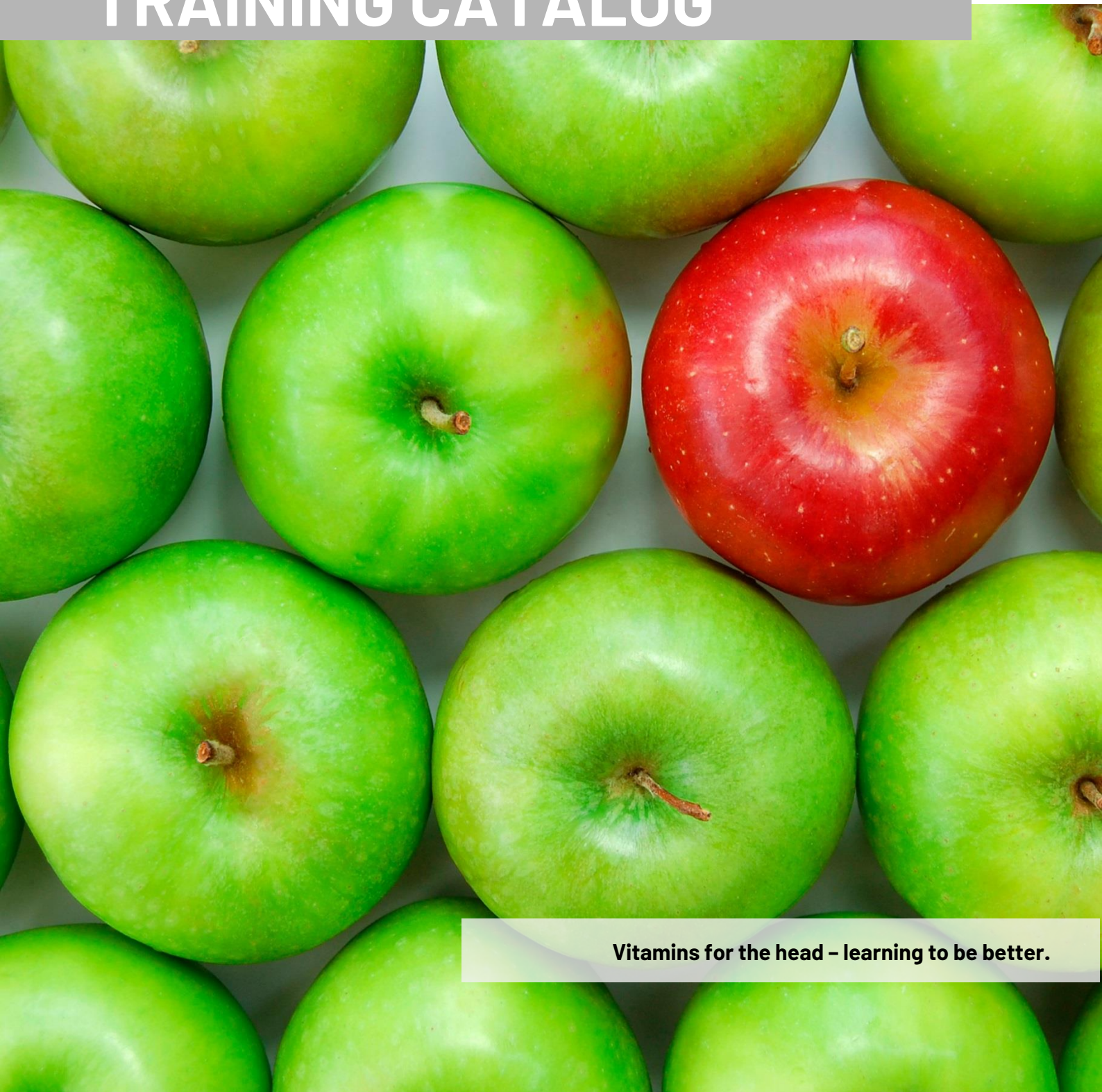




Academy

TRAINING CATALOG



Vitamins for the head - learning to be better.

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Training Catalog of the Sensor-Technik Wiedemann Academy

Our training offers for you

We proudly present this new training catalog of the Sensor-Technik Wiedemann Academy.

The courses have been selected with great care. We derived the course contents and objectives from our experience with the introduction of our products at our customers and from their questions at our product support organization.

Our offer extends from courses of several days duration about the whole range of STW's product portfolio to short informative meetings like video conferences or workshops with selected topics about the technology of our products.

Beside the classic classroom based training, we offer self-learning material like videos.

Trainers

As all our trainers work in the departments Development & Research and Customer Support, they have acquired excellent knowledge of our products and solutions. Feel free to benefit directly from their expertise.

Course Content and Dates

Standard courses have a defined content. They are published in this catalog and on our homepage in the internet and will be constantly updated. Via the homepage you can send us your request for a specific course with a form. We will then contact you immediately to make an appointment.

Do you have specific training needs? We would be happy to offer you a customized training to meet your requirements. Dates and duration of the training can also be arranged according to your needs. Please feel free to contact us with your specific requirements and we will send you an individual offer.

Course Booking

After determining the content, duration and date for a course, you will receive an offer from our sales department to order the course.

Contact:

Sensor Technik Wiedemann GmbH

Am Bärenwald 6

87600 Kaufbeuren

Telefon: +49-8341-9505-0

Telefax: +49-8341-9505-55

e-mail: akademie@wiedemann-group.com

Location

The courses take place in the facilities of the Sensor-Technik Wiedemann Academy in Kaufbeuren. We support your learning success with up-to-date presentation technology and with equipment fitted to practical exercising in small groups.

Alternatively, we can adapt the courses to your requirements regarding content and time. As well, we can execute courses in your facilities. Please contact us and we will make you an individual offer.

Technical Equipment

STW-devices like controllers, test boxes, telematics modules or powerMELA-motors are available for practical exercises. For programming, PCs can be provided on loan if required. However, we recommend to bring your own laptops in order to use your familiar working environment.

Price

The prices mentioned in the catalog are short-prices for the course with 1 to 6 participants. If we execute the course at your facilities, we additionally charge you travel expenses for the trainer.

General Course Plan

The courses are executed in 9 teaching units of 45 minutes between 9 a.m. and 5 p.m.

Coffee, cold drinks and a lunch in the company canteen are included in the course price, if the course is executed in the facilities of the Sensor-Technik Wiedemann Academy in Kaufbeuren.

Hotel Accommodation

We are happy to support you with the arrangement of hotel accommodation close to the Sensor-Technik Wiedemann Academy in Kaufbeuren.

Getting Started with controllers from STW

Getting Started with the Starter Kit

Brief Description:

The video introduces the starter kits from STW and how the user can quickly commission a controller with additional components from the case and check that it is working properly. The video is aimed at all customers who have purchased a starter kit from STW.

Objectives:

The participant

- Knows the components from the starter kit
- Can connect the controller correctly to the power supply and start it up with the ignition signal
- Can check that the controller is working properly using the LED signals

Prerequisites:

none

Contents:

- Presentation of the starter kit using the ESX.3cs as an example
 - Controller and breakout board
 - Cable connections
 - Power supply
- Demonstration of commissioning
 - Minimum cabling for the power supply
 - Ignition signal
 - Correct voltage setting
- Function test
 - Switching on with the KL 15 switch
 - Checking the LED blink codes

Course Identifier	VIDGSSTK
Course Number	VTE001
Course Type	Video
Target Group	Users of STW starter kits
Duration	5 min
Price	Free of charge
Location	STW YouTube Kanal



The [video](#) is available for watching on the [STW YouTube Channel](#).

Getting Started with controllers from STW

Getting Started with the Software Packages from STW

Brief Description:

The video introduces the software supply by STW with the Customer Portal. It demonstrates how a customer receives individual access to the Customer Portal and can then download the required software. It then shows how the downloaded software packages can be installed in order to obtain a functional development environment. The video is aimed at developers who want to program a STW controller.

Objectives:

The participant

- Knows the STW Customer Portal
- Can find and download the necessary software and the user manual for a controller
- Can install the software packages correctly

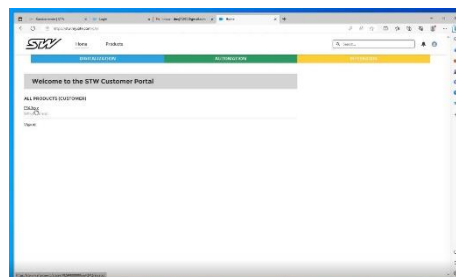
Prerequisites:

none

Contents:

- Customer Portal
 - Get access to the Customer Portal
 - Login
 - Overview of the software provision structure
 - Obtain the required software licenses
- Download the packages
 - Download the software packages required for a development environment
 - Download of the user manual
- Installation
 - Find installation routines
 - Install software
 - Install licenses

Course Identifier	VIDGSSWGET
Course Number	VTE002
Course Type	Video
Target Group	Developers
Duration	10 min
Price	Free of charge
Location	STW YouTube Kanal



The [video](#) is available for watching on the [STW YouTube Channel](#).

Getting Started with controllers from STW

Getting Started with CAN Communication between PC and Controller

Brief Description:

The video explains how a CAN communication between PC and controller is set up and put into operation. The function of the interface is tested with the help of openSYDE and a sample application is flashed to the controller as a test.

The video is aimed at developers who want to program a controller from STW.

