es:saar

# Testing and tuning embedded software is a high-effort process.

Have you have ever struggled with testing embedded software on real hardware? Or perhaps faced the challenge of balancing accurate test results with the high costs of specialized equipment? As developer, you all know how tricky the **interaction between software and hardware** can be in the development process. **Testing hardware-dependent software**—or simply testing and **tuning it on inaccessible hardware**—rarely has straightforward solutions. In fact, this is a challenge we hear frequently from both researchers and our customers' development teams.

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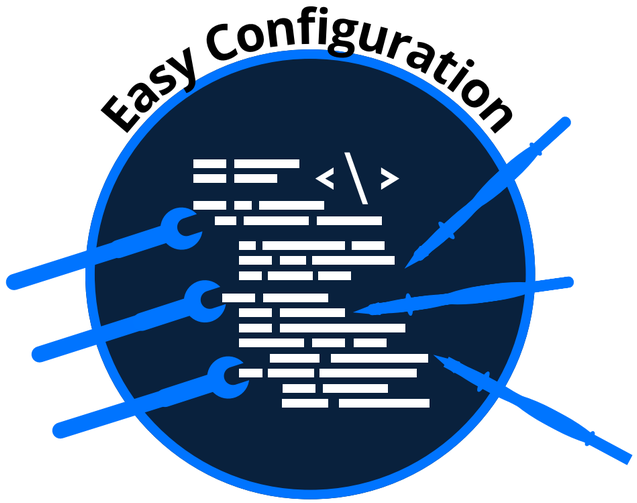
# Testing is the hidden bottleneck of embedded development.

What we hear from developers is that often, the real challenge isn't just solving technical problems—it's communicating those challenges. As developers, we've all felt the frustration of missing deadlines. In many cases this is because testing and adjusting the systems software takes longer than expected. **Iterative cycles and real-time testing are unpredictable,** and sometimes it's hard to explain why, especially when the full picture isn't clear to everyone involved. Software development has evolved, but in embedded systems? It's not that simple. Embedded software interacts with real hardware, physical constraints, and complex system dependencies. While some aspects can be simulated, real-time behavior and system interactions still need to be tested on actual hardware. This creates significant bottlenecks: **testing is high-effort and unpredictable, tuning and debugging slow progress, and traditional methods often rely on costly, specialized setups.**

# Four keys to adress these bottlenecks:




**Easy Configuration:**
With open middleware, es:scope® is hardware and interface-independent, making it incredibly versatile and easy to integrate into any existing system.

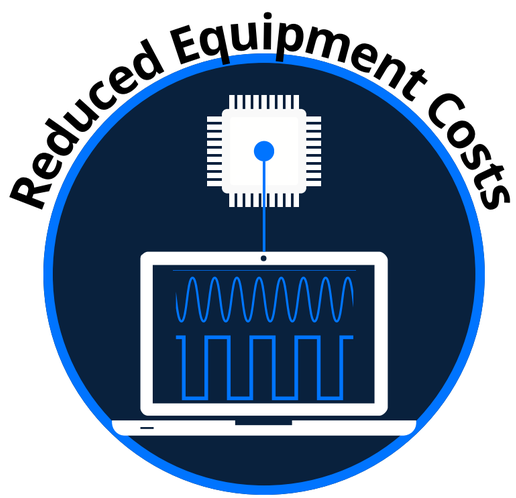

**Lightweight Execution:**
Minimal overhead ensures that testing doesn't slow down system performance, with as much data processing as possible offloaded from the device under test, ensuring smooth operation.


**Real-Time Validation:**
Programmable data logging and real-time measurements from multiple high-speed signals are available directly from internal run-time variables—just as you would expect from an oscilloscope.


**Run-Time Calibration:**
Parameters can be adjusted on the fly in different numbering systems, with asynchronous commands that allow for precise calibration—no system reboots required.

# Three areas where this can save money:


**Streamlined Testing Process:**
es:scope® consolidates the entire testing and tuning process into a single runtime step, significantly reducing the overall effort. We've seen testing time go from days to hours, saving thousands of euros in labor costs in a year.




**Reduced Equipment Costs:**
With es:scope®'s open, interface-independent middleware, many test cases no longer require expensive custom system adaptations or specialized test benches. In most cases, costly systems like HIL or data loggers become unnecessary, as existing hardware and software can now handle the testing requirements.


**Improved Risk Management:**
es:scope® enhances test coverage for hardware-dependent software, ensuring design flaws are identified early in the development cycle. This reduces the risk of costly post-production fixes and minimizes the chances of product recalls or delays.

