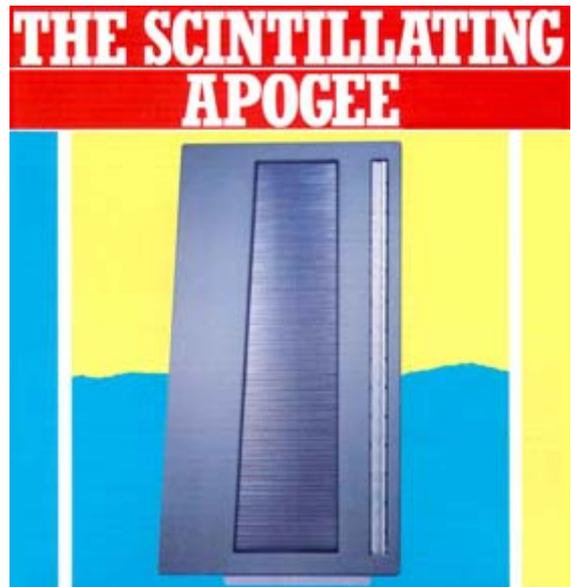


Martin Colloms, Ken Kessler & John Atkinson live with the Apogee Scintilla ribbon loudspeaker

One product-three reviewers? Doesn't this seem like journalistic overkill at best or self-indulgence at worst? The answer, of course, would be 'Yes', if the product in question were conventional, but from the moment I first heard the Apogee Scintilla, playing a John Diamond PCM-F1 Beethoven recording at the 1984 Chicago CES, I knew that not only was this loudspeaker unconventional in concept, it was also out of the ordinary regarding its sound quality. To put it mildly, I had never heard such a breathtakingly natural reproduction of orchestral sound and image in the adverse circumstances of an hotel room in my life. I vowed then that, when the Scintilla reached the UK, it would get the full review treatment, afforded in the past to a handful of products Quad ELS, Quad 405, Decca and Koetsu cartridges, Spendor BC1, Linn Sondek, Quad ESL-63, Celestion SL600, Audio Research D-70, Krell KSA-50, Magneplanar MGIII, Compact Disc -that have blazed new trails.



Stanley Kelly, responsible for the design of the ribbon tweeters manufactured by Decca Special Products, looked at the history of this most basic of magnetic drive units in HFN/RR in January '85. It is nothing more than a practical realisation of Fleming's Left Hand Rule: a conductor loosely hangs between the poles of a magnet; when a DC voltage passes down the conductor it moves one way; when the current passes up, it moves the other. Apply an AC voltage and the ribbon oscillates, moving the air and producing sound.

Unfortunately, unless the magnetic field is very strong, or the ribbon is very large but light, it doesn't produce much sound. The ribbon also has tiny impedance compared with a conventional loudspeaker and if driven directly by the amplifier will cause large currents to be sucked from it. These restrictions in the past have meant that the ribbon principle has been almost exclusively used as a tweeter: transformer matched, to bring the load impedance up to a level compatible with conventional amplifiers; and with a horn in front of the diaphragm to increase the sensitivity to a level where useful sound pressure levels can be achieved without the use of prohibitively expensive magnets. (One of the least coloured of all microphones, which can be regarded as a tweeter working in reverse, the BBC 4038, is also a ribbon.) There is nothing in principle, however, that prevents a ribbon being used as a full-range driver, and it offers advantages in having inherently low levels of resonant coloration and, with attention paid to the magnetic circuitry, low distortion. Additionally, as the driver has a very large surface area and is a very good conductor of heat, its power handling capability can be very high indeed.

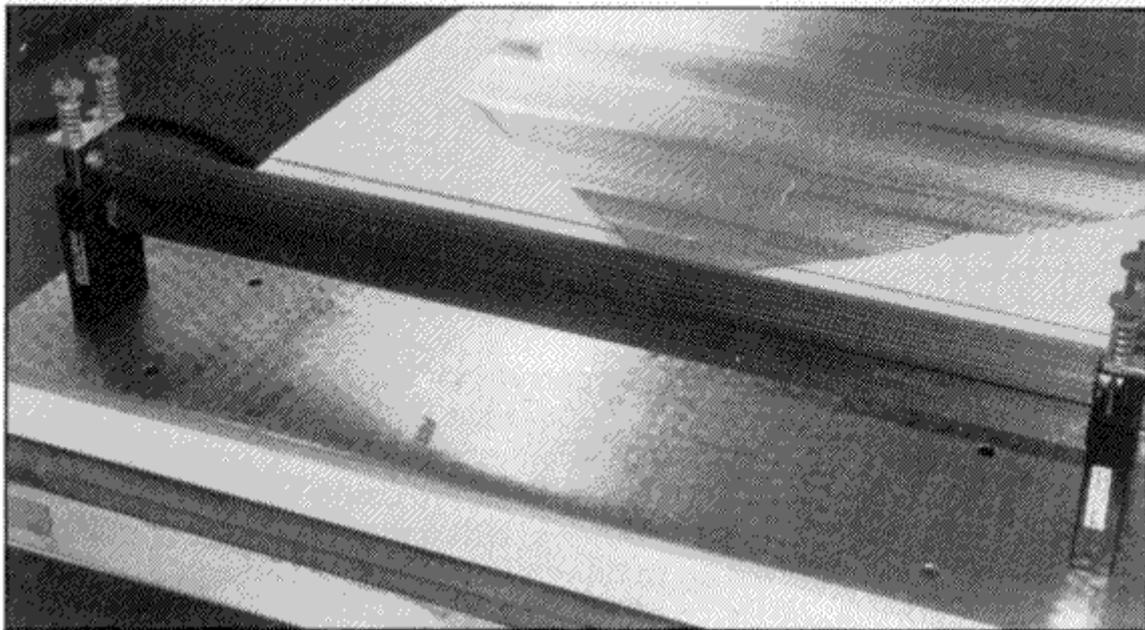
I heard my first wide-range ribbon when visiting Jim Rogers some 8 years ago. Ostensibly, the reason for my visit was to audition his then new subwoofer, but the highlight of the day was when Jim fired up his own system, featuring ribbon drivers going down, I think, to 150Hz. The sound was effortlessly pure, and although I subsequently pursued other speaker paths- Quads, LS3/5as, BC1s, Mission 770s, Celestion SL6s and '600s, Magneplanars-the memory of that ribbon midrange remained at the back of my mind.

Then, two years ago, a new company, Apogee Acoustics, launched a three-way loudspeaker using true direct-radiating ribbons for the mid and treble and an 'almost' ribbon for the bass. Nearly 7ft high, it

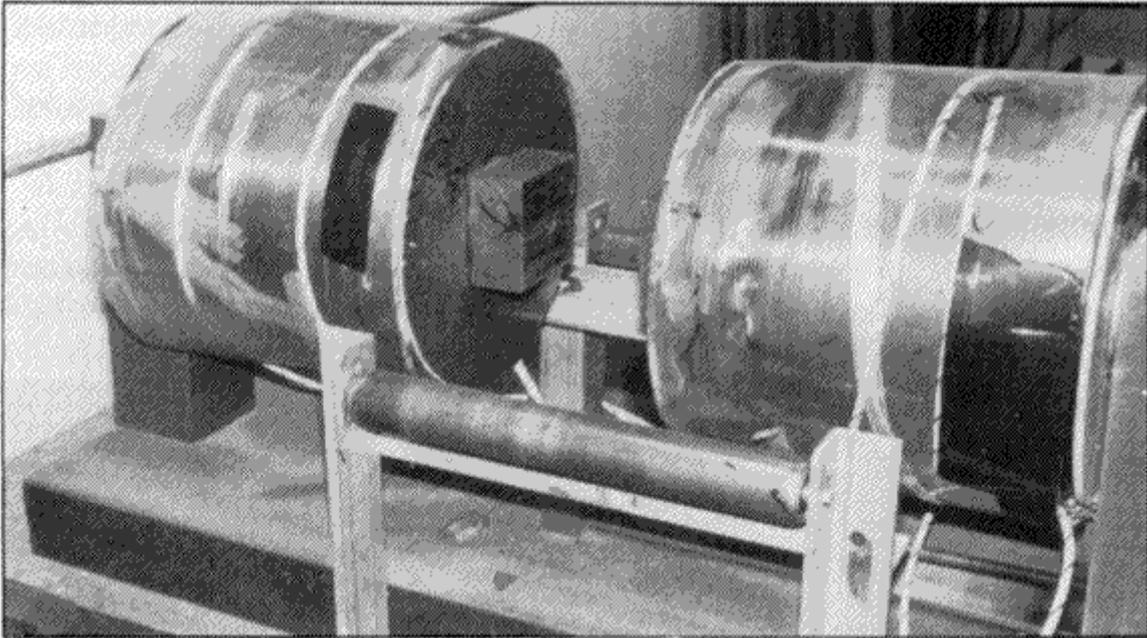
came in two sections, a trapezoidal woofer and a mid/HF enclosure. The woofer and the 80in. long ribbon tweeter had a high enough impedance to be driven direct; the 0.1ohm 2in. wide midrange ribbon was matched via a transformer. Awesome in its dynamic range capabilities- 120dB maximum spls are possible- it set the stage for the appearance of the more domestically acceptable Scintilla, selling for £4950 in the UK, which uses a smaller version of the woofer coupled with a five-ribbon array- not a transformer in sight - for frequencies above 500Hz.

Apogee are a Massachusetts company run by two people: Jason Bloom, an art dealer, audiophile and music lover; and his father-in-law Leo Spiegel, an engineer recently retired from Northrop, and who has spent his life in the aerospace industry. Leo, a recipient of the Tony Janus Award for significant contribution to the aviation industry, worked with high precision engineering projects such as the inertial navigation system for the B52, an 8ft direct-drive turntable for the motion simulation and calibration of Sidewinder missiles, and a 'pointing' system capable of accurately defining direction to micro-radian accuracy. He also became familiar with high intensity magnetic circuits when working with the use of nuclear magnetic resonance to measure inertial forces. Leo and Jason, with a friend Gary Walker, now no longer with the company, had become involved in loudspeaker design, and although their first thoughts were more conventional, Leo felt that the true ribbon, neglected commercially apart from Stanley Kelly's work, held out the potential for dramatic improvements in definition and clarity.

Back in the '60s, the only magnets available for use with a ribbon driver were very expensive and very bulky. The advent of the ceramic magnet, however, meant that what had hitherto been rather too exotic for realisation as a commercial product became practicable. Practicable is not the same as easily achievable, though, and a considerable degree of research had to go into the evolution both of the Apogee speakers and, as it doesn't mean easy to build, either, of the most efficient ways of making them. If you want to set up a company making moving-coil speakers, you can more-or-less buy all your production machinery off the shelf. Apogee had to invest heavily in their own unique tools, jigs, and such items as precision foil corrugators and a half-million ampere-turn magnetiser.

