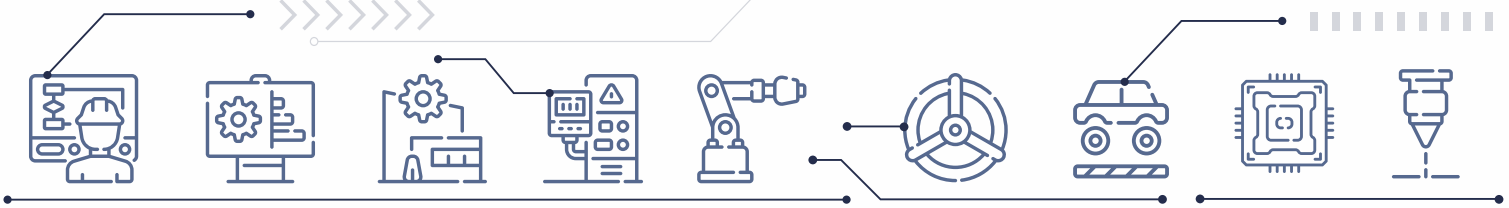
ViSuTech System

Software solutions for industrial automation

EtherCAT • Motion • Automation



Contents

Visutech System

EtherCAT

Motion

About us

25+
years of experience
in industrial automation

500+
various companies around
the world use our software based
on the EtherCAT technology

40+
highly qualified
employees

Visutech System began its history in 1998 and, for more than 20 years, creates innovative and reliable products for industrial process automation.

Our team has gained extensive experience with various industrial buses and networks: EtherCAT, Modbus, CAN, Profibus, and others.

Since 2012, Visutech System is a member of the EtherCAT Technology Group (ETG), an international association of users and developers of the EtherCAT technology. The company has become one of the leading experts in this technology and offers its own line of software products for EtherCAT, including:

- EtherCAT network management stack – VS EtherCAT Master
- EtherCAT bus configuration and diagnostic tool – VS EtherCAT Studio
- Software stack for developing slave devices – VS EtherCAT Slave

Considering the growing role of robotics in industrial automation, Visutech System offers a universal solution for controlling moving parts of equipment - a set of VS Motion Control libraries.

Our products support various operating systems: **Windows, INtime, RTX64, Linux, Xenomai, QNX, VxWorks, FreeRTOS, ITRON** and others.

Visutech System software solutions can be used both independently and as a single automated control system for any industry.

Our team helps to choose and develop the software according to the characteristics of each production and features in the organization and use of equipment.

We provide full technical support and update our software regularly to help our customers to reduce costs and improve the performance of industrial equipment.

Quality standards

Visutech System quality management is certified according to ISO-9001:2015

Member of EtherCAT Technology Group since 2012

Compliance with the OPC Interoperability standard

VS EtherCAT Master

EtherCAT network control

VS EtherCAT Master is software stack with additional functions and extensions for real-time operating systems that is used to configure, diagnose and control the EtherCAT network.

Benefits and key features

- **Meets EtherCAT Technology Group (ETG) standards**

  VS EtherCAT Master complies with the standards of the international association EtherCAT Technology Group ETG: 1500. Two packages are available: Class A (Standard package) and Class B (Basic package). Moreover, Visutech System introduces Premium package, which includes various additional features and extentions.

- **Available for numerous operating systems, as well as OS-less systems**

  VS EtherCAT Master is available for numerous operating systems, including Windows, INtime, RTX64, Linux, Linux+Xenomai, QNX, VxWorks, FreeRTOS, ITRON, as well as OS-less systems. Upon request, Visutech System experts can adjust support for any operating system.

- **Hardware extensions for Xilinx/Intel FPGA (Altera) and Texas Instruments PRUSS Sitara CPU**

  Availability of IP Cores for Xilinx and for Intel FPGA (Altera) FPGAs, PRUss co-program for Texas Instrument Sitara CPUs (AM47x and AM57x) increases productivity and data processing efficiency. Implementation for AM6x is available upon request.

- **Auto Configurator for online configuration**

  VS EtherCAT Master can configure bus on the fly without EtherCAT configuration tools. The Auto Configurator module allows a user application to select slave's configuration and to switch between different configurations of the slave, for example, between position control of a drive and velocity control, or between bus configurations with a different number of slaves.

