

CANopen

CANopen realizes a communication model using the serial bus network 'Controller Area Network' CAN and the easy system configuration by the usage of standards.

I+ME ACTIA offers a CANopen library, which is a software package that can be extended with all defined CAL services. It is conform to the standard "CAL-based Communication Profile for Industrial Systems" DS-301 V3.0 of CiA e. V.

The library is available for master, for slave and for both master and slave.



FEATURES

- Fulfills the standards of CiA e.V. DS 201 - DS 204, DS 207 and DS 301.
- Minimum Boot Up to guarantee an automatic device initialization.
- Service Data Object (SDO)
- Process Data Object (PDO)
- Emergency Object (EMCY)
- Synchronization Object (SYNC)
- Time Stamp (TIME)
- Nodeguarding
- Multi Link

HIGHLIGHTS

- CANopen functionality for both master and slave
- Programs are fully ANSI-C coded, and hardware specific interfaces are located in separate modules. This offers independence from any hardware and operating system.
- The CANopen Library runs on targets with and without operating systems. It supports all available CAN controllers and many microcontrollers / processors.
- Scalability of code size depending on the used services. Every kind of CANopen service is located in its own module e.g pdo.c, sdo.c.
- Extensible to DBT, NMT and LMT properties of CAL

Higher Layer Protocol

SPECIFICATIONS

The standard Boot Up for CANopen Devices (Minimum Boot Up) has been implemented in the CANopen Library. That guarantees an automatic device initialization. After that, the device will be forced in the state PRE_OPERATIONAL. In this state the user is able to change the CAN Object Identifier (COB-ID) of the CANopen services via SDO communication.

Further it is possible to set the PDO parameters and their mapping (variable PDO Mapping). The implemented PDOs support the asynchronous, synchronous, cyclic and acyclic transmission modes. The number of usable CANopen Data Objects (SDO and PDO) depends only on memory restrictions of the user's target hardware.

The Object Dictionary contains references to the user's application variables. The user's variables can be included in the Object Dictionary without any changes of the users application code.

The interface to the user application is built by functions to determine which types of reactions will be processed on an alteration of Object-Directory entries.

A further highlight of this library is the scalability. Every kind of CANopen service is located in its own module e.g pdo.c, sdo.c. Therefore the user can select only the modules he actually needs. Additionally it is possible to use compiler defines to select several properties. The advantage is that the code size is proportional to the used CANopen functionality.

Further variants of the CANopen Library for supporting multiple CAN networks (max. 255) are available. By these the user can implement devices which can handle independent CAN networks, on targets without operating system or with operating systems without resource allocating mechanism. This is useful for building gateways and for a convenient segmentation of CAN networks.

The highlights of this library are:

- supports all CANopen services
- all transmission modes of PDOs are implemented
- variable PDO Mapping is possible
- bit-wise PDO Mapping is possible
- supports PDO Dummy Mapping
- unlimited number of PDOs and SDOs
- easy interface to the user's application
- universal Object Dictionary implementation created by a data base tool
- Program download is possible

- Support of multiple CAN-networks
- Scalable program code size supported by an interactive configuration tool.
- On-Line Reference Manual as UNIX-man pages or HTML files complete set of tools for generating
- the Object Dictionary, EDS and device documentation and for testing and integration

DRIVERS PACKAGES

- LevelX driver concept compatible hardware supported I+ME ACTIA Hardware:
 - PcNetBoard V2.0
 - PcNetBoard V3.0
 - PCSlimLine
 - PCMCIA Key
 - NetPorty II
 - PCI-IntelliCAN
 - InduCAN104
- Prepared hardware driver for selectable CAN controller
Phillips PCA 82C200/(SJA1000), Intel 82526
Intel 82527, Siemens SAE 80C90/91
Motorola TouCAN, Motorola msCAN
- Prepared hardware driver CPU combinations
Motorola MC68332, Motorola MC680x0
Intel I80x86 Siemens 8051-Derivate,
Siemens C167

SUPPLEMENTARY SUPPORT

- I+ME ACTIA supports the development, test and integration of CANopen devices through system know-how and with a complete set of tools.
- CANopen Design Tool generates for every device the Object Dictionary implementation, the Electronic Data Sheet (EDS) and a documentation about the implemented device interface from a database. It reduces the development cycle and ensures the quality by the consistency of implementation and documentation.
- CANopen Device Monitor tool for the graphical inspection and configuration of CANopen devices in a CANopen network. The embedded scripting ability makes it possible to access the implemented CANopen services and to write test or control applications with a minimum of effort.

Please call for more information about these tools.