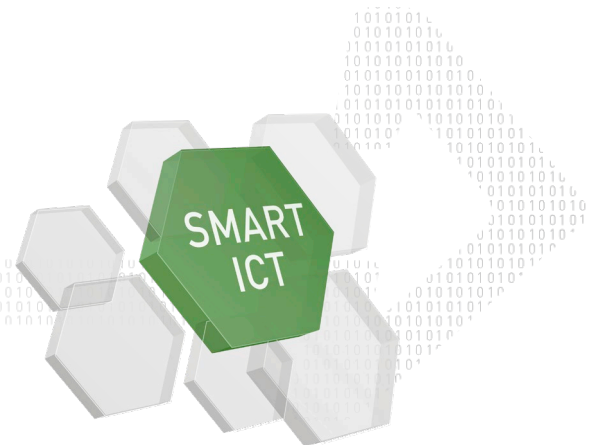# ProMik
SMART ICT
Merging Testing & Flashing based on Bootloader Technology

When conventional testing methods reach their limits

SMART ICT represents the latest technology in embedded testing based on ProMik bootloader know-how and offers, in addition to Flash programming, multiple testing capabilities based on standardized hardware and software components.

SMART ICT is an inside-out approach to In-Circuit Testing. A SMART ICT bootloader running on the main MCU of the target PCB can test if components and modules are correctly placed and functioning, without the need for physical connection via test pads.

→ High-Speed parallel testing
→ Testing despite limited access to test pads
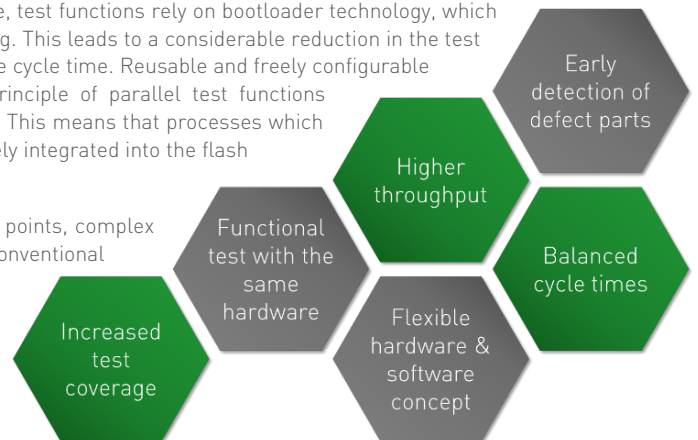→ Flexible solution with highest usability

SMART
ICT

SMART ICT

Overview

Since decades ProMik is the expert for programming & testing of electronic devices and assembled boards. The high aspiration of quality and development of innovative technologies led to unique solutions and applications. SMART ICT is ProMik latest technology based on proven Flash programming bootloader technology. SMART ICT opens new possibilities for our customers to implement more efficient flash and test concepts in production.

The combination of Flash programming and testing significantly increases the productivity in production and decreases the investment for additional tools and systems. testing of electronic boards takes place before and after onboard programming. With this in mind, ProMik integrated test functions into the flash process in order to reduce cycle times by combining and parallelizing processes.

The SMART ICT thus combines many test functions such as Boundary Scan and various Functional Test (FCT) processes and can be performed at panel level together with initial programming. Here, test functions rely on bootloader technology, which enable the use of the microcontroller's functional units for testing. This leads to a considerable reduction in the test effort for ICT and FCT and thus to a significant optimization of the cycle time. Reusable and freely configurable test libraries, flexible control options and the fundamental principle of parallel test functions contribute to an increase in the efficiency of the overall process. This means that processes which are usually performed on separate test systems can be completely integrated into the flash process bases on SMART ICT technology in the future.

Further changes in electronics manufacturing such as less test points, complex circuits, as well as panel programming and testing pushing conventional testing methods to their limits. The special feature of the SMART ICT to map the specific test functions via the microcontroller and its programming and debug interfaces makes it particularly interesting for products where access to test pads is severely limited due to the steadily increasing miniaturization.

- Early detection of defect parts
- Higher throughput
- Balanced cycle times
- Functional test with the same hardware
- Flexible hardware & software concept
- Increased test coverage

Test of CAN FD Communication

Test Description

The above use case example illustrates how the correct functionality of the CAN-FD communication of a module can be tested quickly and reliably using SMART ICT.

In the first step, the SMART-ICT software is downloaded to the module via JTAG and executed there. This causes the microcontroller to send CAN-FD frames via the corresponding communication lines and transceivers. The frames are read in by the ProMik programming device via its fieldbus interface and checked for correctness.
This test, which can be carried out very quickly, can be used to determine whether the CAN-FD interface and thus all the components on the module that are involved in the communication are functioning correctly before the actual flash programming.
After the functionality has been tested, the actual software can now be programmed in a second step.

This example shows how faults can be detected at an early stage using SMART-ICT, thus saving valuable time. In addition, it can be avoided that faults are possibly only detected at the end-of-line where further value-adding process steps have already taken place. In this way, the costs of late defect detection using SMART-ICT can be avoided.

Inside MCU view

Tested CAN-FD connection

Send CAN-FD frames

ProMik Software executes MCU-functions.

Read back CAN-FD frames and compare to expected values.

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