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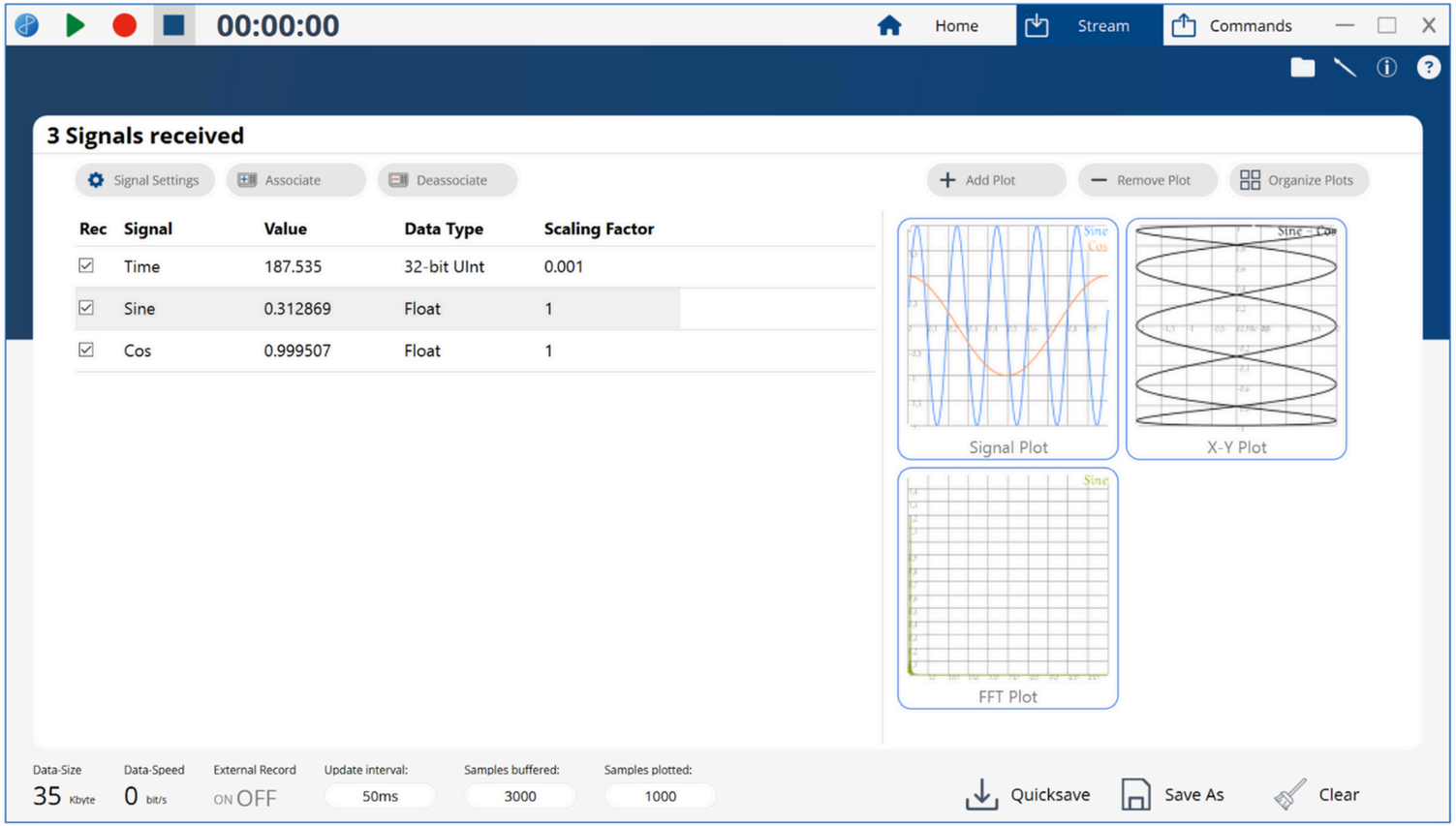
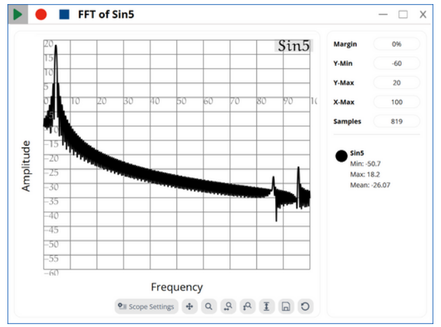
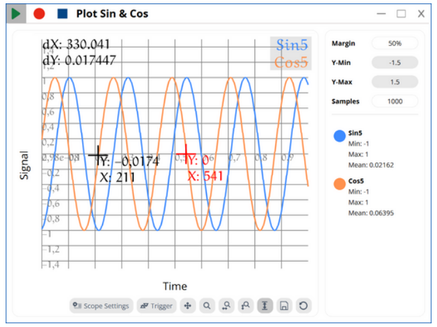
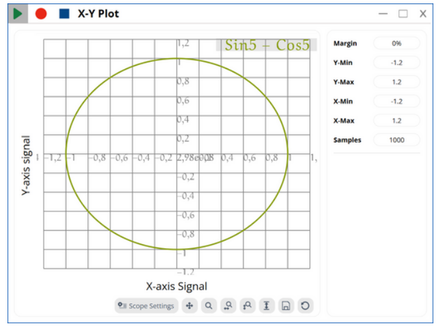
# Schedule a trial of es:scope® now:

essaar.de/esscope



# Interested in talking?

Joshuas' personal
Calendly Link

contact@essaar.de