**FH Brandenburg
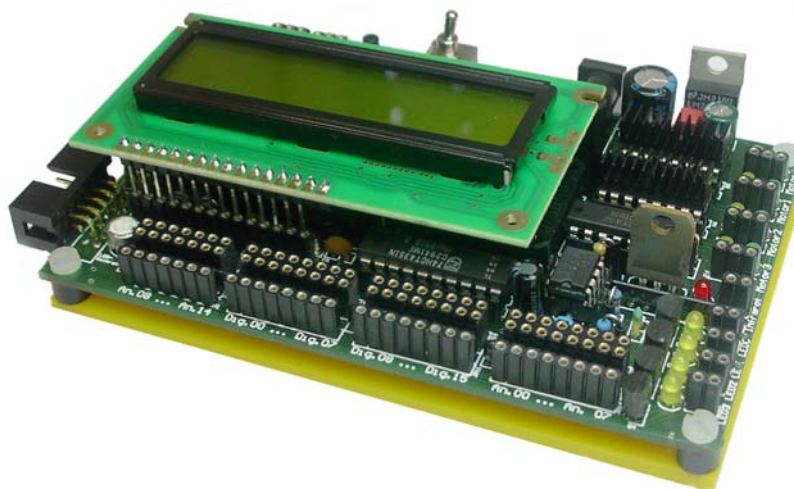University of Applied
Sciences - Project IAS**

AKSEN - controller board for reactive robots

Description

A controller board for reactive robots has been developed by the University of Applied Sciences in Brandenburg. The board is particularly suitable for the simple and low-priced construction of small autonomous systems (e.g. mobile robots). It consists of a freely programmable unit with many ports, which can also used together with other boards (AKSEN boards or image processing boards).

The AKSEN board stands out from the crowd compared to other solutions for autonomous systems due to its

- ports for sensors and actuators,
- performance,
- reliability and
- simplicity of use.

Controller board AKSEN

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Advantages

- many ports for digital and analogue sensors
- motor drivers and universal power drivers
- digital outputs
- enough computing power for autonomous reactive systems
- program persistence and reboot after power outage
- small and low-current
- cost-effective in hardware and software
- native GPL C-Compiler (Linux, Windows)
- PLD design
- distribution as pre-fabricated module or solderable construction kit

June 2004

Parameters

- 15 analogue inputs (e.g. for light, infrared, distance, voltage or line sensors)
- 16 digital ports (freely configurable as input or output)
- 4 motor drivers (variable in direction and speed)
- 4 switchable power drivers (e.g. infrared sender, leds, bulbs)
- 3 servo outputs (expandable by software)
- 1 infrared output with driver (e.g. for localization with modulated infrared)
- 3 encoder inputs (e.g. for odometry)
- DIP switch
- V.24 interface
- LCD display
- 64 KB Flash, 8 KB Flash
- CAN interface 1Mbit (optional)
- Bluetooth connection to PC (optional)

Application fields

- Education in universities, schools and on-the-job training
- Hobby (model building, home constructors)
- Applications in art and design (e.g. interactive installations)
- Technical applications with need for low-current and flexibility
- Universal controller for intelligent sensors
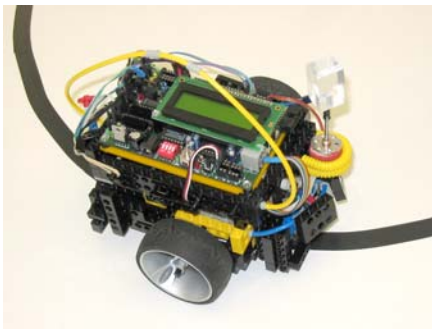
Autonomous reactive robot with AKSEN board

Benefits

- flexibility
- simple programming
- wide application fields und extension capabilities
- cost-effective solution

Usability

The boards are available in limited-lot production. The usability has been tested in student courses and robot buildings labs at different universities.

There is the possibility of further developments and application studies in cooperation with the University of Applied Sciences in Brandenburg.

The architecture is usable under exclusive licence in Germany and internationally-

Project IAS

- 2001 – 2003
- development of a platform for autonomous intelligent systems
- RCUBE – a modular low-current architecture for mobile systems
- subproject: AKSEN board
- supported by the *MWFK des Landes Brandenburg*

Project IAS

- integrated applications of computer science (e.g. mobile autonomous systems)
- knowledge processing and methods of artificial intelligence
- soft computing, fuzzy systems, neural networks, artificial life, artificial evolution
- LISP und PROLOG
- semantic signal analysis

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