



Perigee FK-1F Hybrid Ribbon Loudspeaker

by Roy Gregory

Ribbon drivers have been around pretty much as long as people have been making hi-fi. The Kelly tweeters were the first commercially viable product, at least as far as the UK was concerned, way back in the late '50s. At the same time, the French Orthophase loudspeaker used 24 identical drivers to create a full-range design – albeit at the ruinous cost of \$200. And that's for one speaker back in 1959! But, the inherent simplicity of the approach meant that enthusiasts had been tinkering with their own designs since the late 20's. And in that simplicity lies both the appeal of the technology and its problems. Inherently light, the ribbon diaphragm is blindingly quick, but the basic structure allows limited potential for mechanical damping. And that puts tremendous pressure on the choice of materials and accuracy of manufacture.

The first company to really take the commercial bull by the horns was Apogee Acoustics. With the economic pressure cooker of the '80s fuelling the explosion of high-end audio, Jason Bloom thought the time was ripe and he was right. Back in 1985 (I think it was) and the full-range

Apogee Scintilla reached these shores. John Atkinson, then editor of HFN-RR before *Stereophile* saw the light, graced it with a front cover and no fewer than three, independent reviews in a single issue. As a display of editorial backbone that takes some beating, but it also reflects the inherent fascination with ribbon speakers.

By coincidence, it also marks the start of the Perigee story. Apogee went on to produce a whole range of speakers, both pure ribbons and hybrids, but clashed with Magneplanar over the design of their ribbon tweeter, a protracted case they ultimately lost. It was enough to close the company in 1998, which left a lot of owners out there without any support. Australian Graeme Keet took on the task of producing replacement ribbons for the existing Apogee designs

– not as simple as it first seemed. However, the knowledge and experience gained encouraged him to develop his own driver and it's this that graces the Perigee FK-1F. Keet's ribbon is based on a sophisticated laminate, computer cut for accuracy.

It is mounted to the back of a solid aluminium billet, CNC machined to time-align the ribbon with the dynamic drivers it partners. And "partners" is the right word, as the ribbon was designed from the ground up to match the chosen Peerless bass drivers. These are six and a half inch units, using a molded plastic cone selected for their speed and dynamic response,

always a thorny issue when designing a hybrid. Whether you use a ribbon

or an electrostatic unit for the higher frequencies, the crossover to a conventional moving-coil driver is always a potentially problematic one, and not just because of the difference in speed. What people often overlook is the difference in dispersion characteristics



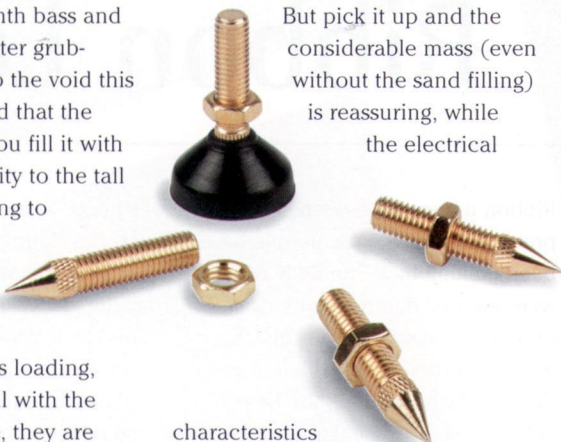
▶ between the dipole upper frequencies and cone bass. This provides an all too audible aural cue to the cross-over point, especially as it so often occurs in or around the critical mid-range.

Perigee have responded to the problem in two ways. Firstly, the ribbon has its own rear chamber in the cabinet, which is combined with careful design to help absorb the rear output of the driver, killing the back wave, whilst also hopefully preventing re-radiation through the surface of the ribbon itself. Secondly, by designing the ribbon unit specifically to work with the chosen bass drivers, they have managed to eliminate both resistors and matching transformers from the cross-over network, thus ensuring maximum energy transfer. Likewise, the other crossover components comprise high tolerance polypropylene capacitors and resin dipped inductors, in order to further reduce cross-over losses and microphony. Sensible five-way binding posts are provided for bi-wiring, hard fastened to the crossover components by copper sheet. The internal cable is selected copper, stranded for the ribbon and solid-core for the bass. The ribbon driver extends down pretty well, especially given its size, but the crossover still occurs around the 1kHz point, making its engineering particularly critical.

