sensors
rotativ
linear

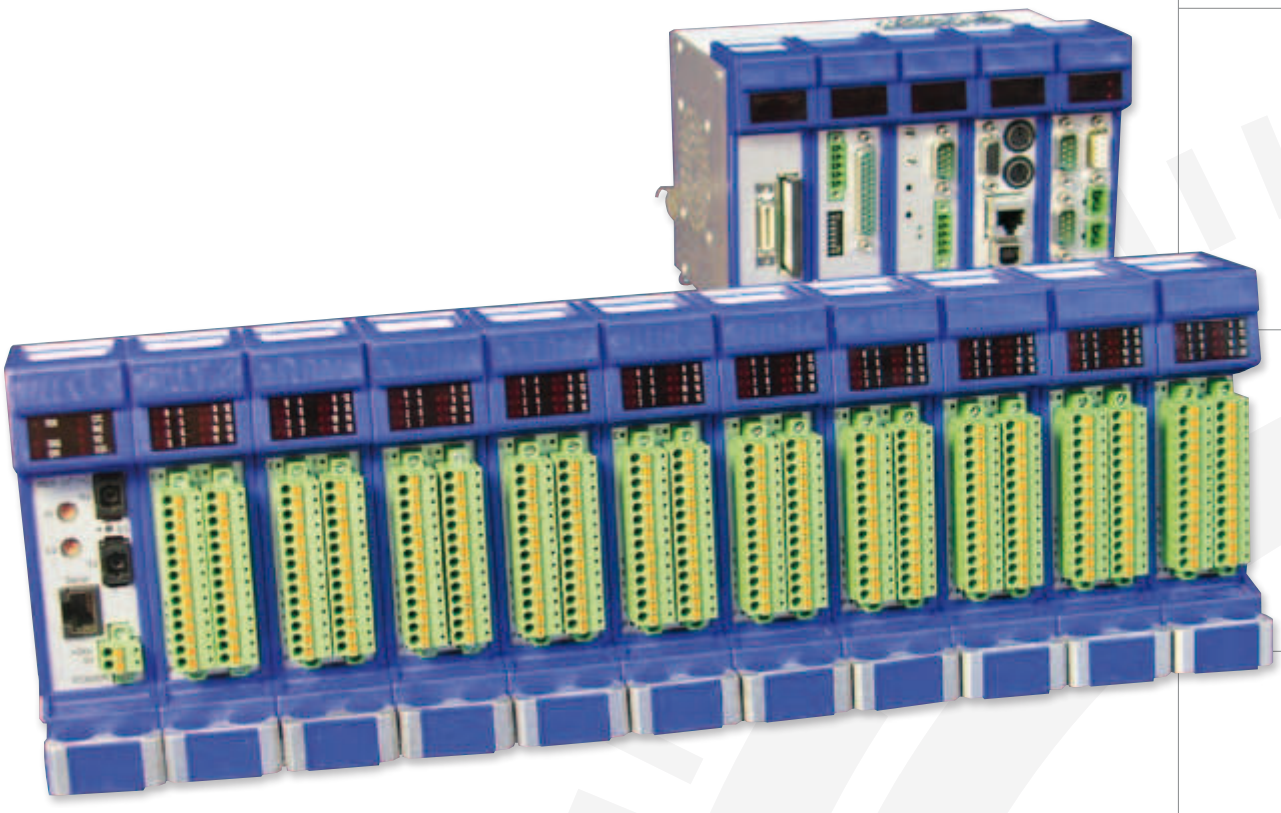
motion

systems

controls

@ctiveIO

Automating - Robust and Dynamic



www.TRsystems.de

TRS Product Family

Industrial PC

- VPC/EPC/MIPC - Industrial PC for progressive control engineering
- User-Interface visualization

