two is via a concealed, heavy-duty multi-way gold plated connector block. The back of the power unit is a circuit-breaker master switch, and if required, there is a soft start power switch on the front underside of the power amp. Normally this command is handled by the included system of 12V control cables which link all the units and which manage start/standby control via one of the pre-amplifiers.

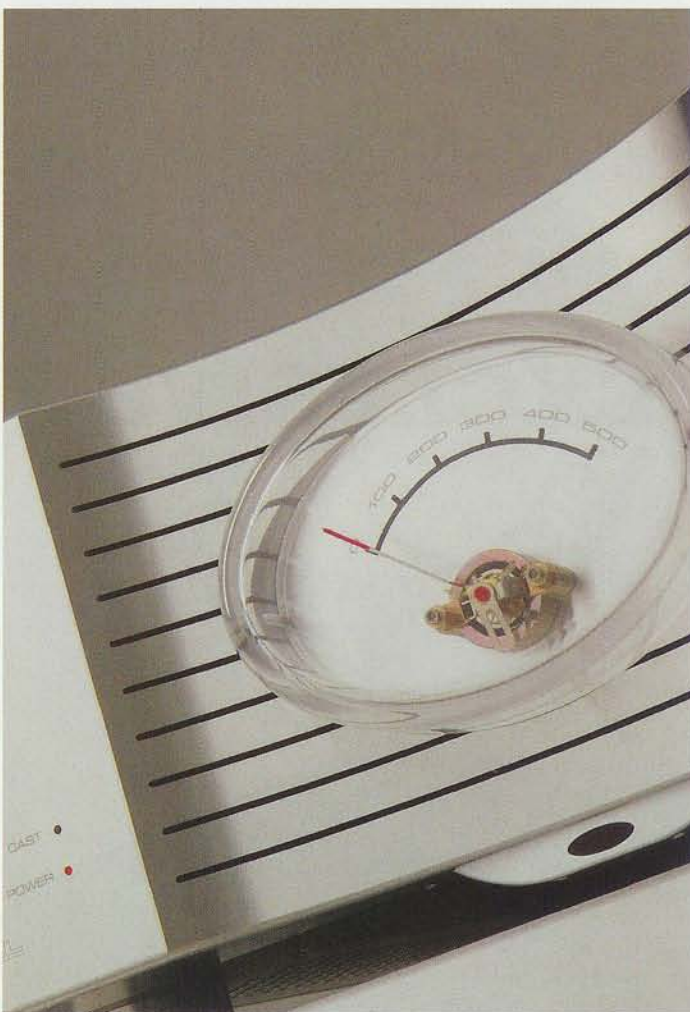
Krell has long backed gain topologies using current-mode amplifiers, with its promise of respectably low distortion maintained over a very wide frequency range. This feature is intended to guarantee near-perfect performance in the audible range, especially by avoiding an in-band gain/frequency transition, which could add coloration. The signal path is fully balanced and complementary, perfectly mirrored from input to output, all stages operated in generous current level of Class A mode, plus advanced plateau biasing at higher powers. Operating with zero global negative feedback to secure a stable inherent sound, only 8dB of local feedback is used to secure the desired matching characteristic for the output stage. A key aspect inherited from the FPB series is the fully regulated power supply. The driver stages are double regulated, while the mains input is pre-filtered and corrected for mains distortion and for DC offset. This controls sound quality variation with different mains sources, reduces power transformer vibration and distortion, and allows it to meet the new regulations despite a powerful rating of 450W output into 8 ohm, and up to 1800W for 2 ohm loads. There are two 2.1kVA toroidal transformers per channel, 120,000µF of reservoir and 56 x 20A connector contacts to transmit the power through rails up to the power amp stacked above. Advanced microprocessors monitor and arrange start up, pre-bias, third gen plateau bias, temperature, over-current, as well as excess DC at the input or output. Loudspeaker connection is via massive binding posts for spade termination, gold-plated or with a wing-nut option. Inputs are CAST (via LEMO connectors), balanced XLR, and SE (through XLR connectors), the latter via an appropriate cable termination or an adapter.

Krell introduced its first distinctive Class A power amplifier, the KSA-50, some 20 years ago and has continued to produce landmark products since. The legendary KSA-200 was followed by a steady stream of models – the FPB600, for example, has evolved through several stages to become the FPB700cx, remaining impressive in its second decade. We have seen Krell power

amp technologies mature as this model has developed and improved. Founded on a fully balanced design, which includes the output stage, it makes use of a proprietary plateau-bias method to achieve quasi-stable Class A operative during, and somewhat after, musical transients which require such a level of linear output current.