Objectives:

The participant

- Knows the necessary hardware and software components for a CAN connection between the controller and PC
- Can create a test setup for CAN communication with the components from a starter kit and software components
- Can check the CAN communication for proper function
- Can flash a controller with a sample application via the CAN interface

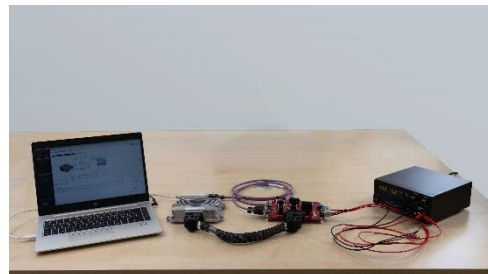
Prerequisites:

none

Contents:

- CAN components
 - Connecting the PEAK CAN USB interface for the PC with cable set and terminating resistors correctly
 - Obtaining and installing software drivers for the PEAK CAN USB Interface
 - Complete commissioning of the hardware and software of the PEAK CAN USB Interface
- Test the CAN communication
 - Execute device configuration with openSYDE via the CAN interface
 - Flash the controller with a sample application
 - Switch dashboard online in openSYDE and observe a measurement

Course Identifier	VIDGSCAN
Course Number	VTE003
Course Type	Video
Target Group	Developers
Duration	11 min
Price	Free of charge
Location	STW YouTube Kanal



The [video](#) is available for watching on the [STW YouTube Channel](#).

Getting Started with controllers from STW

Getting Started with Application Programming

Brief Description:

The video explains how openSYDE can be used to create a programming project based on the template application and how simple programming of the controller's LED can be carried out. The structure of the template application is explained and the programming of the LED with the development environment is demonstrated. The application is built using the integrated compiler and flashed to the controller. The video is aimed at developers who want to program a STW controller.

Objectives:

The participant

- Can create a programming project based on the STW template application with the help of openSYDE
- Knows the structure of the template application
- Can program a simple LED function
- Can build a HEX file and flash it to the controller

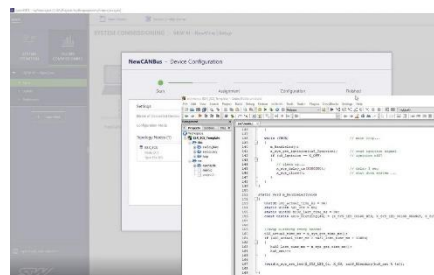
Prerequisites:

none

Contents:

- Template application
 - Extracting and creating a new programming project from the target support package with openSYDE
 - Structure of the template application
- Programming the LED
 - Finding the existing control routine in the template application
 - Changing the function of the LED
- Check result
 - Build modified application and generate HEX file
 - Flash the controller with the new HEX file and check the result based on the function of the LED

Course Identifier	VIDGSAPRG
Course Number	VTE004
Course Type	Video
Target Group	Developers
Duration	13 min
Price	Free of charge
Location	STW YouTube Kanal



The [video](#) is available for watching on the [STW YouTube Channel](#).

Getting Started with controllers from STW

Getting Started with the Ethernet Communication between PC and Controller

Brief Description:

The video explains how an Ethernet communication between PC and controller is set up and put into operation. The function of the interface is tested with the help of openSYDE and a sample application is flashed to the controller as a test.

The course is aimed at developers who want to program a controller from STW.

Objectives:

The participant

- Knows the necessary hardware and software components for an Ethernet connection between the controller and PC
- Can create a test setup for Ethernet communication with the components from a starter kit and software components
- Can check the Ethernet communication for proper function
- Can flash a controller with a sample application via the Ethernet interface

Prerequisites:

none

Contents:

- Ethernet components
 - USB Ethernet interface for the PC
 - Connect the Ethernet cable from the starter kit correctly
 - Configuring the Ethernet interface software on the PC
- Test the Ethernet communication
 - Execute device configuration with openSYDE via the Ethernet interface
 - Flash the controller with a sample application
 - Switch a dashboard online in openSYDE and observe a measurement

Course Identifier	VIDGSETH
Course Number	VTE005
Course Type	Video
Target Group	Developers
Duration	6 min
Price	Free of charge
Location	STW YouTube Kanal



The [video](#) is available for watching on the [STW YouTube Channel](#).

Getting Started with controllers from STW

Getting Started: Troubleshooting CAN communication

Brief Description:

The video explains how problems that sometimes occur in CAN communication between PC and controller can be resolved.

The video is aimed at developers who work with STW controllers and use the CAN interface.

Objectives:

The participant

- Knows known error patterns in CAN communication
- Can take measures to resolve the problems

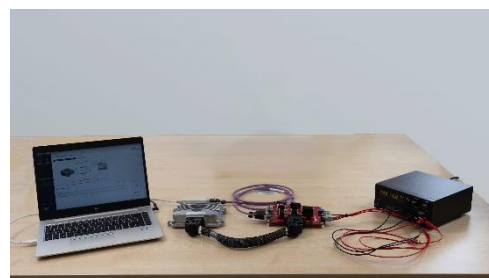
Prerequisites:

none

Contents:

- Error images
 - Hardware setup faulty
 - CAN driver faulty or incompletely installed:
 - Reinstall the drivers
 - Reconfiguration of the CAN network
- Tools for monitoring the CAN bus
- Behavior of the system with unknown bit rate
- Behavior of the system with applications without an integrated openSYDE server

Course Identifier	VIDGSTRSHT
Course Number	VTE006
Course Type	Video
Target Group	Developers
Duration	13 min
Price	Free of charge
Location	STW YouTube Kanal



The [video](#) is available for watching on the [STW YouTube Channel](#).

Controlling Mobile Machines

ESX.4ct: Programming of the controller with logi.CAD 3

Brief Description:

The course explains the hardware functions of the ESX.4ct controller and the programming with logi.CAD 3 including the STW-specific software, compiler and tools.

The course is intended for developers, who will program own applications for the ESX.4ct.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.4ct
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with logi.CAD 3 and the STW software package
- Is able to upload software on the ESX.4ct, change parameters and monitor the controller

Prerequisites:

Basic programming knowledge, ideally with logi.CAD 3, at least knowledge of programming electronic controllers.

Contents:

- Introduction to the hardware of the ESX.4ct
 - Connector and pin compatibility with ESX-I0Xp
 - Mainboard, supplies, GND concept, main switch
 - Determination of the pin assignment
 - Dual Core architecture
 - Inputs/outputs, half/full bridges, gyroscope
 - Communication interfaces CAN bus, RS232, LIN, Bluetooth
- logi.CAD 3
 - Basics, programming languages
 - Installation and setup of the software
 - Compiler
 - POU's, function blocks, PLC Configuration
 - SPS-cycle, RTS, task system
 - Inter-Core communication
 - logi.CAD-application, compile/build
 - logi.CAD Gateway
- STW adaptations of logi.CAD 3
 - IDE, library management, supported libraries and devices
 - STW- libraries
 - Documentation (API, user manual)
 - Programming rules
- STW-Tools
 - Introduction to openSYDE
 - Code generation, template, openSYDE library
 - Flashing, parametrizing, monitoring, visualizing
 - Data administration on laptop and controller
- Programming exercises

Course Identifier	PRG4CTLC
Course Number	108324
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.4ct: Programming of the controller with C

Brief Description:

The course explains the hardware functions of the ESX.4ct controller and the programming with C including the STW-specific software, compiler and tools.

The course is intended for developers, who will program own applications for the ESX.4ct.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.4ct
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with C and the STW software package
- Knows the debugger solution
- Is able to upload software on the ESX.4ct, change parameters and monitor the controller

Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".

Contents:

- Introduction to the hardware of the ESX.4ct
 - Connector and pin compatibility with ESX-I0Xp
 - Mainboard, supplies, GND concept, main switch
 - Determination of the pin assignment
 - Dual Core architecture
 - Inputs/outputs, half/full bridges, gyroscope
 - Communication interfaces CAN bus, RS232, LIN, Bluetooth
- Software development environment
 - Installation of the software
 - Setup of the software
 - Compiler
- Functions of the STW-API
- Communication interfaces
 - CAN bus: Initialize, read and process data of the CAN-objects
 - Application layer: SAE J1939 and CANopen
- STW-Tools
 - Introduction to openSYDE
 - Code generation, template, openSYDE library
 - Flashing, parametrizing, monitoring, visualizing
 - Data administration on laptop and controller
- Debugger
 - Introduction of the hardware solution
 - Demonstration of the Lauterbach hardware debugger
- Programming exercises

Course Identifier	PRG4CTC
Course Number	107130
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.4cs-gw: Programming of the controller with logi.CAD 3

Brief Description:

The course explains the hardware functions of the ESX.4cs-gw controller and the programming with logi.CAD 3 including the STW-specific software, plug-ins, libraries and tools.

The course is intended for developers, who will program own applications for the ESX.4cs-gw. The theoretical course content will be deepened with programming examples from practice.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.4cs-gw
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with logi.CAD 3 and the STW software package
- Is able to upload software on the ESX.4cs-gw, change parameters and monitor the controller

Prerequisites:

Basic programming knowledge, ideally with logi.CAD 3, at least knowledge of programming electronic controllers.

Contents:

- Introduction to the hardware of the ESX.4cs-gw
 - Starter Kit
 - Mainboard, supplies, GND concept, pin assignment, main switch
 - Multicore architecture
 - Inputs / Outputs
 - Ethernet interface, Ethernet switch, CAN-bus, RS232, LIN
- logi.CAD 3
 - Basics, programming languages, POU's, function blocks, PLC Configuration
 - SPS-cycle, RTS, task system
 - Inter-Core communication
 - logi.CAD-application, compile/build
 - logi.CAD gateway
 - Login and debugging
- STW adaptations of logi.CAD 3
 - IDE, library management, supported libraries and devices
 - STW- libraries
 - Documentation (API, user manual)
 - Programming rules
- STW Tools
 - Introduction to openSYDE
 - Code generation, template, openSYDE library
 - Flashing, parametrizing, monitoring, visualizing
- Programming exercises

Course Identifier	PRG4CSGWLC
Course Number	90448
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.4cs-gw: Programming of the controller with C

Brief Description:

The course explains the hardware functions of the ESX.4cs-gw controller and the programming with C including the STW-specific software, compiler and tools.

The course is intended for developers, who will program own applications for the ESX.4cs-gw.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.4cs-gw
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with C and the STW software package
- Knows the debugger solution
- Is able to upload software on the ESX.4cs-gw, change parameters and monitor the controller

Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".

