stereophile

Equipment Report

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mbl
101E Radialstrahler
LOUDSPEAKER

Michael Fremer


mbl 101E Radialstrahler loudspeaker

DESCRIPTION Four-way, omnidirectional, floorstanding loudspeaker. Drive-units: 12"-cone, bandpass-loaded woofer in separate enclosure, plus three omnidirectional bending-mode drive-units: 24-segment carbon-fiber tweeter, 12-segment carbon-fiber upper midrange, 12-segment aluminum lower midrange. Crossover frequencies: 105Hz, 600Hz, 3.5kHz (Linkwitz-Riley, fourth-order). Acoustic center: 45" (1140mm) from floor. Frequency range: 20Hz–40kHz. Sensitivity: 81dB/2.83V/m. Nominal impedance: 4 ohms. Power handling: 320–500W continuous, 2.2kW peak.
DIMENSIONS 67" H by 16" W by 18" D. Weight: 176 lbs.
FINISHES Satin: black, silver, veneer. Piano: black, silver.
SERIAL NUMBERS OF UNITS REVIEWED 136724, 136824.
PRICE $44,900/pair. Approximate number of dealers: 3.
MANUFACTURER mbl, Einemstrasse 20A, 10785 Berlin, Germany. Tel: (49) 030-8518074. Fax: (49) 030-8518062. Web: www.mbl-germany.de. US distributor: mbl of America, 6615 E. Sleepy Owl Way, Scottsdale, AZ 85262. Tel: (480) 563-4393. Fax: (480) 563-4394.

Back in the late 1980s, when I was writing for *The Absolute Sound* and couldn't afford any of the audio gear I was reviewing, my system consisted of an Oracle turntable with Magnepan unipivot arm, a pair of Spica TC-50 loudspeakers, and a heavily modified Hafler DH-200 power amp and DH-101 preamp. It was a fun system that imaged like hell, but my fondest audio memories of that time were of visiting fellow

TAS reviewer Dr. Michael Gindi, who lived on Manhattan's West End Avenue, and listening to his mbl speakers. (With his shrink's paycheck, he could afford them.)

Because Gindi also owned a Forsell turntable, the visit was always an adventure. To avoid compressor noise, air hoses of various thicknesses ran from the 'table, down the hall, and into the bathroom—which made the time water squirted from the arm's bearing all the more bizarre. The liquid had been literally squeezed from the air, as always happens when air containing water vapor is compressed, but that evening something had gone wrong with the compressor's moisture-removal system. Two images will remain with me for years to come: of water running from a hose in the bathroom and out the tonearm's air holes, and of Gindi, later that night or another, changing an LP as its static charge sucked an inch-long ash from his cigarette onto the record's surface.

But more than those visual images, it's the sonic ones that led me to want to review mbl's unusual but, ultimately, graceful-looking 101E Radialstrahler loudspeakers. When Gindi turned out the lights, the reach-out-and-touch-it reality produced by his mbls was unforgettable. The best part was that, no matter where I sat in the room—and Gindi used to invite a two-bench crowd—I heard everything in three dimensions, with my listening perspective shifted almost as it would be live. When the Doctor changed to an artificial studio recording, the stage would flatten appropriately, or lay bare multiple microphones in three dimensions with such clarity that I could hear groups of musicians clustered around each. The recording-specific differences in perspective left me confident that there was nothing artificial or pumped-up about the mbls' portrayal of space. The sense of hall expanse with good live recordings, such as those made in Carnegie Hall, was so compelling that it was easy to forgive the speakers' bottom-end shortcomings: the bass never seemed to be in the same time zone as the rest of the music, or of the same high quality.

mbl Radialstrahler inventor Wolfgang Meletzy and current chief design-

MEASUREMENTS

MBL specifies the 101E Radialstrahler as having a low sensitivity of 81dB/2.83V/m. My estimate came in at 80.5dB(B)/2.83V/m, which is within the margin of error of the specified figure. However, because of its true omnidirectional radiation pattern (see later), the 101E will tend to sound louder in-room than this anechoic sensitivity rating implies. As revealed by its impedance plot (fig.1), however, the speaker is definitely a 4 ohm load, meaning that a good amplifier rated at 4 ohms will be needed to drive it. The actual minimum impedance is 3.4 ohms at 415Hz, but probably of more concern is the combination of 4.9 ohms and a 46° capacitive phase angle at 38.5Hz. Biamping the mbl should lessen the current demand on the amplifier; fig.2 shows the individual impedances of the bandpass woofer and omnidirectional midrange/tweeter enclosures. But note that the higher-frequency section still has a difficult combination of magnitude and negative phase angle at around 150Hz.

