

Elektronik

SPECIAL PRINT FROM SEGGER

Summary of Results

“Flasher PRO” from Segger achieves top rating

Elektronik READER'S
Tested Products
2021 ★★★★★



Ten *Elektronik* readers have extensively tested practical applications of the “Flasher PRO” flash programmer from Segger. We have summarized the results of the individual tests and ratings.

By Harry Schubert

In *Elektronik* issue 10/2021 we had asked our readers to register as testers for the flash programmer “Flasher PRO” from Segger Microcontroller. More than 130 readers responded to take part in the test. Ten of them were selected. Directly from the *Elektronik* editors, they were sent the flash programmer with matching adapters from Segger as a test object and a test sheet for evaluation. Each tester was able to download the software required to operate the “Flasher PRO” directly from the Segger homepage.

From the individual ratings of the ten testers we have formed average numbers for the total rating.

First a short summary of the most important characteristics of the test device:

Flasher PRO fact sheet

The device for this “reader-test” is the universal in-circuit flash programmer “Flasher PRO” from Segger – for (Q)SPI flash devices, microcontrollers and SoCs with external and/or internal flash memory. Designed as a fast and universal flash programmer, it supports programming of microcontrollers or SoCs via their debug interface or dedicated programming interfaces as well as programming of external (Q)SPI flash memories. These QSPI flash memories can be programmed indirectly

via the microcontroller/SoC or directly, by connecting them to the pins of the QSPI flash, with the programmer achieving the theoretical minimum programming time of the QSPI device itself.

Flasher PRO is very easy to set up and operate with software available across platforms – Windows, macOS, Linux for Intel and Linux for Arm processors. It can be operated stand-alone with the push of a button, controlled from a PC or controlled remotely. Equipped with multiple communication interfaces, the programmer can be easily integrated into any production environment. Mass production environments, automated test equipment

(ATE) and other production control units can easily access Flasher PRO to control programming. Using appropriate configuration files, Flasher PRO can be used to program serial numbers in the target system and insert the data into the code before programming.

In the practical test, the flash programmer “Flasher PRO” was evaluated in four main categories according to school grades from 1 to 5 (with 1 “excellent” and 5 “poor”).

What was tested?

The practical test was divided into four parts:

1. BEFORE COMMISSIONING

2. COMMISSIONING

3. OPERATION

4. CONCLUSION

The testers were able to rate the individual disciplines of the test sheet with school grades from 1 to 5. Comment fields were available for additional notes and remarks, and these were used frequently and in detail.

In addition, we asked the testers to provide “information about the test” in a preceding sheet. Here we wanted to know, for example, which operating system and which adapter was used and which devices were used as a targets.

Six of the testers worked with the “Flasher PRO” with 128 MB memory. Four were sent the “Flasher PRO XL” version with SD card and 2 GB memory. All testers used Windows 10. Four additionally tested with a Linux operating system, including Raspbian. Unfortunately, it was not possible to test under macOS. None of the more than 130 readers who contacted the editors had named macOS as their operating system.

The testers used a colorful selection of components as targets for the programming device: Microcontrollers from GigaDevice, Infineon, Nordic, NXP, Microchip, Silicon Labs, STMicroelectronics; modules like the Raspberry PI and COMs from Ka-Ro electronics and Kontron as well as memory ICs from Micron, On Semi,

Toshiba and Winbond. The range of files programmed on the target by the Flasher Pro in the tests was correspondingly large: from 2 kB to 4 GB.

1. BEFORE COMMISSIONING

Here we asked the testers to take a close look at the packaging, the scope of delivery and the documentation before starting.

1.1 Delivery and packaging

- Ecological packaging 1.70
 - Protection of the device 1.40
 - Reusability of the packaging (e.g. transport case) 2.60
- Cardboard packaging is praised as safe by the majority of testers. One tester summarizes: “pure shipping packaging, suitable for storage in the cupboard – reusability is not really relevant there.”

