



50th ANNIVERSARY ISSUE • SPECIAL COLLECTORS' EDITION

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# Hi-Fi News

PURE AUDIO EXCELLENCE

50th Anniversary Issue £3.95



**SPECIAL SOUVENIR ISSUE!**

# CELEBRATING 50 YEARS OF AUDIO EXCELLENCE



**INSIDE THIS BUMPER COLLECTORS' EDITION...**  
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**ON TEST**

→ HOW GOOD IS NAIM'S NEW £14K CD PLAYER?  
→ WE INVESTIGATE KRELL'S MIGHTY FBI AMP

AOL Keyword: Hi-Fi News

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# A Question of Balance

With the Fully Balanced Integrated (FBI) amplifier Krell promises all the power and control of its big pre-/power designs in a single cost-effective, user-friendly package. Martin Colloms investigates the claims...

## DETAILS

-  Krell FBI integrated amp
-  £14,900
-  020 8971 3909
-  [www.absolutesounds.com](http://www.absolutesounds.com)
-  Power, best in class
-  Pre/powers less veiled

BELOW: A huge volume knob dominates the fascia of hand-machined aluminium finished in diamond-milled alloy, a pointer to what this amplifier is all about: power. All functions can be accessed via the remote-control handset

**K**rell has a 25-year record in high-end amplification, with enviable product and design longevity, and yet it still has the ability to surprise. Last year we were astonished by the award-winning eight-pack Evolution pre-power combo and this class act is now followed by a new generation of mainstream 'EVO' amplifiers. These include the 402 stereo chassis, which will soon be reviewed, this replacing the 400cx.

Existing Krell stand-alone power amplifiers belong to the FPB series, a topology and technology that has established reference standards in its class for some years. The FPB 400cx and FPB 700cx are key examples. The '700cx and its direct antecedents have been

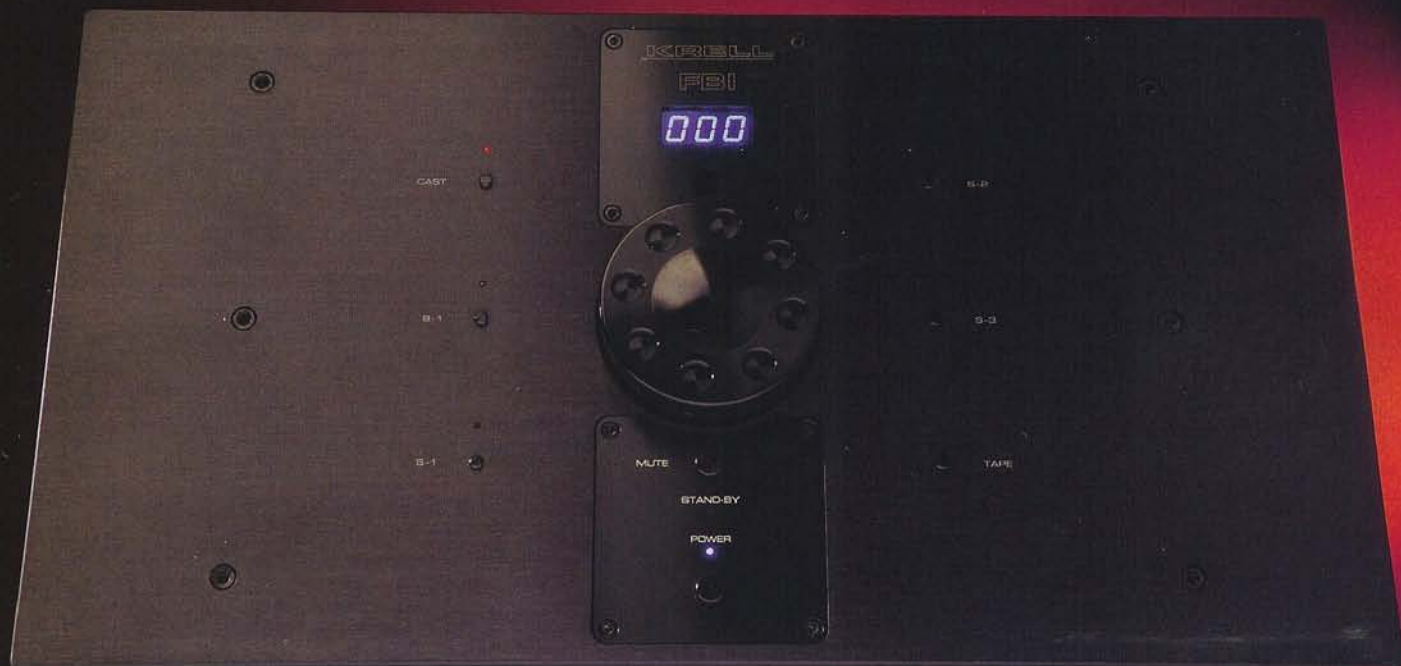
**'The FBI will be fearless in the face the industry's best but also most awkward speaker loads'**

performing well in my own system for years now.