SPC - Slot-PLC

- Central control
- Fieldbus master
- PCI-Slot
- Standard PC-Interfaces

@ctiveIO

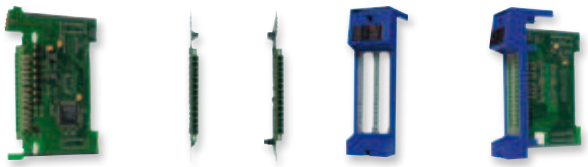
- Fieldbus based automation system with decentralized intelligence
- Fieldbus-ready
- Standard sensors and actuators

The system

There are two basic series to choose from that fit into the industrial environment. First, the **@Control module** with **@Modules** sideways attached for flexible setup; and second, the **@Box module** where **@X modules** are inserted for extreme robust applications with higher shock and vibration resistance. There are three performance classes that offer scalable power according to the application: the µController 80C165, the Net-ARM-Prozessor with TCP/IP-Stack onboard and the PC core.

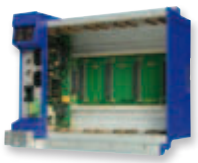
@Print

The **@Prints** are the determining I/O components. A conglomeration of **@Prints** build the foundation of the I/O level.

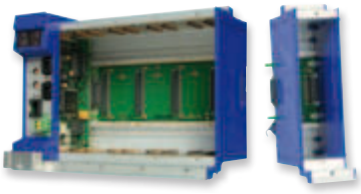


@X modul

By putting one or two **@Prints** into an **@Front**, one gets an **@X module**.



@Box housing



@Box module

By inserting an **@X module** into an **@Box housing** one gets an **@Module**.
If one needs more **@X modules** they can be inserted into the front of an **@Box module**. Advantage: it is modular, but also constructed extremely rugged.

@Module

The **@Module** has a left and a right slot, and it is able with its compact and rugged construction to include up to two **@Prints**. The **@Print's** identifaction for the **left** slot is **"@PxxxxL"** and for the **right** slot is **"@PxxxxR"**.
Multiple **@Modules** can be put together sideways to make an **@Control module**.

@Control module

The intelligence of an I/O system is in the **@Control module**.

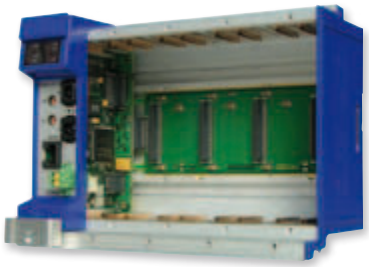
@ctiveIO - The Components

I/O module

Our variety of **I/O modules** is as big as the world of automation. Two submodules (@Print) are put together to make one module (@Module). Therefore, different forms of signals can be combined in one module.
One controller typically provides up to 20 sub-modules (equals 10 fully equipped modules) with data. The supply voltage for the I/O will be supplied separately to each submodule; therefore, the digital and analog I/O are galvanically separated from the signal processing.

Housing

Due to various requirements in logistics and modularity, we provide @ctiveIO in two basic housing forms, which also can be combined.

@BOX	A complete fieldbus node can be incorporated into the box, and therefore, it is easy to handle. Further, you can equip it as you wish and it is ideal for serial production.	
@Module	We also deliver controller and modules in separate housings so you can freely combine the nodes as you wish. They can be stringed together on a DIN rail mounted PC and fastened with a hook. An electrical connection can be established via high-quality connectors.	

Controller

The **@C controllers** are the head of the **@ctiveIO system**. They establish the connection to superior systems via fieldbus or ethernet and communicate with the attached I/O modules.
Further, they have the technology function as a controller algorithm, cam controller...

@C100	These controllers bring all of the I/O data to the bus.
@C101	Fieldbus node with an enhanced storage area for technology functions.

