Krix is a company which any Australian with an interest in hi-fi and AV will likely know and respect. Since 1974 Scott Krix has been designing and selling loudspeakers first for stereo, then for real cinemas and, by obvious extension, later for home cinemas. But the company contains more Krixes than Scott, with brothers Ashley, Brett, Kingsley and Gary all joining the company over its first decades as the company went on to deliver its hi-fi speakers not only in Australia but internationally, while today its professional cinema division undertakes installations in 30 countries worldwide. Krix estimates that 60% of Australian cinemas use its products.

THE RETURN OF TWO-CHANNEL
The resurgence of two-channel stereo systems in recent years has not gone unnoticed by Krix, with the return of vinyl records joining with in recent years has not gone un-noted by Krix, in real cinemas and, by obvious extension, later for home cinemas. The company has decided to release more upmarket dedicated two-channel speakers, and also that we could compete alongside other highly credentialled imported brands.

For this it has resurrected the Esoterix line for this model — last used some 15 years ago for its then-flagship floorstander model. But this new model is a standmount design.

“We decided to start with a standmount speaker using very high quality components and a unique cabinet design and then look at a floorstanding version later,” says Don MacKenzie. “We are aiming this towards customers looking for an outstanding pair of compact speakers for purely stereo applications. As a standmount or bookshelf design, this compact speaker sounds bigger than it looks and will satisfy many music lovers, regardless of their room size or décor.”

As the Krix design team set out to achieve a significant leap in stereo performance, it investigated each element of the loudspeaker design — improved drivers, more advanced cabinets, higher quality crossover components and so on. But it also decided that the way the speakers interact with the listening room should be improved. So building on its wealth of experience in the cinema industry, the team embarked on developing a high-frequency waveguide specifically engineered for two-channel listening, and it is this guide that gives the Esoterix their unique appearance.

A GUIDE TO SOUND
The Krix engineering team had decided to use the same Revelator tweeter that was so successfully employed in that 2014 limited edition 40th anniversary Neuphonix speaker. Manufactured in Europe, the Scan-Speak tweeter uses a ring radiator design coupled with a patented phase plug, while a large neodymium magnet and other design enhancements deliver reduced distortion and power compression.

“By selecting the Revelator tweeter, which is known for its detail, and a bass/mid driver that is very well matched, this speaker is ideal for reproducing all of the dynamics and definition of the latest high-res and low-loss digital music formats,” says Don MacKenzie. “But it’s also great for vinyl lovers — and because of its 92dB (/1W/1 metre) sensitivity, it’s also suitable to be used with valve amplifiers.”

The high sensitivity driver may deliver exceptional performance — but then Krix set out to improve on this, by ensuring that an accurate stereo image could be rendered when listening in normal living room conditions. Krix paid particular attention to achieving the best possible imaging and directivity from this high frequency driver.

“Directivity and imaging are indeed key inter-related criteria,” says David Murphy, Krix’s Chief Design Engineer. “We have gained experience with the Series MX systems, which use waveguide technology to enhance the direct sound — similar to the challenges in the mainstream cinema environment. Another consideration was...
A waveguide on the tweeter can control the sound, delivering a narrower angle of coverage and so reducing sound radiated onto side walls of the room.

our experience — and others, Floyd Toole et al. — indicating that if the loudspeaker already has a very uniform frequency response and adequate bass extensions, then well-controlled lateral dispersion in a loudspeaker improves the perception of its quality.

“Accordingly, one of our design aims for the Esoterix was to improve the off-axis frequency response by controlling the dispersion of the high frequency unit. A waveguide structure was the answer. We anticipated that it would make the perceived sound more direct by creating fewer lateral reflections in the listening room, thus hearing more of the music and less of the room. A preliminary experiment confirmed our expectations and we commenced the full-scale design process.”

So the purpose of the waveguide is to adjust the balance of the direct and reflected mid/low treble in the room by controlling the directivity of the sound radiated at those frequencies.

“By projecting more of the sound forward, and away from the ceiling and side walls, improvements in stereo imaging and definition could be realised without comprising the open frequency response. A waveguide structure was the answer. We anticipated that it would make the perceived sound more direct by creating fewer lateral reflections in the listening room, thus hearing more of the music and less of the room. A preliminary experiment confirmed our expectations and we commenced the full-scale design process.”

A waveguide on the tweeter can control the sound, delivering a narrower angle of coverage and so reducing sound radiated onto side walls of the room.

computer simulations were carried out, and six physical prototypes constructed. The result is the best possible performance for its size and shape. Note that Krix has world-leading experience in the design of acoustic horns, and this expertise has been applied to the design and development of this waveguide.”

Krix notes that loudspeakers which rate highly in double-blind listening tests often have frequency responses which are smooth on-axis and off-axis, and yet good quality. By controlling the dispersion of the high frequency unit, the perceived sound more ‘direct’ by creating fewer lateral reflections in the room.

