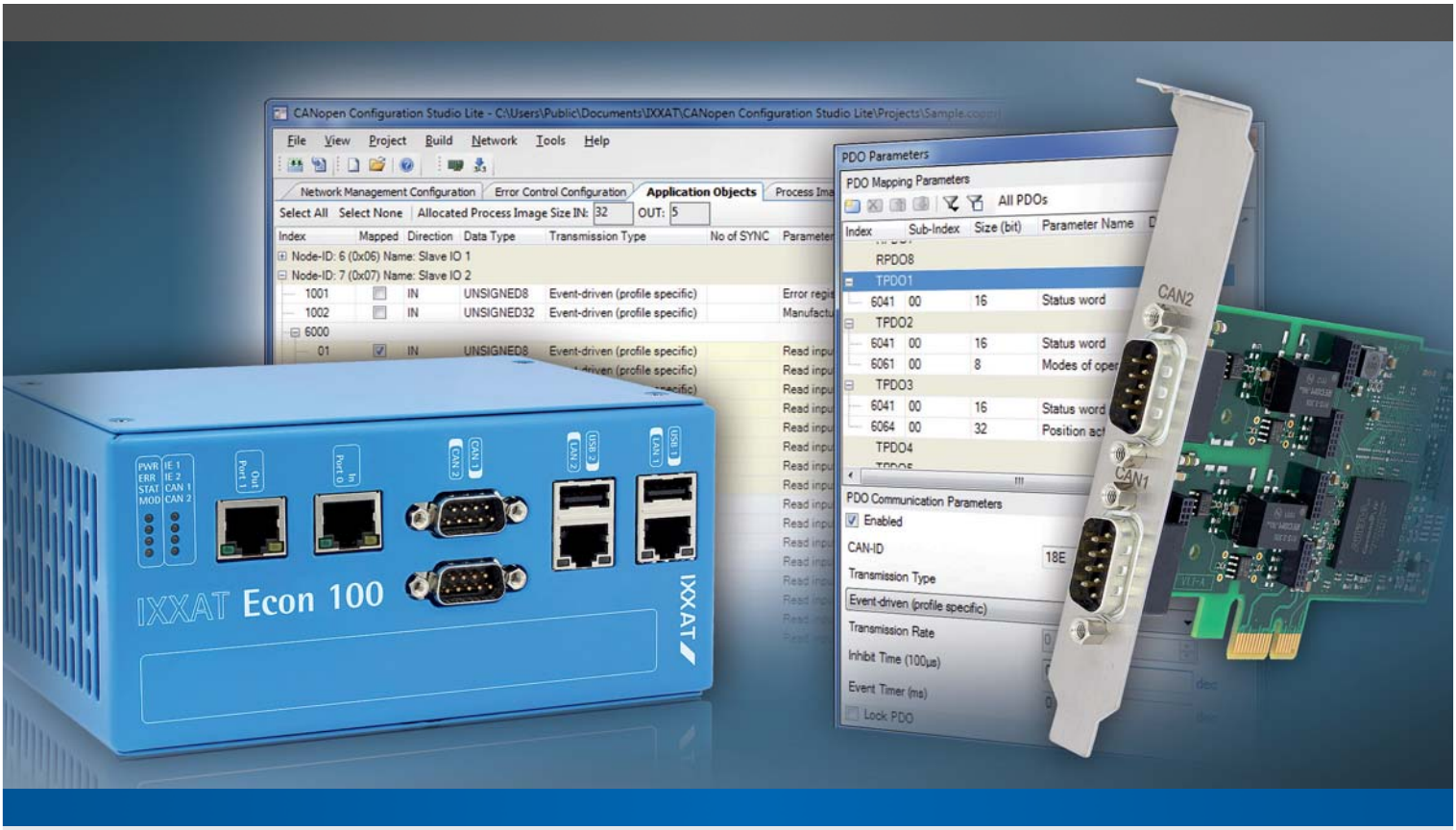
IXXAT



Industrial Data Communication and Embedded System Solutions

Products and Engineering Services

HMS

About IXXAT

A capable partner for embedded system solutions and advanced data communication

IXXAT is one of the leading suppliers of data communication technology for the automation and automotive industry.

With innovative, powerful and cost effective products as well as with high quality standards for our services and products we want to establish long-term partnerships with our customers. To this end we continually invest a considerable amount of our resources in the research and development of new technologies and products.

IXXAT belongs to the Swedish listed public HMS group, which is represented worldwide with numerous local branches and distributors to ensure the best possible customer service.

The quality of our products

For many years quality management has been the foundation of our work and an incentive for continual development.

To ensure the high quality of our products and services, we have a quality management system according to ISO 9001 since 1996. We further develop processes using defined development directives for hardware, software and standardized review processes. For the development of safety-critical hardware and software pursuant to IEC61508, we also employ a functional safety management system.

Experience and primary applications

As a pioneer of CAN technology, we have made major contributions to the successful growth of CAN in industrial applications. IXXAT has been actively involved in the development of the internationally accepted CANopen standard from the beginning. Our primary applications in the field of industrial communication systems involve solutions based on CAN (CANopen, DeviceNet) and real-time Ethernet (EtherCAT, POWERLINK, EtherNet/IP, PROFINET, Sercos, Modbus-TCP) and Safety (PROFIsafe, CIP Safety, openSAFETY, FSoE).

The development of optimum solutions for tasks and problems at the application and system level is another focus of our activity. Our customers benefit from our experience in the area of embedded systems and data communications.

You can rely on

- ✓ **High long-term availability**
- ✓ **100 % product testing**
- ✓ **Fast delivery from stock**
- ✓ **High quality standard**
- ✓ **Made in Germany**

Industries

IXXAT products are used worldwide in a wide variety of applications, including:

- Industrial automation and mechanical engineering
- Medical technology
- Automobile and commercial vehicle industry
- Marine and aerospace
- Trains and rail-bound vehicles
- Elevators
- Regenerative energy systems
- etc...

Developments on behalf of our customers

As a development service provider, we can look back on more than 25 years of experience. In this period we have implemented more than 500 development projects for renowned international customers with a high level of customer satisfaction.
We support our customers throughout the complete development cycle for all relevant technologies in the field of data communication from system design to development of hardware and software, and series production of hardware assemblies and delivery of complete data communication systems.
Our customers benefit not only from development services, but also significantly from the know-how, we have gained in over 25 years in different industries.

Further information about our services can be found on page 26.

Dipl.-Ing.
Christian Schlegel
Managing Director

Content

CAN Interfaces

PC Interfaces for CAN, CANopen and DeviceNet Systems

CAN interfaces have been some of our most important products from the beginning. This is a main reason why we offer our interfaces in a large number of variants for all areas of application and for the most common PC interface standards.

All IXXAT CAN interfaces are developed, produced and tested 100 % before delivery in accordance with the highest quality standards.

The drivers for Windows (VCI) and real-time operating systems included in the scope of supply have an identical programming interface for all CAN interfaces and enable a quick and easy switch between interfaces without adapting the customer's application. Thus, the optimum CAN interface in terms of area of application, performance requirements or target unit costs can be selected at any time.

In addition to customized applications, the CAN interfaces also form the basis for our comprehensive tool chain consisting of analysis and configuration tools.

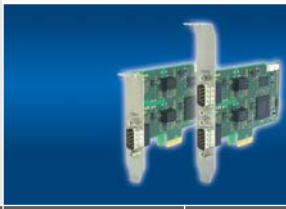
Software support

Windows
Every CAN interface card is delivered with IXXAT's universal "Virtual Communication Interface" (VCI) driver for Windows. This powerful driver package supports all CAN interfaces, regardless of their PC interface format, with a common application programming interface (API).

This means that applications based on the VCI API can be used with all IXXAT CAN interfaces without changing the application program.
The VCI is designed as a system server and allows simultaneous access by several applications to one or more CAN controllers of one or more PC interfaces. Moving all important functions to the kernel optimizes the real-time compatibility of the VCI driver.

User interfaces:
- C API
- .NET API for integration into
  - Agilent VEE
  - C#
  - Visual Basic .NET
- JAVA API
- LabView API
- DasyLab (includes drivers for IXXAT's interfaces)
- LabWindows

The VCI CAN driver is available for 32 and 64 bit Windows operating systems and also includes a simple CAN bus monitor "miniMon", which enables the transmission and reception of CAN messages.






Product	CAN-IB100/PCIe	CAN-IB200/PCIe	CAN-IB120/PCIe Mini	PC-I 04/PCI	iPC-I XC16/PCI	iPC-I XC16/PMC	CAN-IB130/PCIe 104
PC interface standard	PCI express (V1.1)	PCI express (V1.1)	PCIe mini card (V1.2)	PCI (V2.1)	PCI (V2.2)	PMC (V2.2)	PCI express (V1.1)
Microcontroller	Passive	32 Bit	Passive	Passive	16 Bit	16 Bit	Passiv
Fieldbus interfaces	1-4 x CAN	1-4 x CAN 1-4 x LIN/K-Line opt.	1 / 2 x CAN	1 / 2 x CAN	2 x CAN 1 x LIN (optional)	2 x CAN 1 x LIN	1 / 2 x CAN
CAN interface	CAN 2.0 A/B	CAN 2.0 A/B	CAN 2.0 A/B	CAN 2.0 A/B	CAN 2.0 A/B	CAN 2.0 A/B	CAN 2.0 A/B
CAN bus interface	ISO 11898-2 optional switchable to ISO 11898-3	ISO 11898-2 optional switchable to ISO 11898-3	ISO 11898-2	ISO 11898-2	ISO 11898-2 optional switchable to ISO 11898-3	ISO 11898-2 / 11898-3 switchable	ISO 11898-2
CAN connection	Sub D9 plug according to CiA 303-1	Sub D9 plug according to CiA 303-1	Connection cable with open ends	Sub D9 plug according to CiA 303-1	Sub D9 plug according to CiA 303-1	Sub D9 plug according to CiA 303-1	Angled socket board 2x5
Galvanic isolation	optional (1 kV, 1 sec.)	optional (1 kV, 1 sec.)	optional (1 kV, 1 sec.)	opt. (1 kV, 1 sec.)	optional (1 kV, 1 sec.)	yes (1 kV, 1 sec.)	yes (1 kV, 1 sec.)
Temperature range	0 °C ... +70 °C	0 °C ... +70 °C	-40 °C ... +85 °C	-20 °C ... +70 °C	-20 °C ... +70 °C	-20 °C ... +70 °C	-40 °C ... +85 °C
Power supply	3.3 V DC, 350 mA typ.	3.3 V DC, 390 mA typ.	3,3 V DC	5 V DC, 300 mA typ.	5 V DC, 100 mA typ. + 3.3 V DC, 185 mA typ.	5 V DC, 100 mA typ. + 3.3 V DC, 200 mA typ.	3.3 V DC, 350 mA typ.
Certification	CE, FCC	CE, FCC	CE, FCC	CE, CSA/UL	CE, CSA/UL, FCC, EN 60601-1	CE, FCC	CE, FCC
Dimensions	approx. 65 x 105 mm	approx. 65 x 105 mm	30 x 50,95 mm	approx. 95 x 125 mm	approx. 123 x 90 mm	approx. 74 x 149 mm	approx. 90 x 96 mm
Order number	*1.01.0231.xxxxx* Low Profile Version: *1.01.0232.xxxxx*	*1.01.0233.xxxxx* Low Profile Version: *1.01.0234.xxxxx*	*1.01.0237.xxxxx*	*1.01.0057.xxxxx*	*1.01.0047.xxxxx*	*1.01.0049.33660*	*1.01.0238.12000* *1.01.0238.22000*

Linux, INtime, RTX and QNX

For use of the CAN interfaces under Linux and in real-time environments (INtime, RTX), IXXAT provides the universal "Embedded Communication Interface" driver (ECI) free of charge with the delivery of an interface. As with the VCI, the user interface is identical for all operating systems. The ECI can be employed with all supported IXXAT CAN interfaces without changing the application.
The application interface is designed as a "C" interface and contains all necessary functions for CAN-based applications.

CANopen and SAE J1939

For use of the CAN interfaces under CANopen and J1939, IXXAT offers driver APIs that provide all protocol specific functions and thus enable quick and easy development of PC-based control and configuration applications.

Embedded version of the USB-to-CAN V2 compact

							
CAN-IB230/PCIe 104	**PC-I 04/104**	**iPC-I 320/104**	**USB-to-CAN V2 compact**	**USB-to-CAN V2 professional**	**CAN@net II/VCI**	**CANblue II**	**CANwifi**
PCI express (V1.1)	PC/104	PC/104	USB (V2.0, high speed)	USB (V2.0, high speed)	Ethernet	Bluetooth (V2.1)	Dual-band WIFI IEEE 802.11-2007, abg
32 Bit	Passive	8 Bit	32 Bit	32 Bit	32 Bit	32 Bit	32 Bit
2 / 4 x CAN 1 x LIN	1 / 2 x CAN	1 x CAN	1 x CAN	2 x CAN 1 x LIN (optional)	1 x CAN	1 x CAN	1 x CAN
CAN 2.0 A/B	CAN 2.0 A/B	CAN 2.0 A/B	CAN 2.0 A/B	CAN 2.0 A/B	CAN 2.0 A/B	CAN 2.0 A/B	CAN 2.0 A/B
ISO 11898-2 1 x ISO 11898-3 switchable (opt.)	ISO 11898-2	ISO 11898-2	ISO 11898-2	2 x ISO 11898-2 1 x ISO 11898-3 switchable (optional)	ISO 11898-2	ISO 11898-2	ISO 11898-2
Angled socket board 2x5	Angled socket board 2x5	Angled socket board 2x5	Sub D9 or RJ45 plug according to CiA 303-1	2 x RJ45 plug with RJ45/Sub-D9 adapter cable	Sub D9 plug according to CiA 303-1	Sub D9 plug according to CiA 303-1	Sub D9 plug according to CiA 303-1
yes (1 kV, 1 sec.)	optional (1 kV, 1 sec.)	yes (1 kV, 1 sec.)	optional (1 kV, 1 sec.)	optional (1 kV, 1 sec.)	yes (1 kV, 1 sec.)	yes (1 kV, 1 sec.)	yes (1 kV, 1 sec.)
-40 °C ... +85 °C	-20 °C ... +70 °C	-40 °C ... +85 °C	-20 °C ... +80 °C	-20 °C ... +80 °C	-20 °C ... +70 °C	-40 °C ... +85 °C	-40 °C ... +85 °C
3.3 V DC, 390 mA typ.	5 V DC, 150 mA	5 V DC, 190 mA typ.	via USB port, approx. 250 mA	via USB port, 500 mA max.	9-32 V DC, approx. 3 W	9-30 V DC, approx. 0.6 W	9-30 V DC, approx. 0.6 W
CE, FCC	CE, CSA/UL	CE, CSA/UL	CE, FCC	CE, FCC	CE, CSA/UL, FCC	CE, FCC, Telec	CE, FCC, Telec
approx. 90 x 96 mm	approx. 90 x 96 mm	approx. 90 x 96 mm	80 x 50 x 23 mm	80 x 50 x 23 mm	22.5 x 100 x 115 mm	82 x 64 x 26 mm	82 x 64 x 26 mm
1.01.0239.22000 *1.01.0239.42001*	*1.01.0070.xxxxx*	*1.01.0043.10200*	*Compact* *1.01.0281.xxxxx* *Embedded* *1.01.0282.xxxxx*	*Professional* *1.01.0283.xxxxx* *Automotive* *1.01.0283.xxxxx*	*1.01.0086.10200*	*1.01.0126.12000* *1.01.0126.12001 (ext. antenna version, accessories see page 7)*	on request otional IP65 version on request

CAN Topology

Repeater, Bridges and Gateways

CAN repeaters

In terms of robustness, temperature range and safety, IXXAT repeaters are specially designed for use in an industrial environment. When used, the reliability of a system can be significantly increased while typically saving costs due to simpler wiring.

