

XCP Professional

Measuring and Calibrating via CAN, FlexRay and Ethernet

Overview of advantages

- > Can be activated/deactivated in production operation
- > Easy to configure with PC-based tool
- > Low memory requirement and short execution times based on scaling of the software component to your requirements
- > Transport layers available for CAN, FlexRay and Ethernet
- > Compatible with MICROSAR BSW modules (AUTOSAR)

Application Areas

Automotive in-vehicle ECUs are measured and calibrated with the XCP Protocol (Universal Calibration Protocol) – the successor to CCP (CAN Calibration Protocol). XCP was standardized by ASAM (Association for Standardization of Automation and Measuring Systems), a process in which Vector played a leading role. By clearly differentiating the Protocol Layer and Transport Layer, XCP is able to support many different bus systems: CAN, FlexRay and Ethernet.

On the PC side, the CANape tool is used as the XCP master. Its counterpart in the ECU is the XCP slave. This is implemented by the XCP Professional software component. It not only contains all ASAM functional content, but useful extensions as well.

You can use XCP Professional together either with a conventional communication stack or in AUTOSAR systems. In either case, it is unnecessary to modify the XCP software. If a software stack by a third-party producer is used, small modifications to the XCP Trans-

port Layer (TL) may be necessary. Vector would be glad to assist you in this area.

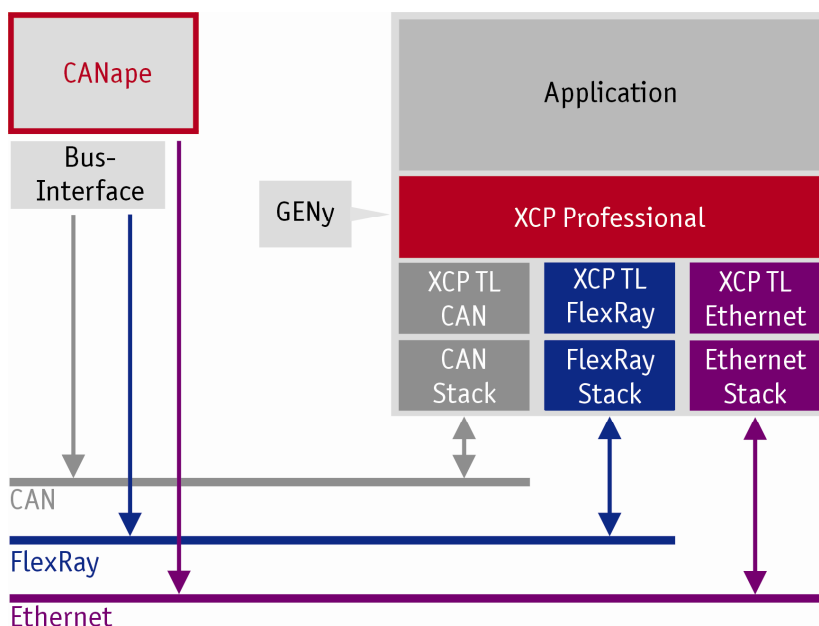
Functions

XCP Professional contains all necessary functions for communicating with the XCP Master, such as:

- > Synchronous data acquisition based on DAQ lists
- > Read and write accesses
- > Initialization and switchover of the memory area for calibration data
- > Support of time stamps
- > Protection against unauthorized writing and reading in memory
- > Shutoff of XCP in production operation by a single function call
- > Access protection by Seed & Key support
- > Synchronous data stimulation (STIM) and Resume mode
- > Flash and EEPROM programming
- > Communication mode: Block transfer
- > Transmission of service request packets
- > Support of AUTOSAR CRC modules
- > Bit modification and short download
- > Configuration by GENy
- > Generation of an a2l file based on the ECU configuration

Synchronous Data Stimulation (STIM)

To optimize algorithms and parameters, you can use XCP over the bus system to read a measured signal from the ECU (DAQ) and



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modify it with a simulation model (e.g. MATLAB). The re-computed value is then written back to the ECU (STIM). Reading and writing are performed synchronously in a predefined time interval (Bypassing).

Resume Mode

The Resume mode permits cold-start measurements, e.g. to check ECU behavior in the wakeup phase. This involves activating the XCP stored in the flash memory immediately after a cold-start – even before the application starts. Sending of the measured values begins automatically, and they can be logged for later evaluation.

Flash and EEPROM Programming

The Vector XCP component is not only able to store measured values in RAM, but also in flash or EEPROM memory. To do this, XCP executes callback functions in which the application could activate the flash algorithms, for example. This gives you the option of individually adapting the algorithms to the flash or EEPROM memory being used.

Communication Mode: Block Transfer

Block Transfer lets you transfer large quantities of data. This functionality is comparable to that of a transport protocol. The sender segments the data, and the receiver re-assembles them in the correct sequence.

Training

In the framework of our training program, we can offer you various training events and workshops for XCP in our classrooms or at your business site.

For more information on individual training events and dates on the Internet go to: www.vector-academy.com

Transmission of Service Request Packets

Service request packets let you transmit lines of text. They are stored in program code, and when the program section is executed they are sent to the XCP master where they are displayed. This function is very useful primarily during system development and in debugging.

Configuration

XCP Professional is configured with the PC-based GENy configuration tool. Compiler switches may be used to deactivate unneeded functions, and this reduces memory loading. When XCP transmission is started, the list of supported functions is communicated to the XCP master via the XCP plug-and-play mechanism.

CANape as XCP Master

CANape, the all-round tool for measurement, calibration and diagnostics of ECUs, is the XCP master, while the ECU acts as the XCP slave. The XCP slave allows CANape to access the measured signals and calibration parameters in the ECU with the help of an ECU description file. Values can be displayed or edited in physical units.

The key properties of CANape related to measurement and calibration are:

- > Time-synchronous real-time acquisition and visualization of internal ECU signals with XCP/CCP, of signals from CAN, LIN and FlexRay buses and from external measurement equipment

- > Online calibration via XCP/CCP, real-time stimulation via XCP and offline calibration
- > Flash programming of the ECU via XCP/CCP or the diagnostic protocol
- > Rapid prototyping for functional development by bypassing a MATLAB/Simulink model with the help of CANape

Additional information can be found in the “ECU Calibration” product catalog.