

# ProMik realizes total solution for drive systems

**Industry:** Micromobility  
**Application:** E-bike driving system

## ProMik as total solution provider

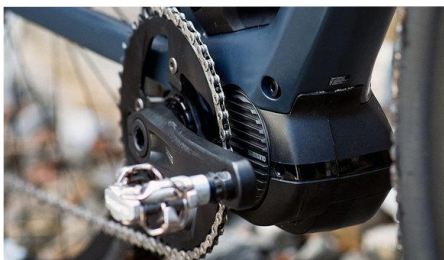
Due to the growing complexity of modern electronic control units, more and more areas of the measurement and test technology market require system solutions that must be able to withstand the increased requirements. ProMik is an experienced partner in this area. This expertise is demonstrated in a new project of the system provider, in which the technology leader enabled the flashing, testing and cyber security implementation of an e-bike drive system with its homogeneous toolchain.

## The difference in production

- Delivery of a holistic system (flashing, testing & cyber security)
- Fast response and realization times
- Flexible implementation of various customer requirements
- Operator friendly system with intuitive handling
- Parallel programming and testing of multiple single boards with one system
- Implementation of OEM-specific cyber security requirements

## Challenge

From running wheel to high-tech vehicle: Nowadays, e-bikes are considered a lifestyle product. This is a development that has increasingly accelerated, especially in recent years. Micromobility is a highly dynamic market in which high volumes and short innovation and product cycles require fast response and implementation times. This is why maximum flexibility is required in the programming and testing of electronic control units in this area.



The application to be programmed was an electric drive system. The manufacturer was looking for an expert who can provide a total solution including flashing, testing and implementation of cyber security requirements. The project consisted of a customer-specific application whose realization required an aligned communication between the customer and the system solution provider in order to satisfy all requirements. Basically, a system was required that could be operated intuitively by the user. Given the highly dynamic market, the system had to be designed to operate around the clock. It was also required that programming and testing be done in parallel on multiple individual boards in a system to ensure the highest

possible throughput. In addition, OEM (Original Equipment Manufacturer) specific **cyber security** requirements had to be implemented.

## Solution

The project was based on the **SAP2100** semi-automated flash and test programming station. The customized plug & play **fixtures** designed and built by ProMik are characterized by highest signal integrity and comprehensive quality control.

The multi-standard programmer, **MSP2150Net**, was selected because of its additional CAN-FD interface. This enables the execution of application-specific functional tests and MCU test functions e.g. fieldbus communication tests. This saved the customer additional test equipment. In addition, the MSP2150Net has an integrated power supply of up to 15 V, which can be used for almost any application. However, the e-bike driving system represented a special case, as the control unit requires a voltage supply of 36V for operation. For this reason, the multi-standard programmer was supplemented by the use of a power supply module: ProMik's **PSU2048** has an increased supply voltage of up to 50V, which ensured that the application could be powered without any problems.

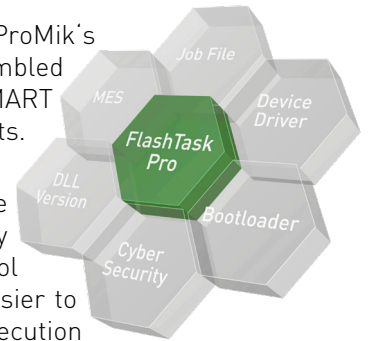


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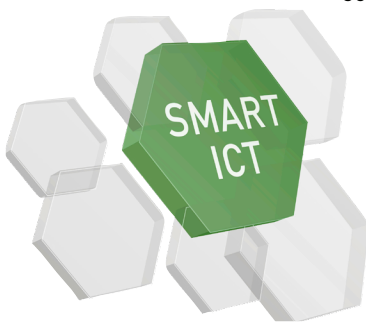
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Along with programming, the application was extensively tested, as required. With the help of ProMik's innovative test approach **SMART ICT**, it was checked whether the PCB was correctly assembled and functioning. Furthermore, application-specific functional tests were carried out by SMART ICT. These included bridge, magnetic sensor, acceleration sensor and gyroscope sensor tests.

To meet the customer's request for an intuitive system, ProMik's **FlashTask Pro** software was implemented. This production software is particularly characterized by its user-friendly handling and application features. For instance, FlashTask Pro includes a traceability tool as well as a statistics tool. The traceability tool records the production data to make it easier to trace back later. In addition, FlashTask Pro can communicate with the Manufacturing Execution System (MES) - the central interface for data exchange between OEM and Tier1. Among other things, the connection via OPC-UA was set up for this purpose in order to subsequently transmit the collected traceability data.



This was followed by the implementation of **cyber security**, in which OEM-specific requirements were realised. First, the connection to a key management server (KMS) was established and dynamic data was written in the form of security keys. These can be fetched by the KMS and simultaneously written via CAN-FD and stored on the KMS. The JTAG password is transferred and stored in a dedicated area of the MCU (e.g. in the HSM, SHE+). Afterwards, the JTAG interface is locked, securing the data against unauthorized access. The connection to the KMS - and thus the communication - was not direct, but via an intermediate point - the programmable logic controller (PLC). As a result, for example, commands are transferred indirectly to the KMS.



## ProMik convinces with one-stop-solution in the field of micromobility:

ProMik delivered the complete solution in the shortest possible time and thus enabled the production of high volumes right from the start. The customer benefited not only from round-the-clock expert support but also from ProMik's one-stop solution with end-to-end support. Already during the development phase, ProMik advised on design-for-manufacturing as well as on the implementation of OEM-specific cyber security requirements. Also during the pre-production phase when debugging first production samples, ProMik's unique technology expertise enabled the successful industrialization of the application. To realize the complex and holistic system solution, ProMik relied on the SAP2100 semi-automated programming and test station with the associated FlashTask Pro production software. Even after delivery of the system, ProMik customer service was available for further questions to guarantee a smooth start of production. With the ProMik One-Stop-Solution, the customer was able to avoid additional production equipment and thus save significantly on costs. The success of the system solution and the satisfaction of the customer is characterized by the easy scalability and duplication at additional customer sites.

### Advantages:

- Solution from a single source with project-specific adaptations
- Savings on additional expensive measurement and test equipment
- Cost effective & powerful system solution

For more information  
please visit our  
website