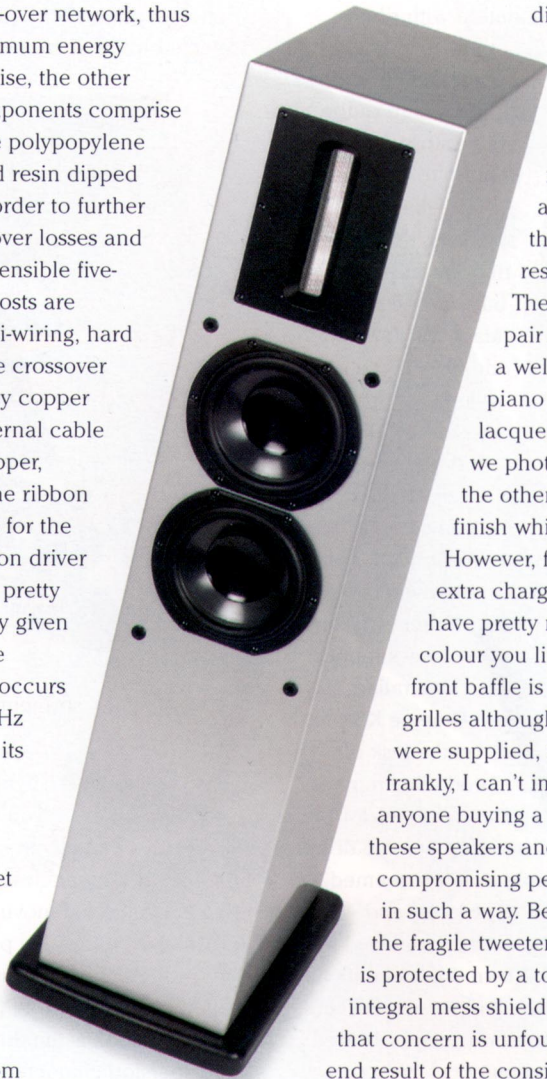
The cabinet is a massive, fairly bluff looking affair, constructed throughout from

25mm MDF. As well as the separate mid/tweeter chamber, it is effectively braced by a horizontal divider that closes off the bottom quarter of its volume. Remove the plinth bass and you'll find a large diameter grub-screw allowing access to the void this creates. The 10kg of sand that the designer recommends you fill it with adds considerable stability to the tall cabinet, as well as helping to counter balance the 5kg ribbon assembly built into its top. Two large diameter, rear-facing ports provide bass loading, and whilst it's hard to tell with the

naked eye, they are different



effort and attention to detail that's gone into the Perigees is a substantial, even imposing speaker that is more purposeful than attractive. But pick it up and the considerable mass (even without the sand filling) is reassuring, while the electrical



lengths to help spread the port resonance and smooth the low-end response.

The review pair arrived in a well-executed piano black lacquer, while we photographed the other standard finish which is silver.

However, for a small extra charge you can have pretty much any colour you like. The front baffle is fitted for grilles although none were supplied, and frankly, I can't imagine anyone buying a pair of these speakers and compromising performance in such a way. Besides, the fragile tweeter ribbon is protected by a tough, integral mess shield so even that concern is unfounded. The end result of the considerable

characteristics speak volumes about the designer's past experience with Apogees. At around 92dB efficient and a flat four ohm load, the Perigees offer a stark contrast to the power hungry American panels. But don't assume you can hook up simply anything to them and expect the best results.

The FK-1Fs' possess a speed and immediacy that's at once impressive and appealing. There's an obvious transparency and complete lack of grain to the sound, while the solid cabinet and low-loss cross-over makes them sound more energetic than the numbers suggest. There's also a top-to-toe coherence that belies their hybrid nature. Confronted with a hybrid design there's something inside every reviewer that makes them go hunting for the crossover point. I've seen a lot of hybrids and, contrary to popular belief, I'm just as human as the next guy; Once I spot that tell-tale discontinuity there's no escaping it. It niggles and it gnaws away at me undermining my enjoyment, drawing my attention. It's why I've never, ever owned a hybrid speaker. There are those that have impressed me, but when it comes time to part with my own money...

I just couldn't help myself. ▶

Replacement Apogee Ribbons

Graeme Keet started out, as noted, producing replacement ribbons for the many Apogee models. Well, it's a side of the business that continues, with Reality Audio offering the service in the UK. The new ribbons are cut using the same computer controlled system as the ones in the Perigee tweeter, a fact that makes them far more accurate and consistent than the hand cut items originally fitted. As such, replacing the older ribbons with the new represents both a repair and an upgrade. As well as this Reality can offer owners of Caliper and Duetta speakers the Signature upgrade. That, plus a complete set of new ribbons will set you back around £1200, which seems pretty reasonable to me. Full details of the ribbons can be found at www.apogeeribbons.com, while Apogee owners might well be interested in the resource and support site www.apogeespeakers.com. It's nice to see people providing back-up for such an expensive product range once the company has gone.

anomalies that normally draw attention to cross-over points and the unobtrusive nature of the Perigee's design begins to make sense.

But be warned, because of the tonal nature of the shift, both speaker placement and the selection of driving electronics needs to be made with care. Any looseness or added flab at the bottom end will tend to exaggerate and warm the lower-mid, widening the gap between the drivers. Importer Jon Oakey provided a pair of granite slabs to go between speakers and floor, which certainly helped bottom-end linearity, and mid-range coherence as a result. A good thing, as the FK-1Fs will go both deep and loud. He also suggested that a slightly greater listening distance (rather than my near near-field set-up) should offer better integration, although I was unable to try this. Space to the rear wall is critical, as is having the speakers absolutely upright. A spirit level is essential here. In my room I actually preferred them tilted very slightly back, but that will depend on listening distance and the height of your seat. What you must do is get the angle and attitude of each identical. Toe in was minimal, allowing you to see plenty of each inner face. When you get all that right, you lose the slightly thrummy quality to cello and the chestiness that

infects voices. What remains is glorious.