1.2 Documentation

- Scope and completeness of content 1.50
 - Comprehensibility, language, (print or electronic) 1.90
 - Declaration of conformity 1.44
 - Test seal 1.33
- Testers praise the documentation, e.g., as “good, comprehensive and [as] easy to understand [as the] documentation on the website.” One tester notes, “Manual for different hardware at the same time, not all relevant.” However, two testers criticize that they could not find the declaration of conformity on the Segger website, saying it “is not linked on product page.”

1.3 Scope of delivery

- Completeness of the device with all necessary elements 1.10
 - Included operating instructions or reference to online documentation 1.70
 - Scope of accessories 1.70
- “Everything important was included. Manual only online, which is sufficient though” writes one tester and another agrees: “Online documentation is adequate nowadays.” Still, there seems to be room for improvement: “Downloads slightly confusing: it’s not directly clear which tools you need for ‘Flasher PRO’, or that those for ‘Flasher without Pro’ are the correct ones. Cross-references to separate J-Flash docs are missing.”

With an eye toward conserving resources, one tester suggests, “The professional user has the cables that are included in the drawer. In my opinion, these don’t have to be included, so electrical components (in terms of later disposal) could be minimized. It might make sense to offer the cable set separately.” He is one of two testers who had not ordered an adapter for the “Flasher PRO”.

2. COMMISSIONING

For commissioning the “Flasher PRO” programmer, software must be downloaded from the manufacturer’s website and installed on a computer that will later control the programmer as a host. In addition to the installation of the software, the testers should take a closer look at the preparation for later use and take a look at the possible applications.

2.1 Installation

- Scope and effort 1.50
 - Download of the required software packs 1.60
 - Availability for different operating systems 1.30
 - User guidance and operation during installation 1.70
 - Quality impression of the hardware 1.50
- In the comments, the testers praise the easy software installation: “Plug&Play, simple setup” and “Installation takes a bit of time because it is quite extensive. It went through without a hitch” as well as “once you find the right software, installation is catchy and smooth”. Only in one case did the installation cause problems: “On a Raspberry I couldn’t get drivers and software to work. On Windows 10, everything is fine.”

2.2 Supported devices

- Variety and number of supported devices 1.40
 - Variety and number of supported manufacturers 1.40
 - Support for individual adaptations 2.11
 - Range of adapters 1.44
- For most testers, the range of supported building blocks and manufacturers is more than sufficient. “An unbelievably large number of supported µC, SoCs

and flash devices!” summarizes one tester, matching the opinion of many of his fellow testers. Only one tester had a target microcontroller that is not supported: “Supported variants are unclear. After skimming the website before testing, I would have expected LS1023A (Cortex-A53) incl. external NAND flash to be supported, but that doesn’t seem to be the case - apparently there are differences between J-Link and Flasher that aren’t quite clear on the website. After studying the doc, it remains unclear how customizations to unsupported CPUs / flash devices would work.” Segger confirmed that NXP’s LS1023A network processor is indeed not supported by “Flasher PRO.” It falls into the category of microcontrollers that are not widely applied, so customization is not worthwhile either.

2.3 Preparing the stand-alone operation

- Create project 1.70
 - Configure project 2.10
 - Preparing for patching data and serial numbers 2.00
 - Communication to the device via command line interface 1.56
- Here, two testers gave laudatory comments on their rating of very good: “works smoothly as documented” and “short training period needed, but it works very well now”. However, two other testers had expected more here: “SPI flash could not be programmed in standalone mode. Possibly the flash configuration was not suitable, but in host mode it had worked.” and “Readout of EEPROM not found or not possible?”

