

Products and Services

for industrial data communication



Automotive Test Platform

IXXAT

Axis Control Unit

EAE

IXXAT

Customer projects

About IXXAT

A reliable and capable partner for 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 turnover in the research and development of new technologies and products.

The quality of our products

For many years quality management has been an essential basis 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 to ISO 9001 standard. 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 have 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 very successful 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 (EtherNet/IP, PROFINET, EtherCAT, POWERLINK, SERCOS III, Modbus-TCP).

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 20 years of experience. In this period we have implemented more than 430 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 20 years in different industries.



**Dipl.-Ing.
Werner Sauter**
Managing Director



**Dipl.-Ing.
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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 and enable a quick and easy switch between cards 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

The scope of supply of every IXXAT CAN card includes the universal "Virtual CAN Interface" (VCI) driver for Windows. This powerful driver package supports all CAN cards, regardless of their PC interface, with a common application programming interface (API).

This means that applications based on the VCI API can be used with all IXXAT CAN cards 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.

The user interface is implemented as a "C" interface and comes with all functions required for the development of CAN based applications. In addition to the "C" interface, the VCI offers a .net API and therefore it can be used with all Windows .net languages and scripts (e.g. C#).

The VCI CAN driver also includes a simple CAN bus monitor "miniMon", which enables the transmission and reception of CAN messages.

ECI driver for Linux, INtime and RTX

For use of the CAN interfaces in real-time environments, IXXAT provides the universal "Embedded Communication Interface" driver (ECI) for INtime,







Product	PC-I 04/PCI	PC-I 04/104	iPC-I 320/PCI II	iPC-I 320/104	iPC-I XC16/PCI	iPC-I XC16/PCle
PC interface standard	PCI	PC/104	PCI	PC/104	PCI	PCI express
Microcontroller	Passive	Passive	8 Bit	8 Bit	16 Bit	16 Bit
Fieldbus interfaces	1 / 2 x CAN	1 / 2 x CAN	1 / 2 x CAN	1 x CAN	2 x CAN 1 x LIN (optional)	2 x CAN 1 x LIN (optional)
CAN controller	SJA 1000	SJA 1000	SJA 1000	SJA 1000	TwinCAN	TwinCAN
CAN bus interface	ISO 11898-2	ISO 11898-2	ISO 11898-2	ISO 11898-2	ISO 11898-2 optional switchable to ISO 11898-3	ISO 11898-2
CAN connection	Sub D9 plug according to CiA 303-1	Angled socket board 2x5	Sub D9 plug according to CiA 303-1	Angled socket board 2x5	Sub D9 plug according to CiA 303-1	Sub D9 plug according to CiA 303-1
Galvanic isolation	optional (1 kV, 1 sec.)	optional (1 kV, 1 sec.)	optional (1 kV, 1 sec.)	yes (1 kV, 1 sec.)	optional (1 kV, 1 sec.)	optional (1 kV, 1 sec.)
Temperature range	-20 °C ... +70 °C	-20 °C ... +70 °C	0 °C ... +70 °C	-40 °C ... +85 °C	-20 °C ... +70 °C	0 °C ... +70 °C
Power supply	5 V DC, 300 mA typ.	5 V DC, 150 mA	5 V DC, 300 mA typ.	5 V DC, 190 mA typ.	5 V DC, 100 mA typ. + 3.3 V DC, 200 mA typ.	12 V DC, 60 mA typ. + 3.3 V DC, 200 mA typ.
Certification	CE, CSA/UL	CE, CSA/UL	CE, CSA/UL, FCC	CE, CSA/UL	CE, CSA/UL, FCC, EN 60601-1	CE, FCC
Dimensions	approx. 95 x 125 mm	approx. 90 x 96 mm	approx. 124 x 97.5 mm	approx. 90 x 96 mm	approx. 89 x 124 mm	approx. 90 x 150 mm
Order number	1.01.0057.xxxxx	1.01.0070.xxxxx	1.01.0039.xxxxx	1.01.0043.10200	1.01.0047.xxxxx	1.01.0053.xxxxx



RTX and Linux free of charge. As with the VCI, the user interface is identical for all operating systems. Thus applications based on ECI can be used with all supported IXXAT CAN interfaces without changing. The application interface is designed as a "C" interface and contains all necessary functions for CAN-based applications.

CANopen, DeviceNet and SAE J1939

For use of the CAN interfaces under CANopen, DeviceNet 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.

					
IPC-I XC16/PMC	IPC-I 165	USB-to-CAN compact	USB-to-CAN II	CAN@net II/VCI	CANblue/VCI
PMC	ISA	USB	USB	Ethernet	Bluetooth
16 Bit	16 Bit	16 Bit	16 Bit	32 Bit	16 Bit
2 x CAN 1 x LIN	1 / 2 x CAN	1 x CAN	2 x CAN 1 x LIN (optional)	1 x CAN	1 x CAN
TwinCAN	SJA 1000	SJA 1000	SJA 1000	SJA 1000	SJA 1000
ISO 11898-2 / 11898-3 switchable	ISO 11898-2	ISO 11898-2	2 x ISO 11898-2 1 x ISO 11898-3 switchable	ISO 11898-2	ISO 11898-2 / ISO 11898-3 switchable
Sub D9 plug according to CiA 303-1	Sub D9 plug according to CiA 303-1	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
yes (1 kV, 1 sec.)	optional (1 kV, 1 sec.)	optional (1 kV, 1 sec.)	optional (1 kV, 1 sec.)	yes (1 kV, 1 sec.)	yes (1 kV, 1 sec.)
-20 °C ... +70 °C	0 °C ... +50 °C	-20 °C ... +80 °C	-20 °C ... +80 °C	-20 °C ... +70 °C	-20 °C ... +70 °C
5 V DC, 100 mA typ. + 3.3 V DC, 200 mA typ.	5 V DC, 250 mA typ.	via USB port, approx. 250 mA	via USB port, 400 mA max.	9-32 V DC, approx. 3 W	9-30 V DC, approx. 2.5 W
CE, FCC	CE, CSA/UL	CE, CSA/UL, FCC	CE, CSA/UL, FCC	CE, CSA/UL, FCC	CE
approx. 74 x 149 mm	approx. 110 x 220 mm	80 x 45 x 20 mm	98 x 55 x 20 mm	22.5 x 100 x 115 mm	88 x 72 x 35 mm
1.01.0049.33660	1.01.0045.xxxxx	1.01.0087.xxxxx 1.01.0088.xxxxx	1.01.0062.xxxxx 1.01.0066.11220	1.01.0086.10200	1.01.0125.00000

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.

The 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 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 or Ethernet.

CAN bridges can connect 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 thus also 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 can

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.)	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)	-	-	F-SMA or 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	1.01.0064.44000 1.01.0064.46000	F-SMA plug 1.01.0063.01010 ST plug 1.01.0063.01020
Accessories	T bus connector 1.04.0073.00000	T bus connector 1.04.0073.00000			

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. As an extension to the CAN bridges, CAN gateways allow for 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.



