Jitter Free...
The impeccable logic of Michel Reverchon

by Roy Gregory

Michel Reverchon, the charismatic and iconoclastic President of Goldmund is one of the founding fathers, a giant of high-end audio. His products have always challenged the status quo – as well as accepted notions of value and pricing. They've also offered stellar performance, perhaps inevitably attracting praise and condemnation in almost equal measure. Feted for years in the Far East, Goldmund's products are once again appearing in the West. I spoke with Reverchon, and Janet Mundy (Goldmund's Chief Operations Officer) in order to understand the history of the brand, as well as its supremo's current thinking.

RG. Perhaps we'd better start with your initial involvement with Goldmund…

MR. That was an accident. I was working with (the European Marketing Division of) IBM and felt it was time to do my own thing. Goldmund was initially started by two young French architects who were doing modifications to the Rabco (linear tracking) tonearm at that time. Eventually they made their own arm which was the first Goldmund T3 and this attracted a lot of attention. They were not in a position to meet the demand so I decided to step in. I was still at IBM at the time and my "hobby" was installing every arm – when you see the tonearm it is precision mechanics and to the French this means nothing (laughs) so I moved production to Geneva and started to produce the arm in quantity, professionally made to an improved design. That was the start, in 1980.

Having decided to build a business I couldn't do that with only the tonearm so we had designed a turntable (the Studio, in 1979) which allowed us to sell sufficient products to actually start the business. That's when we launched the project and research for the Reference turntable and started the development of the complete system. In 1982 we added a speaker and we got the first electronics in 1984. The idea was always to create a complete line of products.

Now, back in 1980 we had only one 'table and one tonearm. Nobody was making a decent turntable at that time… just Linn, a few esoteric Japanese designs… nothing much else (he shrugs). Audiophiles all over the World, you bring them a new turntable, a new tonearm that is exciting and they buy it – so we had no problems. My friends from Levinson and Audio Research were happy because we were completing their systems. They had amplifiers, there were speakers but no good sources of comparable quality so everything was fine, they accepted us.

RG. Initially, you started out working with a product developed by two other people. Yet, within five years you'd developed turntables, speakers, electronics… How can a company achieve that?

MR. A company can do that – one man cannot. If a company decides that it needs to bring a speaker to the market, it looks for a man who knows how to build

speakers. Very fast, in Europe, you have a list of 20 names of such people. You visit them and select one. The first who got involved was a Frenchman called Christian Yvon, a freelance designer – which often means somebody who is good at design, not so good at building a company. So we hired his expertise. In the same way we approach people who design electronics, we approach people doing other things, including cables. I learnt by catching new talents and hiring them as contractors. Some would just do one project for us, others would become more and more involved until they ended up working full-time for us. This is the way you build a company – not by trying to do everything yourself. I just organize.

We started with a plan to create all categories of product and that was the real start of Goldmund – not the turntable and tonearm; we just used them to enter the market. But this had another consequence. When we were just selling the turntable and tonearm we were friends with everybody. But as soon as we started to produce speakers and electronics my friends in the US started to scratch their heads – they started to see us as dangerous. So, we decided to continue selling the turntable products all over the World, but to concentrate on selling the electronics in markets where they would be welcome. There's a business model that says it's better to swim in a blue ocean than a red one – to offer your products where there's little competition rather than a lot. So I looked at the market to see where our products – made in Switzerland, high-tech, superb finish, full line – I looked to see where this would be welcome. Most of our competition at this time was American and the people who loved the Europeans, loved what we did and hated the American brands were the Japanese.

Everybody thought I was crazy but I saw them accepting brands like Levinson because they had no alternative, so I went to Japan – that was in 1984. This was so successful that in 1987 our distributor created a separate company to sell Goldmund products, headed by the former president of Micro Seiki; because of his history with turntables he understood Goldmund very well. In Europe we had just acquired the Stellavox brand which had a fantastic reputation in Japan, so this is what we called the new company – Stellavox Japan – which is still our biggest distributor.

So we actually moved out of the US and Europe – that's when we disappeared off the audiophile scene here – because we were so successful in Japan and the Far East. We had a choice: disturb people here, disturb people in the US or please people in the Far East. There can be no doubt which course you choose. But the effect was that we seemed to disappear, to be removed from Western perception and that has had a huge impact on the way the company is viewed over here.

RG. Why return to the Western markets at this point in time?

MR. (Pauses) Because we are strong enough now to fear no competition… period. Before we were faced by established companies that were powerful in the market; fight them and they'll win that fight. Now, coming back is not a problem. Now we can compete easily – present a proposition and people can decide whether or not they like it.

RG. In other words, fight the battles you can win…

MR. Exactly – much less blood that way!

RG. The key step in this history has to be the decision to evolve from the craft manufacture of modified Rabcos or the original T3 to a business model with a strategic plan. What were the fundamental aspects of that strategy?

