



### Motion-Control solutions by zub AG:

- **Innovative**
- **Cost optimized**
- **Focused on applications**

## zub machine control AG

**We take responsibility !**

### Services

Consulting  
SW-/HW-  
Engineering



### Expertise

Motion-Control  
EtherCAT, Ethernet,  
CAN

### Products

Motion-Control modules & power amplifiers

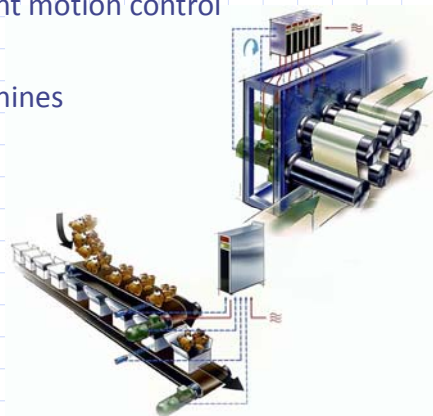
## zub – Benefit from our Services

- Motion control consulting & engineering
- Development, implementation and production:
  - Customized motion control modules
  - Customized power stages
  - Specialized electronic design, e.g. I/F converters
- CANOpen, EtherCAT, Ethernet, USB consulting, engineering & implementation
- Application design & programming

## zub – Benefit from our Products

### Motion control devices by zub machine control AG ...

- ... can be used as intelligent motion control slaves of a PLC or PC
- ... are able to control machines and tools standalone
- ... are free programmable
- ... are able to command external peripherals
- ... are in use more than 10,000 times!



## zub – Product range

- Motion control modules for drive positioning and synchronization
- Power amplifiers
- CANopen modules
- OEM products



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## Main attributes of zub products

- **Innovative:**  
Based on newest technologies and trends of the market.
- **Cost optimized:**  
Clever combination of industry-proven hardware designs and license free motion control libraries.
- **Focused on applications:**  
OEM products offer customized designs.  
Hardware & software features based on demands.  
Highest flexibility due to free programmability.

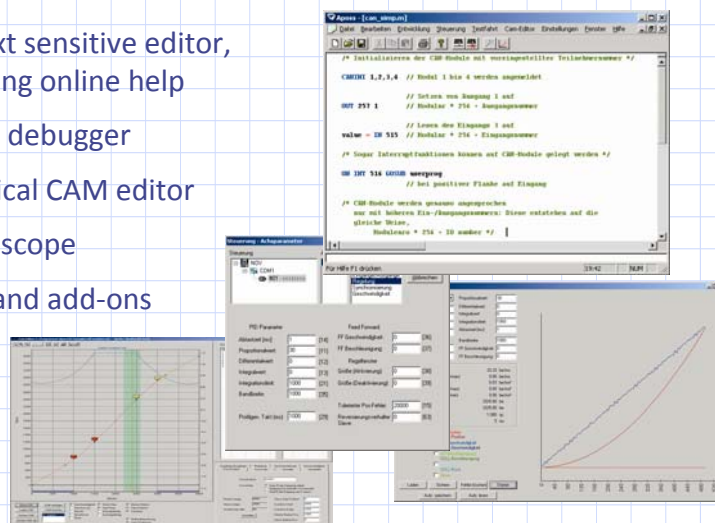
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## MACS4: Focused on motion control

- Encoder-I/F → 6 configurable encoder inputs (Incremental, SSI, SinCos)
- Digital-I/O → 12 inputs / 4 outputs
- Analog-I/O → 1 input / 3 outputs
- Communication → USB, EtherCAT, CAN
- Power stages → up to 6 integrated, depending on type
- Motion control → Positioning, synchronization, CAM (license free APOSS library & tools)

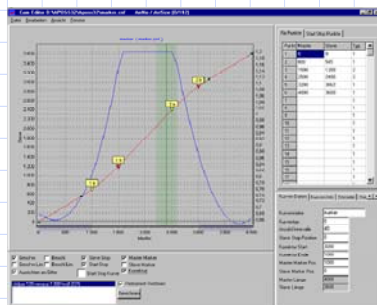
## APOSS: The Development Suite

- Context sensitive editor, including online help
- Online debugger
- Graphical CAM editor
- Oscilloscope
- Tools and add-ons



## APOSS: The Motion Control Library

The APOSS motion control library offers all kinds of modern closed loop drive control:



- Speed Control
- Position Control
- Master/Slave-Synchronization
  - Speed
  - Position
  - Marker
  - CAM profiling

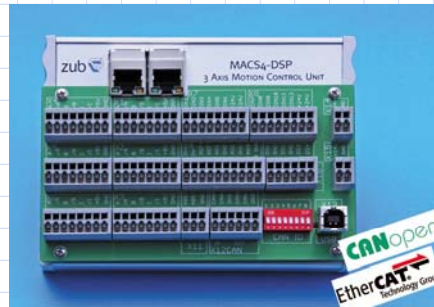
## APOSS: The Programming Language

- Structured programming language featuring loops, function calls, interrupts, ...
- Encapsulation of highly sophisticated motion control and communication tasks
  - Commands for axis positioning and synchronization
  - Commands for data exchange by CAN, EtherCAT, USB

Powerful and efficient as C,  
including fully integrated motion control commands!