The impedance traces were free from the wrinkles that would indicate the presence of cabinet resonances, and I couldn't find any of significance in the bandpass enclosure (not shown). The small saddle at 48Hz in the impedance magnitude trace is due to the tuning frequency of the bandpass-loaded woofer's twin vents. While in a conventional reflex design this would imply only modest low-frequency extension, correlating with the speaker's –6dB frequency, in a bandpass design it indicates the peak of the speaker's output, as shown by the red trace in fig.3. The 101E is 6dB down just above 30Hz, which is pretty good extension for the size of the enclosure. Note also that this kind of bass unit rolls off below its tuning frequency with a second-order, 12dB/octave slope rather than the reflex design's 24dB/octave, which means that the usual room gain will extend the low frequencies to a greater extent than with a reflex.

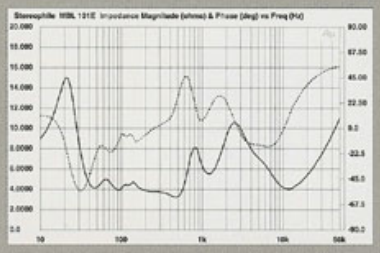

Fig.1 mbl 101E, electrical impedance (solid) and phase (dashed). (2 ohms/vertical div.)

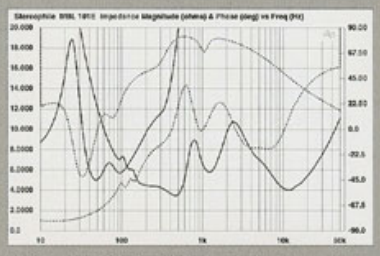

Fig.2 mbl 101E, individual electrical impedance (solid) and phase (dashed) of upper-frequency and bandpass woofer sections (2 ohms/vertical div.).

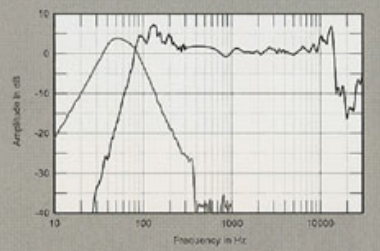

Fig.3 mbl 101E, anechoic response on tweeter axis at 50", averaged across 30° horizontal window and corrected for microphone response, with the nearfield midrange response plotted below 300Hz and the nearfield bandpass port response plotted in red.

The bugbear of bandpass designs is a tendency to out-of-band resonances. But looking at fig.3, the 101E's bandpass woofer is extremely well-behaved above the crossover to the omnidirectional midrange unit. Some sort of antiresonant behavior is apparent at 400Hz, but the unit is well down in level at this frequency, which is more than two octaves above the crossover point.

All the measurements were performed with the rear-panel jumpers set to Smooth/Natural/Smooth, which is how MF auditioned the 101Es. The black trace in fig.3 shows the nearfield response of

er Jürgen Reis have been working on that bass-integration problem in the years since, while refining the performance of their omnidirectional radiators, and of each mbl system as a whole. The result is the 101E ($44,900/pair). Like mbl's 111B, reviewed by John Atkinson in the August 2002 *Stereophile*, the 101E is a four-way speaker using what appears to be the same 24-segment carbon-fiber "bending-mode" tweeter and 12-segment upper-midrange driver. (The 101E's crossover points are 105Hz, 600Hz, and 3.5kHz.) Instead of the 111B's conventional lower-midrange drive-unit, however, the 101E has a large, visually unforgettable, 12-segment, football-shaped omnidirectional driver. When a signal is applied to the bottom-mounted voice-coils of these bending-mode drivers, they flex the segments, producing the omnidirectional wave launch. The three omnis perch atop a subwoofer enclosure with two front vents and a 12" cone designed and built by mbl.