Product	CANbridge	CAN@net II/Generic	CANlink II	CANblue/Generic
Description	Configurable CAN/CAN bridge	CAN/Ethernet gateway with ASCII protocol and CAN-Ethernet-CAN bridge operation mode	RS232/CAN converter	CAN/Bluetooth gateway with ASCII protocol and CAN-Bluetooth-CAN bridge operation mode
Application field	Extension of the network dimension Network segmentation	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 Linux or embedded applications Flexible network connection via CAN-Bluetooth-CAN bridge
Functionality	Message filtering Identifier conversion Baudrate conversion	Message filtering	CAN/CANopen operation mode	Message filtering
Fieldbus interfaces	2 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 / 11898-3, switchable
CAN connection	DIN rail version via screw terminals Alu version via Sub D9 plug according to CiA 303-1	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	10/100 Mbit/s Ethernet, auto negotiation, auto crossover, RJ45 plug	RS232 (600 to 115200 Bit/s), handshake	Bluetooth specification V2.0, Class 1 / +16.9 dBm (49 mW), 100 m
Galvanic isolation	optional	yes	optional	yes
LED indicators	Power, CAN, Serial	Power, CAN, Ethernet, CPU	Power, CAN, Serial	Power, CAN, Status, Bluetooth
Temperature range	-20 °C ... +70 °C	-20 °C ... +70 °C	-20 °C ... +70 °C	-20 °C ... +70 °C
Power supply	9-36 V, 1.5 W	9-32 V DC, 3 W	9-36 V, 1.5 W	9 - 30 V DC, 2.5 W
Housing, dimensions	DIN rail housing approx. 110 x 75 x 22 mm Aluminum housing approx. 100 x 85 x 32 mm	DIN rail housing approx. 22.5 x 100 x 115 mm	DIN rail housing approx. 110 x 75 x 22 mm	Aluminum housing approx. 85 x 72 x 35 mm
Configuration software	9x/Me/NT/2000/XP/Vista/Win7	Via integrated web server	9x/Me/NT/2000/XP/Vista/Win7	-
Certification	CE	CE, FCC, CSA/UL	CE	CE, FCC
Order number	1.01.0121.xxxxx 1.01.0120.22020	1.01.0086.10201	1.01.0033.xxxxx	1.01.0125.00001

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 therefore has the special advantage of exceptional openness and extendibility.

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

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.

An integral part of the canAnalyser is the database based interpretation and processing of received messages. With this, each CAN identifier can be allocated a message name and the signals within the data field can be broken down, interpreted and displayed as physical parameters. The canAnalyser also processes the widely used CANdb format. The canAnalyser is based on the VCI driver from IXXAT and can therefore be used with all CAN interfaces offered by IXXAT.

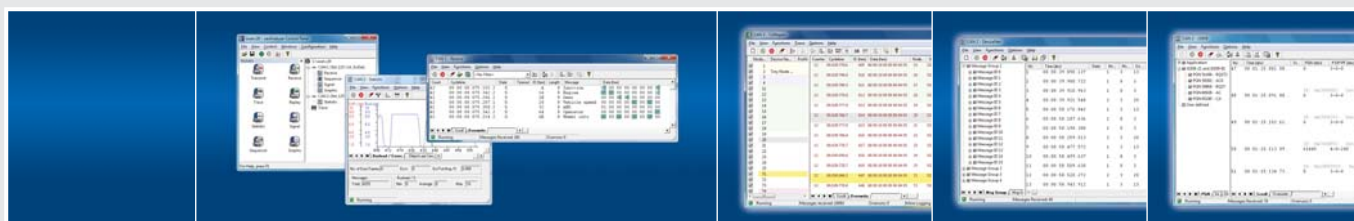
The canAnalyser, the additional modules and the CAN interface card are also offered as a bundle at attractive prices.

Diagnostic tools

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

Based on the analysis results, quick and easy localization and elimination of errors is enabled or an existing system can be optimized to achieve higher reliability. In addition, newly created systems can be subjected to a thorough test.

The CANcorder MMC allows specific logging of CAN messages in stationary or mobile systems



Product	canAnalyser	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	<ul style="list-style-type: none"> - Reception module - Transmission module - Trace module - Sequencer module - Graphic module - Signal module 	<ul style="list-style-type: none"> - Reception module - Transmission module - Trace module - Sequencer module 	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	<ul style="list-style-type: none"> 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 instances Open programming interface Scripting host 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Message display in scroll or overwrite mode Configurable display color (foreground and background) Import of EDS, DCF, XDD files Change highlighting and receive statistics Filtering by node number and message type Interpretation of the LSS protocol and the Flying Master Protocol 	<ul style="list-style-type: none"> Message display in scroll or overwrite 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 	<ul style="list-style-type: none"> Message display in scroll or overwrite mode Interpretation of application, diagnosis and connection management messages Filtering by PGN (Parameter Group Number) destination and source address Export and import of the module configuration and filter settings
Supported operating systems	2000/XP/Vista/Windows 7	2000/XP/Vista/Windows 7	2000/XP/Vista/Windows 7	2000/XP/Vista/Windows 7	2000/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

over long periods in order to evaluate them later, for example with the aid of an analysis tool at the workplace or with a notebook. The device has powerful filter and trigger functions.

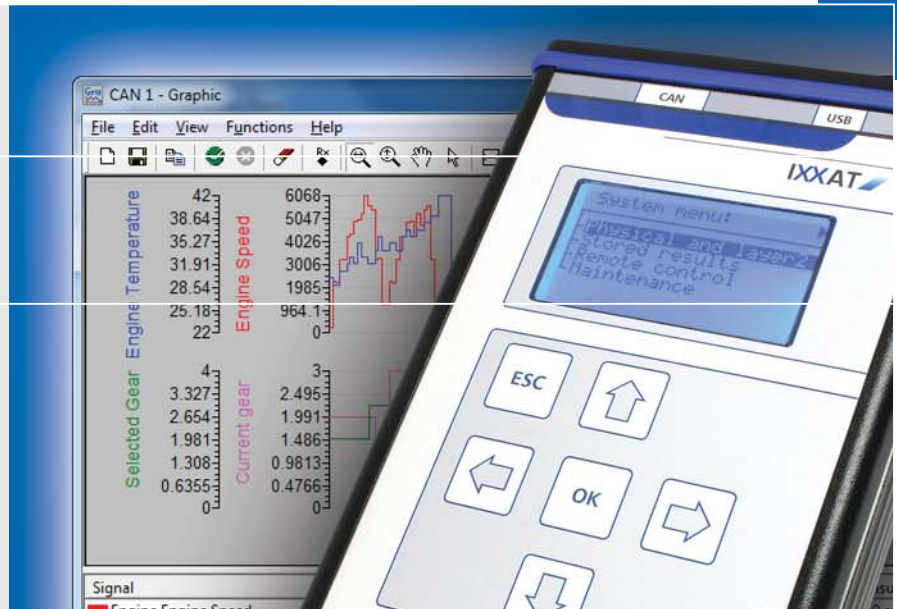
The **CANcheck** is a mobile, robust handheld device offered by IXXAT for maintenance and commissioning CAN systems. With this, for example, the wiring, the line length and the termination resistors as well as the quality of the transmitted signals can be tested.

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)** and the **CANobserver** enable 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.

