NORMA

General Products Philosophy

By Enrico Rossi – English version by Srajan Ebaen, 6moons.com

The path that lead to the birth of NORMA products.

The way NORMA wants to reproduce emotions.

NORMA AUDIO ELECTRONICS

Introduction

Enrico believes there *is* proof. But you need educated ears. It took him seven years and a concentrated R&D project started in 1991 to quantify how hifi gear compromises signal purity. Enrico's company Opal began manufacturing Norma gear in 1997 but had already built measurement equipment to have him well familiar with the necessary tools: Living and being headquartered in Cremona influenced me. Our city is steeped in music and musical instruments. Think Monteverdi, Ponchielli, Giuseppe Verdi, the master violins of Stradivarius, Amati and Guarneri. They left a great legacy to our school of violin making and the university's music faculty. I fondly remember student competitions to insure the few free subscriptions our school provided for concerts at the Teatro Ponchielli.

The human voice and song are one of my greatest passions. Listened to attentively, the correct reproduction of the human voice is one of the most difficult tasks. If the recording quality allows, the micro/macro dynamics of a beautiful voice are incredible as are the richness of detail, expressive nuances and delivery refinement. And unlike other musical instruments the human voice is known to all. This enables immediate comparison. It's why I often use the human voice in the development of Norma gear.

1 – General philosophy

Beyond material aspects it's important to understand a product's design philosophy. Over the years folks hearing Norma products asked what our secret was. As direct expressions of our perception and thinking, we though them simple and devoid of secrets. But over time we concluded that as often happens, what's really important isn't obvious to outsiders. What's the secret to the Stradivarius sound? After exploring all possible combinations of wood, aging and lacquer, we still don't know. Perhaps the real secret was the designer's sensitivity, taste and love which intuitively or strategically guided very specific choices. In the absence of such intense desire, none of the available materials and processes would have ended up being shaped as they were.

Playback electronics influence the sound even more than what's generally believed. Here we distinguish between sonic *appearance* and *quality*. Elements of appearance ease our perception. Its parameters include tonal balance, soundstage articulation and certain dynamic aspects as long as deviations remain tolerable rather than become irreparable compromise. Sonic appearance is what strikes and impresses a listener at first. Aside from creating something like an imprint, it then loses importance little by little. With ongoing listening more important parameters reveal themselves mostly related to the actual structure of the sound we perceive. This no longer is about basic ingredients but how they were treated and combined. With fruit it'd be the degree of ripeness and flavor. With a person it'd be character and intelligence, not height, weight, race and gender.

This gets us to *quality* which also gives pleasure but is neither short-term nor a coincident mechanism that connects with an emotional memory of a previously pleasurable experience. Sound quality is a kind of long-term love that arises with a more intimate discovery of sophisticated features. Perception of sonic appearance is instinctive. Perception of quality is learnt and depends on being able to perceive specific traits, then assign values to them. Here we deal with the absence of distortion and grain, with the quality of speed, micro/macro dynamics, spatial relationships within the soundstage. More so than any other parameter, the one we're particularly concerned with is *lack of playback artifice*. We accept that whenever an audio signal passes a circuit, it exits degraded compared to how it entered. The very best audio gear can hope for is to commit the least possible degradation. Without an ability to capture and assign values to specific quality aspects, there can be no deeply fulfilling design work. Consider a wine novice. The best initial impression might come from a glass of fresh sparkling lambrusco. Only with deepened exposure and refinement of the palate does the true universe of wine open up. One cannot truly love that which one doesn't know.

The art of sound reproduction is no exception. It relies on a more profound understanding of the underlying mechanisms. Here one arrives at a more fundamental level than superficial instinctual sonic beauty. The easiest way is to alter the sound to make it more pleasant yet one cannot fix something faulty by adding another fault. Two faults don't make one right. The interpretative approach is also limited and not universal. Soft focus works well in a wedding photo but gets annoying in a landscape. Altering one parameter to improve it invariably affects other parameters in unpredictable ways. More is lost than gained. Subjective gains in appearance can thus mean a loss of quality.

2 – Technical Aspects

The elements of audio electronics which influence sound span circuit type/ topology, parts quality, mechanical engineering, power supply and more all of it interdependent. It's imperative to have the broadest possible understanding to properly gauge how particular choices interact. To design a winning Formula 1 car *everything* must be perfectly integrated and of the highest quality, from the engine to the chassis, suspension, tires, driver, pit team and more. During our 7-year R&D project we attempted to investigate the totality of factors influencing hifi sound and how they interrelate. Starting with circuit topology, we saw that minimalism itself guarantees no good overall performance. Returning to the F1 car, a single-cylinder engine won't lead to victory. Our Norma circuits are thus very elaborate. Another important aspect is dynamic delivery. Whilst it's often considered sufficient to have bandwidth that only slightly exceeds the audible spectrum of 20Hz-20kHz, in our opinion bandwidth must be *far* greater. This relates directly to overall circuit speed and its ability to supply instantaneous current.

