EC-LIB® DATASHEET - PRECOMPILED

The EC-LIB® is a library consisting of mathematical and control-related functions. It has been designed for supporting the development of embedded software and employs fixed point arithmetic for all computing operations that are being processed. It is implemented in C and contains:

EC-LIB® EXTENSION 1 - CONTROLLER + FILTER*

Simple Moving Average
Linear Weighted Moving Average
PT1 | PT2 Element
PI | PD | PID Controller

EC-LIB® EXTENSION 2 - INTERPOLATION*

1-dimensional
Linear Interpolation

2-dimensional
Linear Interpolation

3-dimensional
Linear Interpolation

EC-LIB® EXTENSION 3 - BIT FUNCTIONS*

coming soon...

EC-LIB® BASIC

Addition	Assign	Is Equal	Square
Subtraction	Absolute Value	Is Less (or Equal)	Cube
Multiplication	Get Minimum	Is Greater (or Equal)	4th Power
Division	Get Maximum	Is Exception	Square Root

*EC-LIB® BASIC required

SCOPE OF DELIVERY

- **EC-LIB®** - Embedded Function Library
  - Header files (.h)
  - EC-LIB® precompiled library file with debug support (.a)
    - → assert messages to indicate erroneous behavior
  - EC-LIB® precompiled library file without debug support (.a)
    - → run-time and memory optimized
- User Manual for EC-LIB® (.pdf)
- Release Note (.pdf)
- READ ME file (.txt)
- License certificate (.pdf)

TARGET GROUP OF THE EC-LIB®

The EC-LIB® is used by software developers who

- develop embedded software
- work in software projects using fixed point arithmetic
- implement their code in C
- want to work in an efficient way with tested and optimized functions

The EC-LIB® is designed for projects with high functional safety requirements.

CHARACTERISTICS OF THE EC-LIB®

REUSABILITY
By utilizing the elements of EC-LIB®, the implementation and testing reduces the risk of errors, accelerating the development process through the use of this reusable library.

RELIABILITY
The in-depth testing of the EC-LIB® ensures reliability when used in conjunction with your application.

PERFORMANCE & MEMORY HANDLING
All functions of the EC-LIB® have been optimized with respect to runtime memory consumption. This saves hardware resources, especially on memory-limited embedded microcontroller devices.

ROBUSTNESS
We have developed a comprehensive concept for coping with overflows, underflows and invalid input- and output values. Thus, EC-LIB® always delivers defined results you can use for analyzing purposes, even in case of an atypical system behavior. This focus on a stable behavior of the library helps to ensure meeting safety goals.

EASY HANDLING
The EC-LIB® can be used and applied in an easy and efficient manner. Through the library's implementation using both functions and macros, usage of the mathematics functionality is simplified. The shift factor concept makes using fixed point arithmetic as easy as using floating point arithmetic.

TECHNICAL ENVIRONMENT

Target Micro-controller:	ARM Cortex Mx
Compiler:	GCC (GNU C Compiler) for ARM Embedded Processors Version 7 (7-2018-q2-update)
Development IDEs:	suitable for all IDEs

DEBUG SUPPORT

The EC-LIB® supplies a comprehensive debugging support function by means of strictly implemented assert messages. Assert messages are short notes that draw the user's attention to abnormal behavior of the software and serve as debugging support. These assert messages should be used during development. In this way, the source of errors can be quickly localized ensuring that bugs do not occur.
If the EC-LIB® is being received as compiled version, the download contains two files: one version of the EC-LIB® with assert messages and one version without assert messages.