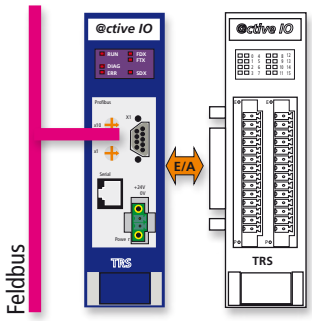
@C200	Industrial Ethernet onboard. No matter how your version of the Industrial Ethernet is laid out, with the @C200 you also will have the option of fieldbus and ethernet.
@C201, 202 203, 210	Ethernet node with enhanced technology functions.

@C500	PC power in the field. May it be anything else? For the big things, we have an adequate PC core based on PC104. (Depending on the construction, you need 5 or more module sizes).

Controller Module

@C1__

Fieldbus node

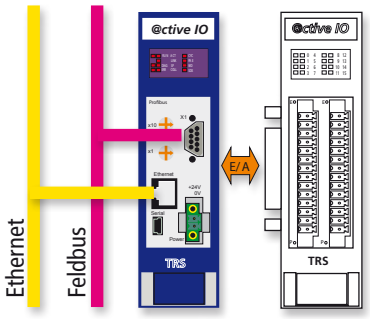


The fieldbus nodes with C165 µController and RS232 interfaces are for diagnoses via @ctiveIO Toolkit.

	@C100	@C101
Processor	C165, 44 MHz	C165, 44 MHz
Storage		
Standard: Flash SRAM NVRAM Enhanced: RTC SRAM	1 MByte (16 bits) 512 kByte (16 bits)	1 MByte (16 bits) 1 MByte (16 bits) 32 kByte (8 bits)
Supply unit	24 VDC, ±20%	24 VDC, ±20%
Classification		
CANopen FiberOptic IIO Profibus DP DeviceNet only Ethernet Ethernet + CANopen Ethernet + FiberOptic IIO Ethernet + Profibus DP EtherCAT	@C100-CO @C100-FO @C100-PB @C100-DN	@C101-CO @C101-FO @C101-PB @C101-DN
	Fieldbus node to connect the I/O with the fieldbus	Fieldbus node for technology functions as @PLC

@C2__

Fieldbus node with ethernet



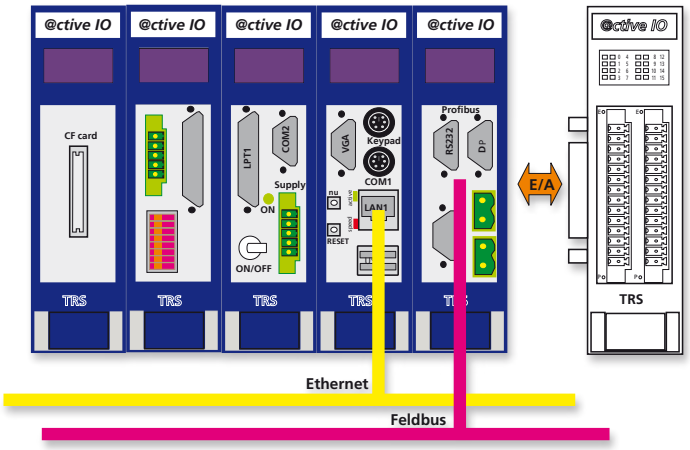
The **Ethernet controller** opens up a connection to Industrial Ethernet. There is standardized transfer of programs into the controller via **FTP** (File Transfer Protocol) and the **IP address allocation** is implemented via the **@ctiveIO Toolkit**. You can displace alarm signals over an external modem via FTP, URL, UMP or PPP.

@C200	@C201	@C203	
ARM 7, 44 MHz	ARM 7, 44 MHz	ARM 7, 44 MHz	
2 MByte (16 bits) 8 MByte (32 bits)	2 MByte (16 bits) 8 MByte (32 bits) 32 kByte (8 bits)	4 MByte (16 bits) 8 MByte (32 bits) 32 kByte (8 bits) x 512 kByte (16bits) within the Co-Processor	
24 VDC, ±20%	24 VDC, ±20%	24 VDC, ±20%	
@C200-EN @C200-CO @C200-FO @C200-PB	@C201-EN @C201-CO @C201-FO @C201-PB	@C203-EN	
Fieldbus node to connect the I/O with the fieldbus and/or ethernet	Fieldbus node for technology functions as @PLC	Fieldbus node for technology functions like @PLC, additionally with digital co-processor for use as cam switch e.g.	

