

## **VERTERE DG-1**

This new entry-level turntable features plenty of innovative engineering: Chris Kelly says all the cleverness pays off in its remarkable sound

## **JBL L100 CLASSIC**

Chris Frankland discovers there's more to this reinvented design than mere nostalgic appeal

## **NETWORK NAIM WITH MORE POWER**

Martin Colloms revisits the ND555 network player – this time with a pair power supplies

## **A CLOSER LOOK AT DISTORTIONS**

We know distortions are bad, but Keith Howard explains which ones matter, and how to measure them

## **MUSIC & MORE**

Reviews and opinions from our experts on the latest classical releases

## **ALSO REVIEWED THIS ISSUE**

Avid Integra  
Focal Chora 806  
Magico SPods  
McIntosh MA9000  
Townshend Allegri  
Reference

## **MAGICO M2**

*Martin Colloms finds this slim floorstander an exceptional listen - while it deserves a careful install to achieve optimal performance*





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**Published by**  
HIFICRITIC Ltd.

Registered in England No.6054617  
Registered Office: Winnington House,  
2 Woodberry Grove, London, N12 0DR  
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Printed in the UK by  
Premier Print, London

## HIFICRITIC

is a printed publication available  
by subscription only.

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We leap into the 'twenty-twenties' with this brave new issue, the first in our expanded format: we have refreshed layouts, typography and presentation, thanks to our designer Philippa Steward, and hope you'll enjoy it. This update offers the opportunity to be more creative with our presentation of both features and reviews, include extended technology investigations, and write greater detail where appropriate – and it's also easier to read. Instead of the oft- found breathless chase to a quotable conclusion found in many publications, we favour a deeper exploration of the subject, the product, and its context. 'Slow publishing', if you like...

I hope I'll be forgiven for my extended review of the smallest of the 'M' series Magico, the M2, which I found by turns to be frustrating, fascinating, fast, feasible, feisty, fettled, fervent, funky and fulfilling, and that's enough 'f' words for now (although at least one other may have been used as I struggled with it!). My examination of this loudspeaker also reaches back to primary acoustic research undertaken 70 years ago.

Our rich and varied menu for this issue also includes a complete record player from Vertere: with arm and cartridge, it's just about 'plug and play'. Called the Dynamic Groove (DG-1) turntable, it's sold as a bundle with its own 'Groove Runner' tonearm and a Vertere-branded 'Magnetic' moving magnet cartridge, based on a trusted Audio Technica design. In the world of turntables that's as close to 'fit and forget' as it is possible to get – although the sound is anything but forgettable.

Technology correspondent Keith Howard gets stuck into one his favourite subjects, namely the continuing lack of correlation between the usual simple distortion measurements commonly used, and sound evidence showing that a more intelligent approach to distortion harmonic weighting would provide better correlation with this aspect of sound quality. Meanwhile columnist Stan Curtis explores the innate sound quality of components, some of military origin, used in audio amplifiers reaching back to Cambridge Audio in the 1970s.

Avoidable or not, we return to Naim with a long planned revisit for the HIFICRITIC reference ND555/555PS DR network player – one year on and by now well run in. This work is complemented by an upgrade: the player is now running with double 555 PS DR supplies, thus further separating digital sections in the ND555 from the analogue. Where will this costly three-box combo place in the international rankings?

Chris Frankland gets to grip with the resurrection of the legendary JBL Century L100, a modern interpretation of an original design I knew well while working as a student demonstrator at Audio T West Hampstead in the mid 1970's. From Avid we have the Integra ES, an intriguing integrated amplifier with a refined phono stage included (as you might expect from this company), reviewed by Ed Selley.

Kevin Fiske gets to grips with a pair of compact Focal loudspeakers, the CHORA 806, with intriguing results, while I attempt to qualify the sound quality of the latest Townshend Allegri Reference, a remotely controlled autotransformer line control unit. I find that it adds almost no sound of its own – surely the ideal situation?

Chris Kelly has an all too brief but still meaningful encounter with the behemoth McIntosh M9000, a 300W per channel integrated amplifier, while I've been revisiting Magico's 'S Series' accessory speaker support 'Pods, following discoveries uncovered during my extended Magico M2 review.

We complete the marathon overview of Manfred Eicher and ECM penned by music expert Mark Prendergast, who presents his selection of must-have ECM recordings, followed by our classical and jazz reviews.

Finally on our back cover, Andrew Everard celebrates the valued audio lives of Ken Ishiwata and our own Malcolm Steward.

*Martin Colloms*  
**Editor-in-Chief**

# Contents

- 4 MAGICO M2**  
After an exhaustive (and sometimes exhausting) review procedure, Martin Colloms finds these slimline speakers from the Californian company are capable of superlative performance – but explains that the secret is all in the set-up
- 16 THE BRISTOL SHOW 2019**  
A fixture on the British hi-fi calendar for more than three decades, this show is packed with new product launches, and provides the chance to hear some superb systems. Ed Selley was our man on the ground to bring you all the news
- 19 McIntOSH MA9000**  
Chris Kelly was looking forward to hearing this big integrated amplifier from the celebrated manufacturer, but he wasn't quite ready for its size or weight. But after an all-too-brief review period, he came away more than impressed
- 22 STAN'S SAFARI**  
Stan Curtis casts his mind back over the strengths and foibles of some of the studio recorders he has owned and used, and recalls the days when amplifier designers could turn to a ready stock of 'cost no object' components made to military specification
- 24 MAKING DISTORTION MEASUREMENTS MORE RELEVANT**  
We all thought that the less distortions a system has, the less it will add to, or subtract from, the sound. But which distortions should we be targeting, and how do we best measure them? Keith Howard investigates,
- 29 VERTERE DYNAMIC GROOVE DG-1**  
Designed as an entry-level turntable model for the British company's range, the DG-1 opts for some highly innovative solutions in the quest for simplicity, from thread bearings to a flat beam tonearm. Chris Kelly discovers that this leads to excellent performance
- 33 NAIM ND555 REVISITED**  
After spending more than a year with the Salisbury company's flagship network player, Martin Colloms takes time for a thorough reassessment. He starts by adding a second 555PS DR power supply, to create a £27,000 digital front-end for his reference system
- 37 JBL L100 CLASSIC**  
One of the most distinctive designs from catalogue of the American manufacturer – thanks to its distinctive Quadrex foam grilles – has been reinvented for the 2020s. Chris Frankland explains that this is much more than just an exercise in nostalgia
- 41 AVID INTEGRA**  
Ed Selley spends time with the Integra integrated, the entry-level model in the British company's ambitious amplifier line-up. It's impressive, not least for the quality of its built-in phono stage
- 44 FOCAL CHORA 806**  
Kevin Fiske likes the midrange of these speakers from the 'affordable' end of the French company's line-up, but is less than enamoured with what they do at the frequency extremes
- 46 TOWNSHEND ALLEGRI REFERENCE**  
Martin Colloms is a big fan of transformer-based passive preamplifiers, and there's more to this remote-control newcomer than just saving the wear on his floor
- 50 MAGICO SPODS**  
After his experience with the MPods provided with the Magico M2 speakers, Martin Colloms returns to the SPods with renewed enthusiasm
- 52 MANFRED EICHER**  
In the concluding part of his survey of the life and work of the founder of ECM, Mark Prendergast suggests ten of the label's 'must hear' recordings
- 58 CLASSICAL MUSIC**  
The latest releases are considered by Andrew Mellor
- 60 JAZZ**  
Greg Drygala takes a listen to some of the more innovative jazz releases
- 62 SECONDHAND STARS**  
Steve Harris continues his bargain-hunting habit, revealing more of his latest finds
- 64 SOUNDSTAGE**  
Andrew Everard pays tribute to two of his influences – Ken Ishiwata and Malcolm Steward – both recently passed away