Contents:

- Introduction to the hardware of the ESX.4cs-gw
 - Starter Kit
 - Mainboard, supplies, GND concept, pin assignment, main switch
 - Multicore architecture
 - Inputs / Outputs
 - Ethernet interface, Ethernet switch, CAN-bus, RS232, LIN
- Software development environment
 - Installation of the software
 - Setup of the software
 - Compiler
- Functions of the STW-API
- Communication interfaces
 - CAN bus: Initialize, read and process data of the CAN-objects
 - Application layer: SAE J1939 and CANopen
 - Ethernet: Programming with the LwIP library
- STW-Tools
 - Introduction to openSYDE
 - Code generation, template, openSYDE library
 - Flashing, parametrizing, monitoring, visualizing
 - Data administration on laptop and controller
- Debugger
 - Introduction of the hardware solution
 - Demonstration of the Lauterbach hardware debugger
- Programming exercises

Course Identifier	PRG4CSGWC
Course Number	90449
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.4cs-gw: Programming of the controller with C for safety projects

Brief Description:

The course includes the explanation of the hardware functions and the programming of the controller in C considering the requirements in SIL2/PLd projects. Further contents are the introduction to the diagnostic functions, memory protection and other safety specific functions of the software.

The course is intended for developers who program their own safety applications on the ESX.4cs-gw.

Objectives:

The participant

- Knows the hardware and software requirements for programming the ESX.4cs-gw
- Knows the STW documentation (user and safety manual) and is able to use it for target-oriented research
- Knows the requirements for the programming of safety projects
- Can program own safety applications with C and the STW software package
- Knows the debugger solutions
- Can use STW Tools to load, parameterize and monitor the software on the ESX-4XS-GW

Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".

Contents:

- Introduction to the hardware of the ESX.4cs-gw
 - Mainboard, supplies, GND concept, pin assignment, main switch
 - Multicore architecture
 - Inputs / Outputs
 - Ethernet interface, Ethernet switch, CAN-bus, RS232, LIN
- Software development environment
 - Installing and setting up the software
 - Compiler
- Communication interfaces
 - CAN bus: Editing the CAN objects
 - Ethernet: Programming with the lwIP library
 - Application Layer: SAE J1939 and CANopen
- Programming requirements for SIL-2/PL-D projects (Safety Manual)
- Introduction to safety functions
 - STW-API, memory protection
 - Introduction to SIL2 diagnostics
- STW-Tools
 - Introduction to openSYDE
 - Code generation, template, openSYDE library
 - Flashing, parametrizing, monitoring, visualizing
- Debugger
 - Introduction of the hardware solution
 - Demonstration of the Lauterbach hardware debugger
- Programming exercises

Course Identifier	PRG4CSGWCSAF
Course Number	102026
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.970 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.4cm-a: Programming of the controller with logi.CAD 3

Brief Description:

The course explains the hardware functions of the ESX.4cm-a controller and the programming with logi.CAD 3 including the STW-specific software, plug-ins, libraries and tools.

The course is intended for developers, who will program own applications for the ESX.4cm-a. The theoretical course content will be deepened with programming examples from practice.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.4cm-a
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with logi.CAD 3 and the STW software package
- Is able to upload software on the ESX.4cm-a, change parameters and monitor the controller

Prerequisites:

Basic programming knowledge, ideally with logi.CAD 3, at least knowledge of programming electronic controllers.

Contents:

- Introduction to the hardware of the ESX.4cm-a
 - Starter Kit
 - Mainboard, supplies, GND concept, pin assignment, main switch
 - Multicore architecture
 - Inputs / Outputs
 - Ethernet interface, Ethernet switch, CAN-bus, RS232, LIN
- logi.CAD 3
 - Basics, programming languages, POUs, function blocks, PLC Configuration
 - SPS-cycle, RTS, task system
 - Inter-Core communication
 - logi.CAD-application, compile/build
 - logi.CAD gateway
 - Login and debugging
- STW adaptations of logi.CAD 3
 - IDE, library management, supported libraries and devices
 - STW- libraries
 - Documentation (API, user manual)
 - Programming rules
- STW Tools
 - Introduction to openSYDE
 - Code generation, template, openSYDE library
 - Flashing, parametrizing, monitoring, visualizing
- Programming exercises

Course Identifier	PRG4CMALC
Course Number	105319
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.4cm-a: Programming of the controller with C

Brief Description:

The course explains the hardware functions of the ESX.4cm-a controller and the programming with C including the STW-specific software, compiler and tools.

The course is intended for developers, who will program own applications for the ESX. 4cm-a.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX. 4cm-a
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with C and the STW software package
- Knows the debugger solution
- Is able to upload software on the ESX. 4cm-a, change parameters and monitor the controller

Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".

Contents:

- Introduction to the hardware of the ESX. 4cm-a
 - Starter Kit
 - Mainboard, supplies, GND concept, pin assignment, main switch
 - Multicore architecture
 - Inputs / Outputs
 - Ethernet interface, Ethernet switch, CAN-bus, RS232, LIN
- Software development environment
 - Installation of the software
 - Setup of the software
 - Compiler
- Functions of the STW-API
- Communication interfaces
 - CAN bus: Initialize, read and process data of the CAN-objects
 - Application layer: SAE J1939 and CANopen
 - Ethernet: Programming with the LwIP library
- STW-Tools
 - Introduction to openSYDE
 - Code generation, template, openSYDE library
 - Flashing, parametrizing, monitoring, visualizing
 - Data administration on laptop and controller
- Debugger
 - Introduction of the hardware solution
 - Demonstration of the Lauterbach hardware debugger
- Programming exercises

Course Identifier	PRG4CMAC
Course Number	105288
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.4cl: Programming of the controller with logi.CAD 3

Brief Description:

The course explains the hardware functions of the ESX.4cl controller and the programming with logi.CAD 3 including the STW-specific software, plug-ins, libraries and tools.

The course is intended for developers, who will program own applications for the ESX.4cl.

The theoretical course content will be deepened with programming examples from practice.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.4cl
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with logi.CAD 3 and the STW software package
- Is able to upload software on the ESX.4cl, change parameters and monitor the controller

Prerequisites:

Basic programming knowledge, ideally with logi.CAD 3, at least knowledge of programming electronic controllers.

Contents:

- Introduction to the hardware of the ESX.4cl
 - Starter Kit
 - Mainboard, supplies, GND concept, pin assignment, main switch
 - Multicore architecture
 - Inputs / Outputs
 - Coprocessor iMX 6
 - Ethernet interface, Ethernet switch, CAN-bus, RS232, LIN
- logi.CAD 3
 - Basics, programming languages, POUs, function blocks, PLC Configuration
 - SPS-cycle, RTS, task system
 - Inter-Core communication
 - logi.CAD-application, compile/build
 - logi.CAD gateway
 - Login and debugging
- STW adaptations of logi.CAD 3
 - IDE, library management, supported libraries and devices
 - STW-libraries
 - Documentation (API, user manual)
 - Programming rules
- STW Tools
 - Introduction to openSYDE
 - Code generation, template, openSYDE library
 - Flashing, parametrizing, monitoring, visualizing
- Programming exercises

Course Identifier	PRG4CLLC
Course Number	107689
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.4cl: Programming of the controller with C

Brief Description:

The course explains the hardware functions of the ESX.4cl controller and the programming with C including the STW-specific software, compiler and tools.

The course is intended for developers, who will program own applications for the ESX. 4cl.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX. 4cl
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with C and the STW software package
- Knows the debugger solution
- Is able to upload software on the ESX. 4cl, change parameters and monitor the controller

Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".

Contents:

- Introduction to the hardware of the ESX. 4cl
 - Starter Kit
 - Mainboard, supplies, main switch, GND concept, pin assignment,
 - Multicore architecture
 - Inputs / Outputs
 - Coprocessor iMX 6
 - Ethernet interface, Ethernet switch, CAN-bus, RS232, LIN
- Software development environment
 - Installation of the software
 - Setup of the software
 - Compiler
- Functions of the STW-API
- Communication interfaces
 - CAN bus: Initialize, read and process data of the CAN-objects
 - Application layer: SAE J1939 and CANopen
 - Ethernet: Programming with the LwIP library
- STW-Tools
 - Introduction to openSYDE
 - Code generation, template, openSYDE library
 - Flashing, parametrizing, monitoring, visualizing
 - Data administration on laptop and controller
- Debugger
 - Introduction of the hardware solution
 - Demonstration of the Lauterbach hardware debugger
- Programming exercises

Course Identifier	PRG4CLC
Course Number	107690
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.4cl: Programming of the controller with C for safety projects

Brief Description:

The course includes the explanation of the hardware functions and the programming of the controller in C considering the requirements in SIL2/PLd projects. Further contents are the introduction to the diagnostic functions, memory protection and other safety specific functions of the software.

The course is intended for developers who program their own safety applications on the ESX.4cl.

Objectives:

The participant

- Knows the hardware and software requirements for programming the ESX.4cl
- Knows the STW documentation (user and safety manual) and is able to use it for target-oriented research
- Knows the requirements for the programming of safety projects
- Can program own safety applications with C and the STW software package
- Knows the debugger solutions
- Can use STW Tools to load, parameterize and monitor the software on the ESX.4cl

Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".

Contents:

- Introduction to the hardware of the ESX. 4cl
 - Mainboard, supplies, main switch, GND concept, pin assignment,
 - Multicore architecture & Coprocessor iMX 6
 - Inputs / Outputs
 - Ethernet interface, Ethernet switch, CAN-bus, RS232, LIN
- Software development environment
 - Installation and setup of the software
 - Compiler
- Communication interfaces
 - CAN bus: Initialize, read and process data of the CAN-objects
 - Application layer: SAE J1939 and CANopen
 - Ethernet: Programming with the LwIP library
- Programming requirements for SIL-2/PL-D projects (Safety Manual)
- Introduction to safety functions
 - STW-API, memory protection
 - Introduction to SIL2 diagnostics
- STW-Tools
 - Introduction to openSYDE
 - Code generation, template, openSYDE library
 - Flashing, parametrizing, monitoring, visualizing
 - Data administration on laptop and controller
- Debugger
 - Introduction of the hardware solution
 - Demonstration of the Lauterbach hardware debugger
- Programming exercises

Course Identifier	PRG4CLCSAF
Course Number	109341
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.970 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.4cl-ag: Programming of the controller with logi.CAD 3

Brief Description:

The course explains the hardware functions of the ESX.4cl-ag controller and the programming with logi.CAD 3 including the STW-specific software, plug-ins, libraries and tools.