CAN repeaters are used to establish a physical coupling of two or more segments of a CAN bus system. They can be used to implement tree or star topologies as well as for long drop lines. Systems connected by repeaters are independent electrical segments that can be optimally terminated in terms of signals. In addition, network segments can be electrically decoupled using a galvanically isolated repeater.

CAN bridges and gateways

The use of bridges and gateways opens up a large number of configuration possibilities. For example, CAN systems can be implemented over a larger area, devices without CAN interfaces can be connected to CAN systems or CAN systems can be coupled using different technologies, such as Bluetooth, Ethernet or PROFINET.

CAN bridges can link CAN networks of different bit rates or protocols with each other. They are based on the store-(modify)-forward principle where CAN messages are received by a sub-network and then transmitted to the other sub-network. Translation and filter rules can also be used, allowing a protocol adaptation to be carried out between the sub-networks. A bridge can, therefore, provide simple gateway functions. CAN bridges are appropriate for creating hierarchical networks by transferring only the information to the connected sub-networks via bridges which are relevant to the sub-network. The bridge function

					
Product	**CAN-CR200**	**CAN-CR210/FO**	**CAN-CR220**	**CAN-Repeater**	**FO-Repeater**
Description	Stackable ISO 11898-2 CAN repeater	Stackable ISO 11898-2 to fiber optic converter	ISO 11898-2 CAN repeater with 4 kV galvanic isolation	ISO 11898-2 CAN repeater with low-speed option	ISO 11898-2 to fiber optic converter
CAN bus interface	2 x ISO 11898-2 with CAN choke 1 x ISO 11898-2 DIN rail bus	1 x ISO 11898-2 with CAN choke 1 x ISO 11898-2 DIN rail bus	2 x ISO 11898-2 with CAN choke	2 x ISO 11898-2 with CAN choke optional ISO 11898-2 to ISO 11898-3	1 x ISO 11898-2 with CAN choke
CAN connection	Sub D9 plug according to CiA 303-1	Sub D9 plug according to CiA 303-1	Sub D9 plug according to CiA 303-1	Screw terminals	Screw terminals
Integrated CAN bus termination	Switchable	Switchable	Switchable	Switchable via soldering jumpers	Switchable via soldering jumpers
Galvanic isolation	CAN 1, CAN 2 (1 kV, 1 sec.)	CAN 1 (1 kV, 1 sec.)	CAN 1, CAN 2 and power supply (4 kV, 1 sec.; optional 3 kV, 3 min.)	CAN 1, CAN 2 (1 kV, 1 sec.)	CAN 1 (1 kV, 1 sec.)
LED indicators	Transmission Defect segment	Transmission Defect segment	Transmission Defect segment	Transmission Defect segment	Transmission Defect segment
LWL connection	-	F-SMA or ST for duplex cable (fiber optic 50/125 µm duplex)	-	-	ST for duplex cable (fiber optic 50/125 µm duplex)
Baudrate	up to 888 kbps	up to 888 kbps	up to 888 kbps	up to 888 kbps	up to 888 kbps
Transmission delay	approx. 200 ns (equal to 40 meter bus length)	approx. 300 ns (equal to 60 meter bus length)	approx. 200 ns (equal to 40 meter bus length)	approx. 200 ns (equal to 40 meter bus length)	approx. 300 ns (equal to 60 meter bus length)
Temperature range	-20 °C ... +70 °C	-20 °C ... +70 °C	-20 °C ... +70 °C	-20 °C ... +70 °C	-20 °C bis +60 °C
Power supply	9-32 V DC, 1.5 W typ., via screw terminals	9-32 V DC, 3 W typ., via screw terminals	9-32 V DC, 1.5 W typ., via screw terminals	9-35 V DC, 1.5 W typ., via screw terminals	9-35 V DC, 3 W typ., via screw terminals
Certification	CE, FCC	CE, FCC	CE, FCC	CE	CE
Housing, dimensions	Plastic DIN rail housing, approx. 22.5 x 100 x 115 mm	Plastic DIN rail housing, approx. 22.5 x 100 x 115 mm	Plastic DIN rail housing, approx. 22.5 x 100 x 115 mm	Plastic DIN rail housing, approx. 110 x 75 x 22 mm	Plastic DIN rail housing, approx. 110 x 75 x 22 mm
Order number	*1.01.0067.44010*	F-SMA plug *1.01.0068.45010* ST plug *1.01.0068.46010*	*1.01.0067.44400* Option 3 kV, 3 min. *1.01.0067.44300*	*1.01.0064.44000* *1.01.0064.46000*	ST plug *1.01.0063.01020*
Accessories	T bus connector *1.04.0073.00000*	T bus connector *1.04.0073.00000*			

can also be executed with the aid of other transmission systems. For example, the CAN-Ethernet-CAN bridge is set-up by two CAN-Ethernet gateways which enable connection to remote CAN networks.
An adaptation to customer specific requirements can be made by using the Application Development Kit for the CANbridge.

As an extension to the CAN bridges, CAN gateways allow access to CAN networks via other communication systems. In each case, the protocols of the connected bus systems are mapped to the other communication model.

New

Product	CANbridge	IXXAT CME/PN	CAN@net II/Generic	CAN-GW100/RS232	CANblue II
Description	Configurable CAN/CAN bridge	PROFINET-CANopen gateway	CAN/Ethernet GW and CAN-Ethernet-CAN bridge operation mode	RS232/CAN converter	CAN/Bluetooth GW, CAN-Bluetooth-CAN bridge, PC interface
Application field	Extension of the network dimension Network segmentation	Connection of CANopen devices and networks to PROFINET	CAN connection via Ethernet for Linux or embedded applications Network extension via CAN-Ethernet-CAN bridge	Connection of devices with RS232 interface to CAN/CANopen	Wireless CAN connection of Windows, Linux or emb. applications Flexible network connection via CAN-Bluetooth-CAN bridge
Functionality	- Message filtering - Identifier conversion - Baudrate conversion	- Bidirectional transmission - IO-Device (PROFINET) - CANopen-NMT-Master	Message filtering	CAN/CANopen operation mode	Message filtering
Fieldbus interfaces	2 x CAN	1 x CAN	1 x CAN	1 x CAN	1 x CAN
CAN bus interface	2 x ISO 11898-2	ISO 11898-2	ISO 11898-2	ISO 11898-2	ISO 11898-2
CAN connection	DIN rail version via screw terminals Alu version via Sub D9 plug according to CiA 303-1	Screw terminals	Sub D9 plug according to CiA 303-1	Screw terminals	Sub D9 plug according to CiA 303-1
Further interfaces	RS232 for the device configuration	PROFINET: 2x100 MBit/s ETH via RJ45 (2 port switch)	10/100 Mbit/s Ethernet, auto negoti., auto crossover, RJ45 plug	RS232 (600 to 115200 Bit/s), handshake	Bluetooth specification V2.1, Class 1 / +17 dBm
Galvanic isolation	optional	ja	yes	optional	yes
LED indicators	Power, CAN, Serial	Power, Host/Module/Protocol-Status, CAN1, CAN2	Power, CAN, Ethernet, CPU	Power, CAN, Serial	CAN, Bluetooth, Mode
Temperature range	-20 °C ... +70 °C	-20 °C ... +70 °C	-20 °C ... +70 °C	-20 °C ... +70 °C	-40 °C ... +85 °C
Power supply	9-36 V, 1.5 W	9-32 V DC, 3 W	9-32 V DC, 3 W	9-36 V, 1.5 W	9 - 30 V DC, 0.6 W
Housing, dimensions	DIN rail housing approx. 110 x 75 x 22 mm Alu. approx. 100 x 85 x 32 mm	DIN rail housing approx. 100 x 115 x 22.5 mm	DIN rail housing approx. 22.5 x 100 x 115 mm	DIN rail housing approx. 110 x 75 x 22 mm	82 x 64 x 26 mm
Configuration SW	2000/XP/Vista/Win7	2000/XP/Vista/Win7	Via integrated web server	2000/XP/Vista/Win7	-
Certification	CE	CE, FCC	CE, FCC, CSA/UL	CE	CE, FCC, Telec
Order number	*1.01.0121.xxxxx* *1.01.0120.22020*	*1.01.0261.02106*	*1.01.0086.10201*	*1.01.0033.xxxxx*	*1.01.0126.12000* *1.01.0126.12001 (ext. antenna vers.)*
Accessories	Application Development Kit *1.03.0270.00000*				External antenna *1.04.0085.00001* Screwable ant. foot *1.04.0085.00002* Magnetic ant. foot *1.04.0085.00000*

CAN Analyzing and Diagnostics

canAnalyser and Diagnostic Tools

canAnalyser and modules

The canAnalyser is a powerful, versatile tool for the development, testing and maintenance of Controller Area Network systems. The software package is based on a modular concept and employs special features that offer exceptional openness and extendibility.

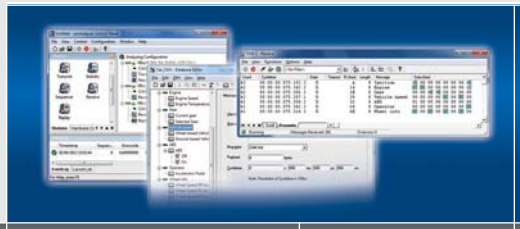
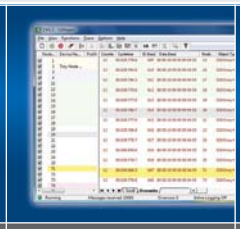
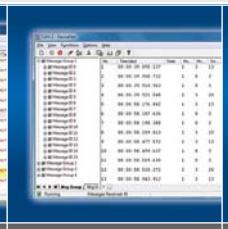
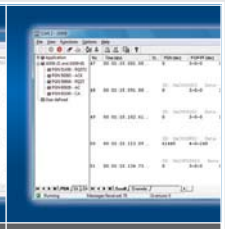
The canAnalyser offers functions covering many areas of application, such as: transmission of individual messages and signals or transmission of sequences, reception and interpretation of messages and signals and display of statistical data.

The signals are managed within a database and can be loaded using special import filters. Import filters are available for the CANdb, FIBEX and DIM format. CANdb and DIM databases can be created by using the included editor tool.
Statistical values like bus load or error frames can be evaluated together with the signals from a database. New, script-based statistics functions also permit quick, easy adaptation to your specific application needs.

The canAnalyser is based on the VCI driver from IXXAT and can be used with all PC interfaces offered by IXXAT.
The new canAnalyser version 3 allows to assign a measurement configuration to multiple PC interfaces. Such a configuration can be easily transferred to other computers and adapted to the local hardware.

Additional functions are provided by optional modules, such as the protocol specific display of messages in CANopen, DeviceNet or J1939 based systems. Customer specific functions can be easily integrated via an open .NET programming interface in the form of individual modules.

The canAnalyser, the additional modules and the CAN interface card are also offered as a **bundle** at discounted prices.

Product	canAnalyser 3.0	canAnalyser lite	CANopen Module	DeviceNet Module	SAE J1939 Module
Description	PC based analyzing tool for CAN systems	PC based analyzing tool for CAN systems	CANopen extension for canAnalyser /-lite	DeviceNet extension for canAnalyser /-lite	SAE J1939 extension for canAnalyser /-lite
Included functions/ modules	- Reception, Transmission, Trace, Statistic, Sequencer and Replay module for CAN messages - Signal/Graphic and Transmission module for signals - Import of CANdb, FIBEX and DIM files	- Reception, Transmission, Trace and Sequencer module for CAN messages	Interpretation and display of CAN messages in accordance with the CANopen standard (CiA 301, ...)	Interpretation and display of CAN messages in accordance with the DeviceNet standard	Interpretation and display of CAN messages in accordance with the SAE J1939 standard
Features	Online monitoring of bus traffic Transmission of single-shot or cyclic messages and message sequences Recording of CAN messages with configurable trigger conditions Statistical analysis Detection/presentation of the bus load Creation of command controlled message sequences Graphical presentation of message content on the timeline Multi-line mode Multiple module and board instances Open programming interface Scripting host	Online monitoring of bus traffic Transmission of single-shot or cyclic messages and message sequences Recording of CAN messages with configurable trigger conditions Statistical analysis Detection/presentation of the bus load	Message display in scroll or overwrite mode EDS, DCF, XDD file import Export to CSV and clipboard Change highlighting and receive statistics Filtering by node number and message type Interpretation of all relevant protocols (SDO, LSS, EMCY, SYNC, SRDO, MPDO, Flying Master) as well as the PDO content Simultaneous file recording of the interpretation Configurable display color (foreground/background)	Message display in scroll mode Configuration of explicit and fragmented connections Evaluation and monitoring of the fragmentation protocol with message-wise or fragment presentation Filtering by Message Group, Message ID, MAC ID and message type Simultaneous file recording of the interpretation	Message display in scroll or overwrite mode Interpretation of application, diagnosis and connection management messages Change highlighting and reception counter Filtering by PGN (Parameter Group Number) destination and source address Simultaneous file recording of the interpretation Export and import of the module configuration and filter settings
Operating systems	XP/Vista/Windows 7	XP/Vista/Windows 7	XP/Vista/Windows 7	XP/Vista/Windows 7	XP/Vista/Windows 7
Order number	*1.02.0133.00000*	*1.02.0166.00000*	*1.02.0145.00000*	*1.02.0148.00000*	*1.02.0149.00000*

Diagnostic tools

By using IXXAT diagnostic tools, CAN systems can be analyzed and evaluated upon installation and during operation. The tools allow recording of the transmitted data and errors as well as detection of signal, transmission and wiring errors.