However it seems while the new Evolution series was under development, there was still felt to be life in the FPB format. In particular, a 300W/ch design could be successfully configured to meet the latest EU power harmonic legislation. Krell boss

Dan D'Agostino decided to take the FPB platform and recast it as the FBI, on the face of it the world's most capable integrated amplifier. This claim is based on one technical parameter taken alone, namely that in the much admired FPB tradition, this unit is capable of doubling its rated 8 ohm output into 4 ohm loads and then doubling it yet again into 2 ohm. Like the FPBs, the new FBI will remain essentially fearless in the face of some of the industry's best but also most awkward loudspeaker loads.

As befits a £15,000 product, the finish is a superlative diamond-milled alloy, off-setting the block-like, rather military styling. Fully remotely controlled, the amplifier fascia is nonetheless dominated by a



**THE INSIDE TRACK ON... INTEGRATEDS**

The relative merits and disadvantages of integrated versus separate audio components for the signal control and power amplification functions have frequently been discussed. For now I will stick to what I feel are the advantages of an integrated design like the FBI, on the basis that it does reach the expected quality standard.

An obvious advantage is that you don't need to buy costly pre-power interconnect cables with the inevitable losses which even the best of them impose. Instead, the control section is short path, 'hot-wired' to the power amplifier, located inside the unit. Generally it is likely that an onboard control pre-amp will cost less when

integrated rather than when built as a separate requiring its own supply and casework. In this case, we are looking at a saving of perhaps £5000.

One of the design problems which must be solved for separate audio components is their use of individual power connections and the potential circulation of ground currents between them. Unifying the pre-power grouping addresses this issue and can deliver better and more consistent sound.

Done well, the proper organisation of a single centralised signal ground for pre- and power sections via the integrated approach can provide benefits in dynamics and rhythm, resulting in a 'faster' more involving sound.

XL. This was one well and truly pampered amplifier.

I suspect that I was hoping for the benchmark sonic performance of something like an FPB400cx enhanced by the anticipated advantage of an on-board, directly coupled line pre-amplifier. The recognised strengths of the Krell technology were certainly present in spades, namely effortless high-level replay, an inspiring consistency of quality at all sound levels regardless of loading, plus ample power for all conditions. And not least, it was capable of those rock-solid bass lines for which the marque is justly famed. But in my opinion it did not fully match my experience of

## 'The Krell is probably the best integrated available anywhere near this power capacity'

huge central volume control, and arguably this is what this powerful amplifier is all about.

### SOUND QUALITY

I looked forward to installing this unit, having run it in for several days at a third of its rated power using a CD player on endless repeat that I had plugged into the main S1 RCA phono input. The amp had also been bench tested and thoroughly exercised via its various inputs and at many powers, currents and frequencies, both within and beyond the audible range.

BELOW: With a lab-measured 400W into 8 ohms doubling into 4 ohms and yet again into 2 ohms it's no surprise the Krell integrated has cheeks made of up massive heatsinks

Installed on a Finite Element point-decoupled sound table, the all-black FBI dominated the listening space, even more so when the blue numeric display was powered up.

A dedicated power spur provided a clean ultra-low impedance supply; speaker and interconnect cables were generally Transparent Reference

the company's '400cx.

Invoking 'theatre mode', unity gain, bypassing the onboard pre-amplifier, this facility showed that the underlying and well regarded performance of the well known '400cx was essentially available from the FBI package. Now I cannot put off the moment of truth any longer, and must disclose the overall result when the FBI is used as intended. My commentary inevitably reflects hundreds of