Biwiring is a necessity: The 101E's woofer and mid/hi sections have their own sets of beefy binding posts, designed and built by mbl, on opposite sides of the cabinet's rear. The configuration also allows for biamping, which I didn't attempt. Also on the rear are three sets of jumpers: Smooth or Attack for the low/midrange; Natural or Rich for the mids; and Smooth, Natural, or Fast for the top. These jumpers don't change anything in the crossovers, but merely route the signal through different cables—or, as the instructions say, "only the molecular microstructure of its signal path is changed." Next time you're in front of a pair of these speakers with a "cable doubter," be sure to switch the jumpers around without telling him what's going on. He'll become a believer. (I ended up using the Smooth/Natural/Smooth connections.)

Setup

mbl's instructions, stiffly translated from German to English, are difficult to follow and need rewriting, especially given the unique and specific setup required for omnidirectional speakers. There is a very clear drawing of the triangle they want the two speakers and your listening position to form, and the

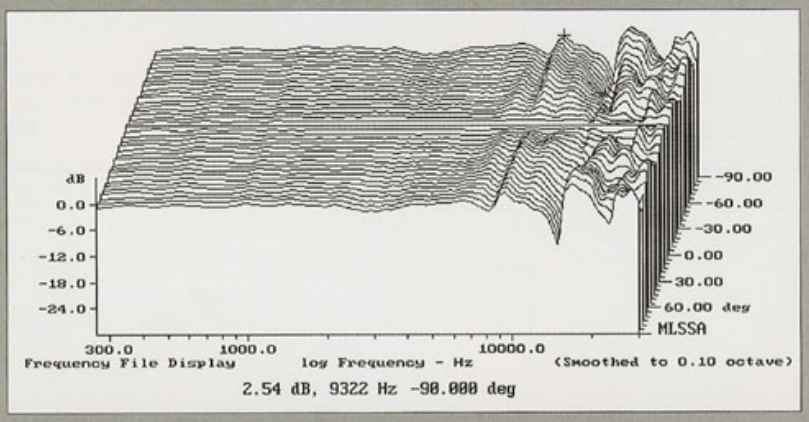

Fig.4 mbl 101E, lateral response family at 50", normalized to response on tweeter axis, from back to front: differences in response 90°–5° off-axis, reference response, differences in response 5°–90° off-axis.

the large omnidirectional midrange unit spliced at 350Hz to the 101E's farfield response, averaged across a 30° horizontal window on the tweeter axis. The rise between 80Hz and 300Hz is entirely due to the nearfield measurement technique—the 101E actually has a superbly flat response throughout the midrange and treble. Only in the top audio octave is there a bit of peakiness, but this is high enough in frequency that it will be perceived as extra "air" rather than as tilted-up highs.

I have been using the term "omnidirectional" throughout this section without comment. As fig.4 shows, the mbl 101E is indeed omnidirectional in the horizontal plane, its output at 90° being identical to that at 0° up to 7kHz. While there is some off-axis unevenness in the top audio octaves—perhaps due to reflections from the various struts that support the structures of the upper-frequency driver magnets—the speaker really does offer full-range omnidirectional behavior. In the vertical plane, the 101E's balance changes

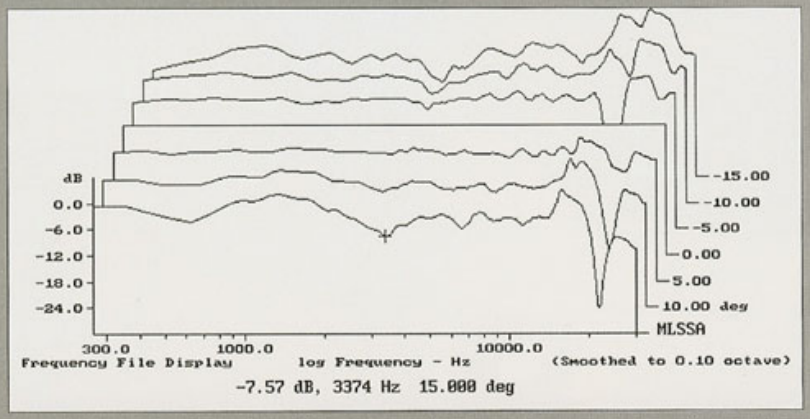

Fig.5 mbl 101E, vertical response family at 50", normalized to response on tweeter axis, from back to front: differences in response 15°–5° above axis, reference response, differences in response 5°–15° below axis.