Based on the analysis results, errors can be quickly and easily eliminated or an existing system can be optimized to achieve higher reliability. In addition, newly created systems can be subjected to a thorough test.

The **CANcheck** is a mobile, robust handheld device offered by IXXAT for maintenance and commissioning CAN systems. With this tool, the wiring, the line length and the termination resistors as well as the quality of the transmitted signals can be tested.

Operation of the device is intuitive via testing processes controlled by a display and keypad. All test results can be saved and printed out on the PC for logging.

The **CAN-Bus-Tester (CBT)** enables detailed analysis of the signals and of the transmission errors occurring in the CAN systems. The CBT is connected to the PC via USB and operated with a Windows program. The software enables online analysis with numerous test functions.

Product	CANcheck	CAN-Bus-Tester (CBT)
Description	Hand-held installation tester for CAN systems for commissioning, troubleshooting and maintenance	Powerful tool for the CAN bus physics and protocol analysis
Functionality	Test of wiring, terminators, cable length, impedance Measurement of signal level and bus load Determination of the transmitted identifiers and display of reception frequency Display of error frames per time unit Autom. baudrate detection Operation via LCD display/keypad CANopen mode: Message display according to the node number Storage of measurement results and transm. via USB	Analysis of the signal quality (levels, slopes, faults) Integrated oscilloscope Powerful trigger functions Monitoring of bus status, bus load, error messages Wiring test Integrated CAN monitor for transmission and reception Automatic baudrate detection Creation of inspection reports
Display	LCD display with backlight	-
Fieldbus interfaces	1 x CAN	1 x CAN
CAN bus interface	1 x ISO 11898-2	ISO 11898-2
CAN connection	Sub D9 plug according to CiA 303-1	Sub D9 plug according to CiA 303-1 as well as various adapter cables
Further interfaces	USB 2.0 for PC based control and message download; BNC trigger output for the oscilloscope	USB 2.0 for PC connection; BNC trigger output for the oscilloscope
Galvanic isolation	-	-
Temperature range	0 °C ... +50 °C	+5 °C ... +40 °C
Power supply	4 x 1.5 V AA battery or USB	9 - 36 V DC; Power supply included
Housing, dimensions	approx. 116 x 160 x 34 mm	approx. 40 x 134 x 170 mm
Software for operation and configuration	Also possible via terminal program	Win XP/Server2003/ Vista & Win7 (32/64 Bit)
Order number	*1.01.0097.00000*	*1.04.0402.00000* (also for rental)
Accessories		Add-ons for higher layer protocols (CANopen, DeviceNet, SAE J1939) and monitor

CANopen®

Protocol Software, Windows API and Tools

IXXAT is one of the few suppliers that offer a complete spectrum of CANopen products and services, from protocol software and interface cards to configuration and development tools and customized seminars. This enables us to expertly support projects from development to commissioning and certification.
Products and solutions from IXXAT are used worldwide in a large range of industries with different requirements, such as medical technology, maritime, subsea applications and factory automation.

As a founding member and active supporter of CAN in Automation e.V., the international users and manufacturers group promoting and developing specifications based on the CAN technology, IXXAT combines its significant product development experience to offer a comprehensive range of services.

Protocol software

To implement CANopen in customer-specific devices, IXXAT offers optimized protocol software packages for a large number of microcontroller platforms.
In addition to the standard **CANopen Protocol Software** for the implementation of CANopen Slave or simple Master devices, specific software packages, such as the **CANopen Manager Software** for complex manager devices (e.g. IEC 61131 programmable controls) or the **CANopen Real-Time Software** for use with real-time operating systems are available.
Firmware updates within a running system can be made by using the **CANopen Bootloader Software**, which is available for a variety of microcontrollers.

The software packages offered by IXXAT are characterized by their high modularity and scalability, which enable optimum adaptation to customer requirements. In this way, both simple applications can be implemented with extremely low resources and complex applications with a comprehensive scope of functions. The clearly structured programming interface also facilitates integration in the application software.

APIs

For the development of Windows PC-based applications, IXXAT offers the **CANopen Master API** and the **CANopen Manager API**. The Master API provides all CANopen relevant functions for the development of control, service and test programs. In addition, complex PC-based control solutions can be implemented with the Manager API. The package is also suitable for integration with IEC 61131 runtime environments based on Microsoft Windows PC platforms.

Tools

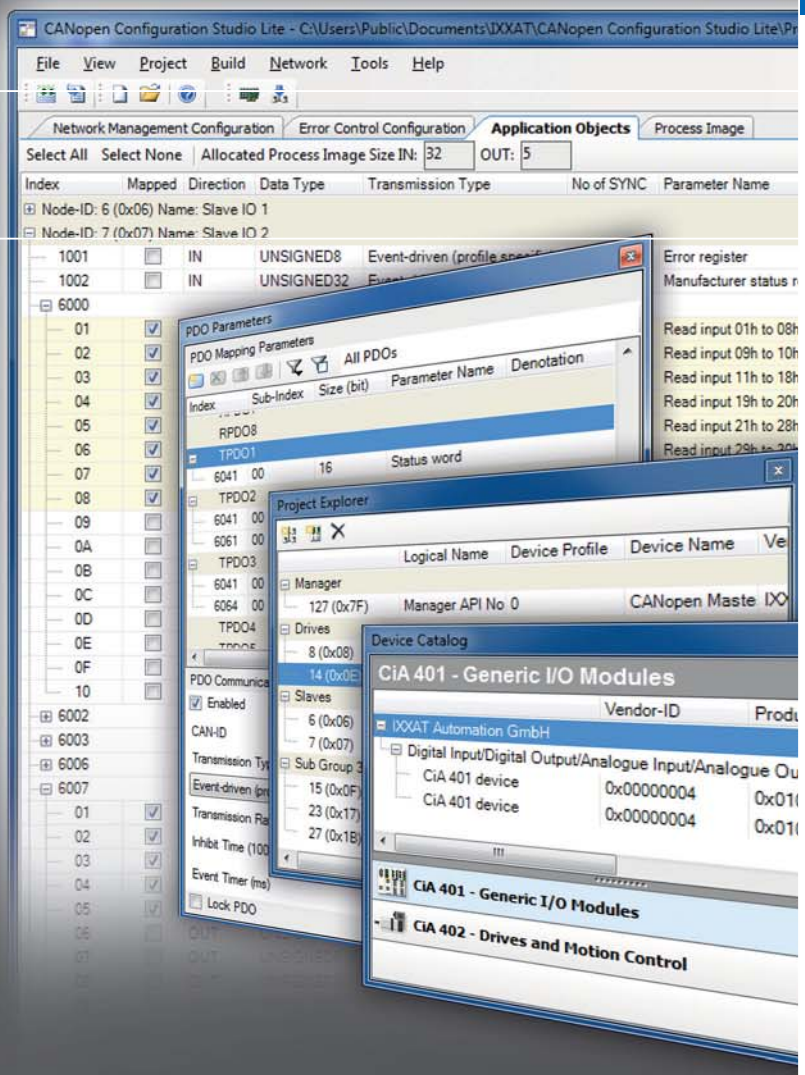
The **CANopen Configuration Studio** is a powerful tool for the system design and configuration of CANopen devices controlled by a central CANopen manager.

Product	CANopen Bootloader	CANopen Protocol Software	CANopen Real-Time Software	CANopen Manager Software
Description	Compact protocol software package for the implementation of a firmware update functionality within a CANopen network	Software package for the development of CANopen slave and simple CANopen master devices	Software package for the development of CANopen slave and simple CANopen master devices optimized for real-time operating systems	Software package for the development of sophisticated CANopen Master devices and programmable controls according to IEC61131
Supported standards	CiA 301, CiA 302-3, CiA 305	CiA 301, CiA 303-3, CiA 305	CiA 301, CiA 303-3, CiA 305	CiA 301, CiA 302, CiA 303-3
Multi-channel support	-	optional	Target dependent	Target dependent
Included functionality	Complete scope of functions for the program download according to CiA 302-3 Library for flash memory access Server SDO with support for normal, expedited and block transfer mode NMT Node Control, NMT Error Control (Heartbeat) Simple LSS functionality for the CANopen Node-ID configuration	Static or variable PDO mapping, multiplexed PDO CAN-ID configuration according to Predefined Connection Set CAN-ID configuration via SDO Client (Master/Slave) and server SDO with support for normal, expedited and block transfer mode SYNC, EMERGENCY and TIMESTAMP objects NMT Node Control, NMT Error Control (Heartbeat, Node Guarding) Layer Setting Services with LSS Fastscan support Optional: - Flying NMT master according to CiA 302-2 - CANopen Maritime	Static or variable PDO mapping, multiplexed PDO CAN-ID configuration according to Predefined Connection Set CAN-ID configuration via SDO Client (Master/Slave) and server SDO with support for normal, expedited and block transfer mode SYNC, EMERGENCY and TIMESTAMP obj. NMT Node Control, NMT Error Control (Heartbeat, Node Guarding) Layer Setting Services with LSS Fastscan support Abstraction module for operating system integration Optional: - Flying NMT master according to CiA 302-2	Variable PDO mapping Process image with network variable support according to CiA 302-4 Auto Configuration Mode for simplified configuration of the process image Client (Master/Slave) and server SDO with support for normal and expedited transfer SYNC, EMERGENCY and TIMESTAMP objects NMT Node Control, NMT Error Control (Heartbeat, Node Guarding) Standardized NMT start-up procedure, configurable via local object directory Supports CANopen slave devices according to CiA 301 V 3/4 Config. Manager according to CiA 302-3, configurable via local object directory Support of IEC61131-3 run-time systems (with or without operating system)
Order number	*1.02.0128.00000*	Slave: *1.02.0122.00000* Master/Slave: *1.02.0124.00000* Multi-Channel Slave: *1.02.0222.00000* Master/Slave: *1.02.0224.00000*	Slave: *1.02.0212.00000* Master/Slave: *1.02.0214.00000*	*1.02.0175.00000*

One highlight of the tool is the modern and ergonomic user interface, enabling the intuitive assembly of the network via a flexible device catalog as well as the configuration of the individual CANopen devices. A special focus during the development of this tool was the ability for the integration into existing programming environments according to IEC 61131.

The **CANopen Device Manager** is a versatile, extendible tool for testing, diagnostic and service tasks. The tool provides support for features such as NMT services, error control services, SDO client, PDO producer and consumer, concise DCF and firmware download as well as LSS Master services. A Python-based scripting engine for the development of powerful test applications is available as an additional add-on.

With the **CANopen Module**, the canAnalyser optionally permits the interpretation and display of CAN messages in accordance with the CANopen standard (CiA 301) (see also page 8).



CANopen Master API	CANopen Manager API
Windows API for the development of PC-based control and test programs	Windows API for the development of complex CANopen PC-based control solutions
CiA 301, CiA 305	CiA 301, CiA 302
yes	-
Transmission/reception of PDOs (synchronous and asynchronous) Client (Master/Slave) and server SDO with support for normal, expedited and block transfer mode NMT Node Control, NMT Error Control (Heartbeat, Node Guarding) SYNC, EMERGENCY and TIMESTAMP objects For C, C#, vb.net, Delphi and LabView	Complete CANopen master functionality including support of the standard boot-up procedure Support for CANopen slave devices according to CiA 301 version 3/4 Automatic configuration of devices at system startup via configuration manager according to CiA 302-3 Local object dictionary with integrated management of network variables Hot-swap support Simple integration of programs via Windows DLL and process image All functions locally parameterized via the object dictionary
1.02.0132.00000	*1.02.0134.00000*

CANopen Configuration Studio	CANopen Device Manager
Projecting and configuration tool for CANopen devices and systems	Powerful tool for service people and developers
CiA 301, CiA 302, CiA 306	CiA 301, CiA 305, CiA 306, CiA 311
-	-
Automatic PDO mapping and linking Optimized for the configuration of CANopen Manager devices with process image. Support of network variables according to CiA 302-4 Supporting the integration of IEC61131 CANopen PLC programming environments Clear and easy access to device data Easy management of EDS device description files via device catalog	Extensive CANopen functionality including NMT services, error control services, SDO client, PDO consumer and producer SDO block transfer LSS master functionality Configuration and firmware download Adaptable to specific service tasks through customer specific plug-in modules Optional: Python scripting engine for creating applications by the user
1.02.0162.00000	CANopen Device Manager: *1.02.0157.00000* Python Script Engine für CANopen Device Manager: *1.02.0158.00001*

Protocol Software and Drivers

As one of the first companies to offer DeviceNet in Europe, and as a long-standing member of the ODVA, IXXAT enjoys a solid reputation for successful projects worldwide.

IXXAT understands the requirements of it's customers and supports them with products, services and a comprehensive knowledge base in the implementation of protocol software and device profiles.

The implementation of solutions based on the CIP technologies for DeviceNet, EtherNet/IP as well as CIP-Safety and CIP-Sync are part of IXXAT's integrated approach. Moreover, IXXAT relies on it's long-standing partnership with Rockwell Automation, the originator of the CIP technology.

This enables IXXAT to provide it's customers with the best possible support from application recommendations and implementation of the DeviceNet protocol software to preparation for certification of the finished devices.

Protocol software

To implement DeviceNet in customer-specific devices, IXXAT offers the **DeviceNet Slave Protocol Software** for a large number of microcontroller platforms. Thanks to the modular structure and scalability of the software, optimum adaptation to customer requirements is a straightforward task. In addition, with the clean programming interface, quick and easy integration in the application software is achieved. The DeviceNet Slave protocol software is supplied as "C" source code and is always tested with the most recent DeviceNet Protocol Conformance Test Software of the ODVA. The protocol software is used in many DeviceNet products of various vendors worldwide, has proven successful in a very wide variety of applications and is continually supported by IXXAT.

The **DeviceNet Master Library** is a software package that IXXAT offers as a Value Added Design Partner (VADP) under a sub-license from Rockwell Automation. The software supports the development of DeviceNet Master and I/O Scanner devices, as used in industrial controls for DeviceNet.

Tools

The **DeviceNet Conformance Test Driver** enables the use of the ODVA DeviceNet Protocol Conformance Test Software on IXXAT PC/CAN interfaces with the VCI V3. By employing this test software, the customer can pre-check conformance of his device during the development phase prior to sending it for the official test at the ODVA.