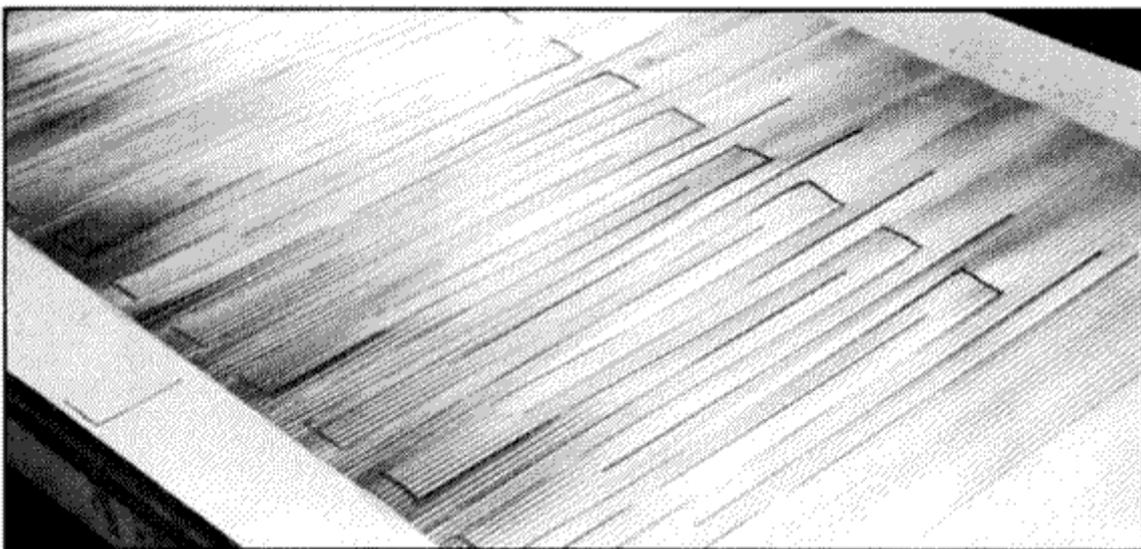


The foil, 12µm thick for all drivers, is corrugated by Apogee for strength and springiness



Part of the custom production machinery required for the Scintilla production is this half-million ampere turn magnetiser
The midrange/tweeter magnet array is magnetised in one pass

It also takes experience in handling large, awkward objects. The bass ribbon for a Scintilla takes an hour to fabricate from aluminium foil, and there are plenty of opportunities while the speaker is constructed for such a fragile object to be damaged. As other companies making unique products have found-when going around the Apogee plant, I was reminded of Quad's production line for the ELS and ESL-63- you end up doing everything yourself, and Apogee now have their own woodworking shop, paint shop, coil-winding set-up, drive-unit assembly plant and loudspeaker manufacture and testing facility.



The Scintilla bass panel, fabricated from aluminium foil, has the 83-slit conductor pattern cut by hand

What you have, therefore, is a company which has made a major investment in hi-fi, with aluminium foil, wood, steel, magnets and high quality passive components entering their factory at one end, and unique, individually tested, heavy, cumbersome, and expensive ribbon loudspeakers leaving the other. The proof is in the listening, so how did the Scintillas fare? Ken Kessler first... JA

KEN KESSLER AND THE SCINTILLA

In march 1983 I stumbled across an early pair OF THE Apogee Scintillas' seven-foot-tall brothers. I'd just driven 60 miles through a blizzard during rush hour to reach a shop in Framingham, Massachusetts, where a couple of copies of the Mobile Fidelity UHQR-pressing of Sgt. Pepper could be found. After sorting out the transaction, I caught sight of these huge panels and wandered through to the sound room. I sat. I listened. I was hooked.

It was one of those rare moments - not just in hi-fi - when something grabs you, impresses you with such force or intensity that you have to sit back and revise your standards. It was like the first time I heard Sam & Dave (at Andy Merdek's house, summer of 1966) or the first taste I ever had of good Beef Wellington (in The Gaslight, September '72) -you remember those moments, unless you lost your soul when you lost your innocence. The Apogees had it, or rather 'It' with a capital 'I'.

At the time, I didn't know that there was anything revolutionary about a full-range ribbon loudspeaker. All I knew about ribbons were that Decca made a mighty fine ribbon tweeter, and that ribbons were difficult and expensive to manufacture. I didn't know that making ribbons capable of spanning more than a couple of octaves was such a big deal. When I got back to the UK, JA filled me in on a bit of the background, and it made me even more of a convert. Not only did these things break new ground sonically, they also gave technology a strong push in the tush. But they were there and I was here and seven or eight thousand pieces of green paper with George Washington's mug on the front stood, along with the Atlantic, between me and a pair.

Come June '84 and the Summer CES witnessed the birth of a baby Apogee, to be called the Scintilla and to sell for half the price. While I still couldn't afford them, I figured that these more manageable offerings would bring the likelihood of UK distribution closer to viability, and maybe, just maybe, I'd get a stab at some. By October, I'd managed to visit the Apogee factory, with sheer luck akin to a struggling automotive journalist blessed with a trip to Modena or Sant' Agata. I don't know if it was the heavy breathing or the salivation which prompted Jason Bloom to ask if I'd like to review a pair for HFN/RR. compared with conventional box loudspeakers.

'Sh-sh-sure,' I stuttered, hoping JA wouldn't grab these as he did the D-250, SP-10, SMGas ...

They arrived in January, 10 stone each and taller than my wife. These speakers are big, not the sort of things you install on your own, or if you've got a bad back. Both I and my volunteering best friend have been known to frequent osteopaths, but we couldn't resist. We did it anyway.

We had to unpack them in the street, because the instruction manual says 'Clear a space 8x8ft' and I didn't think my wife would appreciate me moving the dining room table into the lounge. Besides, we had to shlep these up the stairs, and going straight in the front door was easier than turning any unnecessary corners. For once, it didn't rain in January.

You'd think that two flat panels, though they weighed so much, couldn't be that unmanageable, but then you've got to get a grip on them without (1) putting your hands, feet or knees through the ribbons (unless you can hump them up the stairs in their boxes), and (2) you've got to manoeuvre them so that the Nextel finish doesn't end up pock-marked. A step at a time was the way we did it, huffing and puffing and worrying about screwing up someone else's five grand.

Once we'd got them in the salon d'hi-fi, we set them on their sides, one holding the panel upright while the other fitted the metal baseplate and the struts. Careful shimmying and we figured that they were just about ready for preliminary listening, if not the all-out, impossible-to-fault set-up I knew we had yet to accomplish. Indeed, from the time the van pulled up until the first notes were heard was just

over two hours; you should be able to do it in half that time if you order a pair with the impedance correctly set for your system.

Because the manufacturers know this product intimately, they are considerate enough to lay down certain ground rules. Unlike the majority of loudspeakers, the Apogee Scintillas are truly amp-fussy, cable-fussy and position-fussy; they can be driven in three ways (single amp, single amp bi-wired, bi-amped); and the user has a choice of nominal 4ohm or 1ohm (yes, a lone ohm) impedance. I had to use the Apogees in the 4ohm mode (because of my valve fetish); the pair arrived arranged for something of the Krell variety, and the time added to the installation was due to rewiring the speaker terminals for the higher impedance. This is described in full in the owner's manual, and can be accomplished by any literate individual who doesn't suffer colour-blindness, but it is time-consuming.

Your own finances will determine whether or not you use a single stereo amplifier or bi-amplify, but bi-wiring, if you choose the former, is mandatory. The Apogees can be driven by a single set of cables to a single pair of binding posts; bi-wiring is a desirable option requiring two sets of cables from the amplifier's output terminals to separate pairs of binding posts for the bass ribbons and the mid/treble ribbons (tri-amplifying or tri-wiring is not possible, though the Scintilla is a three-way system). I tried the standard, single-cable method when a crazed DIY mood hit (yes, you have to dig inside to change the terminals for single or bi-wire mode), just to see if the cost of extra cables was justified, and it proved to be so, especially in the area of bass control. Additionally, as the Apogee even using it as a 4ohm speaker - is such a low impedance load, the extra cables allow for better transmission of current.

The internal wires, from the complex crossovers (two sets, one per impedance) to terminal strip, are special cables made by Monster for manufacturers' use; the stout, gold-plated binding posts are Monster products as well. Because of the occasional need to change the wiring around, the cables are connected to the terminals and the binding post via closed spade terminations rather than soldering. The four binding posts are colour-coded for bass plus-or-minus and mid/treble plus-or-minus. The handbook suggests that you experiment with placement; in your eagerness to hear these beauties you'll set them up, position them as your gut tells you a dipole-cum-line-source-cum-panel should be, switch on, and be treated to sounds of truly high calibre. What you will not hear is what these speakers can do when positioned to the centimetre.

What it needs

Long before you hit upon the exact positioning, you're going to hear all the nasties your system can deliver, no matter how high a pedigree it might possess. The revealing nature of the Scintillas is, in my experience, only equalled by the brutal Stax Lambda Professional headphones; expect to readjust your turntable, arm and cartridge, to clean and Tweak all plugs and sockets, to dig out a variety of cables, and to fine-tune your ears. And assuming that you've discussed with your Apogee dealer the amplifiers in your possession, you plug the whole lot into electronics capable of delivering real power into an adverse load. I don't listen at earth-shattering levels, and my room is tiny, but I've driven a 300W/channel amplifier into clipping on normal material. If in doubt, think of the Krell KSA-100 as the minimum safe bet; otherwise, be prepared to watch amp after pedigreed amp fail to meet the challenge.

Because I've been living with a pair of Scintillas for five months, I've managed to try them with no fewer than 16 cartridges, five preamps, five power amps (serious), and two small-ish power amps (just for the hell of it). The only constants have been the Oracle turntable and the Zeta arm; I've genuinely lost count of the number of cables sampled. It wasn't until mid-May that I felt so confident about the system that I could only improve on it by moving to a bigger room; sorting out the positioning only occupied the first month.

While Jason Bloom of Apogee deems the Scintillas far easier to locate than I do, he does concur that movement of a mere centimetre can have quite noticeable effects on the shape of the soundstage. My goal in locating the Scintillas, besides giving them enough breathing space and obtaining a correct amount of bass relative to the room's own behaviour, was to find the best compromise between stage width and stage depth. As the manual suggests, the user should start with a tiny amount of toe-in, using more, or less, as you become familiar with the speakers' characteristics. After a month, I hit the right spot, which -in my room - is 26in. from the sidewalls, 25in. from the back wall, toe-in of 3in. (meaning that the speakers' outer edges are 28in. from the back wall), leaving my ears 76in. from the centre of each baffle. The speakers tilt back very slightly; there are no gains to be made - in my situation - by altering this slope. (Oh, and you needn't worry about spikes. Ten stone admirably couples the speaker to the floor, unless you happen to have shag carpeting the depth of a loaf of Hovis.)

Knowing when you hit the sweet spot is just like setting VTA: everything snaps into focus. You can over extend stage width, but at the expense of depth and vice versa. When you've got it right, you'll know. And the reason why I'd suggest you tackle the physical location before you carry on with the task of cable selection or amp suitability is that once you've got these sited, any remaining tasks will involve the rest of the chain.

There is one other consideration, again felt to be unnecessary by many, that I learned of via Marantz's Ken Ishiwata, a ribbon aficionado and possibly the only true hi-fi nutcase employed by a major Japanese manufacturer. Prior to the arrival of the Scintillas, he advised me to run them in for about 100 hours, suggesting that this frees the speaker in the same way you'd run in a car. I couldn't resist listening to the things the minute they were ready, but I did leave them running (FM interstation noise) for four days, checking periodically. To my ears, Ken was right. And if you think that this seems like an extraordinary request to make of someone simply dying to hear his new goodies, rest assured that anyone owning a pair of Apogeos will pass that 100 hour mark in the first fortnight. Your friends and family will lose sight of you for days on end; I've given them over 500 hours in five months. (Note: this does not mean they need warm-up times *à la* amplifiers, but then I wouldn't know about that as I never listen to my system 'cold'.)

All this pre-pleasure preparation ends when you've determined whether or not your amp will deliver the goods. I started with a Beard P100, which drove them to acceptable levels but clipped without much provocation, and the 100W Lumley monoblocks, which did the same. The two Moscodes ('Pot Pourri', July), worked admirably in my small room, but they were too new to me to serve as the drive for a speaker needing my undivided attention. Still resisting solid-state equipment, and desperately wanting to stay with components I knew, I begged the indulgence of Bill Beard, who - in rapid order whipped up a pair of his 200W mono versions of the P100. Here were amplifiers which, while still liable to clip if driven to excess, were able to drive the Scintillas to slightly beyond the levels I prefer, before going edgy.

Before deciding that all was well, and knowing that the Scintilla was too complex and critical a component to judge without assurances that the speakers were working as God and Leo Spiegel intended, I sought the approval of both my editor and the speakers' importer regarding the set-up. Their reactions were such that I can now tell you with confidence ...