Further work has since been done on refining the precision of

## DETAILS – EVOLUTION ONE



Evolution One power amplifier: old-school swing-arm power meters add to that 'audiophile jewellery' statement

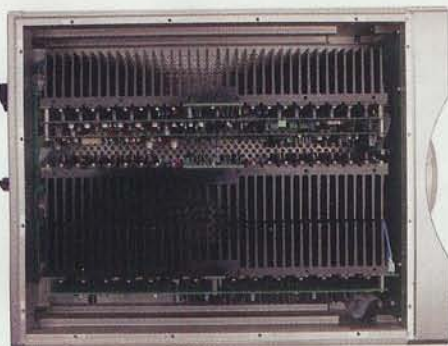
## The price of the Evolution One and Two is roughly equivalent to buying a Porsche 911 Turbo... if you need to ask the price, you can't afford it

the plateau method, to minimise any residual audible artefacts. Other technical features included an essentially open-loop, zero-feedback output stage, and very wide band gain circuits founded on current amplification practice.

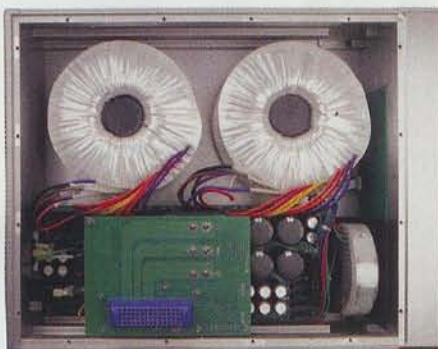
From the model '600 onwards, these reference amplifiers were found to be capable of almost 1000W per channel, yet such power was delivered from a single – if weighty – stereo chassis. Speaker loads down to a really demanding 2 ohm were accepted without complaint

and with remarkably little change in sound quality. Fine sound quality, comprehensive fault protection, reliability and imperturbability are the key features which describe this justly popular design, qualities largely shared by the other FPB models in the series.

About mid-way through the evolution of this series the 'CAST' current loop signal connection was introduced. This topology allows for the use of interconnect cables of moderate price to perform to a high standard, even with potentially prejudicial long lengths. 'CAST'



Massive heatsinking required for class A power amp



Power supply for Evolution One power amp



Power amp and PSU can only connect by stacking

is indicated by the 'c' suffix. Mindful of increasingly arduous EU regulations regarding the quality of current drawn from the mains supply, the new Evolution amplifiers aim to fill the 2005 reference slot, and beyond, while meeting the new regulations.

#### LISTENING SESSIONS

The first musical notes were all that it took to realise that this was no mere exercise in separating potential buyers from their money. The Evolution One supplies high power, low noise, low distortion and a wide bandwidth – but that's just the beginning. It has a great spec – most Krells do – but this is an expression of a new approach to design where sound quality drives the game, and high technology simply exists to

serve the object. The Krell team, guided by founder-designer Dan D'Agostino, pooled its creative knowledge for yet another 'blue sky' project. And they are not always immediately successful – I've been told the Evolutions were a long time in the making.

The combination of extreme delicacy and refinement with an iron grip on dynamics and musical pulse, is a seductive combination. The design's eye-popping transparency is exemplified by a special level of clarity and resolution.

So great has been the leap in sound quality compared with some established reference components, that I am certain my own system may not have shown the full measure of these Evolution components.

Some amplifiers sound a little cool and lean, others

## TECHNOLOGY

### EVOLUTION TWO



Again, Krell's current design feature of wideband current mode bi-polar circuitry is employed, in a fully-balanced and complementary configuration. Many active devices are used, in highly linear circuits, supported by very low noise supplies using extensive double regulators. Like the matching power amp the mains input section has circuitry that corrects for noise and DC offset, improving supply transformer performance and reducing variations in sound quality with supply. Operating on Class A throughout (constant full operating power for stable performance and dynamic stability) it runs quite warm, a pair of operating channels consuming some 160W. Add in the 600W for the power amplifiers and you have a total of 760W. For summer use, quiet air conditioning might well be a valued accessory for this system!