MR. If I tell you the truth, you will hate me! As a businessman it was to make money to stay in business. I saw Goldmund as a real business. So when making decisions about this product or that, I always did so on the basis of their potential. The company has always been run like that. I still listen to and love music and love equipment, but as a business our products have to make the money to create the equipment I want to listen to.

RG. So how do you set about creating financially viable products?

MR. It is extraordinarily simple. We are just operating at the top of our field. It is an arena in which people are prepared to pay as long as it is for something genuine. That's a luxury market and it will support extremes if necessary. So what you must do is overcome technology barriers; create products that really do perform better. You must build your brand; which is making the quality of the product, the finish, the image, name, distribution chain, everything… the top. Then the recipe is filled; you must just ask the right price and people will say, "Yes". So, business-wise, the recipe is the same as Patek Phillipe or Chanel. Make the best, with the best performance and finish and you can ask the full price – and people are glad to pay it. They will buy your equipment because that is a pleasure in itself. So it this touch of luxury added to high-tech, provides a powerful mix that brings in the money to invest in the next R&D.

RG. With so many options and approaches available, how do you select the ones you use?

MR. That's down to your business sense, watching the market. Being aware of future technological changes before the others. Be very close to the customer – on his knees as he is listening. Be sensitive to the changes in distribution, technology and the taste of people when it comes to front-ends – where they get their music from. You must have the organization to capture all this information and understand it. The choices become obvious then.

JM. Michel makes it sound very easy, but that's like an Olympic athlete makes their sport look easy. It's a special skill and there are not many people who can do this with such clarity, who have the ability to act as a catalyst with designers, technicians, distribution chain – the whole team. To combine the right people and skills to produce exactly the right direction so that they achieve far beyond what was originally perceived. That's the unique talent Michel has.

MR. It is true that we surround ourselves with many talents, but that was a business decision. We chose to make Goldmund a research rather than a manufacturing company. If you want to make the best amp or turntable or speaker, as a small company you cannot afford to employ the top guy. But if you hire him as a consultant for six-months, then you really can afford the best. As you develop the company and it grows, soon you can afford one guy, but with so many products and different technologies he can't be the best at everything – that's not possible. So rather than hiring the stars, when we started to attract our own engineers in 1998, we took young people who would develop into stars.

JM. But they're attracted by the opportunity to work with the specialists who still surround Goldmund, and to be part of a true technology company – we have always had more engineers than all the rest of the staff put together. Also, the Swiss Atelier system, the collection of tiny precision engineering houses on which the watch industry is built suits our structure perfectly. Technological advances aren't just to do with chips and electronics, but also the degree of precision available and the engineering possibilities that creates. We've seen huge advances in this regard in recent years.

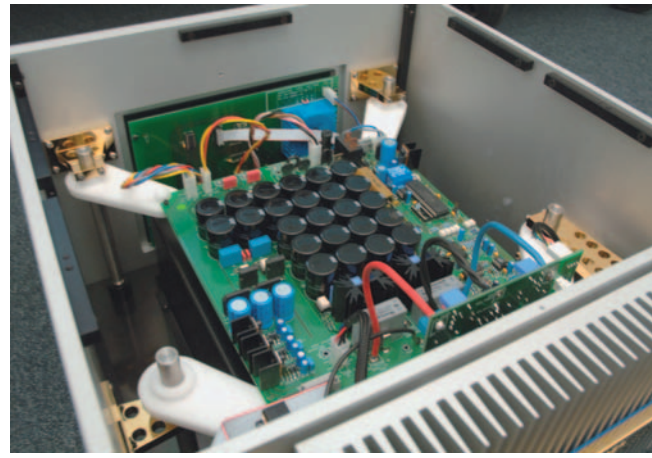
RG. Given the importance of branding and continuity to your overall strategy, does bringing an engineering element in house help provide that?

MR. There are few aspects in the design of a product. The visual designer, from the beginning, was myself – I drew everything. I still do some of this. But branding and finish is far more than just the surface or appearance of products. We also have an extraordinary level of mechanical and technological continuity, approaches that typify our products – mechanical grounding, wide bandwidth for instance. These things have been with us from the start and absolutely dictate how we actually build our products. To that extent our engineers represent a methodological foundation, a fundamental basis on which outside designers can overlay new thinking and which we know is secure.