What it does

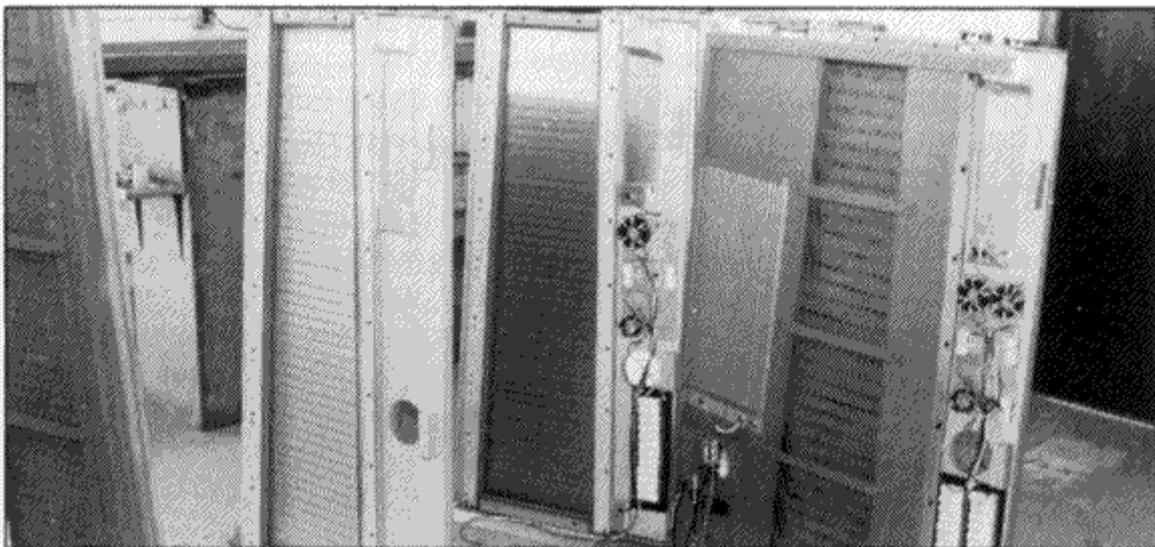
Though I've used the Scintillas as my sole speaker system since they arrived, aside from short forays into reality when reviewing more affordable products, I spent those first months letting them creep gently into my psyche. I soon forgot the hernia-inducing trek up the stairs, the problem of storing the door-sized boxes, the grazed knuckles, the leers from my wife, and quickly learned that the Scintillas

were giving me more music than I'd ever heard before. What with the continual surprises - finding low level information I'd never known existed, for example - and the steady flow of components upsetting my preferred chain, it was with relief that I was allowed the last month or so prior to writing the review to leave my system intact. The remarks to follow apply to the Scintillas' use with the Oracle/Zeta/Garrott-Decca Microscanner cartridge, the Beard P505 Mk.II preamp, and the Beard P100 Mk.II monoblocks. Then there was the fine-tuning.

I attacked the turntable with new, pre-drilled TipToe feet from the Mod Squad, and a tonearm terminator from Randall Research, to guarantee the freedom of the subchassis. HFNIRR Flux Dumpers were installed everywhere felt necessary, and I used Monster's best cables throughout, with one exception. Tonearm to preamp, and preamp to power amp cables were Monster Interlink Reference A, and the bi-wiring was done with Monster PowerLine 2 for the mid/treble panels, but experiments revealed the Absolute Wire to be preferable for the bass ribbon. Tweek was used by the syringe-full, and I stopped just short of checking my biorhythms before each session.

How do you select program material when you want to hear your entire collection from first LP to last? As I listen to about 30 new LPs per month because of my duties as a reviewer, I had no problem guaranteeing variety of material, but what would mean more to me was how the speakers handled music with which I felt intimately familiar. The earlier crack about new-found low level information is but one of the revelations.

Not wanting merely to reaffirm my love for certain performers - I could list, ad nauseum, the usual Sam and Dave, Ella Fitzgerald, and Howard Tate tracks which occupy so much of my life - I felt it necessary to feed the Scintillas as broad a diet as possible. Mono, stereo, analogue, digital, DMM, direct-cut, half-speed - I tried 'em all. As sonic spectaculars like Sheffield's James Newton Howard & Friends seem to make all systems sound that much better, I didn't let the frighteningly fast attack or carpet-curling bass impress me too much. No, I needed some standard issues for the acid test, LPs of the sort that we really listen to for pleasure, rather than for impressing our friends.



Scintillas awaiting the aesthetic finishing touches, 6dB/octave crossover filters use air-cored inductors and high quality 10 μ F plastic film capacitors in parallel. Very high tolerance woodwork is required to get predictable spacing of the woofer ribbon and magnet over the large distances involved

Take, for instance, something as mundane as the Eagles' Hotel California. By mundane, I mean that you don't have to look hard for households with copies or shops carrying it in stock or for people familiar with the music (well, pop listeners familiar with the music). As with most mega-hit bands, the Eagles were able to command the best, and their recordings are terrific despite being studio-generated

and therefore artificial as hell. Indeed, when the wife of a known classical-only fetishist asked to hear it, I knew I was on safe ground. Enter the title track:

To pick out a single instrument from a wash of six or eight or so seems trivial, but- as I grew up with a drum-playing brother- I find simple, non-Linn Drum (nothing to do with the Scottish manufacturer), real hit-the-skins bass percussion a telling sign of a speaker's low-end capabilities, bass transient proficiency, power delivery, and - if there's a bass guitar trying to smother it - resolution. As the Eagles placed equal importance on all the members, their drummer got his fair share of the tape width. The kicks in 'Hotel California' more often than not sound like a wet cardboard box, a boxer's punching bag, or the digestive symphony which follows a vindaloo. Surprise, surprise: through the Apogeos, the sound was that of a real bass drum. If you've heard the genuine article, you'll know that you can feel it, too, and that it's a lot louder sound than you'd think a man could produce using a foot-operated mallet and a skin stretched over a frame. No sogginess, no overhang, just reality. When the bass guitar comes in, the drum remains. So much for following the line when in truth you probably have two or more. But drums ain't everything; for me it all gets down to the most important instrument in all of music, and how it's presented in scale:

Voice.

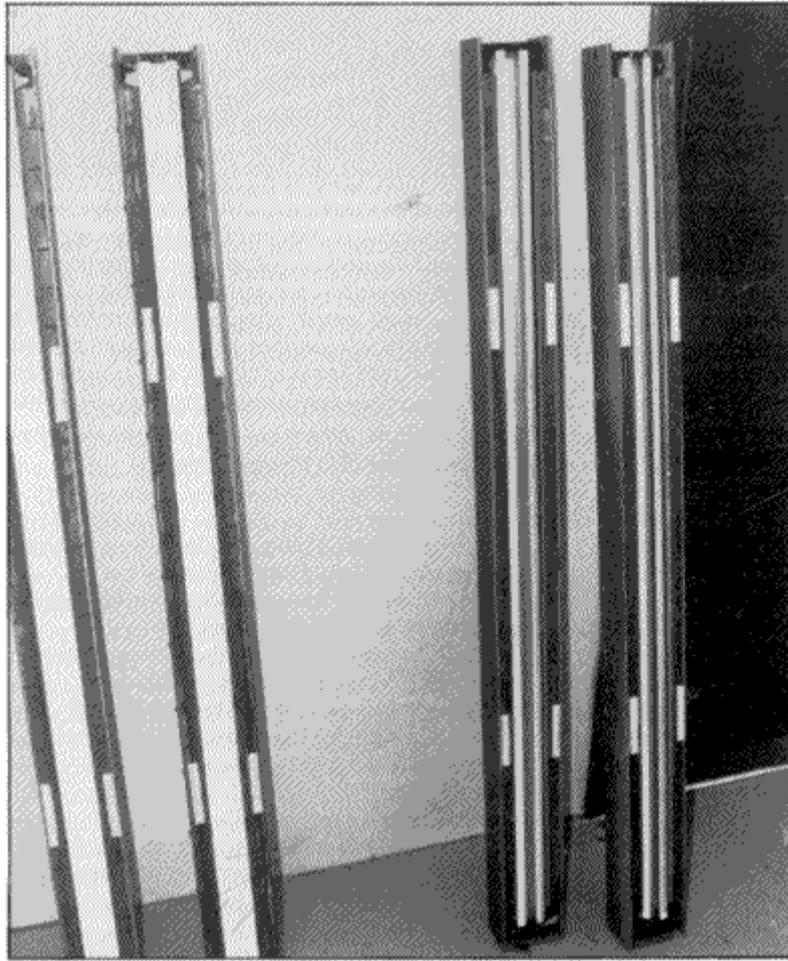
The good thing about voice is that you don't have to travel very far or pay money to hear real ones. And while my wife's voice or JA's voice bear no resemblance whatsoever to Kiri Te Kanawa's or Willie Nelson's, they do give indications of realistic levels (conversation and spoken word LPs are great test discs), and a friend with a lisp will tell you more about sibilance than any bad hi-fi system. So, to show me just how good or bad a component is, I fed it the Persuasions' No Frills, a cappella from alpha to omega.

When a system is asked to reproduce five or more voices which by design are meant to blend as one without losing a single singer, the system has to have resolving properties beyond reproach. And - as in reality - it doesn't mean just being able to hear each individual sound (despite the design to make up a whole), it means being able to pinpoint each vocalist in his or her own space. The Apogeos not only locate each Persuasion in the left-to-right and front-to-back planes, they also tell the listener which vocalist is a giant and which a runt. And, yes, Jason Bloom is a Persuasion fan.

But on to another, this time a guitar. Adrian Legg is regarded by many as the fastest, slickest, most inventive guitarist in the land, sort of like mixing Alvin Lee's speed, Leo Kottke's sensibilities, and Ry Cooder's eclecticism and coming up with a guitar hero to beat the lot. His LP, Technopicker, is solo guitar, but he makes it sound like three. The recording is superb, and the sheer power he conveys just with a lone guitar will tax most set-ups. As he produces notes faster than McDonalds makes fries, there's lots of room for confusion. And you can bet that he gets all three ribbons working.

What the Apogeos did with Adrian Legg was put him right in the room, no more and no less. And considering that that's all you want a hi-fi to do, I'd have to say that the Scintilla does just what a speaker should. Each note came through loud and clear, whole and firm and fast and resonant. You could hear the fingers on the strings, the guitar's body, and the odd fingernail or 10. Or, as a non-hi-fi oriented guitar-playing friend said, 'Wow...'

In a way, I wish the Apogee had some severe weaknesses; it's a lot easier to describe what's wrong than to repeat again and again that 'it sounded real'. Indeed, each time something horrible would manifest itself, I'd locate the source elsewhere, like the cartridge loading or the valves being slightly off bias. The above recordings, not overcrowded with players, failed to turn up any easy-to-identify shortcomings, so it was on to the complex stuff.



The mid and treble ribbons are made as one with the magnet assembly.
Careful construction is required to place the ribbons in the optimum
position in the magnetic field

Keeping in mind that I'd been living with the Scintillas for many months, surely ample time to become accustomed to their presence, at no point did I feel I'd transcended their capabilities. Give a novice driver a car capable of more than he can handle and - provided he doesn't kill himself - his driving will improve to a level where he reaches the car's full potential. Hi-fi is like that, too, and you grow with a system in much the same way. With the Scintillas, you can expect a long passage of time before boredom sets in.

By feeding it multi-layered signals, even something as wholly artificial as the 12in. version of the Human League's 'Don't You Want Me', I hoped to find conditions where the Apogeos would show a weakness. Overkill recordings like the Human League's, though synthesiser generated, cover a wide frequency range, contain lots of fast, conflicting transients, and tend to pour notes with such rapidity and in such quantity that it's too easy for the system or the listener to lose track of what is happening.

No matter how cluttered or chaotic a performance I selected, I could not get the Scintillas in a muddle. What this means for lovers of complex works like Schoenberg's Variations For Orchestra (Op.31) is the unsullied portrayal of pieces which might otherwise suffer in translation from groove to ear. While the Scintillas excel in this area, I still found my greatest rewards in smaller works, if only because I listen mainly for relaxation rather than challenge. This, not unsurprisingly, leads me back to the Scintillas 'capabilities with voice, and with a burning urge I have to stop discussing the parts and get on to the whole.