With the optional **DeviceNet Module** the canAnalyser allows the interpretation and display of CAN messages according to the DeviceNet standard (see also page 8).

Product	DeviceNet Slave Protocol Software	DeviceNet Master Library	DeviceNet Conformance Test Driver
Description	Software package for the development of DeviceNet slave devices	Software package for the development of DeviceNet master and I/O scanner devices	Driver for Conformance Test Software to run on IXXAT interfaces
Supported standards	ODVA - The CIP Networks Library Volume 1: Common Industrial Protocol (PUB00001) Volume 3: DeviceNet Adaptation of CIP (PUB00003)	ODVA - The CIP Networks Library Volume 1: Common Industrial Protocol (PUB00001) Volume 3: DeviceNet Adaptation of CIP (PUB00003)	ODVA - The CIP Networks Library Volume 1: Common Industrial Protocol (PUB00001) Volume 3: DeviceNet Adaptation of CIP (PUB00003)
Included functions	Supported CIP objects classes: Identity, Message Router, DeviceNet, Assembly, Connection, Acknowledge Handler DeviceNet 8/8 message format Fragmentation protocol for explicit and IO messages Predefined master/slave connection set (Group-2-only-server) with explicit and I/O connections (Poll, Bit Strobe, Change of State/Cyclic) UCMM Server/Group-2-Server for dynamic explicit connections Peer to Peer I/O connections Device Heartbeat and Shutdown Message (Producer) Offline Connection Set Quick Connect Interfaces for user specific hardware for switches (MAC ID and baudrate) and indicators (MS-LED, NS-LED)	Simultaneous operation of master and slave Background polling for low-priority nodes Flexible bit mapping of I/O data on up to 4 memory segments Shared inputs between multiple scanners enable simultaneous access to input data of a node without additional IO connections RSNetWorx for DeviceNet Configuration with RSNetWorx for DeviceNet via EDS file Access to internal data structures possible via host side and from network side Firmware upload and download	
Order number	*1.02.0118.TTDDC*	*1.04.9240.00001*	*1.02.0261.00000*

SAE J1939

Protocol Software, Tools and Windows API

IXXAT offers a comprehensive, cost-effective tool chain for SAE J1939 applications. This ranges from the protocol software, analysis and configuration tools to the Windows API based test destination device.
Thanks to a central definition of all relevant parameters based on a database, header files can be generated for the protocol software and configuration files for the Windows API and canAnalyser. This avoids errors due to inconsistent data.

In addition, IXXAT offers its SAE J1939 protocol software for a large number of platforms. This reduces the amount of adaptation required during implementation and thus considerably shortens the time-to-market.

Protocol software

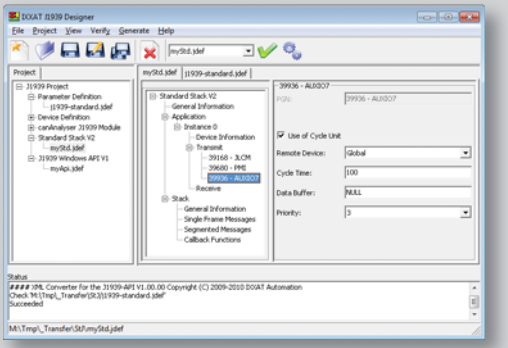
With the cross-platform **SAE J1939 Protocol Software** J1939 devices can quickly and easily be developed. The software is available for various CPUs and in three variants: "Micro" for 8-bit systems, "Single Channel" for solutions with one CAN channel and "Multi Channel" for solutions with more than one channel. In addition, extension packages for NMEA 2000 and ISO 15765-2 are offered.

The **SAE J1939 CAN Driver** serves as the basis for the J1939 protocol software (single/multi channel) and also contains the abstraction modules for the CPU and operating system. The driver is available for various CAN controllers.

Tools and APIs

With the **SAE J1939 Designer**, IXXAT offers an editor and code generator for J1939 projects. It is used to produce J1939 network descriptions and to generate code and configuration files for the various IXXAT J1939 products.

The **SAE J1939 API** is a Windows DLL based on the IXXAT J1939 protocol software for the development of SAE J1939 service and test applications. The DLL offers convenient interfaces at the signal level for the development of applications in C/C++ or Python.



SAE J1939 Designer

With the optional **SAE J1939 Module** the canAnalyser allows the interpretation and display of CAN messages according to the SAE J1939 standard (see also page 8).

Product	SAE J1939 Protocol Software	SAE J1939 API for Windows	SAE J1939 Designer
Description	Software package for the development of J1939 devices	DLL for the development of J1939 service and test applications	Editor and code generator for J1939 projects
Included functions	Transmission and reception of application specific messages (confirmed and unconfirmed) Processing of the J1939 transport protocols for large data blocks (message/node oriented) Simultaneous communication with multiple nodes Support of the "address claiming" procedure Cyclical transmission and reception of messages with timeout monitoring Optional: - ISO 15765-2 extension - NMEA2000 extension - J1939 CAN driver - Diagnostics Extension	Supports all the features of the protocol software Automatic conversion of received messages into signals and vice versa Use of the J1939 designer data base for signal interpretation Supports multiple CAN channels and therefore also J1939 networks	Definition of parameters (SPNs), messages (PGNs) and devices Configuration of the J1939 protocol software (generation of H- and C-files) Configuration of the J1939 API for Windows Configuration of the J1939 canAnalyser module Storage of the configuration as XML file
Order number	Single Channel Version *1.02.0351.00000* Multi Channel Version *1.02.0351.00001* Micro Version *1.02.0286.TTDDC* J1939 CAN Driver *1.02.0350.00TTT* ISO 15765-2 Extension *1. 02.0352.00000* NMEA2000 Extension *1.02.0353.00000* Diagnostics Extension (J1939-73): *1.02.0354.00000*	*1.02.0287.00000*	*1.02.0360.00000*

IO Modules

Universal I/O gateways for CAN, CANopen and EtherCAT systems

With the CANio 250/500 and the EtherCAT I/O, IXXAT offers three modules enabling the quick and easy connection of analog and digital input and output signals to CAN, CANopen and EtherCAT systems – whether in experimental setups, test benches or vehicles.

An important key feature of the modules are the inputs and outputs for digital and analog (only CANio 500 and EtherCAT I/O) signals, which can be flexibly configured. The analog interfaces provide a precise 12 bit resolution.

A special focus, during the development of the CANio 250/500, was the device operability within CANopen and also standard CAN systems. For this reason, the CANio 250/500 was designed as a self-starting CANopen slave, with all important parameters, such as Node-ID, sampling rates for the analog inputs or voltage range of the analog outputs, stored as default values on the device. This enables the devices to operate directly after start up without further settings in accordance with basic CAN operation.

The individual configuration of the CANio 250/500 for different applications can be done either by loading configuration data via a CANopen master or by sending configuration messages in a pure CAN network or offline via the free CANio configuration tool. Configurations that have been created with the CANio configuration tool can be saved as a project and on customer request preinstalled on ordered devices before delivery.

The configuration of the EtherCAT I/O module is performed by using an EtherCAT master with a special XML configuration file (ESI file).

All three devices are delivered in a rugged aluminum housing with a wide power supply voltage and temperature range allowing for easy integration into existing applications in the industrial and automotive area.

Beside a standard version with aluminum housing, IXXAT offers the CANio 250 also as "plug-in" version, which can be easily integrated into customer specific devices due to its small footprint.

CANio ADK

For the simple development of customized applications on the CANio 250/500

As a standard product, the CANio 250/500 represents an I/O gateway implementation in which the analog and digital inputs/outputs can be queried or triggered via CAN messages.
The Application Development Kit enables creation of custom device applications with customer-specific functionality in the C programming language. Industrial controls or vehicle control devices can therefore be simply implemented without own hardware.

The CANio ADK contains all drivers required for communication via the CAN bus and for triggering the various inputs and outputs, which allows development of custom applications even without specific hardware know-how.

The drivers are delivered as a binary library together with a comprehensive C-source demo application. The demo application demonstrates the usage of the various functions and can be very easily extended according to individual requirements.
As development platform an evaluation kit of the CANio 250/500 is included in the scope of supply.

Together with a development environment, available for free, and a low-cost hardware debugging solution, custom applications can thus be created, uploaded to the target and verified.
On completion of the test and verification phase, the application can be loaded to standard CANio 250/500 devices. This is carried out via the CAN bus with the aid of the CANio configuration tool and the bootloader permanently installed on the devices.

We will also be pleased to develop adapted software solutions for customers based on the CANio 250/500. The custom software is delivered with documentation that allows further modification by the user.

Product	CANio 250
CAN protocols	CAN, CANopen
CAN bus interface	ISO 11898-2
Galv. CAN isolation	yes (500 V DC)
IE interface	-
Digital inputs	Up to 16 x + clamp 15 (5 V CMOS compatible)
Digital outputs	Up to 16 x, max. 30 mA, 5 V CMOS signal levels
Analog inputs	-
Analog outputs	-
GPIO's	-
Further interfaces	- 2 user programmable LEDs - Measurem. of power supply
Temperature range for operation	-40 °C to +70 °C
Power supply	6-32 V
Types of plugs	CAN: D-SUB-9 I/O: D-SUB-9
Protection class	IP42
Dimensions	75 x 82 x 32 mm
Order number	*1.01.0099.00000*

Customer specific solutions

Based on our years of experience, we also work for our customers to develop solutions that, in terms of interfaces, construction, and protocols supported, are adapted optimally to customer requirements.

- Specific form factor, housing
- Analog in-/outputs
- Digital in-/outputs
- CAN, CANopen, SAE J1939, DeviceNet
- Real-time Ethernet (e.g. EtherCAT)
- ...

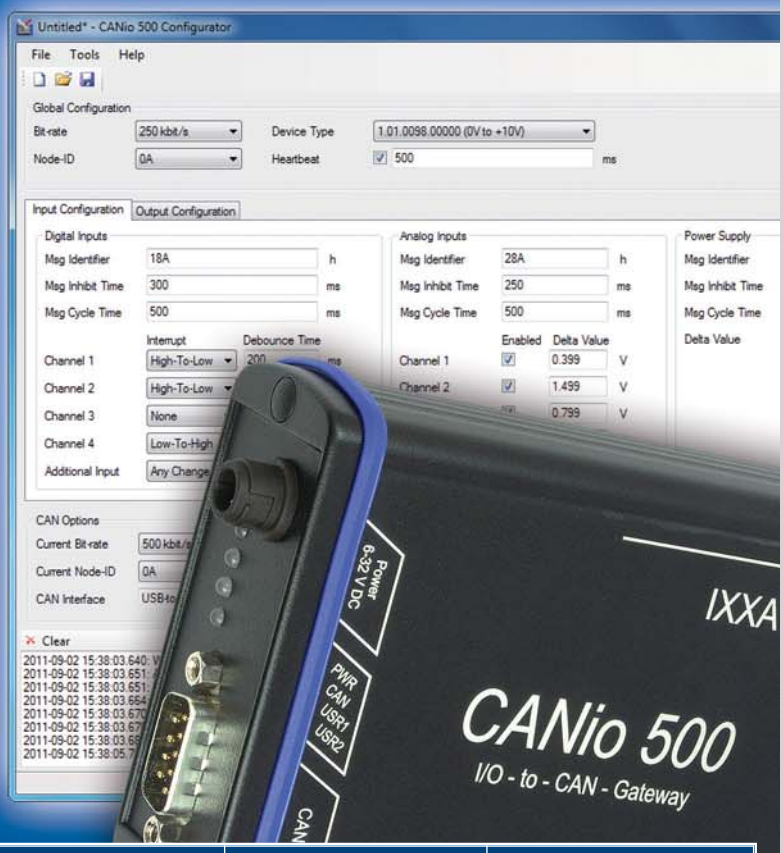
Product	CANio Application Development Kit (ADK)
Description	Package for the easy development of customized applications on the CANio 500 and CANio 250
Content of delivery	CANio evaluation kit I/O drivers, boot loader, demo application Programming manual The development environment and the debugger are not included in the scope of delivery
Order number	CANio500 ADK: *1.03.0098.00000* CANio250 ADK: *1.03.0099.00000*

Accessories

Termination Resistors and Cables

As accessories for the CAN products, IXXAT offers terminal resistors of various designs, cables for the connection of nodes and adapter cables.

A complete overview of the offered accessories can be found on our website.



CANio 250 - Plug-In	CANio 500	ETCio 100
CAN, CANopen	CAN, CANopen	-
ISO 11898-2	ISO 11898-2	-
-	yes (500 V DC)	-
-	-	EtherCAT
-	4 x + clamp 15 (between 0-34 V, threshold at 50 %)	6 x (between 0-34 V, threshold at 2.5 V)
-	4 x, max. 1 A, output voltage free selectable, up to 32 V	4 x, max. 2 A, output voltage free selectable up to 32 V
-	4 x, 12 bit resolution +/- 5 V, or 0-10 V, or +/- 100 mA	2 x, 12 bit resolution 0-10 V
-	4 x, 12 bit resolution +/- 5 V, or +/- 10 V, or 0-5 V, or 0-10 V, switchable via software	2 x, 12 bit resolution 0-10 V, 20 mA (optional 16 bit resolution)
25 x, free configurable as analog input, digital in-/output or SPI, 3V3 CMOS	-	-
- 2 user programmable LEDs	- 2 user programmable LEDs - Measurement of power supply	- 4 LEDs
-40 °C to +70 °C	-40 °C to +70 °C	-40 °C to +70 °C
6-32 V or 3V3	6-32 V	6-32 V
Socket board with 2.54 mm contact spacing	CAN: D-SUB-9 I/O: D-SUB-HD15	16 pin plug for the digital/analog signals; Phoenix-Contact RM 3,81
-	IP42	IP42
77 x 59 mm	120 x 82 x 32 mm	120 x 82 x 32 mm
1.01.0099.00001	With 0 to 10 V analog inputs *1.01.0098.00000* With -5 bis +5 V analog inputs *1.01.0098.00001* With +/- 100 mA analog inputs *1.01.0098.00002*	Aluminum case *1.01.0250.20001* Board level version *1.01.0250.21001*

Product	Sub-D9 Connector with Termination	CAN Termination
Plug/Sockets	Sub D9 Male/Female	Sub D9 male
Termination	120 Ohm	120 Ohm
Dimensions	-	-
Further information	-	-
Order number	*1.04.0075.03000*	*1.04.0075.02000*

CAN Termination	CAN Y Cable	T-Bus Connector
Sub D9 female	Sub D9 socket to socket/plug	-
120 Ohm	-	-
-	20 cm	-
-	1-to-1 connection	T-Bus connector for creating star couplers in conjunction with the IXXAT CAN repeaters
1.04.0075.01000	*1.04.0076.00001*	*1.04.0073.00000*

www.ixxat.com/accessories

Embedded Controller

IXXAT Econ 100

The IXXAT Econ 100 is a universally applicable, ARM-based platform with a Linux operating system that even in the standard variant has two Ethernet, two CAN, and two USB interfaces. It combines a wide variety of requirements, whether high performance, temperature range, or interfaces, into a single solution at an extremely attractive price.