*Magico S2 loudspeakers (p4) all the effort in set-up pays off in a remarkable sound*



*Vertere DG-1 (p29)*

# The Magico M2

MARTIN COLLOMS GETS TO GRIPS WITH THIS SLIM FLOORSTANDING SPEAKER FROM THE CALIFORNIAN MASTERS OF ALL THINGS METAL, AND FINDS THAT – THOUGH PLENTY OF WORK IS REQUIRED TO MAKE IT SING – WHEN YOU GET IT RIGHT THE RESULTS ARE MAGICAL

**Loudspeaker design and development is all about pushing boundaries, but how hard do you push? Do electroacoustic engineers and loudspeaker designers seek to improve on previous work? Of course they do, and will pursue their art with varying degrees of success. Just what they achieve depends on many factors, not least their commitment to numerous evolving technological innovations but also to consistency in manufacture, that vital component of quality control that will make the endeavour worthwhile in the first place. A greatly refined prototype is not enough: the manufacturer must also closely maintain the physical properties of materials used and master the arts of precision assembly and accurate calibration such that the production examples very closely approach the signed-off exemplar.**

When you already make great loudspeakers how do you improve on your art? When all those design, materials, build and manufacturing choices are finally realised as a satisfactory working model, who is to be the arbiter of this mythic perfected sound quality, to micro-tune those prototypes towards an imagined goal of perfection for the finished product?

It's mythical as well as mystic: there can be no such thing as perfection in sound engineering, and we remain some distance from the creation of a fully convincing sense of reality generated by a sound reproducing system. And this is not just to do with the loudspeakers, it is the whole chain including all that goes into making – and reproducing – a recording. We widely enjoy live music, and certainly we are aware of the substantial quality gap between live and reproduced sound.

Aware of audio prior art, from these experiences we endeavour to make valid judgments of quality for our connected sound systems, in fact for the whole recording and reproducing chain. From the artist to our listening set-up, it's a combination of appreciating accuracy, naturalness, immediacy, involvement, sound stage dimension and focus, not to omit dynamics rhythm and timing, also how well our concentration is captured and held.

That done, it is nevertheless important to distance ourselves from the practicalities, the gritty details of the audio machinery, to suspend belief and simply enjoy the music.

There is no specific need to upgrade a good audio system. If kept in good condition, driver and enclosure screws kept tight, frames well aligned, cables dressed and tidy, spikes well locked, speaker terminals set nice and firm, such a set-up may run for years with only this minimal attention. Upgrading is a kind of bug which can be caught, and become

a hobby, for some even an obsession. There is fun to be had in that, but it's the music that matters, not audio technology, nor proscribed ideas of reproduced sound quality per se.

Yet, despite a century of technical development for audio reproduction, especially for the loudspeaker (which arguably remains the weakest link), a wealth of competing ideas and technologies are applied to the art of loudspeaker engineering. Yes, art, because loudspeakers remain significantly imperfect: defining, controlling and then balancing those imperfections to an optimised musical whole, inevitably judged by human beings, is the objective of the design process.

Certainly, machines and computers are extremely helpful, both for the control of material properties, and for calculations of the behaviour of structures and connected electromechanical systems which have appropriately advantageous vibratory and acoustical properties. But ultimately the human judgement of sound quality which overrides all this: someone must take responsibility for the completion of a loudspeaker design, where the positives and the negatives have been weighed in the balance, where the hundreds of decisions made concerning myriad technological details, all assessed in concert, finally arrive at a finely tuned and engineered subjective quality focus.

As this crux is beyond measurement, the process must be undertaken by ear, and by definition must use recorded sounds and music – quite some responsibility. Recordings are a largely unknown quantity and must themselves be judged for quality from many aspects, including a natural tonal balance, detail, imaging, transparency, rhythm, and more, if the loudspeaker under development relying on these qualities is not to drift away from the goal

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REVIEW

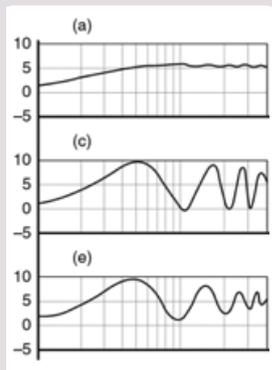
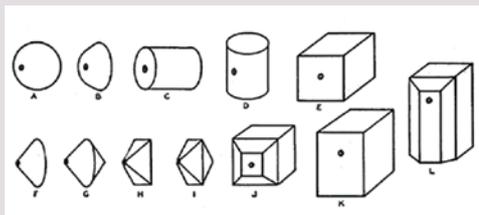


## Two Technology Pioneers: Olsen and Barlow

### 1. Olsen

The M2 enclosure design is a result of extensive research using laser scanning vibration measurements and the use of new materials, combined with manufacturing experience generated during the prototyping of the M3 and M6 loudspeakers. Decades ago two academics pioneered key research on what I regard as certain crucial aspects of enclosure technology which have been incorporated in the M series. The first concerns the radiation of uncorrupted diffraction-free sound wave fronts, this investigation made by multi-patentee Dr Harry F Olson of RCA laboratories, and published seventy years ago in 1950. Here a specially crafted and near perfect miniature sound source was mounted to a whole range of enclosure shapes to see how just their geometry affected the sound output. While the result was near perfect, uniform over frequency, when mounted on a sphere, it became progressively worse as the twelve shapes of the enclosure tried out became less rounded. These days this aberrant radiated sound wave diffraction behaviour may be readily modelled using a computer.

These are the twelve shapes investigated by Olsen, also showing the placement of the miniature loudspeaker, while the respective performance respectively of the spherical, cylindrical and rectangular shapes of the many tried is shown below.



Apart from the natural, size related lower frequency roll-off below 300Hz, the sphere (a) confers a smooth, flat, diffraction-less output with barely 1dB of ripple in the audio output response.