Scintillations

Forgive, please, the use of synecdoche to discuss the total impact of the Apogee experience. As there are more types of music out there than any reviewer, no matter how conscientious, could ever hope to feed through components under review, he has, by necessity, to choose select pieces for his evaluation. I'm opting for larynx and lungs, though the time spent with these speakers has enabled me to hear how they deal with everything from Salsa music via CD to mono Beatles recordings via TEAC open-reel to Baroque on virgin vinyl. I've got a few humdingers in my collection from singers with voices like angels, and their chill factor - spinal rather than epidermal - tells me more about a piece of hardware than any torture track Shure or Ortofon can create. Therefore, I'm using a formula of Voice = Music, though these voices do bear some accompaniment.

A certain American country/pop vocalist named Juice Newton belies her genre by avoiding the usual sub-Dolly Parton cliches. Her taste in music is immaculate, and I reckon that she'd knock Linda Ronstadt out of the running if her mammarial endowments were as oft-exposed. Her voice is clear, with the intensity of a Patsy Cline, and she does one hell of a good job with soulful material despite her peach complexion. Her track, 'Break It To Me Gently', is a gutwrencher in the best torch fashion, and she rivals the aforementioned Ms Ronstadt in range and power. It is capable of turning even cynics to jelly via transistor radio, telephone, or two tins and a piece of string.

Through the Apogees, all is revealed. She is presented in front of the musicians, singing her little heart out, and you have to be devoid of any sense of the visual to avoid picturing her swaying, keening form. Sounds hyperbolic, huh? Well, you've just never heard that track through the Apogees, that's all. My tendencies towards exaggeration have been tempered by constant exposure to superior hi-fi systems, and JA forces me to use discretion; the Apogees say, 'Too bad, kiddo. Dig out your list of superlatives'. I could go crazy and tell you that I almost hear the blood coursing through her veins, but that's too trite. What I can hear is a real, live vocalist in the middle of my room, and I didn't have to share the experience with 10,000 other concert-goers, either.

The sound fills the room from outside to in, the soundstage not bounded by the physical presence of plaster and wallpaper. The instruments stand behind and around Ms Newton, with accurate height - she seems neither Lilliputian nor Brobdingnagian - and utter solidity. No, I haven't walked between the speakers while it's playing to see if I meet any physical resistance, but my ears tell me I would if I tried.

I said she has good taste, and the guitarist who rips out the mournful middle eight rivals Elvin Bishop's masterful work on 'Fooled Around And Fell In Love'. The notes really do soar, and you wonder, on first listening, if either the system or the guitarist will run out of range. Assuming that what's in front of the Apogees is worthy of those speakers, it will never happen. I don't want you to think that it's a frequency sweep reaching for infinity, but you do get that impression.

As the Newton track has full backing, it's a bit too much to show the utter delicacy of these speakers; you want to hear something sparse and totally acoustic. The Persuasions' 'Slip Slidin' Away' and Poco's 'Keep On Tryin' ' both fit the bill nicely, the former because of the vocalists' varying textures - from deep-in-the-belly bass to near falsetto - while the latter is more of the sweet Beach Boys/Hollies variety. I've already said that the Apogees give each vocalist his own space, allowing the voices to blend yet remain distinctive should the ear choose to focus on an individual. Again on the physical, rather than sonic side of the presentation, the Apogees have an uncanny way with representing (what I assume is) correct height. All this gives the Scintillas their authority in the areas of soundstage and dimensionality, but the bottom line is the sound.

I've never swallowed any of the guff about not being able to recognise a tune or a melody or a rhythmic pattern unless it's played through certain products, because my ears, brain and heart prove that I can identify a song whether it's coming through the ether, the world's finest hi-fi, or over a walkie-talkie. Ghetto blaster or state-of-the-art system, I'll lip-synch to Sam and Dave and I'll even tap along with Al Jackson. No, the difference is in the subtle details; that's what separates the so-so from the brilliant. What the Apogees allow through with these recordings are the sounds of real mouth activity, like breathing and tongues hitting palates, though I draw the line as to whether or not I heard tiny saliva bubbles between gum and cheek. For those who do believe that rhythms can be lost in less than the best, note the metre established by the Persuasions' bass vocalist.

If you think I've devoted too much space to the way the Scintillas deal with voice, it's only because I've never heard any speaker deal with this touchiest of instruments with such total command. Some listeners have found the Apogees a bit soft in the bottom end, and slightly dim or recessed in the upper mid, neither of which upset my listening because of the way the Decca and my room influence these areas; if those are the Scintillas' main weaknesses, then their capabilities with voices are the main strengths.

But how do you pick out virtues when they're all intertwined? The Scintillas are, for me, unrivalled for speed and transient recovery, the attack on fast passages leaving the listener somewhat breathless. They are devoid of any colorations related to their physical structures - you cannot go back to boxes after these - so that they 'disappear', leaving only you and the music. Sounds can be located with pinpoint precision as emanating from areas which you know are solid, non-moving objects, like the outer baffle. It's disconcerting.

Which leads me to the typical initial reaction, the response elicited by most listeners upon first facing the Scintillas. Some register disappointment, so unusual is it hearing such a lack of artificially induced excitement, but most register surprise and say things like, 'I know I heard a cymbal coming from your record cabinet', meanwhile shaking heads in disbelief. Then there's 'How do you get one instrument up there and another down there?' and 'What happened to your back wall?' There are no arguments about the existence of front-to-back depth after you've heard the Scintillas, no snide cracks about suggestibility and audiophilic wishful thinking. No, you show the layman what transparency means, and why their Amstrads are not hi-fi. You convert people and they end up apologising to you for calling you a hi-fi crazy.

It goes like this:

Lloyd G, 34, music fanatic, anti-hi-fi: 'Amazing.'

Kevin A, 28, music fanatic, hi-fi cynic: silence and humility.

Peter B, 35, audio junkie: 'How much and where?'

Anthony M, aged 34, clarinettist: 'I'm having a pair.'

Gordon L 33, acoustic guitarist: 'Wow. . .'

Betty K, 31, reviewer's wife, anti-hi-fi: 'Oh, they're nice.'

That last is the highest accolade imaginable, by the way.

Not that all was sunshine and glory, of course. Some people object to the styling, thinking them too Star Wars-y; to them I say 'So what?' Others object to the price or the size; to them I say 'You get what

you pay for it/it's big for a reason'. But most, like me, say, 'Where can I get £5k?'

No apologies are needed for the cost or the size or the styling or the difficulty in driving these speakers. The results speak for themselves, and if that's what it takes - ribbons are swine to manufacture - then so be it. The Apogee Scintillas have, for me, no rivals below twice the price, they reproduce music with such sheer competence as to make all previous standards redundant, and they deserve to be heard by every music lover- whether he or she can afford them or not - in the same way that every art lover should visit the Jeu de Paume, even though he or she will never own the paintings inside.

Apogee named these well, but I think that the company should change its name to Apogee-nius.

MARTIN COLLOMS AND THE SCINTILLA

Although planned for some months, the arrival of the Apogee Scintillas could not have come at a worse time. The decorators were in and an acoustically-isolating wall was under construction in my listening room. There was hardly anywhere to put two large loudspeakers, let alone my own pair of Magneplanar MGIII's. The doorbell rang at 8am one Saturday morning. Two burly van drivers pointed to a palletted shipment which had been loaded into their lorry by a forklift truck at Heathrow. 'We can't lift this,' they said. The Apogeos had arrived.

An hour later, the two drivers, my assistant and myself had managed to dismantle the packaging (weight around 360lbs), get the Scintillas up the Victorian staircase to my listening room on the first floor. We had also decoded the instructions and fitted the stabilising aluminium bases. By this time, our 'new' living room was looking a little worse for wear, my wife had left muttering rude words under her breath, and I was thinking of asking John Atkinson for danger money.

I had initially wanted to run the Scintillas as part of my reference system, driven by an Audio Research D-115 valve power amplifier; it was then that I found that the speakers had been set in the factory to a 1 ohm impedance, something the D-115 wouldn't even look at. Another hour was to elapse, therefore, before I had successfully rewired the speakers as per the instruction manual to a nominal 4ohm load. What with further shifting of the room contents, little listening was going to be possible that day. The space problem was further aggravated by the arrival of two mono Krell KMA-200's almost unliftable brutes deemed useful by Ricardo of Absolute Sounds for driving the Scintillas on their 1ohm setting.

My problems were not yet over. Even on the 4ohm setting, my D-115 was clearly not too keen on the Scintilla load factor, while one of the Krell 200's had a buzzing relay which mitigated against comfortable low level listening. No other suitable amplifier was available during the review period, so I requested a Robertson Forty Ten, which was supplemented later on by a new series Krell KSA-100 which JA had brought back from Chicago as hand baggage specifically for this review.

Ken Kessler had also had amplifier problems with Scintillas as his preferred Beard P100 would not achieve decent levels. His solution was to acquire a second P100 and drive each speaker with a separate P100, the two channels strapped together to provide suitable drive. If nothing else, these experiences helped expand the knowledge base of the Scintillas, in particular how they behaved in different rooms.

Aesthetics & Ribbons

By my standards, the Scintilla is a large floor-standing loudspeaker, more imposing and dominant in my room despite its more compact dimensions (145cm high by 88cm wide at the base, tapering to 74cm at the top, by 9mm deep) than the MGIII (183 by 61cm). The monolithic appearance is

augmented by its dark-grey, stone-like colouring, and the black mesh grilles allow sight of the silver-grey metal diaphragms.

In my old-style furnished room, the Scintillas looked like something from the Star Wars set, their dark and almost menacing bulk and presence suggesting that they came from Darth Vader's own system. In a more modern setting, however, they are a striking piece of design, reflecting the directness of the engineering principles involved. Perhaps they would have suited my room better had they been in a lighter colour, with a more furnished grille appearance. In fact, a lighter fawn colour, called Taupe, is available to order.

Aesthetics aside, what is the Scintilla? The heart of the matter is simply the use of ribbon acoustic elements—the joy of a true ribbon driver being its singular lack of resonances. The Scintilla has one of the largest and widest ribbon transducers ever made, covering the range from full mid to high treble. The mid/treble array used is an open-backed vertical line whose fundamental resonance is well below the audio band at 1-3Hz, and even this is highly damped due to the low ribbon mass. As the name indicates, a true ribbon is a very lightly stretched foil, generally pleated horizontally to add some springiness and a degree of stiffness to inhibit a tendency to fold. Suspended between the poles of a powerful and costly magnet system, the ribbon conductor element moves as a whole: it is an ideal and elongated piston, free from break-up, driven over its entire surface.

Many so-called ribbon speakers are not in fact ribbons, but make use of a stretched diaphragm clamped on all edges like an electrostatic transducer film. The Magneplanar driver is generally of this type, with discrete conductor wires bonded to a thin plastic sheet diaphragm, although the top Maggies use a true ribbon tweeter. All the Apogeos join the non-ribbon group in respect of the large bass driver. This, like the Magneplanars, consists of a drum skin type element clamped on all sides, carrying a conductor system with an array of bar magnets adjacent to the diaphragm.

Several differences are apparent between the MGIII and the Scintilla woofer. In the case of the former, the magnets are disposed vertically, with the perforated mounting plate at the front and the diaphragm at the rear, perhaps for protection against accidental damage. In the case of the Scintilla, the diaphragm is exposed at the front and the magnets are disposed horizontally, matching the aluminium foil conductor pattern, which can be seen behind the grille. (Great care must be taken when bringing ferromagnetic objects near the speakers, since the magnetic fields involved are very powerful, and extend well beyond the enclosure. While measuring the speaker, I almost wrote off a ribbon when my steel rule was snatched out of my hand to attach itself with a sharp clunk to the frame.)

Magneplanar use a rectangular-shaped bass element, clamped at specific points to distribute the dominant resonances and smooth the response. Apogee achieve a similar result, but with a significantly lower main panel resonance, by dispensing with nodal clamps and by making the diaphragm asymmetric, mildly trapezoidal, in fact. The Scintilla bass radiator does not quite conform to the usual stretched-skin form since it is not self-tensioning and an additional compliance is introduced at the edge to allow more excursion freedom. Via adjustment of this compliance, the upper section of the woofer is tuned to the 40-50Hz range, while the lower section is set to a little under 30Hz. This differential tuning extends and smooths the bass response.