## Motion Control Logic: MACS4-DSP

3-axis motion control module for all applications



Low cost, due to integration of all motion control interfaces.  
Open for PLC and PC systems, as well as all types of power stages.

## Motion Control Logic: MACS4-DSP

- High performance 3-axis motion control module.
- Programmable by a modern development suite (at no charge).
- Royalty free, but fully featured motion control functions for drive positioning and synchronization, including on-the-fly CAM-profiling and flying saw.
- 6 encoder inputs, analog and digital I/Os, EtherCAT, CAN, USB, RS485 on board.
- For standalone usage or as a slave of a PLC-/PC-networks.

## Motion Control Power: MACS4-DC6

6-axis control with integrated power stages



Optimized for multi-axis drive positioning at minimum cost.  
For standalone applications or in combination with a PLC or PC.

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## Motion Control Power: MACS4-DC6

- 6-axis motion control with integrated power stages.  
Optimized for smart and easy, but low-cost drive positioning.
- Programmable by a modern development suite (at no charge).
- Position, speed and current/torque control.
- 6 encoder inputs, analog and digital I/Os,  
EtherCAT, CAN, USB, RS485 on board.
- 6 power stages (12-48V, each 1.5A/3.8A) for brush motors.
- Standalone control or usage as a PLC/PC slave.

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## Motion Control OEM: MACS4-DC3

Multi-axis control, that fits to your (!) needs



Optimized for specialized medium and high-volume applications.  
Functionality, housing and connectors according to your needs.

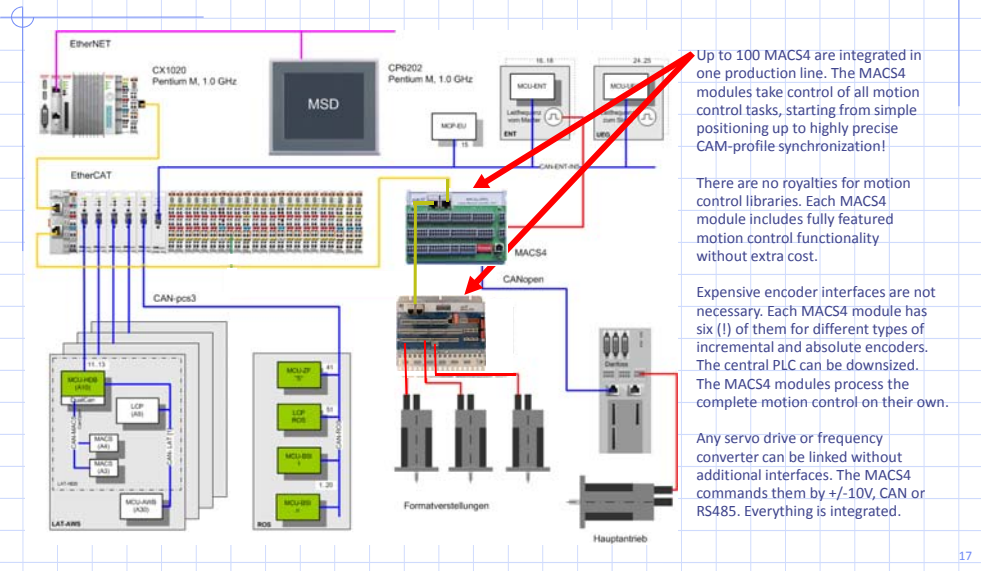
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## Motion Control OEM: MACS4-DC3

- Customized multi-axis control unit with integrated power stages for brush and brushless drives.
- Position, speed and current/torque control for precise and highly dynamic positioning down to 0.1  $\mu\text{m}$ .
- 6 encoder inputs for direct connection of Heidenhain SinCos glass scales and incremental encoders.
- 3 power stages (12-48V, each 3A/7A) integrated.
- Standalone usage or as a motion control slave of a PC, commanded by USB and a C++/C# application interface.

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## Sample Control Concept



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## PLC , EtherCAT and MACS4: Your Profit

- Industry-proven, modern bus system:
  - Maximum performance and highest reliability.
  - Easy integration of the MACS4 as an EtherCAT slave.
- Cost savings by adding MACS4 devices:
  - Unload and downsize your PC / PLC.
  - Forget about additional encoder interfaces & latching-I/Os.
  - Be free to link other EtherCAT, CAN or USB devices or masters.
  - Do not pay royalty fees for motion control libraries.

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## Conclusion

Just use the **ICF** principle by zub AG  
to get the most out of your machine designs:

- **Innovative:**  
Newest technologies and trends of the market.
- **Cost optimized:**  
Integration and modularity without overhead.
- **Focused on applications:**  
Listen to your customers. Design your product for them.

## Your Motion Control Partner



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