The high degree of flexibility in the use of the IXXAT Econ 100 is outstanding – achieved by the unique combination of expansion interfaces, FPGA, software, and services.
In addition to the interfaces available in the basic version, customer-specific interface or functional extensions (such as digital and analog I/Os, DVI output) can quick and easily be implemented with the expansion slots or with an FPGA provided on the hardware.
The IXXAT Econ 100 is thus also a particularly well-suited platform for application-optimized and customer-specific solutions.

Out-of-the-box solutions for EtherCAT, POWERLINK, and CANopen

For the fast, easy development of customer-specific solutions, IXXAT offers special Application Development Kits for the IXXAT Econ 100. These include:

- An extensive board support package
- Linux operating system and software package preinstalled on SD card for EtherCAT, POWERLINK, or CANopen
- Suitable I/O module for the example applications, provided both in compiled form and as source code
- Detailed documentation and cable kit

EtherCAT Master
The well-known protocol software from acontis for EtherCAT Master Class B is included for EtherCAT Master functionality. The specially optimized link layer permits the IXXAT Econ 100 to achieve cycle times of up to 100 µs.

CANopen Master
With the CANopen software package, the IXXAT Econ 100 can also be used as a multichannel-capable CANopen controller.

POWERLINK Master
The POWERLINK implementation is based on the IXXAT POWERLINK MN/CN software. It permits a powerful managing node implementation and, thanks to built-in hub logic, supports the line topologies typical for POWERLINK. Optionally available redundant features like the redundant master or cable redundancy turn the Econ into a high-availability communications solution.

Flexibility

By combining different master software packages, powerful controllers are easy to implement for heterogeneous systems with CANopen, EtherCAT, and Powerlink. Typical application areas for the IXXAT Econ 100, aside from customer-specific control applications, also include gateway solutions, in which the IXXAT Econ 100 acts as the master in a network and is simultaneously connected to a higher-level network as a slave. The FPGA provided can also be used to provide an optional EtherCAT slave interface – that also lets the IXXAT Econ 100 act as a powerful EtherCAT-to-EtherCAT gateway. The variety of different interfaces also permits the implementation of other gateway variants.

In addition to the variant in a robust metal housing, the IXXAT Econ 100 is also available as a board-level product, which can be built into existing customer applications to save space. IXXAT also offers the Econ 100 as an OEM product, which can quickly and inexpensively be offered with specific adaptation and application implementations from IXXAT.

New

Product	IXXAT Econ 100
CPU	Xilinx Zynq SoC - Dual-Core Cortex A9 CPU with integrated FPGA of the Artix 7 Family; clock frequency 667 MHz
FPGA (within CPU)	28 k logic cells (optional 85 k logic cells)
Memory	256 MB DDR-RAM (optional 512 or 1024 MB)
Flash	256 MB SD card (optional memory sizes, up to 32 GB)
Operating system	Linux (3.9.0), pre-installed on SD card
Standard interfaces	1 x 1000/100/10 MBit LAN and 1 x 100/10 MBit LAN (e.g. for EtherCAT Master) 2 x 100/10 MBit LAN (optional, e.g. for EtherCAT Slave) 2 x CAN (ISO 11898-2 high-speed, galvanic isolated) 2 x USB 2.0
Optional external interfaces	- DVI - Digital/analog inputs and outputs Additional interfaces via FPGA and expansion board
Internal interfaces for expansion board	2 x 12 bit 1 MSps analog-to-digital converter 1 x SPI or 1x SDIO 1 x I2C; 1 x UART
Cooling	Passive, fanless
Environment temperature	-40 °C to +60 °C
Power supply	9-32 V, 2-pin Phoenix Contact connector
Housing	Steel
Protection class	IP20
Dimensions	72 x 154 x 105 mm
Order number	IXXAT Econ 100: *1.01.0271.00051* Application Development Kits EtherCAT: *1.03.0271.10001* Powerlink: *1.03.0271.10002* CANopen: *1.03.0271.10003*

Customizable FPGA-Solutions for Industrial Ethernet

IP-Cores and Protocol Software, Design-In and Evaluation Kits

When space on the PCB is strictly limited or your device needs special application-related features that cannot be realized using standard communication modules, then the Industrial Ethernet Modular concept, IEM, is the solution to solve your customization needs.
The IEM concept includes a broad portfolio of customizable FPGA-based solutions for Industrial Ethernet connectivity: From IP-cores and protocol software to complete Design-In systems including hardware-design, IP-cores and software – even with ready-to-use evaluation kits.

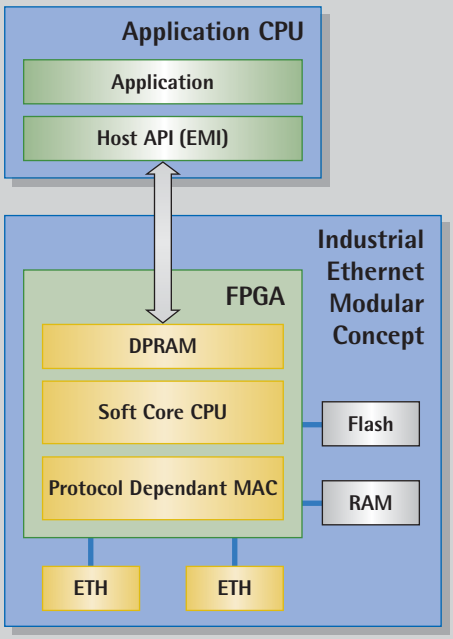
Within the IEM concept, all required software, IP, hardware-schematics and services are provided focusing on use-cases in devices such as drives, frequency converters, I/O modules, valves, and other components in automation technology that need to combine Industrial Ethernet connectivity and application-specific features in one solution. The idea of the IEM concept is to join the application and communication into a single piece of customer specific hardware or OEM-solution that supports a selected range of Industrial Ethernet standards, such as EtherCAT, EtherNet/IP, PROFINET, Powerlink and Sercos.
The IEM concept is built upon a broad range of building blocks that can be combined with customer's IP to form the final customized solution. One benefit of the IEM concept is, that all communication blocks provide a joint API for the Industrial Ethernet connection (IXXAT IEM API) that permits a largely protocol-independent implementation of the application using ANSI C. The API includes all important components for the configuration and setup of communication, as well as for complete cyclic and acyclic process data exchange. In addition, this API comes with a structured design that makes it easy to port to a variety of hardware platforms, which is especially interesting if the IP cores for communication and the protocol software shall be executed on independent controllers.

Ready-to-go design-in solutions

The IEM concept also includes ready-to-implement Design-In solutions that come with the protocol software, the required IP cores and the hardware-schematics for quick and easy implementation into the targeted hardware. The Design-In solutions combine full flexibility with the benefits of a mature hardware-design, allowing the implementation of optimized systems with reasonable efforts. In addition to the IEM concept and the associated Design-In packages, IXXAT also offers a wide variety of services and options, such as schematic diagram reviews of the design-in, porting of the API to a variety of microcontrollers as well as complete implementation of customer systems and their extension with special application IP cores and software.

Evaluation kit

IXXAT offers evaluation kits for the Industrial Ethernet implementations. These provide solutions for rapid prototyping or evaluation options for protocols not yet used by the customer.



EtherCAT®

Protocol Software and Tools

In co-operation with acontis technologies, IXXAT offers an EtherCAT Master Stack with which EtherCAT Master controls can be implemented quickly and cost-effectively. The protocol software is available "out-of-the-box" for a large number of operating systems and network interface cards, providing extremely simple and safe implementation based on the field-tested versions.

The **EtherCAT Master Stack** is specially optimized for operation in embedded operating systems (or real-time operating systems) and is characterized by its modular structure.

The software supports the full EtherCAT standard according to ETG.1000 and is available as a Class A or Class B master according to ETG.1500. Further functions, beyond the ETG.1500 standard can be implemented using optional feature packs.

The interfaces of the individual modules are open, which means that sub-components can be easily replaced if required and adapted to the relevant requirements.

The EtherCAT master stack is characterized in particular by its high performance with a low CPU load and can be used with standard Ethernet controllers.

The **EC-Engineer** is a powerful software tool used for configuration and diagnosis of EtherCAT networks. Using this single tool one can handle all required engineering and diagnosis tasks in a quick and comfortable way. The modern, clear and very intuitive user interface is crucial for a smooth experience in configuring and diagnosis of customer's EtherCAT networks.

Product	EC-Master Core Class A	EC-Master Core Class B
Description	Library for the development of Standard EtherCAT Master Devices	Library for the development of Minimum EtherCAT Master Devices
Supported standards	ETG.1000 EtherCAT Specification (fully) ETG.1500 EtherCAT Master Classes (Class A)	ETG.1000 EtherCAT Specification (partially) ETG.1500 EtherCAT Master Classes (Class B)
Included functions	- Process data exchange - Mailbox support - Network configuration - CAN Application Layer over EtherCAT (CoE) - Ethernet over EtherCAT (EoE) - File Access over EtherCAT (FoE) - Servodrive Profile over EtherCAT (SoE) - ADS over EtherCAT (AoE) - Vendor over EtherCAT (VoE) - Distributed clocks - Slave-to-Slave communication	- Process data exchange - Mailbox support - Network configuration - CAN Application Layer over EtherCAT (CoE) - Ethernet over EtherCAT (EoE) - - - Servodrive-Profile over EtherCAT (SoE) - - - - - - - Slave-to-Slave communication
Further functions (feature packs)	- Cable redundancy - Hot connect - TCP server und remote API - EoE endpoint - Master Object Directory	- Cable redundancy - Hot connect - TCP server und remote API - EoE endpoint - Master Object Directory
Supported operating systems	Windows CE/CeWin, VxWorks/VxWin, QNX, RTX, INtime, RTOS-32/ RTOS32Win, Windows XP/7, Linux (with RT Preempt Patch)	
Supported network interface boards	Real-time, optimized link layer for Intel Pro/100, Intel Pro/1000, Realtek 8139, Realtek 8111/8168/8169 Standard network driver, not real-time capable, for Windows XP/7 (WinPcap), Linux (Raw Socket) and VxWorks (SNARF/SMP)	
Order number	on request	on request

Product	EC-Engineer
Description	Software for Configuration und Diagnosis of EtherCAT Networks
Supported standards	ETG.1000 EtherCAT Specification (fully) ETG.1500 EtherCAT Master Classes (Class A)
Included functions	General Features - Configuration of multiple master systems within one project - EtherCAT Slaves connected to Windows PC or control system - ESI Manager - Multiple languages - Modern user interface based on Microsoft WPF Configuration Features - Import ESI files according to ETG.2000 - Export ENI files according to ETG.2100 - Automatic determination of connected slaves - Slave device copy/paste incl. all parameters - PDO selection and configuration - Adjustment and appending of EtherCAT slave init commands - Transparent integration of MDP slaves - Fixed memory layout of slaves or Distributed Clocks Settings - Definition of "Hot Connect" groups - Programming Station Alias Address Diagnosis Features - Master/Slave state and process (I/O) data (display/control) - ESC register and EEPROM (read/write) - Master and Slave Object Dictionaries - Mailbox transfers (SDO upload/download) - Firmware upload/download - Comparison of configuration and real network
Supported operating systems	Windows XP, Windows 7, Windows 8
EtherCAT network access	Local access using integrated EC-Master or remote access via TCP/IP with EC-Master on Controller
Order number	on request

Protocol Software and Tools

IXXAT has been involved with EtherNet/IP through its many years of active participation in the ODVA organization, workshops and plugfests. During this period, IXXAT has significantly contributed its knowledge to many EtherNet/IP customer projects performed over these years.

With our experience in the implementation of protocol stacks and device profiles, and our continuous knowledge expansion, we ensure that our customers always use state-of-the-art technology and secure our customers' investment in the future.

Protocol software and Windows API

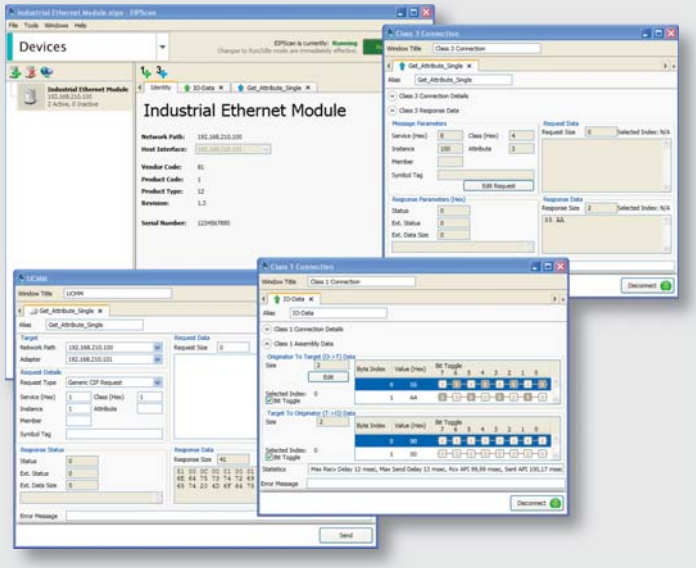
The **EtherNet/IP Software Products** support the development of PC-based and embedded EtherNet/IP devices. With the Communication Drivers, a powerful Windows library is available, with the Developers Kits as a complete EtherNet/IP stack for adapters and scanner devices alike. The software products provide a uniform programming interface with all relevant EtherNet/IP functions for development. They are supplied for Windows operating systems but can easily be adapted to other operating systems and platforms.

Templates and a sample application in source code provide the developer with an easy introduction.

The EtherNet/IP software products are used in many EtherNet/IP products of various vendors worldwide. They have proven successful in a wide range of applications and are continually supported.

Tools

The EtherNet/IP software product range is supplemented with an **EtherNet/IP Scanner Simulator** for Windows with which EtherNet/IP Adapter devices can be tested in the development phase.