The open-backed bipolar bass radiator is used up to the 500Hz range. Slightly pleated horizontally, it comprises a single sheet of aluminium foil 12 μ m thick, with handcut slots providing the conductor pattern. The rear of this diaphragm over the slots is sealed with orange Kapton tape, this of high temperature stability as well as good mechanical properties. This massive element seems happy to move up to \pm 6mm down to a limit of 20Hz. While its total excursion and linearity will not be as good as those of a moving-coil driver, it is a sobering thought that each Scintilla packs a similar radiating area to 8 12in. (30cm) woofers—equivalent to a complete Marshall stack as beloved of heavy metal

guitarists, in fact- allowing for edge corrections.

Two conductor chains are formed in the aluminium foil, each of 2ohm impedance, which can be connected in parallel to give the 1ohm setting at reference sensitivity. If they are connected in series, this gives the 4ohm setting but with a 6dB loss in voltage-rated sensitivity. Yes, the Scintillas have a very low efficiency. For a 4ohm watt- usual reference is 8ohms - I estimate the sensitivity to be poor at 73dB/W. On this scale, the Celestion SL600 is 81dB/W (8ohms), with the MGIII 86dB/W (8ohms) and the KEF R104/2 nearly 20dB (4ohms) more sensitive than the Scintilla at 92dB/W. More on this topic later.

The true ribbon section is a composite mid/treble driver employing an array of five ribbons, four 0.5in. wide and one 1.9in. The central ribbon rolls off above 3.5kHz, while the flanking 0.5in. ribbons - two at the front and two at the back- operate in the main above this range. An interesting twist occurs here since the central mid element naturally operates as a dipole, with 'in theory 'the rear radiation out of phase with the front. However, while the front flanking treble ribbons are run in-phase with the main ribbon, as one might expect, the rear-facing treble ribbons are wired in reverse. In effect, the HF range is unipolar, representing a pulsating cylinder mounted in the 2.25in. wide vertical slot in the baffle. In the overlap region between the mid and upper treble ribbons, the sound is reinforced to the front but decayed to the rear, forcing a cardioid-type response in this range.

Slow rolloff, 6dB/octave, single-pole crossover sections are used, resulting in considerable overlap between the drivers. If these are in the same time plane and are very good, as these are, this will aid blending and offers a linear phase characteristic. It does mean, however, that with a nominal 500Hz crossover frequency, the mid ribbon drive will be only 12dB down at 125Hz, which is almost in the bass range, while the bass panel will still be going strong at 2kHz.

For 4ohm operation, the mid/treble ribbons, being single conducting elements, cannot be rematched; instead, attenuating resistors are used to drop the level by 6dB, In any case, the intrinsic mid ribbon impedance is a little under 0.2ohms, and is padded to a nominal resistance value by power resistors (unusual in that they are made from aluminium foil and stuck to the rear of the baffle).

The unusual ribbon configuration means that all five elements can share a single, costly magnet system. The location of the treble ribbons is a function of optimum placement, both in terms of the non-linear field distribution over such a wide gap, and also with respect to the acoustics of the main aperture.

Internally, a heavy gauge of Monster cable is used. The connector panel has two pairs of inputs- red/black for the woofer, blue/white for the mid/treble - these decently-sized four-way 4mm binding posts. When the panel is removed, the grille cloth may be pulled down to reveal a terminal strip where the internal connections are made for the 4ohm/1ohm impedance options. Lug terminals are fitted to aid solid and reliable reconnection, and in view of the low impedances involved, the advice given to torque down the connections well is most appropriate.

The weighty Scintilla is stabilised by a rectangular aluminium baseplate 15.5in x 19in, reinforced by angling the speaker back at around 5 degrees by means of two strong metal struts. With such a compressive mass loading, the question of floor-coupling spikes is purely academic.

The instructions advise the user to experiment with speaker position, the optimum depending greatly on room size and acoustics. Given the transparent, dipole operation, the spacing from the rear wall should be 80cm or more, aided by a slight toe-in of around 5 degrees-just a few inches. Likewise, the speakers should not touch the sidewalls, a 30cm spacing being the minimum here. Rear reflections in the upper range can be reduced by absorbent curtaining on the wall behind the speakers. Some

enthusiasts have expanded on this by using foam wedges or deeper panel absorbers. With skill and patience, the Scintillas may be 'tuned' in a given room by good placement to achieve the maximum performance.

Sound Quality

While my editor favours the lab report to come first, as the Scintilla was auditioned first and measured second, that is the order I have adopted for this review.

What with the various installation problems, my first dose of the Scintilla was with one used well off-axis to provide background music as I reassembled the room. Horowitz was playing Scarlatti (the 'live' recording at the Met), and from the first few bars I was struck by the lively dynamics and natural acoustic of the piano reproduction.

With such a pre-taste, the serious listening just had to come as soon as possible.

The sessions commenced in earnest with the ARC D-115 power amplifier, both it and the Scintilla set to 4ohms. Initially exploring the available dynamic range with solo piano, it was clear that only modest sound levels were possible, due to amplifier clipping in the midrange. Since the D-115 will happily boot a 4ohm MGIII around, even on its 8ohm tap, the Scintilla is obviously a rather tough load, confirming the comment made by ARC's Bill Johnson- 'I have nothing at present to drive these well'. However, given that restriction on maximum level, it was only with the valve amplifier that the speaker showed its true potential.

I shall prevaricate no longer.

Yes, the Apogee Scintilla is a truly great performer. It is not without flaws, as this review will show, but the magnitude of its achievement with respect to levels of coloration is so extraordinary that we shall all have to redefine our expectations as to what is possible from a loudspeaker.

Putting to one side the question of amplifier interaction and matching for a moment, how did the loudspeaker essentially sound?

Well set-up, it provided reproduction of near breathtaking clarity, focus, scale and naturalness. Very good speakers often manage a good measure of these qualities over a restricted area, such as the midrange, or, by fine design, offer a reduced measure more evenly balanced over the whole frequency range. By contrast, the continued pleasure offered by the Scintilla concerns its ability to provide high sonic standards throughout the complete range. And as if this were not enough, it has a remarkably extended bass response, solid right down to organ and bass drum fundamentals, and capable of realistic- if not excessive- levels.

It would take many pages to convey fully the performance over a wide variety of program, so only brief descriptions must suffice. Piano reproduction was outstanding, with a wonderful rendition of the left hand and a sparkingly alive right hand register. The sound was the nearest to a real piano I have yet heard. Human voice was likewise very well reproduced. The full character and complex inner modulations of good singers voices were strikingly revealed in a manner which enhanced the feeling of communication with the music. A voice could soar through the range without any strain, hardness or unevenness. Sibilants and formants were perfectly natural, articulated with subtlety and control.

In the treble range, instruments rang and sang with full tone colour and precision, without 'jangle', grain, or 'fizz'. In the bass, the articulation of harmonic character defined a natural instrumental tone, the type of instrument and the manner of playing. No limit seemed to be placed on the reproduction of

deep bass, while overall the bass was accurate and 'fast' in the transient sense, totally free from enclosure effects.

Capable of providing high sound levels with the right matching, the Scintilla reproduced large-scale works with great authority and power, plus a natural sense of scale and perspective.

Stereo imagery was also large-scale, stretching in width beyond the visible limits set by the enclosures, and also showing good height. With the best amplifier, stereo depth and the reproduction of recorded ambience were exemplary. In addition, it focused very well, which is unusual for such a broad-fronted speaker, its image sharpness rivalling some of the finest examples in this respect. As in other areas of performance, the Scintilla's excellent imaging was maintained throughout the frequency range. Indeed, for the first time in my room, a clear sense of localisation was obtained on sounds with fundamentals extending as low as the mid bass.

So far I have covered the positive attributes; what about the negative? First, there was some moderate inaccuracy in tonal balance, the subjectively perceived frequency response. It is, by almost any standards, clearly bass heavy. The speed and clarity at low frequencies does much to compensate for this imbalance, but it remains an obvious feature, exaggerated by a withdrawn region in the presence area, 1-3kHz. A rich tonal quality and a distant perspective are the result.

The presence region is also the frequency range where an excess can lead to a characteristic 'hardness' or 'ringing'. The Scintilla, however, offers the reverse effect; in fact, it is a mite too soft. In consequence, mid transients and percussive sounds are 'rounded', and the speaker also lacked some 'attack' and dynamic impact. On the plus side, though, this did endow it with a supremely relaxed nature. On program that was already boomy or rich, the Scintilla sound could go over the top, with a bloated and unduly soft sound as the result.

At the risk of a mild sacrifice in low bass, as well as a slight loss of midrange depth with a mild impairment coloration, the speaker's low end can be muted by fine-tuning its position with respect to the rear wall. The minimum 0.8m spacing worked fairly well in my room, though I also had to choose a seat position which did not exploit the full bass power and evenness of the room. Used further out, the mid clarity and depth were superior, but the bass level then was clearly excessive. It is possible that in either much smaller or larger rooms, the bass excess will pose less of a problem.

To return to the amplifier question, I felt the Scintillas attained the maximum in musical naturalness with the Audio Research D-115. This does not just apply to the mid register but also to the entire range from low low bass to the highest audible frequencies. The D-115's inability to produce more than adequate (by the standards expected from such a line-up) volume levels, prompted me to try one of my inexpensive audiophile favourites, the Robertson Forty Ten. The maximum volume was now several times greater, quite realistic and more than satisfactory. In terms of available dynamic range, the 4ohm Scintilla/Forty Ten combination compared well with a current combination favoured by enthusiasts, namely the ARC D-70 with the MGIII.

From this baseline, which was not felt significantly to compromise the Scintillas in other respects, I progressed to a current series Krell, the KSA-100. With the Scintillas still set on 4ohms, this gave some improvement in headroom and scale, plus a touch more ease, and also showed an improvement in clarity and definition compared with earlier KSA-50s and '100s. For ultimate subtlety, however, I would probably still go for the Forty Ten here.

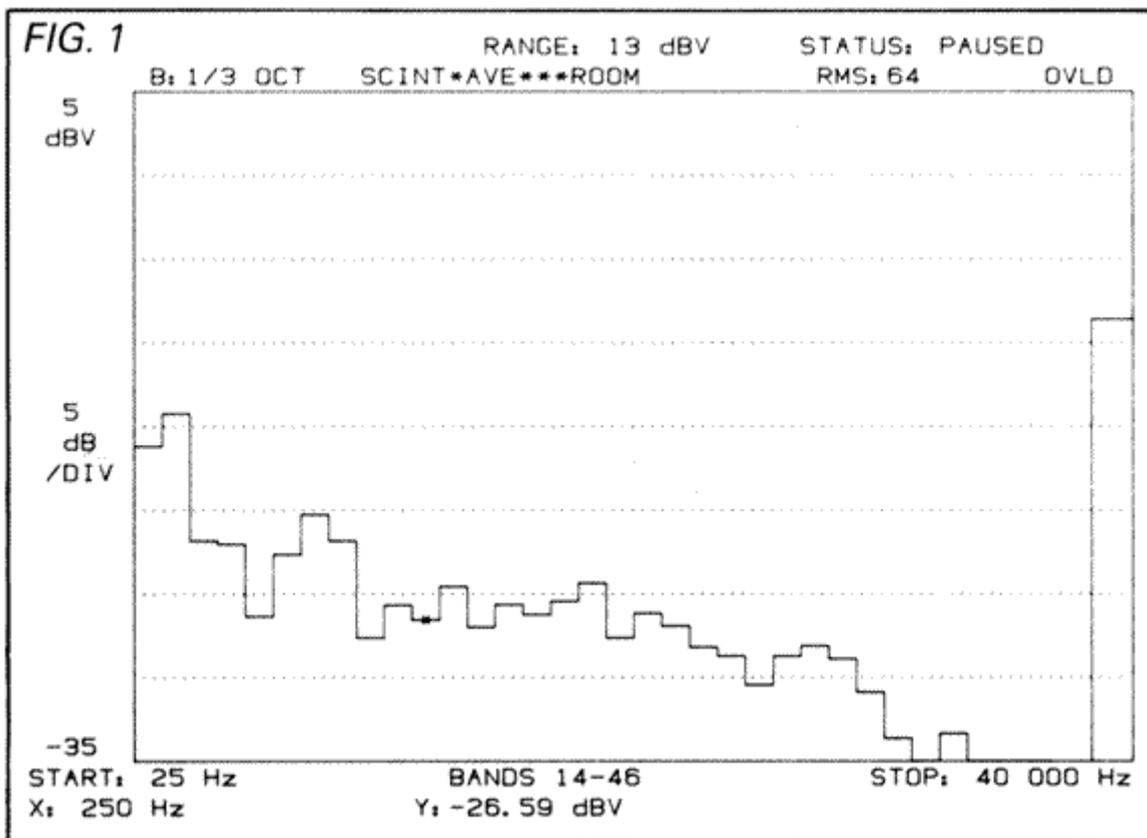
However, the picture altered when the Scintillas were rewired in 1 ohm mode. The Robertson was now outclassed by the sheer guts shown by the Krell which serenely delivered whatever huge currents the Apogees demanded from it. Now the peak sound level seemed subjectively limitless; clean

reproduction was possible with a majestically effortless intensity. In the absolute sense, the Krell's high standard of sound quality seemed unimpaired. Moving on to the KMA-200's seemed unnecessary, but still higher dynamic sound levels were possible, sufficient for very large rooms at accurately realistic intensities. Additional control and stability of the stereo image was also noted.