The **CANobserver** is permanently integrated in the system to be tested and monitors it automatically. The results are displayed directly on the device via LEDs or can be viewed with the integrated web server. Any error occurrence can trigger an e-mail message.

The device saves all error occurrences in the internal memory, so sporadic bus impairments and a slowly deteriorating signal quality can be detected over time.



Product	CANcorder MMC + Remote Control	CANcheck	CAN-Bus-Tester (CBT)	CANobserver
Description	Stand-alone data logger for CAN systems for long-term data recording	Hand-held installation tester for CAN systems for commissioning, troubleshooting and maintenance	Powerful tool for the CAN bus physics and protocol analysis	Long-term monitoring and recording of faults and early failure reporting
Functionality	Recording of data, error and remote frames Storage in ASCII, can-Analyzer, CANalyzer and CSV format Configurable start/stop and filter function CANdb import Sending of predefined messages 4 MB memory, expandable via SD/MMC card Configurable sleep mode SMS transmission and remote access via GSM	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 and 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	Physical monitoring (noise voltage, edges) Logical monitoring (active/passive error frames, overload frames, acknowledge error) Control center access via SNMP Error notification by e-mail Service without a PC, continuous recording Export of results in XML format for processing with the CAN Bus Tester 2
Display	LEDs for status and configuration	LCD display with backlight	-	LEDs for signal quality, errors, bus load, bus status
Fieldbus interfaces	2 x CAN	1 x CAN	1 x CAN	1 x CAN
CAN bus interface	2 x ISO 11898-2 opt. 1 x ISO 11898-3	1 x ISO 11898-2	ISO 11898-2	ISO 11898-2
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 as well as various adapter cables	Sub D9 plug according to CiA 303-1 or screw terminals
Further interfaces	Digital input (TTL, 5 V) and digital output (TTL, 5 V)	USB 2.0 for PC based control and message download	USB 2.0 for PC connection; BNC trigger output for the oscilloscope	Ethernet for configuration and download; Programmable error outputs
Galvanic isolation	optional	-	-	-
Temperature range	-20 °C ... +80 °C	0 °C ... +50 °C	+5 °C ... +40 °C	+5 °C ... +40 °C
Power supply	7 - 50 V DC	4 x 1.5 V AA battery or USB	9 - 36 V DC; Power supply included	9 - 36 V DC
Housing, dimensions	approx. 165 x 85 x 32 mm	approx. 116 x 160 x 34 mm	approx. 40 x 134 x 170 mm	approx. 125 x 50 x 124 mm
Software for operation and configuration	For 9x/Me/NT/2000/XP/Vista	Via terminal program	Win XP/Server2003/ Vista & Win7 (32/64 Bit)	Via integrated web server
Order number	1.01.0096.XXXXX (also for rental)	1.01.0097.00000 (also for rental)	1.04.0401.00000 (also for rental)	1.04.0410.00000
Accessories	1.01.0081.00000 Cable remote control			



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 tools. This enables us to expertly support your project from development to commissioning and certification. Products and solutions from IXXAT are used worldwide in a large number of industries with different requirements, such as medical technology, maritime and factory automation.

Last but not least, our customers benefit from our many years of experience in the implementation of development projects (founding member of the CAN in Automation e.V.) and our active participation in the committees of the CiA.

Protocol software

To implement CANopen in customer-specific devices, IXXAT offers 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 Master/Slave devices, specific software packages also exist, such as the CANopen Manager Software for complex manager devices (e.g. IEC 61131-3 programmable controls), the CANopen Real-Time Software for use with real-time operating systems and the CANopen Maritime Software, which is specially designed for the high safety requirements in maritime automation.

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 and CANopen framework

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 61131-3 runtime environments based on Microsoft Windows PC platforms.

The **CANopen Configuration Framework** enables the integration of a design and configuration functionality in OEM tools, such as PLC programming environments, while maintaining a uniform customer specific look and feel. Here the Framework provides all components and mechanisms required to generate and manage configuration data of a CANopen project.

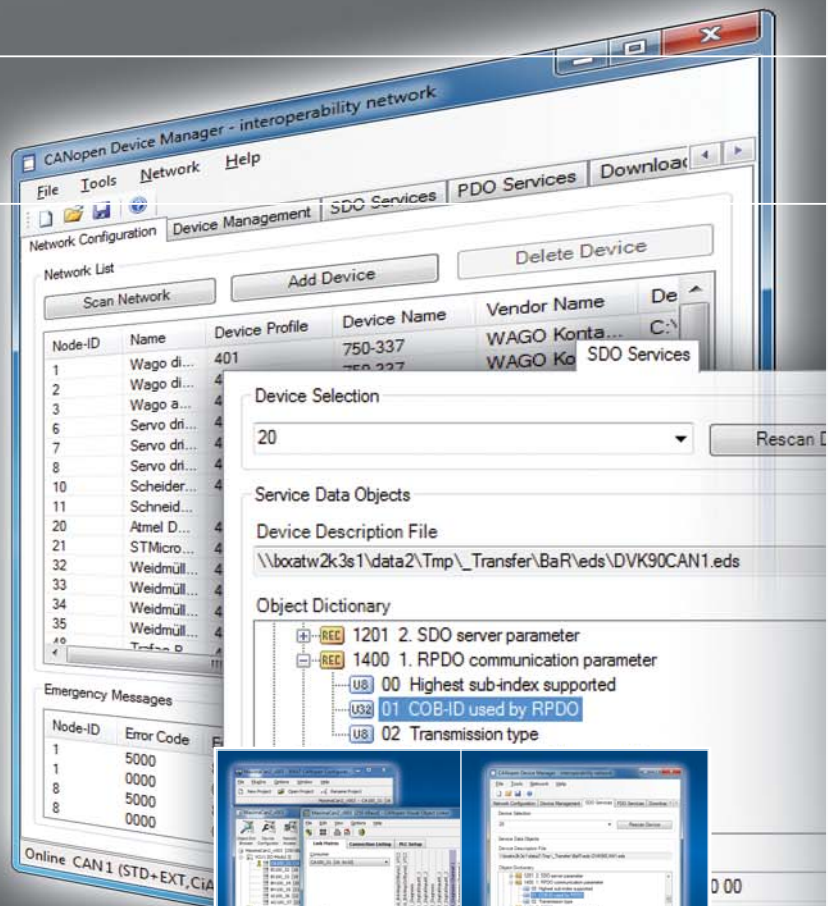
Product	CANopen Protocol Software	CANopen Real-Time Software	CANopen Manager Software	CANopen Maritime Software
Description	Software package for the development of CANopen slave and simple CANopen master devices	Real-time capable CANopen software for the development of CANopen slave and master devices	Software package for the development of sophisticated CANopen master devices	Software for the development of devices with the support of redundant communication mechanisms
Supported standards	CiA 301, CiA 303-3, CiA 305	CiA 301, CiA 303-3, CiA 305	CiA 301, CiA 302, CiA 303-3, CiA 405	CiA 301, CiA 302, CiA 307
Multi-channel support	optional	Target dependent	Target dependent	Target dependent
Max. no. of Server/Client SDOs	127/127* (*CANopen M/S)	127/127* (*CANopenRT M/S)		127/127* (*nur M/S)
Max. number of TPDO/RPDO	512/512	512/512	255/255	255/255
Included functions	Static or variable PDO mapping, multiplexed PDO SYNC, EMERGENCY and TIMESTAMP object NMT functions, Node Guarding, Heartbeat CAN-ID config. according to Predefined Connection Set CAN-ID config. via SDO NMT start-up object Slave assignment list Layer Setting Services, LSS Optional: - Flying master - Startup capable device or NMT master capable device - SDO manager, SDO requesting device	Static or variable PDO mapping, multiplexed PDO SYNC, EMERGENCY and TIMESTAMP object NMT functions, Node Guarding, Heartbeat CAN-ID config. according to Predefined Connection Set CAN-ID config. via SDO NMT start-up object Slave assignment list Layer Setting Services, LSS Abstraction module for integration into operating systems Optional: - Flying master - Startup capable device or NMT master capable device - SDO manager, SDO requesting device	Dynamic PDO mapping NMT functions, Node Guarding, Heartbeat Process image with support of network variables IEC61131-3 support based on CiA 302/405 Auto Configuration Mode for simplified configuration of the process image Standardized NMT start-up procedure, configurable via local object directory Supports CANopen slave devices according to CiA 301 V 3/4 Configuration Manager, configurable via local object directory Support of IEC61131-3 run-time systems (with or without operating system)	Redundant communication, Active CAN Line Mechanism according to CiA 307 Independent NMT state machines NMT master control, Heartbeat Startup capable device and flying master dynamic PDO mapping Maritime multiplexed PDOs SYNC, EMERGENCY and TIMESTAMP object NMT start-up object Slave assignment list
Order number	Slave: 1.02.0122.TTDDC Master/Slave: 1.02.0124.TTDDC Multi-Channel Slave: 1.02.0222.TTDDC Master/Slave: 1.02.0224.TTDDC	Slave: 1.02.0212.TTDDC Master/Slave: 1.02.0214.TTDDC	1.02.0175.TTDDC	Slave: 1.02.0280.TTDDC Master/Slave: 1.02.0281. TTDDC