The high resolution 'electronic' volume control is founded on a 16-bit ladder using discrete resistors commuted by selected low resistance IC chip switches of good dynamic range. Top quality gold-plated relays select the inputs and modes, double-switched where required to maintain low cross-talk levels between sources.

The finish and construction quality are first rate though I would like to see some protective rubber feet for the weighty remote hand set, the latter milled from solid metal with a pleasing heft.

mildly hard, brittle or glaring, or alternatively the sound may be too rich and full. The Krell combination was never dull, but was correctly full in the bass, strong and well proportioned in the lower mid and explicit and precise in the upper mid and treble.

Some amps can only produce a dulled or darkened sound stage illusion – you have to aurally 'peer into the image' – but the Krell soundstage appears brightly illuminated, with full sunlight brilliance and colour temperature. For example, the treble is extreme in its micro resolution, its explicit transient detail, the exposition of the nuances of timbre, image specificity, harmonic shading, and transient definition.

So, be warned – it would be a mistake to combine them with bright speakers, bright cables and a bright room. In the past, such

## WE LISTENED TO



**CDs**  
**Tori Amos Little Earthquakes**  
(WEA 7567-82358-2)



**Jan Garbarek In Praise of Dreams**  
(ECM 1880)



**Joni Mitchell Blue**  
(Warner 7599-27199-2, non-HDCD edition)



**Mahler Symphony No 2 Slatkin, St Louis Symphony Orchestra**  
(Telarc CD 80081)

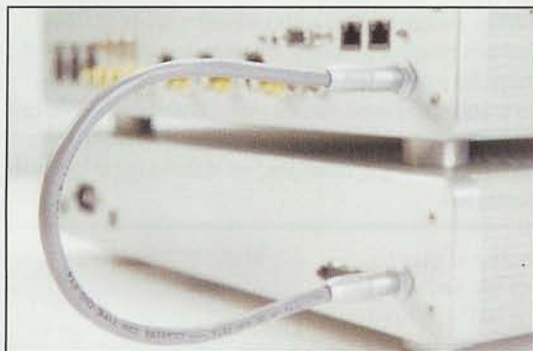
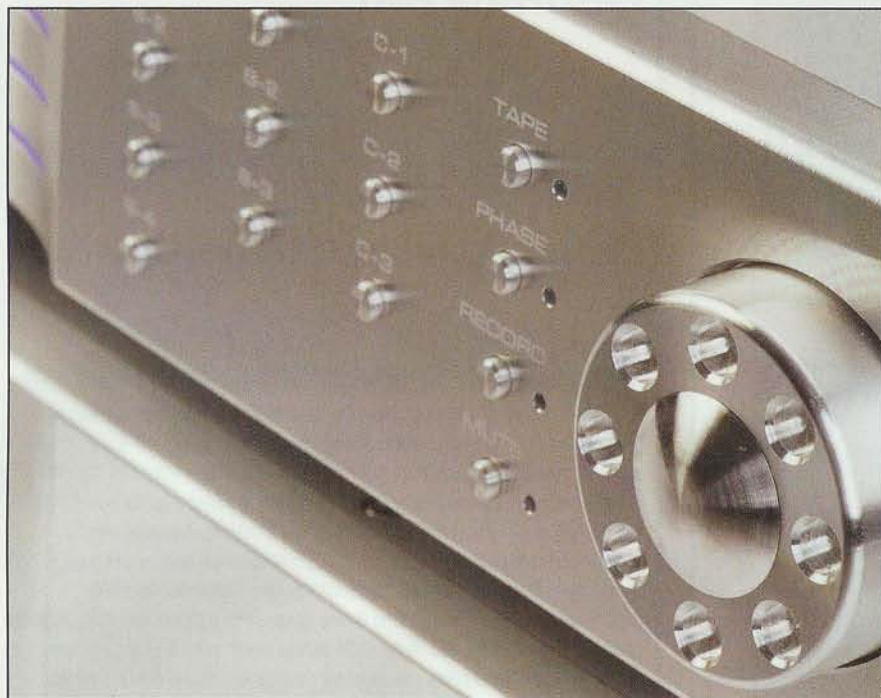