The course is intended for developers, who will program own applications for the ESX.4cl-ag. The theoretical course content will be deepened with programming examples from practice.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.4cl-ag
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with logi.CAD 3 and the STW software package
- Is able to upload software on the ESX.4cl-ag, change parameters and monitor the controller

Prerequisites:

Basic programming knowledge, ideally with logi.CAD 3, at least knowledge of programming electronic controllers.

Contents:

- Introduction to the hardware of the ESX.4cl-ag
 - Starter Kit
 - Mainboard, supplies, GND concept, pin assignment, main switch
 - Multicore architecture
 - Inputs / Outputs
 - Coprocessor iMX 6
 - Ethernet interface, Ethernet switch, CAN-bus, RS232, LIN
- logi.CAD 3
 - Basics, programming languages, POU's, function blocks, PLC Configuration
 - SPS-cycle, RTS, task system
 - Inter-Core communication
 - logi.CAD-application, compile/build
 - logi.CAD gateway
 - Login and debugging
- STW adaptations of logi.CAD 3
 - IDE, library management, supported libraries and devices
 - STW-libraries
 - Documentation (API, user manual)
 - Programming rules
- STW Tools
 - Introduction to openSYDE
 - Code generation, template, openSYDE library
 - Flashing, parametrizing, monitoring, visualizing
- Programming exercises

Course Identifier	PRG4CLAGLC
Course Number	109454
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.4cl-ag: Programming of the controller with C

Brief Description:

The course explains the hardware functions of the ESX.4cl-ag controller and the programming with C including the STW-specific software, compiler and tools.

The course is intended for developers, who will program own applications for the ESX.4cl-ag.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.4cl-ag
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with C and the STW software package
- Knows the debugger solution
- Is able to upload software on the ESX.4cl-ag, change parameters and monitor the controller

Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".

Contents:

- Introduction to the hardware of the ESX.4cl-ag
 - Starter Kit
 - Mainboard, supplies, main switch, GND concept, pin assignment,
 - Multicore architecture
 - Inputs / Outputs
 - Coprocessor iMX 6
 - Ethernet interface, Ethernet switch, CAN-bus, RS232, LIN
- Software development environment
 - Installation of the software
 - Setup of the software
 - Compiler
- Functions of the STW-API
- Communication interfaces
 - CAN bus: Initialize, read and process data of the CAN-objects
 - Application layer: SAE J1939 and CANopen
 - Ethernet: Programming with the LwIP library
- STW-Tools
 - Introduction to openSYDE
 - Code generation, template, openSYDE library
 - Flashing, parametrizing, monitoring, visualizing
 - Data administration on laptop and controller
- Debugger
 - Introduction of the hardware solution
 - Demonstration of the Lauterbach hardware debugger
- Programming exercises

Course Identifier	PRG4CLAGC
Course Number	109453
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.4cl-ag: Programming of the controller with C for safety projects

Brief Description:

The course includes the explanation of the hardware functions and the programming of the controller in C considering the requirements in SIL2/PLd/Ag PL d Cat2 projects. Further contents are the introduction to the diagnostic functions, memory protection and other safety specific functions of the software. The course is intended for developers who program their own safety applications on the ESX.4cl-ag.

Objectives:

The participant

- Knows the hardware and software requirements for programming the ESX.4cl-ag
- Knows the STW documentation (user and safety manual) and is able to use it for target-oriented research
- Knows the requirements for the programming of safety projects
- Can program own safety applications with C and the STW software package
- Knows the debugger solutions
- Can use STW Tools to load, parameterize and monitor the software on the ESX.4cl-ag

Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".

Contents:

- Introduction to the hardware of the ESX.4cl-ag
 - Mainboard, supplies, main switch, GND concept, pin assignment,
 - Multicore architecture & Coprocessor iMX 6
 - Inputs / Outputs
 - Ethernet interface, Ethernet switch, CAN-bus, RS232, LIN
- Software development environment
 - Installation and setup of the software
 - Compiler
- Communication interfaces
 - CAN bus: Initialize, read and process data of the CAN-objects
 - Application layer: SAE J1939 and CANopen
 - Ethernet: Programming with the LwIP library
- Programming requirements for SIL2/PLd/Ag PL d Cat2 projects (Safety Manual)
- Introduction to safety functions
 - STW-API, memory protection
 - Introduction to SIL2 diagnostics
- STW-Tools
 - Introduction to openSYDE
 - Code generation, template, openSYDE library
 - Flashing, parametrizing, monitoring, visualizing
 - Data administration on laptop and controller
- Debugger
 - Introduction of the hardware solution
 - Demonstration of the Lauterbach hardware debugger
- Programming exercises

Course Identifier	PRG4CLAGCSAF
Course Number	109455
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.970 € <small>plus statutory VAT.</small>
Location	STW Academy



Controlling Mobile Machines

ESX.3cs: Programming of the controller with CODESYS V3

Brief Description:

The course explains the hardware functions of the ESX.3cs controller and the programming with CODESYS V3 including the STW-specific software, plug-ins, libraries and tools.

The course is intended for developers, who will program own applications for the ESX.3cs.

The theoretical course content will be deepened with programming examples from practice.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.3cs
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with CODESYS and the STW software package
- Is able to upload software on the ESX.3cs, change parameters and monitor the controller

Prerequisites:

Basic programming knowledge, ideally with CODESYS V3, at least knowledge of programming electronic controllers.

Contents:

- Introduction to the hardware of the ESX.3cs
 - Starter Kit
 - Mainboard, supplies, GND concept, pin assignment, main switch
 - Inputs / Outputs, NAMUR and SENT interfaces
 - Ethernet interface, CAN-bus, RS232, LIN
- CODESYS V3
 - Basics, programming languages, POUs, function blocks, PLC Configuration
 - Gateway server, login and debugging
 - CODESYS-application, SPS-cycle, RTS, task system
- STW adaptations of CODESYS V3
 - IDE, PLC configuration, trace, visualization, watch and recipe manager, library manager, supported libraries and devices
 - STW-libraries
 - Documentation (API, user manual)
- STW Tools
 - Introduction to openSYDE
 - Flashing, parametrizing, monitoring, visualizing
 - ESX Testbox (TUX)
- Programming exercises

Course Identifier	PRG3CSCOD3
Course Number	90445
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.3cs: Programming of the controller with logi.CAD 3

Brief Description:

The course explains the hardware functions of the ESX.3cs controller and the programming with logi.CAD 3 including the STW-specific software, plug-ins, libraries and tools.

The course is intended for developers, who will program own applications for the ESX.3cs.

The theoretical course content will be deepened with programming examples from practice.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.3cs
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with logi.CAD 3 and the STW software package
- Is able to upload software on the ESX.3cs, change parameters and monitor the controller

Prerequisites:

Basic programming knowledge, ideally with logi.CAD 3, at least knowledge of programming electronic controllers.

Contents:

- Introduction to the hardware of the ESX.3cs
 - Starter Kit
 - Mainboard, supplies, GND concept, pin assignment, main switch
 - Inputs / Outputs, NAMUR and SENT interfaces
 - Ethernet interface, CAN-bus, RS232, LIN
- logi.CAD 3
 - Basics, programming languages, POUs: Programs, function blocks, functions
 - SPS-cycle, RTS, task system
 - logi.CAD-application, compile/build
 - logi.CAD gateway,
 - Login and debugging
- STW adaption of logi.CAD 3
 - IDE, library management, supported libraries and devices
 - STW- libraries
 - Documentation (API, user manual)
 - Programming rules
- STW Tools
 - Introduction to openSYDE
 - Flashing, parametrizing, monitoring, visualizing
 - ESX Testbox (TUX)
- Programming exercises

Course Identifier	PRG3CSLC
Course Number	90447
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.3cs: Programming of the controller with C

Brief Description:

The course explains the hardware functions of the ESX.3cs controller and the programming with C including the STW-specific software, compiler and tools.

The course is intended for developers, who will program own applications for the ESX.3cs.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.3cs
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with C and the STW software package
- Is able to upload software on the ESX.3cs, change parameters and monitor the controller

Prerequisites:

Basic knowledge of programming electronic controllers.

Programming skills in the programming language "C".

Contents:

- Introduction to the hardware of the ESX.3cs
 - Starter Kit
 - Mainboard, supplies, GND concept, pin assignment, main switch
 - Inputs / Outputs, NAMUR and SENT interfaces
 - Ethernet interface, CAN-bus, RS232, LIN
- Software development environment
 - Installation of the software
 - Setup of the software
 - Compiler
- Functions of the STW-API
- CAN bus
 - Introduction
 - Initialize, read and process data of CAN-objects
 - Application layer: SAE J1939 and CANopen
- STW-Tools
 - Introduction to openSYDE
 - Flashing, parametrizing, monitoring, visualizing
 - Code generation, data administration on laptop and controller
- Debugger
 - Introduction of the hardware solution
 - Demonstration of the Lauterbach hardware debugger

Course Identifier	PRG3CSC
Course Number	90442
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.3cs: Programming of the controller with C for safety projects

Brief Description:

The course explains the hardware functions and the programming of the standard systems of the ESX.3cs controller in C. Further contents are the introduction to the safety layer and the SIL2 diagnosis and the difference between standard API and safety API.

The course is intended for developers, who will program own safety applications for the ESX.3cs.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.3cs
- Knows the STW technical documentation and is able to use it for target-oriented research
- Knows the requirements for programming of safety applications
- Is able to program own safety applications with C and the STW software package
- Knows the debugger solutions
- Is able to upload software on the ESX.3cs, change parameters and monitor the controller

Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".

