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CLAUDIO LASTRUCCI

Powersoft is led by two generations of the Lastrucci family, but it didn’t come together in the conventional fashion. The company was the brainchild of brothers Claudio and Luca and their university friend Antonio Peruch, with the father of the brothers joining the company further down the line. Clive Wilson interviewed R&D Director, [Claudio Lastrucci](#) to hear about the 20 year history of the company.





Carlo, Claudio, Luca and Antonio

In recent years Claudio Lastrucci has become something of a poster boy for power amplifiers and control electronics compressing ever more bang into smaller, higher density packages.

In fact you could paper the walls at Powersoft, where he is R&D Director, with international patents that have been filed to protect the Italian company's relentless technology drive. Now, as it celebrates its 20th anniversary, this engineering-led, family run business is at last getting the recognition it deserves.

After helping to fuel the active loudspeaker revolution, and last year delivering the voltage agile X-series amplifiers in what was one of the most memorable launches seen at Prolight+Sound in Frankfurt the cocoon had metamorphosed into a beautiful butterfly.

Powersoft already holds bragging rights by virtue of being based in the Renaissance crucible of Florence, where they keep company with the likes of K-array, B&C Speakers and measurement company, Audiomatica. Italy's own little Silicon Valley is ensuring that the 'Made in Italy' insignia now carries real cachet around the world as does 'Powered by Powersoft'. This is the result of continuous investment in R&D.

After a decade dominated by leading American amplifier brands such as Crest, Crown and QSC, Powersoft has been slowly rewriting the rules and revising the benchmark. The breakthrough came in 1997, when it filed patents for the DIGAM platform with which it has become synonymous. This was achieved not only by establishing switch mode technology, but at the same time utilising a combination of PWM (Pulse Width Modulation) and load independent output-stage filtering. It also became the first company to introduce Power Factor Correction (PFC) into commercial amplifiers, further improving performance of the new generation Class D amplifiers at high output levels while avoiding mains voltage collapses. Greater power was delivered to the loudspeakers in a more stable and efficient fashion than had been seen previously, with greatly reduced dissipation of heat - all packaged in a lightweight 1U chassis. And the guiding hand was that of Claudio Lastrucci.

To find comparable paradigm shifts of power/weight ratio you would need to go back 10 years to Bob Carver's Magnetic Field principles, and before that to the MOSFET energy revolution of the '80s, which took over from the vintage valve and transistor days of solid state Crown Amcron DC300 and BGW 750. Today, road crews no longer run the risk of internal haemorrhaging caused by humping the business end of a PA system into the venue.

With the early Digam Series (3000, 5000, 7000), Powersoft was able to replace unforgiving slabs of metal weighing 25kg with just 9.5kg. Yet it is probably in the multi-channel amplifier market that these advantages have been most manifest - first in the year 2000 - the Q4002 delivering four independent channels of 950W/ four ohms in just 1RU, followed by the super lightweight M-Series M50Q, Class-D high power amplifier offering four x 1,250W/four ohms and Ottocanali 12K4 with eight x 1,500W/four ohms into 2RU.

The growth of Powersoft has been steady if unspectacular until recently; but that graph gradient is now starting to plot noticeably upwards. With Italian production facilities dedicated to modules and rack amplifiers respectively in Bologna (San Giovanni) and Gorizia, it has enough ordnance to set up sonic Armageddon, but

it has been the way that Claudio and his team have converted power signals and then migrated technologies fomented decades before in the industrial sector that are at the root of these breakthroughs.

Powersoft is led by two generations of the Lastrucci family but this has not come together in the conventional fashion, with dad starting a company which eventually cascades down to the two sons. The company was the brainchild of brothers Claudio and Luca Lastrucci and their university friend Antonio Peruch. They remain the 'three amigos' to this day.

Carlo Lastrucci, Claudio and Luca's father, arrived a few years into Powersoft's life, having retired from his position as MD for one of the Marconi companies, where he headed a workforce of 600 for the telecommunications giants.

All three Lastruccis had graduated from the local University of Florence, Claudio and elder brother Luca with degrees in Electronic Engineering and Carlo in Physics many years earlier. While Claudio was feverishly refining paradigms from the industrial sector with the alchemist's touch, Luca was masterminding IT and software, and Antonio Peruch, was overseeing quality assurance.

"A few months before we got our final degree we pooled our ideas and discussed the possibility of forming a company," recalled Claudio, recapturing the origins of the alliance. "Maybe these ideas were not ready to be produced yet, but still we had sewn the seeds."

