



Release Presentation

ASAM AE-MCD1 XCP V1.2 (FVD)

Enhancements for dynamic DAQ list description, XCP on CAN FD

Release Date: 2013/06/20

Deliverables

- ▶ Documents:
 - ASAM_AE_MCD-1-XCP_Protocol-Layer_BS_V1-2-0.pdf
 - ASAM_AE_MCD-1-XCP_AS_CAN-Transport-Layer_V1-2-0.pdf
 - ASAM_AE_MCD-1-XCP_AS_Ethernet-Transport-Layer_V1-2-0.pdf
 - ASAM_AE_MCD-1-XCP_AS_Flexray-Transport-Layer_V1-2-0.pdf
 - ASAM_AE_MCD-1-XCP_AS_SxI-Transport-Layer_V1-2-0.pdf
 - ASAM_AE_MCD-1-XCP_AS_USB-Transport-Layer_V1-2-0.pdf
- ▶ AML_Sources: files for XCP IF_DATA declaration of A2L files (ASAM MCD2)
- ▶ SeednKey-DLL-Template: C-Source-Code example for a Windows DLL which implements a Seed&Key algorithm

Introduction

ASAM MCD-1 XCP defines a bus-independent, master-slave communication protocol to connect ECUs with calibration systems. XCP is short for Universal Measurement and Calibration Protocol. The primary purpose of XCP is to adjust internal parameters and acquire the current values of internal variables of an ECU. The first letter X in XCP shall express the fact that the protocol is designed for a variety of bus systems. The standard consists of a base standard, which describes memory-oriented protocol services without direct dependencies to specific bus systems. Several associate standards contain the transport layer definitions for CAN, FlexRay, Ethernet (UDP/IP and TCP/IP) and serial links (SPI and SCI).

Introduction (contd.)

XCP accesses parameters and measurement variables in a memory address oriented way. The properties and memory addresses of this data are described in the A2L-file format, which is standardized through ASAM MCD-2 MC. The A2L-file contains all information to carry out such accesses and to correctly interpret the data that is transmitted via the XCP protocol. This means that access to a specific parameter or variable does not need to be hardcoded into the ECU application. In other words, the ECU just contains a generic XCP-protocol stack, which responds to memory access requests from the calibration system. Different calibration and measurement tasks can be performed by different configurations of the calibration system without recompiling and reprogramming the ECU application code.

Introduction (contd.)

XCP was designed with two main objectives. The first is to impact the ECU resources, such as CPU load, RAM consumption and flash memory, for the XCP slave in a minimal way. The second is to achieve a maximal data transmission rate over the communication link and to reduce the impact on bus communication as much as possible. The standard also describes the organization of the ECU memory segments used by the ECU software. This allows memory-type specific access. Additionally, it describes the ECU interface for data read- and write access.

Marketing

XCP

- ▶ is an established and mature standard since 2003
- ▶ is used by both OEMs and ECU manufacturers
- ▶ reduces the variety of calibration systems
- ▶ avoids the need to create specific ECU implementations for specific application tasks

What's New?

XCP V1.2 (FVD)

- ▶ **Base Standard:**
 - Added Chapter 7.2.3 ECU resource consumptions
- ▶ **Associated Standard XCP on CAN:**
 - Added Chapter 8: Data Transfer on the CAN Bus: Prioritization , Calculation of Bandwidth & Limit
 - Added Chapter 9: CAN-FD Transport Layer, Definition of Communication Parameters for CAN-FD
- ▶ **Associated Standard XCP on ETH:**
 - Added Chapter: Data Transfer on the Ethernet: Calculation of Bandwidth & Limit)
- ▶ **Specification documents have been restructured according to ASAM guidelines (base standard, associated standards)**

What's New?

XCP V1.2 (FVD):PC_UG

- ▶ **BS:** Definition of ECU resource consumptions occupied by XCP DAQ measurement configurations, e.g. RAM consumption, CPU execution time, transmission bandwidth on CAN and Ethernet
- ▶ Definition parameters for the limits of these resources are added. A calibration tool can use this information to calculate the resource consumption and inform the user, particularly if the defined limits are exceeded, to avoid e.g. physical damage of the controlled device.
- ▶ Providing a means to control the priority of the XCP communication on CAN in order not to disturb the mandatory vehicle communications on the network.

What's New?

XCP V1.2 (FVD): TCO

Technical Content:

- ▶ The parameters are realized by extensions to the XCP IF_DATA sections.
- ▶ Mathematical formulas are defined which calculate the resource consumptions based on the XCP DAQ measurement configuration of the calibration tool. This configuration is basically a list of measurement variables (labels) and their corresponding measurement rate (XCP Event)

Compatibility

- ▶ XCP V1.2 is compatible to XCP V1.1.
- ▶ No modifications are necessary to ECU XCP slave implementations.
- ▶ Calibration tools, which do not implement XCP V1.2, still should be able to read A2L files, but of course do not access the new keywords.
- ▶ The enhancements of XCP 1.2 only affect the A2L XCP IF_DATA. The parameters are defined as optional keywords.
- ▶ No protocol communication enhancements with regard to commands and responses