iTRON

Driven by Current. Defined by Sound.

With iTRON, Avantgarde Acoustic challenges a principle that has defined amplifier design for decades – replacing voltage with current as the direct driving force of sound. The result is astonishing: more control, more precision, more immediacy. A new way of listening. How it sounds – and which models are built to deliver it.

Mezzo G3 – the core of the new G3 series. Commanding in presence, uncompromising in performance. The ideal blend of spatial sophistication and cutting-edge engineering.

In a world of audiophile superlatives – where manufacturers compete with ever more exotic materials, ever higher resolutions, and ever heavier enclosures – it's rarely the quiet revolutions that bring true change. And yet that seems to be exactly what's happening now – almost unnoticed by the general public, but with growing impact among those who view sound not as a by-product, but as a cultural essential. With its iTRON technology, Avantgarde Acoustic has introduced an amplification concept that questions, redefines – and for some, perhaps even surpasses – the established rules of amplification. iTRON is not an amplifier in the conventional sense. It's not just another model in the endless stream of high-end launches – it's a conceptual reorientation that rethinks the signal path from the ground up. The central difference is as simple as it is radical: instead of regulating voltage, as conventional amplifiers do, iTRON controls current directly. The current that ultimately moves the loudspeaker's diaphragm is no longer treated as a consequence – but as the primary tool of expression.

Anyone hearing it for the first time – can't quite believe

This reversal of the amplifier principle is far more than a technical novelty – it's a deliberate rejection of entrenched paradigms, a return to fundamental physics, and at the same time a leap into previously unattainable realms of sonic fidelity. What may sound like a sober translation of a signal into current reveals, in practice, an acoustic reality that catches many listeners off guard. Those who experience an iTRON-driven system for the first time often describe it with words like „unmasking", „intimate", or „startlingly clear". The room opens up – not as an effect, but as an acoustic fact. Locating instruments becomes so effortlessly precise, it feels as though you've never really heard them any other way. This becomes especially striking in recordings like Rebekka Bakken's „Der Schnee draußen schmilzt" – a complex ballad that places high demands on both music and sound. Under the influence of iTRON, playback turns into an experience that no longer feels like reproduction, but rather like a direct encounter with the music. Every nuance of her voice, every tonal shade in the accompaniment appears exposed, translucent, unfiltered. And yet it's precisely this uncompromising clarity that carries risk. Because iTRON is ruthlessly honest. What becomes a deeply moving experience with superbly produced material can quickly turn into acoustic disillusionment with anything less.

True sonic progress through technology

Conventional amplifiers are forgiving – they lay a subtle veil over technical imperfections, a kind of acoustic makeup that smooths

out a great deal, conceals some things, and in doing so, makes the listening experience more pleasant, though less authentic. iTRON, by contrast, holds nothing back. It adds nothing, softens nothing. It reveals – and demands. Those who embrace this technology step into a sonic tension field between absolute truth – and the challenge of facing it. Technically, iTRON is a masterpiece of precision. Its architecture is based on a symmetrical single-ended Class A circuit, equipped with specially developed core inductors that function as constant current sources. Their design ensures that magnetic interference from DC current is neutralized, while remaining selectively responsive to AC signals. This results in exceptionally stable, low-distortion current delivery, even at high frequencies. Negative feedback is intentionally avoided – a decision with far-reaching sonic implications. Many conventional amplifiers compensate for gain errors by applying feedback. While this can reduce measurable distortion, it often introduces new, subtler forms of error: so-called TIM distortions (Transient Intermodulation Distortion), which can harden the sound artificially or blur fine detail. iTRON takes a different approach – not through correction, but through prevention. The signal path is kept as pure as possible, with direct control and no detours. It's a design that doesn't aim for perfection – it strives for truth. While the concept of current amplification isn't entirely new – early attempts such as so-called Howland circuits found applications in medical equipment or basic hearing aids – none of these technologies have achieved the level of stability and sonic excellence that Avantgarde Acoustic now demonstrates with iTRON. Previous designs often failed due to high-frequency instability or were simply too sensitive to interference for use in high-end audio environments. iTRON, however, proves that current control is not only viable in the high-end domain – it may in fact be superior. And it's easy to see how this technology could extend far beyond traditional hi-fi applications. In professional recording studios, for instance – where every nuance matters – iTRON has the potential to redefine what transparency means in mixing and mastering.