Yet while all three men had a strong musical heritage - Claudio was a classically trained pianist who also played saxophone and later drums - their early work was as consulting engineers, far removed from the world of entertainment

"I have always been interested in acoustical design," Claudio told *mondo*dr*. "Our primary goal from the very beginning was not only audio but powered electronics and work in the radio sector. We did a lot of work on localisation during the early days of GPS- today GPS is everywhere," he remembered.

In addition to making the first software in Europe for bus optimisation routing called RadioBus, Powersoft's also created an interactive product for telephone systems and launched a division dealing with mobility. "We jumped on opportunities such as these," declared Claudio.

The company name they had chosen was 'Powersoft'. At first sight this might appear as something of an oxymoron - 'Power-soft' - but it would become ever more logical with the growing software influence of Luca.

"Today there is no power without a big brain," Claudio rationalised. "The software side of the interface defines the functionality of the hardware- everything is about the ergonomics of the software."

The consultancy work largely funded the new venture, which began humbly enough in the house where they were born, a 100 sq metre apartment. It was a year before they were able to take on their first employees.

Claudio recognised that switched mode power supplies - and later power factor correction of non-linear loads - had not yet been successfully deployed in the entertainment sector. "While these technologies were effective and proven, they had not been considered for pro audio although the amplifier is the driving part of the system," he affirmed. PFC had been mandatory in the industrial domain, and with the addition of Pulse Width Modulation (PWM), another 50 year old technology which further minimised power loss, the power transfer into a much



more efficient engine was complete.

"We knew this transposition would bring real benefits but it took a long time to get these benefits across, because audio is a conservative market and changing the mindset takes a lot of time. As for power factor correction, today if it's not PFC it's not in the game you are using less energy and less copper, and it's exactly the same with switched mode amps at the output stage."

And so the industry remained initially tied to the linear world, the more so when the first generation of digital amplifiers, for all their weight and space saving characteristics of Class-D amplifiers lacked both stability and the sonic 'warmth' of analogue. Claudio remains philosophical. "There was a fight to overcome the early technical difficulties but you can ask 200 people and they will all have a different opinion about why the technology was struggling with those early digital amplifiers," he said.

It took a process of continual refinement in his quest to break through the power-to-size barrier before those mindsets eased. Powersoft aimed for a factor of five in weight reduction, essentially bringing the same performance from a Class-D switched mode power module weighing around 10-11kg that historically would have weighed 40kg with a linear power supply. But the constant success they achieved in blind testing spurred them on. And then the breakthrough came.

"We developed a high powered 2U amplifier with integrated remote control 20 years ago which never went into production - a 10kW amplifier with front panel LCD- but it was too complicated to be produced."

However, by 1996 Powersoft had built a number of good relationships through its OEM work, one of them being fellow Italian loudspeaker manufacturer Outline, run by the late Guido Noselli. "We attended an SMAU electronics show in Milan in 1996 where we had the prototype and Guido came past, and couldn't believe there was a 10kW amplifier, with remote control, and a PFC LED display," said Claudio. "We had a meeting with them in Brescia and set up comparative tests. Guido was really one step ahead, and even though we had no history or background in pro audio, he was ready to commit."

"We were newcomers. Linear technology was established so why would such a well established company change and jeopardise their core business?" he recalled, still in disbelief today.

Digam became the first design to incorporate stable Class D fixed frequency switch-mode technology and PFC. And after successful experimentation, Outline



placed an order for 500 of the slightly less muscular Digam 7000, a 2U device, outputting two x 3.5kW/two ohms.

"However, there had been a concern that the Digam 7000 was still too powerful at that time. So we moved to the smaller Digam 3000 [two x 1500W/two ohm impedance]. By fitting it into 1U we could half the weight to just 12kg." Establishing the 1U benchmark to harness so much power, showed the degree to which Powersoft was starting to leverage the power legacy of the industrial world.

With the revenue from its third party OEM and consultancy work, Powersoft was not only able to invest in new equipment but after two years was able to move to larger facilities in the north of the city, which signaled the arrival of Carlo.

His large scale industrial telecoms experience was soon turned to good use.

"Telecoms and pro audio were very different but in principle they were similar," said Claudio. "He brought some structure to the company." The company, and its staff of around 15 personnel remained there for three years before taking on the first of the three buildings it occupies today on the west side.

And with commendable prescience, having already developed an aluminium, sealed-in-resin monoblock amplifier in 1997, the company also introduced PowerMod, the first complete compact amplifier module, providing the highest power density at the time: the output stage and power supply were condensed into a compact and lightweight power amplifier for self-powered loudspeakers.