Driving the Perigees with either the RADIA or the Conrad-Johnson Premier 350, each fed by the Vibe/Pulse or Hovland HP100, the overall coherence of the signal chain was just what the speakers ordered. Admittedly these are expensive ancillaries, but the FK-1Fs never failed to do them justice. Other electronics proved less successful, the speakers only too happy to reveal their character or shortcomings – especially any unevenness or roll-off, top or bottom. Fortunately it's quality

that counts here rather than quantity, which is just as well, because buying a lot of quality will cost an awful lot of money. The RADIA and Prem 350 both represent bargains in this respect. If the budget doesn't stretch that far, a decent integrated is probably the way to go, the Moon I-5 or Lavardin IT springing to mind. Likewise, a coherent cable loom will be essential, and whilst I stuck with Valhalla, the importer reports excellent results with the Vertex AQ products. I think Chord Signature represents a sensible minimum in this instance, which further underlines the quality



► Out came the Starker *Bach Suites*, and sure enough, there's the crossover, slap-bang in the middle of the Cello's range. But, and here's the surprise, it really wasn't that intrusive or distracting. Extensive experimentation nailed down its nature: a tonal shift as the signal passes to the ribbon, introducing a sheen or brilliance to instrumental colours that's absent lower down the range. However, it's much more noticeable in the first half-hour of listening, diminishing as the drivers warm through. More importantly, there's no noticeable shift in instrumental scale or position through the cross-over. I'm speculating here but my guess is that the consistent energy levels through the critical frequencies are playing a big part here. Couple that to the ear's tonal adaptability and the absence of dispersion/placement/scale

► of these speakers.

So, once you've got the system AND the set-up right, how do they sound? That quick, immediate quality is their hallmark. Voices and instruments are contained in a well-defined acoustic space, although emphasis is on the players rather than the acoustic boundaries.

The tonal character of the ribbon driver brings an etched, spot-lit quality to the stage which whilst it might not be strictly accurate is certainly attractive. The bass is tactile and deeper than you at first think, a function of its speed and agility. Deep bass lines like the ones that underpin 'Single Father' (from Jackie Leven's *Defending Ancient Springs*) are sure footed and tuneful, while the bass thuds that open his fabulous cover of 'You've Lost That Loving Feeling' have a visceral foundation that takes you by surprise.

Those low-frequencies provide a solid foundation for the stable and beautifully separated mid-band, although overall, there's a lightening of tonal colours that robs Jackie's voice of some texture and substance. What you are trading here is quick, agile dynamics for the last word in harmonic textures and development. It's a balance that plays to rock, pop and large scale orchestral music while leaving itself more exposed on simpler acoustic and jazz material. The space and dynamic scaling of the Johanos/Dallas *Symphonic Dances* is impressive indeed, the tonal subtlety and voicing of Narcisco Yepes' guitar less so. You pay your money and take your choice – just


look at your record collection first.

I've dwelt on the contrasting strengths and weaknesses of the Perigee speakers at some length – which creates the danger of a negative sounding review. Well, that's far from the case. It's just that the particular balance of compromise with this

speaker is quite distinct from its many price peers. What you are actually getting is a wide-bandwidth speaker with superb dynamic speed, transparency and the best executed crossover I've come across in a hybrid design. Most ribbon or ribbon hybrid speakers tend to be fragile,



inefficient or awkward (for which read expensive) to drive. They often come with extortionate price tags. The Perigees suffer from none of these failings, and in material terms

alone, it's hard to argue with the content given the price. They also go loud. Pretty much as loud as you're likely to want. As such, the FK-1Fs make a serious stab at delivering the theoretical advantages of their technological blend whilst neatly avoiding the many possible pitfalls. Their real strength lies in the fact that they actually make accessible AND useable, the benefits of ribbon technology. Like any technology that comes with its own strengths and weaknesses, but at least you now have the option to decide for yourself whether it's for you. If so, then practical, capable and chock full of serious engineering the Perigees represent a highly enjoyable bargain. Apparently, there's a full range model in the offing. Now that I'd like to hear... 

TECHNICAL SPECIFICATIONS

Type:	Ribbon/moving-coil hybrid
Bass Loading:	Twin port differential reflex
Drivers:	1x Perigee laminated ribbon mid-tweeter 2x Peerless 165mm fiber coned bass
Crossover:	1kHz
Bandwidth:	28Hz - 22kHz ±3dB
Impedance:	4 Ohms
Sensitivity:	92dB
Dimensions (WxHxD):	285 x 1100 x 410mm
Weight:	40kg each
Finishes:	Black or silver as standard. Other colours to order.
Price:	£5000

UK Distributor:

Reality Audio

Tel. (44)(0)121 356 2697

E-mail. realityaudio@btopenworld.com