Controller Module

@C5__

DIN rail mounted PC



Configuration @C5_ series	500
Bus	
1 PC 104 slot 2 PC 104 slots Housing	X 175 mm wide 100.5 mm deep
Processor	
Standard	
Optional	
Drives	
Standard	
Optional	
Interfaces	
Standard	
Power supply	
Standard	
other options are available upon request	
Fieldbus interface	
Options	

Modular platform with high processing power ...

The DIN rail mounted PC @C500 has a similar modularity as our industrial PC series and a great variety of configuration possibilities. You can put the components together to realize the demand of controller and measurement assignments decentralized in the field.

...and direct contact to your application

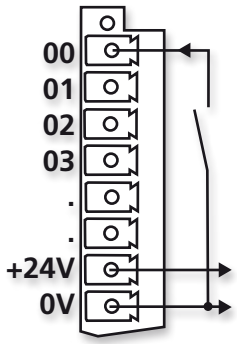
The CPU has immediate access to the @ctiveIO back plane bus; and further, (via our I/O modules) direct access to your plant. Therefore, your application does benefit from the processing speed. For your disposal, you have additional fieldbus masters (as control system) or fieldbus slaves (for the implementation of the @C500 in a control system). Needless to say that all standard PC interfaces (LAN, LPT, COM, USB,...) are available.

520	550	570
X 280 mm wide 100.5 mm deep	X 175 mm wide 142.7 mm deep	X 280 mm wide 142.7 mm deep
AMD LX 800 500 MHz		
Intel Celeron M 1 GHz		
Compact Flash		
HDD 2.5“		
PS2, COM, LPT, LAN (10 / 100 Mbit), VGA, USB		
24 VDC		
UPS, other power supply voltage		
Profibus-DP/FMS combi master, INTERBUS master, CANopen, DeviceNet Master, alternatively as slave		

Digital

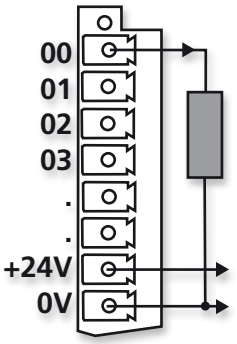
Digital input

@P1__	4 channels	8 channels
NAMUR Input	@P1410	
24 VDC Input filter 2 ms		@P1800
24 VDC Input filter 200 µs		@P1801
12 VDC Input filter 2 ms		@P1803
24 VDC Input filter 2 ms 10 kΩ Pull down		@P1804



Digital output

@P2__	4 channels	8 channels
24 VDC 1.5 A	@P2411	
24 VDC 2.5 A	@P2412	
24 VDC 0.8 A		@P2810
12 VDC 0.8 A		@P2813
Relay		
Potential free, 24 VDC, 1 A, directional contact	@P2430	
230 VAC	@P2420	



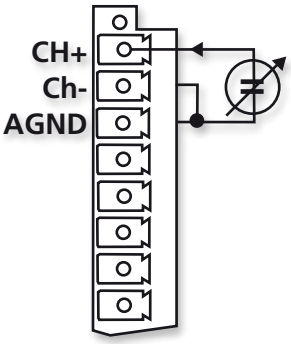
Accessories for analog and digital I/O

Connecting plug	
Plug in with tension spring	@S141
Plug in with screw terminal	@S142