Current or Voltage – Why the Difference Matters

In the automotive industry – especially in the premium segment – iTRON could usher in a new era of authentic in-car sound reproduction. And even in home cinema, current-controlled amplification could elevate the immersive experience to an entirely new level. But all of this remains hypothetical – for now. Because at this moment, iTRON is above all one thing: a radical redefinition of what an amplifier can be – for those willing to

Duo GT – both sculpture and sound source. A bold statement of form, precision, and sonic power. This is what high-end can look – and sound – like.

Duo SD – the essence of iconic horn design: clear, focused, and emotionally engaging. Built for spaces where music takes center stage.

open themselves fully to the music. No softening compromises. No convenient error correction. No comfort in the familiar. The question remains whether the audiophile world is ready for such truth. Because what iTRON offers is not a convenient improvement – it's a challenge. A challenge to our listening habits, to our expectations, to the very relationship between music and technology. For many, this technology may feel too uncompromising, too revealing – perhaps even too demanding. But for others – for those who don't just consume music but want to experience it – it may be the fulfillment of a long-held desire: an amplifier that no longer stands between the artist and the listener. One that adds nothing – and takes nothing away. iTRON is more than a product. It's a statement. A return to what sound, at its core, truly is: motion, energy, expression – unfiltered, unaltered, unflinching. With iTRON, Avantgarde Acoustic has taken a path that won't resonate with everyone – but it will move many. And those who dare to follow it may never listen the same way again..

Why iTRON Is Superior to Conventional Amplifiers

Anyone who takes a deeper look into amplifier technology will eventually encounter the critical distinction between voltage and current amplification. At first glance, this may seem like a minor technical nuance – something for engineers, perhaps, but not for music lovers. But that's where the misunderstanding begins. Because whether a loudspeaker is controlled by voltage or by current ultimately determines how precise, how natural – and how truthful – the music sounds. To make this distinction more tangible, a mental detour can be helpful. Imagine the amplifier as a conductor leading an orchestra. In the world of voltage-output amplifiers – the kind used in more than 99 percent of all hi-fi systems – the conductor simply tells the orchestra how loud to play. The actual execution is left to the ensemble, made up of speaker diaphragms, coils, magnets, and enclosures. And this orchestra is far from perfect: depending on frequency, temperature, or construction, it may respond more quickly or more sluggishly, with more or less force. The conductor merely calls out „adagio" or „allegro" – but how those instructions are translated into sound in the concert hall depends on many variables he doesn't directly control. It's different with a current amplifier. Here, the conductor not only gives the cues – he also ensures that the orchestra carries them out precisely. Instead of simply specifying a target voltage, the amplifier directly controls the current – that is, the force with which the speaker diaphragm is physically moved. And in this analogy, current isn't just energy – it's impulse with consequence. It's the difference between giving a command – and taking action. What many people don't know: a loudspeaker is a complex, physically

sensitive system. Its so-called impedance – its electrical resistance to different frequencies – is anything but constant. It changes with pitch, with volume, with temperature, and even with the specific music signal itself. For a conventional amplifier that only delivers voltage, this means:

It can't be certain how much current it's actually sending through the speaker – and therefore, how quickly or precisely the diaphragm will respond. This is exactly where iTRON technology comes in. It bypasses these uncertainties by not specifying voltage, but by directly controlling current – the very part of the energy that produces mechanical motion. The effect is instantly audible: transients – those tiny impulses that mark the beginning of a piano keystroke or the pluck of a guitar string – are no longer smeared or delayed.

Timing Is Everything – Especially in High-End Audio

The loudspeaker no longer approximates the intention – it does exactly what it's told. It transforms from an interpretive medium into an instrument of precise execution. Another key benefit lies in what's known as time accuracy. In music playback, this means that all frequencies of a signal – from the deepest bass to the finest overtones – arrive at the ear simultaneously, just as intended in the original recording. Conventional systems tend to introduce slight temporal shifts that blur spatial information or soften depth. A current-driven active loudspeaker, by contrast, behaves like a dancer who doesn't just hear the music, but feels it – in every muscle, every motion, at exactly the right moment. The active design plays a crucial role here as well. With iTRON, the amplifier is no longer a generic component to be paired with any speaker – it's part of a tightly integrated system. Drivers, crossovers, enclosures – all are engineered specifically for the behavior of a current amplifier. The result is not just greater efficiency, but a new level of coherence: the system speaks with one voice, from a single impulse, without delay or translation. This immediacy may feel unfamiliar to some listeners at first. It strips away the comforting background texture that many conventional systems create through their own sonic fingerprint.