"OEM has always been a big portion of our work," Claudio continued. "Since the introduction of active systems, that includes having electronics inside the loudspeakers." And so by the end of the millennium Powersoft had diversified its production, with rack amp production taking place in one factory, complemented by power modules on the other.

"That business rose up from scratch and meant that the speaker manufacturer no longer needed to worry about the electronics," Carlo continued. "The demand came as soon as the technology was available - it was compact, reliable and efficient and ready to upgrade into speakers. At that time, there was not much integration though - you just screwed the model onto the back without wasting too much heat."

It was another five years before the superior DigiMod refined the art and became the first Class D amplifier module with specifically designed DSP boards, boasting advanced processing, remote control and networking capabilities, and providing granular control of sonic parameters. The introduction of signal processing on-



Claudio, Antonio, Luca Giorgi and Francesco

board marked a further huge step forward in system customisation which became even more adaptive once it was able to be addressed and monitored by Armonia Pro Audio Suite, from 2009 onwards.

But for all the feverish activity taking place in Claudio's skunkworks, Powersoft desperately needed some outreach and international marketing, a function that didn't really ascend to a professional level until another graduate from the local university, Luca Giorgi, joined in 2007, building on a legacy that had originally begun back in 1998.

"We went to Frankfurt in 1998, specifically looking for significant distributors partners who could understand the technology," remembered Claudio. "And it was successful in that we have since recorded a growth in turnover that has been consistent every year."

Distributors did not have to wait as the company soon revolutionised the installation market for high density, small footprint multi-channel amplifiers. The Q Series compacting four channels into 1RU.

"However, at that time no-one wanted to see a four-channel amplifier in a rack and it took several years before there was a big payback," noted Claudio, further alluding to the conservatism of the industry. "Now, it's unthinkable to not have a four-channel amplifier but back then people were worried what would happen if the power supply died?"

The risk was minimal and the advantages were great - a fact exemplified by its latest eight-channel product, the Ottocanali DSP+D, which is fast gaining high prestige global adoption. With its Smart Rails Management, dual redundancy and Dante support- it also met customers' demands for an eco-solution which would at the same time guarantee a low cost of ownership over its life cycle.

The 'green' culture courses through the company, no more so than in the production principles set up by Antonio Peruch. Chipping into the conversation, he stated: "Being green is a large part of our ethos and the solar panels we use, generating just 500kW of power at our Bologna plant and 1500kW at Gorizia, makes production very efficient."

And of course, system integrators have been quick to jump aboard Powersoft's relentless quest for economy, as Claudio admitted: "While we had been tied to live sound, because of the nature of our lightweight products, we didn't really consider the installation market. But we participated in a tender for Munich Airport [Terminal 2 in 2005] and the specification wanted PFC, four-channel with switching mode output stage and it was exactly our product [the QTU 1400 series].

"We made a calculation to show that the client would recover the money spent on 380 amplifiers in just three years due to the savings on electricity.

"We have been building [low impact] products like this since the beginning but it's only in the last 10 years that green issues have become important," noted Claudio. "Energy is not such an important issue for live sound but for 24/7 use there is a big difference."

Claudio thinks in terms of packages, fervently believing in the synergies that integration - combining all parts of the system - can leverage. And while he says loudspeaker development would be counter to their philosophy they would not turn their back on producing subwoofer systems. "If there is something that can improve performance, even if it's not your [core] business, you have to take advantage of the technology or someone else will do it.

"One technology can change a lot of things. It's like playing cards- if you get the Joker the whole game changes." Yet for all his self-belief, Claudio remains one of the most self-effacing individuals you are likely to find spearheading a company, which makes Powersoft's approach at the same time endearingly parochial.

"I have been lucky because I have been surrounded by a lot of patient people," he said typically. "My biggest achievement has been my ability to convince people that the new technology could provide benefits. Class-D, PFC were all steps that were needed to achieve certain functionalities and change the way things can be done." "But if you are looking only for the market demand of tomorrow you are already too late because someone will be faster for sure. "Let's think about what's going to be used in 10 years' time."

But to the outside world, Claudio masterpiece was the introduction of the high powered K Series in 2004, which really put the company on the map. He recalled the challenge. "The idea was to make the most powerful and best sounding amplifiers in the world.

"It came about because three or four customers were absolutely clear about what they would like but could not find elsewhere," he recalled. "This involved a huge amount of voltage and current that would work anywhere in the world. We already had control software that was running the four-channel Q-series amplifiers," Claudio continued. "But K-series deserved a new interface and new management software."

And so several years later they started to develop Armonia Pro Suite. "It's a completely different language, remote control and Ethernet based rather than serial with a better user interface offering more functionality. As soon as we integrated the new DSP it really started to take off."