**LPs**  
**Rickie Lee Jones,**  
Warner K56628

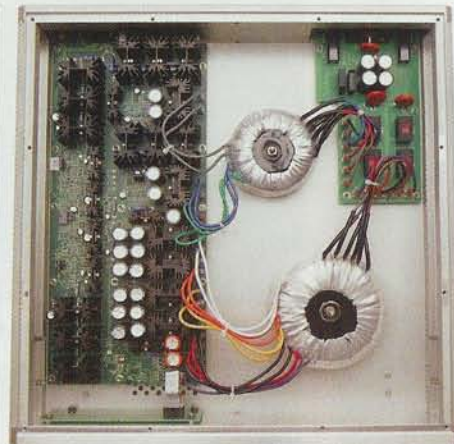


**Beethoven Triple Concerto: David Oistrakh, Mstislav Rostropovich, Sviatoslav Richter, Herbert von Karajan, The Berlin Philharmonic,**  
ASD 2582.

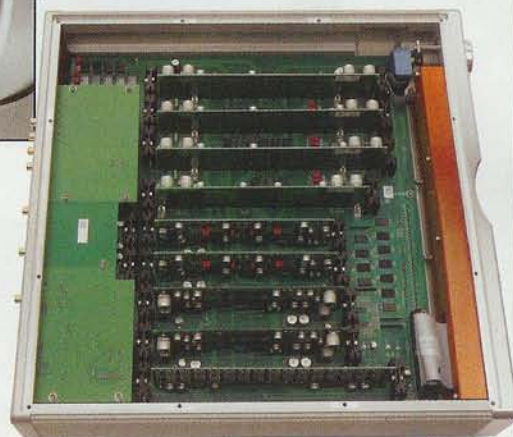
DETAILS - EVOLUTION TWO



Above: Evolution Two inputs labelled only as S1-4, B1-3 and C1-3 on the panel (single-ended/balanced/CAST), but can be assigned pre-set names for the fluorescent display like 8TRK, DCC, GAME and HI-8; [left] unlike power amp, power connection from PSU to pre-amp is by cable



Evolution Two pre-amp's power supply [above], with a sea of heatsinked regulators



Evolution Two pre-amp: all inputs with JFET input buffer

SPECS & REFERENCES

EVOLUTION ONE

Size: power supply plus amplifier  
[one channel] 400 x 316 x 547mm (whd)  
Weight: 150lbs  
Idle power consumption:  
800W per channel  
Output power: 450W/8 ohm, 900W/4

ohm, 1800W/2 ohm  
Output current: 57A peak  
Input sensitivity: 1.5V SE, 3.0V BAL  
Noise [ref full power]: -118dBA  
Frequency response: 0.6Hz to 220kHz,  
+0/-3dB.

EVOLUTION TWO

Line inputs: CAST, XLR-BAL, SE-RCA;  
line outputs: XLR-BAL, SE-RCA  
Number of inputs: 3 CAST, 3 Bal, 4 SE,  
1 Tape in/out (BAL & SE)  
Number of outputs: 3 CAST, 1 Bal,

1 SE, Auxiliary power: ±2.0V for  
optional phono preamp 12dB  
Gain: 12dB  
Frequency response: 0.2Hz to 1.3MHz,  
0, -3dB Noise: -104dBA

REVIEW SYSTEM

- Amplification: Krell FPB 700cx, Conrad-Johnson Premier 350SA, Conrad-Johnson ACT-2, and XTC PRE-2
- Sources: Marantz CD-7, Naim CDS3, Linn LP12 Lingo/Aro/Koetsu RS II, Aesthetix Rhea phono equaliser
- Cardas, Transparent cables
- Avalon Eidolon Diamond & Quad ESL-63 loudspeakers

The first musical notes were all it took to realise that this was no mere exercise in separating potential buyers from their money

brilliance could have been heard as a coloration or distortion, but in the case of the Evolutions it's expressed as a hyper-real level of clarity. You simply hear more through these Krells.