Tools

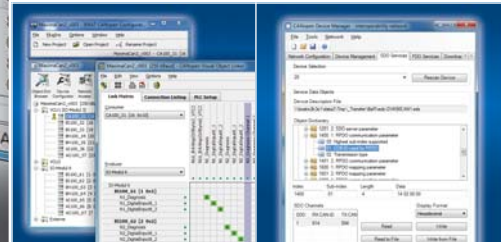
The **CANopen ConfigurationStudio** is a powerful tool for the design and configuration of CANopen devices and systems.

Highlights of the tool are the ergonomic user interface, the modularity and the basic database concept. Implemented on the basis of a Client-Server structure, it is extremely flexible and can be adapted to the individual user's requirements through various program modules.

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



CANopen Master API	CANopen Manager API	CANopen Configuration Framework
Windows API for the development of PC-based control and test programs	Windows API for the development of complex CANopen PC-based control solutions	Components for the integration of projecting and configuration functionality into OEM tools
CiA 301, CiA 305	CiA 301, CiA 302	CiA 301, CiA 302, CiA 306, CiA 311
yes	-	-
- /127	1 /127	-
Hardware dependent	255/255	-
Transmission/reception of client SDOs (expedited, non-expedited, block transfer)	Complete CANopen master functionality including support of the standard boot-up procedure	Automatic PDO mapping and PDO linking
Transmission/reception of PDOs (synchronous and asynchronous)	Automatic configuration of devices at system startup via configuration manager	Support of network variables according to CiA 302 and CiA 405
Reception of emergency messages	Local object dictionary with integrated management of network variables	Clear and easy access to device data
Transmission of SYNC and TIMESTAMP object	Support for CANopen slave devices according to CiA 301 version 3/4	Fast database-driven, management of all configuration and device data from device description files
NMT master functionality for boot-up, node guarding and heartbeat control	Hot-swap support	Management of any number of device description files via catalog
	Simple integration of programs via Windows DLL with "C" interface and process image	COM based interface for integration into OEM tools
	All functions locally parameterized via the object dictionary	
1.02.0132.00000	Software Development Kit: 1.02.0135.00000 Run-Time License: 1.02.0134.00000	On request



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 305, CiA 306	CiA 301, CiA 305, CiA 306, CiA 311
-	-
- /127	- /127
-	Network dependent
Automatic PDO mapping and linking	Extensive CANopen functionality including NMT services, error control services, SDO client, PDO consumer and producer
Support of network variables according to CiA 302 and CiA 405	SDO block transfer
Configuration of CANopen managers according to CiA 302	LSS master functionality
Clear and easy access to device data	Configuration and firmware download
Supporting the integration of IEC61131-3 CANopen PLC programming environments	Adaptable to specific service tasks through customer specific plug-in modules
Quick management of all configuration and device data from EDS and DCF files	Optional: Python scripting engine for creating powerful applications by the users
1.02.0162.00000	CANopen Device Manager: 1.02.0157.00000 Python Script Engine for the 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, today we can look back on a large number of successfully implemented projects worldwide.

We understand the requirements of our customers and support them with products, services and last but not least with our comprehensive know-how 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 our integrated approach. Here we can also fall back on our long-standing partnership with Rockwell Automation, the inventor of the CIP technology. This enables us to provide our 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 possible. In addition, with the clear 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 developed.

The **DeviceNet Master Library** is a software package that IXXAT offers as a Value Added Design Partner (VADP) for Rockwell Automation under license. 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 use of the ODVA DeviceNet Protocol Conformance Test Software on the IXXAT PC/CAN interfaces with VCI V3. With this the customer can check conformance of his device during the development phase and prepare for the official test at the ODVA.

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)	
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 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.TTDC	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. 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 of the 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**, combined with the J1939 CAN driver, J1939 devices can quickly and easily be developed. The software is available in three variants: "Micro" for 8-bit systems, "Single Channel" for solutions

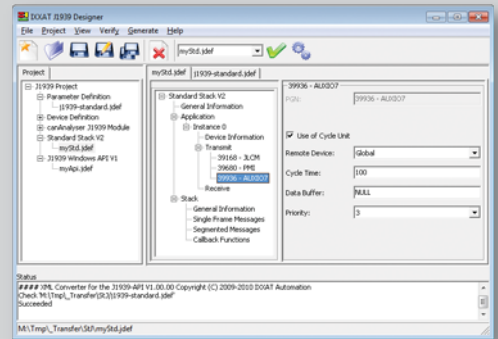
with one CAN channel and "Multi Channel" for solutions with more than one channel.

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 Designer is available for Windows and Linux.

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++, C# or Python.



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	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 1.02.0350.007TT ISO 15765-2 Extension 1.02.0352.00000 NMEA2000 Extension 1.02.0353.00000	1.02.0287.00000	J1939 Designer for Windows 1.02.0360.00000 J1939 Designer for Linux 1.02.0360.00001

CAN – I/O-Module

Analog/Digital Interfaces for CAN Networks

The CANio modules from IXXAT are intelligent modules for the connection of analog and digital signals via CAN-based networks. Thanks to the universal approach, the devices are versatile and can also be adapted very quickly and cost-effectively to specific requirements on request.

