



Welcome to the Future!

MicroAutoBox II:
Flexible, powerful, and ready for future applications

dSPACE proudly presents MicroAutoBox II, the advanced version of our long-running success story, MicroAutoBox. This flexible, open prototyping system combines Ethernet interfaces providing versatile connection options, an integrated FPGA board for application-specific extensions, and I/O interfaces that are faster and more powerful than ever. This new generation is raising performance standards.

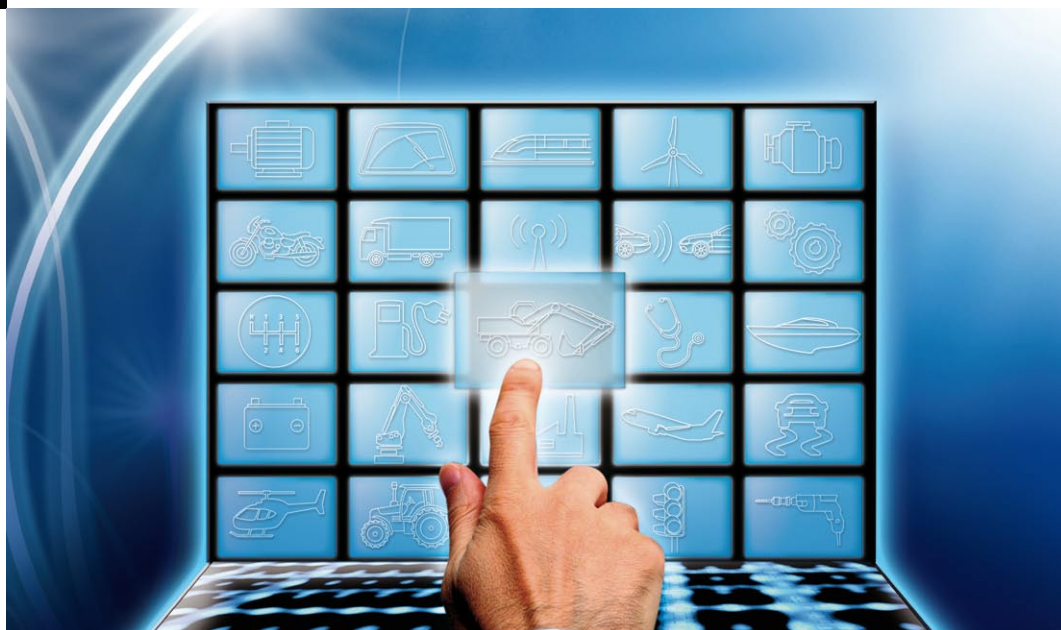
The Future Challenges for Prototyping Systems

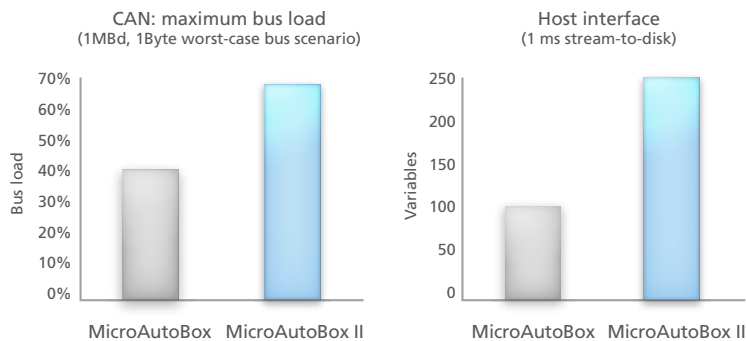
New driver assistance systems, electric and hybrid drive concepts, combustion engine optimization: The trends in automotive electronics are making increasingly tough demands on development tools. Flexible networking is essential. Automotive bus systems need to be supported, and standard PC interfaces are also becoming more important. The prototyping systems have to be extendable and configurable to meet the needs of specific applications. For

example: In the development of electric drive concepts, specific I/O such as resolver interfaces must be added as and when required, but they do not have to be supplied with every system.

Ready for the Future

One answer to the challenges of constant change is to use flexible, open tools that future-proof investments in the long term. So dSPACE has revamped its tried and tested MicroAutoBox, giving it a new, flexible, open architecture.





The performance of the MicroAutoBox II communication interfaces has been further improved (as the CAN and host interfaces show).

The result: MicroAutoBox II. New Ethernet and USB interfaces ensure openness, and modern FPGA technology provides the necessary flexibility. With its powerful 900-MHz processor, it is currently the fastest fanless prototyping compact system for developing automotive embedded applications.

Keeping the Best

The MicroAutoBox's proven strength such as its compact size and passive cooling live on in the new model. The permitted operating temperature is still -40°C to +85°C (-40 ... 185 °F) – a true benchmark! Its mechanical robustness is better than ever. Users can operate the MicroAutoBox II via a convenient RTI blockset just as they always did to test new control functions quickly in the vehicle.

Ethernet Interfaces for Openness

MicroAutoBox II has an Ethernet interface for direct connection to a host PC, for tasks such as loading models and reading or adjusting parameters in ControlDesk®. It also uses the Ethernet I/O interface to communicate with devices like embedded PCs and measurement systems, to process their data and

signals in the controller model. There is a new RTI blockset for configuring the Ethernet I/O interface.