Conversely the axisymmetric boundary presented by the cylinder face example (c) is the worst possible with +/-5dB of response aberration. It would also show corresponding audible colouration.

The cube (e) is somewhat less symmetrical, thus exhibiting a significant reduction in amplitude response ripple compared with the cylinder. Note that for the power response, not shown, the total energy radiated will remain uniform over frequency for all shapes. This work guides the shapes of loudspeakers some 70 years later.

(From the AES Paper October 27, 1950: Direct Radiator Loudspeaker Enclosures: HARRY F. OLSON)

### 2. Barlow

The second research example concerns Don Barlow researching in the mid 1970s, who explored another facet of enclosure behaviour, investigating unwanted sounds emitted by panels when they are excited by reaction energy from the loudspeaker drivers. It was already known that enclosures do vibrate or resonate and thus emit unwanted sound, which could then mask and colour the desired output. First, he tried sticking on internal bituminous lossy damping pads, with some marked success in resonance control, then widely adopted for BBC monitors.

Barlow also investigated the huge increase in bending stiffness conferred by panel curvature, here acting to move the vibration frequency to a harmless upper region. He noted that the resonant bending performance of tubular examples, in this case of bonded cellulose fibre, was far superior to a rectangular form, and that in the quoted example the much reduced unwanted sound radiation was equal to concrete panels no less than 4-in, 10cm thick. (Dr Don Barlow of York University: *The Sound Output of Loudspeaker Cabinet Walls*, AES Convention: 50 (March 1975))

While ignored by many designers, in recent years more attention is being paid to this topic. Thus, strong curvature is a feature of the M series enclosure profiles, minimising such secondary sound radiation effects, lowering colouration, also significantly enhancing stereo image focus.

of even-handedness, of exceptional neutrality, in the face of all kinds of music.

Magico is known to make good loudspeakers – there is remarkably little dissenting opinion on this matter: the company strives for perfection with its high-end M series and doesn't seem to care a jot quite how much they cost. To be fair there are also several moving coil brands which also operate in this territory including Raihdo and Wilson Audio, Rockport, YG, Avalon, Martin Logan and Tidal.

The Magico M2, each equipped with two 7in/178mm bass units, is the smallest and most recent of the M series, this more compact three-way joining the extant M3 and M6 designs. Compared with the M2, M3 is larger, equipped with three seven-inch bass drivers per channel, specifically designed for it and resulting in a 3dB greater nominal system sensitivity of 91dB over the M2's 88dB, plus increased power handling. Joining the bass driver pair for the M2 is a 6in/150mm diameter composite graphene/carbon fibre cone mid unit and finally a 28mm (nominal 'one inch') pure piston, beryllium-diamond dome tweeter.

By comparison the much more costly M6 is altogether more heroic, employing three larger 250mm bass units per channel, and is also a sealed box design. These three low frequency drivers are in unison equivalent to a long throw 18-inch driver, and you need to experience this creation in order to comprehend its genuinely physical percussive and dynamic potential at lower frequencies.

Slimmer than Magico's taller S5II, the M2 stands on a substantial tripod base milled from aluminium alloy, and stands 116 cm tall, this measurement including those optional MPod floor couplers. The enclosure is 46 cm wide at its maximum, tapering to about 10cm at the narrowed rear section, the profile – resembling an aerofoil – designed to reduce airflow eddies, and used here to reduce sound wave diffraction: the association is more than coincidental.

Hi-tech constructions of curved carbon fibre laminated composite form the enclosure sides, similar technology being used in modern aircraft wings and fuselage shells. The near black sides are finished to a deep gloss with that characteristic carbon fibre weave visible, while the remaining alloy components are a fine grain black texture lacquer. The M2 enclosure is lighter and stores less energy than if it were all metal, though it is pretty massive nonetheless, at 165 lb/ 75 Kg per speaker.

In the flesh it looks slimmer than these figures might suggest, helped by that strong taper towards the back. The tweeter is located 100cm from the floor, about 10cm above a seated ear height, but of course this figure will be dependent on the height of the seat and the listener. Fortunately, our tests

have shown that the sound quality variation with height is remarkably small for this design.

Specified sensitivity is at the industry average of 88dB/8ohm watt, while the rated impedance is 4 ohms: more on these two matters in the test report. While that suggests that tube/valve amplifiers would need to be high current types, the choice more obviously falls to powerful solid state designs, up to 200W/ch. Magico suggests a recommended amplifier power minimum of 50W rms (8 ohm rated) which I think would suffice for less ambitious sound levels in smaller rooms. Amplifier headroom is helpful here and 100W would be a good baseline, while a higher 200W would accommodate an extra 3dB for unclipped transient peaks, and as such, greater realism. Single wired, the amplifier connection is via heavy duty solid copper alloy binding posts made by Mundorf, these with decent finger grips and they also sport usefully deep 4mm sockets.

The specified overall frequency response is given as 26 Hz – 50kHz, but more precisely this is a *range* for which no tolerance limits are included: our measurements do suggest some extended upper frequency output to 45kHz -10dB, and also that bass is also available down to 40Hz -6dB in free field, the latter limit extended to decently low 35Hz with the usual measure of boundary and room gain.

As standard spikes are provided while a tripod base (*MPod Stand*) also employs heavy duty stainless steel spikes (for hard floors these resting on included steel pads). There is some differential adjustment available for azimuth. Accessory Magico *MPod* vibration controlling footers designed for the speakers are also available, either with or without the *MPod Stand* assembly, and the whole assembly was fitted to the review samples. In the UK distributor Absolute Sounds prefers to add the relevant extras to the deal at a package price, so highly does it regard their contribution. The UK price with *MPod Stand* and *MPods* is £79,998 exchange rates permitting. UK RRP for the M2 alone is £69,998

### Sound Quality Magico M2 Part 1

When reviewing the Magico S5 II (2016, Vol 3 No 10) I explained how we so very nearly got the wrong result by underestimating its performance potential. Initially, we unknowingly assessed more the components of the system than the loudspeaker under test. Once again, for the M2 the whole system had to be scrutinised, updated, aligned, reset and recalibrated in order to fully discover just what this new loudspeaker was capable of. Moreover, as the review proceeded, and the primary arrangements were debugged, still further adjustments and micro realignments proved worthwhile. This also comprised an extended re-examination of the

system, choice of optimum equipment, supports, cables, alignment and electronics. This was continued when the M2 was itself finally installed with its recommended stand and sextet of *MPods*, and optimally positioned.

Once this installation was satisfactorily calibrated listening began, with some truly exceptional initial results. Low colouration and fine transparency, together with near incredible levels of detail, were obvious from the start, plus extraordinarily realistic stereo imaging. At this stage all seemed very well indeed – but, as the work proceeded, we began to experience some disappointment, becoming aware of a moderate shortfall in listener involvement.