And yet, once you've experienced this kind of reproduction, it's hard to settle for anything less. Because it reveals what may be the most important quality of any truly great system: not how beautifully it sounds – but how little of itself you hear. In that sense, iTRON isn't an amplifier in the traditional sense. It's a musical conduit. Not a filter, not a stage, not an interpreter. But a system that brings the artist directly into the room. And once they're there, they perform – not through a device, but through us..

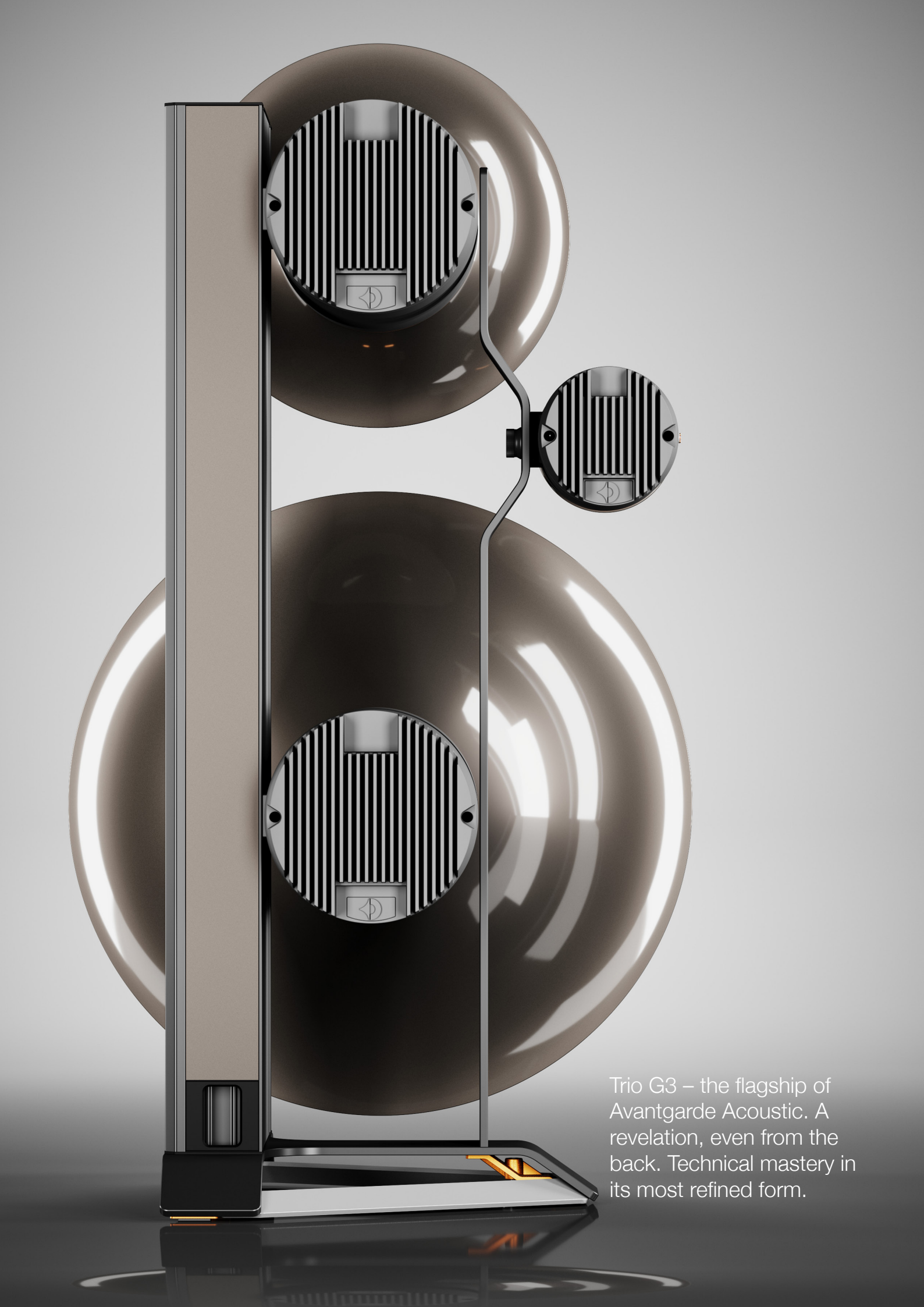
Zero iTRON – compact, stylish, uncompromising. Featuring fully integrated iTRON technology. Current-driven, room-friendly, ready for any sonic journey.

