Organ der **GMM** VDE/VDI-GESELLSCHAFT
MIKROELEKTRONIK, MIKROSYSTEM-
UND FEINWERKTECHNIK

Elektronik

EMBEDDED SYSTEM TECHNOLOGY

SECURE ELEMENTS FÜR IOT-ANWENDUNGEN

SICHERHEIT EINFACH HANDHABEN

MICROCHIP

SPECIAL PRINT FROM SEGGER

Elektronik automotive
E-VEHICLES
& CONNECTE
ETAS

Zuliefermarkt:
Angriff der
Cybertech Tiers

Energiemanagement:
Neue Architektur
für das Bordnetz

NEU

Jetzt 28 Seiten
Elektronik
automotive
als Heft im Heft!

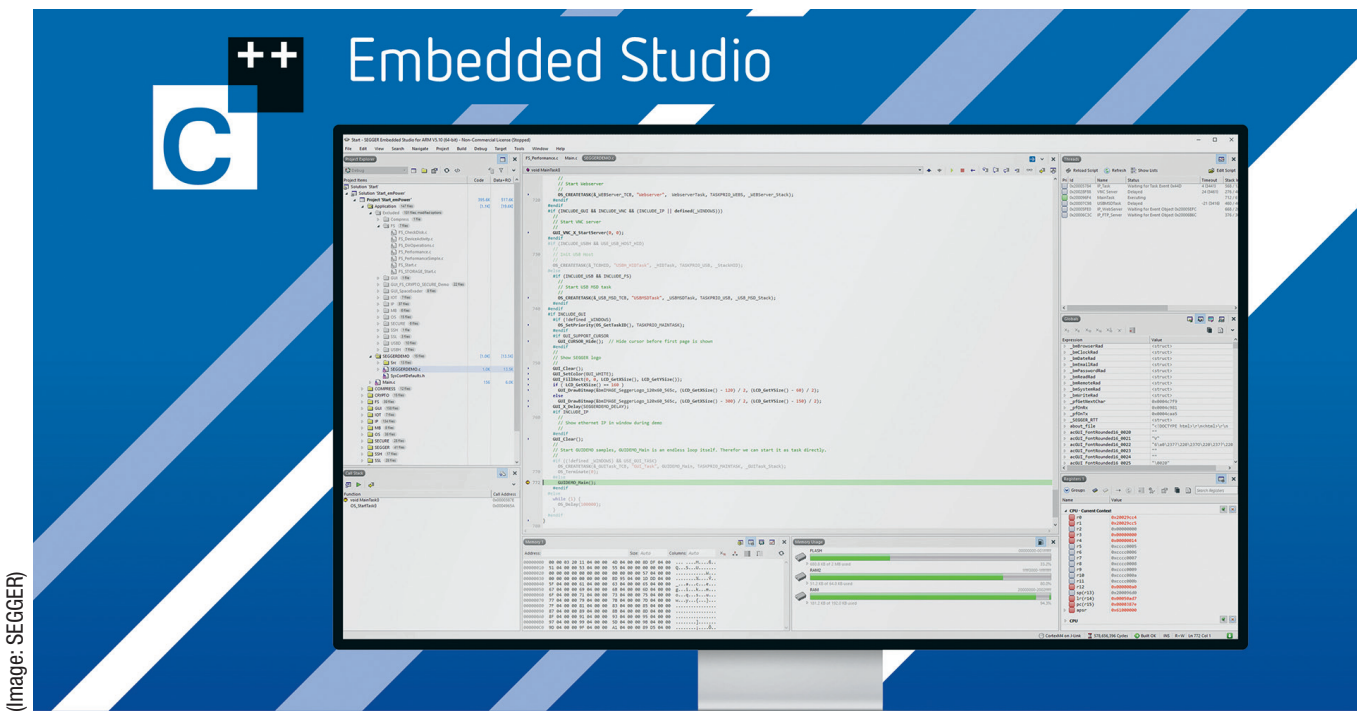**Qseven, SMARC oder COM?
Entscheidungshilfen in
Sachen Computermodul**

**Model-based System
Engineering – von der Idee
bis zum virtuellen Produkt**

A SUMMARY OF RESULTS

"EMBEDDED STUDIO" FROM SEGGER ACHIEVES TOP RATING

(Image: SEGGER)

Ten Elektronik readers subjected the "Embedded Studio" development environment from SEGGER to an extensive practical test by undertaking numerous experiments. Here are the test results in detail.

By Gerhard Stelzer

In the *Elektronik* 21-2020 issue, we invited readers to apply to us to become a tester for the "Embedded Studio" development environment from SEGGER Microcontroller. Out of almost one hundred interested parties, we selected ten participants. The Editors of *Elektronik* sent each tester a test evaluation sheet and SEGGER sent them the subject of the test, namely the "J-Link PLUS" debug hardware and the Embedded Studio license. The software itself could

be downloaded directly from SEGGER's homepage. The test results are now available but first, a brief summary of the test object's most important features.