The Apogee's tonal balance will provide some accommodation for mild 'hardness' in the accompanying amplifier, should this be present. Paradoxically, it is simultaneously revealing yet forgiving of moderate subjective faults in amplifiers.

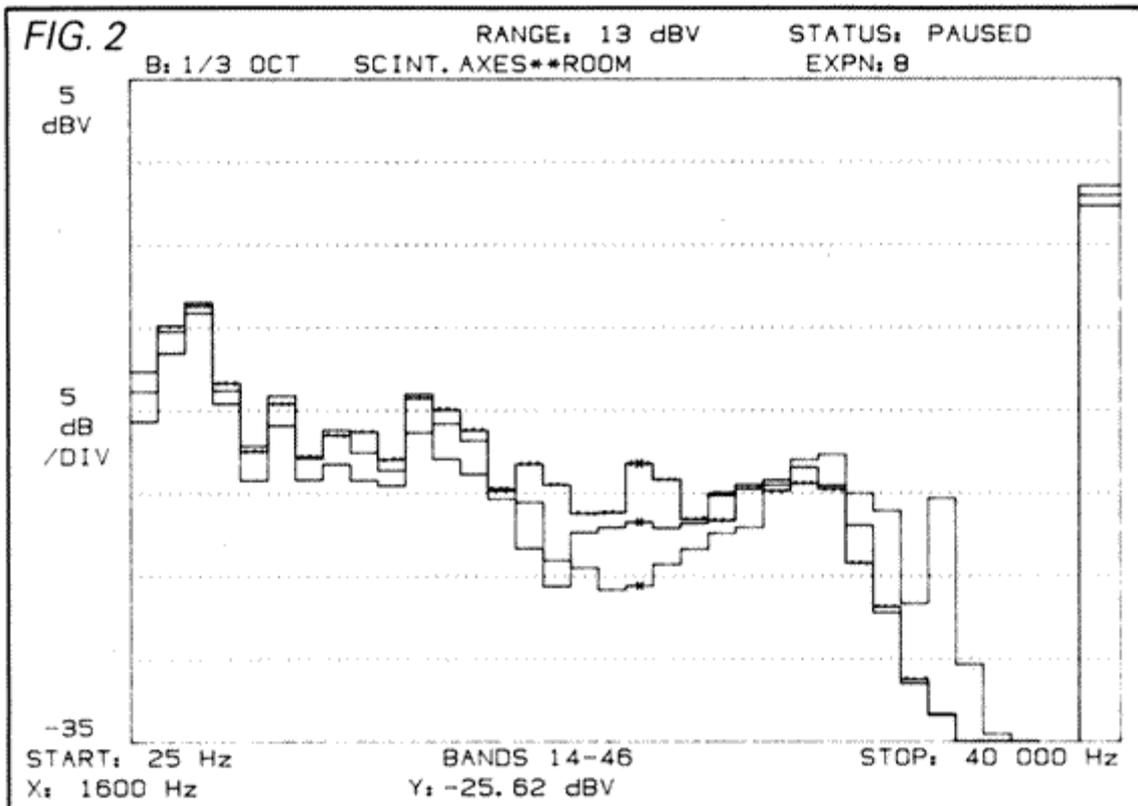
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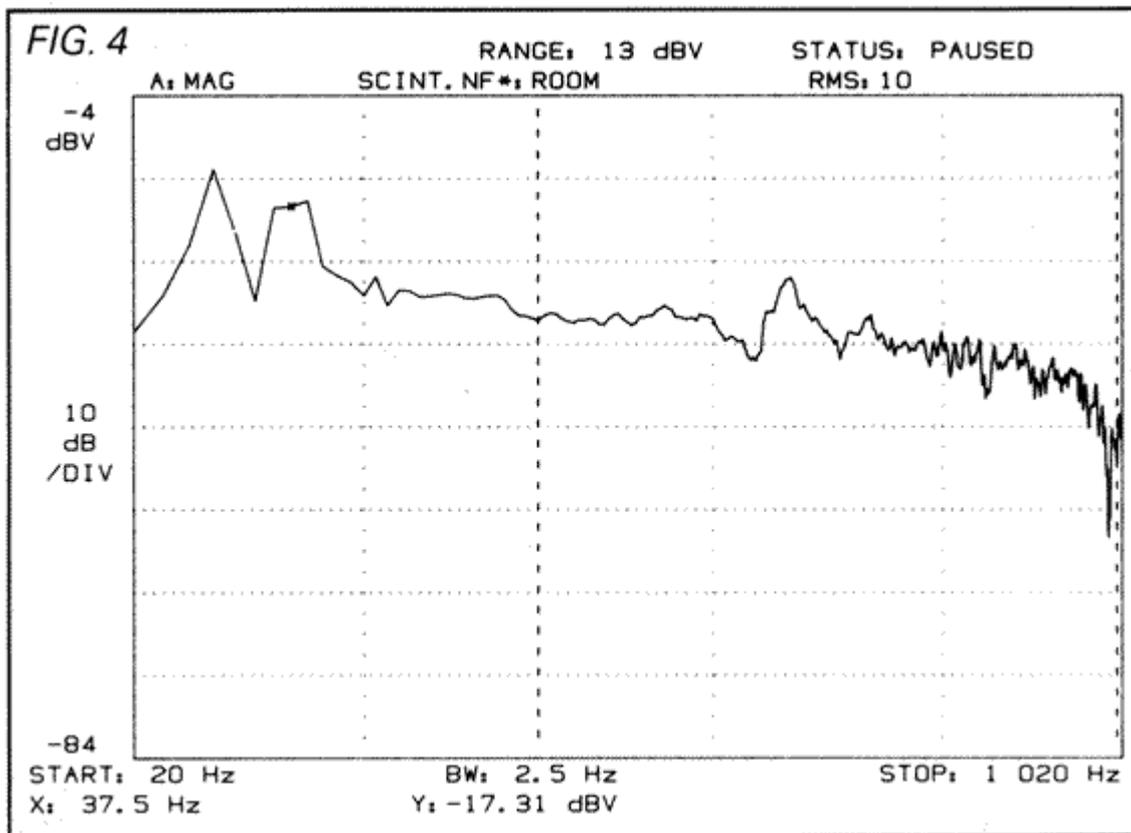
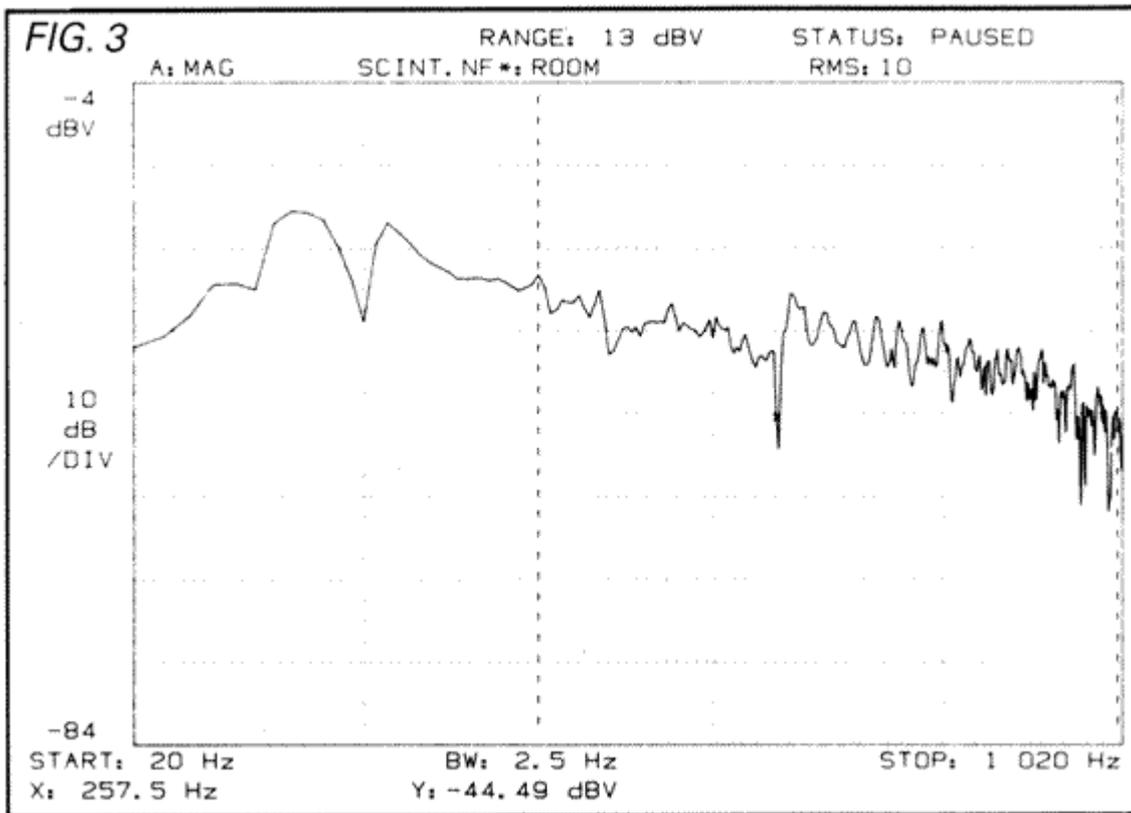
For obvious reasons, the Scintillas could not be shifted to an anechoic chamber; accordingly, a range of tests were conducted in my listening room. Using a combination of multiple mic position, computer averaging, and near-field techniques, I hope that a fair measure of the Scintilla has been obtained. In my view, the most vital result is the main computer-averaged response taken in-room (fig.1), which deserves some discussion.



From 160Hz to 18kHz, the trend is pretty good -well-balanced, but with some loss of presence energy as well as some restraint in the treble. Below 160Hz, the output rises 5dB on average, giving a rich, bass-heavy character, with some typical dipole in room unevenness. The response then rises further to +10dB in to 25-30Hz bands- no wonder that the bass sounded powerful.

