

III Applications

3 Applications

3.1 Physical Computing Kit “Modularis” for automation

Modularis denotes a comprehensive physical computing kit, suitable for rapid prototyping of control, HMI and mechatronic training tasks. The high flexibility and usability of the system is a result of a well-planned connector concept and a compact design without any grid. By principle, Modularis is a multi-processor system and therefore incorporates the advantage of reduced software complexity with nearly no restrictions for scaling the network for additional actuators, sensors or computing nodes. WLAN, USB, XBee and of course CAN are standard interfaces to the rest of the world. Modularis is a registered brand of the Aevum Mechatronik GmbH, which drives the development of the standard. Everybody and every company is encouraged to contact Aevum, to become an authorized partner for advancing the standard in all fields of applications, and bringing a positive impact to the time to market for new ideas, and also to the environment by the reduction of electronic waste.

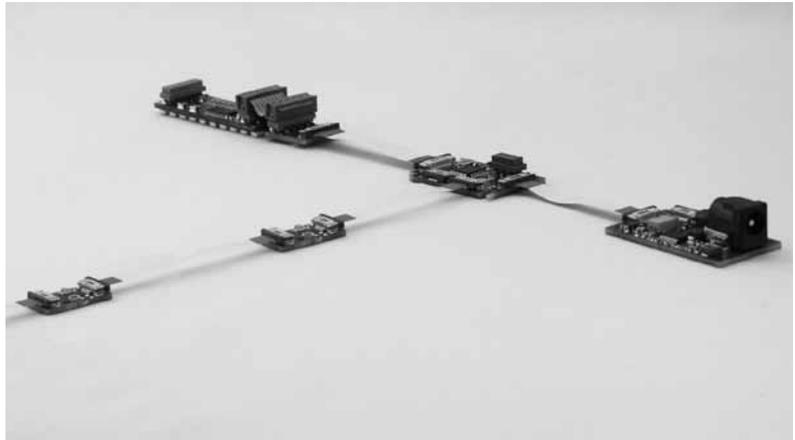


Fig. 3.1: Typical modularis setup

Physical Networking and the concept of Modularis

For easy data acquisition, control configuration and HMI purposes, Modularis modules come with the Mona feature. This software connects Modularis to the world via WLAN, therefore it is not only a physical computing but a physical networking platform. The generic visualization and configuration software ModulaVis supports either PC as well as Android devices – which means an ultimate degree of freedom for HMI purposes as well.

HMI

**WLAN, USB, XBee,
CAN**

**HMI
WLAN**

Android

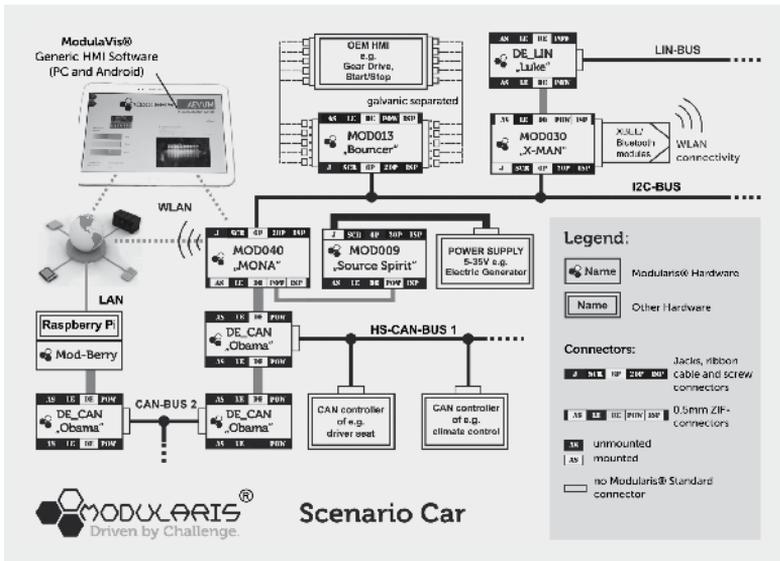


Fig. 3.2: Modularis concept

Concept of the MODs and their extensions

Behind the various connectors used in the Modularis system there is a clear concept, which defines the function of each connector as well as the position on board. This is needed to allow the integration of third party modules and other external devices.

Modularis recognizes the following connector types for setting up the network:

- AS: Analog Sensors, 6 analog channels connected by ZIF8, bc, 0.5 mm pitch (order code 687 108 145 22)
- EN: Energy, versatile power supplies connected by a ZIF10, bc, 0.5 mm pitch (order code 687 110 145 22)
- DE: Digital Extension, digital peripherals connected by ZIF12, bc, 0.5 mm pitch (order code 687 112 145 22)
- LE: LED – Controller connector directly powering LEDs with max 1.0 A via ZIF14, bc, 0.5 mm pitch (order code 687 114 145 22)
- ISP: In System Programmer, connected by ZIF6, bc, 0.5 mm pitch (order code 687 106 145 22)
- Bus-Connector: at least 6 poles for interfacing to a 1.27 mm ribbon cable with the configuration bus (WR-CAB-Ribbon Flat Cables, order code 639 1xx 155 21)

Modules with a BUS connector or power supplies are called the "MODs". The modules are grouped in ten functional groups, with a maximum of 100 different variants each:

- MODXX0: Controller modules, intended to be reprogramed by the user
- MODXX1: HMI-input adaptor, like touch panels, keys, encoders

III Applications

Galvanic separation

Raspberry Pi

FPGA

Energy harvesting

MODXX2: HMI-output adaptor like displays

MODXX3: Signal handling, e.g. galvanic separation or signal conditioning devices

MODXX4: Power electronics, like motor, and relay drivers

MODXX5: Gateways and bridges, for instance MOD-Berry interfacing a Raspberry Pi to Modularis

MODXX6: Analog front ends like sensors or filters with digital processing unit on board

MODXX7: FPGA-boards – intended for reconfiguration by the user

MODXX8: LED controller modules

MODXX9: Energy harvesting and supply modules

With this standard, very cheap, but powerful hardware can be generated for a maximum of flexibility at a minimum of redundancy induced by the principle of modularization.

The Modules (examples):



MOD_000:

ATmega328-module, measures only 20 x 34 mm

Connectors: AS, DE, EN, Bus-connector and ISP

Additional features: RGB-LED

Nick: Chameleon

Würth Elektronik products:

WR-MM Female SMT Connector 6903 6728 06 76,

WR-MM Male IDC Connector 6901 5700 06 72

Buck-Boost power

Energy Harvesting



MOD_009:

Buck-Boost power converter,

Input range VO: 1.5 V–35 V,

Outputs: 5 V (1 A), 3 V3 (200 mA), VO

Energy Harvesting prepared

Nick: Source Spirit

Galvanic separation



MOD_013:

Galvanic separation of up to five inputs and output signals

Inputs are analog resolvable, outputs digital, mechanical cuttable, ideal for changing existing HMIs without interfering to the safety concept of a machine like a car

Nick: Bouncer

Würth Elektronik products:

WR-MM Female SMT Connector 6903 6728 06 76,

WR-MM Male IDC Connector 6901 5700 06 72,

WR-MM Female SMT Connector 6903 6728 10 76,

WR-MM Male IDC Connector 6901 5700 10 72