Doubt began to creep in. Could our view of sound reproduction, in particular for beat, rhythm and timing, be so different from Magico's? Hearing a beautifully expressed sound quality such as this, but which was not sufficiently involving, providing abundant aesthetic excellence, but lacking the full quotient of emotional grip was really frustrating.

This situation has been experienced before with other products where this particular difficulty has turned out to be inherent. Regarding the M2, amplifiers were swapped out to check matching issues, these including the *NAIM NAP 500DR* and the *Constellation Performance Centaur II 500 Stereo Power*. More troubled listening continued followed by much introspection.

Another question concerned large rooms: how low would the bass extend and how loudly could it be driven? Obviously, it will not play as loud, nor as deep in the bass, as its larger brethren, and on the face of it my room at 16 by 30-foot, in addition part open plan, is possibly too large for it. I was doubtful, initially experiencing set-up and positioning issues and yet, once these were satisfactorily resolved, the M2 gamely took on my room despite its more modest low frequency reserves.

Understandably some of the weight and extension I enjoy from the S5 II, with its twin 250mm-10inch bass drivers per channel, was found to be relatively muted with the M2. Nevertheless, the M2 bass remained quite deep and powerful right from the beginning, particularly if you observed its natural limits and did not transgress.

Certainly it would seem that the design objective for the M2 was to perfect the art for this more moderate size and profile of floorstanding loudspeaker, and not accept compromises such as one involving a bass reflex port in order to make the low frequency output appear more powerful.

There followed seemingly endless trials, repositioning in multiple combinations – both for loudspeakers and the listeners – to try to recover a sense of satisfying timing, but ultimately to no avail. It was potentially, tantalisingly, marvellous, yet

### The System

Constellation Inspiration 1.0 pre, Townshend Allegri Plus and Reference control units; Naim NAP500DR power amplifier, Constellation Performance Centaur II 500 Stereo Power amplifier, Naim SuperLine phono pre, with Linn LP12 player with Keel chassis and Radikal motor control, Naim ARO arm, Lyra Delos cartridge, Naim UnitiCore network server and S/PDIF source; Linn Klimax Katalyst streamer-DAC; Naim ND555 network player, 555 PS(DR)x2, Wilson Audio Sabrina, Sasha DAW, Magico S-5II, Quad ESL63, BBC LS3/5a (15ohm) speakers; Naim FRAIM racks; Transparent XL MM2, Naim NAC A5 speaker cables, Naim Super Lumina, Transparent MM2 and van den Hul Carbon TFU interconnect cables.

## Chief Engineer Yair Tamman explains some M2 design details

'Our materials science research in the properties and applications of carbon allows the M2 to feature a new monocoque enclosure. Similar in construction technique first introduced in the M6, it is formed using multiple layers of carbon fibre adding up to a 3/8" thickness. Similar to the external shell of an F-35 fighter jet, this enclosure construction when compared to machined or extruded aluminium parts increases the structural stiffness to mass ratio by a factor of 60, allowing overall weight to be reduced by 50% and yielding outer dimensions that are 30% smaller without compromise to internal volume. The curved interior and exterior walls impede internal standing waves and but also greatly suppress sound wave diffraction from the exterior.

The M2 midrange has an oversize 75mm voice coil with a super light 'Gen 7' Magico Nano-Tec cone, this cone being developed during the fabled M Project research and development. This is an exclusive new type of carbon reinforcement that is 20 % lighter and 300% stiffer the previous art. Working with technology leaders in this field we are using an improved formula to further stiffen the cone by combining multi wall carbon nanotube with nanographene platelets. The intention is to maximise stiffness with minimum mass, closer to the pure piston ideal with lowest stored energy. The short, low mass pure titanium former voice coil sits in a massive double neodymium alloy magnet system with a deep, distortion controlling copper cap.

Complementing the mid driver, the bass units are very similar in construction save for a much greater throw for the required bass excursion. All drivers have ventilated 75mm, 3 inch diameter voice coils, non-reflecting magnet systems, and high-strength die-cast alloy chassis.

The M2 incorporates a 28mm Beryllium dome tweeter with optimized geometry also benefiting from a plasma deposited diamond reinforcement layer. The latter increases stiffness without the weight penalty of a pure diamond dome and offers a near ideal stiffness to weight ratio that may well be unmatched in the industry. The design includes exceptional voice coil excursion for improved maximum power limit distortion, operating in conjunction with a proprietary neodymium alloy energised motor system which is closely tuned to the sensitivity and power handling capabilities of the M2, while the particular design and mounting also

confers wider directivity. The dome shape and reinforcement were painstakingly computed and prototyped for the most even and extended output over the audible band but with optimum mechanical damping. (for more detail on tweeter, see exploded image)

'M' series enclosures, derived from the extensive research undertaken for that fabled, limited edition MProject precursor, are based on an ultra-stiff, curved sidewall construction. The latter, a mirror finished, dense carbon fibre composite, is allied to a fabulously reinforced aircraft grade internal aluminium alloy frame fabricated as a space array. There is also a trio of massive front to back bolts whose tension is calibrated if necessary in situ, using a supplied high precision torque wrench, these bolts interlocking the milled-from-solid and massive front panel to the deeply curved equally massive rear panel imparting a calibrated pretension to the side panels. This also sets the contact parameters defined between the inner driver baffle and the exterior front panel. This construction offers very low intrinsic noise with negligible coloration, benefiting from the diligent application of record-breaking structural science for this industry. All in all, these M series designs are heading toward lowered levels of coloration better associated with some of the finest low moving mass open panel loudspeaker systems.

An eye-catching exploded view (see picture) of the interior tells much about the structural design. Noteworthy is the unusual mounting of the four drive units. The high frequency driver does not directly contact the low diffraction, milled from solid but potentially vibrating front panel, but is partially isolated from it via a thin pad of selected viscoelastic material. It is otherwise supported from behind on a massive milled alloy sub panel. As such, potential displacement jitter from front panel vibration is prevented from reaching the tweeter. At the front there is a minimum of recess and thus included cavity resonance, while the suspension half-roll to the dome is substantially reduced in area compared with earlier designs to beneficially reduce its acoustic contribution.

The oddly shaped enclosure behind the mid driver offers a decent volume for back wave absorption, effective over the volume of the fractal shape. The latter disperses and sinks back wave energy from the mid driver in a highly non-resonant manner for minimal coloration.

The remaining three drivers are bolted to that sub baffle, each via an optimally damped, mechanical impedance matching ring, here machined from thick copper plate. Such differential materials technology

is also found in the MPods, which include stainless steel sections also combining highly compressed viscoelastic with a heavy copper plate interlayer to sink stray vibrations.