**REVIEW SYSTEM**

**Sources:** Naim CD555 CDP CD player and power supply

**Amplifiers:** Conrad Johnson ACT-2 pre-amplifier, Conrad Johnson 350SA and Krell FPB700cx power amplifiers

**Speakers:** Sonus Faber Amati Anniversario, Avalon Eidolon Diamond, Quad 63

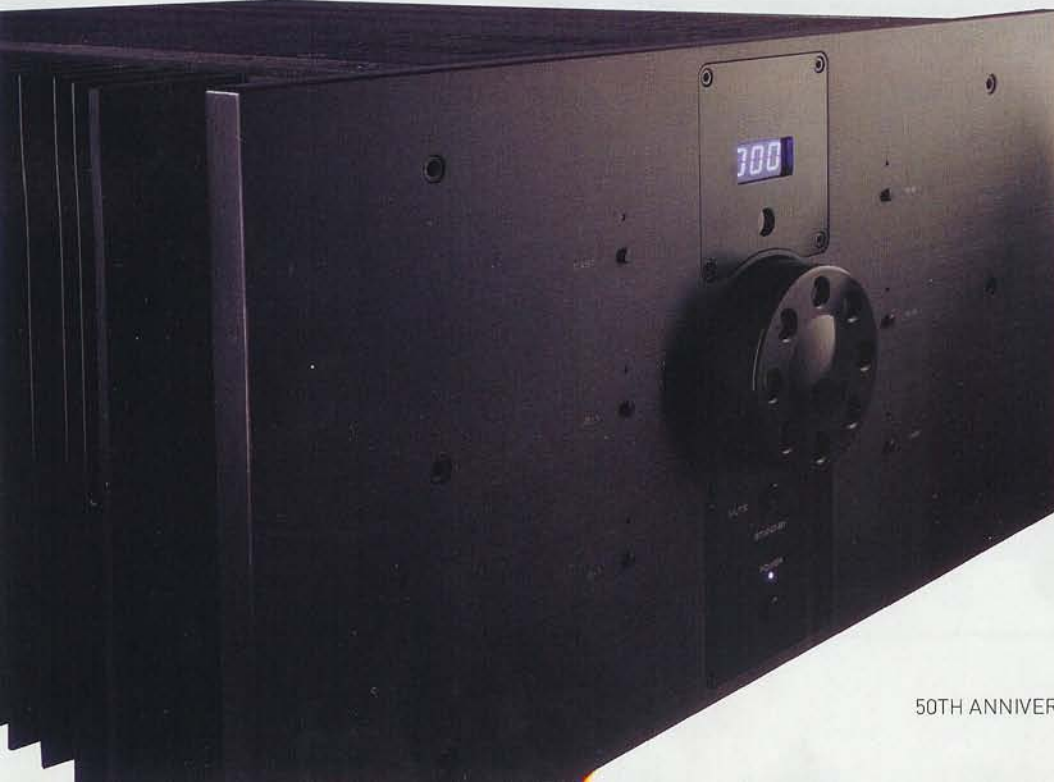
**Cables:** Transparent and Cardas interconnects, Transparent Reference XL speaker cables

happy hours listening to the FPB 400cx and 700 series designs over recent years, yet I consider that some of the inherent quality of the in-built reference power amplifier was diluted when using the installed pre-amplifier.

Where a spacious, near limpid transparency was known to be possible, by comparison the 'integrated' was perceptibly veiled. An almost clinical clarity and sonic precision is familiar from the 400cx while this FBI was rendered marginally less confident, and was perceptibly softened. Likewise, where a near-crystalline focus and expansive image for the 400cx has set reference standards, this integrated provides a significantly narrower sound stage with marginally less precise image focus. Where a '400cx can be shown to approach 75% of the reference performance of the FPB700cx itself, the new FBI achieves about 50% of that level judged for overall sound quality

**STILL BEST IN CLASS**

It is ironic that by general industry standards this FBI result is actually pretty damn good, indeed better than most equivalent pre-power combination built with respected separates. However reluctantly, I must recognise that if viewed objectively, the indications are that it is probably the best integrated amplifier available at anywhere near this exceptional power capacity. Potential competitors that I've encountered in the past year or two just don't come close. Noting one example which is clearly not a competitor, consider the much more costly Ongaku



**THE INSIDE TRACK ON... FBI ENGINEERING/DESIGN FEATURES**

To deliver a rated total of 2400W, even with power supply-friendly, balanced amplification, you need a huge power transformer and this Krell amp has it, namely 3kVA. Its sheer bulk and mass dominates the build of this product. In the FPB tradition, its huge supply is distinguished from most of the competition by being fully regulated. This confers excellent signal-to-noise ratio, improves low-level detail and confers very clean, high-level dynamics. It also improves the bass on end.

To deliver such high power without compromising the choice of linear output transistors, Krell has adopted the balanced approach for some time now, where the selected standard voltage devices are arrayed in sufficient numbers to deliver exceptional output current headroom; this the equivalent of torque for a motor engine.