ABOUT "EMBEDDED STUDIO"

The subject of this test is the "Cross-Platform IDE Embedded Studio" from SEGGER. Embedded Studio provides developers with a development environment characterized by its flexibility

in use and with code that is optimized for real-life applications. Embedded Studio includes SEGGER's proprietary runtime and floating-point libraries, compilers and linkers. SEGGER's primary development goal was to enable users to easily develop fast programs with minimal memory requirements tailored to the target system.

For this reason, Embedded Studio and all its components are also used for the development of the compa-

Image 1: To conduct the Embedded Studio test, SEGGER provided all testers with the „J-Link PLUS" debug hardware, which the testers were allowed to keep after the test.

ny's own products including "J-Link" debug probes, "J-Trace" trace probes and "Flasher" programming devices. This interaction between development and internal use for the company's own products enables SEGGER to carry out additional practical and targeted development based on its own experience. Optimizations, which serve to reduce the code size and improve execution speed, are carried out during various phases of the "build" process. The "Linker" can make optimum use of the usually limited memory capacity of microcontrollers. Code blocks can be distributed over several memory areas and unusable memory locations can be omitted.

Embedded Studio supports all of the features that characterize J-Link and J-Trace, such as unlimited breakpoints in flash memory or RTT (Real Time Transfer). Ozone, the J-Link debugger and performance analysis tool, as well as SystemView, the real-time analysis and visualization tool, can also be run directly from an Embedded Studio project. In line with the company's cross-platform policy, SEGGER's Embedded Studio also works not only on System-View and Ozone but also on Windows, Linux and macOS.

Furthermore, for educational and non-commercial purposes, Embedded Studio can be downloaded free of charge and without registration from the SEGGER website. There are no restrictions in terms of code size, functionality or duration of use.

In the test Embedded Studio was evaluated in three main categories according to school grades from 1 to 5.

WHAT WAS TESTED?

The practical test was divided into three categories:
➜ 1. Commissioning
➜ 2. Operation
➜ 3. Conclusion
The testers were asked to rate the individual disciplines of the subject by filling out their test sheets based on the school grading system, in other words from 1 to 5. For assessments that could not be expressed in grades, there were comment fields, which were also used extensively.

1. START-UP

Since the test object is software, we have adapted the test criteria accordingly. Start-up covers the aspects of installation, license management, initial use and documentation.

1.1. INSTALLATION
• Download of the software   1.4
• Installation   1.4
• Scope   1.3
• Availability for different operating systems   1.0
➜ One tester would have preferred an installation guide instead of "release notes", another praised the good introduction compared to Keil, Eclipse and Greenhills.

1.2. LICENSE MANAGEMENT
• Comprehensibility of license conditions   1.4
• Use with "non-commercial" license   1.2
• License management   1.7
➜ Most testers found they could work well with the license management. One tester remarked, "I think the non-commercial license is a good idea, e.g. to connect students or hobbyists to the product. In my opinion, it will pay off."

1.3. FIRST TIME USE
• Start time   1.1
• First impression   1.4
• Getting started with development   1.4
➜ One tester praised the dashboard, saying (among other things) that it was very informative and that one can see if there are updates and recently used projects. Several testers mentioned the software's quick start. There was also general praise for the good clarity.