For repair, skilled removal of the through tensioning bolts allow the sculpted front panel to be detached so gaining access to the drivers and their mountings. That full height sub section of viscoelastic damping is clamped between the driver sub baffle and the front panel and also forms part of the specified pre-tensioning of the three massive external access bolts which help optimise the mechanic-acoustic coupling of these two vital structural elements.

Overall the application of advanced materials science made the M2 possible; these processes are migrating from spaceship and aircraft to race cars and now to high end loudspeakers. Aspects such as diamond layers on beryllium, the application of graphene hyper reinforcement to cone diaphragms (with other secret ingredients), where such a layer on a carbon fibre woven diaphragm then offers amazing stiffness while lowering weight dramatically. Both the mid and bass driver cones benefit from this technology (Multi-Wall carbon XG Nanographene). We should not forget modern adhesives with bonds that are even superior to welding.

Magico use the latest FEA simulation for the full acoustics- mechanics- electromagnetic and thermal behaviour. Both the design and testing processes are now completed on a single software platform allowing multiple optimizations to be taken to a higher integrated level. The acoustic outputs are united by a proprietary Magico crossover alignment, a version of the elliptical symmetry form, using the finest selected Mundorf components and wire, while the crossovers are also built by Mundorf.

We experimented, tested and listened to many variations of the M series enclosures and discovered that the effects on the sound characteristics is dramatic. The structural design elements which give the speaker its magic includes the minimizing of acoustic diffraction with smooth surfaces and contriving the precise balance between rigidity and damping which is key to the feeling of freedom for the musical sounds that the M2 achieves. That tensioning from front to back with those three massive through bolts, while free of resonance, has an optimum tension, adjustable from the rear, set using the precision calibrated torque wrench supplied. This final adjustment when necessary is to account for potential handling and temperature changes in transit.'



would not hang together as a whole-body musical experience. Certainly, it was rather better in many parts than the well-established and well regarded S5II. But with still more reviewing slog now under our belts we became aware that we were beginning to lose the plot. In desperation a technical investigation was deemed necessary, here relegated to a sidebar.

#### **Sound Quality part 2: You *can* have your cake and eat it**

I had written much on the M2 sound before recognising and addressing the contentious MPod/floor interface. Now that earlier work was now rendered obsolete. Listening resumed, for what was, in this elevated context, something of a new product. New locations were tried out and optimal positions found. Interestingly, while the use of 'naked' MPods had driven the loudspeakers somewhat away from the usual optimal room locations, with the residual carpet interlayer now installed on my contentious floor they found their way back to the usual coordinates, a very good sign.

Good timing was back on the agenda; there was a collective sigh of relief and the analysis could begin again. An early observation had confirmed that the overall sound quality for the M2 was relatively uncritical of listener location: for sure, it was optimal at 'top dead centre' but off axis listeners still got a good slice of the action, making these speakers great for sharing.

It was hard to do, but mentally separating the carpet footer matching from the overall sound, in depth, detail and stereo imaging terms, those undoubtedly impressive early results were now substantially built upon, reaching a new and musically exciting plateau. Bass lines now offered key support, being tunefully enunciated, dynamic, punchy, airy, textured, very well timed, even captivating. Leading edges in the bass were so crisp and revealing as to give the impression of greater power and extension, while the innate character of instruments in the low register was clearly revealed. Now you could hear that the exceptionally low coloration and transparency

## MPOd footer complications at Colloms Towers

Certainly, many aspects of the M2 sound were special – harmonic purity, image depth, micro detail, focus, together with exceptionally natural vocals – but also there was some shortfall in slam, of powerful uncompressed attack, and of musical rhythm. Frustratingly, bass line rhythms lagged perceptibly behind the primary beat. A fellow listener hinted that I might have to return them unreviewed, on grounds of reviewer and system incompatibility.

After a few more days of listening a recollection surfaced, that of a previous and confounding experience with the 'S' Series Magico support 'Pods sent for separate review to try with the S5II. I recalled that when they were fitted, the overall, much heralded and claimed substantial quality improvement did not occur. There were tantalising wins in clarity, delicacy, spatiality, micro detail, and yet the full quotient of musical timing and dynamics which I also value appeared to be significantly impaired. After much experiment, frustration and exertion I was driven to reinstall the plain factory spikes on the S5II and return the SPods to the agent. I submitted an equivocal review. You can well imagine the reaction at Magico's HQ. (Review in Issue HIFICRITIC Vol 11 No4 Oct-Dec 2017)

So, what was it with my room, and these special multilayer vibration absorbing 'Pod footers? While I have achieved great results from many, many loudspeakers, with enclosures mostly of wood bonded fibre construction, the all metal, super rigid genre has often needed more installation work to perform well here. Belatedly, some lateral thinking took hold in late 2019 during the M2 review, the dawning of an idea. Could those MPods have ever been trialled or tested on a floor such as mine, a 200 ton concrete platform sub structure, topped with hardwood block? While I do have thick carpets over much of the room, the local loudspeaker regions are essentially clear to facilitate adjusting those footers for spiked feet and set a precisely adjusted, levelled and essentially rigid interface so that loudspeakers do not rock, fore and aft even a fraction, under power drive. Thereby image focus, timing and dynamics have been preserved.

Noting that MPods do differ in some design detail from the earlier SPods, I removed the recommended MPods from the M2, replacing them with the included factory trio of standard spikes, these bearing on the supplied stainless steel footers, and at last a satisfying measure of rhythm and timing was restored.

Job done? .... Not yet! You see, a fair proportion of the previously experienced and particularly magical degree of spatiality, subtlety, stereo holography and detail had now faded.

What on earth was going on? No answers were forthcoming from the team at Magico as this whole scenario seemed to be outside of their experience. So, what could be so different between my long-established room arrangements and the design/auditioning set-up at their factory?

Thinking hard about the specific aspects of sound quality loss when using MPods on my unyielding mechanically reflective floor, I speculated that it might result from a residual induced higher frequency resonant vibration which was significantly blurring the timing instants, a kind of jitter. Mechanical jitter can be a product of an energised spring like interface with inappropriate damping. Damping materials are ideally of a resistive rather than of a rubber-elastic nature, even if intendedly visco-elastic with high loss. It seemed possible that the particular type of visco-elastic interlayer installed in the MPods had been designed and calibrated for more conventional flexible and partially absorptive suspended timber floors, very likely carpeted, and this kind of foundation is certainly the norm for most loudspeaker installations. Perhaps Magico had never encountered my situation.

Considering the inclusion of a mechanically resistive compressible pad of fibrous material, here working as a benign damper for the interface to my floor, I placed a small square of short pile, heavy duty, office grade wool carpet (woven hessian backing, and not rubber underlay), chosen for its mainly resistive rather than spring like mechanical properties. These were installed under each freshly re-MPOdded M2 and the I pressed that virtual play button on my streamer control iPad surface.

Caramba! that was it: the Magico M2-MPOd combination was now absolutely back in the game.