- **Process image logging for data transferring into analytic tools**

  Process image (PI) logger allows to collect real-time data for transferring to other levels without influence on real-time behavior of the control system. Data can be transferred to MATLAB, LabView (TDMS format), and any other analytic tools. Moreover, Visutech System has designed a special Python extension, which allows to aggregate data into a file of any format, for example a CSV-file, for its further processing.

Feature packages

Features	Basic	Standard	Premium	[1]Full
Process Data Exchange	+	+	+	+
Network Configuration	+	+	+	+
Mailbox support	+	+	+	+
CoE	+	+	+	+
FoE	+	+	+	+
Synchronization with Distributed Clock (DC)	*	+	+	+
DC support	+	+	+	+
Time distribution (Slaves synchronization)	+	+	+	+
Slave-to-Slave Communication	+	+	+	+
Explicit Device Identification	-	+	+	+
EoE	-	+	+	+
SoE	-	+	+	+
AoE	-	+	+	+
VoE	-	+	+	+
Continuous Propagation Delay compensation	-	+	+	+
Sync window monitoring	-	+	+	+
Synchronization of Master with Slaves	-	+	+	+
Feature Pack ([2]FP)				
FP External Synchronization	-	*	*	+
FP Cable redundancy	*	*	+	+
FP Hot Connect	*	*	+	+
VS Extensions ([3]EX)				
EX Data logger	*	*	+	+
EX Frame logger	*	*	+	+
EX PI Snapshot	*	*	+	+
EX Events handler	*	+	+	+
EX PI logger	*	*	*	+
EX CAN DBC driver	*	*	*	+
EX VCOM driver	*	*	*	+
EX Online configuration	*	*	*	+
EX Optimized drivers and HW Extensions	*	*	*	+
EX Hardware timed send	+	+	+	+

"+" – included in the delivery set
"-" – not included in the delivery set
"*" – may be included in the delivery set
[1]Full – this class includes all existing functionality at the time of a purchase, as well as all the functionality that will be developed in the future
[2]FP – (Feature pack / additional functionality)
[3]EX – (Extension / functional extension)

Custom Development

Visutech System offers specific software development for customers who require additional support for integrating EtherCAT capabilities into their applications or solutions. Our company has extensive experience in fieldbuses, embedded systems, real-time operating environments, industrial automation solutions for various fields of application.

VS EtherCAT Slave Stack

Software stack for device development facilitation

VS EtherCAT Slave is a software stack, which is developed to run on microcontrollers, CPUs, or DSPs with or without any operating system (OS) and is especially designed to minimize time to market for companies that want to be a part of dynamically increasing EtherCAT market.

Benefits and key features

- **Meets EtherCAT standards**

  VS EtherCAT Slave stack supports all features defined in EtherCAT standards. Each new version of the stack is verified with the latest released and all internal versions of the EtherCAT Conformance Test Tool (CTT).

- **Portability**

  VS EtherCAT Slave Stack may be presented as a software stack with embedded Hardware Abstraction Layer (typically implemented through OSAL and driver part), which can be used for simple support of any EtherCAT ASIC and communication interface (PDI) between ASIC and a microcontroller.

- **Optimized memory usage for embedded platforms**

  Used RAM size depends on application design and the size of the Object Dictionary (OD). For example, in case of static OD usage (a build based on source code):

  RAM size:
  - >= 3 KB for Basic package
  - >= 8KB for Standard package

  ROM (flash) size:
  - >= 55 KB for Basic package
  - >= 64 KB for Standard package

  Moreover, to minimize a final size of the application, VS EtherCAT Slave Stack may be customized by editing the configuration file, for example, it is possible to deactivate Mailbox EoE, Mailbox VoE and Mailbox FoE.

