SMART Laboratory car MLBA4

▶ **Sensor and Actuator simulation for Electronic control units**

Function

MLBA4 is a test system for the simulation environment of the control units of the automotive sector. The I / O cards of MLBA4 support all types of control signals. In addition, through the closed loop module the test system can be enhanced in such a way that it runs in closed loop with the ECU.

Field of application

The MLBA4 is used throughout the product life cycle of the control unit - from development to testing to quality assurance and appraisal. The following test types are covered:

Software function test

- Module Test
- Unit tests
- System integration test
- Diagnostic test

Key features

- Midrange simulation environment with a compact design and interface for Test Automation

- signal fault simulation with the error states + Bat / Bat- and "open load"

- Saving of project and user data individually by using an USB-Stick

- Operated eithr via MMI or with an individual PC interface

- Configuration for diffirent ECU's through a PC-Software

- The MLBA4 simulates the following signal types: Analog IN / OUT, Digital IN / OUT, PWM IN / OUT, speed, cylinder pressure, special signals

- A Windows interface makes it possible to adapt the MLBA4 to a wide range of test automation tools like Labcar automation (ETAS), Taxi (BOSCH) and TON (SMART)

The V-Model

The MLBA4 covers the following tests - along the V-model:
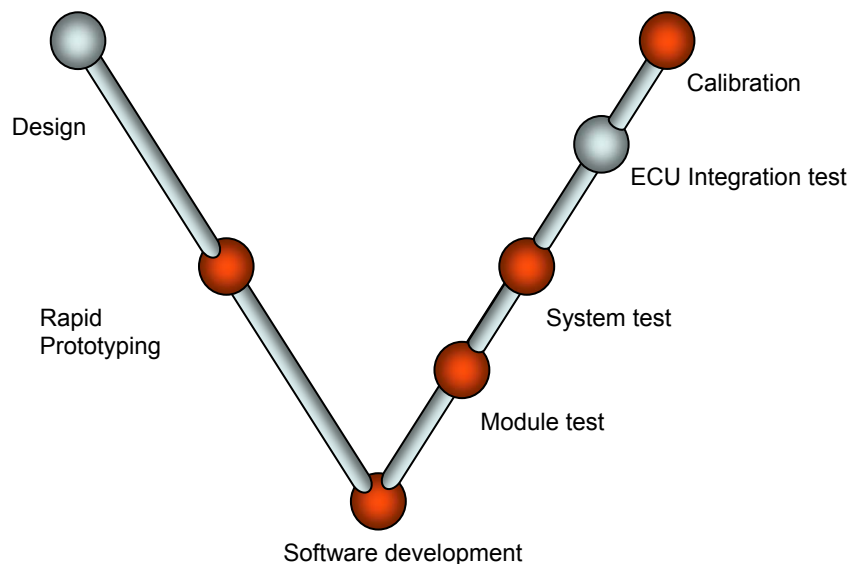
The use and your benefits

MLBA4 offers suitable solution for test concepts for a best possible price: The device is universally applicable, the adaption to the respective ECU projects is possible with a low cost wiring harness