(Technically, the compressed carpet fibre pad under each of the hemispherical pod profiles, together with that very substantial loudspeaker mass loading, more than satisfactorily damped that vexatious stray higher frequency resonant Q present for the interface between loudspeaker, MPods and my unyielding high mass floor.)

inherent in this design is continued right into the low bass. While a body shaking slam could not be expected from this slim design, the low bass which was reproduced, and at fair power even down to 30-40Hz, was surprisingly extended, satisfying, speedy, punchy and unusually tuneful.

The M2 was simply outstanding in the mid and treble ranges: beautifully natural, well balanced and limpidly transparent, combined with exceptionally low listener fatigue. The inherent operating noise floor is so low that highly satisfying levels of micro detail and musical microdynamics and expression were effortlessly resolved. Extremes of image width, where present in the recordings, were extraordinary, with phased offstage effects superbly delineated.

Sure, the M2 will play quite loud, ideally with up to 250W/channel (though be careful not to compromise the innate quality potential), but not rock concert loud: that sense of full throttle sound pressure envelopment is a little beyond its reach in my large room, and with conscious and deliberate overdrive its remarkable introspection and subtlety begins to fade.

Conversely classical orchestral music is disposed of really well at generous sound levels, here imbued with depth and breadth, state of the art staging, focus and detail. A whole list of other music categories was carried with aplomb: jazz, folk, country, quartet, grand piano and minimalist. The M2 offers up exemplary musical development, crisp focus, highly extended image width and depth, and deep insight into the character and dimension of the reverberant fields of the many recordings tried.

Returning to the bass, working within its dynamic compass – ideally in a smaller room than mine (and certainly not one which is open plan to a staircase) – it is distinguished by a remarkable neutrality, together with an unexpected transparency which adds to the already considerable listening pleasure. With track after track, musical discoveries were made, here concerning quality of performance, excellent tune-playing and instrumental character (with Charlie Mingus and Bill Evans for example), together with very fine ensemble timing: this is sheer performance joie de vivre.

Myriad virtual sound sources in recordings were clearly triangulated, and on many occasions it proved hard to drag oneself away from the listening room. Stereo images were state of the art, very wide and very deep, the latter sounding like 25 foot and more in my room with suitable material, and with quite negligible levels of false sound source cues at the loudspeaker locations. In dim lighting that long wished for aural three-dimensional illusion was essentially complete. Time and again familiar material was rendered fresh and clear as if newly mastered, reaching back to the original.



### Conclusions

While not really designed for larger open plan room arrangements such as mine (where the M3 or even the M6 might be optimal), the M2 took on this task with surprising commitment even in the bass, where for many listeners its outstanding overall musical achievement at low frequencies would outweigh moderate reservations concerning maximum dynamic range and the delivery of a whole-body rock band experience. Having cleared up the curious case of MPod incompatibility with my local hardwood-on-concrete floor, and found a fix, I can now vouch for MPod effectiveness. In fact the MPods should not be separated from this loudspeaker's overall performance plateau: the M2 is the lesser without them.

It is abundantly clear that the M2 is a decidedly close approach to the state of the art, irrespective of size or price. On many occasions I was strongly reminded of the fabled midrange naturalness and micro detail of the Quad electrostatic. With the review audio system fully optimised the noise floor was exceedingly low, the rendition of fine detail was truly exceptional, this combined with frankly jaw dropping stereo image focus, width and depth.

Myriad tracks and entire works sounded as if they had been remastered and there was no need for the system to be played any louder to hear all of that. Somehow the designers have conjured up an engineering recipe where the witness of the design and technologies employed is no longer identifiable, and created magic electroacoustic devices which simply disappear into the entire soundstage illusion.

### Test results

See table and graphs (multiple responses, energy decay, impedance)

Sensitivity is moderate, about average at 87.3dB per 8 ohm watt, the usual test input, a little shy of the 88dB specification, although this is a low impedance, four ohm rated design which momentarily grazes the 2.5ohm resistive minimum on the impedance measurement graph, and also hovers at around 4 ohms were the reactive component of phase angle is some 60 degrees, considered to be similarly taxing. The overall rated load would be quoted closer to 3 ohms if we were to be pedantic.

Recently rated, powerful, load-capable amplifiers of top quality are to be preferred if you are going to hear just what these remarkable transducers are capable of, and neither should one neglect the importance of the loudspeaker cables: suitable sound quality options for both amplifier and loudspeaker cable will benefit from careful exploration. The Naim NAP 500DR was excellent on quality grounds but was not quite powerful enough in my room for the M2, though ironically it will drive the similarly sensitive, but higher maximum output Magico S5II well enough in this space.

A flat frequency response as measured on axis is not necessarily the optimum objective and I measure on and around the listener axis in addition to the other axes in order to get a better picture of the frequency balance in the listener region of the room. I have mentioned that, while the design is quite tall, the vertical off-axis performance is pretty good, making listener ear-height less critical than usual. Accordingly the measurement for 15° below axis holds to a commendably tight +/- 2dB tolerance right up to 12kHz. It is only when heard above, almost at standing head height, that the crossover dip present at 2.4kHz (seen at 15° above axis) is mildly increased to 5dB.

There is some evidence of a very well controlled final high frequency 'peak' of just 4dB at 35kHz, which is well into the ultrasonic range and is hardly a peak since it barely rises above the passband level, while the overall output is pretty flat to 11kHz and tapers away very gently by -3dB towards 30kHz.

Clearly HD programme with content beyond the usual 20kHz limit has a chance of expression here, and those frequently encountered 'just out of band' and often severe high frequency peaks are absent, thanks to the designed contour and self-damping of the diamond/beryllium lamination for the dome. Certainly, the treble range sounded particularly sweet, open and extended.

Concerning the forward directed acoustic output, I didn't hear that small broad band prominence graphed over the double octave



or fifteenth, from 600Hz to 2.4kHz, this only amounting to 1.5dB in any case. It may well have been contrived to fine tune the timbre in view of the directivity and floor boundary effect of the vertically orientated twin bass drivers: it should be noted that below a few hundred Hz, our 1 and 2m spacing mic measurements are marred by inevitable floor boundary interference, as it wasn't possible to elevate the M2 onto a suitable platform.