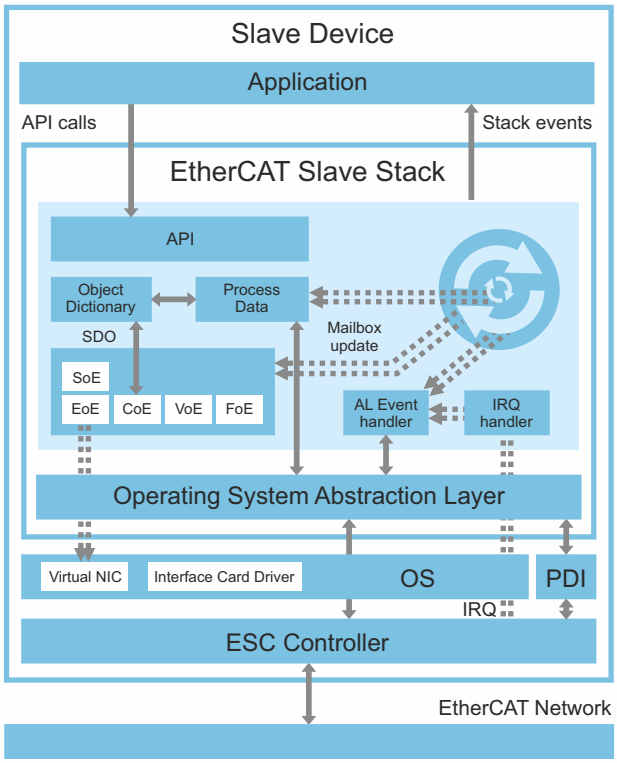
- **Support**

  Visutech System offers a technical support contract for 1 year (period of installation, debugging and implementation).

Feature packages

Features	Basic	Standard
Mailbox protocol: CoE.	+	+
Static OD with pointer given from application.	+	+
With or without Interrupt Service Routines (ISR).	+	+
Mailbox protocols: EoE, FoE, SoE, VoE.	-	+
Runtime generation and changing of the OD.	-	+
Adaptation to operating system by using Operating System Abstraction Layer (OSAL).	-	+
Virtual Ethernet card support for EoE (depending on OS).	-	+

Workflow



An EtherCAT Slave Stack package may include a set of ready solutions for specific platforms and operating systems, such as:

Platforms:

- XMC4800 (Infineon)
- Microblaze (Xilinx)
- Sitara AM335x with ESC PRU (Texas Instruments)
- C2000 (Texas Instruments)
- STM32 (ST)
- NIOS II (Intel FPGA/Altera)

Operating systems:

- Linux (with/without RT-Preemption patch)
- Linux + Xenomai
- QNX
- No OS

VS EtherCAT Studio

EtherCAT configuration tool

VS EtherCAT Studio is a second generation of a user-friendly tool for EtherCAT bus configuration and diagnostics. This lightweight, high-performance standalone Windows application natively supports all the advanced features of VS EtherCAT Master.

Benefits and key features

- **Meets EtherCAT Technology Group (ETG) standards**

  VS EtherCAT Studio is compliant with EtherCAT Technology Group (ETG) standards and can create ENI (EtherCAT Network Information) files for EtherCAT masters from various vendors.

- **Extended Slaves Library**

  Slaves Library is a list of available ESI (EtherCAT Slave Information) files, which can be used to build up the project configuration. VS EtherCAT Studio provides an opportunity to work with several Slaves Library collections, change an active collection by using a custom collection and manage Slaves Library view by setting user attributes for slaves.

- **Several feature package modifications**

  VS EtherCAT Studio is delivered as a Basic, Standard, Premium or customized feature packages depending on customer's demands.

- **Available for integration**

  VS EtherCAT Studio can be integrated into any custom application using SDF API (.NET, COM) or .NET Remoting.

- **Customization of features in the package**

  In the delivered package, features can be activated or deactivated according to the customer need. Moreover, there is a possibility to customize brand data, such as a product name, logo, copyright and contacts.

- **Problem diagnostics**

  VS EtherCAT Studio includes system problem diagnostics, which provides clear data interpretation for further successful problem solving.