Project Manager ECUx

SW-Developper ECUx

Test system Manager

ECU1

ECU2

ECU3
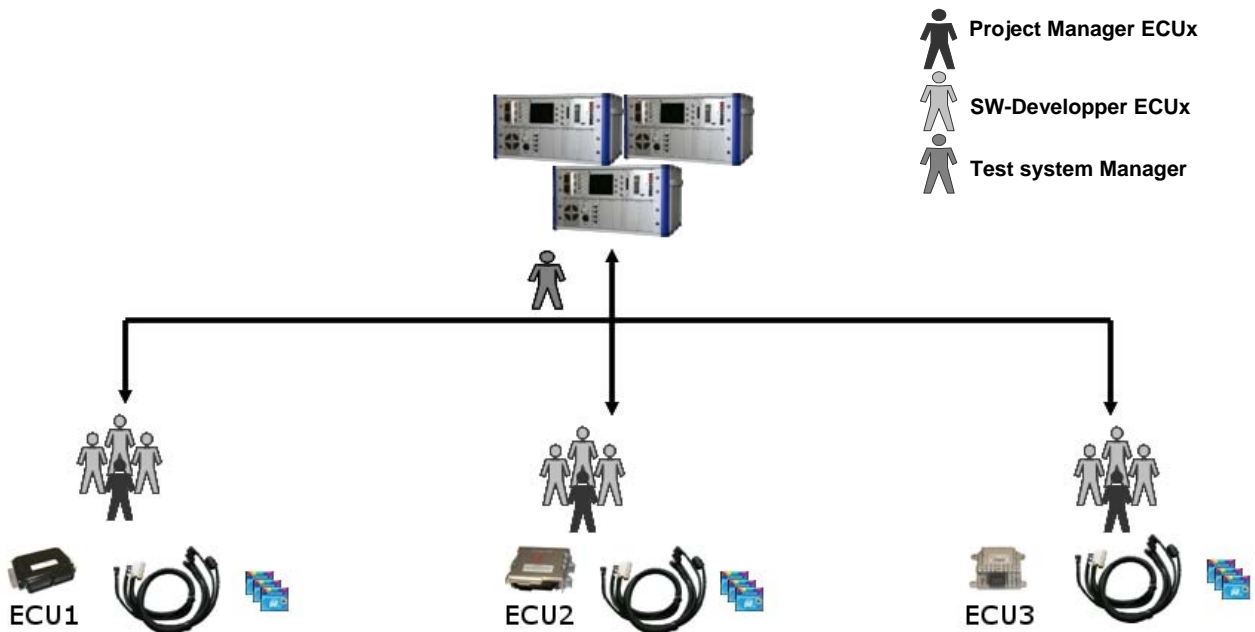
- Through an optimal planing you can satisfy all your project teams with a minimum of test systems since the systems are universal

- For new ECU projects the aditional investment is very low: Suitable cable harness + Project files

- Synergy between the various project teams is made easy; through the exchange of test sequences and user tips

- All users can be introduced in the operation of the test system through a one-day operator training. This makes it even faster to operator the MLBA4 in an effectiv way

- The test system manager can have an advanced-training so that he can maintenace the test systems and make changes and adaptions if needed

- Long term cost savings by:
  - Controlled expansion of the number of test systems (eg if all test systems permanently occupied).
  - Minimum costs for new EDC projects
  - Minimum cost for the training
  - Robust and stable test systems with minimal failure rate

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The MLBA4 vs. Hardware-in-the-loop test systems

In Open-Loop operation the I/O of the ECU can be stimulated and measured. Through a specail module (A42G) the rail peressure and the engine speed can be simulated in a way that the MLBA4 can be operated in Closed-Loop with the ECU. In that case the MLBA4 provides a plattform for Hardware-in-the-loop testing.

	MLBA4	Current HIL-Systems
Initial training effort	++ minimal	-- very high
Operation	+ comfortable (standalone or with PC)	+ comfortable
Visualization	+ user friendly	+ user friendly
Coonection to external test automation tools	++ can be adapted to all standard tolls through an API	o platform dependent. On some platforms it is not possible.
Cost-perfermance ratio	+ middle-range	- high-end
Simulation model	++ included in the delivery	-- addon, mostly expensive
Realtime capability	+ calculation of the simulation model under 1ms	++ calculation of complex simulation models under 1ms
Tests in realtime	+ fullfilled	o plattform dependent
Efforts for setup	++ minimal	-- very high
Mounting form	+ compact	o plattform dependent, most the HIL test systems are full size
Efforts of maintenance	++ minimal, can be done by the customer it self after training	- very high, the customer is dependent on the support of the supplier
Features of the simulation model	- includes to control loops: rail pressure control and engine speed control (this is sufficient for many applications)	++ Depending on the complexity of the simulation model multiple control loops can be simulated
Testing an ECU network	-- Is designed for the testing of individual control units	++ can be used for testing an ECU network