1.4. DOCUMENTATION
• User manual   2.0
• Additional documentation   1.7
• Support   1.3
➜ Some testers found the user manual rather unclear. The integrated help function, on the other hand, was very well received. One tester said: "Super online manual."
Overall, testers were very satisfied with the implementation and this was reflected with an average rating of 1.4.
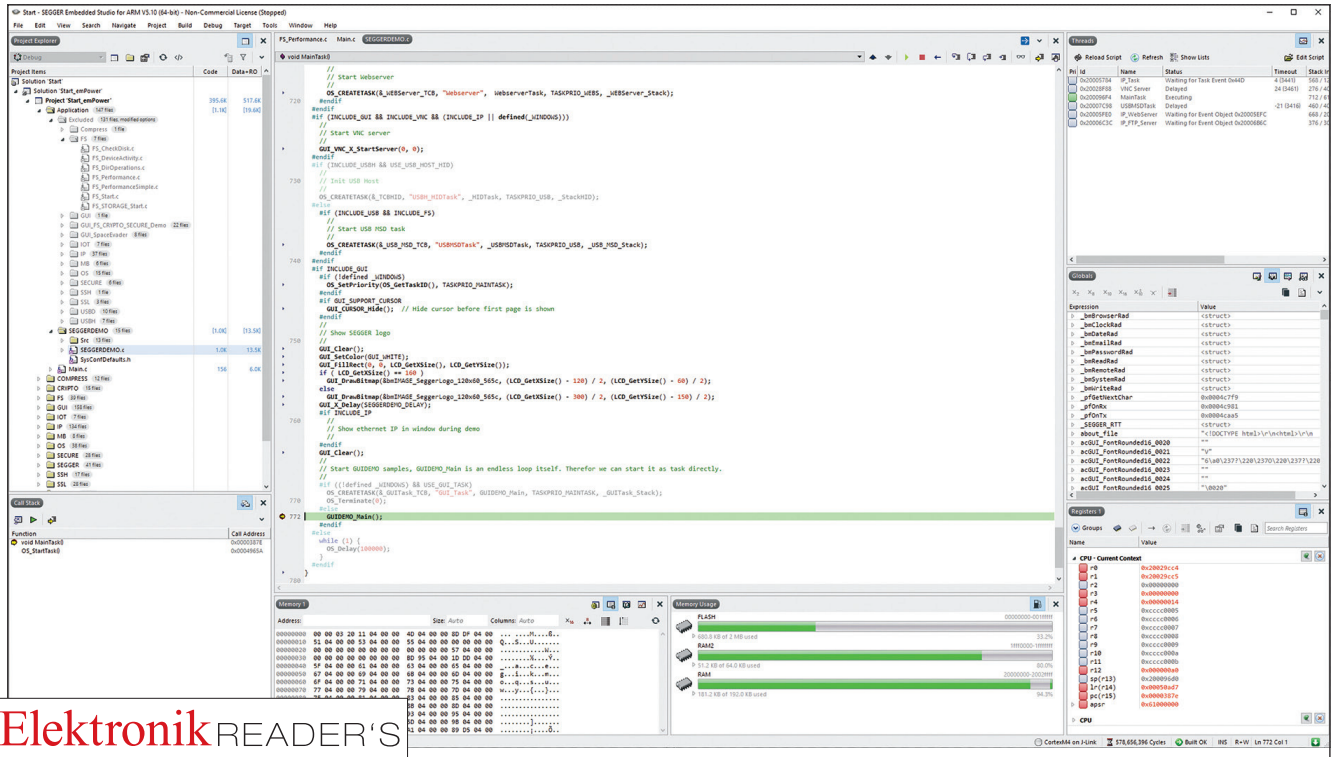
2. OPERATION

The largest part of the test involved practical day to day operation with the integrated development environment (IDE). Its three fields: Project management, Application analysis and Debugging were put to the test.

2.1. PROJECT MANAGEMENT
• Project creation   1.3
• Project extension   1.8
• Configuration   1.8
• Actual development   1.8
➜ One tester found the project options to be confusing and difficult to get used to at first. Another tester praised the very easy entry into a complex tool. Other comments: Extension via drag-and-drop would be very practical, and a better explanation of the different configuration levels would also be desirable.

2.2. APPLICATION ANALYSIS
• Memory requirements   1.4
• Analysis capabilities   1.3
• Map File   1.6
• Linker   1.9
• Post-build   1.7

Image 2: In operation the Embedded Studio development environment from SEGGER achieved an average grade of 1.5 and was praised for its overall clarity. (Image: SEGGER)

→ Several testers considered the memory requirements to be quite low. One tester would have liked to see a structured preparation of the Map File while another would have liked export to PDF.

2.3. DEBUGGING

• Hardware setup	1.3
• Download time	1.1
• Performance/response time	1.2
• Analysis window	1.7
• Debug output	1.4
• Execution control	1.3

→ One tester noted the very fast execution. Another praised the debug functions as intuitive and clear. Another tester criticized the somewhat awkward operation of the analysis windows. This means that Embedded Studio also impressed the testers during operation, with an average grade of 1.5.

3. CONCLUSION

For the final assessment, the testers were asked to evaluate various overriding aspects and to indicate their weighting of these aspects with regards to a purchase decision for a product. No weighting was taken into account for the following grades.

• Price/performance ratio	1.8
• Scope of delivery/documentation	1.8
• Practical operation	1.3
• Overall impression	1.6

→ One tester commented: "Overall, I think that Embedded Studio is a very successful and usable development environment." Another: "All together, a well-structured tool that makes it surprisingly easy to get started." Another tester said: "The J-Link Debugger and Embedded Studio are excellent tools for professional embedded development. Compiling and loading source code to the target is extremely fast, debugging responds reliably and quickly. However, the documentation and wiki/videos could, in my opinion, do with being polished and updated a bit."

The overall rating resulted in a 1.6 in the report card.

In terms of weighting, it is noticeable that the testers fell into two distinct groups. One group considers the price-performance ratio to be the most important factor, the other group the operation and overall impression. Here, therefore, we see a division between "Cost conscious" and "Premium". Interestingly enough, both groups were very satisfied with SEGGER's Embedded Studio. GS

GERMAN SCHOOL NOTE SYSTEM:
→ 1.0–1.5   very good
→ 1.6–2.5   good
→ 2.6–3.5   satisfactory
→ 3.6–4.0   sufficient
→ 5.0   does not meet requirements