Analog

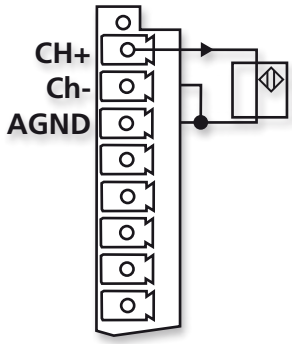
Analog input

@P3__	2 channels	4 channels
16 bit, synchronous sampling		
-10 ... +10 V, Ri = 1 MΩ	@P3200	@P3400
-10 ... +10 V, Ri = 100 kΩ	@P3202	@P3402
0 ... +5 V, Ri = 1MΩ	@P3204	@P3404
-20 ... +20 mA, Ri = 50 Ω	@P3210	@P3410
4 mA ICP, for FFT module	@P3280	
Temperature/RTD		
2-wire technology, 16 bit	@P3220	@P3420
3-wire technology, 18 bit	@P3221	@P3421
4-wire technology, 18 bit	@P3222	



Analog output

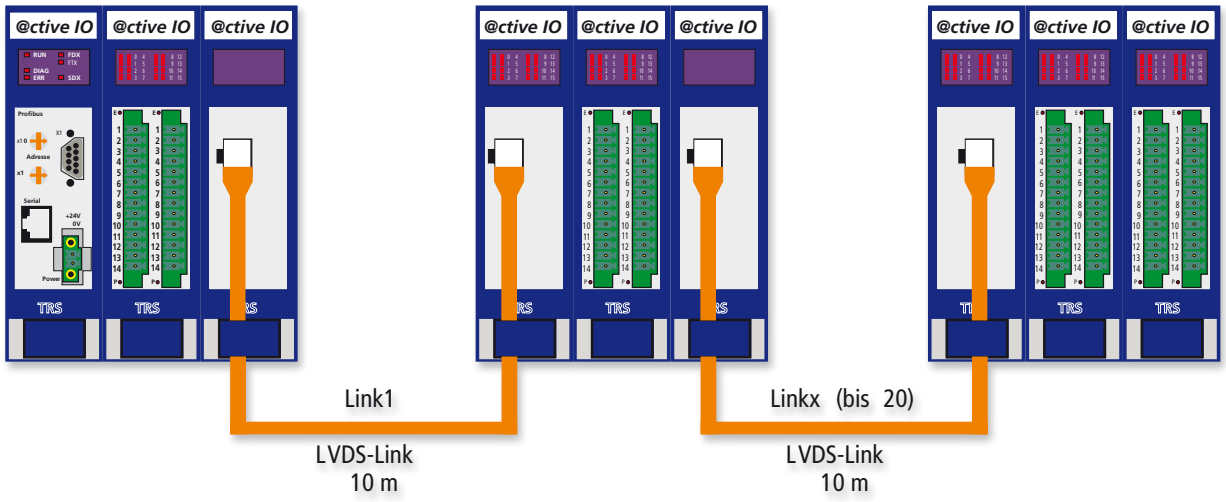
@P4__	2 channels	4 channels
16 bit, synchronous output		
-10 ... +10 V	@P4200	@P4400
-20 ... +20 mA	@P4210	@P4410



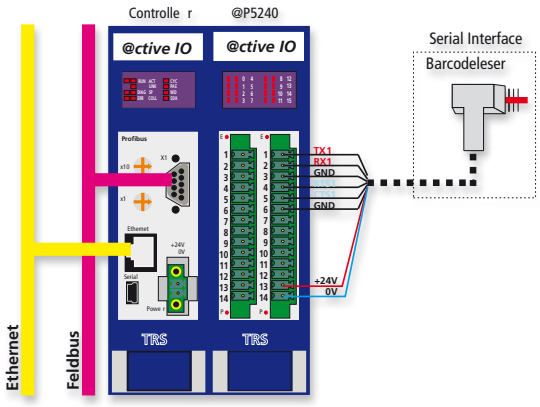
Bridge for @ctiveIO system bus	
Power distribution (24 V / 7 channels)	@P6010
Blind slot	@P6011
Passive connector	@P6012