In recent years several new inventions have astonished the market the first being M-Force, which was launched two years ago. This patented moving magnet linear motor transducer is matched with the Class-D M-Drive amplifier module which ►



enables the M-System to deliver optimum performance in terms of power handling, electromagnetic conversion, reliability and maximum SPL: a true paradigm shift from the conventional moving coil and cone arrangement.

Designed to handle extremely low impedance loads, Claudio helped build a system for sound engineer, Antonio, to take out with Italian hip-hop, rock and rap artist Caparezza. "I realised that I was immersed in the future, and face to face with what I considered a turning point in the sound system development, comparable to that of the line array," Antonio said at the time.

And in what is believed to be the world's largest subwoofer club installation at the Avalon Hollywood Club, the integrated M-Force drives the new EAW Avalon house system while the newly launched Sound Force series from D.A.S. Audio also features M-Force technology.

The same year as M-Force was launched, Claudio was able to release DEVA a highly complex project taking them well out of their historic heartland. This was an all-in-one Wi-Fi based multimedia unit with integrated solar panel. Audio signals could be distributed across large areas and perform audio/video surveillance in any operating conditions.

"It took two to three years to evaluate the concept," he said. "It was designed for paging and BGM, but with the idea of being self-sufficient, and able to be run with solar energy. The control and transducer have been designed in such a way so that a single sunny day will sustain it through three or four cloudy days.

"It will handle Wi-Fi, streaming, FM, and is also a low impact product; people are starting to understand the cost benefits when you would otherwise be digging deep into the ground to lay cable."

This innovation was followed last year by the highly vaunted X-series with a revolutionary worldwide power supply, suitable for single, bi and three-phase operation from 85V to 440V, DC - 400Hz ensuring safe power distribution anywhere on the planet.

Although Powersoft is a member of the AVnu Alliance, and have been investigating its AVB protocol for some time, it has also backed Dante support with the X-series "because the product was already in the pipeline but X-series can move to any standard because it is protocol independent."

And 'independence' remains very much a buzz word in the Lastrucci family. Ask

"The best thing my father taught me is that if you have an idea, follow it, and go with your instinct."

Claudio where Powersoft will be technologically in two years' time and he may shrug. Ask him if they will still be independent and the answer is more forthright. "Independence gives us a good advantage and allows us to do what we do best and get products to market faster."

And yet as much as Claudio enjoys talking high technology principles he realises that all the efforts would be wasted without a proper sales network, a subject he is eager to return to. "There is a lot of engineering in Powersoft but historically there was not so much capability to spread the word of what was inside. It was a limiting factor with Powersoft. In recent years Luca (Giorgi) has done some great work to improve the visibility of the company."

Everything in the Powersoft universe seems to be an oasis of calm. Trying to unravel much below the surface seems futile, possibly because there is simply not much to unravel. Were there never blood feuds between the three Lastruccis? Unlikely. Arguments between the founders? No. "The good thing is that we have split the competences since the beginning between R&D, production and software. There's never been much overlap, and so there's not much to fight over," he said. Perhaps a three or four hour discourse over a slew of Negronis about non-Boolean Matrix factorisation, and its role in amplification, would have evoked a different dynamic.

However, probe Claudio about his life outside Powersoft and we find the same spirit of adventure in the recreational world as he does in the professional one. A family man, with sons aged 11 and eight and a half, and a daughter of four, when not pouring over circuit boards, he and his family can be found travelling far and wide to remote parts of the world to indulge in more extreme pursuits such as trekking, scuba diving and skiing.

So how would he wish to be remembered? "Just for making good products that are accepted in the market and for putting some spice into the technology so that it is an improvement over the competition."

In the meantime he believes Powersoft have future proofed themselves by spreading the risk. Why? "Because the amplifier is not what it was 20 years ago. More than 50% of the pro and semi pro market is no longer based on rack amplifiers, they are active systems. Modules are a growing market and we are collecting customers from our key competitors... and that's helping to keep the market fresh." Today, OEM and modules are responsible for some 46% of the business.

But just as markets have changed in this increasingly homogenised world, so has manufacturing, and fluctuations in the US dollar to Euro ratio has resulted in increasing cost in Chinese production. "You now need to go to India or Vietnam to find a cheaper source for product manufacture but nowhere can you now go to make product at a third of the cost, as you could before," he stated.

One thing's for certain Claudio is unlikely to stop bringing fresh ideas to market and taking risks in the process. "The best thing my father taught me is that if you have an idea, follow it, and go with your instinct." That ethos has certainly paid dividends so far. 