2.4 Preparing the host operation

- Create project 1.78
 - Configure project 1.78
 - Preparing for patching data and serial numbers 1.75
 - Communication to device via host 1.63
 - Integration of script files 1.88
 - Integration of customer-specific RAM code 2.60
- Here, too, the testers predominantly award very good ratings. “Host operation also works well, with more options,” is the conclusion of one tester. The last test point, integration of custom RAM

code, was only rated by five testers. The other five testers commented that they did not use this feature. One tester noticed, “There are no descriptions of corresponding features in the docs.”, an omission Segger intends to make up for quickly, as the information is already available online, albeit on the Open Flashloader wiki page. The use of Linux on a tester’s host proved to be problematic: “Linux: FlasherConfig does not find device via Ethernet, although it is reachable via IP (ping works, J-Flash works, but only if you enter the IP address by hand). On Windows 10 it works as expected.”

3. OPERATION

The third test field is not only the most comprehensive, but also the most important. It takes a close look at the actual function of the test object. The application, speed, reliability, security and also ergonomics are examined.

3.1 Usage

- Ease of use during operation 1.50
 - Integration capability in automatic test systems (ATE) 1.44
 - Energy efficiency 1.44
 - Electrical compatibility with Target 1.44
 - Help and support in case of problems 1.56
- The consistently positive rating is perfectly represented in one tester’s comment: “Had no weak points in our test, everything OK.” In fact, only one tester called for support: “Support responds and can understand problems. Solution still open” – which he rated positively. One tester praised: “Very good integration capability for ATE systems. Even controllable via el. pulses.”

3.2 Speed

- Programming time via μ C/SoC 1.33
 - Programming time Q-SPI via pins 1.44
 - Erase time 1.67
 - Verification time 1.38
 - Preparation for programming/change of image (setup time) 1.11
- In this test section, the testers gave the “Flasher PRO” programmer the best ratings, compared to the other test sections. However, differences can be read from the testers’ comments. Thus, the

classification ranges from the rather sweeping “speed very good” to “significantly faster than e.g. OpenOCD”. Another tester, however, found “Programming the 438 KB program code into the Flash takes 22 s. With Raspberry and OpenOCD, the same task takes about 15 s.” Another tester notes, “Deleting takes a little longer, as usual, but all still within reason.”

3.3 Reliability

- Error rate during programming 1.44
 - Use in continuous operation 1.33
- The very good rating is an indication of trouble-free operation. “No obvious errors could be found during the test period,” commented one tester. Only one tester experienced problems when programming two devices: “On one target (RP2040) standalone programming does not work, no log file is created. On i.MX RT1021 connection to CPU core is established, but flash programming does not work – neither with J-Flash, nor standalone. When it works, it works very well.”

3.4 Security

- ESD protection 1.89
 - Documentation of programming process regarding traceability requirements 2.33
- One tester’s assessment: “ESD protection cannot be assessed from the outside, no information in the manual. The device has survived laboratory use so far :-)” is essentially shared by other testers. The documentation of the programming process, on the other hand, is rated very differently. From “After activating the log file, traceability is very good” to “Log files or connection database etc. could be even more extensive” to “Traceability: unclear, no information in the manual”.

3.5 Ergonomics and haptics

- Device 1.20
 - Adapter 1.60
- In this test section, the testers are largely unanimous in their assessment: “Device and adapter make a quality impression and appear robust” and “Adapter mostly small boards without housing, but sufficient.” One tester notes, “Device could be a bit more compact, but still acceptable. Display and more buttons would be nice-to-have, but operation via host is OK.”

4. CONCLUSION

For the final assessment, we asked the testers to rate overarching aspects.

- Price / performance ratio 2.40
- Scope of delivery / documentation 1.80
- Practical operation 1.60
- Overall impression 1.70

As is well known, opinions differ when it comes to price. Many testers addressed the price in their comments: “Expensive for use in development, acceptable for use in production.”, is one comment, which also reflects the tenor of the

comments of other testers. The evaluation of the price/performance ratio has a disproportionately negative influence on the overall score of 1.9 because it is much lower than the score for the overall impression.

Looking at the function, one tester praises: “Everything has been thought of and it is very intuitive to use.” Other comments: “The documentation and quality are right and make a good impression. Durability and protection against faulty connections is still unclear, as long-term experience is lacking. Display and host independent operation would be nice, but would probably make the device more expensive.”