Contents:

- Introduction to the hardware of the ESX.3cs
 - Mainboard, pin assignment, EEPROM
 - Inputs / Outputs
 - Hardware functions, configuration options
- Software (standard system)
- Programming of the standard system
- Requirements for the programming in SIL-2/PLd projects (safety manual)
- Introduction to the safety layer
 - ESX.3cs safety BIOS with memory protection
 - Software safety API for the creation of SIL-2/PLd applications
 - Difference to the standard API / additional functions
- Introduction to the SIL2 diagnosis
- Diagnosis library for safety projects
- Debugger
 - Introduction of the hardware solution
 - Demonstration of the Lauterbach hardware debugger

Course Identifier	PRG3CSCSAF
Course Number	93380
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.970 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.3cm: Programming of the controller with CODESYS V3

Brief Description:

The course explains the programming of the ESX.3cm controller with CODESYS V3 including the STW-specific software, plug-ins, libraries and tools.

The course is intended for developers, who will program own applications for the ESX.3cm.

The theoretical course content will be deepened with programming examples from practice.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.3cm
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with CODESYS and the STW software package
- Is able to upload software on the ESX.3cm, change parameters and monitor the controller

Prerequisites:

Basic programming knowledge, ideally with CODESYS V3, at least knowledge of programming electronic controllers.

Contents:

- Introduction to the hardware of the ESX.3cm
 - Starter Kit
 - Mainboard, supplies, GND concept, pin assignment, main relays
 - Inputs / Outputs and their grouping, NAMUR and SENT interfaces
 - Ethernet interface, CAN, other communication interfaces
 - Hints for mounting
- CODESYS V3
 - Basics, programming languages, POUs, function blocks, PLC Configuration
 - CODESYS-application, SPS-cycle, gateway server, RTS, task system
- STW adaptations of CODESYS V3
 - IDE, PLC configuration, trace, visualization, watch and recipe manager, library manager, supported libraries and devices
 - STW-libraries and documentation (API, user manual)
- STW Tools
 - openSYDE
 - WinFlash
 - KEFEX RAMView
- Debugging
- Programming exercises

Course Identifier	PRG3CMC0D3
Course Number	80269
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.3cm: CODESYS V3 Safety

Brief Description:

The course explains the features of CODESYS V3 Safety, how STW implemented the requirements for SIL1 und how the developers have to implement the requirements within their applications. Further contents are preparing traceability and the separation of safety and non-safety code in the application, hardware diagnosis of the ESX.3cm controller and the usage of the KEFEX tool chain. The commissioning will be practically executed using the CODESYS V3 Safety Template.

Objectives:

The participant

- Knows the different requirements for programming of safety and non-safety applications
- Knows the STW technical documentation and is able to use it for target-oriented research
- Knows the various tools and libraries of STW software packages and is able to use them for programming of safety applications
- Commissioning of an application with the safety template
- Knows the requirements to accomplish a certification for a safety application

Prerequisites:

Programming of controllers with CODESYS V3

Contents:

- Introduction to the hardware of the ESX.3cm
- Introduction to CODESYS V3 Safety, differences to the standard system
- Important features
 - Effects on the safety in CODESYS V3
 - Non interfering part of the code
- Update of the development environment to CODESYS V3 Safety with the STW-software package
- Implementation of the safety requirements by STW: Manual [H1] CODESYS Safety SIL1 - OEM Integration Manual
- Requirements for programming safety applications: Manual [H2] CODESYS Safety SIL1 - IEC Programming Guidelines
- Overview CODESYS V3 ESX.3cm SIL1 User & Safety Manual
 - Structure of the information
 - Preparing traceability
- Separation of safety relevant and non-safety relevant parts of the application's code
- Hardware diagnosis library for the ESX.3cm controller
- Parametrization of the ESX.3cm by using the STW-solution
- KEFEX RAMView and der KEFEX V2 driver library
- openSYDE
- Commissioning with the included CODESYS V3 safety

Course Identifier	CODSAFE3CM
Course Number	87512
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.970 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.3cm: Programming of the controller with C

Brief Description:

The course explains the hardware functions and the programming of the ESX.3cm controller with C including the STW-specific software, plug-ins, libraries and tools.

The course is intended for developers, who will program own applications for the ESX.3cm.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.3cm
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with C and the STW software package
- Knows the debugger solutions
- Is able to upload software on the ESX.3cm, change parameters and monitor the controller

Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".

Contents:

- Introduction to the hardware of the ESX.3cm
 - Starter Kit
 - Mainboard, supplies, GND concept, pin assignment, main relays
 - Inputs / Outputs and their grouping, NAMUR and SENT interfaces
 - Ethernet interface, CAN, other communication interfaces
 - Hints for mounting
- Software development environment
 - Installation of the software
 - Setup of the software ESX.3cm compiler
 - openSYDE
 - WinFlash, KEFEX RAM-View
 - Data organization on the laptop and on the controller
 - Functions of the STW-API
- CAN Bus
 - Introduction
 - Initialize, read and process data of CAN-objects
 - Application layer: SAE J1939 and CANopen
- Debugger
 - Introduction of the hardware solution
 - Demonstration of the Lauterbach hardware debugger

Course Identifier	PRG3CMC
Course Number	80268
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.3cm: Programming of the controller with C for safety projects

Brief Description:

The course explains the hardware functions and the programming of the standard systems of the ESX.3cm controller in C. Further contents are the introduction to the safety layer and the SIL2 diagnosis and the difference between standard API and safety API.

The course is intended for developers, who will program own safety applications for the ESX.3cm.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.3cm
- Knows the STW technical documentation and is able to use it for target-oriented research
- Knows the requirements for programming of safety applications
- Is able to program own safety applications with C and the STW software package
- Knows the debugger solutions
- Is able to upload software on the ESX.3cm, change parameters and monitor the controller

Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".

Contents:

- Introduction to the hardware of the ESX.3cm
 - Mainboard, pin assignment, EEPROM
 - Inputs / Outputs
 - Hardware functions, configuration options
- Software (standard system)
- Programming of the standard system
- Requirements for the programming in SIL-2/PLd projects (safety manual)
- Introduction to the safety layer
 - ESX.3cm safety BIOS with memory protection
 - Software safety API for the creation of SIL-2/PLd applications
 - Difference to the standard API / additional functions
- Introduction to the SIL2 diagnosis
- Diagnosis library for safety projects
- Debugger
 - Introduction of the hardware solution
 - Demonstration of the Lauterbach hardware debugger

Course Identifier	PRG3CMCSAF
Course Number	85613
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.970 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.3xm: Programming of the controller with CODESYS V3

Brief Description:

The course explains the programming of the ESX.3xm controller with CODESYS V3 including the STW-specific software, plug-ins, libraries and tools.

The course is intended for developers, who will program own applications for the ESX.3xm.

The theoretical course content will be deepened with programming examples from practice.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.3xm
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with CODESYS and the STW software package
- Is able to upload software on the ESX.3xm, change parameters and monitor the controller

Prerequisites:

Basic programming knowledge, ideally with CODESYS V3, at least knowledge of programming electronic controllers.

Contents:

- Introduction to the hardware of the ESX.3xm
 - Mainboard, supplies, GND concept, pin assignment
 - EEPROM
 - Inputs / Outputs
 - Extension boards
 - Hardware functions, approval tests
- CODESYS V3
 - Basics, programming languages, POUs, data types, operators, syntax
 - Architecture of CODESYS-applications, SPS-cycle, gateway server, RTS
- STW adaptations of CODESYS V3
 - IDE, PLC configuration, trace, visualization, watch and recipe manager, library manager, supported libraries and devices
 - STW-libraries and documentation (API, user manual)
- STW Tools
 - Winflash
 - KEFEX RAMView
 - ESX Testbox (TUX)
- Debugging
- Programming exercises

Course Identifier	PRG3XMCOD3
Course Number	76104
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.3xm: CODESYS V3 Safety

Brief Description:

The course explains the features of CODESYS V3 Safety, how STW implemented the requirements for SIL2 und how the developers have to implement the requirements within their applications. Further contents are preparing traceability and the separation of safety and non-safety code in the application, hardware diagnosis of the ESX.3xm controller and the usage of the KEFEX tool chain. The commissioning will be practically executed using the CODESYS V3 Safety Template.

Objectives:

The participant

- Knows the different requirements for programming of safety and non-safety applications
- Knows the STW technical documentation and is able to use it for target-oriented research
- Knows the various tools and libraries of STW software packages and is able to use them for programming of safety applications
- Commissioning of an application with the safety template
- Knows the requirements to accomplish a certification for a safety application

Prerequisites:

Programming of controllers with CODESYS V3.

Contents:

- Introduction to the hardware of the ESX.3xm
- Introduction to CODESYS V3 Safety, differences to the standard system
- Important features
 - Effects on the safety in CODESYS V3
 - Non interfering part of the code
- Update of the development environment to CODESYS
- V3 Safety with the STW-software package
- Implementation of safety requirements by STW:
 - Manual [H1] CODESYS Safety SIL2 - OEM Integration Manual
 - Requirements for programming safety applications: Manual [H2] CODESYS Safety SIL2 - IEC Programming Guidelines
- Overview CODESYS V3 ESX.3xm SIL2 User & Safety Manual
 - Structure of the information
 - Preparing traceability
- Separation of safety relevant and non-safety relevant parts of the application's code
- Hardware diagnosis library for the STW ESX.3xm
- Parametrization of the ESX.3xm by using the STW-solution
- KEFEX RAMView and der KEFEX V2 driver library
- Commissioning with the included CODESYS V3 safety template

Course Identifier	CODSAFE3XM
Course Number	76105
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.970 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.3xm: Programming of the controller with C

Brief Description:

The course explains the hardware functions and the programming of the ESX.3xm controller with C including the STW-specific software, plug-ins, libraries and tools.