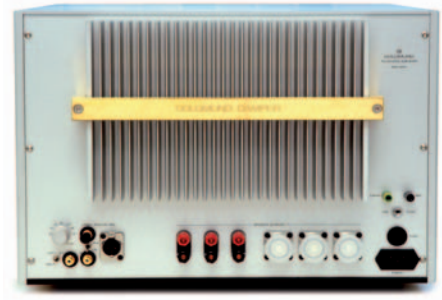
Let's take mechanical grounding as an example that

has been with us from the beginning and is still in every product. I learned about this from one of our original contractors, the guy who designed the Goldmund Reference, Georges Bernard. He introduced the idea. When a concept is so attractive, when it makes so much sense, I fasten on it. I had him explain it, more and more and now, when people come to work for us, I have him teach them too. The new Reference turntable – you know it is the work of the same guy? That's continuity of thinking – and practice. When we hire a new engineer they embrace this concept – it becomes central to their thinking too. But to get the best technology, to bring that to us, our people must work with outside talents. I don't know any other way to do it.

You know though, we are now starting to also make discoveries ourselves. Our own people are doing some fundamental research, things they have discovered that they will soon teach at the University. Sometimes when you can't find what you need, you have to create it…



RG. Besides mechanical grounding, what are your other keystone technologies?



MR. I think that we have two families of technologies. Firstly, and mechanical grounding is part of it, we are concerned with suppressing mechanical resonances. So, for instance, we have designed transistors and have them specially built for us because most transistor manufacturers don't worry about resonance within components. This is one domain where we have really pushed the thinking. If you look at the design of the new Reference turntable you'll see that the theory and structure behind its construction is almost identical too – just a development of – the mechanical grounding principles used in the original version. Every detail is different, but the principle is exactly the same. Of course there are huge advances in materials and execution, but that basic approach, the removal of extraneous vibration from the mechanisms and circuitry in our products is universal. If you look in our speakers, our amplifiers, our CD players you'll find a properly executed ground path sinking energy out of all the critical components. This isn't just a spike on the bottom of the box. This is a carefully constructed exit strategy, starting from the source of the vibration and, yes, terminating with a spike or cone that the unit stands on. But do not confuse it with the spikes on most other products.

Another thing that surprises many people who look at the new Reference turntable is that it provides a digital output. Sacrilege! But it is also an essential part of our second and most exciting technological advance related to the listening mechanism and accuracy of the brain. We all know how easy it is to make something sound nice that is also totally inaccurate: to fool the brain. So we must examine how the brain works with sound. In this respect we have made huge strides, not just in terms of psycho-acoustics, but also in understanding which parameters in musical reproduction are really critical. What is important and not important, which things combined create that incredible impression of being real.

The human brain has been tuned to work on time – not on amplitude. So anything that is wrong in terms of time is immediately noticed by the brain. It doesn't exist in nature since Mother Nature doesn't fool with time. You can fool with everything else, frequency response, phase response but nothing exists to distort time except hi-fi. This was always something we knew, but we have spent years and years analysing and developing a better understanding of this in order to be able to correct it.

RG. So what you are really talking about is time and phase integrity across the system?

MR. I think the principle is known, however, when you show people the way in which a simple two-way speaker crossover distorts time, you play them a cello and then the same instrument through the speaker, they can't believe they are listening to the same thing. The brain immediately hears the time distortion.

To preserve proper time relationships across a whole system – that's difficult, but it's vital to our ability to create a "real" sound. How do we do this? Let's start with our Telos

amplifier circuitry. If you take a Telos amp and put it in any system it will improve the sound – any system! This is what our distributors and dealers confirm. It's because the power amp is generally the weakest link in that system. Telos is about speed – speed and safety: The safety because of the speed. An amp that is capable of delivering 70 Amps in 100ns is a killer. If you do that by accident to a driver you'd better be wearing a mask! So safety is important for the protection of people and speakers and reputation also. This is an amp that is, in theory and practice to date, unbreakable.

The reason we want speed is for bandwidth. If you want to reproduce a decent phase response you need 10 times more bandwidth than you'll actually need to hear: 20 – 20k needs 200k – everybody does that. But if you want correct arrival time, for that you need 0.2 – 2Mhz! That is to prevent a variation of propagation delay between 20 and 20k. So speed is vital to increasing the bandwidth and correcting the time. Bandwidth by itself has no advantage. By the time your signal is in the amp, there is no way to correct time – you can only protect it. So in Telos, bandwidth is from DC to 3Meg within the amplifier itself. We limit it at input and output, but that is the performance of the circuit doing the work. This gives us a decent time response, with a group delay within a few nano-seconds (the brain is sensitive to 100 pico-seconds). We have that performance irrespective of level; no bandwidth limitation with power or load.

The other big advantage of Telos over any other amp is in its control of the driver. To really get hold of a speaker an amplifier must have an output impedance as near as possible to zero Ohms. This is reflected in the amp's damping factor (a term made famous by Phase Linear in the USA). Well, our damping factor is several orders of magnitude above others! And that's not for acceleration, it's for braking. The driver has a weight and that will cause overshoot if the amplifier doesn't control the driver.