The focusing effect of the waveguide also has the added benefit of raising the apparent directivity of the tweeter within. The tweeter normally has a sensitivity advantage of around 10dB (1.4 times) over the bass driver, but the waveguide can raise that approximately 12dB (3.9 times). So the tweeter’s sensitivity is generally ‘padded down’ in the crossover network to match the acoustic output of the bass driver at the crossover point, reducing the actual applied signal level at the tweeter’s terminals. That has a secondary advantage, since distortion rises with the applied input level — so reducing the level to the tweeter can dramatically reduce unwanted distortion from the tweeter, especially at higher volume levels. With reduced distortion plus controlled directivity, Krix redefines the waveguide thereby delivers a clearer, large listening experience than would otherwise be expected from a bookshelf loudspeaker of this size.

The mid/bass driver completing the driver complement is a 165mm (6.5-inch) driver highlighted by an innovative cast aluminium basket that minimises internal acoustic reflections through its large basket windows and sculpted struts. This basket design also improves power handling capacity by acting as a highly coupled heat-sink for the large neodymium-iron-boron magnet.

The cone and dust cap are pressed from a natural wood-fibre material, with a proprietary coating added to improve clarity and frequency response. A titanium voice-coil bobbin with copper caps, minimising voice-coil inductance, completes this cutting-edge design.

PUTTING IT TOGETHER

The cabinet for the Esoterix is a bass reflex design tuned to a resonant frequency of 45Hz, to take best advantage of the bass driver’s extended range. The cabinet has been shaped to minimise standing waves, with internal damping to absorb sound energy within, and the vent positioned at the kick-up towards the rear of the enclosure, where bi-wire gold-plated brass terminals for positive connections allow the user to bi-amp or bi-wire the unit for improved performance.

The baffle of the new Esoterix is angled at 7.5 degrees, allowing the waveguide to protrude — this time aligns the two drivers while also creating what is obviously a novel design feature.

“The angled front baffle is integral to the design,” says David Murphy. “It directs sound slightly upwards so that sitting and standing listeners can hear the extended high frequency response. And it is a key design element to aesthetically balance the appearance of the loudspeaker, avoiding a top-heavy look.”

Krix explains that it expects the speakers to be potentially located on low-line cabinets or below seated ear level, while the optional stands for the Esoterix take the baffle slant into account and will be ideal for a listener seated between two and four metres from the speaker.

A magnetic grille will be available, which Krix says will ‘float’ over the bass driver.

We asked Krix’s Senior Industrial Designer Jon Scott what processes follow on from the

A MOBILE PROTOTYPING EN ROUTE TO THE FINAL PRODUCT, USING ONE OF SIX PHYSICAL PROTOTYPE WAVEGUIDES DEVELOPED FROM EXTENSIVE COMPUTER MODELLING.
signing-off of a successful prototype loudspeaker into full production.

“After the prototype, the next stage is to work on the manufacturing process, including developing the CNC program to manufacture the enclosure and then work through the assembly process to produce production documents. This ensures that every speaker is produced to the same exacting standards,” he explains. “The next task is to establish a standard program that all speakers will be tested against in our test chamber. Every speaker that is manufactured and assembled in our Adelaide factory goes through a rigour test in our test chamber before it is given a serial number and then packed and shipped.

Then once the necessary components have been sourced and the pre-assembly of crossovers and so on completed, we manufacture the first pair of speakers. These are fully auditioned and tested, then are used for final design of the product packaging, and will eventually become the model ‘reference’ speakers, used throughout the life of the model to compare and spot any inconsistencies that might occur through the production process.”

FINISHING OFF

Given the sensitivity of the Esoterix, options for amplification are “reasonably limitless”, says Don MacKenzie. “The size of the room and the level the customer likes to listen to their music at will determine the amplifier more than anything. So a quality integrated amplifier with a relatively modest output, through to a pre-power combination with massive transformers and output stages — both will work with these speaker. The same goes for a valve amplifier.”

The finish continues Krix’s flagship styling of a timber veneer enclosure with a black satin front baffle — “striking yet approachable” says the company of this combination. We gather the retail price will be $6500 per pair in this finish, though with the Esoterix being made in Australia at Krix’s manufacturing plant south of Adelaide, it will likely be able to offer a variety of finishes including the option of custom veneers.

The Esoterix made its first public outing at The Australian Hi-Fi & AV Show in Sydney at the end of July. Thereafter it will begin making its way to Krix dealers nationally as the latest example of Australian loudspeaker design at its best. A list of dealers and full Krix contact details can be found at www.krix.com.au

“An inherent problem for a two-way design is that sound from the low frequency unit narrows towards the top end of its frequency range, while above the crossover frequency the high frequency unit has a much wider dispersion of sound, creating a discontinuity in the horizontal off-axis response, and hence in the acoustic power response,” explains David Murphy, Krix’s Chief Design Engineer.

“As an exaggerated example, the top diagram here shows the on-axis and the horizontal off-axis responses of a larger two-way loudspeaker. They show that the bass driver has a dip in the off-axis horizontal frequency response due to its narrowing just below the crossover frequency. They also show the advantage of a Constant Directivity horn in maintaining a remarkably uniform beam angle and thus uniform power acoustic into the room through the critical midrange and lower high frequency range. A waveguide can achieve similarly good control of the dispersion at higher frequencies.

“Below the first diagram you can see the polar diagram of the Esotex loudspeaker showing vertical and horizontal responses, and the 3D polar balloon at 2kHz. Note that the LF and HF drivers are in phase, and that the vertical lobe is angled slightly upwards — corresponding to the angle of the front baffle on the Esotex.”