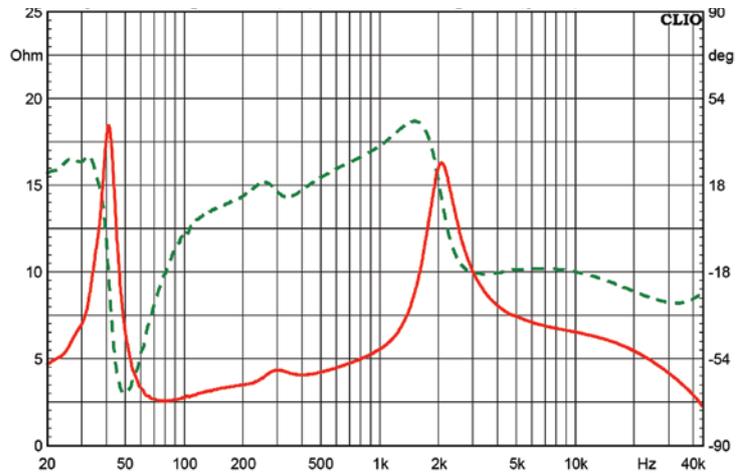
Worthy of praise are the very minor losses seen found up to 20kHz over the range of graphs taken, these including 15° below axis, axial, plus 15°, 30° and 45° laterally. Even at 60° off-axis there is barely any deviation from the dominant forward trend, even to 10kHz. This means that the off-axis room drive for the forward hemisphere is exceptionally accurate so ensuring a natural sound in respect of the perceived timbre of side wall reflections and related reverberation. It was also noted that the satisfactory listener region was quite large and audiences of up to five were surprisingly well catered for enjoying fine timbre and good stereo imaging.

**Loudspeaker Test Results: Magico M2**

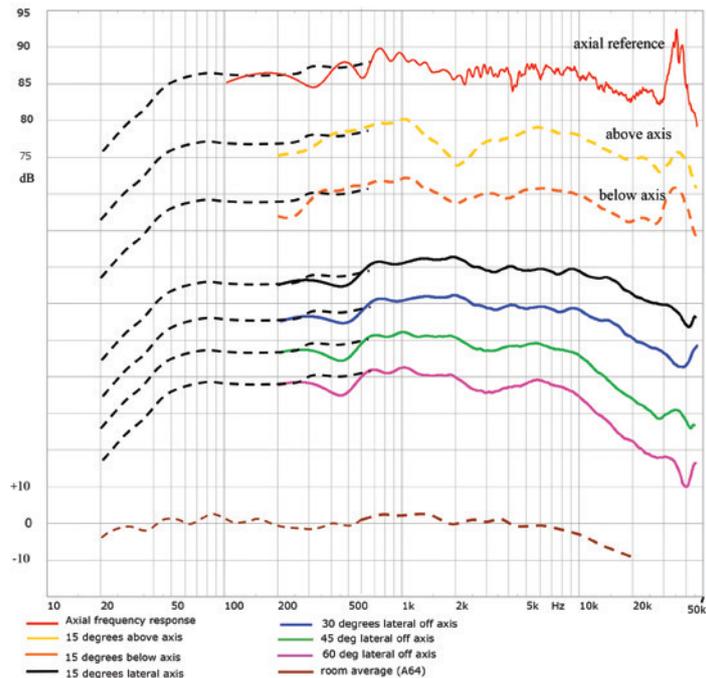
HIFICRITIC January 2020

Make	Magico Acoustics, California, USA
Type	Moving coil, 3-way, floor standing, closed box loading
Price (per pair)	£69,998 (With MPod Stand and six MPods, £79,998)
Finishes	clear gloss lacquer over black carbon fibre, textured black enamel, black anodised alloy base
Size (HxWxD)	116 x 43x 44.5cm
Weight	75kg/160lb
Type	3-way infinite baffle, sealed box 2x 170 mm bonded carbon/nanotube cone LF, 155 mm carbon/ graphene mid, 28mm beryllium /diamond composite dome HF
Sensitivity for 2.83V	87.3 dB @ 1m (2.83V)
Amplifier loading	Minimum 2.5 ohms, 3 ohm nominal, 5 ohm typical
Frequency response:	
axial	43Hz- 12kHz +/- 2.0 dB (-5dB 30kHz) <i>(listener axis: very good)</i>
Frequency response off- axis	See graphs and in-room response <i>(very good)</i>
Bass extension anechoic	37 Hz for -6dB, (33 Hz -6dB in-room response)
Max loudness, in-room	108dBA for a stereo pair
Power rating (min, max)	25W-200W
Placement	Floor mounted locate in free space 0.5-1.5m from front wall. Spiked base frame tripod with optional MPod absorbing footers
Warranty	3 years, conditionally transferable
Terminals	Mundorf heavy duty copper-alloy binders, for 4mm plugs, bare wire, and spades

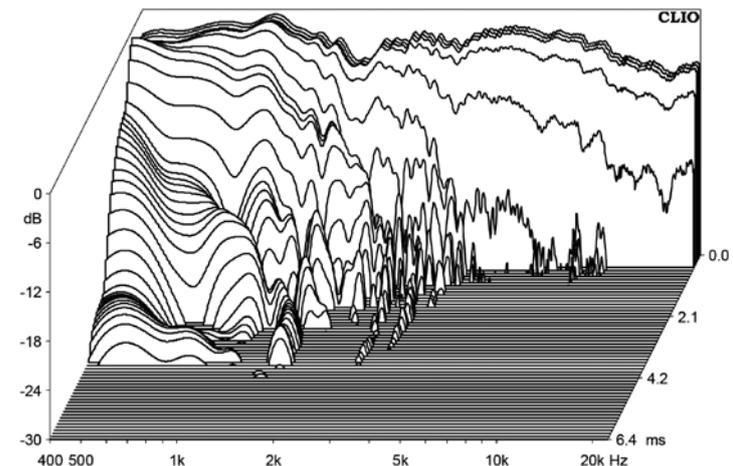
**Magico M2 Impedance (red) and Phase Response (green)**



**Magico M2 Master Graph: Frequency Responses (Sensitivity 87.3 dB/2.83V 1m)**



**Magico M2 Time Frequency Analysis - CSD**



“At non rock concert sound levels the distortion is typically comparable to a fine power amplifier, a remarkable achievement

#### Room-matched bass extension

The orientation of the bass drivers, their designed low frequency alignment, together with the lowered crossover frequency all contributed to a uniform bass drive in my room down to 35Hz, without boominess and with subjectively fast bass transients. In-room the combined response of 64 averages, over the listener area and with height, held to +/- 3dB 40Hz to 10kHz, this unusually even.

Harmonic distortion was examined, but not to an exhaustive level. Even at a low 22Hz bass frequency, 10V (25W into this load) the subjectively assessed bass 'wafted' correctly with inaudible harmonics. Higher up, near system resonance, 35Hz, here at greater driver excursion and working really loudly in the room, mild doubling was present and audible by 12V (36W/4 ohm) sine. In practice this mild distortion would be well masked by those higher harmonics naturally present in music.

At higher frequencies this loudspeaker is characterised by exceptionally low distortion. For the 88 to 90 dB sound level range the typical results for second harmonic distortion were better than 0.1%, -60dB with the subjectively more critical third harmonic averaging an amazingly low 0.04% and with similarly negligible higher harmonics. This performance was held even down to 200Hz in the upper bass. At non rock concert sound levels the distortion is typically comparable to a fine power amplifier, a remarkable achievement.