Product	EtherNet/IP Adapter Communication Driver (EIPA)	EtherNet/IP Adapter Developers Kit (EADK)	EtherNet/IP Scanner Communication Driver (EIPS)	EtherNet/IP Scanner Developers Kit (ESDK)	EtherNet/IP Scanner Simulator (EIPScan)
Description	Windows library for the development of EtherNet/IP Adapter devices	Software package for the development of EtherNet/IP Adapter devices	Windows library for the development of EtherNet/IP Scanner devices	Software package for the development of EtherNet/IP Scanner devices	Windows program for the simulation of EtherNet/IP scanner devices
Supported standards	ODVA - The CIP Networks Library Volume 1: Common Industrial Protocol (PUB00001) Volume 2: EtherNet/IP Adaptation of CIP (PUB00002)				
Included functions	Supported CIP objects classes: Identity, Message Router, Assembly, Connection Manager, TCP/IP Interface, Ethernet Link Adapter class functionality: - UCMM Message Server - Class 3 Message Server - Class 1 I/O Server Additional functions: - UCMM Message Client	Supported CIP objects classes: Identity, Message Router, Assembly, Connection Manager, TCP/IP Interface, Ethernet Link Adapter Class functionality: - UCMM Message Server - Class 3 Message Server - Class 1 I/O Server Additional functions: - UCMM Message Client	Supported CIP objects classes: Identity, Message Router, Assembly, Connection Manager, Connection Configuration, TCP/IP Interface, Ethernet Link Scanner class functionality: - UCMM Message Server and Client - Class 3 Message Server and Client - Class 1 I/O Server and Client	Supported CIP objects classes: Identity, Message Router, Assembly, Connection Manager, Connection Configuration, TCP/IP Interface, Ethernet Link Scanner class functionality: - UCMM Message Server and Client - Class 3 Message Server and Client - Class 1 I/O Server and Client	Scanner Class functionality: - UCMM Message Server and Client - Class 3 Message Server and Client - Class 1 I/O Server and Client Scanner simulation: - Connect to devices via one or more Ethernet interfaces on the PC - Browse the networks for devices or manually add them - View and modify I/O data (bin/hex) - Automated test of Class 1 and Class 3 connections - Queuing of multiple UCMM Requests
Order number	*1.04.0124.00000*	*1.04.0125.00000*	*1.04.0126.00000*	*1.04.0127.00000*	*1.04.0128.00000*

ETHERNET POWERLINK

Protocol Software, Interfaces, IP-Core and Tools

Based on its many years of experience in the area of POWERLINK and active participation in the standardization of the POWERLINK protocol, IXXAT offers a comprehensive product range which always complies with the latest technical standards and is continually supported.
IXXAT is the only vendor to offer the complete spectrum of POWERLINK software including systems for safety and high availability applications. IXXAT software packages are used in a large number of applications of the leading POWERLINK device vendors.

Protocol software

The **POWERLINK Protocol Software** includes all functions to implement Managing Nodes (MN) and Controlled Nodes (CN) in accordance with the current POWERLINK specification DS 301 quickly and easily in customer-specific applications. The stack is used by numerous renowned vendors and can therefore be regarded as the POWERLINK reference implementation. Unlike other available solutions, the IXXAT software supports a large number of optional POWERLINK objects and services that enable optimum adaptation to the relevant customer application.

In addition, the protocol software has a dynamic object directory that forms the basis for simple integration of existing user objects as well as for fast implementation of existing CANopen applications on POWERLINK.

Interfaces and IP-Core

The POWERLINK interface card **PL-IB 300/PCI** enables an efficient connection between PC host systems and POWERLINK networks, and can be used both as MN and as CN.

The POWERLINK functionality runs completely on the FPGA of the card, through which guaranteed performance is achieved, for example in Windows systems, independent of the application processor. Due to the PCI Master-DMA compatibility of the card, a smooth, fast data exchange is ensured between the application and the POWERLINK bus. A host API is included in the scope of supply for communication and control of the PCI card. This is provided as "C" source code thereby enabling use with different operating systems.

With the FPGA POWERLINK **MN IP-Core**, IXXAT offers a solution with which the POWERLINK MN functionality can be integrated in any target system as a simple hardware/software function block, free of risk and with guaranteed performance. The clear advantages of the FPGA-based implementation are the high flexibility, the independence from vendors, the low development costs and the short implementation time.

In addition to the actual POWERLINK functionality, the MN IP-Core contains a standard Ethernet controller, an Ethernet hub and a PCI controller for communication with the host CPU.

For the fast and flexible integration of the POWERLINK CN functionality IXXAT offers the **CN IP-Core**. This IP-Core can be very easily extended by application-specific FPGA features. The CN IP-Core is directly supported by the IXXAT POWERLINK MN/CN protocol software to enable seamless integration of applications using FPGA Soft-CPUs.

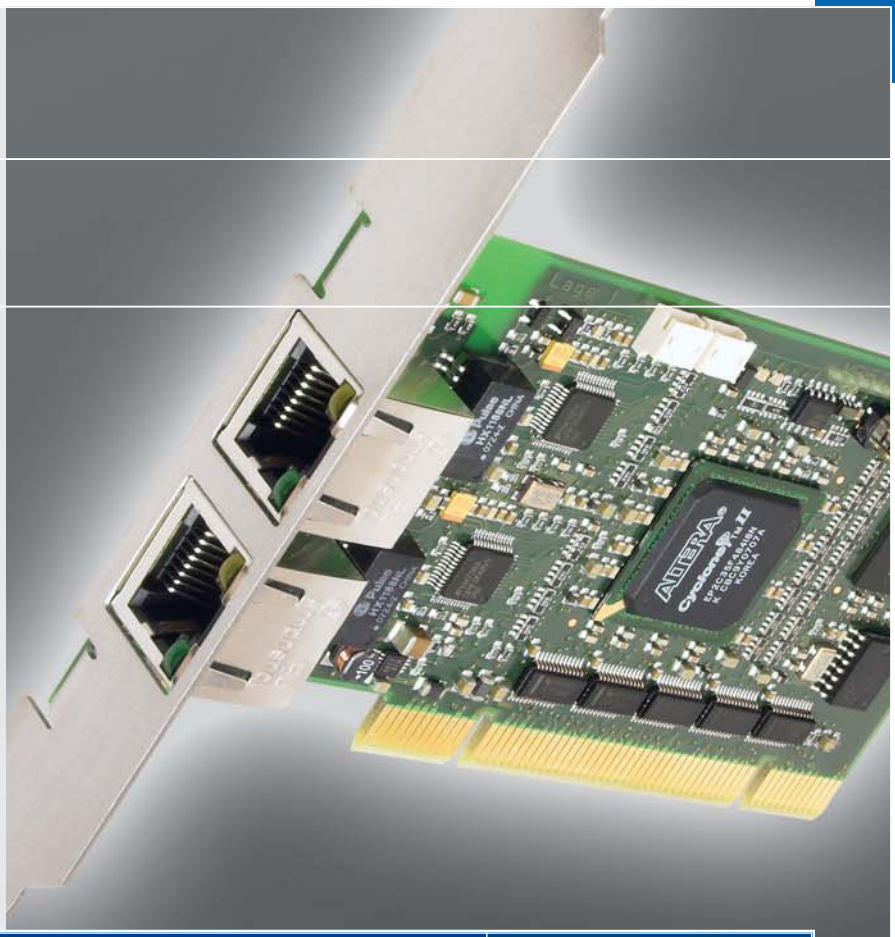
High availability

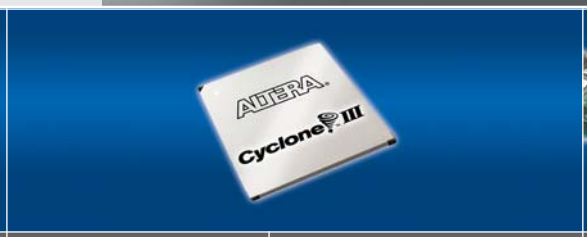
POWERLINK is one of the few industrial Ethernet protocols that can also fulfill the requirements of a highly available communication network. As the only provider in the market, IXXAT offers these high availability solutions as add-on modules for the POWERLINK protocol software, the interface card PL-IB300/PCI and the FPGA-based POWERLINK CN solutions (CN IP-Core and IEM). Based on these products redundant Managing Nodes, the dual Ethernet line redundancy and the ring redundancy according to DSP 302-A can be integrated into customer applications.

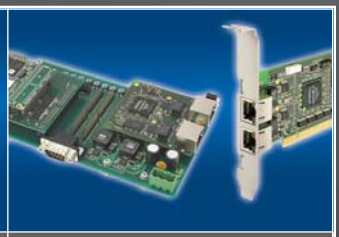
Product	MN/CN Protocol Software
Description	Software package for the easy and rapid development of Managing Nodes (MN) and Controlled Nodes (CN)
Supported standards	EPSG DS 301 V 1.1.0 EPSG WDP 302-A V 1.0.4 Pre-certified on the IXXAT IEM Module
Included functions/ features	Operation speed-optimized, modular software structure Comprehensive configuration and scaling options Clearly structured programming interface enables the quick and easy connection of the user application Operating system independent - runs with or without operating system Easy to adapt to different Ethernet controller architectures and to different hardware/software platforms Dynamic modification of the object dictionary during run time Multi-channel capability Configuration manager for automatic network configuration Optional: - Redundant Managing Node - Multiple Poll Response and multiple ASend - Support for Ethernet ring redundancy manager and link selector
Order number	CN: *1.02.0291.00000* MN/CN: *1.02.0293.00000*

Starter Kit

The POWERLINK Starter Kit contains all components for creating a real-time-compatible demo and reference network and allows a quick introduction to the POWERLINK technology.
The Starter Kit consists of an Evaluation Kit for the Industrial Ethernet Module (CN) and a PCI card PL-IB 300/PCI as MN and all necessary software packages and drivers for implementation of a POWERLINK system.







Product	PL-IB 300/PCI	MN IP-Core	CN IP-Core	POWERLINK Starterkit
Description	POWERLINK interface card for PCI bus systems	Managing Node IP-Core for design-in solutions	Controlled Node IP-Core for design-in solutions	Package consisting of MN and CN for the quick access to the technology
Supported standards	PCI V2.2; EPSG DS301 V1.1.0	EPSG DS301 V1.1.0	EPSG DS301 V1.1.0	PCI V2.2; EPSG DS301 V1.1.0
Included functions/ features	POWERLINK MN/CN configurable during runtime Complete execution of the POWERLINK communication on the FPGA Network configuration possible via Device Configuartion File Format Triple-Buffered Input/Output process image with up to 8 kB each direction Supports up to 240 CNs Fast response times of < 2 ms Synchronization with SoC jitter < 50 ns Cycle times down to 600 µs Synchronization of multiple cards via external synchronization line Host API in source code Optional - Redundant Managing Node - Ethernet Link Selector - Ethernet Ring Redundancy Manager	Identical communication features like PL-IB300/PCI PL-IB300/PCI development license for the design-in, consisting of schematic and binary stream of the FPGA reference firmware 5 runtime licenses for the prototype development Alternative host interfaces, for example parallel address/data bus on request Runs on Cyclone 2C35 FPGA or higher	Development license for the design-in of a CN, consisting of schematic and encrypted netlist Preconfigured NIOSII CPU and SDRAM interface Quick poll responses due to special POWERLINK MAC Integrated Hub (for line wiring) Easy adding of user-specific FPGA extensions Runs on Cyclone 2C8 or higher, Cyclone 4CE6 in preparation (Xilinx MicroBlaze and Xilinx Zynq on request) Also suitable for creating simple Managing Nodes Matching MN/CN protocol software license also required Optional - Redun. Managing Node (stack option) - Ethernet Link Selector - Ethernet Ring Redundancy Manager	PL-IB 300/PCI as managing node with Windows MFC application example for the direct visualization of the input and output data IEM-200 POWERLINK with baseboard and XC161 application CPU module as CN Simple digital I/O demo of the XC161 in source code Access to services, for example NMT and SDO, via MFC application sample enables simple device diagnosis
Interfaces	- 2x RJ45 Ethernet (integrated hub) - Ext. Sync. In/Out - 32 bit PCI V2.2	- 2x RJ45 Ethernet (integr. hub) - Ext. Sync. In/Out - 32 bit PCI V2.2	- 2x RJ45 Ethernet (integrated hub), SDRAM	-
Supported operating systems	2000/XP/Vista/Windows7; RTX	-	-	2000/XP/Vista/Windows7
Order number	Standard: *1.01.0109.00111* Low Profile: *1.01.0109.00121*	*1.02.0342.00000*	*1.02.0340.x0000*	*1.03.0100.00000*

TCP/IP

Protocol Software

In close co-operation with the American company InterNiche Technologies Inc., IXXAT offers a complete TCP/IP protocol software family with all important protocols and services.

One important advantage of the InterNiche products, compared with freely available protocol stacks (e.g. Linux, FreeBSD), Open Source projects or protocol stacks integrated in real-time operating systems is that the software packages have been consistently developed for minimal resource requirements combined with high scalability. This improves performance, reduces hardware costs and thus ensures the competitiveness of your products.

NicheStack is a full and easy to port TCP/IP stack containing all basic products for internet, intranet and LAN connections. With NicheStack, the implementation of TCP/IP in embedded devices is very simple. The stack saves resources and requires only approx. 26 kB of code. The software package can be used with or without operating system.

The NicheStack is available in a variant for the standard IPv4 and for the new internet standard IPv6. The NicheStack Dual supports IPv4 and IPv6 and enables parallel use of both protocols in one network.

Extensions are available for all variants of the NicheStack, with which the Stacks can be upgraded with specific functions.

Product	NicheStack IPv4	NicheStack IPv6	Extensions
Description	Protocol software for the implementation of TCP/IP in microcontroller systems. Both NicheStacks can be combined to get a dual stack.		Selection of expansion packs, available for all variants of the NicheStacks
Included functions	Specifically optimized for embedded applications Easily portable due to ANSI-C source code Prepared for real-time operating systems or superloop Protocols/services (selection) - Address Resolution Protocol (ARP) - Internet Protocol (IP) - Internet Control Message Protocol (ICMP) - Dyn. Host Configuration Protocol Client (DHCP) - Trivial File Transfer Protocol (TFTP) - Transport Control Protocol (TCP) - User Datagram Protocol (UDP) - Scheduler NicheTask (on request) - NicheTool (Debugging and Tuning Suite)		- NicheStack IPSec/IKE - NicheStack SSL - NicheStack SSH - NicheStack SNMP v1, v2c, v3 - NicheStack NAT - NicheStack RIP v1, v2 - NicheStack SNTP - NicheStack DHCP-Server - NicheStack DNS-Server - NicheStack POP3 - NicheStack SMTP - NicheStack HTTP-Server - NicheStack RTP/RTCP - Multicast IGMPv3 - Multilink PPP - PPPoE
Already included extensions:	- FTP Server - Telnet Server - Multicast IGMPv2		
Order number	on request	on request	on request

IEEE 1588

Protocol Software and

As the market leader in the area of IEEE 1588 precision timing protocol, IXXAT with its IEEE 1588 PTP protocol software has a highly developed and application proven package with a full range of functions. IXXAT's co-operation with many major semi-conductor manufacturers and the active participation in the relevant working committees ensures further development of the software according to the latest technical standards and provides a solid resource for future precise timing solutions.