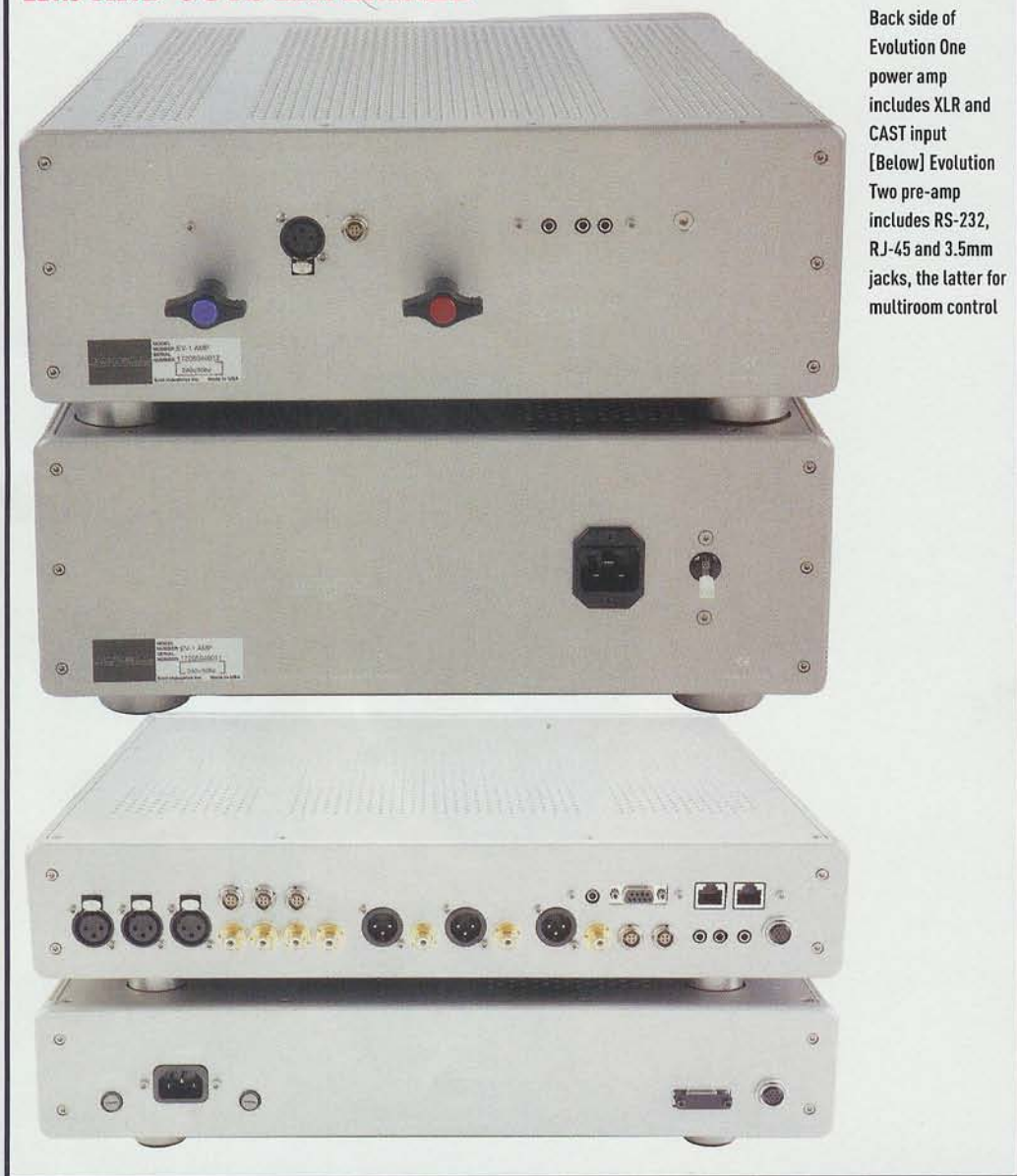
The bass is equally extraordinary and deserves particular mention. It has a 'direct-coupled' quality, sounding clean edged, capable of conveying the 'slam' in full measure, yet with a natural dynamic impact.

The musicians on a complex orchestral recording were clearly laid out, each instrument sharply differentiated, yet

perfectly illuminated. No overhang or false colour was present in the bass which showed an impressive stop-start delivery with percussive material.

This amplifier combination allows a listener to wield an aural scalpel and meticulously dissect a recording. With all the speakers I tried, this power amplifier's output had a really tight grip on matters, and it appeared to reach right down the speaker cables and take hold of the speakers. By comparison, it was as if other amplification has some

**INS AND OUTS EXPLAINED**



Back side of Evolution One power amp includes XLR and CAST input [Below] Evolution Two pre-amp includes RS-232, RJ-45 and 3.5mm jacks, the latter for multiroom control

**Separating the two audio components leaves the power amplifier with a slight advantage. The Evolution One managed to make my valued FPB 700cx sound tired**

measure of resilient decoupling in the path to the loudspeakers.

I decided to break up the Krell pairing to allow for individual analysis, but not before three interconnection modes were assessed.