Feature packages

Features	Studio version	Basic	Standard	Premium	Full[1]
Studio					
Scaling Signal Values	1.12, 2.10, 2.11	+	+	+	+
.NET Automation interface	2.10, 2.11	-	+	+	+
Slaves Library	1.12, 2.10, 2.11	+	+	+	+
Project Access Limitation	1.12	-	-	+	+
Export UESI for Autoconfigurator	2.10, 2.11	-	-	+	+
Engineering Unit Mapping	1.12, 2.10, 2.11	-	+	+	+
Plug-ins for configuring specific devices					
CANopen Master/Slave (EL6751)	1.12, 2.10, 2.11	+	+	+	+
Profibus Master/Slave (EL6731)	1.12, 2.10, 2.11	+	+	+	+
Bridge terminals (EL6692/EL6695)	1.12, 2.10, 2.11	+	+	+	+
Modular Devices	1.12, 2.10, 2.11	-	+	+	+
Virtual Serial COM	1.12, 2.10, 2.11	-	-	+	+
MDP Profibus Master Gateway Profile 3100	1.12, 2.10, 2.11	*	*	*	+
Tools					
Topology Viewer	1.12, 2.10, 2.11	+	+	+	+
Snapshot Viewer	1.12, 2.10, 2.11	+	+	+	+
Chart Viewer	1.12, 2.10, 2.11	+	+	+	+
Diagnostic scanner	1.12, 2.10, 2.11	+	+	+	+
S2S Communication Editor	1.12, 2.10, 2.11	+	+	+	+
EEPROM Editor	1.12, 2.10, 2.11	-	+	+	+
Comparing tools	1.12, 2.10, 2.11	-	-	+	+
Data logging tools	1.12, 2.10, 2.11	-	-	+	+
Fixed Process Image Editor	1.12	-	-	+	+
Sample Rate Editor	1.12	-	+	+	+
Process Image Viewer	1.12, 2.10, 2.11	-	+	+	+
Motion Configuration Utility	1.12, 2.10, 2.11	+	+	+	+
Master Output	1.12, 2.10, 2.11	-	+	+	+
Emergency Output	1.12, 2.10, 2.11	+	+	+	+
Watch Viewer	1.12, 2.10, 2.11	+	+	+	+
Dashboard	2.11	+	+	+	+
Dashboard customization	2.11	-	-	+	+
Common					
DC	1.12, 2.10, 2.11	+	+	+	+
Tasks/Sync Units	2.10, 2.11	+	+	+	+
Power calculation via LVDS	1.12, 2.10, 2.11	-	-	+	+
Master					
Cyclic Commands	1.12, 2.10, 2.11	+	+	+	+
ENI Export	1.12, 2.10, 2.11	+	+	+	+
External task	1.12, 2.10, 2.11	+	+	+	+
PI Alignment	1.12, 2.x - disabled	-	+	+	+
Master Watchdog	1.12, 2.10, 2.11	-	+	+	+
Master Mailbox. AoE	1.12, 2.10, 2.11	-	+	+	+
Master Mailbox. EoE	1.12, 2.10, 2.11	-	+	+	+
ENI Export. XSLT Scheme support	1.12, 2.10, 2.11	-	+	+	+
Cable Redundancy	1.12, 2.10, 2.11	-	-	+	+
Slave					
Slave Mailbox. CoE	1.12, 2.10, 2.11	+	+	+	+
Slave Mailbox. FoE	1.12, 2.10, 2.11	+	+	+	+
Slave Watchdog	1.12, 2.10, 2.11	-	+	+	+
Slave Mailbox. AoE	1.12, 2.10, 2.11	-	+	+	+
Slave Mailbox. EoE	1.12, 2.10, 2.11	-	+	+	+
Slave Mailbox. SoE	1.12, 2.10, 2.11	-	+	+	+
Configuring Init Commands	1.12, 2.10, 2.11	-	+	+	+
FMMU/SM	1.12, 2.10, 2.11	-	+	+	+
Direct Memory access	1.12, 2.10, 2.11	-	+	+	+
Direct EEPROM access	1.12, 2.10, 2.11	-	+	+	+
Explicit identification	1.12, 2.10, 2.11	-	+	+	+
Hot Connect	1.12, 2.10, 2.11	-	-	+	+

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Full[1] – this class includes all existing functionality at the time of a purchase, as well as all the functionality that will be developed in the future

VS Motion Control

Software for Motion Control

VS Motion Control is a library used in software motion to turn any device to motion controller using position, velocity or torque control. VS Motion Control is specially designed for automation industry, medicine, and other fields, where it is necessary to control the moving parts of equipment, for example, for numerical control (CNC) machines. VS Motion Control is implemented according to PLCopen specifications.