The course is intended for developers, who will program own applications for the ESX.3xm.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.3xm
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with C and the STW software package
- Knows the debugger solutions
- Is able to upload software on the ESX.3xm, change parameters and monitor the controller

Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".

Contents:

- Introduction to the hardware of the ESX.3xm
 - Mainboard, supplies, GND concept, pin assignment
 - EEPROM
 - Inputs / Outputs
 - Extension boards
 - Hardware functions, approval tests
- Software development environment
 - Installation of the software
 - Setup of the software ESX.3xm compiler
 - KEFEX RAM-View, data organization on the laptop and on the controller
- Functions of the STW-API
- CAN Bus
 - Introduction
 - Initialize, read and process data of CAN-objects
 - Application layer: SAE J1939 and CANopen
- Debugger
 - Introduction of the hardware and software solution
 - Demonstration of the Lauterbach hardware debugger

Course Identifier	PRG3XMC
Course Number	76106
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.3xm: Programming of the controller with C for safety projects

Brief Description:

The course explains the hardware functions and the programming of the standard systems of the ESX- 3XM controller in C. Further contents are the introduction to the safety layer and the SIL2 diagnosis and the difference between standard API and safety API.

The course is intended for developers, who will program own safety applications for the ESX.3xm.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.3xm
- Knows the STW technical documentation and is able to use it for target-oriented research
- Knows the requirements for programming of safety applications
- Is able to program own safety applications with C and the STW software package
- Knows the debugger solutions
- Is able to upload software on the ESX.3xm, change parameters and monitor the controller

Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".

Contents:

- Introduction to the hardware of the ESX.3xm
 - Mainboard, pin assignment, EEPROM
 - Inputs / Outputs, extension boards
 - Hardware functions, configuration options
- Software (standard system)
- Programming of the standard system
- Requirements for the programming in SIL-2 / PLd projects (safety manual)
- Introduction to the safety layer
 - ESX.3xm safety BIOS with memory protection
 - Software safety API for the creation of SIL-2 / PLd applications
 - Difference to the standard API / additional functions
- Introduction to the SIL2 diagnosis
- Diagnosis library for safety projects
- Debugger
 - Introduction to the hardware and software solution
 - Demonstration of the Lauterbach hardware debugger

Course Identifier	PRG3XMCSAF
Course Number	76108
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.970 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.3xl: Programming the controller with CODESYS V3

Brief Description:

The course explains the programming of the ESX.3xl controller with CODESYS V3 including the STW-specific software, plug-ins, libraries and tools.

The course is intended for developers, who will program own applications for the ESX.3xl.

The theoretical course content will be deepened with programming examples from practice.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.3xl
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with CODESYS and the STW software package
- Is able to upload software on the ESX.3xl, change parameters and monitor the controller

Prerequisites:

Basic programming knowledge, ideally with CODESYS V3, at least knowledge of programming electronic controllers.

Contents:

- Introduction to the hardware of the ESX.3xl
 - Mainboard, supplies, GND concept, pin assignment
 - EEPROM
 - Inputs / Outputs
 - Extension boards
 - Hardware functions, approval tests
- CODESYS V3
 - Basics, programming languages, POUs, data types, operators, syntax
 - Architecture of CODESYS-applications, SPS-cycle, gateway server, RTS
- STW adaptations of CODESYS V3
 - IDE, PLC configuration, trace, visualization, watch and recipe manager, library manager, supported libraries and devices
 - STW-libraries and documentation (API, user manual)
- STW Tools
 - Winflash
 - KEFEX RAMView
 - ESX Testbox (TUX)
- Debugging
- Programming exercises

Course Identifier	PRG3XLCOD3
Course Number	76109
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.3xl: CODESYS V3 Safety

Brief Description:

The course explains the features of CODESYS V3 Safety, how STW implemented the requirements for SIL2 und how the developers have to implement the requirements within their applications. Further contents are preparing traceability and the separation of safety and non-safety code in the application, hardware diagnosis of the ESX.3xl controller and the usage of the KEFEX tool chain. The commissioning will be practically executed using the CODESYS V3 Safety Template.

Objectives:

The participant

- Knows the different requirements for programming of safety and non-safety applications
- Knows the STW technical documentation and is able to use it for target-oriented research
- Knows the various tools and libraries of STW software packages and is able to use them for programming of safety applications
- Commissioning of an application with the safety template
- Knows the requirements to accomplish a certification for a safety application

Prerequisites:

Programming of controllers with CODESYS V3

Contents:

- Introduction to the hardware of the ESX.3xl
- Introduction to CODESYS V3 Safety, differences to the standard system
- Important features
 - Effects on the safety in CODESYS V3
 - Non interfering part of the code
- Update of the development environment to CODESYS V3 Safety with the STW-software package
- Implementation of safety requirements by STW:
 - Manual [H1] CODESYS Safety SIL2 - OEM Integration Manual
 - Requirements for programming safety applications:
 - Manual [H2] CODESYS Safety SIL2 - IEC Programming Guidelines
- Overview CODESYS V3 ESX.3xl SIL2 User & Safety Manual
 - Structure of the information
 - Preparing traceability
- Separation of safety relevant and non-safety relevant parts of the application's code
- Hardware diagnosis library for the STW ESX.3xl
- Parametrization of the ESX.3xl by using the STW-solution
- KEFEX RAMView and der KEFEX V2 driver library
- Commissioning with the included CODESYS V3 safety templates

Course Identifier	CODSAFE3XL
Course Number	76110
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.970 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.3xl: Programming of the controller with C

Brief Description:

The course explains the hardware functions and the programming of the ESX.3xl controller with C including the STW-specific software, plug-ins, libraries and tools.

The course is intended for developers, who will program own applications for the ESX.3xl.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.3xl
- Knows the STW technical documentation and is able to use it for target-oriented research
- Is able to program own applications with C and the STW software package
- Knows the debugger solutions
- Is able to upload software on the ESX.3xl, change parameters and monitor the controller

Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".

Contents:

- Introduction to the hardware of the ESX.3xl
 - Mainboard, supplies, GND concept, pin assignment
 - EEPROM
 - Inputs / Outputs
 - Extension boards
 - Hardware functions, approval tests
- Software development environment
 - Installation of the software
 - Setup of the software ESX.3xl compiler
 - KEFEX RAM-View, data organization on the laptop and on the controller
- Functions of the STW-API
- CAN Bus
 - Introduction
 - Initialize, read and process data of CAN-objects
 - Application layer: SAE J1939 and CANopen
- Debugger
 - Introduction to the hardware and software solution
 - Demonstration of the Lauterbach hardware debugger

Course Identifier	PRG3XLC
Course Number	76111
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

ESX.3xl: Programming of the controller with C for safety projects

Brief Description:

The training explains the hardware functions and the programming of the standard systems of the ESX-3XL controller in C. Further contents are the introduction to the safety layer and the SIL2 diagnosis and the difference between standard API and safety API.

The training is intended for developers, who will program own safety applications for the ESX.3xl.

Objectives:

The participant

- Knows hard- and software requirements for programming the ESX.3xl
- Knows the STW technical documentation and is able to use it for target-oriented research
- Knows the requirements for programming of safety applications
- Is able to program own safety applications with "C" and the STW software package
- Knows the debugger solutions
- Is able to upload software on the ESX.3xl, change parameters and monitor the controller

Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".

Contents:

- Introduction to the hardware of the ESX.3xl
 - Mainboard, supplies, GND concept, pin assignment,
 - EEPROM
 - Inputs / Outputs, Extension boards
 - Hardware functions, configuration options
- Software (standard system)
 - Programming of the standard system
 - Requirements for the programming in SIL-2 / PLd projects (safety manual)
- Introduction to the safety layer
 - ESX.3xl safety BIOS with memory protection
 - Software safety API for the creation of SIL-2 / PLd applications
 - Difference to the standard API / additional functions
- Introduction to the SIL2 diagnosis
- Diagnosis library for safety projects
- Debugger
 - Introduction to the hardware and software solution
 - Demonstration of the Lauterbach hardware debugger

Course Identifier	PRG3XLCSAF
Course Number	76112
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.970 € plus statutory VAT.
Location	STW Academy



Controlling Mobile Machines

Features of the VSX-Display-Family

Brief Description:

This seminar shows the most exciting features of the STW-Displays from the VSX- -family. The programming of a user interface with the VSX devKit will be demonstrated.

The seminar is intended for people, who want to use the displays of the interACT-family.

Objectives:

The participant

- Knows the platform based concept of the VSX product family
- Knows the displays of the VSX-series and their most important features
- Knows the VSX devKit

Prerequisites:

None

Contents:

- Introduction
 - Platform based concept of the VSX product family
 - Functions of the platform eiCab
 - Speed Booting
 - Safety features
 - Multimedia interfaces
 - Expandability
 - Diagnostic Capability
- Displays of the InterACT V-series
- Demonstration of the VSX devKit
 - Widgets
 - Wizard for applications programming

Course Identifier	LMIIV
Course Number	76119
Course Type	Video Conference
Target Group	System Planers, Technical Sales Representatives
Duration	2 Hours
Price	Free of charge
Location	Online



Controlling Mobile Machines

Programming of the VSX-Display-Family

Brief Description:

The course gives an overview of the displays of the VSX-series and the platform concept. Furthermore, the course introduces to the programming of the displays with the VSX DevKit.

The course is intended for developers, who want to program user interfaces on the VSX displays. The theoretical course content will be deepened with programming examples from practice.