The CANio range currently includes two variants, the CANio 100, as the basic module, and the CANio 500, as an independent device. The CANio 100 can be integrated directly into customers' devices. The areas of application here are sensor groups or interface devices where a large number of analog and digital inputs and outputs as well as other interfaces, such as text displays, have to be

connected to a CAN system. The CANio 100 is a tried and tested, and fully qualified module (based for example on the railway standard EN50155) for integration into various areas of application.

The CANio 500 is suitable for use as an independent device. It enables fast and extremely flexible connection of various signals to a CAN or CANopen network – whether in test set-ups, component test benches or vehicles.

If the CANio devices presented do not meet all your requirements for interfaces, design or CAN protocols, the devices can be quickly adapted to your customer-specific requirements.





Product	CANio 100	CANio 500
CAN protocols	CANopen	CAN, CANopen
CAN bus interface	ISO 11898-2	ISO 11898-2
Galvanic CAN isolation	yes (800 V DC)	yes (500 V DC)
Digital inputs	128 (via SPI)	5 x
Digital outputs	128 (via SPI)	4 x, max. 1 Ampere
Analog inputs	8 inputs with 10 bit resolution (2 inputs with socket board)	4 x, 12 bit resolution +/- 5 V, or 0-10 V, or +/- 100 mA
Analog outputs	8 outputs (via SPI)	4 x, 12 bit resolution +/- 5 V, or +/- 10 V, or 0-5 V, or 0-10 V, switchable via software
Further interfaces	1 x UART (RS 232): Gateway CANopen/RS232 without data interpretation, can also be used to control LCD displays 1 x PWM output (can also be used as an analog output with 8 bit resolution) 1 x control for a 4-digit 7-segment display	2 LEDs, controllable via CAN Measurement of the power supply Internal temperature measurement
Temperature range for operation	-25 °C ... +85 °C	-40 °C ... +70 °C
Power supply	4.5 – 5.5 V, max. 100 mA	6-32 V
Types of plugs	DDR2 SODIMM 200 pin connector 0.6 mm, optional 26 pin 2.5 mm pin header (limited I/O functions)	CAN: D-SUB 9 I/O: D-SUB-HD15
Protection class	-	IP42
Dimensions	67.6 x 31.75 x 8.6 mm	120 x 82 x 32 mm
Order number	1.04.0047.00000	Version with 0 to 10 V analog inputs 1.01.0098.00000 Version with -5 bis +5 V analog inputs 1.01.0098.00001 Version with +/- 100 mA analog inputs 1.01.0098.00002

Accessories






Termination Resistors and Cables

As accessories for the CAN products, IXXAT offers terminal resistors of various designs, cables for the connection of nodes, adapter cables as well as glass fiber cables for use in combination with IXXAT glass fiber repeaters.



				
Product	Sub-D9 Connector with Termination	CAN Termination	CAN Termination	CAN Cable
Plug/Sockets	Sub D9 Male/Female	Sub D9 male	Sub D9 female	Sub D9 male to female
Termination	120 Ohm	120 Ohm	120 Ohm	-
Dimensions				2 m
Further information				1-to-1 connection with shielding
Order number	1.04.0075.03000	1.04.0075.02000	1.04.0075.01000	1.04.0076.00180



				
CAN Adapter Cable	CAN Y Cable	T-Bus Connector	Glass Fiber Cable F-SMA	Glass Fiber Cable ST
RJ45 plug to SUB D9 socket	Sub D9 socket to auf socket/plug		F-SMA; Preassembled with two plugs per side	ST; Preassembled with two plugs per side
-				
20 cm	22 cm		2 m *	2 m *
Set of two cables	1-to-1 connection	T-Bus connector for creating star couplers in conjunction with the IXXAT CAN repeaters	Duplex cable; Wave length 820 nm; Glass fiber 50/125 μm; Attenuation 3 dB/km	Duplex cable; Wave length 820 nm; Glass fiber 50/125 μm; Attenuation 3 dB/km
1.04.0074.01000	1.04.0076.00001	1.04.0073.00000	1.04.0003.01012	1.04.0003.01022



* Customer specific length on request.

Industrial Ethernet Module

Industrial Ethernet Module, Design-In and Evaluation Kit

With the Industrial Ethernet Module (IEM), IXXAT offers a universal interface which enables the quick and easy integration of various industrial ethernet technologies into customer-specific applications.

The significant reduction of the development effort, compared with the customer's own development (70 - 80 %), represents a decisive competitive advantage for the customer, which has a direct effect on the time-to-market.

In addition, the FPGA-based design and continual further development ensures future compatibility and a secure investment.

The area of application of the IEM is wherever intelligent devices such as drives, frequency con-

verters, IO modules, valves and other components of automation technology are to be equipped with Industrial Ethernet and where flexibility and extendibility as well as simultaneously clear and foreseeable costs are important.

After successful initial integration, use of the Industrial Ethernet Module enables a fast switch to other Industrial Ethernet standards by simply replacing the module. The consistent separation of the Industrial Ethernet connection from the customer's application allows the customer a more or less cross-protocol implementation of his own application.

Due to the standardization of the hardware and software interface, on the one hand the necessary abstraction from the individual protocol stacks of

the relevant Industrial Ethernet standards is given, and on the other the DPRAM-based access to the process data ensures optimum performance.

The software interface is implemented in ANSI-C and due to its clear, structured design can easily be ported to customer-specific hardware platforms. The API includes all important components to set up and configure communication and complete cyclic and acyclic process data exchange.

Design-In

The Industrial Ethernet Module is also available as a design-in. This allows the customer to integrate the design of the Industrial Ethernet Module into his own PCB and thus implement spatially denser systems that are optimized for his own application.

Product	Industrial Ethernet Module EtherCAT	Industrial Ethernet Module PROFINET	Industrial Ethernet Module POWERLINK	Industrial Ethernet Module EtherNet/IP	Industrial Ethernet Module SERCOS III
Functionality	EtherCAT Slave Node 2 FMMUs 4 Sync-Master Automatic IN/OUT detection of the network interface Emergency Message Support NV-RAM support	PROFINET IO RT Device Conformance Class B Compliant (2-port solution) Integrated store-and-forward switch (2-port solution) Alarm support (200 bytes payload) Support for diagnostic data Max. 5 APIs supported	Ethernet POWERLINK Controlled Node Integrated hub	EtherNet/IP Adapter Integrated store-and-forward switch (2-port solution) Remote reset: 0/1 Connection Classes: 1/3 Unconnected Explicit Messaging DHCP support ACD support	SERCOS III Slave Device Supports all 4 communication channels GDP supported SCP_VarCFG supported
Minimum cycle time	50 µs	1 ms	400 µs	1 ms	31.25 µs
Max size of the cyclic process image	1536	1436 bytes at 1-port version 850 bytes at 2-port version	1536	1500	1536
Max size of the acyclic process data	256	4176 bytes	256	128	256
Configuration	Vendor Code, Product Code, Revision Number, Serial Number	VendorID, DeviceID, StationName, StationType, Device Annotation	Vendor Code, Product Code, Revision Number, Serial Number	Vendor ID, Product Type, Product Code, Product Name, Revision, Serial Number	
Transmission speed	100 Mbit/s, full duplex	100 Mbit/s, full duplex	100 Mbit/s, half duplex	10/100 Mbit/s, full/half duplex	100 Mbit/s, full duplex
Network interface	2 x RJ45, galvanic decoupled	1x RJ45 at single port 2x RJ45 at switch solution galvanic decoupled	2 x RJ45, galvanic decoupled	1x RJ45 at single port 2x RJ45 at switch solution galvanic decoupled	2 x RJ45, galvanic decoupled
Host interface	Double-row 50-pin connector in 1.27 mm grid, electrically connected as address/data bus or SPI				
Power supply	3.3 V, approx. 1 W				
Temperature range	-40 °C ... +85 °C (Industrial temperature range)				
Specifications and certificates	Compliance to the relevant Industrial Ethernet Standard and CE				
Dimensions	72.2 x 57.5 x 16 mm				
Order number	Industrial Ethernet Module: 1.01.0220.02003 Design-In: 4.02.0220.02003	Industrial Ethernet Module: 1.01.0220.02002 - 1-Port 1.01.0220.02006 - 2-Port Design-In: 4.02.0220.02002 - 1-Port 4.02.0220.02006 - 2-Port	Industrial Ethernet Module: 1.01.0220.02001 Design-In: 4.02.0220.02002	Industrial Ethernet Module: 1.01.0220.02004 - 1-Port 1.01.0220.02008 - 2-Port Design-In: 4.02.0220.02004 - 1-Port 4.02.0220.02008 - 2-Port	Industrial Ethernet Module: 1.01.0220.02008 Design-In: 4.02.0220.02008