Returning to the automotive industry, one might calculate a certain drag coefficient and the power required to maintain it at 130km/hr, say 25KW. Based on the audio bandwidth example, one might conclude that a 40KW motor is sufficient to guarantee a good driving experience. Now imagine a car with a 200KW engine driving at the same 130km/h. It will respond better to acceleration and give us more pleasure and performance. Compared to the speed changes of driving, the scope of music's dynamic gradations has a crest factor of 1:100 which is a power scale of 1:10.000. From that follows that bandwidth, speed and current can *never* be too high. To be fair, frequent solutions to bandwidth increases come at the cost of sonic naturalness. At Norma we have worked very hard to combine these seemingly irreconcilable aspects.

Just as the best F1 **car** won't perform without high-octane gasoline so the best circuits rely on adequate power. For this reason all our power supplies are extremely refined and account for power-grid isolation, DC, very low residual noise and very low output impedance all the way up into the ultrasonic range. Continuing our F1 parallel experience teaches us how important materials and parts are. How often have we seen an F1 car at the edge of the runway with its engine smoking? Some sophisticated tech solutions cannot be implemented without the proper parts. Certain parts are vital to realize certain circuit topologies whilst signal-path components can have a very marked influence on the sound. Unfortunately the best parts are nearly always difficult to source and very expensive. One example are seemingly trivial resistors. In certain strategic locations our resistors are about 1.000 x more expensive than already excellent 1% metal-film parts. The same is true for semiconductor batches of 1000 where each is measured, graded, selected and matched for each unit's left and right channel. Our mechanics are carefully engineered and free from ferromagnetic elements except for the power transformers.

With our SC-2 preamplifier the external power supply contains a first stage of stabilization followed by further voltage filtration in the main unit by means of independent l/r-channel circuits. The volume control which so often is a bottle neck is a programmable analog digital attenuation scheme which optimizes attenuation accuracy, channel balance and resolution with minimal signal impact. Steps are 0.5dB from 0 to -127.5dB with ±0.01dB accuracy. The switches are electromechanical relays to overcome limitations of solid-state switches, CMOS DACs, solid-state potentiometers and such. In addition all our preamps operate either active or passive. In passive mode the signal is tapped right behind the volume control and sent directly to the outputs to bypass the active gain stage. This can be triggered by remote.

3 – Sound

It's maybe easier to realize a good electronic than to describe its sound using words.
Even if the listening experience is unitary, as everything around us, it is an attitude of our minds to try and break it up in single factors. This way, the we are also partly going to follow, presents a great limit: as by describing a human body by sectioning its organs, you deprive it of its life, by trying to describe the listening experience by dividing it into many separate components you risk not to convey the emotive impact that, most of the time, is more than the sum of the single parts.

Timbre

By timbre we refer to the relative relation of level between the different frequency ranges of which the audio signal is made of (lows, mid-lows, mids, mid-highs, highs, etc.). This parameter belongs to the sonic appearance; in a complete chain, the timbre alterations are almost completely generated by ambience and speakers.
It Is though common experience that audio electronics also have their timbre; in our opinion, this is only partially true, because this alterations are in fact secondary effects created by other causes; for example, a limited bandwidth may deliver the sensation of a closed sound on high frequencies.
On the contrary, the sound of a solid state electronic with grain problems may give the sensation of too many high frequencies, etc. Low frequencies are very dependent, especially in a power amplifier, to the power supply section; therefore we have great variability, from the electronics with a too prominent bass to the ones with a bass that is too much behind.
In theory, speaking of timbre, the optimal condition would be the one of a perfectly flat response, so not to alter the original signal. In practical, two elements

intervene: the first is a compensation factor, the other is personal taste. By compensation we mean that sometimes people try to remedy a preexistent defect in the audio chain by inserting a component with complementary characteristics. A sadly classic example is the situation in which the speakers, maybe of generous dimensions, are badly placed in a non-acoustically-treated environment, generating a sound too generous of low frequencies. This starts the infinite search for an amplifier with controlled bass.

We are definitely against this strategy, as we believe it is not possible to correct a defect by introducing another one. At most, the sonic appearance will be approximately restored, compromising though the actual quality with not only one, but two factors.

It is in fact important to understand that, when referring to real quality, compensating mechanisms cannot work; defects always sum.

By personal taste we mean that some enthusiasts have their own idea on how real music should be, and find themselves completely disorientated when they don't recognize their own idea at a live exhibition.

This kind of enthusiast will probably look for devices that recreate their idea, rather than ones with a flat response.

Many manufacturers follow this strategy, characterizing their products with a coloured timbre to facilitate sales, that are often based on short comparative listening sessions. But what may create enthusiasm at the beginning, will probably be very tiring after some time.