The IEEE 1588 protocol software enables quick and simple development of IEEE 1588-2008 compliant devices. The software developed by IXXAT has a modular structure so that fast integration into the target system is ensured. The interfaces with the target platform, for example access to the UDP/IP socket, are grouped together in a separate adaptation layer, which simplifies the porting process.

The protocol software is offered in a basic version at a very attractive price. In addition, several extension packages are available that allow it's use in specific application areas.

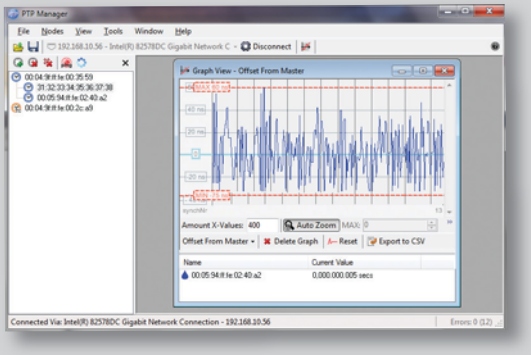
The **IEEE 1588 IP-Core Module** for FPGAs is used to implement 1588 devices with high time stamping accuracy. Due to the implementation of the real-time clock and time stamp unit in the FPGA, clock synchronism in the

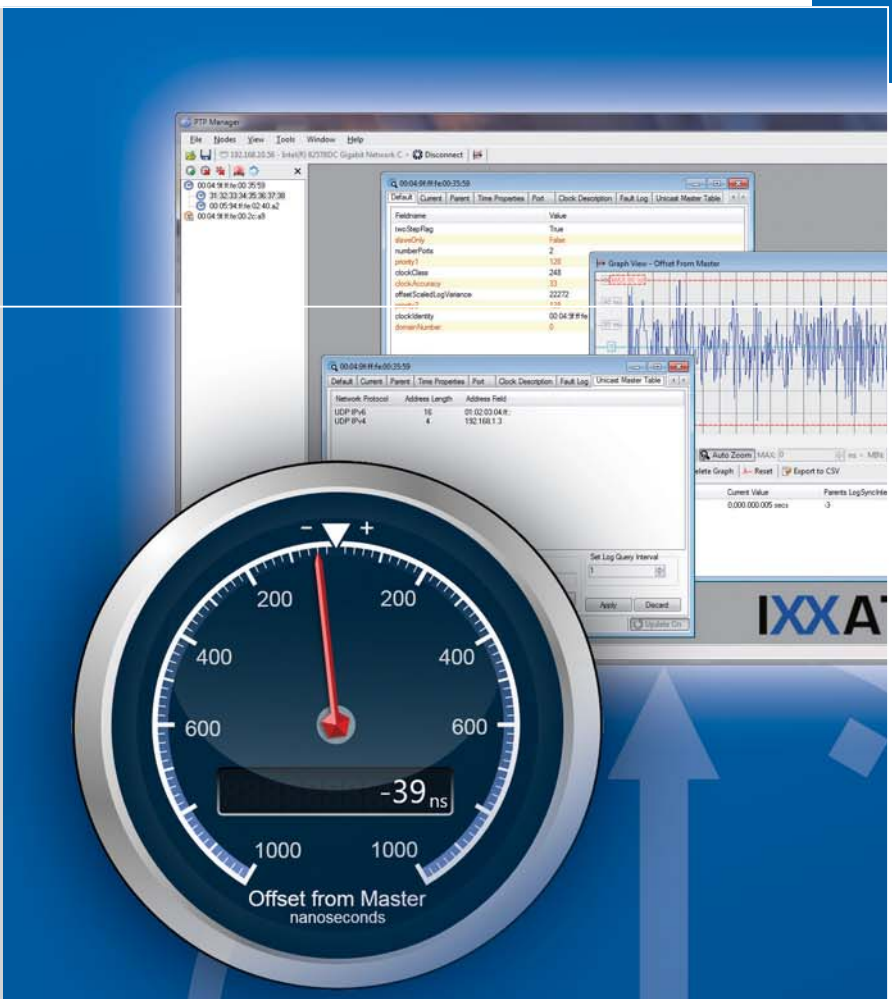
Product
Description
Included functions
Order number

IP-Core Module

two-digit nanosecond range can be achieved. Due to the scaling of the number of ports and timer/trigger units, it is also suitable for complex devices with several network interfaces.

The **IEEE 1588 PTP Management Tool** enables monitoring and configuration of an IEEE 1588-2008 network. It therefore represents the ideal supplement to the protocol software for the development and commissioning of PTP clocks. The IEEE 1588 PTP Management Tool uses the Management interface of a PTP clock and can therefore be used for all standard-compliant PTP clocks.





IEEE 1588 PTP Protocol Software	IEEE 1588 PTP IP-Core Module for FPGAs	IEEE 1588 PTP Management Tool
Software package for an easy and rapid development of IEEE 1588 devices	Real time clock and timer/trigger unit for Altera Cyclone FPGAs to set-up high-precision 1588 devices	Tool for monitoring and configuration of IEEE 1588 networks
Basic version: Support for Ordinary and Boundary Clocks Best Master Algorithm UDP/IPv4 multicast support Unicast/Multicast support One step/two step support Peer-to-peer and end-to-end delay mechanisms Management protocol/interface Simple API for the application connection Operation with or without operating system Easy adaptation to the target hardware, TCP/IP stack and operating system	Setting/adjustment of the real time clock via software Time stamping of external input signals via trigger unit Triggering external output signals based on configurable timers MII interface for detection of incoming/ outgoing Sync messages Standard address bus/data bus interface Time stamping of IPv4, IPv6 and 802.3 messages Possibility of interrupt generation Variable external clock frequency Generation of external PPS signals to check the clock synchronization	Automatic detection of PTP clocks in the network Supports multicast and unicast Supports data sets of the Ordinary, Boundary and Transparent Clocks Display of the master/slave relationship of PTP clocks in tree hierarchy Display of the PTP clock data sets Adjustment of the clock configuration using SET and COMMAND messages Graphic output of "One Way Delay", "Offset from Master" and "Observed Drift" Adjustable PTP domain
Basic version: Protocol SW: *1.02.0314.L01nn* Extension packages: UDP/IPv6: *1.02.0314.L1100* IEEE 802.3 (Layer 2): *1.02.0314.L1200* Unicast Messaging: *1.02.0314.L1300* Transparent Clock: *1.02.0314.L1400* Telecom Profile: *1.02.0314.L1500*	*1.02.0315.LVnnn*	*1.02.0318.10000*

www.ixxat.com/ieee1588

Safety Solutions

Module, Protocol Software and Services

With our products and services, you benefit from our many years of experience in the integration of safe communications solutions based on IEC 61508. Here, IXXAT offers one of the most extensive product portfolios on the market for the implementation of safety – from quickly and easily implemented modular solutions to flexible stacks.
All safety products have been developed together with the TÜV and appropriately precertified on reference platforms.

IXXAT Safe T100

The IXXAT Safe T100 offers device manufacturers an easy way to control safe I/O signals using a safe field bus protocol. The module meets the SIL3 safety requirement level as defined by IEC 61508 and Performance Level PLe / Category 4 in IEC 13849-1.

It is used in customer devices together with a communication module of the Anybus CompactCom series, which is used to implement the unsafe bus connection. Safety communications use the black channel principle through the Anybus CompactCom communication module. For PROFIsafe, for example, the communication module carries out the tasks of a PROFINET I/O device. The IXXAT Safe T100/PS implements the PROFIsafe layer and the safe control of three dual-channel inputs, as well as one dual-channel output.
The module's very compact dimension and flexible Safety I/O routing make it perfect for integration into customer-specific device solutions.

For device certification, a comprehensive safety manual is provided. This describes all needed integration and verification steps to achieve the TÜV certification of IXXAT Safe T100-based end products with greatly reduced effort. Especially the clear separation of safety-relevant functions from the unsafe functions of the end device by the precertified IXXAT Safe T100 plug board is a great help in this situation.

To evaluate the IXXAT Safe T100, a corresponding development kit is available as a reference implementation. It consists of a base board with a PROFINET I/O Anybus CompactCom communication module and a host CPU, along with an IXXAT Safe T100/PS with Safety I/O leads brought out. The configuration of the Safety I/Os uses PROFINET/PROFIsafe and is supported by a special configuration tool, which can be integrated seamlessly into the Siemens Step7 toolchain, for example.

IXXAT Safe Protocol Software

CIP Safety™

For CIP Safety
The IXXAT CIP Safety software can be used to implement CIP Safety Targets (slaves) and CIP Safety Originator (master) devices based on EtherNet/IP or Sercos up to SIL-3. All necessary adapter modules for use on Sercos as a non-safe communication protocol are available, including those for connection to the Sercos stack and Sercos IP.
Your transition into CIP Safety technology is made easier by an included PC demo that provides a clear overview of the application options and functionality of a target and an originator.

The porting and certification of the CIP Safety software on customer-specific platforms is simplified using the unit tests and safety manual provided, along with the clearly separated adaptation layers.

Safety over EtherCAT®

For Functional Safety over EtherCAT (FSoE)
The very slim implementation of the IXXAT FSoE protocol software is notable for its efficient protocol processing which is essential for safe drive applications and other applications up to SIL-3.

The FSoE software permits parallel instantiation of both slave and master functionality. This opens up a variety of communication options for safe applications. The cleanly delineated interfaces of the FSoE software also permit the use of different non-safe EtherCAT communications interfaces, such as the HMS Anybus CompactCom Module or the IXXAT Industrial Ethernet Module.
Using a PC demo, the possibilities of the FSoE master and slave software can be evaluated. The safety manual describes all the necessary integration and test steps as well as the configuration of the software package in detail, and along with the unit tests it is therefore the basis for simplified certification of safe communications using FSoE.

open SAFETY

For openSAFETY
openSAFETY protocol stacks, developed for Safety Nodes (SN) and Safety Configuration Managers (SCM) by IXXAT with collaboration from B&R Automation, provide an easy and secure port to customer safety platforms.

The openSAFETY protocol software is particularly notable for its complete independence from the underlying non-safe transmission protocol. No other safety protocol provides this level of flexibility.

Features such as the direct exchange of safety data between

New

Product	IXXAT Safe T100/PS
Description	Module solution to easily control safe IO signals
Supported standards	PROFIsafe (further versions for CIP Safety, FSoE and openSafety are planned)
Digital inputs	3 x dual channel, configurable with filter and monitor functions
Digital outputs	1 x dual channel, configurable
Safety Conformance Level	SIL 3, PL e
Power supply	24 V DC (SELV/PELV), 3.3 V DC
Environment temperature	-40 °C to +85 °C
Dimensions	70 x 40 x 15 mm
Order number	1.01.0300.00001

Product
Description
Supported standards
Supported platforms
Functions/ features
Order number

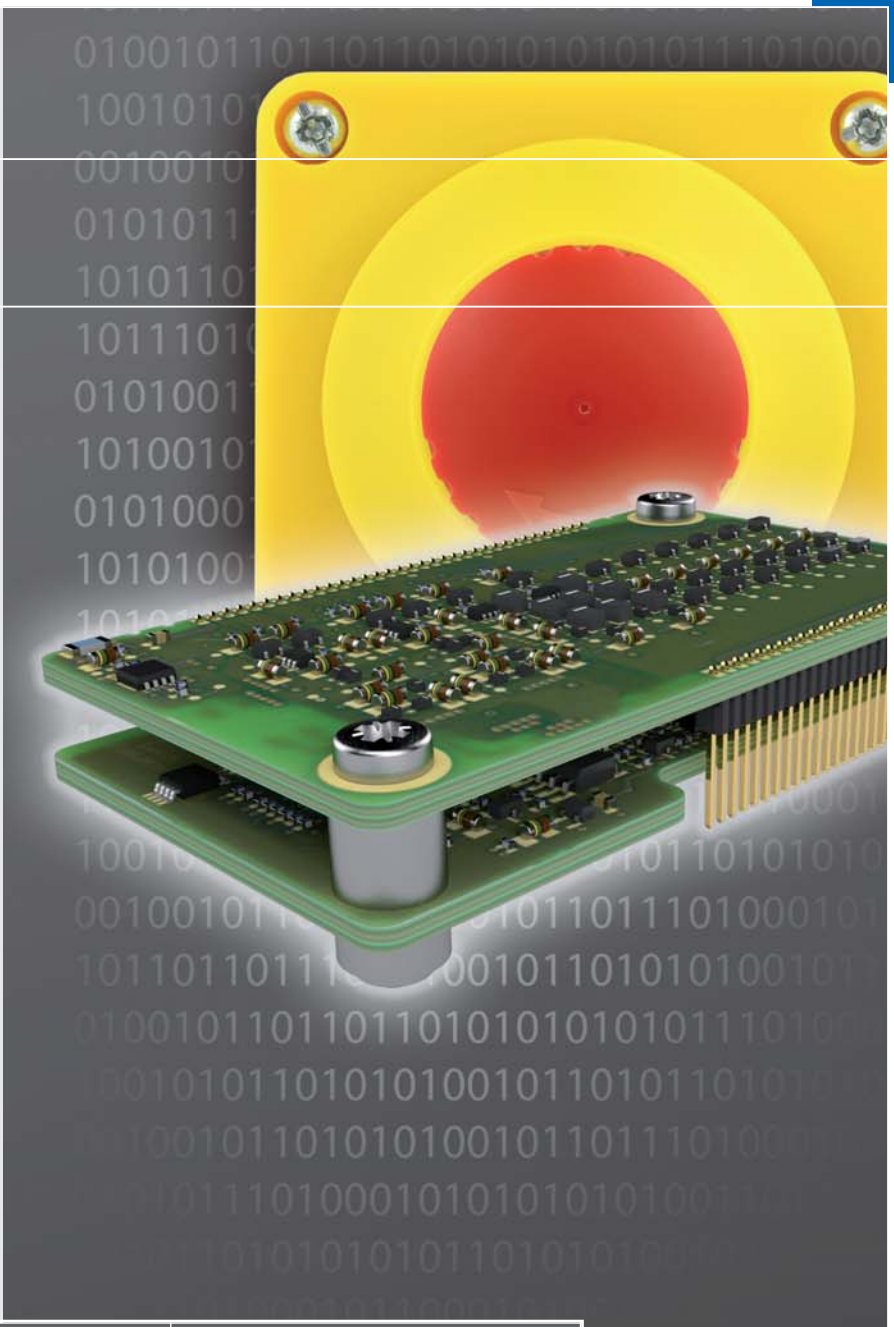
slaves and manufacturer-independent parameterization using a secure object dictionary create free space for applications up to SIL-3. For a simple evaluation of patent-free, cost-free openSAFETY software, there is a PC demo available.