In addition, IXXAT offers various services for the Industrial Ethernet Module and the design-in package:

- Customer-specific form factor adaptation of the Industrial Ethernet Module
- Wiring diagram reviews for the design-in
- Implementation of customer's systems
- Porting of the API to special microcontrollers.

Evaluation Kit

IXXAT offers evaluation kits for all industrial Ethernet implementations. These offer solutions for Rapid Prototyping, or evaluation options for protocols not yet used by the customer.



IEM Evaluation Kit

Evaluation kits with support for the following microcontrollers:

- Infineon XC161
- TI TMS320
- Coldfire V2

Available for all offered Industrial Ethernet protocols

EtherCAT®

PROFI®
NET

ETHERNET
POWERLINK

EtherNet/IP™

SERCOS
interface

Modbus-TCP

Industrial Ethernet Module Modbus-TCP

Modbus-TCP Slave

Supported Function Codes:

- Read Coils
- Read Discrete Inputs
- Read Holding Registers
- Read Input Registers
- Write Single Coil/Register
- Write Multiple Coils/Register
- Read/Write Multiple Registers

Modbus conformance classes 0 and 1

Integrated store-and-forward switch

-

850 bytes each direction plus 1024 bytes with free selectable direction

250 bytes

According to Function Code 0x43/14

100 Mbit/s, full duplex

2 x RJ45, galvanic decoupled

Industrial Ethernet Module:
1.01.0220.02005

Design-In:
4.02.0220.02005

-

-

-

-

-

-

-

9-32 V DC, max. 10 W (depending on the CPU module)

0°C ... +70°C

165 x 90 x 15 mm (without module)

on request



Protocol Software

The PROFINET IO Developer's Kit is a software package that allows convenient development of PROFINET IO devices with real-time functionality.

It is supplied completely in source code with a sample application and can be easily adapted to various operating systems and platforms with a standard Ethernet controller. Necessary adaptations are encapsulated in defined interfaces to the hardware and operating system in order to carry out porting as simply and cost-effectively as possible.

Product	PROFINET IO-Developer's Kit
Description	Software package for the development of PROFINET IO devices with real time functionality
Supported standards	PROFINET specification
Included functions	Cyclic and acyclic data exchange with a PROFINET IO controller Transmission and reception of diagnostic and process alarms, and plug and pull alarms Assignment of IP addresses and device names via Ethernet
Order number	1.04.0300.00000

Modbus-TCP

Protocol Software

With its Modbus-TCP protocol software, IXXAT offers a package that is extremely easy to port to a wide variety of operating systems, thanks to its clearly structured software interfaces. In this case, maximum flexibility in the integration of the application data by means of internal and external primary tables is given.

The Modbus-TCP Server protocol software enables quick and easy development of Modbus-TCP Server devices. The software has numerous options for configuration and adaptation to the individual application to ensure optimum integration of the stack. For example, the primary table data can be managed both within the protocol software and directly by the customer application.

Due to separate abstraction layers for the operating system and the TCP/IP software, the stack can be quickly and easily adapted to different processors or operating systems.

Product	Modbus-TCP Server Protocol Software
Description	Software package for the development of Modbus-TCP server devices
Supported standards	Conformance class 0, 1, and parts of class 2 Tested in compliance with the Modbus-TCP Conformance Test version 3.0
Included functions	Supported function codes: <ul style="list-style-type: none"> - Read Coils (FC 1) - Read Discrete Inputs (FC 2) - Read Holding Registers (FC 3) - Read Input Registers (FC 4) - Write Single Coil (FC 5) - Write Single Register(FC 6) - Write Multiple Coils (FC 15) - Write Multiple Registers(FC 16) - Read/Write Multiple Registers(FC 23) Support of prioritized connections Configuration of prioritized connections via vendor-specific FC (110) Use with or without operating system TCP/IP connection management
Order number	1.02.0380.00000



Protocol Software and Tools

EtherNet/IP is another technology that IXXAT has been involved in from the beginning. Thanks to our many years of active participation in the ODVA workshops and at the plugfests, we can always contribute state-of-the-art standardization know-how to our customers' projects.

With our experience in the implementation of protocol software and device profiles as well as our continual know-how development, we ensure that our customers' developments always comply with the latest technical standards and also secure the investments of our customers in the future.

Protocol software and Windows API

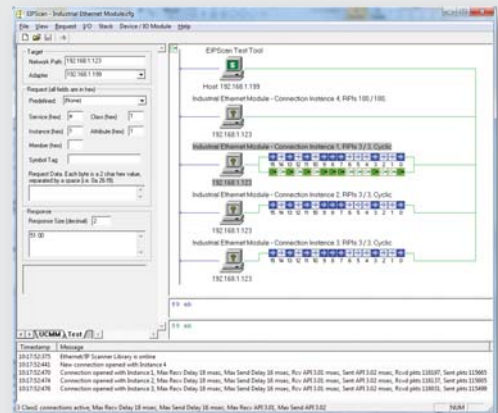
The EtherNet/IP Software Products support the development of PC-based and embedded EtherNet/IP devices. With the Communication Drivers, a powerful Windows library is available, with the Developers Kits a complete EtherNet/IP stack, for

adapters and scanner devices in both cases. 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 further developed.

Tools

The EtherNet/IP product range is supplemented with an EtherNet/IP Scanner Simulation Test Tool 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 Simulation Test Tool (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 objects classes: - UCMM Message Server and Client - Class 3 Message Server and Client - Class 1 I/O Server and Client Scanner simulation: - Display and modification of I/O data - Automatic testing of Class 1 and Class 3 connections
Order number	1.04.0127.00000	1.04.0126.00000	1.04.0125.00000	1.04.0124.00000	1.04.0128.00000

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 further developed.