CAST proved to be quite special in terms of its almost ethereal, fluid three-dimensional experience. Musical textures were creamy, yet superbly informative, and with the sense of form and structure well expressed. Performers almost floated in space in front of you, while

definition and detail were both first class. That uncanny feeling of 'blackness' behind the soundstage was most evident for this connection as was the lowest perceived grain and related distortion. I listened using relatively inexpensive interconnect cable, six metres long and more – a validation of this current drive approach to addressing the interface issue.

If there were no alternative, the Krell CAST solution would be deemed wholly satisfactory in this product, and for some, I am sure will be the optimum choice.

But there are alternatives and so I moved on to the XLR balanced input connection. After some experiment with cables, the latest Transparent Reference XL was judged as the most capable, almost matching CAST for subtlety and fineness of grain, if not quite

as atmospherically spacious, but conversely firmer, more dynamically confident.

A check with Cardas Golden Reference showed this to be brighter than was sensible in this combination. I have said before in such connection mode comparisons, the orchestra becomes more firmly placed on the hall platform. There is a greater sense of foundation, of solid focus, if presented on a slightly smaller scale.

Balanced mode is also slightly more upbeat, rhythmically coherent, and involves the listener a little more in the flow of the performance.

These positive aspects were still more apparent when this same cable type was fitted in single-ended form, but with appropriate XLR plug, and SE wiring to the power amplifier. While it appears to go against logic, and the manufacturer's favoured mode, for me the SE connection gives still more of those UK-favoured levels of dynamics and involvement.

**POWER ADVANTAGE**

Separating the two audio components leaves the power amplifier with a slight advantage. It edged a tad closer to perfection, with an impressive neutrality of reproduced timbre. The Evolution One managed to make my valued FPB 700cx workhorse sound tired and withdrawn, which it most certainly is not! This seems a cruel comparison, but is one that shows how the Evolution opens the window to sharper focus, wider sound stages, substantially greater transparency and extraordinary gains in both clarity and definition over the entire frequency range.

Benchmarking the Evolution Two was more difficult. In explicit exposition, breadth of soundstage, overall clarity

**ALSO CONSIDER**

There are now some other breathtakingly-costly amplifiers on the market, each of which offer particular combinations of features, power and performance, eg, Boulder, Mark Levinson, Halcro, to name a few, and I have heard most of them. To my knowledge none are capable of reproducing music in quite the holographic, almost edge of your seat form that the Krell Evolutions have now shown is possible.

and 'crispness' it matched the power amp. Likewise in bass attack and definition, and overall micro-resolution it is a clear leader. What just shades it from the standard of the power amplifier is a hint of darkening of clarity in the final decay of sounds, in the far stage reverberation where a touch of dryness is detectable. This aspect appears to slightly slow the sense of pace while much of the noted 'full sunlight' tonal balance was found to be attributable to the pre-amplifier.

### ADMIRABLE SOUND

You may be surprised when I say that this exceptional Krell amplifier system won't please everyone. Yes, the sound is admirable, even extraordinary in many ways, fresh and superbly illuminated, but some may yet prefer a more restful, legato sound where the underlying continuo line may seem better balanced with the drama engendered by a soloist.

That uncanny sense of a 'black velvet' silence first encountered behind the sound stage and audible after the music 'stops' remains striking in its aural impact and is particularly evident with fast percussion. There is some mild loss of the final decay tail and associated reverberant expression, more down to the pre than the power amp.

Rhythm is certainly good, if considered slightly measured and controlled, while the time signature of the reproduction is precise to the point of seeming metronomic. Reaching over all of this, you have the amazing sense of grip and control, the cut-glass precision of note edges and harmonic lines, and the extraordinary resolution of detail.