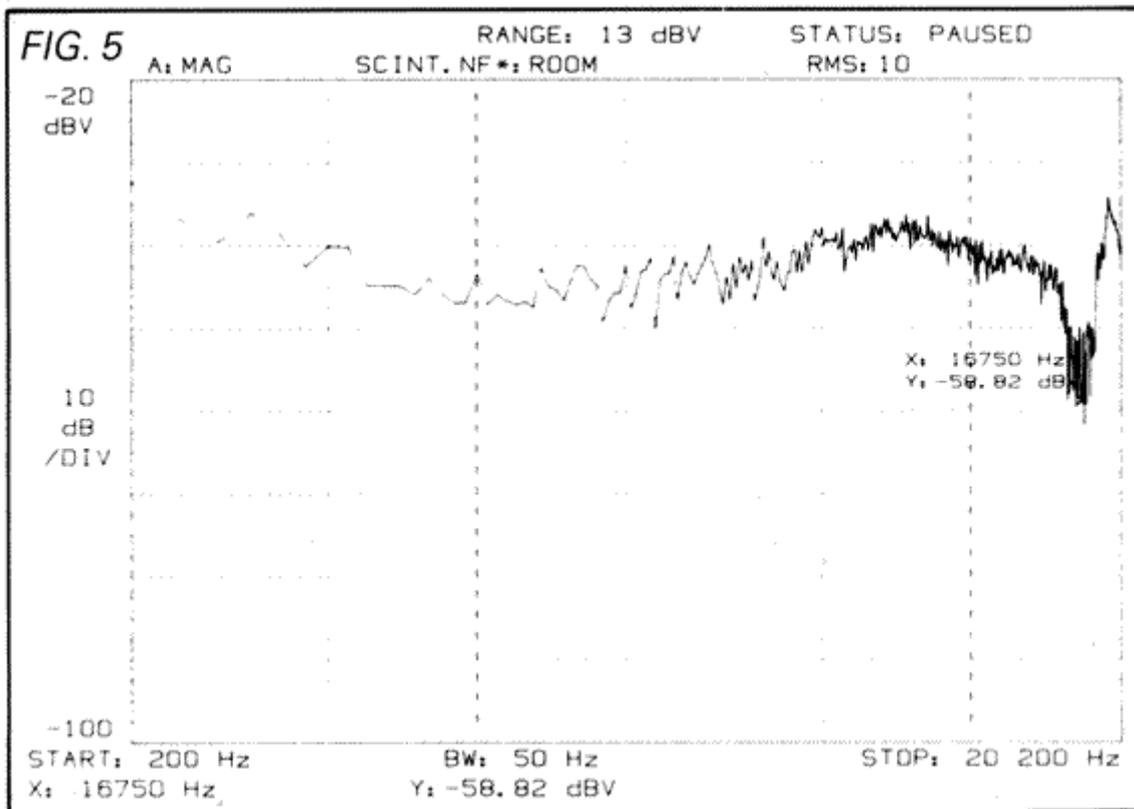
Moving in to about a 1m mic spacing, and with the speaker placed well into the room, the frequency response (fig.2) was taken on-axis (at S' in the preferred direction), and then at 30 degrees laterally clockwise (solid line) and 30 degrees anticlockwise (dotted line). The low end remains fairly consistent, again showing the basis for the comments concerning excessive bass. On-axis, the mid shows an energy valley centred on 1.6kHz (the marker 'x' s). This position gives the best high end, which measured more directional than it sounded. A 30 degree anticlockwise axis gave the best mid 'fill' at the expense of a loss in top sparkle. These results confirm the need for careful and critical angling to give the optimum performance.





Two nearfield responses were taken for the bass panel alone, one in the upper third (fig.3) and the other in the lower third (fig.4). Excepting a mild 'glitch' around 500Hz, which is not present over all the diaphragm area, and ignoring measurement ripples, the response can be classed as very smooth. The upper section can be seen to be mildly resonant at 50Hz, the lower more dominant at 30Hz. As

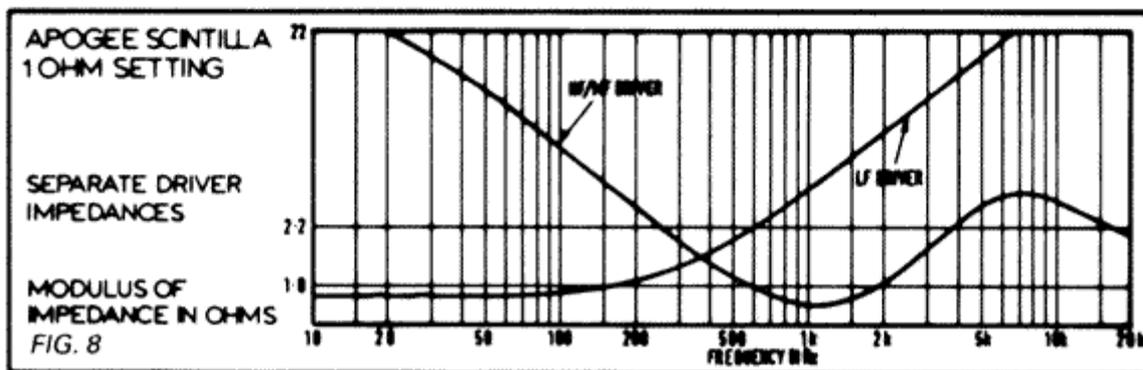
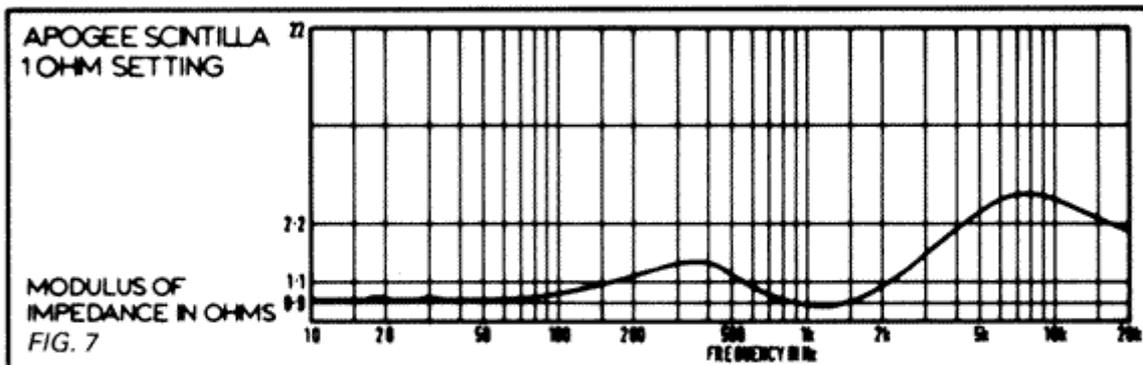
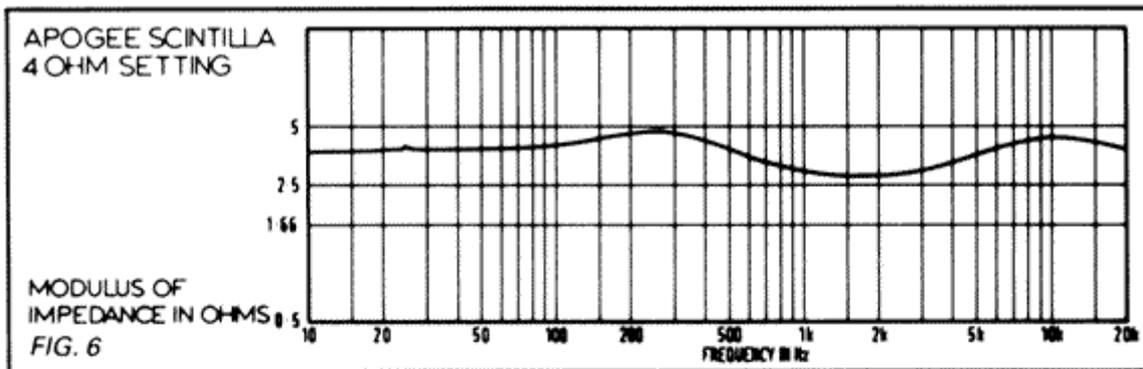
the curve shows, the output had not fallen below the median line by 20Hz, virtually subwoofer performance. The overall downtilt with increasing frequency can be clearly seen.



Finally, a near-field curve was taken for the mid/treble ribbon array (fig.5). The gentle response trough centred on 1700Hz is evident, as is the very uniform mid/treble register. The spaced HF ribbons finally go 'phasey' directly on-axis between 16kHz and 17kHz, above audibility for most listeners. The result is a harmless notch rather than a response peak. The character as a whole shows a singular smoothness and lack of resonant behaviour, as well as a freedom from complex discontinuities.

The sensitivity in 4ohm mode was appalling, my estimate being 76dB/W (8ohm base) typically at 1m on-axis. Like the Magneplanars and Acoustats, though, the Scintilla's bipolar dispersion will 'throw' more energy at a distance, so by 4m in an average room, and when compared with conventional speakers, the subjective sensitivity rises to perhaps 79dB/W. In addition, the impedance is pretty cruel. Around 1.6kHz- surprise, surprise-the load (fig.6) dipped to just under 3ohms. No wonder the valve amplifier took offence while the transistor models hammered on, benefiting from their good peak current capacity.

The coincidence of the impedance minimum and the acoustic response valley confirmed the struggle the designer had with the loading vs. sensitivity equation for the large midrange ribbon. Rematching with a high quality transformer-as with the big Apogee-surely would be the answer here.



Rewired to 1ohm, the impedance measurement was re-run (fig.7) and for the individual bass and mid/treble drivers on their own (fig.8). The lower crossover point can be seen in theory at 375Hz, where the two curves cross, but this is complicated by the acoustic and individual impedance characteristics. The treble section clearly presents an easier load, with an average of 2.2ohms above the upper 4kHz crossover frequency.

The overall 1ohm impedance trend shows a value a little below 1 ohm at low frequencies, rising a little in the midrange before dipping to an approximate 0.88ohms at 1200Hz. Indeed, this explains why Apogee favour separate cables from the power amplifier to each of the two pairs of the Scintilla's input terminals. With such a low impedance, cable resistance is important; what is good enough for an 8ohm system may be useless here, and long cable runs are best avoided altogether.

Consideration also needs to be given to the peak current demand of the Scintilla at 1ohm. Taking an average impedance of 0.9ohms, a Krell KMA-200 on full song will provide up to 60V peak. Assuming minimal cable losses, the Scintillas will draw peak currents of over 60amps. Now you can see why blockbuster amplifiers of Krell current capacity are required for 1ohm working.

Even in 4ohm mode, the Apogee is asking for 15amp peaks, something the Robertson can provide, but at which the D-115 balks. The Beard P100 has quite a generous current capability for its size, and in paralleled mode and on the 4ohm tap, this monoblock will be able to provide enough current. The 40-

60amp peak current demand in 1ohm mode rules out amplifiers with modestly rated output fuses. The presence of fuses, in any case, would suggest that these would be unusable with the Scintillas.

It is rumoured that the Swiss Jadis valve amp can drive the 4ohm Scintilla but otherwise a valve contender might result from a D-115 chassis reworked with both channels set to 4ohm matching and connected in parallel to double the current capacity.

Greater rewards in tonal balance and tonal dynamic range would be gained by tri-amping the system, which would need extensive modification of the internal wiring. In this mode, the midrange ribbon could be driven to its natural tonal level, while the bass range could be subject to a simple passive equalisation to pull it back a little. With direct coupling to each of the drivers, the overall result could be unsurpassable.

In 1ohm mode, the conventionally rated voltage sensitivity (referred to 2.83V input, an 8ohm 'watt') will increase by 6dB, bringing the apparent in-room sensitivity to 85dB/W. Given sufficient current, this would explain why the Krells could attain such high sound levels with the Scintillas. In a medium-sized (80m³) room, peak levels of 103-105dBA will be possible from a stereo pair, this a decently high level if not quite of disco intensity. Driven to this level, they could be clearly heard all over the house, even with the intervening doors closed.

Spot checks were made on distortion levels, which proved to be exceedingly low. Allowing for some experimental tolerance, the LF range, even at 96dB, managed under 1% of 2nd and 3rd harmonic. Above 100Hz, 0.1% or less was the norm. At lower sound levels, superb indications were obtained, with 0.03-0.05% typical over much of the range. Negligible compression was shown on high power burst tests up to 200W (4ohm) peak. While the ribbons could be made to show some torsional flexure on some input signals, subharmonic generation was also considered negligible.

Conclusion

This extraordinary loudspeaker gave a basic sound quality akin to some of the finest electrostatic, single-element headphones- a high compliment indeed. It redefines what is possible in terms of high level sound reproduction from high performance loudspeakers. Once properly heard, it can never be forgotten. I cannot excuse its phenomenally high UK price of £4950/pair, but readily have to admit that it really does deliver the goods.