Communication

LVDS - fieldbus extension		
@C01_	**Sender**	**Receiver**
Bus extension	@C011	@C010
Including galvanic isolation	@C015	@C014
Connecting cable	@LVDS-LINK 3 - 11.25 m	

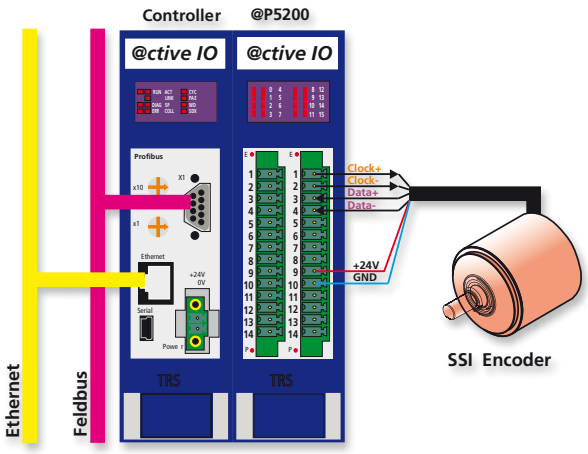


Serialized communication		
@P5_4_	**2 channels**	**4 channels**
RS232 RTS, CTS	@P5240	
RS485 / RS232	@P5241	
RS232		@P5440
RS485		@P5441
RS422	@P5242	



Sensor Interface

Measurement system - input		
@P5___	**1 channel**	**2 channels**
SSI	@P5100	@P5200
Incremental 5 VDC	@P5110	
Incremental 24 VDC	@P5111	
BiSS	@P5130	



Measurement system - output		
@P5___	**1 channel**	**2 channels**
ISI / Incremental output 5 VDC	@P5112	
Virtual incremental encoder	@P5190	
Repeater for @P5190	@P5191	
SSI output		@P5220

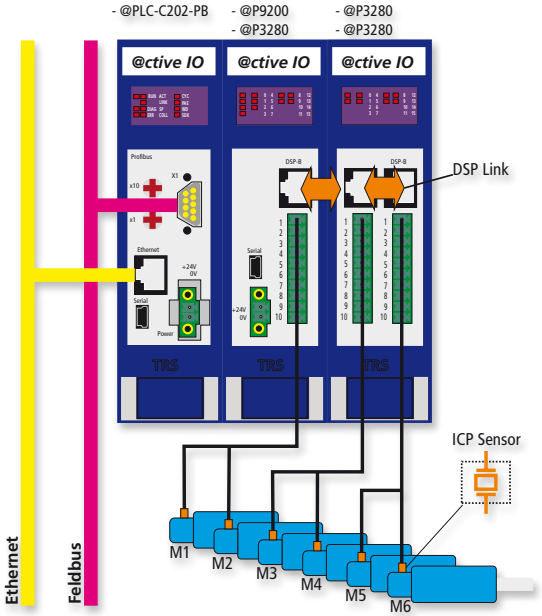
Condition Monitoring

@DIAG

Are you interested in the early detection of deterioration and high availability of your system? Then the @DIAG is exactly the right thing for you.
The technology module of the @ctiveIO series of TRsystems was developed for the dynamic vibration analysis of industrial machines.
You can realize the real time frequency analysis via fast signal processing technology.
You can use the advatage of an early-warning system to recognize damages of the roller bearing. Detect plant damages when they emerge.