Objectives:

The participant

- Knows the displays and the platform concept of the VSX display family and it's benefits for software development.
- Knows the development kit and the provided widgets
- Is able to program user interfaces using a variety of widgets

Prerequisites:

Programming skills in Qt helpful, but not mandatory

Contents:

- Introduction
 - Hardware of the VSX-product family
 - Interfaces
- Development environment VSX DevKit
 - DevKit concept and tools
 - Datapoints, Lookup-Tables, Widget-configuration
 - Widget classes and examples for widgets
 - Language- and color management
 - Video-processing
 - Protocols, like CAN-protocols, KEFEX
- HMI API for extension of the graphical programming environment with C++
- Simulation and debugging
- Programming exercises

Course Identifier	PRGIAV
Course Number	76120
Course Type	Classroom Based Training
Target Group	Developers
Duration	1 Day
Price	830 € plus statutory VAT.
Location	STW Academy



Basic knowledge Functional Safety for application development

Brief Description:

The course covers the introduction to the development of safety-related applications based on the EN ISO 13849 standard. Using a case study using STW control, the practical implementation of the standard requirements is explained in order to achieve functional safety. Necessary documents required to obtain certification are discussed on the basis of templates.

The course is aimed at project managers and developers of safety-related applications.

The theoretical course content will be deepened with programming examples from practice.

Objectives:

The participant

- Knows the European directives and national laws as origin of the requirements for functional Safety.
- Knows the most important requirements of EN ISO 13849
- Can carry out a risk assessment and determine the required performance level.
- Can determine the achieved performance level
- Knows the procedures, plans, and documents required for certification
- Can assess the hardware and software requirements of a controller and consider them in the development of safety-related applications

Prerequisites:

None

Contents:

- Legal foundations of the EN ISO 13849 standard
- CE - Marking
- Basics of management of functional safety
- System concept - funktional system definition
- Planning of functional safety
- Hazard and risk analysis - ISO 12100 and EN ISO 13849
- Requirements and specification of the safety functions
- Safety concept - determination of the safety characteristics and usage of SISTEMA
- Software development - requirements, design and coding
- Commissioning and test - verification and validation
- Approval process
- User documentation for operation, maintainance and decommissioning

Course Identifier	BASEFUSI
Course Number	76122
Course Type	Classroom Based Training
Target Group	Developers
Duration	2 Days
Price	2.970 € plus statutory VAT.
Location	STW Academy

Data Management and Connectivity

i.MX series: Commissioning and programming of the modules

Brief Description:

The course explains the hardware- and software features of the telematics modules of the i.MX series and introduces to the programming. Necessary basic knowledge of Linux as well as the Teleservice Application Framework are explained. Practical exercises for installation, commissioning and programming are executed throughout the course.

Objectives:

The participant

- Knows the configuration options of the i.MX series
- Is able to install the development environment under Linux and Windows
- Knows the features of the Teleservice Application Framework (TAF)
- Is able to program telematics applications with the Teleservice Application Framework (TAF)

Prerequisites:

Linux basic skills

Programming skills in the programming language "C".

Contents:

- Hardware of the i.MX series
 - Hardware variants of the TCG series
 - Overview of the ESX product range with i.MX coprocessor
 - Hardware features
- Development environment for programming of the i.MX series
 - Commissioning of the i.MX modules
 - Installation and configuration of the development environment (Linux and Windows)
- Linux basics
 - Directory structure (standard Linux and STW-specific directories)
 - Basic Commands
- Teleservice Application Framework (TAF)
 - Create a new project
 - Inter-process communication via D-Bus
 - Create data pool, log and process data
 - Collect GPS data
 - Configure a data logger
 - Concepts for data transmission
- Connector to the STW solution machines.cloud
- Practical programming exercises

Course Identifier	IBNPRGTC
Course Number	80297
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



Data Management and Connectivity

i.MX series: Creation and use of own configurations and updates

Brief Description:

The course introduces the hardware of the i.MX product line and explains the configuration options. The necessary basics from Linux and shell scripting are explained. Update concepts and configuration recommendations from STW are explained using examples. Own configurations and update packages are created on the basis of templates and tested in practice.

Objectives:

The participant

- Knows the configuration options of the i.MX product line
- Can create the custom partition and update packages by himself
- Can create and run OTA updates
- Can create BuildRoot Customer for the i.MX modules

Prerequisites:

Linux basic skills

Contents:

- Hardware of the i.MX product line
 - Hardware variants of the TCG product series
 - Overview of the ESX product range with i.MX coprocessor
 - Hardware features
- Linux software structure
 - Linux structure
 - Partitions and overlay
 - Security
 - System Information
- STW Software
 - Daemons, Utilities
 - Configurations and Usage
 - Typical troubleshooting
- Shell Scripting
 - Important commands
 - Shell templates
 - Creating sample scripts
- Custom Partition
 - Create Golden Sample
 - Create Update Packages
- OTA Updates
 - Concept
 - Create own keys, certificates
 - Creation of own packages
 - Pre-/Post-scripts
 - Concepts in the field
- BuildRoot Customer
 - Installation
 - Activation of other packages
 - Generation of combined updates

Course Identifier	CFGUPDTC
Course Number	103669
Course Type	Classroom Based Training
Target Group	Developers
Duration	3 Days
Price	2.490 € plus statutory VAT.
Location	STW Academy



System Development Software Platform

Basic Introduction to openSYDE

Brief Description:

This video tutorial introduces the most important functions of the openSYDE PC Tool from STW. The steps required to create an openSYDE project and, subsequently, the processes up to the flashing of the components of the system as well as the visualization of data and monitoring of the CAN bus are demonstrated.

Objectives:

The participant

- Knows the most important features of openSYDE
- Can download openSYDE from the STW cloud and put it into operation
- Can map a system of controllers and other devices in a network topology
- Can flash the components of the system and visualize data
- Can monitor the CAN bus with the CAN Monitor and interpret the measurement results

Prerequisites:

None

Contents:

- Basic Introduction
 - Overview openSYDE
 - Download and installation
 - Operating principles
- System Definition
 - Creating a network topology consisting of STW controller and 3rd party products
 - Provide hex-files for flashing
 - Datapools
 - Create Reports
- System Commissioning
 - View Management
 - Device Configuration
 - Update of a system (flashing)
 - Update over command line with SYDEsup
 - Visualization of data
- CAN Monitor
 - Overview functions
 - Monitoring and interpretation of measurement data
 - Send CAN messages to the bus

Course Identifier	VIDOSYINTRO
Course Number	VT001
Course Type	Video
Target Group	Developers, Service Technicians
Duration	36 min
Price	Free of charge
Location	STW YouTube Channel



The [video](#) is available for watching on the [STW YouTube Channel](#).

System Development Software Platform

First steps with openSYDE C-Code Generation

Brief Description:

This video tutorial introduces the generation of C-code to support the programming of a C-application with openSYDE. Using the simple example of programming the blink code of an LED, the interaction of openSYDE datapools, code generated from them and its integration into an application, as well as the modification and display of variables of the application at runtime with openSYDE dashboards is demonstrated.

Objectives:

The participant

- Knows the principle of code generation from datapools with openSYDE
- Can put the example from the Target Support Package into operation in openSYDE and the IDE
- Can generate code with openSYDE and can integrate this code into the own application
- Can create dashboards in openSYDE and modify or display values of variables of the application at runtime

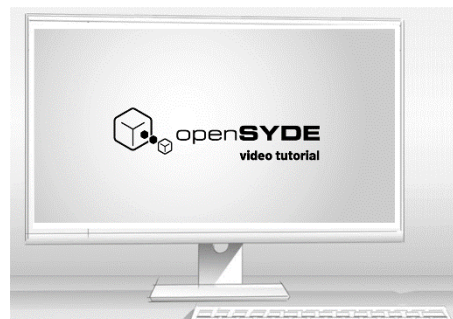
Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".
Basic knowledge of openSYDE

Contents:

- Experimental Setup
 - Required hard- and software components
 - Creation of the openSYDE project
- Commissioning of the template application
 - Import of the template application from the TSP
 - Re-compilation of the HEX files
 - Flashing of the controller
- Programming the LED of the controller
 - Creation of a DIAG datapool for LED functions
 - Code generation and integration into the application
 - Programming a logic for changing the LED behaviour
- openSYDE Dashboards
 - Creation of widgets for changing variables
 - Creation of widgets to display variable values
- Test of the application
 - Operation of the dashboards in openSYDE at runtime of the application

Course Identifier	VIDOSYCGENINTRO
Course Number	VT002
Course Type	Video
Target Group	Developers
Duration	23 min
Price	Free of charge
Location	STW YouTube Channel



The [video](#) is available for watching on the [STW YouTube Channel](#).

System Development Software Platform

Application of COMM Datapools for "C"-programming with logi.CAD

Brief Description:

This video tutorial introduces the use of openSYDE COMM Datapools when programming an application in "C". With an example, the programming of CAN communication between a controller and a temperature sensor using the openSYDE COM engine and COMM datapools is shown step by step. Code generated from openSYDE and its integration into the own application, as well as the display of variables at runtime of the application with openSYDE dashboards are demonstrated and in parallel the data traffic on the CAN bus is observed with the openSYDE CAN Monitor.

Objectives:

The participant

- Knows the required components and tools for programming an application with "C"
- Can program CAN communication between the controller and a temperature sensor using COMM data pools based on the template application from the Target Support Package
- Can generate code with openSYDE and integrate it into an own application
- Can create dashboards in openSYDE and use them to display the values of received CAN messages
- Can use the openSYDE CAN Monitor to observe the CAN messages on the CAN bus

Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".
Basic knowledge of openSYDE

Contents:

- Experimental Setup
 - Required hard- and software components
 - Creation of the openSYDE project
 - Import of the template application from the TSP
 - Examination of the structure of the template application with the logi.CAD IDE for "C"
- Creation of the COMM data pools
 - Configuration of the CAN messages of the temperature sensor in openSYDE
 - Code generation with openSYDE
- Programming of the openSYDE COM engine
 - Integration of the generated code
 - Initialization and start of the COM engine
 - Programming of a logic for exemplary further processing of received CAN messages
- Display of variables
 - Programming of another datapool in the "C" project for displaying data in the dashboard
 - Creation of an openSYDE dashboard to display temperature and status of the sensor
- Test of the application
 - Flashing of the controller
 - Operation of the dashboards in openSYDE
 - Parallel start of the openSYDE CAN Monitor and display of messages on the CAN bus

Course Identifier	VIDOSYCOMDPC
Course Number	VT003
Course Type	Video
Target Group	Developers
Duration	32 min
Price	Free of charge
Location	STW YouTube Channel



The [video](#) is available for watching on the [STW YouTube Channel](#).