Why Isn't iTRON the Standard Yet? – On the Challenges of Current Amplification and Avantgarde Acoustic's Unique Pathic

At some point, a seemingly simple question inevitably arises: If current amplification offers so many advantages – why hasn't it become the standard in the high-end market? Why are almost all amplifiers still voltage-driven? Why haven't other manufacturers embraced this principle years ago? And why is iTRON designed primarily for active loudspeaker systems – rather than for connection to just any speaker on the shelf? The answer lies less in sound quality than in structural and physical constraints. As elegant as the idea of current amplification may be, a current amplifier can't simply be connected to any loudspeaker. The use of a passive crossover network fundamentally conflicts with the concept of current control, as the crossover filters can redirect or block current flow around the voice coil. Current control only works convincingly when amplifier and loudspeaker are developed as a single unit. The traditional hi-fi amplifier, by contrast – and this has long been its greatest strength – is a universal device. It delivers voltage and relies on the speaker to handle the rest. This kind of interface is robust, standardized – and convenient. Manufacturers don't need to coordinate with one another. Speakers can be swapped, mixed, and chosen according to personal taste. In short: the entire world of high-end audio as we know it is built on an open-system philosophy. Current amplification, however, demands a closed system – a carefully tuned whole. Technologically, it's more precise – but also more demanding. And then there's the engineering challenge: developing a truly stable current amplifier is anything but trivial. It's not enough to simply „translate" a voltage signal into a current output. The circuit must remain perfectly stable across all frequencies, all dynamic impulses, and all load variations – otherwise distortion, instability, or, in the worst case, speaker damage can occur..

One Technology Is Redefining High-End Audio

Earlier attempts by other manufacturers often failed at exactly this point. Either the circuit was too sensitive to real-world loads – or it sounded flat, sterile, and overly technical. This is where Avantgarde Acoustic's iTRON development takes a different path – and it does so deliberately. The underlying patent application, filed under the title „Method and circuit for current control of a loudspeaker with magneto-mechanical conversion", makes the ambition clear: it's not just about precisely controlling current, but about how that current is converted into me-



Trio G3 – the flagship of Avantgarde Acoustic. A revelation, even from the back. Technical mastery in its most refined form.

Uno SD – adaptable in design, consistent in musical impact. A true Avantgarde loudspeaker from every angle.

chanical motion – and ultimately into the listening experience. A central element of the patent is the description of a current source with coupled inductors, which use magnetic counteraction to create a kind of self-stabilizing effect. These coupled chokes act like elastic buffers – storing energy in their magnetic fields, compensating for fluctuations, and preventing instability at higher frequencies. At the same time, a special type of symmetrical circuit layout ensures that the system remains phase-accurate – a key factor for timing and spatial precision. The omission of negative feedback – a hot topic in audiophile circles – is not a dogma here, but the logical result of a circuit designed from the ground up for minimal distortion without reactive correction. And yet: this technology can't be scaled arbitrarily. The iTRON amplifier is only truly effective in one context – when it can transmit the signal directly to the voice coil of the speaker, with no additional components in between. That's why it was conceived from the outset as an integral part of a loudspeaker system. The „black box" between source and speaker is dissolved in iTRON – and replaced by a chain of knowledge, tuning, and precision. It may sound like a limitation at first – but it's the price of radical control. In a way, iTRON is also a statement against the modular, mix-and-match character of traditional hi-fi. It's not a product for collectors of separate components. It's not an invitation to tweak, swap, or endlessly modify. It's a tool for those who aren't interested in celebrating the gear – but in experiencing the result. Music, in its purest form – untouched by what stands between. And perhaps that's also why iTRON has yet to gain widespread traction in the minds of the audiophile community. It requires a shift in thinking. Not in terms of sacrifice – but in terms of trust. Trust in a closed system that doesn't need to be changed constantly – because it was designed right from the very beginning.

„Sound Isn’t an Accident – It’s a Matter of Control“or „What If the Last 30 Years of Speaker Design Got It All Wrong?

An interview with Engineer Matthias Ruff on the patented iTRON technology he created for Avantgarde Acoustic.

Mr. Ruff, with iTRON, Avantgarde Acoustic has developed a radically new amplifier technology. What makes it so special?