So we have speed for time coherence, damping factor for control and protection for safety: no new things but all extended to the extreme and in a completely new way. Telos 5000 will arrive soon – 5kWs continuous! And a crazy damping factor. To achieve this we need new devices, three times the price of the Telos 2500s (so $150,000US a piece), a special electrical installation, the amp will need to be tuned for your speakers and completely tested on installation for safety. These are the lengths we can go to.

But the Telos is only a better amp. Our Universal pre-amp is where we can really transform a system. In a normal set up you have your CD player, a DAC, a pre-amp, power amp and speakers. What we decided to do was take the DAC and move it in the system – put it at the input of the power amp. So, if you look at any Telos amp you'll see that it has both digital and analogue inputs, and its own internal DAC. As soon as you do this, it is much easier to transport the signal. In its analogue form the signal is extremely fragile and difficult to transfer. Each step in the process risks major time and phase disturbance, the very things we wish to avoid. By keeping the signal in its digital form it is far more robust. Of course, you have to have a good digital signal, and our transports are extremely good.

So too are our A to D converters, so that even analogue sources will produce better results when they are handled in this way. The way I explain this is to say that although the music is always analogue, we prefer packaging it in digital, to protect it.

In the Universal pre-amp we have digital inputs and digital outputs. A conventional analogue pre-amp will require buffers on the input and output as well as a volume control – three more areas where you can only damage the signal. Properly executed (and many aren't) a digital volume control is infinitely superior – causing no damage at all. But, once we do things digitally, other things become possible.

Why not put the speaker crossover in the pre-amp? We can make a digital crossover where both the bandwidth interface and phase response and the time coherence are all perfect. This is impossible to do in analogue.

Why not add a surround-sound decoder? Dolby digital, DTS, etc… – that's an interesting facility: easy to do with a digital unit. Suddenly there's no difference between a pre-amp and a processor. And again, this facility involves no quality loss because we do it in the digital domain.

RG. But most 5.1 chip-sets sound awful…

MR. Not if you apply the Dolby digital algorithm without cutting corners; the multi-channel digital output is then nearly perfect. It is just that most people don't do that. They buy cheap chips and use them as decoders – and that's not following the algorithm. That's cutting corners. We are the only company who has engineered a complete DSP decoder that is theoretically perfect. Cost? A house… or you can use a Goldmund pre-amp.

You could incorporate multi-room control, room compensation, filters – many, many things that might be incorporated into DSP. All without loss of quality. This is just mathematics – multiplying whole numbers. Now we have new things too: time alignment for separate cabinet speakers or sub-woofers.

So, a Goldmund pre-amp is a box with little in it – just digital in, digital out, switching and a great deal of software processing. That's all. We call it Universal because the same box can perform all pre-amp or processor or system control functions. It never has to be replaced if the system grows or expands.

RG. Do you provide analogue inputs?

MR. Yes, along with the A to Ds. The number varies depending on model: three stereo in the small one, two six-channel and five two-channel in the big one. With analogue inputs and the decoding in the power amps now we have a revolution in system topology. But it only works because of the quality of the digital electronics and the DSP implementation. Here we have made huge advances and this system approach exploits those benefits.

RG. Does it eliminate the issue of cable quality?

MR. Yes and no. In digital the problem is not transmission but reflection. Termination at the cable ends becomes critical. The quality of the cable is 99% down to the quality of the connector and the correctness of the electrical interface. Accuracy of the cable geometry is also important, but only once you have proper termination. 75 Ohm RCA is okay, BNC is best.

The next stage is what we call Project Leonardo – a blue sky project. In the analogue domain you cannot repair time alignment once it has been damaged. But in the digital domain you can. We now have DSP time-corrected analogue speakers. In other words, we analyse the damage done by the conventional passive crossover network of the speaker and apply the inverse "corrective" in the DSP and feed that into the power amp input. It sounds simple but the maths is horrendous and the subject of an AES paper. One of our engineers has been working on this for years and finally we have the results…

And what results! Goldmund's Epilogue speaker is a highly rated and far from inexpensive audiophile system. Indeed, it has featured in some of the best sounding show systems I've ever heard. Yet, in an ABA comparison against the DSP moderated model, the standard version sounded broken – all as a result of a software implementation within the pre-amp. The hardware in the system remained identical throughout. Project Leonardo is way too big and complex a subject to discuss here, but the results are incredibly impressive, the implications profound. It sums up Goldmund's impressive grasp of their chosen technology and commitment to research – as well as Reverchon's innate understanding of music and correct reproduction.

Michel Reverchon undoubtedly expresses challenging views, some of which have been previously expressed and widely discredited in the past. But the proof of the pudding is in the listening and he can certainly demonstrate performance that suggests he has the technology and products to support his claims where others have failed. I'll be reviewing a complete Goldmund system in the next issue. To say I'm looking forward to the experience is an understatement!