Properties:

- capture impact sound based signals according to the ICP (Integrated Circuit Piezoelectronic) Standard
- deterministic capturing of analog values (40 µs, 10 channels)
- fast mathematics to calculate the analysis data (z.B. FFT)
- filtering and pre-processing of sensor information (frequency band 1 Hz … 11,5 kHz, variable / processing image at the PLC)



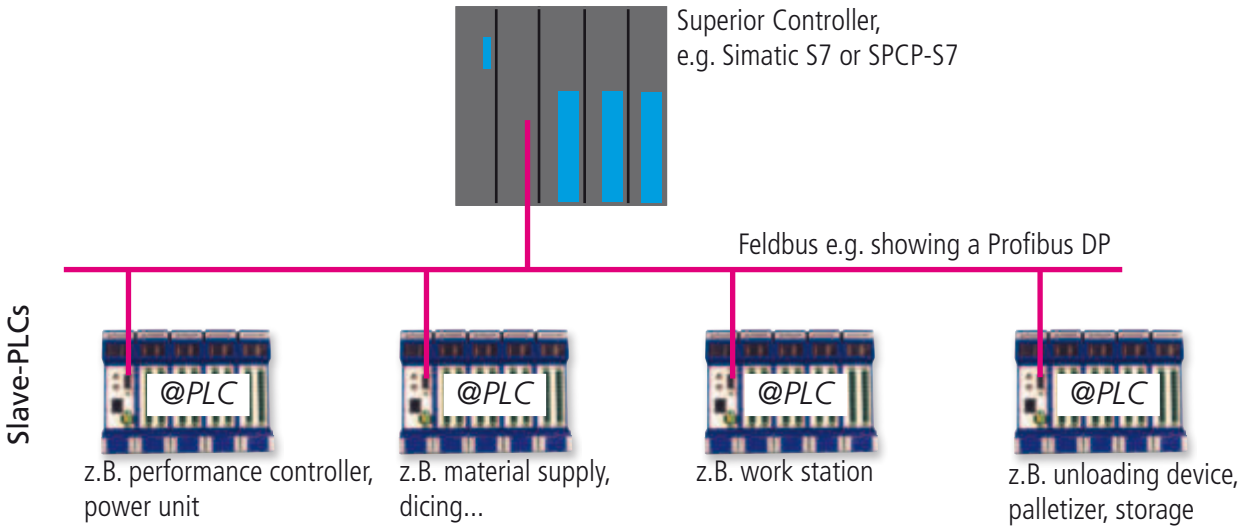
Application area:
Possible application areas are the diagnosis of rotating machines, pressing and stamping machines or for the general control of roller and radial thrust bearing applications. Repair tasks can be planned and efficiently executed.

Decentralized PLC

@PLC

Modular decentralized allocation of intelligence is key to flexible machine conception as it is required more and more on the market. **@PLC** is our answer to this challenge. It does appear as a fieldbus node, but the **@PLC** does hard work in the field at a high-performance level to prepare decentralized signals and to operate independent subprocesses. Therefore, it relieves the master control system and fielbus Machine components can then be built up independently from each other. Another advantage is the standardized programming language IEC-61131 which means continuity throughout your whole plant.

Example:



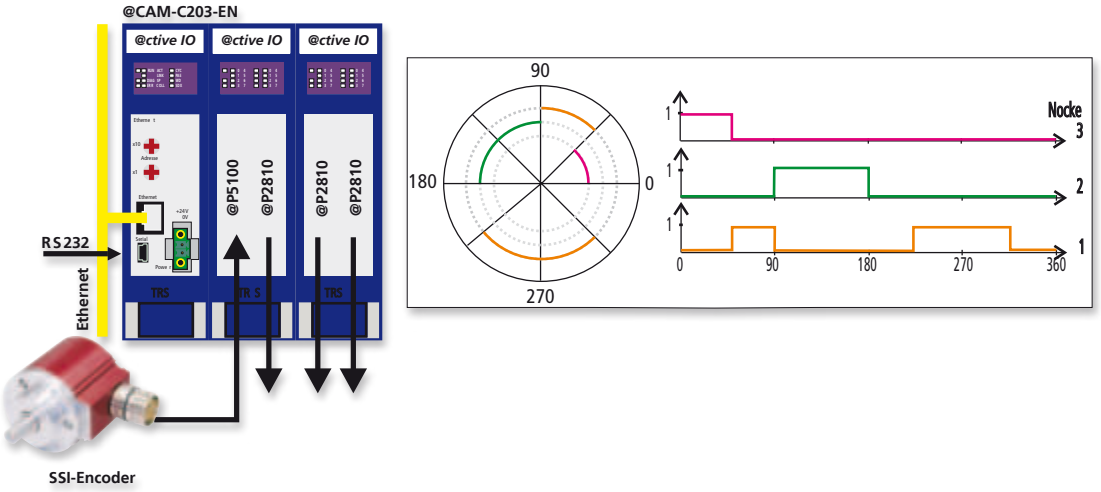
Simatic S7 is a registred trademark of Siemens AG