For example, IXXAT is now the only vendor to offer the complete spectrum of highly available, safe POWERLINK software products. Our 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

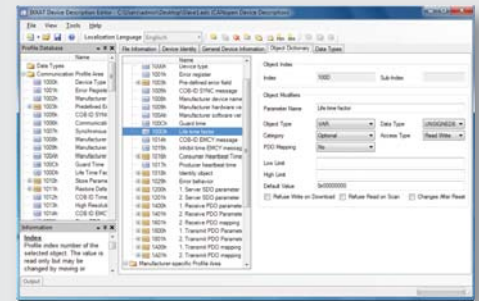
stack is used by numerous renowned vendors and can therefore be regarded as the POWERLINK reference implementation. Unlike other available solutions, the IXXAT software supports a large number of optional POWERLINK objects and services and therefore enables optimum adaptation to the relevant customer 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.

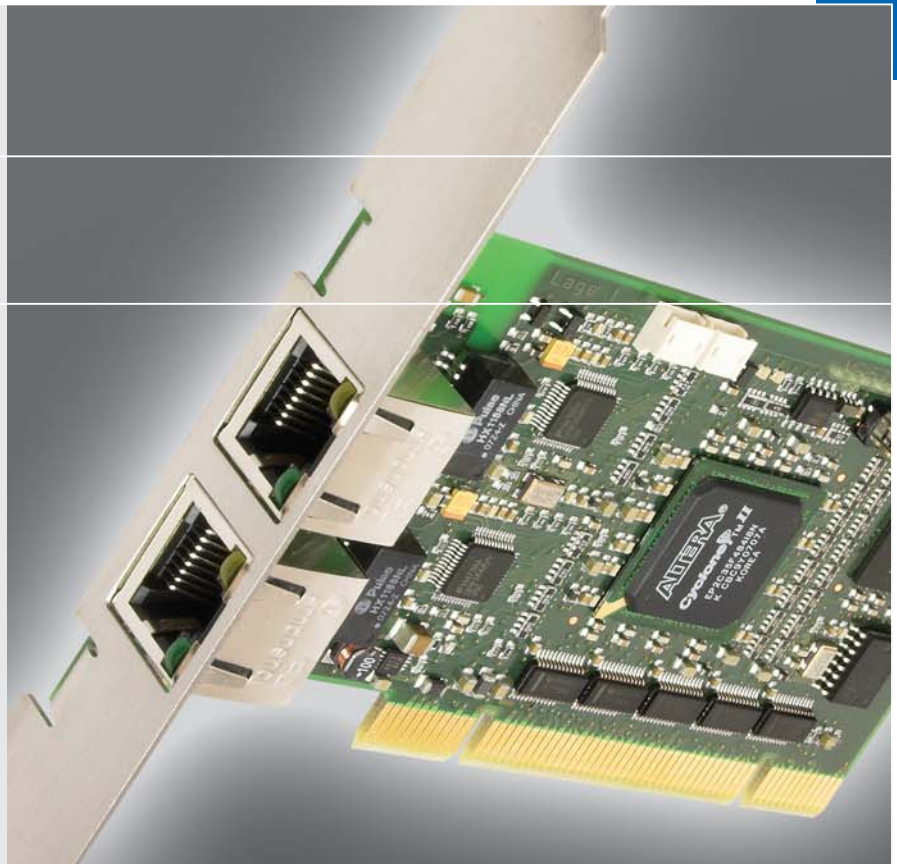
Tools

With the POWERLINK Configuration Framework, IXXAT offers a tool that is integrated into customer applications and provides the user with an intuitive user interface for configuration of the POWERLINK network. Thanks to the simple import and management of XML device descrip-

tion files (XDD), devices of different vendors can be very quickly combined to form a communication network. The complete configuration is created in the cross-vendor Device Configuration File (DCF) format. The ability to integrate customer-specific interfaces and tools makes the Configuration Framework particularly interesting for OEMs.



Product	MN/CN Protocol Software	openSAFETY	Configuration Framework	Device Description Editor
Description	Software package for the easy and rapid development of Managing Nodes (MN) and Controlled Nodes (CN)	Software package for the development of Safety Nodes (SN) and Safety Configuration Managers (SCM)	Component for the integration of a design and configuration function for POWERLINK systems in OEM tools	Tool for the easy creation and maintenance of CANopen and POWERLINK device description and configuration files
Supported standards	EPSPG DS 301 V 1.1.0 EPSPG WDP 302-A V 1.0.4 Pre-certified on the IXXAT IEM Module	POWERLINK Safety Specification 1.1.0	EPSPG DS 301 V 1.1.0 EPSPG DS 311 V 1.0.0	EPSPG DS 311 V 1.0.0
Supported target platforms	Coldfire MCF523x, Altera NIOSII	PC demo, TÜV pre-certified on AT91SAM7 and IXP420	Windows 2000/XP	Windows 2000/XP
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 - Support for Ethernet ring - Redundancy manager and link selector	Operating system independent - runs with or without operating system Easy connection to an insecure transport protocol via abstraction layer Any "unsafe" transport protocol can be used, according to the black channel principle Multiple instancing allows creation of safety domain gateways Designed for use in SIL-3 devices	Automatic PDO mapping and PDO linking Import of XDD files according to EPSPG DS 311 Support of network variables according to CiA 302 and CiA 405 Clear and easy access to device data Fast, database-driven management of all configuration and device data from device description files Management of any number of device description files in a catalog Calculation and verification of all relevant POWERLINK communication and timing settings COM-based interface for integration into OEM tools	Import and verification of XDD files according to EPSPG DS 311 Simple editing and extension of device descriptions via graphical user interface Explanations for protocol-specific objects can be displayed
Order number	CN: 1.02.0290.00000 MN/CN: 1.02.0293.00000, 1.02.0294.00000	Free download on www.ixxat.de	On request	1.02.0165.00000



The **Device Description Editor** is a tool for simple creation and management of CANOpen and POWERLINK device description and configuration files. All inputs are directly checked for plausibility with relation to the POWERLINK specifications.

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, via which guaranteed performance is achieved, for example in Windows systems, regardless 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 and enables 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.