The timbre of NORMA's products is instead absolutely linear, with the original timbre of instruments never subject to artifacts or modifications.

Colouration

It is a mechanism which is similar to timbre alteration, but due to different causes. For example, colouration in speakers is mainly due to resonance problems, or dips, in specific frequencies. While the timbre refer to wide band phenomena, the colouration is proper to narrow bands, which alter the relationship between the frequencies of which the musical signal consists, altering the colour of reproduced musical instruments. In our opinion, no audio electronic with a wealthy setting should create colouration effects. If this was to happen, the situation would be definitely desperate.

Transparency

The name should be self-explaining, but as it turns out, it isn't. As NORMA, by transparency we mean the ability to let *see* the signal without *obfuscating* it. We might take for example a nice mountain landscape, seen from the top of a mountain. If the sky is clear, the vision will be sublime and we'll be able to catch all the details until the horizon; but if the peak is filled with haze, while the landscape will remain the same, we won't be able to see it clearly, depending on how much haze there is. Returning to audio, one of the most common misinterpretations is to associate transparency to high frequency, which leads to phrases like *"this sound is too transparent!*". How can a thing this illogic be said?
A sound cannot be too transparent, as a sight cannot be too clear! It is therefore very important to understand what lays behind that sentence. The first thing that leads to this is a wealthy but unpleasant product of transparency: it reveals all of the defects and limitations of the other components of the chain. As to say that "if you hide the dust under the carpet, you will find it when you pick it up". The second one, is generated by people which associate transparency with a device that has an harsh sound, with emphasized high frequencies. Which is clearly wrong, as

true transparency starts from 0 Hz, and has nothing to do with HF emphasis. In fact, almost all of the fundamental notes of the sonic message lay in the mid-low range of the spectrum, including the human voice. It should now be completely clear that NORMA's transparency consists in a clear 360° view, which extends as long as the sight can. In fact, what you introduce a NORMA device in your signal chain, it removes the bottleneck created by electronics, letting you also appreciate the improvements made on the other devices.

Dynamics

Dynamics, speed and modulation are three facets of dynamic behavior which must track the continuously variable music signal whilst applying gain. Here the power amp's job is hardest because besides amplifying voltage, it must also deliver current to the speaker and absorb kicked-back electromotive forces. Failures on those counts change the wave form to become distortion. Success relies on bandwidth, speed and ultra-fast delivery of very high currents. Under dynamic conditions our Norma electronics behave like a fine 12-cylinder engine: powerful, flexible, responsive, fast, perfectly torque balanced and capable of also running at very low RPM to reproduce both minuscule changes and large voltage swings.

Sound Staging & First Watt

Sound staging is primarily a function of a precisely symmetrical speaker setup to exploit the arrival-time difference between let and right ear for a virtual recreation of what the microphones captured. Apart from extreme channel imbalances, electronics are more or less excused from responsibilities in soundstaging. Which gets me to the first watt, a concept virtually unknown in Italy at the time. I was introduced to it at an Athens show with our Greek importer who showed our electronics and low-power tubes plus a classic American dynamic speaker and a

well-known high-efficiency variant. When we arrived the latter were set up with the valve gear. As a gesture of welcome the importer offered to switch to our Norma electronics with the American dynamic speakers. Being curious we asked to hear the highly efficient speakers on our gear which the importer was reluctant to do expecting detrimental results for both his products. But he did anyway and as a result that combination played for the duration of the show offering one of the best sounds we've heard. This first-watt phenomenon is a classic Achilles heel for transistor electronics which during very small power demands exhibit parasitic phenomena like inherent background noise, grain, crossover distortion and such. After this experience we examined the subject at length and conducted numerous comparisons to insure excellent performance on this count. Our Norma amplifiers are thus equally suitable for very high-efficiency and very low-impedance challenging loads.

Grain

Grain is related to the physical mechanism whereby current flows through a semiconductor. This gives rise to a separation of the conduction current into discrete charges. To simplify, consider closing down a running water tap until a very thin stream of water stops running continuously but transforms into individual drops. Something similar happens to the electrical charges in semiconductors. This includes a component of parasitic noise generated by a similar process. It translates into an audible but hard-to-define quality which is perhaps best described as the discomfort of a pinching shoe. It explains listener fatigue or feedback of the sound being too accurate. The truth is the opposite. The sound is too coarse in both texture and background noise. Here Norma electronics are truly extraordinary by offering a fineness of grain almost unique.

Artificiality

Artificiality is the least technical aspect but for us the by far most important. We've always pursued the creation of audio electronics which sound the least artificial. If we created two parallel events—one live, one playback—beyond matching all parameters as ideally as possible, what would most differentiate them is this artifice. Its reduction or lack is what generates ongoing listening pleasure over long sessions and many years. It's perhaps for this reason that once people have heard Norma gear, it's very difficult to listen to anything else.