All-New Powerful I/O Interfaces

The I/O interfaces on the MicroAutoBox II are completely new. They provide powerful digital I/O

(with 40 inputs and 40 outputs) for all kinds of applications. There are also sixteen fast 16-bit analog inputs with a sampling rate of 1 MSample/s, ideal for precisely capturing dynamic signals. And there's no need to worry about growing volumes of bus traffic: The FlexRay, CAN and LIN channels have been given a significant performance boost by new controllers and a new interface implementation, respectively.

Maximum Flexibility with FPGA

The integrated FPGA technology (Xilinx® SPARTAN-6 FPGA) opens up completely new potential. With the new architecture, computing-intensive data preprocessing can run on

the FPGA, so engineers can implement very fast control loops. Initially, the programming will be done by dSPACE's Engineering Service, but users will soon be able to create their own FPGA designs with a Simulink® blockset. The I/O interfaces can be extended to meet the needs of specific applications, using additional modules that are currently under development. The modules will be completely integrated into the MicroAutoBox by mounting them on the FPGA carrier board. One module due for launch very soon will be used to control electric motors in support of current developments in drivetrain electrification.

Other Enhancements

One of MicroAutoBox's special strengths, its fast boot-up behavior, is now even quicker: Similar to a real ECU, it can now perform immediate boot-up in ECU networks. A USB interface has been integrated for data logging to external hard drives or USB sticks.

Modern FPGA Technology and Ethernet Interfaces for Greater Flexibility and Openness

Summary

The new MicroAutoBox II's compact, robust design is as impressive as ever – and when it comes to performance, openness and flexibility, it sets new standards. In short, it's ready for the future. The transition to MicroAutoBox II is easy for customers who already use MicroAutoBoxes. They can continue using their familiar tool environment such as ControlDesk – or ControlDesk Next Generation – plus Real-Time Interface. All they need is a current dSPACE software release. ■

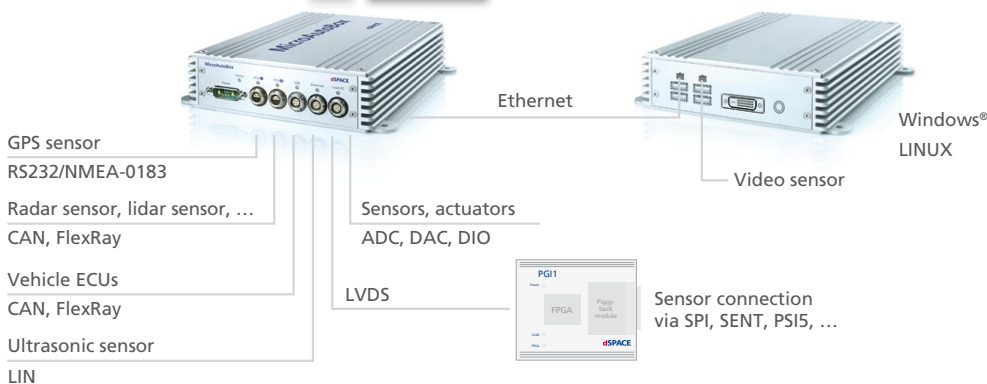
Rapid prototyping system

- Function development in MATLAB®/ Simulink®/Stateflow®



(Embedded) PC, Car2x box

- Electronic horizon
- Camera integration, image processing
- HMI control
- Car2x communication



The wide range of connection options on the MicroAutoBox II is ideal for developing intelligent driver assistance systems.

Application Examples

Developing Cylinder Pressure-Based Controllers

For the latest adaptive engine control developments, the cylinder pressures need to be captured angle-synchronously and with high precision for several cylinders at once. The characteristics calculated from the pressures have to be used for parameterizing the subsequent injections cycle. Such applications have several hundred thousand measurement values per second, and the new A/D interfaces are ideally suited to this. Being able to also use external, angle-synchronous hardware triggering of the AD converters and burst data transmission greatly reduces the load on the real-time processor during measurement. This means that sufficient capacity is available for model computation. The optimized I/O connection means that cylinder pressures for up to 16 cylinders can be processed with a resolution of 0.1° at a corresponding engine speed.

Electrifying the Powertrain

Using electric motors in hybrid vehicles and electric vehicles, and also for the electrification of auxiliary units of conventional vehicles, currently promises the greatest potential for reducing fuel consumption and emissions. A wide range of different electric motors can be used depending on the application – brushless direct current motors, synchronous and asynchronous motors. Rapid prototyping systems have to support the different position capture and control methods used with these motors. For this type of application, MicroAutoBox II users will soon be able to use an additional module that is tailor-made for controlling electric motors. This will be plugged onto the FPGA-based carrier board, which is designed for different I/O extensions, and will be completely integrated into MicroAutoBox II.

Profile

- Compact, robust prototyping system for in-vehicle use
- Powerful I/O including CAN, LIN, K/L-line, FlexRay, and Ethernet interfaces, plus an LVDS/bypass interface
- High processing power with passive cooling and a small footprint
- Integrated FPGA board for application-specific extensions
- Live data recording (flight recorder) on USB mass storage device