Fig.6 mbl 101E, step response on tweeter axis at 50" (5ms time window, 30kHz bandwidth).

optimum distances between the speaker and the front ("b") and side ("a") walls, but then it all falls apart.

I admit to being mathlexic, perhaps even mildly retarded mathematically and spatially, but I don't think even *you* would have an easy time with these instructions. It might help if distances were expressed as my tape measure and brain register them: in feet and inches instead of meters, especially since you're asked to use the ratio of 1.32m to 1.63m when calculating sidewall to rear-wall speaker distances, as in: "Distance 'b' between Radialstrahler and backwall = 1m, a/b = 1,32...1,63m." Huh? If you're setting the speakers up on the short wall, as I did, the ratio is b/a instead of a/b. ?huH Once you've figured that out, be mindful that "If the triangle is kept, the sittingposition [*sic*] in front of the systems and behind the listener should not come up to the estimate of the measurement of the formula."

I'll say! Fortunately, mbl of America sent over Jeremy Bryan to do the initial setup, which I modified somewhat over time. (Coincidentally, Jeremy used to write for my old magazine, *The Tracking Angle*.)

With its omnidirectional radiation pattern, the 101E is not a speaker you want to use in an untreated or highly reverberant room, neither of which mine is. I'm not sure if I maintained the proper ratio or even came close; I used my ears. I also left the grille "pagodas" off, as recommended by Bryan. I like the space-age-bachelor-pad looks of the 101E in the raw.

THE **REVEALING NATURE** OF THE 101Es MEANT THAT IT WOULD TAKE JUST THE RIGHT COMBINATION OF PLACEMENT AND ASSOCIATED EQUIPMENT TO **ACHIEVE THE SOUND** I HAD HEARD AT HE2004E.

Sound in the round?

Toward the end of the Home Entertainment 2004 East show last May, I visited the mbl room and played a CD-R compilation of tracks I'd recorded using the Rockport System III Sirius turntable or the Boulder phono preamplifier on the mbl 101Es. The sound of those tracks in that room's combination of high resolution, believable soundstaging, convincing tonal balance, and airy, soaring musical delicacy, transfixed me and the other visitors for almost an hour. I've played that disc a hundred times in a hundred places; that afternoon was among the best I'd heard it sound.

I looked forward to getting that sound at home, but the revealing nature of the 101Es meant that it would take just the right combination of placement and associated equipment to achieve it—and I'd never before had to deal with an omnidirectional speaker. When everything—or *anything*—was wrong, there was an odd chesty, compressed, almost grainy mid-bass coloration, and a sense that female singers centered between the speakers were performing in a closet in the next room. The offending sound was probably due to an unusual combination of placement and reflective interference.

But when that nastiness had been eliminated and everything had been optimized, including cables, AC treat-

very little with the height of the listening axis (fig.5)—a good thing, considering that the speaker's tweeter is 45" from the floor.

The MBL's step response (fig.6) is a little hard to interpret, but it basically suggests that the drive-units are all connected with the same polarity. (This includes the output from the bandpass woofer ports.) The wrinkles at 4.5ms are due to early reflections from the speaker's structure, but note the wrinkles at the 7ms mark in this graph. These are due to reflections from the floor of the 101E's high-frequency output—because of the speaker's bulk, I was unable to lift it on to my usual high stand for the acoustic measurements. As a result, I had to aggressively window the impulse-response data to prevent the inevitable floor reflections from corrupting the 101E's waterfall plot (fig.7). Where this windowing would have affected the graph, the plot is replaced by dots. But other than above 10kHz (where the early reflections produce some hash) and below 2kHz (where the high-order crossover produces some delayed energy), the 101E's decay is very clean.

Technically, MBL's 101E Radialstrahler is an intriguing design that works as advertised. From my own experience of the mbl 111B, which uses the same omnidirectional upper-midrange and treble units, I feel that the sonic presentation of this type of speaker can be addictive.