“Operation with simple microcontrollers (GD32E230) very good, SoC only satisfactory (supported targets and flashes). Works relatively smoothly in PC operation and standalone, except for the quibbles with RP2040 and i.MX RT1021 and the wish to support newer ARM targets with external NAND flash, I have no criticisms.” One tester notes, “Only further testing in production use will show the problems. Support will be contacted!” and another tester wishes he had more time for testing, then he would “probably be more satisfied.” But we had to give the testers a time limit so that we can present the results to you, dear reader. hs

Segger's responses to testers' comments

Individual testers contacted Segger during the test. Segger is using the testers' feedback to improve the Flasher PRO. In summary, the company writes:

“First of all, we would like to thank the testers very much for their time spent and the high praise for our Flasher. However, we are just as happy about the constructive criticism which helps us further enhance our products. At the time of this issue being published, we have already implemented many of the suggestions! We would also like to thank the electronics editors for presenting very concrete steps to the readers and making the overall process smooth and informative.”

→ At 1.2 Documentation:

“Thank you for the hint, the declaration of conformity can now be downloaded directly from the product pages.”

→ At 1.3 Scope of delivery:

“Again, thank you for your comment. The website and user documentation have been adapted in line with the testers' comments.

As part of our sustainability initiative, we at Segger are working to customize the contents of packages to best meet customer needs. If cables are not needed, the package contents are reduced accordingly. For us it is not ‘one size fits all’ but ‘the best fit for the customer's needs’.”

→ At 2.1 Installation:

“Raspberry Pi OS has been tested in Debian versions 8, 9 and 10 by us. We would be pleased if the tester would contact us so that we can understand his problem.”

→ At 2.2 Supported devices:

“The LS1023A is not on the official list of supported devices of the Flasher PRO.

In order to provide a simple and time-saving procedure for customers to inquire about devices that are not yet supported, we will implement a form on our website very soon.”

→ At 2.3 Preparation of stand-alone operation:

“Regarding the readout of an EEPROM, we ask for contact from the tester to understand his use case. So far we had not received any similar comments on this issue.

Generally the programming works in host as well as in stand-alone mode, unless an unsupported CPU is used in stand-alone mode. Also in this case we ask you to contact us in order to be able to understand the configuration of the tester and the problem that occurred.”

→ At 2.4 Preparing the host operation:

“Our devices are of course extensively tested under Linux, but there are countless Linux distributions. Which Linux distributions our flashers were tested with can be read in a Wiki entry. We will take the tester's hint – for which we are very grateful – and place the link more prominently on the product website.

→ At 3.2 Speed:

We believe we produce the fastest flash programmers on the market. The data rate of 20 kB/s achieved by one tester does not even come close to the range usually achieved by our customers and other testers. Standard programming steps are CheckBlank, Erase, Program and Verify. A possible explanation for the low speed could be the memory used for

the test. If the memory was not brand new, the overall process will be drastically slowed down by erasing the memory in advance. In our software, the CheckBlank and Erase steps can of course be deselected by the user and thus skipped. When using OpenOCD, the erase step must be optionally and actively prefixed to the write step in the corresponding command: flash write_image [erase] [unlock] filename [offset] [type]. In this respect, we suspect that two different scenarios may have been compared here. Therefore, we would be pleased if the tester would contact us so that we can understand his concrete configuration and give him hints on how to speed up the programming.”

→ At 3.3 Reliability:

“We thank the tester very much for his hint, indeed the log file on the Flasher PRO XL was stored incorrectly in the internal file system of the SD card. By the time this issue is published, we will have corrected the error and will provide all users with a firmware update.

We could not reproduce the described problems with the i.MX RT1021, an EVAL board RT 1020 – on which an RT 1021 is implemented – could be programmed by us without problems. We ask the tester to contact us in order to understand his procedure and his problem and to be able to solve it.”

→ At 3.4 Security:

“Thank you for your comment, which we have gladly taken on board. We have revised the user documentation with regard to traceability. The new version already includes a corresponding section.”