Imperturbability in the face of adverse output loading is a significant benefit and will help maintain sound quality to the amp's full power.

Many advanced Krell technologies are incorporated into the FBI including fully-balanced topology right to the output terminals. Power supply regulation can have a powerful influence on sound quality and is rarely applied to power amplifiers on grounds of cost. But Krell has done it for years and the FBI integrated is no exception.

The CAST interconnection is also included, providing for low installation cost, long cable run, and current-mode linking of systems.

While electronically controlled, the precision volume control uses an array of solid-state switches to operate a attenuator 'ladder' of selected discrete resistors for premium sound quality.

Massive heatsinks are located on the left- and right-hand sides and should not be obstructed: convection heat flow is essential for this very powerful design. All-transistor, the high-current output stage operates at a very low level of feedback, and this linear topology achieves a sound quality largely independent of output loading or loudness. This constitutes the bedrock of the sound of the bigger Krell amplifiers. Lower powers are Class A, while a dynamic tracking bias system delivers optimum bias levels for low distortion at higher powers.

The 3kVA power toroid is a low-noise high regulation example of the art and allows this amplifier to maintain rated level on programme peaks regardless of loading down to 2 ohms. Yet such amps will still sound a little better and run cooler on more normal speaker loads.

[Audio Note] which offers less than one tenth the power. Even when used with sensitive loudspeakers, it is quite different to the FBI, less taut and controlled, yet mellifluous and flowing, thoroughly musical and involving, and beguilingly focused and transparent.

**EXCEEDS PERFORMANCE**

Seeking to find more neutral ground through mentally disconnecting from the FPB experience, as delivered the FBI exceeds the performance of the known solid-state opposition by virtue of its general neutrality, its substantial clarity and focus, plus a powerful dynamic bass, together with a general authority and competence, and an unrivalled load drive tolerance. Recent speaker reviews have included designs

**FRONT & REAR PANELS**



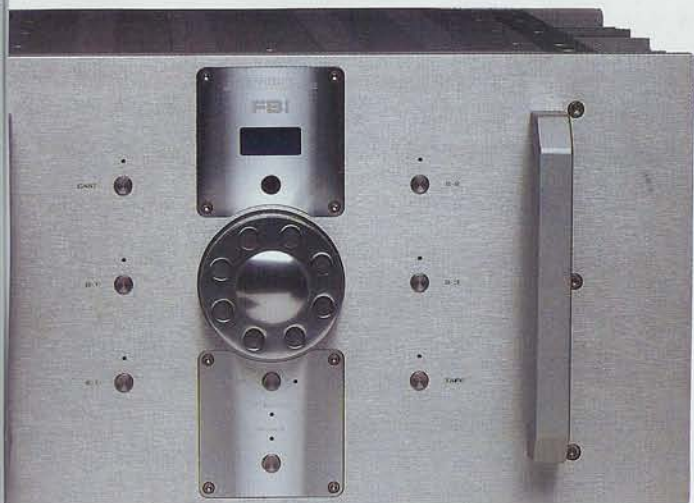
**FRONT**

Massive volume control is beautifully weighted while the balance control available via the remote handset leaves one of the channels untouched while attenuating the other in graduations of 1dB, up to a maximum of 4dB. While some will find the blue readout rather bright in subdued light conditions it is readable from a distance



**REAR**

Signal inputs include one balanced XLR, one CAST (the proprietary Krell format) and four RCA line inputs, including 'tape'. A direct, unity gain 'through' Home Theatre facility may be selected. Meanwhile, a 12V link line is provided for remote power control with associated systems, multi-room and home cinema. Two sets of loudspeaker outputs are provided on high-contact pressure, gold-plated binding posts



ABOVE: The FBI is also available in a brushed silver finish

## 'The Krell exceeds the known solid-state opposition by virtue of its substantial clarity and focus'

of high sound quality that also present tough loading for an amp. To preserve their inherent quality at peak levels, such as a choir and orchestra at full blast, and maintain clarity and natural timbre, the amplifier must be able to reach full output level in the face of peak current demands rising in some cases to 50 amps. Here the FBI is pre-eminent, and can drive these larger loudspeakers to realistic levels even in large areas.

Concerning general operation, it worked well, with a smooth accurate volume control, plus trouble-free input selection and options. Balanced and single-ended sources provided comparable quality, though I could not check the CAST input, lacking a suitable source.