Services

Due to the qualified development processes employed, IXXAT meets the increased requirements for the development of safety-relevant software in compliance with IEC 61508.

We support you in all phases of development, from the design phase with consulting on integration options for our safety protocol stack and the IXXAT Safe T100, to the development of safety hardware and software, to the certification and delivery of complete devices.

IXXAT also offers appropriate code and technology introductions for all safety products.



CIP Safety	FSoE	openSAFETY
Software package for the development of CIP Safety Targets and Originators	Software package for the development of EtherCAT Safety slaves and masters	Software package for the development of Safety Node (SN) and Safety Configuration Managers (SCM)
CIP Safety specification edition 2.5	FSoE specification ETG.5100 S (R) V1.2.0	openSAFETY specification 1.1.3 and higher
PC demo, TÜV pre-certified and CIP Safety conformance tested on PXA255 and STM32F107	PC demo, TÜV pre-certified, conformance tested	PC demo, TÜV pre-certified on AT91SAM7 and IXP420
Independent of the operating system - Runs with or without operating system Supports CIP Safety on Sercos and EtherNet/IP Can be used with multiple instances of CIP Safety Interfaces enable the portability to different hardware and software platforms Developed according to IEC 61508 for applications up to SIL-3 Simplified integration and re-certification on any target platform via included unit test suites and safety manual	Independent of the operating system - Runs with or without operating system Simple connection to a non-safe EtherCAT communication module through abstraction layers Multiple instantiation allows the parallel integration of master and slave on one device Developed according to IEC 61508 for applications up to SIL-3 Simplified integration and re-certification on any target platform via included unit test suites and safety manual	Independent of the operating system - Runs with or without operating system Simple connection to an insecure transport protocol via abstraction layer Any "unsafe" transport protocol can be used, according to the black channel principle Multiple instantiation allows creation of Safety domain gateways Developed according to IEC 61508 for applications up to SIL-3 Simplified integration and re-certification on any target platform via included unit test suites and safety manual
EtherNet/IP Target: *1.02.0501.20000* Sercos Target: *1.02.0500.20000* Originator: *1.02.0500.20100*	Slave: *1.02.0502.10000* Master: *1.02.0502.10100*	Free download at www.ixxat.com/opensafety

Engineering Services

We support you in all phases of your development

For well over twentyfive years, development services have been an important part of IXXAT's activities. More than 80 % of IXXAT's 80 employees are electronics engineers and computer scientists. About half of IXXAT's experienced development engineers support customer projects.

IXXAT offers services in all phases of development, beginning with the definition phase of products or systems. As a discussion partner, IXXAT is available to produce studies, to develop concepts, create requirement specifications and to review your internally-development requirements with regard to the most suitable technologies and appropriate solutions.

IXXAT delivers the optimal solution including the application development. Designing and developing turnkey systems is an important strength that extends to the integration of hardware and software and the responsibility for the system operation and performance. IXXAT ensures that its customers receive the optimum solution with maximum protection of its customers investment.

In the implementation phase, IXXAT develops hardware and software for embedded systems and PCs from scratch or from modified versions of existing IXXAT designs. In the test phase, IXXAT is able to define and perform tests.

With IXXAT as your partner and hardware supplier, you'll benefit from long-term availability, high quality, lifetime support, short delivery times, and "Made in Germany" quality.
IXXAT subsidiaries in the US and France, as well as sales offices and distributors are able to provide on-site support around the world.

Our range of services

- Customized OEM hardware and devices (e.g. control units, single board computers, I/O modules, gateways, interface modules)
- Application development
- Embedded software (e.g. drivers, protocol software, application software)
- Safety-related hardware and software according to IEC61508
- Devices and systems for test and service
- Analysis and configuration applications

Example projects

Brand labeling and adaptation of standard products to customer-specific requirements
For the company ATECH, a manufacturer of motor controllers and displays, IXXAT provides a special variant of its trusted USB-to-CAN compact with a custom design.
The adaptations needed to the housing label were carried out by IXXAT to ATECH's specifications. ATECH now offers "their" USB interface in an ATECH look as accessories for their customers.

In addition to pure brand labeling, IXXAT can also adapt the hardware and software of its interfaces and gateways to meet customer-specific requirements, and can deliver them in even large lots in their familiar quality at attractive prices.

Developing with IXXAT means

- ✓ Shorter time to market
- ✓ Avoiding development risks
- ✓ Predictable development costs
- ✓ Competitive advantage through use of modern technologies
- ✓ Focus on core competencies

Development of function modules for vending machines
For a globally active manufacturer of ticket sales systems, after introductory consulting, the hardware and software for the I/O modules needed were developed.
IXXAT's experience permitted the project to be implemented successfully on a tight six-week schedule before series production commenced.

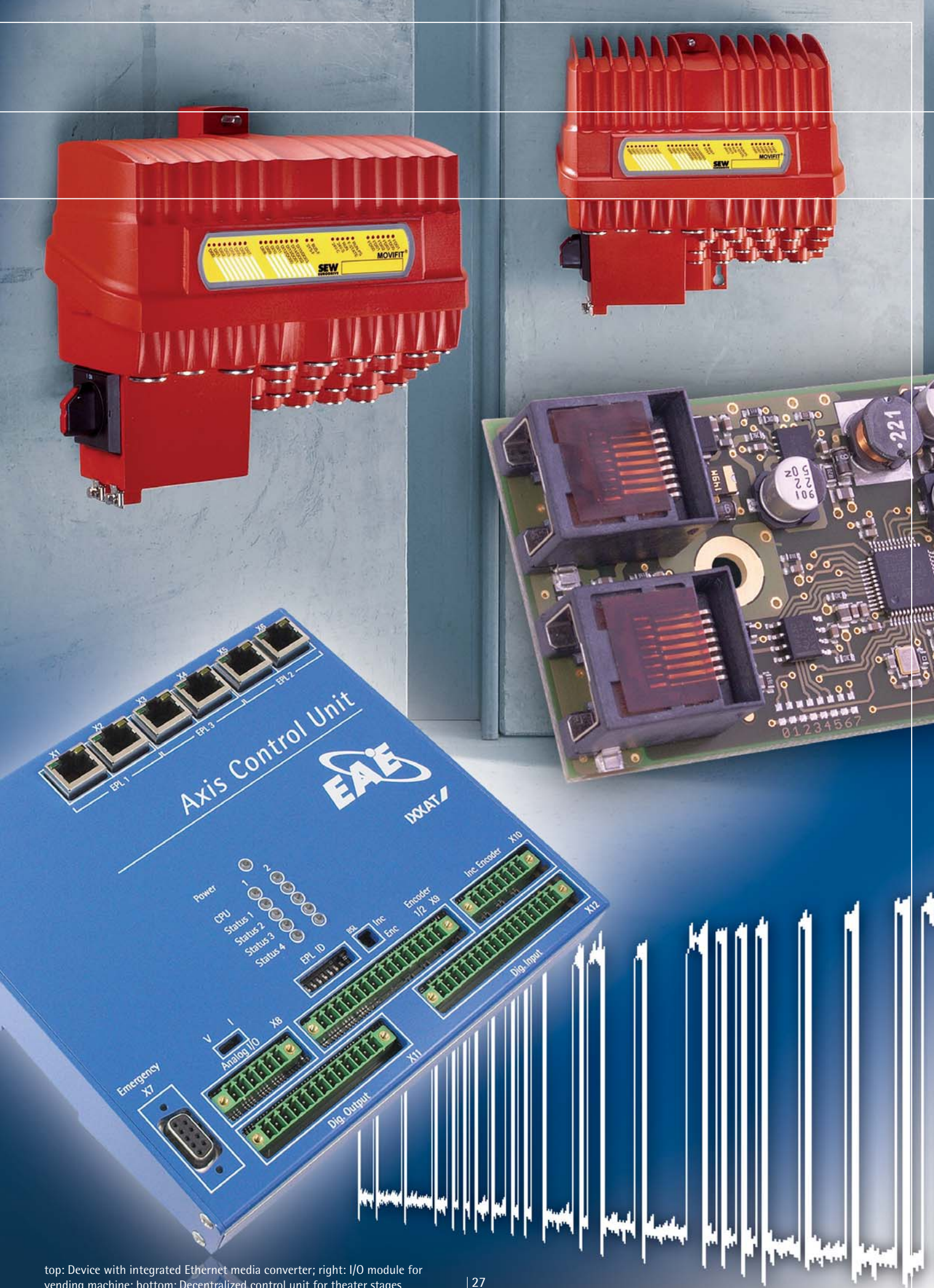
System design and software development for elevator systems
In close collaboration with specialists from a global leader in the manufacture of elevators, the design for a CAN-based network was developed that took into account the requirements for future generations of elevators with the potential of up to 80,000 CAN nodes in a single network.

The design was successfully implemented in the form of a protocol software package, then tested in the context of an extensive system test, and is in use worldwide today in many forms.

CANopen interface for medical injectors
For a well-known manufacturer of medical devices, IXXAT developed a CANopen interface for medical injectors. The interface was connected to the USB port of the injector and permitted the control of the injector using a CRT/MRT scanner. All the required hardware and software was specified and developed by IXXAT.

Decentralized control unit for theater stages
For a global equipment manufacturer of theater, show, and opera stages, after mutual determination of the requirements, a decentrally organized, intelligent, and safe I/O module was developed. The modules employ a redundant, optionally high-availability network connection, are intrinsically safe, and the complete system meets the requirements of the EN 61508 SIL3 safety standard. This system has already been used on renowned stages.

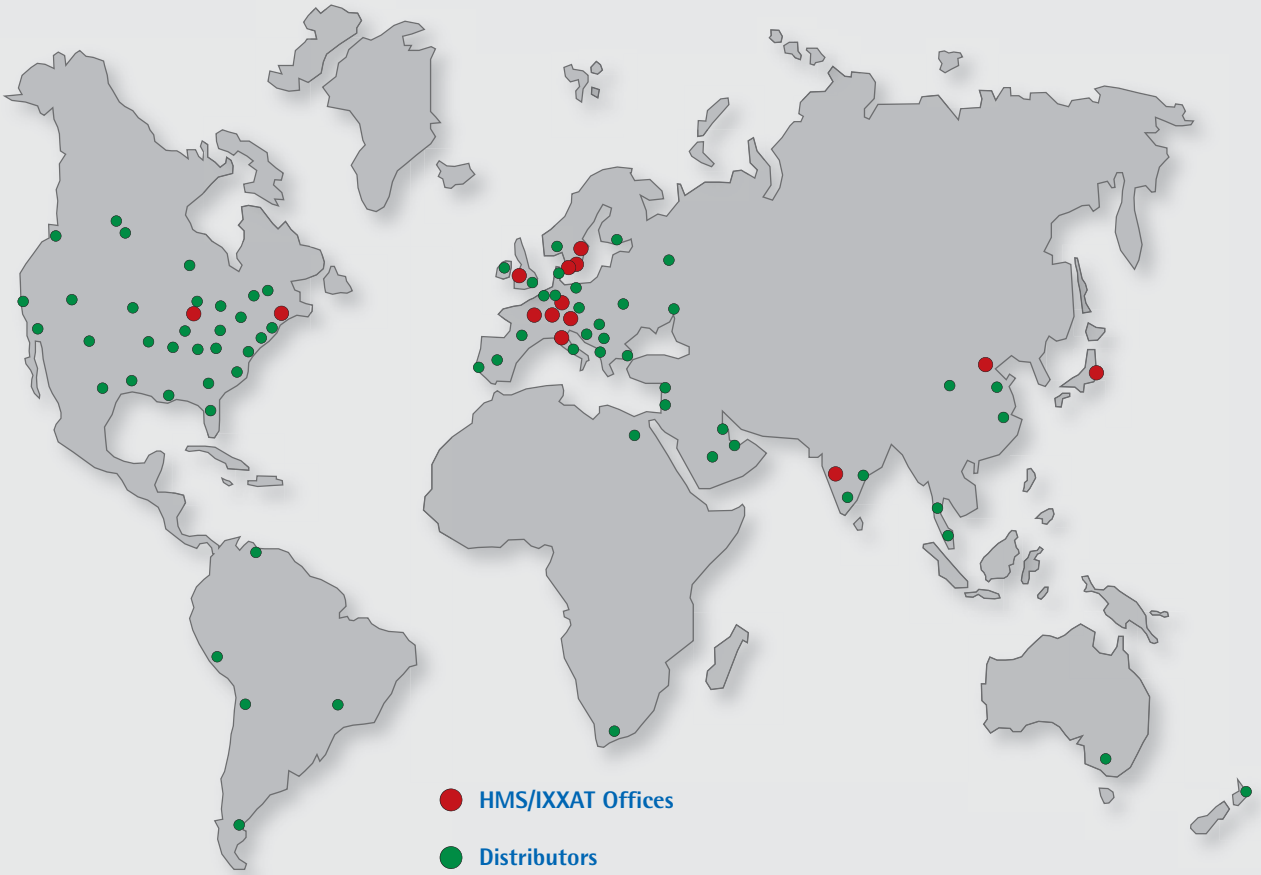
Ethernet media converter with integrated diagnostic function
For a well-known manufacturer of products in the drive automation sector, a converter from copper-based Ethernet to optical Ethernet was developed. The system is capable of diagnosing and adjusting the quality of the optical connection during operation. The particular challenge here was to mix diagnostic data into the Ethernet data stream with the least possible delay. Our FPGA engineers mastered the task with ease.



top: Device with integrated Ethernet media converter; right: I/O module for vending machine; bottom: Decentralized control unit for theater stages

Headquarters, Branches and Distributors

Local Presence Worldwide!



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A detailed list of our worldwide sales offices and distributors is available on our webpage:
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