These two genuine audiophile components work very well together, and while I did try them as separates, I found the power amplifiers to have the outright edge in performance. Considering what else is available I just cannot see any point in splitting them up. These Evolutions simply demand to be heard. ■

## LAB TEST

### EVOLUTION ONE

Rated at 450W 8 ohm, 900W 4 ohm, at 1800W 2 ohm, here the Krell assertion for its independence of load impedance is boldly made. The One easily met its spec, approaching 550W/ch for 8 ohm over the full bandwidth tested, 20Hz to 20kHz. It was happy to double up to 1064W into 4 ohm and almost double again for 2 ohm, reaching 1800W short term, at 1kHz, midband. With a pretty heroic 65A typical value for peak output current, impedance dips to as low as 1 ohm won't damage this amplifier. Conversely one can expect some variation in measured distortion for substantial loading, and potentially a loss in sound quality. Cruising-level distortion, 1W, 8 ohm, was really low, 90dB down, at about 0.003%. At full power, 8 ohm, it was better than 0.1%, -60dB overall, and -76dB midband. At a mid output level I found an interesting distortion behaviour. I had set a level of 10W for 8 ohm and when measured on no-load, I got -93dB of distortion. Then for 8 ohm it read -88.2dB, for 4 ohm, -70.3dB; and for 2 ohm (a true power of 40W) it was just -64dB. Thus the distortion is roughly proportional to output current.

Further at a 20W 'level', while running distortion sweeps with frequency, a standard result was obtained for 8 ohm, but for 4 ohm there was a strange jump in distortion below 60Hz,

(sweep tracking downwards in frequency) reaching 0.3% by 20Hz. With a 2 ohm load, (now a true 80W) the measured distortion was naturally higher over the band but again showed this jump, this time at below 80Hz. This phenomenon may be related to the plateau-biasing regime, with a frequency sensitive weighting function.

I noted a small change in frequency response with loading. For easy loads the distortion was primarily third harmonic, as expected for a zero-feedback highly symmetric design, but with increasing load severity the harmonic spectrum becomes richer and more extended, spanning more than 20kHz and with even-order components now well in evidence. Potentially the sound could 'brighten' a little for such higher output currents. High-frequency intermodulation was very low at all powers (a fine result), better than 0.001% at full power, and 0.0003% at a cruising level of 1W. An input of 3.53V produced full power via balanced while 148mV gave 1W. Signal/noise ratios were excellent. It's commendably devoid of mains-related components. The One has an easy to drive input impedance, a low output impedance and minimal DC offset. It also enjoys an amply wide frequency response together with comprehensive electronic protection systems.

### EVOLUTION TWO

This line pre-amp is distinguished by very quiet backgrounds and essentially zero mains-related hum. Regarding distortion, for the purpose of driving the power amplifier, 2V is a fair output level and here the harmonics are odd order, but monotonically decreasing and the largest, third harmonic, is a low -88dB for 1kHz, quite negligible. Reducing the output to 0.5V led to a distortion reduction to -116dB, 0.00015%.

Distortion is typically 0.003% over the whole frequency range for a spectrum of levels. With the more searching high-frequency intermodulation distortion tests, the results were exceptionally good, at 0.5V in/out, reading -106dB, the instrument threshold, and -112dB at 5V in/out, again the test limit for this voltage.

IHF signal/noise ratios were first rate, eg, 97.3dBA and 94.8dB unweighted. It remained quiet at the zero volume setting. The frequency response is so wide that it defied my attempts to measure it with any real degree of accuracy, and was at least 0.1Hz to 900kHz +0/-0.1dB. A check with my spectrum analyser indicated the -3dB or half power point at a very high 1.5MHz.

IHF input overload was measured at 24.5dB, or 9.5V unbalanced, 19V balanced, ample for any source. The input impedance is a bit lower than average at 18.3k ohm, and may be less compatible with some sources possessing tubed output stages of higher-than-usual impedance.

Maximum output level as 9.5V single ended, 19V balanced.



While the level was reduced slightly into a taxing 600 ohm load, there was no significant change in the distortion. The output impedance measured at about 130 ohm, and will drive virtually anything.

Generators were not available to test the CAST interfaces directly, but when used with the matching power amplifier the figures checked out satisfactorily. Built as double mono, channel separation is limited only by the sources used. Channel balance was excellent, within 0.05dB throughout.

Fully microprocessor-controlled, input options and sensitivities may be memorised and custom labelled to aid easy, seamless operation. Multiple pre-amplifiers may be stacked to proved any number of channels for surround sound application, and master and slave hierarchies may be established by the installer.

## VERDICT

This is a state-of-the-art amplifier system without any shadow of a doubt, but it does add some of its own measure of interpretation and mild emphasis to the replay of recorded

music. Skilled matching of the audio system design and installation will make the best of these amplifiers, which will undoubtedly find their way into some of the world's finest audio

systems. I still cannot forget that first experience of those silent backgrounds and the delight in the sheer clarity and resolution achieved over the entire audible range.