### OVER CRITICAL

I have to confess that initially I was over critical of this amplifier, anticipating magic from its integrated potential, and instead finding a fine amplifier of quite exceptional power and load drive, uniquely equipped to face the most difficult audiophile loudspeakers.

In fact it presents music on a larger scale, with a broad generous tonal balance, free of coloration and it is generally

upbeat and involving. It was capable of crisp powerful bass lines with exceptional low-frequency extension even with tough speakers and the treble register was detailed and nicely judged. High quality stereo images were also possible.

As is expected from Krell designs the lab performance is first rate, this low-feedback design providing low-order and low levels of distortion under all conditions, with very high power and output current. The controls are accurate and operate with precision while the build quality is exemplary, even if I would like the option to dim that rather actinic blue LED display.

The FBI compares well with highly rated pre-power combinations and in fact provides a significant cost saving, this not including the implied deletion of a top quality pre-power interconnect cable. It provides a relatively compact, space-saving integrated package of exceptional power. It has versatile inputs, balanced, CAST and SE, and is remarkably easy to setup and operate. With comprehensive protection systems and an on-board circuit breaker, it should provide a trouble-free life and certainly may be recommended. ■

## DATA FILE

### MEASURED SPECS

Power output .....	420W/ch
Channel separation (1kHz) .....	better than 100.7dB
Channel balance .....	better than $\pm 0.05$ dB
Total harmonic distortion/300W .....	71.8dB
Signal-to-noise ratio/'A' weighted.....	nearly -109dB
Input overload margin .....	6.5V rms flat-out
Dimensions .....	43 x 25.4 x 44.5mm (whd)
Weight.....	63.5Kg

### LAB REPORT

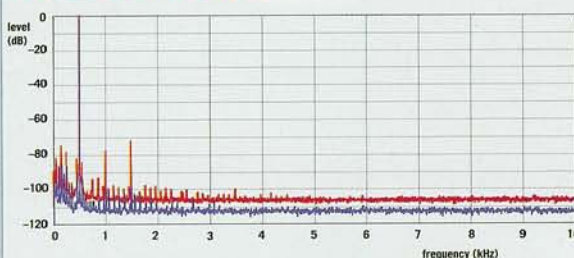


Fig 1: Distortion at 500Hz (blue trace is 1W; red trace is 100W)

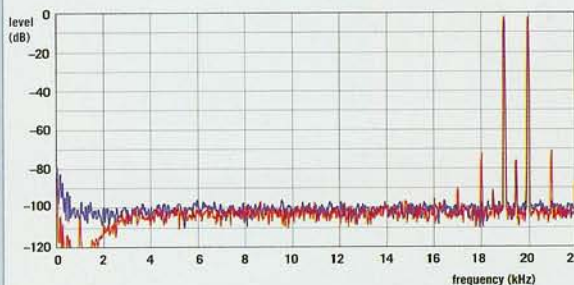


Fig 2: Intermodulation distortion (blue trace 1W; red trace at full power)

Built with more than a touch of generosity with respect to power, this lusty performer kicks out no less than 420W/ch (26.2dBW) into 8 ohm loads, either singly or both channels driven, for a 1% clip point.

Could it really double this again into 2 ohms? Well, not quite. I got a still amazing 1500W/ch into this load and on a music related regime you could get from both channels at least 40A peak, mighty handy for driving the likes of a Krell Resolution One or a Sonus Faber Amati Anniversario. The latter result certainly beats the specification of 1200W/2ohm.

Checked for distortion at mid power (Fig 1) down to a -105dB noise floor, a 500Hz driving tone gave rise to second and third harmonic at better than -70dB (0.03%) and then with nothing of consequence higher than -100dB. Such low-order harmonics are considered relatively harmless to the ear even in rather greater quantities. By 1 watt all harmonics were better than -96dB, showing excellent linearity. The full power high-frequency intermodulation is shown in Fig 2. There is a moderate cluster centred around the driving tones, 19 and 20kHz, while the in-band potentially audible difference signal at 1kHz is way down at -103dB and is judged inaudible.

### HI-FI NEWS VERDICT

Being a long time user of the Krell FPB400cx and FPB700cx amplifiers I initially made some inevitable comparisons between them and the FBI. However, taking the FBI on its own merits as an integrated amplifier shows that Krell has delivered a fine amp that has exceptional power and is almost uniquely equipped to handle the most difficult audiophile speakers. Combine that with first-rate lab performance and top-notch build quality and you have an integrated that's clearly best in class.