Starter Kit

The POWERLINK Starter Kit contains all components for creating a real-time-compatible demo and reference network and thus 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	POWERLINK MN IP-Core	POWERLINK Starterkit
Description	POWERLINK interface card for PCI bus systems	Managing 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	PCI V2.2; EPSG DS301 V1.1.0
Included functions/features	<p>POWERLINK MN/CN configurable during runtime</p> <p>Complete execution of the POWERLINK communication on the FPGA</p> <p>Network configuration possible via Device Configuration File Format</p> <p>Triple-Buffered Input/Output process image with up to 8 kB each direction</p> <p>Supports up to 240 CNs</p> <p>Fast response times of < 2 microseconds</p> <p>Synchronization with SoC jitter of less than 50 ns</p> <p>Cycle times down to 200 ms</p> <p>Synchronization of multiple cards via external synchronization line</p> <p>Host API in source code</p> <p>Optional</p> <ul style="list-style-type: none"> - Redundant Managing Node - Ethernet Link Selector - Ethernet Ring Redundancy Manager 	<p>Identical communication features like PL-IB300/PCI</p> <p>PL-IB300/PCI development license for the design-in, consisting of schematic and binary stream of the FPGA reference firmware</p> <p>10 runtime licenses for the prototype development</p> <p>Alternative host interfaces, for example parallel address/data bus on request</p> <p>Runs on Cyclone 2C35 FPGA or higher</p>	<p>PL-IB 300/PCI as managing node with Windows MFC application example for the direct visualization of the input and output data</p> <p>IEM-200 POWERLINK with baseboard and XC161 application CPU module as CN</p> <p>Simple digital I/O demo of the XC161 in source code</p> <p>Access to services, for example NMT and SDO, via MFC application sample enables simple device diagnosis</p>
Interfaces	<ul style="list-style-type: none"> - 2x RJ45 Ethernet (integrated hub) - Ext. Sync. In/Out - 32 bit PCI V2.2 	<ul style="list-style-type: none"> - 2x RJ45 Ethernet (integrated hub) - Ext. Sync. In/Out - 32 bit PCI V2.2 	-
Supported operating systems	2000/XP/Vista/Windows7; RTX	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	1.03.0100.00000



Protocol Software

In co-operation with acontis technologies, IXXAT offers an EtherCAT Master Stack with the aid of which EtherCAT controls can be implemented quickly and cost-effectively. The protocol software is available more or less "out-of-the-box" for a large number of systems, therefore providing extremely simple and safe implementation based on the robust 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 as per ETG.1000 and can be extended with 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 protocol software is characterized in particular by its high performance with a low CPU load and can be used with standard Ethernet controllers.

Product	EtherCAT Master Stack
Description	Library for the development of EtherCAT master devices
Supported standards	EtherCAT standard ETG.1000
Included functions	Process data communication Mailbox communication XML-based configuration CAN application layer over EtherCAT (CoE) protocol Ethernet over EtherCAT (EoE) protocol File transfer over EtherCAT (FoE) protocol Distributed clocks Optional support of alias addressing
Error detection and diagnosis	Bus scan with topology and configuration test for the slaves (Recognition without an existing bus configuration, EEPROM Information Service, EtherCAT Slave Information (ESI) format) Detection of cable breaks Incorrect or missing response of the slaves Monitoring of the slave state and slave operation Support of Ethernet link layer debug messages for troubleshooting during runtime
Optional functions (feature packs)	Control of several independent EtherCAT networks by one master Controller for synchronization between master and slave (DC Master synchronization) Master object dictionary with objects for Master status, condition of the slaves, error memory, bus scan result. Access is via SDO transfer. TCP/IP remote interface with the same API for remote and local operations. Feature for diagnostic and configuration tools.
Supported operating systems	Windows CE, VxWorks, KUKA CeWin, KUKA VxWin, QNX Neutrino RTOS, IntervalZero RTX, On Time RTOS-32, Win. XP, Win. 7, Linux
Order number	on request

IEEE 1588

Protocol Software and

As the market leader in the area of IEEE 1588, IXXAT with its IEEE 1588 protocol software has a highly developed, application proved package with a very high scope of functions. Thanks to our co-operation with all renowned semi-conductor manufacturers and our active participation in the relevant committees, we constantly ensure further development of the software according to the latest technical standards and therefore create a solid basis for the future-oriented solutions of our customers.

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 for access to the UDP/IP socket, are grouped together in a separate adaptation layer. This considerably simplifies porting to the target system.

The protocol software is available in two versions:

- IEEE1588 Protocol Software OC for implementation of end devices with only one network interface
- IEEE1588 Protocol Software OC/BC/TC for implementation of network components with several network interfaces

The **IEEE 1588 IP-Core Module** for FPGAs is used to implement 1588 devices with high accuracy. Due to the im-

Product	IEEE 1588 PTP Protocol Software
Description	Software package for an easy and rapid development of IEEE 1588 devices
Included functions	Support for Ordinary, Boundary and Transparent Clock Multiple instantiated, e.g. simultaneously TC + OC Best Master Algorithm Management Protocol/Interface Unicast/Multicast support One step/two step support Peer-to-peer and end-to-end delay mechanism Communication via IPv4, IPv6 and 802.3 Simple API for the application connection Easy adaptation to the target hardware, TCP/IP stack and operating system
Order number	Protocol SW with OC/BC/TC 1.02.0314.L1nnn Protocol SW with OC 1.02.0314.L2nnn Packet Delay Variation Filter 1.02.0317.10000

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 and NicheLite are full and easy to port TCP/IP stacks containing all basic products for internet, intranet and LAN connections. With the NicheStacks, implementation of TCP/IP in embedded devices is simple. The stacks save resources. The NicheLite Stack requires only approx. 12 kB of code. The software packages can be used both with and without any operating system.

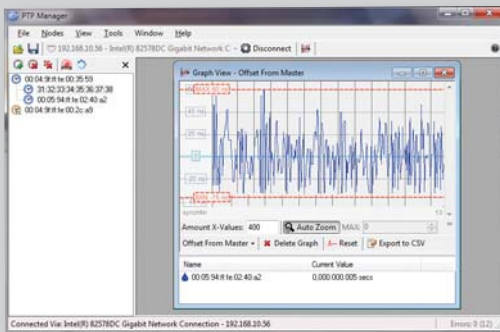
The NicheStack is available in a variant for the standard IPv4 and for the new internet standard IPv6. The NicheStack Dual supports both IPv4 and IPv6 and enables parallel use of both protocols in one network.

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

Product	NicheStack IPv4 & NicheLite TCP/IP	NicheStack IPv6 & Dual IPv4v6	Extensions
Description	Protocol software for the implementation of TCP/IP in microcontroller systems	Protocol software for the TCP/IP implementation with the latest IPv6 support	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) - NicheTask (on request) NicheStack also includes - FTP Server - Telnet Server - Multicast - NicheTool	- NicheStack IPsec/IKE - NicheStack SSL - 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 - InterNiche HTML-Compiler - NicheView	- NicheStack TELNET-Server - NicheStack PPP - NicheStack FTP Server
Order number	on request	on request	on request

IP-Core Module

Implementation of the real-time clock and time stamp unit in the FPGA, clock synchronism in the two-digit nanosecond range is 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 IP-Core Module for FPGAs	IEEE 1588 PTP Management Tool
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
Setting/adjustment of the real time clock via software	Automatic detection of PTP clocks in the network
Time stamping of external input signals via trigger unit	Supports multicast and unicast
Triggering external output signals based on configurable timers	Supports data sets of the Ordinary, Boundary and Transparent Clocks
Mill interface for detection of incoming/outgoing Sync messages	Display of the master/slave relationship of PTP clocks in tree hierarchy
Standard address bus/data bus interface	Display of the PTP clock data sets
Buffer for timestamp and additional information for message assignment, including the possibility of interrupt generation	Adjustment of the clock configuration using SET and COMMAND messages
Variable external clock frequency	Graphic output of "One Way Delay", "Offset from Master" and "Observed Drift"
Generation of external PPS signals to check the clock synchronization	Adjustable PTP domain
1.02.0315.LVnnn	1.02.0318.10000



● **Distributors**

Further information about our distributors can be found on our website www.ixxat.com

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