



Jürgen Reis

A Man For All Seasons

Jonathan Valin

Jürgen Reis, the brilliant engineer behind MBL of Germany's celebrated line of loudspeakers and electronics, began his career in audio when he was 14 years old—and needed an amplifier and a loudspeaker for the electric guitar he played in a rock band. Because he didn't have much money he decided to make both for himself. Using a technical manual to guide him, he bought some second-hand parts and soldered them together. Magically, the amp and speaker worked. It was this experience that set him on the path to earning a degree in electrical engineering. "I simply wanted to understand what I was soldering together, why it worked the way it did, and what I had to do to get a good-sounding speaker system."

Toward the end of his university studies, Reis attended an audio show in Berlin and heard the first iteration of the MBL Radialstrahler, the Model 100—a unique two-and-a-half-way omnidirectional loudspeaker. Though the sound was far from optimal, Reis thought "the concept was genius."

After graduating, Reis contacted some of the companies he'd visited at the Berlin show, looking for a job, and MBL offered him a position. At that point, the company was marketing the 100 loudspeaker, the brand-new 4010 preamp, and the six-month-old 4020 parametric equalizer.

After a few weeks at the company, Reis asked if he could bring in a preamp he'd made while he was at university in Frankfurt. Since he'd had no fancy measuring equipment, he'd built the preamp on the basis of what he thought and felt ought to be right, and was curious to know how it would perform on MBL's sophisticated suite of Hewlett-Packard test gear. As it turned out Jürgen's preamp measured far better than MBL's just-released 4010. Mr. Lehnhardt (the "L" in MBL) and Mr. Meletzky (the "M" in "MBL") were so impressed that they put Reis in charge of developing all future electronics on the spot. Unsurprisingly, his first assignment was to design a new preamp, the 5010, which later became the legendary 6010 (currently in its 6010 D iteration).

After two years at MBL, Reis began working on MBL's loudspeaker. At the time, the bass and trumpet players in Jürgen's rock band (Reis has been a performing musician for most of his life) founded a company for building carbon-fiber necks for guitars. Starting in 1984, Reis began applying the same techniques to speaker building, using carbon fiber to design a new tweeter for the Radialstrahler. Originally, the tweeter and midrange membranes of the 100 were made of slices of aluminum, but the metal gave the speaker a highly colored sound. Reis was looking for a material that would eliminate that coloration, lower distortion, and have smoother, broader frequency response. It took more than a year for him to perfect his new carbon-fiber tweeter, but he finally got it to work. He then applied the same techniques

to the midrange driver.

Thanks to Reis, in 1986 MBL was able to offer a new and very much improved three-way Radialstrahler with carbon-fiber tweeter and midrange, the celebrated MBL 101 (now in its four-way 101 E MK II iteration). The initial reaction from the audiophile press and community to his speaker was similar to Jürgen's own first reaction to the 100: "People liked the 101, but they didn't understand *why* they liked it." Without any enclosure to absorb anything or influence decay, the 101 added so little of its own colorations that listeners could not only hear the sound of the music but also of all the components in front of it with a clarity that they simply weren't used to.

It was that very transparency (and his own genius—a word I don't use lightly) that helped Jürgen to develop his standard-setting MBL electronics, including MBL's first Reference amplifier, the 9010, and (in time) the 1611 Reference D/A converter and the 1621 Reference CD transport. "Being a musician helps me to understand how something actually sounds and how live sound *feels* when I am listening. My chief objective in designing is to ensure that I am satisfied with the presentation in the long term, so that the product continuously invites me to turn it on and listen, and become emotionally involved with the music. But it's also imperative that I back *everything* up with measurements. And since a great deal of what I heard could not be explained with standard tests, I was inspired to invent new measurement techniques."

For example, Reis noticed that some power amps sound-

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ed weak and stressed when driving loudspeakers, even though they had several hundred watts on tap, where other power amps sounded sovereign and in control with only 100 watts. This observation resulted in the development of Reis' "Four Quadrant Test (4QT)."

"Typical testing uses a resistor or capacitor or inductor at a fixed value, but this doesn't tell you if an amp will sound stressed or have control over the loudspeaker. No matter if 2, 4, or 8 ohms is being used, the current on this resistive load always has the same phase as the voltage. With real music and a real loudspeaker load, you can have a situation where the amp drives positive voltage but negative current flows into the amp because of phase shifts within the speaker's impedance. The '4QT' measures amplifier performance under *all* phase conditions—when the voltage and current are in phase, when the voltage and current are negative, if the voltage comes before the current, or if the current comes before the voltage. All four quadrants of these phase relationships are verified."

In 1990, Reis began developing the Reference Line amplifier using his ingenious "4QT" test to measure performance. The result was the remarkable 9010 monoblock (the current 9011 is a further development of the 9010), which can verifiably drive *any* phase relation between voltage and current.

In 2005, Reis started his own recording studio, signing on to be an Apple Certified Mastering Engineer. This required a spec for true high-res files that are 24bit/96kHz and have no "sample overs" and no "intersample overs" (no distortion from AD to DA).

At the time, the "Loudness War" was well underway. "Each CD got louder and louder, and I realized when listening to a D/A converter that the sound was often harsher, brighter, and more aggressive than the measurements told me it should be. Sinewave distortion might say everything was fine—no clipping—but as with the '4QT' you needed to use a complex signal like real music when testing."

So this ingenious man developed the "Reis test" to prove that he *could* measure what he was actually hearing—and discovered that you can drive a D/A to clipping with recorded music. In fact, most DACs can't avoid it. "When I tested the ten most popular CDs in Germany, I found in total there were approximately 1.5 million intersample overloads. This means on average in *each second*, the signal was clipping *50 times*. This is the reason why digital sounds harsher than a regular THD measurement would indicate."

After learning via the Reis Test that nearly all new releases produce intersample overloads in DACs, Jürgen wanted to make sure, from that moment on, that MBL DACs would produce no intersam-

ple overloads, even though the musical releases were loaded with them. "You can play CDs on any MBL DAC and hear no intersample overloads because I devised a method to build-in headroom that prevents those 'overs' from causing clipping." If manufacturers took care of this problem from the beginning, the D/A chips themselves could be built to be immune to intersample overloads. But DAC manufacturers don't do this. MBL DACs, however, *are* immune to the problem, because Reis was able to test for it and come up with a solution.

In his 38 years with MBL, and 36 years as Chief Engineer, Reis has designed ten preamps, fourteen power amps, six integrated amps, and over thirty MBL speakers (including one of the world's greatest, the 101 X-treme). In the 15 years he has had his own recording studio, he has made scores of recordings, several with his marketing partner the Concerto Köln. "I sing in a choir, have been in several bands, record, mix, master, design electronics and unique loudspeakers because sound and music are my life's blood." And we are the better for it.

For all his contributions to the building and testing of audio equipment, and the enjoyment of music played back on it, this extraordinary man for all seasons, Jürgen Reis, is hereby inducted into *The Absolute Sound's* High-End Hall of Fame. **tas**

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