System Development Software Platform

Application of COMM Datapools for IEC61131-3 programming with logi.CAD

Brief Description:

This video tutorial introduces the use of openSYDE COMM Datapools when programming an application in Structured Text (ST) according to IEC61131-3. With an example, the programming of CAN communication between a controller and a temperature sensor using the openSYDE COM engine and COMM datapools is shown step by step. Code generated from openSYDE and its integration into the own application, as well as the display of variables at runtime of the application with openSYDE dashboards and in parallel with logi.CAD IDE are demonstrated.

Objectives:

The participant

- Knows the required components and tools for programming an application according to IEC61131-3
- Can program CAN communication between the controller and a temperature sensor based on the template application from the Target Support Package using COMM data pools
- Can generate code with openSYDE and integrate it into an own application
- Can create dashboards in openSYDE and use them to display the values of received CAN messages
- Can use the Data Debugging function of logi.CAD to display the values of variables

Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in Structured Text according to IEC61131-3.
Basic knowledge of openSYDE

Contents:

- Experimental Setup
 - Required hard- and software components
 - Creation of the openSYDE project
 - Import of the template application from the TSP
 - Examination of the structure of the template application with the logi.CAD IDE
- Creation of the COMM data pools
 - Configuration of the CAN messages of the temperature sensor in openSYDE
 - Code generation with openSYDE
- Programming of the openSYDE COM engine
 - Integration of the generated code
 - Initialization and start of the COM engine
 - Programming of a logic for exemplary further processing of received CAN messages
- Displaying variables
 - Programming of a variable for display with the data debugging function of logi.CAD
 - Creation of an openSYDE dashboard to display temperature and status of the sensor
- Test of the application
 - Flashing the controller
 - Operation of the dashboards in openSYDE
 - Parallel logi.CAD login and display of values with the Data Debugging function

Course Identifier	VIDOSYCOMDPLC3
Course Number	VT004
Course Type	Video
Target Group	Developers
Duration	32 min
Price	Free of charge
Location	STW YouTube Channel



The [video](#) is available for watching on the [STW YouTube Channel](#).

System Development Software Platform

NVM Parameters

Brief Description:

This video tutorial explains the creation and use of NVM datapools for parameters stored in the EEPROM of a controller with openSYDE. Changing the parameters in the EEPROM, updating the RAM copy, saving in parameter set image format and writing the parameters directly to the EEPROM during flashing of a controller are demonstrated with a practical example.

Objectives:

The participant

- Can edit NVM datapools with the Parametrization Widget and modify them in the controller with openSYDE
- Can modify parameters and update them in EEPROM and RAM copy
- Can create parameter set images with an active controller
- Can include parameter set images in update packages in openSYDE and write to the controller with openSYDE or SYDEsup

Prerequisites:

None

Contents:

- Use cases for NVM Datapools
- Introduction to an existing sample project from the Target Support Package of ESX.3cs
 - NVM Datapools and parameter lists
 - Dashboards for visualization
 - Parametrization widget for access to parameters
 - Parameters in EEPROM and RAM copy
 - Voltage measurement and calibration by an offset parameter
- Parameter Set Image
 - Backup options for parameters
 - Recording of a parameter set image
- Updating a controller
 - Creation of an update package
 - Updating the controller with openSYDE
 - Creation of a service update package
 - Updating the controller with SYDEsup

Course Identifier	VIDOSYNVM
Course Number	VT005
Course Type	Video
Target Group	Developers
Duration	17 min
Price	Free of charge
Location	STW YouTube Channel



The [video](#) is available for watching on the [STW YouTube Channel](#).

System Development Software Platform

Routing with openSYDE

Brief Description:

This video tutorial introduces you to the topic of routing with openSYDE. Routing can be used in a system of controllers to access a controller that is not directly connected to the openSYDE client PC. This is possible only via the CAN interfaces or from the Ethernet to the CAN interface. Routing can be used for system update or for data transfer of dashboards.

Objectives:

The participant

- Knows the principle of the routing function in the PC-tool openSYDE
- Can apply routing to flash controllers not directly connected to the PC-tool
- Can apply routing to use dashboards for controllers not directly connected to the PC-tool

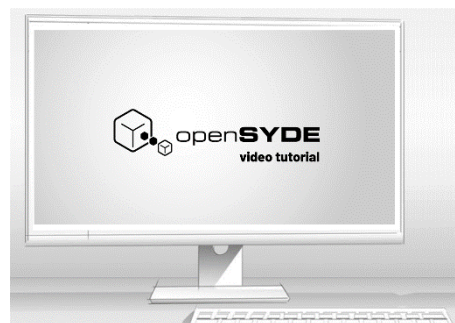
Prerequisites:

None

Contents:

- Experimental Setup
 - Required hard- and software components
 - Creation of the openSYDE project
- Flashing of a controller
 - Routing via 2 CAN busses
 - Routing via Ethernet and CAN
 - Behavior at not allowed configurations
- Transferring measured values to a dashboard
 - Routing via Ethernet and CAN

Course Identifier	VIDOSYROUT
Course Number	VT006
Course Type	Video
Target Group	Developers
Duration	18 min
Price	Free of charge
Location	STW YouTube Channel



The [video](#) is available for watching on the [STW YouTube Channel](#).

System Development Software Platform

Service Projects

Brief Description:

This video tutorial explains how to create and use service projects with openSYDE. Service projects can be used to create an openSYDE project with limited access rights, so that, for example, service personnel can update the controller and use dashboards for configuration, but cannot make any changes to the project itself.

Objectives:

The participant

- Knows the use case for service projects of the PC tool openSYDE
- Can create a service project with limited access rights
- Can correctly provide users of the service project with all required data
- Can operate service projects

Prerequisites:

None

Contents:

- Creation of a service project
 - Application of a sample project
 - Selection of functions that should be usable in the service project
 - Providing the necessary files for service personnel
- Application of a service project
 - Updating a controller
 - Use of dashboards
 - Explanation of access rights

Course Identifier	VIDOSYSP
Course Number	VT007
Course Type	Video
Target Group	Developers
Duration	10 min
Price	Free of charge
Location	STW YouTube Channel



The [video](#) is available for watching on the [STW YouTube Channel](#).

System Development Software Platform

Hardware Configurator

Brief Description:

This video tutorial explains the function and application of the Hardware Configurator and the HAL driver using the associated example with the ESX.3cs controller. The interaction of the settings in openSYDE, the transfer of these settings into the development environment by generated code and the effects of this code in the application are explained and demonstrated live.

Objectives:

The participant

- Knows the functions of the Hardware Configurator
- Can understand the path of the settings from openSYDE to the application code
- Can make settings via the openSYDE dashboard of the example and understand their effects
- Can make modifications to the application code via the Hardware Configurator

Prerequisites:

None

Contents:

- Introduction
 - Hardware Configurator
 - Hardware Abstraction Layer (HAL)
- HAL example from the TSP - openSYDE
 - Explanation of the structure of the example
 - Operation of the Hardware Configurator in openSYDE
 - Code generation
- HAL example from the TSP - programming project
 - Explanation of the structure of the example
 - Explanation of the routines of the HAL driver and the datapools with the development environment
 - Explanation of the interaction of generated code from openSYDE, HAL-Driver and application code
- Demonstration of the Hardware Configurator with a controller ESX.3cs
 - Explanation of the experimental setup
 - Setting outputs and measuring with inputs using the openSYDE dashboard
 - Reprogramming of an input with openSYDE

Course Identifier	VIDOSYHAL
Course Number	VT008
Course Type	Video
Target Group	Developers
Duration	31 min
Price	Free of charge
Location	STW YouTube Channel



The [video](#) is available for watching on the [STW YouTube Channel](#).

STW Matlab/Simulink Support

STW Matlab/Simulink Target Support Package for ESX-3xx

Brief Description:

This video tutorial gives you an introduction to the methodology of using Matlab/Simulink for the ESX-controllers of the 3rd generation and the software tools used in the process. Editing of datapools, export of C-code for the application on the controller, use of the datapools in the PC simulation and possibilities to check the parameters in the running application are explained clearly with examples.

Objectives:

The participant

- Knows the components of the Target Support Package
- Can edit parameters with RAMView
- Can export datapool lists and use them in the application and in Matlab

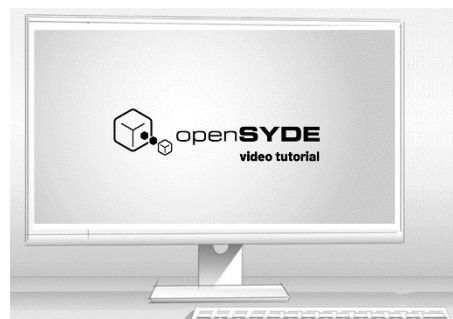
Prerequisites:

Basic knowledge of programming electronic controllers.
Programming skills in the programming language "C".
Basic knowledge of Matlab/Simulink.

Contents:

- Overview
 - Online help
 - Block diagram of the integration
- Example for a workflow
 - Programming an output
- RAMView
 - Parameter lists
 - Usage in the example
- Datapool lists
 - Read and write parameters
 - Display in diagrams
 - RAM copy and EEPROM
- Datapool export
 - Edit a datapool
 - Export C-source for Simulink
 - Explanation of generated code
- Datapool in Simulink
 - DPM files
 - Signals and variables in the Matlab workspace
- Adding a parameter
- Using an alternative input

Course Identifier	VIDMATSIM3INTRO
Course Number	VTMS001
Course Type	Video
Target Group	Developers
Duration	26 min
Price	Free of charge
Location	STW YouTube Channel



The [video](#) is available for watching on the [STW YouTube Channel](#).



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