The magnitude of its lead over other loudspeakers in terms of musical performance is such that, even when compromised by the use of a good, but modest, amplifier such as the Robertson Forty Ten, the result remains outstanding. With a budget uplift to a total of £8000 or so, the new Krell KSA-100 is the obvious choice, capable of driving the Scintilla to majestic levels in 1 ohm mode. In truth, one would need to go no further.

Such is the high quality of the Scintilla that it will benefit for years to come from future amplifier improvements, their potential existence proven by the limited, low-level performance of the D-115.

Noting the weaknesses of its softened upper-mid transient attack and the excess bass, the subjective performance of the Scintilla was generally characterised by exceptionally low levels of coloration, as well as its very low distortion and excellent stereo imaging. Add to this its high volume capability (with the appropriate amplifier) and wide response extension, and the Scintilla's true worth becomes clear. If you have the taste and deep enough pockets, the Apogee Scintilla will be the loudspeaker of the decade.

NB: I feel that Apogee could and should provide a simple, optional step-taper equaliser to fit between

preamp and power amplifier, in order to adjust the bass response for some customers. Further cooperation with some amplifier manufacturers may also result in a more flexible choice in this respect. Personally, I also look forward to a smaller and less aggressive-looking version of this speaker, with better matching characteristics. Perhaps the Duetta, introduced in June at the CES will be that model.

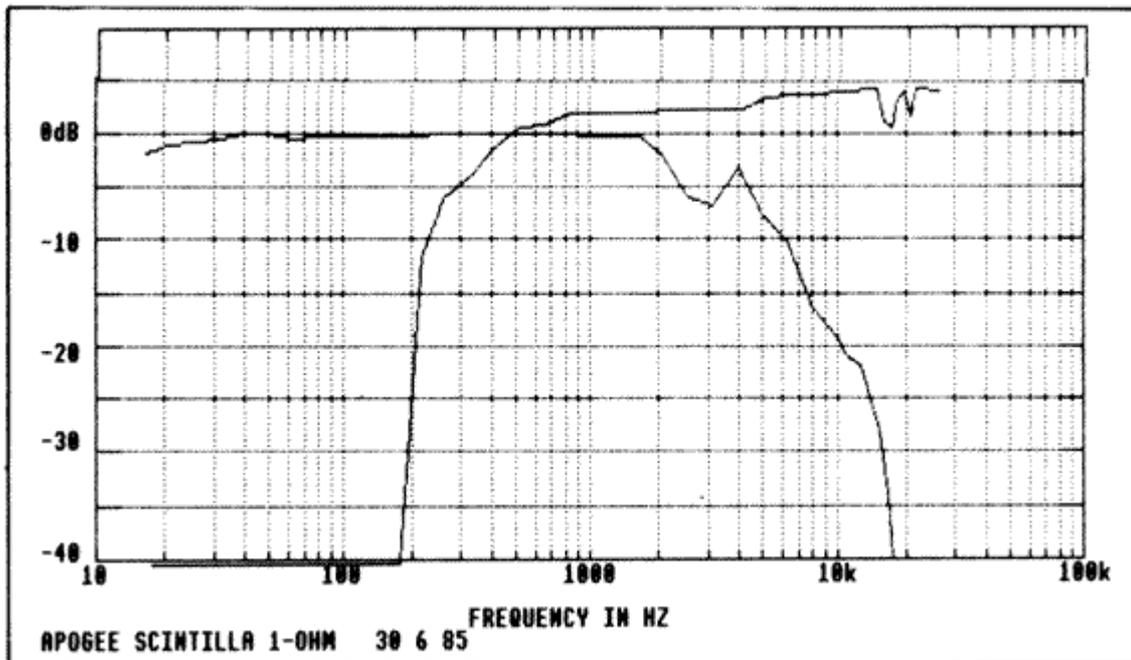
JA and the Scintilla

As the only one of HFN/RR's team involved in this review to have a listening room on the ground floor, setting up the Scintillas caused no real problems. Did I find that the Scintillas lived up to what they had promised in Chicago? To put it simply, yes I did, though the actual story is more complicated.

I started off driving the speakers in 4ohm mode with the Krell KSA-50 with just one set of cables; both Ivor Humphreys, who had helped me set them up, and I were initially unimpressed. It was only after listening to several LPs and CDs and hearing major differences between what had hitherto been thought relatively similar recordings, particularly of piano, that we realised that what we were hearing was the lack of a loudspeaker's resonant signature on the sound. The Scintilla is so transparent that it enables the listener to hear the hows, whys and whats of a recording with a clarity only rivalled, in my experience, by the Quad ESL-63. (And the British speaker has drastic limitations on bass extension and dynamic range compared with the Scintilla.)

Sometime was spent playing around with room positions, and it became clear very quickly that, even in 4ohm mode, the speakers benefited from bi-wiring, Monster Powerline 3 for mid/HF drive and Absolute Wire for the bass working well. Transparency increased even further in 1 ohm mode, but ultimate levels were not as high as I would have liked with the KSA-50, so I ended up driving them with the latest Krell KSA-100. I also tried biamping, using the Krell KSA-50 on the bass panel and the KSA-100 on the mid/treble ribbons. Although this increased the attainable levels, the integration of the sound suffered, the seamlessness of the joins between the driver responses, as well as the solidity of the stereo imagery, being degraded, so I returned to the KSA-100 alone for serious listening.

I feel the positive attributes of the Scintilla to be much as described by KK and MC. It is the finest speaker I have ever heard to reproduce human voice. Even at high levels, the point when finally the voice quality 'cracks', so familiar with conventional loudspeakers, just does not happen with the Apogee. The voice just soars over its whole range of pitch and dynamics. Piano, too, has an effortless quality to reproduction, and percussion of all kinds reproduced with a uniqueness to each sound that I have rarely heard. The speaker allowed me to become an aficionado of recorded drum sound; it imparted so little of its own character on the sound that the formant structure of each instrument was allowed to stand alone.



Scintilla nearfield driver responses (note that the AKG 451 mic rolls off the LF)

It must be this tack of resonant coloration which leads to an aspect of reproduction that in the long term impressed more than any other: the apparent dynamic range. Loud passages were louder than I remember from other speakers; quiet passages remained quiet. Quiet instruments in the mix remained quiet yet audible, even when all hell was breaking out somewhere else. Last year, with the help of Peter Walker, who was playing second flute in the orchestra, Ivor Humphreys and I recorded Elgar's *The Dream of Gerontius* in Ely Cathedral. This work is at times very densely scored for two choirs and organ as well as large orchestra. The Scintillas allow the listener to hear every member of the choir, yet without thrusting the detail forward or destroying the sense of the choir's unity. In fact, image sizes remain realistically small; the solo voices in *Gerontius* as reproduced by the Scintillas, are tiny in size compared with the orchestral image, yet are perfectly audible, not smearing when the orchestra lets rip. And when the organ bass pedals underpin the climaxes...

The bass of the Scintillas just goes down and down. The diagram shows the individual near-field response of the two driver sections in my room. That is real 20Hz extension!

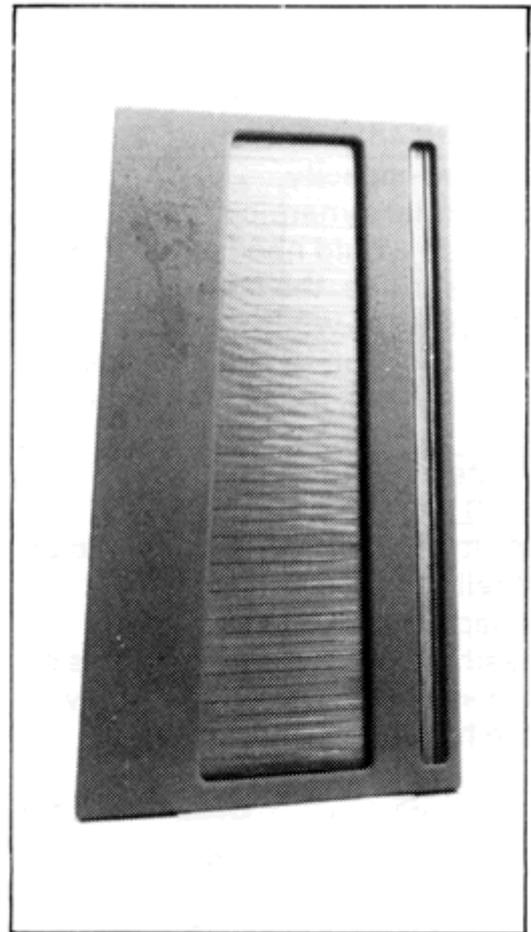
As MC has described, though 'fast' in the bass- bass instrumental transients start and stop unbelievably quickly-the speaker does have an effective LF EQ boost, and this makes it very fussy about bass aberrations in the rest of the system. In my room, the bass only intruded when the recording was itself flabby. The boomy bass drum featured throughout 'Surfin' USA' on the Telarc Beach Boys tribute CD, for example, became unlistenable, but this was the exception. Personally, I am quite prepared to accept this as a trade-off to set against the ability of the Scintilla to reproduce the bass 'slam' of live bass guitar and bass drum, the power of the piano's left hand register, and the bass extension of recorded organ.

The one aspect of the sound that did bother me was the lack of brilliance in the presence region. Whilst lending a relaxed feel to the overall character, and contributing to a distant perspective, it also suppressed recorded ambience to some extent. Depth there was, but the reflections from the recording venue's walls were less apparent than I expect on my own recordings. John Crabbe -who also felt that the Scintillas were wonderful on human voice - informs me that this is to be expected if there is a lack of output in the 2-3kHz region. This is where the ear is most sensitive to low level detail and the psychoacoustic effects of a slight depression here manifest themselves out of proportion to the measured effect.

There is also an aspect of the speakers which affects the stereo imagery-their size. In my 100m³ room, the best position for bass tuning across the narrow dimension of the room resulted in a relatively narrow stereo stage, due to the need to keep the speakers away from sidewalls. The best position across the long wall enabled the speakers to be widely spaced for the best stereo, but the need to keep them away from the rear wall meant that they were then visually unacceptable. I settled for the narrow staging. Although the Scintillas are angled back from vertical, at my 4m listening distance this meant that my chair was a little too low for optimum transparency. Propping the rear of the speaker bases on wooden wedges brought everything into fine focus, so if you are interested in the Scintillas, be prepared to rearrange the room to get the best performance.

Did I have any problems with the speakers apart from the initial room matching? Only that it was very easy to run out of volts and amps, even with the generous delivery of both featured by the KSA-100. The sheer lack of strain to the sound meant that it never sounded loud. As I tend to turn up the volume to the point where something is starting to show signs of working hard, then back the volume control off a tad, this meant with the Scintillas that I kept being caught out as a higher than usual transient peak sent the amp into clipping. What usually happened was the HF ribbons would give a flick and a twist as the sudden burst of extra HF power (when the signal knocked against the amp's voltage rails) drove them out of the linear region of the magnetic field. I would curse, and settle down to listening at a slightly lower average level.

Only once did I get really perturbed, and that was when John Crabbe wanted to hear the Telarc 1812 CD. The cannons went off (not sounding very loud), the ribbons twisted and waded, one HF ribbon hit the midrange, there was a blue flash, and the two stuck together, looking very droopy. (The Krell, of course, was not upset by anything I cared to ask it to do.) I carefully blew the ribbons apart, and we went out for supper. On our return, everything was OK, but I did have sweaty armpits at the thought of nearly doing the audio equivalent of taking a Grand Prix car out for a lap or two and spinning into the Armco at the first bend.



Conclusion

Visually imposing, room fussy, amplifier fussy heavy and awkward, the Scintillas are nevertheless the finest, most transparent, most musically pleasing loudspeakers I have ever had the privilege to use. The price is immaterial; high fidelity as a concept is about obtaining as faithful a reproduction as it is possible to get, regardless of cost. If I had the money to buy a pair I would; as (at present) I don't, I'm just glad that Apogee has managed with the Scintilla to redefine the art of what is possible. (I'm sad, though, that it wasn't a British company that made the fullrange ribbon loudspeaker a commercial reality!) The Apogee Scintilla is the Ferrari Testarossa of loudspeakers: I'm sure that one day I shall own both.

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