—John Atkinson

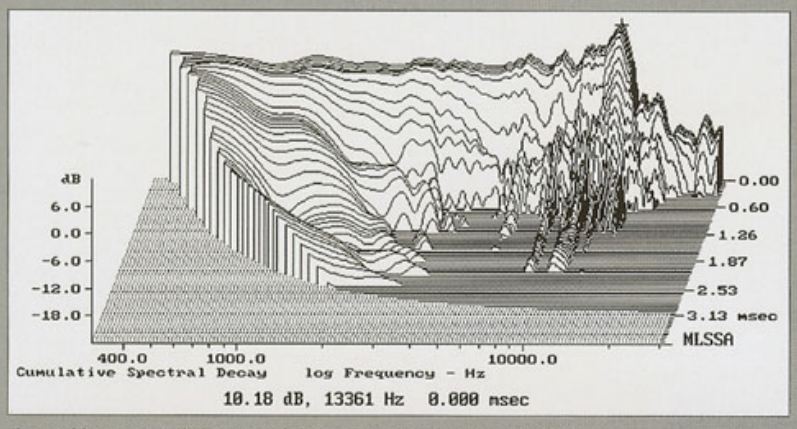

Fig.7 mbl 101E, cumulative spectral-decay plot at 50" (0.15ms risetime).

ment, and the jumper selections, *look out!* In my room, the mbls produced sonic sensations that lost a bit compared to the HE2004E presentation in terms of stage width, openness (my sidewalls were but a few feet from the speakers; at HE2004E, the walls weren't in the picture), and bass extension, but gained plenty in terms of clarity, image focus, midband resolve, and — especially — intimacy and immediacy.

The 101Es had an effortlessness, openness, transient clarity, and crystallinity that set them apart from all others I've heard — including electrostats. On a congested recording such as the Rolling Stones' *Exile On Main St.* (LP, German EMI Electrola pressing), the mbls separated out the instrumental strands with unusual ease, and portrayed the strummed acoustic guitars with a visceral believability I'd never before experienced. Lesser speakers bury Ian Stewart's piano throughout the album's four sides, and while that hasn't happened with any of the gear reviewed here over the past five years, never has that piano *popped* as cleanly as it did through the 101Es. Mick Jagger's vocals on much of this set are purposefully recessed, but what the mbls managed to do was place his voice in the most convincing three-dimensional backdrop I've yet heard from this recording.

The velvety richness of the Rockport Technologies Merak II/Sheritan II combo (reviewed in the September 2004 issue) was pleasing, but the mbl's greater speed, transparency, and transient delicacy was like adding a $15,000 sports handling package to a softly sprung boulevard cruiser. I've been listening to "Sweet Black Angel" for more than 30 years, but never had I heard the recording's spaciousness and percussive grandeur expressed with this degree of conviction. Nor had the background details been so ruthlessly yet effortlessly exposed. I could hear into the sonic picture with greater clarity and far greater ease than ever before.

In one night's listening orgy, I tore through albums by the Weavers, Harry Belafonte, Sweet Honey in the Rock, Tony Bennett, etc. — all recorded live in Carnegie Hall. The results were nothing short of astonishing. I could walk around the room and not lose the soundstage: the perspective of the enormous Carnegie ambience simply shifted three-dimensionally. The eerie reality of the picture I remembered hearing at Gindi's had come home, minus the "Dear Lord let me forget" sensation of sitting in a darkened room, buttock-to-buttock in a row of wheezing *audiophiles*.

The mbl 101Es didn't offer the deepest extension or the most bass I've heard in my room. But in a room famous for problematic bass,[1] a speaker the previous versions of which were once known for problematic bass delivered enough *good*, nimble bass to make bass *not* a problem. In fact, I preferred the 101E's slightly lean but tight bass to the slightly thick variety rolled out by the Rockport Merak II/Sheritan IIs. Classic Records' four-LP Led Zeppelin set worked extremely well through the mbls: John Bonham's percussion was positively spine-tingling, with a tight but somewhat light kick drum, and cymbals that rang as convincingly as through any speaker I've heard. Bass extension was strong to 40Hz, far weaker at 30Hz, and nothing was delivered at 20Hz. But that was my room. In the right place, in a room with more solid boundaries, I'm sure bass would be strong to below 30Hz.

Playing Zep and other hard rock, such as the Who's *Tommy* (UK Track or SACD), demonstrated one of the 101E's weaker suits: dynamics. If you've got the power, the seriously inefficient (81dB, 4 ohm impedance) mbls can be made to play really loudly without strain, but they reach their macrodynamic limits well before the SPLs give out, and at that point there's a mild sensation of strain and constriction. Fortunately, that happens at SPLs you won't want to hear long-term; below that level, you won't have an original Quad-like experience, though greater mid-level dynamic expression can be had elsewhere.