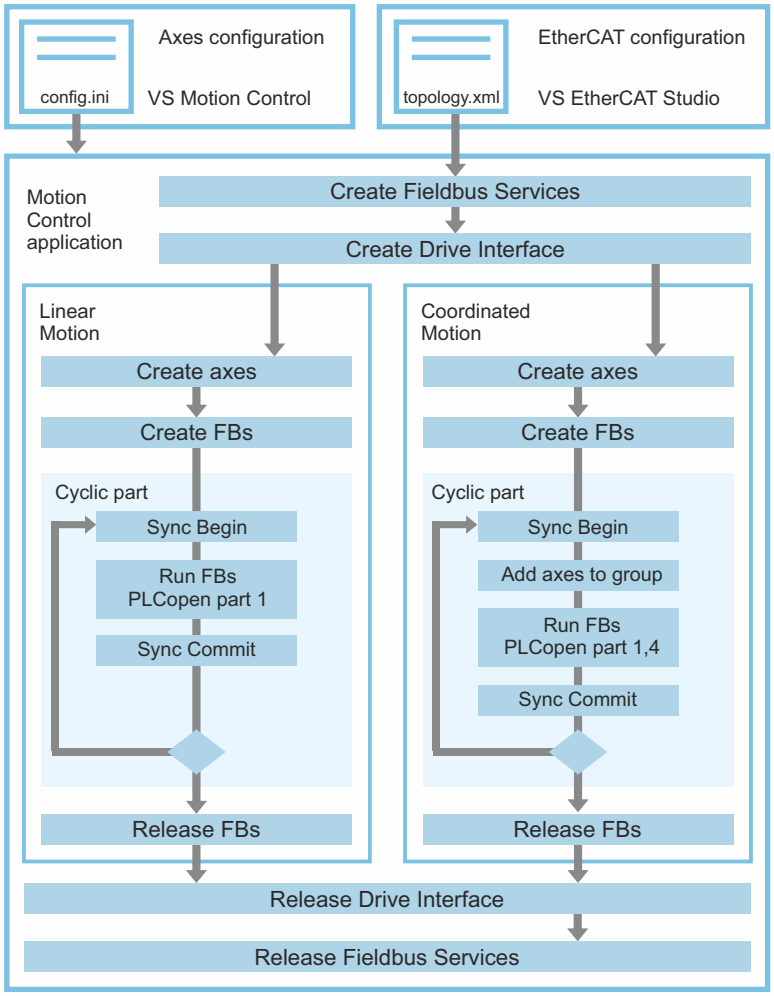
Benefits and key features

- **3D-axis, synchronized axis and single-axis motion control**
  VS Motion Control provides the opportunity to create custom applications for managing portal systems and 3D-axis motion with complex trajectories.
- **Time-optimal trajectory generation on the fly**
  Internal algorithms of VS Motion Control allow to generate time-optimal trajectories at each motion cycle.
- **Jerk-limited**
  VS Motion Control helps to reduce equipment wear, acoustic noise, and loads amplitude in motion.
- **Operating System Abstraction Layer**
  VS Motion Control is compatible with various systems due to developed Operating System Abstraction Layer (OSAL).
- **Bus Abstraction Layer**
  Bus Abstraction Layer (BUSAL) allows to interact with drivers based on various profiles, such as CiA402/DS402, SERCOS and PROFIdrive.
- **Available for various CPUs**
  VS Motion Control offers multi-thread processing for multi-core CPUs and is also optimized for low-end CPUs.
- **Native EtherCAT bus support**
  EtherCAT bus support is provided by a comprehensive own-developed master driver.
- **Meets industry standards**
  koenig-pa GmbH is a voting member of PLCopen Group. VS Motion Control supports PLCopen specifications with additional extensions.

Workflow

VS Motion Control is delivered as an archive, which includes documentation, header files, libraries and examples. Remote usage of product capabilities is provided by proxy development kit. VS Motion Control allows to control drives using a non-real-time OS on the client side due to motion control performed in a real-time OS on the server side.

VS Motion Control is complemented with Motion Configuration Utility – a plug-in of VS EtherCAT Studio, which allows to create configuration, check it and generate configuration files for custom applications.



VS Motion Proxy

VS Motion Proxy is an add-on to VS Motion Control that allows to transfer control logic of the real-time application to the non-real-time system. It means, that this add-on provides remote control of real-time motion application. The addition consists of two parts: client (works on non-real-time system) and server (works on real-time system). VS Motion Proxy is a bridge for GUI interfaces which allows to increase application interactivity and to improve visualization of the application.

Visutech System is your partner in the field of industrial automation

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