Fraunhofer
IPMS

CAN-XL Security Add-On

CAN-SEC – CANsec Controller IP

The new standards CiA 613-1 and -2 by CAN in automation (CiA) extends the CAN XL protocol with security functions aimed at protecting the integrity and authenticity of the origin and confidentiality of data in CAN-based networks.

The CAN-SEC IP core can be used directly between the host processor and a CAN-XL controller core. The CAN-SEC IP core builds up the CANsec structure in the buffers of the CAN-XL core directly before transmission or directly after reception of the frame. The CAN-SEC IP core has internal registers that contain the information (identifier, key and mode) for the secure channels. The registers for up to 256 secure channels can be set by synthesis parameters. Therefore, the station equipped with the CAN-SEC IP core can participate in up to 256 secure channels.

The CAN-SEC is compatible with the CAN XL IP Core (CAN CTRL) of Fraunhofer IPMS and can also be used standalone or with other CAN XL Solutions.

CAN

Fraunhofer IPMS is a member of CAN in Automation (CiA) and contributes to the development of CiA specifications covering all Open Systems Interconnection (OSI) layers and applications in different areas. CiA representatives actively support the international standardization of CAN-related topics.

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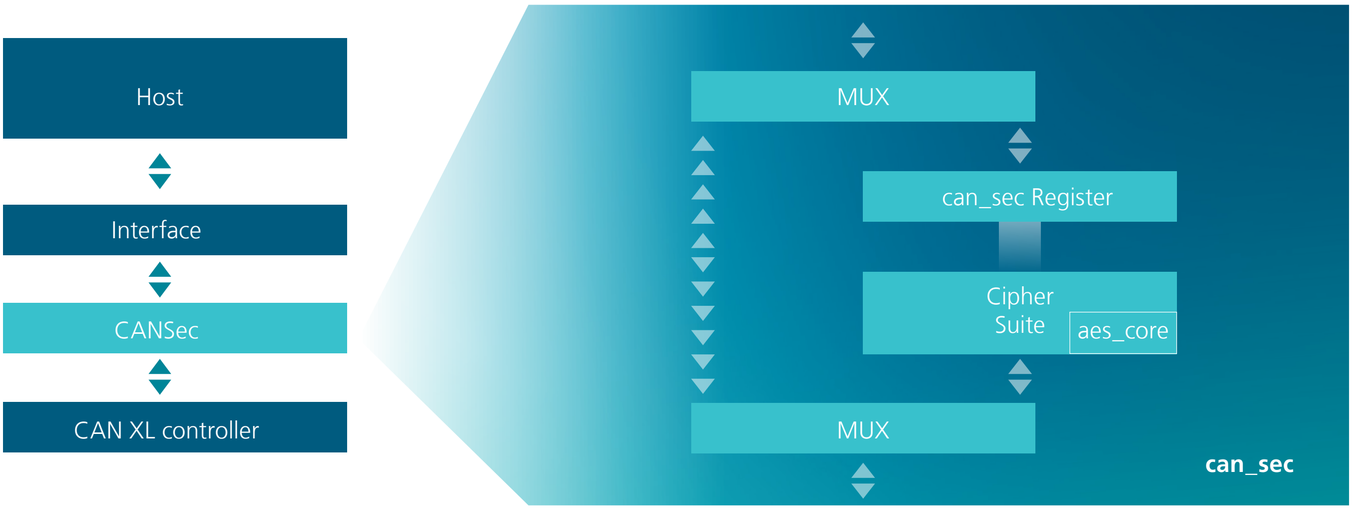

Features

- Supports up to 256 bit key size
- Fully synchronous HDL design (System Verilog)
- Supports CAN XL specification and CAN XL add-on services (CiA 610-1, CiA 613-1 and 2)
- Supports NIST encryption Standards
  - Advanced Encryption Standard (AES)
  - Cipher-based Message Authentication Code (CMAC)
  - Galois Counter Mode (GCM)
- One clock domain
- Detailed error reporting
- Configurable number of supported secure channels (up to 256)
- Transmit and receive buffers used from CAN-XL controller cores
- Supports separate buffers for standalone operations
- Configurable interrupt sources
- Usable with several CAN XL IP-Cores

Host Controller Interfaces

- 32 bit synchronous host controller interface; wrapper for 8 bit hosts
- 32 bit AMBA APB Protocol Specification v2.0
- 32 bit AMBA 3 AHB-Lite Protocol v1.0
- 32 bit Avalon-MM version 2018.09.26, simple interface (no pipelining)
- 32 bit Wishbone
- Optional application specific interface to the host-controller on request

Deliverables

- Source code or targeted netlist
- Testbench
- Sample synthesis and simulation scripts
- Comprehensive documentation

Easy System Integration

- Platform independent implementation in any FPGA or foundry technologies
- Responsive implementation support

CAN Controller IP Core CAN CTRL

Fraunhofer IPMS offers a CAN Controller IP Core which carries out serial communication in accordance with the CAN 2.0, CAN FD and CAN XL specification. It is certified as ASIL-D-ready according to ISO 26262 for functional safety.