In many designs, distortion rises quickly with increasing power, but the M2 showed no such

behaviour. For example, even at 2kHz 95dB SPL, (very loud) that vital third harmonic was still held at just 0.03%. For 88dB at 10kHz I measured 0.06% for both second and third harmonics, again a great result. I checked again at lower powers and observed a trend to still less distortion, here comparable with many great power amplifiers. Past work indicates that consistency of timbre, transparency and lowered aural fatigue are all linked with such lower distortion.

Examining the energy decay or transient response, noting the magnified uniform axial frequency response seen at the back of the graph, several plus features are evident. Firstly, the phase response is exceptional as there is a largely uniform and exceptionally rapid frequency decay with time, without overlapping traces. This would suggest very fast, detailed and focussed transients coupled with low colouration. While the midrange, 400Hz to 3kHz, has a fast decay by any standard, the measured treble performance actually approaches that of a really good ribbon of near zero mass. Resonances are exceptionally well controlled here.

A fairly low 3ohm nominal rating is indicated from the load impedance curve, suggesting the use of low impedance loudspeaker cable and not least, a load capable power amplifier. This because the fairly strong association between load current and increasing amplifier distortion.

An AC voltage of 40 V RMS delivers 200W into a nominal 8 ohms, with a peak current of 5A x 1.414, i.e. 7.07A. For 4ohms it rises to 14.14 amps and for 2.5ohms, that figure rises to a really demanding 22.6A, even if this load were to be nonreactive (i.e. a minimal phase angle denoting pure resistance where the additional effect of reactive load content is not included).

To fully maintain the overall sound quality at the peak power limit which has been shown possible, a margin of two would be desirable i.e. an amplifier with a 50A peak current rating. Of course, the M2 will work well with rather less margin than this but then this loudspeaker is all about pushing performance boundaries since it is so readily capable of *measuring* amplifier quality.

The phase angle of impedance hits zero at 41Hz, essentially the designed closed box system resonance (drivers v enclosure air volume) and here the impedance curve peaks at a modest 18 ohms. It then falls harmlessly between those friendly +/- 40° phase boundaries from 60Hz to 40kHz. Equally harmless is the fall in load modulus at ultrasonic frequencies, dipping to 2.5ohms by 40kHz. Even with those few dips the average impedance over the audio music power range is about 5 ohms, so relatively normal. Overall this is a fine set of results correlating very well with the observed sound



# Magico SPod footers

AFTER HIS IN-DEPTH EXPLORATION OF THE MPOD FOOTERS PROVIDED FOR HIS REVIEW OF THE COMPANY'S M2 SPEAKERS IN THIS ISSUE, MARTIN COLLOMS REALISES IT'S TIME TO REASSESS THE JUNIOR VERSION

**I reviewed these vibration-controlling feet, accessories designed to be fitted to the Magico S5II speakers and also other S series models, in Vol 11 No4 Oct-Dec 2017. As I explained in that assessment, for my installation at least, the results were certainly not unqualified, for while there were tantalising gains in transparency, image depth and micro detail there were some accompanying losses when it came to low frequency slam, pace, rhythm and timing.**

As I said at the time, my results were somewhat equivocal and I left the purchase decision with the reader, while noting that for other systems and arrangements, results could well differ from those I experienced.

Recently, working on the Magico M2 loudspeaker review for this issue, I was once again presented with the issue of proprietary supports, these being the newly designed but related MPod accessories for the prestige M series loudspeakers.

If I had thought that Magico was rather keen on their 'S' series pods, the company was still more so for the latest 'M' type, and the three-armed base with which they were supplied. The particular virtues of the

review M2 loudspeaker were said to be more than materially advanced with the fitting of the MPod 'system' in place of floor spikes, and yet once again I had misgivings about some sound quality aspects analysed during the M2 review.

I tried removing the MPods and fitting the alternative trio of spikes, as usual bearing on stainless steel footers, resting on my hardwood floor. Now there was a good measure of rhythm and timing, but a large proportion of the previously experienced and particularly magic degree of spatiality, subtlety, micro-focus and detail had evaporated. What on earth was going on?

No solid answers were forthcoming from Magico and the phenomenon seemed to be outside of the company's experience. So, what could be so different between my long-established room arrangements and the design/auditioning set-up at the factory?

Concerning the behaviour of MPods on my high mass rigid floor, in the M2 review I eventually surmised that it had to be down to some kind of

residual vibration, an unwanted higher frequency resonance which was significantly blurring the timing instants, a form of mechanical jitter.

This can be a product of a spring-like interface where there is insufficient mechanical damping. Damping materials are ideally of a resistive rather than of a rubber-elastic nature even if they are designed to be partially visco-elastic. The latter property is frequently strongly frequency dependant and may introduce colouration, and it seemed

possible that the particular visco-elastic interlayer installed in the MPods had been designed and calibrated for more conventional flexible and absorptive suspended timber floors, very likely carpeted,

this type of foundation more probable for most installations. On a rigid platform such as mine it was plausible that the operational loudspeakers were being excited into lower frequency resonant vibration of undefined duration. As I noted in the M2 review:

*Accordingly I placed a small square of short pile, heavy duty, office grade wool carpet (woven hessian backing, and not rubber underlay), chosen for its mainly resistive mechanical properties, under each freshly MPodded, loudspeaker, and pressed that virtual play button on my streamer control iPad. Caramba! that was it: the Magico M2 was absolutely back in the game.*

For my own S series loudspeaker example, the S5II, I reinstalled those contentious, previously set aside, SPods beneath my S5II speakers, on the usual included spikes and footers. As I had found before, when set on the rigid hardwood on concrete floor, the disturbed timing and the loss in low frequency dynamics and speed recurred with the SPods.

*For my system I consider the overall S5II sound quality gain was substantial, and one which I wouldn't wish to do without*

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## REVIEW

But adding that thin carpet interlayer under the footers provided a similar and overall substantial improvement as had been found with the M2.

No, SPods with carpet pads did not transform the S5II into an M2, but it did take this established and very familiar 'S' series design a noticeable way towards it. That previously held concern about bass precision, slam and timing when using the SPods – when compared with plain spike mounting – was now firmly dispelled, and for my system I considered the overall S5II sound quality gain substantial, and one which I wouldn't wish to do without.

Conclusion? For the want of a scrap of carpet the battle for better sound was lost, once again teaching us the importance of mechanical interfaces in the

control of fidelity-robbing audio vibrations. Thanks to the experience gained with the M2, the concrete floor support problem for Magico Pod footers has been solved.

My S5II speakers, now re-fitted with SPods, sound reworked, turbocharged, and with fine rhythm, imaging detail and dynamics. Those previously contentious Magico SPods get a clean bill of health at last and – more than that – they are now highly recommended.