Matthias Ruff: The key difference is that we don't rely on voltage – as is traditionally done – but directly on current. You could compare it to the difference between pressure and flow: voltage is the pressure within the system, while current is the actual flow of energy. And only what truly flows can create motion – and that's what produces sound.

Why is that especially important when it comes to loudspeakers?d?

Matthias Ruff: A loudspeaker behaves like a highly temperamental load. Its impedance – in other words, its electrical resistance – fluctuates constantly depending on the frequency. On top of that, there are reactive effects: as the diaphragm moves back and forth, it generates its own voltages, which in turn influence the current flow.
You can think of it like a cyclist on a hilly road: even if they're pedaling at a constant rate (representing constant voltage), their actual speed (the current flow) varies depending on the slope and headwind (impedance and reactive effects).
Traditional voltage amplifiers apply a fixed voltage, but the resulting current doesn't follow in a linear way – it's shaped by the loudspeaker's fluctuations. That leads to subtle distortions in the transition from electrical signal to mechanical motion – minor, but clearly audible.
With iTRON, we control the current directly – the physical quantity that actually applies force to the diaphragm. This allows the musical signal to be translated into motion with precision, immediacy, and perfect timing.

This principle is sometimes compared to a car's cruise control system. Can you explain that analogy?

Matthias Ruff: Imagine trying to keep a car at a constant speed. In the past, people would simply lock the gas pedal in place – but the actual speed would still fluctuate depending on wind, incline, or descent. Today, a cruise control system regulates the speed directly.
It's the same with loudspeakers: traditional voltage amplifiers control the output voltage and indirectly influence the current – hoping that the right amount of current will actually flow. What we do is control the current directly. We're not just issuing the command – we're controlling its execution.

Are there examples from the audio world itself that support this principle?

Matthias Ruff: Yes, a very fitting example can be found in analog record production. The cutting stylus – the device that engraves the musical signal into a lacquer disc – isn't voltage-driven, but controlled by current. And for good reason: only by directly controlling the current can the stylus movement be executed with the precision and control that's required.
So exactly in the place where absolute sonic accuracy is critical, current control has long been the standard. It's not an exotic concept – it's just one that, until now, has rarely been applied in loudspeaker technology.

Why not?

Matthias Ruff: Current-driven amplification is technologically demanding. Earlier approaches were often unstable or unsuitable for high-frequency performance. There's also a long-standing division in the industry: loudspeaker manufacturers typically don't build electronics – and electronics companies don't build speakers. If you want to offer amplifiers that work with a wide range of passive multi-way loudspeakers, it has to be a voltage amplifier – because passive crossovers either block or redirect current. Current

amplifiers only work with active loudspeakers. But once you develop both together – as we do – you quickly realize the benefits that current control offers.

You once said you spent 30 years building the wrong loudspeakers. Looking back now – do you still feel that way?

Matthias Ruff: That was, of course, a deliberately pointed statement. The truth is: before iTRON, I was designing loudspeakers for voltage amplifiers – like everyone else. Those designs inevitably involved compromises, because they had to accommodate the behavior of voltage outputs.
Today, with the ability to tailor loudspeakers specifically for current drive, I can clearly see how much potential went untapped – at least when it comes to dynamic speaker systems. There are concepts, like electrostatic loudspeakers, where voltage amplification is technically necessary. But in the realm of dynamic drivers, current control opens up entirely new possibilities.

How does that affect the sound?

Matthias Ruff: Many listeners describe the sound as immediate, clear, and uncolored. Some even find it almost unmasking – in the best possible way. The music takes center stage, not the equipment. iTRON isn't a classic amplifier that 'adds' sound – it's a precise conduit. You hear what's on the recording – nothing more, but also nothing less.
Question: And that includes timing?
Matthias Ruff: Exactly. Timing is critical. Music lives in the precision of the moment. When a musician strikes a note, it's all about the exact timing and speed of that gesture. Our technology ensures that this information is transmitted completely and without delay to the loudspeaker – and that it's reproduced with absolute accuracy.

That sounds like a philosophy – not just a piece of technology.

Matthias Ruff: For us, music is a cultural asset. Through realistic reproduction, we want to transport the listener directly to the place where the recording was made. And iTRON is our attempt to make that experience as pure and unfiltered as possible – without softening, without coloring, without compromise. Those who are open to it may end up rediscovering music altogether.

Conducted by
Joachim Pfeiffer