The mbl's tonal balance leaned slightly toward the bright and less-than-rich side (less so than the Rockport swayed the other way). Another way of expressing this balance would be to describe the midrange as being slightly laid-back. Overall, instrumental timbres were satisfactorily convincing on both pop and classical recordings. Well-recorded massed strings had a feathery, woody, intoxicating delicacy, reeds had plenty of bite and buzz, and horns a velvety metallic purity that was just right. I haven't heard it through any other speakers, but a new SACD, *The Trumpets that Time Forgot* (Linn CKD 242), which features accompaniment on an enormous pipe organ, was absolutely mesmerizing.

INSTRUMENTAL TIMBRES WERE **SATISFACTORILY CONVINCING** ON BOTH POP AND CLASSICAL **RECORDINGS**.

Despite the mbl 101E's perceived brightness, record-surface noise and tape hiss were well suppressed. Perhaps the speaker's very top end is slightly rolled-off, but its overall treble quality was near ideal. I rank the tweeter as one of the best.

Having spent hours while reviewing the Rockports listening to engineer Tony Faulkner's new two-LP set of John Lill performing solo piano music by Schumann (LP, Greenpro 4001/2, distributed by Acoustic Sounds), I thought it appropriate to listen again through the mbls. Spatially, it was no contest: The mbls were magical in terms of imaging and soundstaging, producing a believably large context, and image size and focus that set them apart from everything else I've ever heard. It was the sort of "out-of-the-box" experience some claim to get from electrostatic and planar speakers, but without any of the negatives.

I found Lill's piano to be as tonally and texturally convincing as through the Rockports. The lower notes may have lacked a bit of weight, but they had a crisp shapeliness that had escaped the Rockports' grasp. The

1 I'm told that some dweebs on www.audioasylum.com suggest I shouldn't be reviewing equipment because my room is so "bad" — not that they've heard it. I guess they prefer reviewers with problematic rooms who don't mention or perhaps don't even recognize the problems.

upper register may have been slightly softer as well, but the midband was on the mark, and the overall illusion of believability was as good as the Rockports, if not better. The dynamics were slightly constricted at the top end of the scale, but only compared to my recent memory of the Rockports.

There wasn't a genre of music or a favorite recording that didn't yield spectacular results through the mbl 101Es, or, in many cases, reveal heretofore hidden information—the resolving power of these speakers was astonishing. But more than revealing new information, the mbls delivered what I already knew was there with an unforced ease and grace that are unrivaled by any speaker I've heard. When finally set up correctly and surrounded by the right associated gear, they were positively addicting.

Conclusions

The $45,000/pair mbl 101E Radialstrahler is highly inefficient (81dB). Though mbl says 250Wpc will do, whether from tubes or solid-state, it requires as many watts as you can throw at it to come alive. When I bought the 1000W Musical Fidelity kW amplifiers, I told myself, "Now I'll have a set of good-sounding amps that can drive *anything*." I was happy to have them for this review.

THE **MBL 101E**s ARE TRICKY TO SET UP...[BUT WHEN **DONE RIGHT**] THEY CREATED A BELIEVABLE **MUSICAL REALITY**.

The 101Es are tricky to set up, and when everything's not right, they're not fun to listen to. I've never had a speaker that, when not dialed in to perfection, made me so strongly *not* want to listen to them. But when they and all of the associated equipment were right, the sound—and it's a big sound—floated effortlessly in three-dimensional space as with no other speaker in my experience. More important, they created a believable musical reality.

At our annual summer block party the other weekend, I met a music-loving neighbor who'd held on to his 1960s rock LPs but hadn't played them for years. I invited him down for a listen, and despite his feeling that he "hasn't got the ears to tell the difference," he accepted. So in the middle of the party, tipsy on Margaritas (for me, add some Mike's Hard Lemonades, Smirnoff Orange Twists, and a few Coronas), we headed down the block to hear some tunes. One look at the mbl space cadets got him laughing. I put on the Beatles' "Baby You're a Rich Man," from *Magical Mystery Tour* (LP, German Hör Zu stereo pressing), and when the track ended, he looked at me wide-eyed. "I've never heard anything like that before."

I thought about my month with the mbl 101E Radialstrahlers. "Me neither!" ■