The **@PLC** acts the same way to a control system as a slave to a fieldbus. Therefore, it does not matter what programming language you use to program your controller. You have all the I/O modules to your disposal because we enter the same hardware like in the traditional fieldbus modules and of course with the full modularity of the @ctiveIO system.

Camshaft Gear

@CAM

Fast processes need fast signals. The camshaft gear **@CAM** is able to achieve high performances due to optimized porgramming.



The **@CAM module** is a technical software solution to a mechanical camshaft gear. Regardless of whether you are using a distance or positioning measurement system, it simulates up to **255** dynamic cam tracks. There is a total of up to **1024** cams that can be programmed and allocated arbitrarily to the existing **255** cam tracks. For programming, every cam track has a dead time available for increasing and decreasing flanks. Each cam track can be allocated arbitrarily onto **256** outputs. Due to the existing RS232- and Ethernet interfaces, all cams are programmable and the cam images can be shown on other application and visualization programs.
With its Ethernet (10 / 100 Mbit) interface, the **CAM-C203-EN** controller is your connection to Industrial Ethernet. Standard implementation of the module's configuration (TCP/IP settings) is done by the @ctiveIO Toolkit via RS232 and Ethernet interface. If a firmware update is needed, the **@CAM module** offers the possibility of updating your firmware via **FTP** (File Transfer Protocol).

Applications - Customer Oriented

@CUST

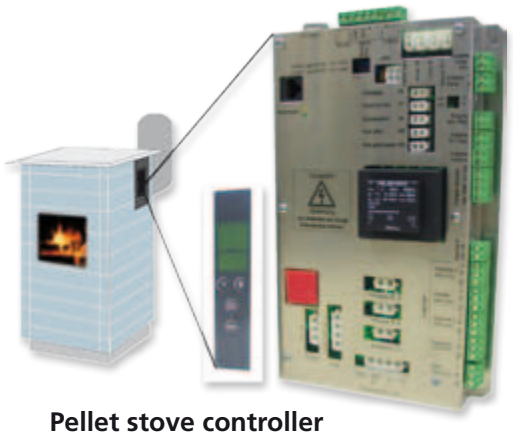
The TR system always has been the partner when you needed someone with founded experience and to develop components with specialized solutions according to your needs. The @ctiveIO is the optimal platform for many custom-made configurations. Basically, there are three models available:

1. Standard hardware with modified software
Is one of our technology modules close to your solution? Since we have the complete development know-how in our hands we find a way to fit your application. Customized test and standard algorithms, specialized cam programs or special PLC functions are some examples.

2. Our hardware, your software
Would you like to write your own software? We can provide you with the hardware performace of our technology compatible control module. We give you the know-how to control the fast backplane bus. A typical module would be the @C5__ , an industrial PC programmed by our customers themselves.

3. Custom-made hardware
From the specialized I/O modules of the @ctiveIO to complete controller technology made according to your requirements, we offer our service to every manufacturer. Particularly, you benefit from our substantial experience in the areas of fieldbus technology and decentralized allocation of plant intelligence.

Even if our standard program is solving all your tasks, we can give you a hand with logistical issues, especially concerning production. Choose if you would like to configurate the nodes yourself, or if you want us to deliver the finished product with pre-configurated and tested nodes to your own terms.



Pellet stove controller

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