



GCT Standard Libraries

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GCT Attribute Library

The GCTATTR library contains attributes solely required by the GCT editors to maintain editing information.

All projects and libraries should include the GCTATTR library as the first included library (bottom of the list of libraries).

The GCTATTR library is owned and maintained by the GCT development team. GCT users must not add, remove or modify attributes from this library at any time.

IEC Functions Library

The IECFUN library contains standard IEC 1131-3 functions, plus some standard Eurotherm specific functions.

By including the IECFUN library in a project or library enables that project to use the following list of functions.

Note that even though a function is defined in the IECFUN library does not mean that the function's implementation is provided. Each build target is responsible for providing the appropriate implementation of any functions required.

- IEC 1131-3 Functions
 - Type Conversion Functions:
 - SINT_TO_USINT
 - SINT_TO_INT
 - SINT_TO_UINT
 - SINT_TO_DINT
 - SINT_TO_UDINT
 - SINT_TO_REAL
 - SINT_TO_LREAL
 - SINT_TO_TIME
 - SINT_TO_QTIME
 - SINT_TO_BOOL
 - USINT_TO_SINT
 - USINT_TO_INT
 - USINT_TO_UINT
 - USINT_TO_DINT
 - USINT_TO_UDINT
 - USINT_TO_REAL
 - USINT_TO_LREAL
 - USINT_TO_BOOL
 - USINT_TO_BYTE
 - USINT_TO_TIME
 - USINT_TO_QTIME
 - USINT_TO_STRING
 - INT_TO_SINT
 - INT_TO_USINT
 - INT_TO_UINT
 - INT_TO_DINT
 - INT_TO_UDINT

- INT_TO_REAL
- INT_TO_LREAL
- INT_TO_BOOL
- INT_TO_TIME
- INT_TO_QTIME
- INT_TO_STRING
- UINT_TO_SINT
- UINT_TO_USINT
- UINT_TO_INT
- UINT_TO_DINT
- UINT_TO_UDINT
- UINT_TO_REAL
- UINT_TO_LREAL
- UINT_TO_BOOL
- UINT_TO_WORD
- UINT_TO_TIME
- UINT_TO_QTIME
- UINT_TO_STRING
- DINT_TO_SINT
- DINT_TO_USINT
- DINT_TO_INT
- DINT_TO_UINT
- DINT_TO_UDINT
- DINT_TO_REAL
- DINT_TO_LREAL
- DINT_TO_BOOL
- DINT_TO_TIME
- DINT_TO_QTIME
- DINT_TO_STRING
- UDINT_TO_SINT
- UDINT_TO_USINT
- UDINT_TO_INT
- UDINT_TO_UINT
- UDINT_TO_DINT
- UDINT_TO_REAL
- UDINT_TO_LREAL
- UDINT_TO_BOOL
- UDINT_TO_DWORD
- UDINT_TO_TIME_OF_DAY
- UDINT_TO_DATE
- UDINT_TO_DATE_AND_TIME
- UDINT_TO_TIME
- UDINT_TO_QTIME
- UDINT_TO_STRING
- REAL_TO_SINT
- REAL_TO_USINT
- REAL_TO_INT
- REAL_TO_UINT
- REAL_TO_DINT
- REAL_TO_UDINT
- REAL_TO_LREAL
- REAL_TO_TIME
- REAL_TO_QTIME
- REAL_TO_STRING
- LREAL_TO_SINT
- LREAL_TO_USINT
- LREAL_TO_INT
- LREAL_TO_UINT
- LREAL_TO_DINT
- LREAL_TO_UDINT
- LREAL_TO_REAL
- LREAL_TO_TIME
- LREAL_TO_QTIME
- LREAL_TO_STRING
- BOOL_TO_SINT
- BOOL_TO_USINT
- BOOL_TO_INT
- BOOL_TO_UINT

- BOOL_TO_DINT
- BOOL_TO_UDINT
- BOOL_TO_REAL
- BOOL_TO_LREAL
- BOOL_TO_BYTE
- BOOL_TO_WORD
- BOOL_TO_DWORD
- BOOL_TO_STRING
- BYTE_TO_USINT
- BYTE_TO_BOOL
- BYTE_TO_WORD
- BYTE_TO_DWORD
- BYTE_TO_STRING
- WORD_TO_UINT
- WORD_TO_BOOL
- WORD_TO_BYTE
- WORD_TO_DWORD
- WORD_TO_STRING
- DWORD_TO_UDINT
- DWORD_TO_BOOL
- DWORD_TO_BYTE
- DWORD_TO_WORD
- DWORD_TO_TIME
- DWORD_TO_QTIME
- DWORD_TO_STRING
- TIME_OF_DAY_TO_UDINT
- TIME_OF_DAY_TO_STRING
- DATE_TO_UDINT
- DATE_TO_STRING
- DATE_AND_TIME_TO_UDINT
- DATE_AND_TIME_TO_STRING
- TIME_TO_SINT
- TIME_TO_USINT
- TIME_TO_INT
- TIME_TO_UINT
- TIME_TO_DINT
- TIME_TO_UDINT
- TIME_TO_REAL
- TIME_TO_LREAL
- TIME_TO_QTIME
- TIME_TO_STRING
- QTIME_TO_SINT
- QTIME_TO_USINT
- QTIME_TO_INT
- QTIME_TO_UINT
- QTIME_TO_DINT
- QTIME_TO_UDINT
- QTIME_TO_REAL
- QTIME_TO_LREAL
- QTIME_TO_TIME
- QTIME_TO_STRING
- STRING_TO_SINT
- STRING_TO_USINT
- STRING_TO_INT
- STRING_TO_UINT
- STRING_TO_DINT
- STRING_TO_UDINT
- STRING_TO_REAL
- STRING_TO_LREAL
- STRING_TO_BOOL
- STRING_TO_BYTE
- STRING_TO_WORD
- STRING_TO_DWORD
- STRING_TO_TIME_OF_DAY
- STRING_TO_DATE
- STRING_TO_DATE_AND_TIME
- STRING_TO_TIME
- STRING_TO_QTIME

- TRUNC
- BCD_TO_SINT
- BCD_TO_USINT
- BCD_TO_INT
- BCD_TO_UINT
- BCD_TO_DINT
- BCD_TO_UDINT
- SINT_TO_BCD
- USINT_TO_BCD
- INT_TO_BCD
- UINT_TO_BCD
- DINT_TO_BCD
- UDINT_TO_BCD
- DATE_AND_TIME_TO_DATE
- DATE_AND_TIME_TO_TIME_OF_DAY
- Mathematical Functions
 - ABS
 - ABS_SINT
 - ABS_USINT
 - ABS_INT
 - ABS_UINT
 - ABS_DINT
 - ABS_UDINT
 - ABS_REAL
 - ABS_LREAL
 - SQRT
 - SQRT_REAL
 - SQRT_LREAL
 - LN
 - LN_REAL
 - LN_LREAL
 - LOG
 - LOG_REAL
 - LOG_LREAL
 - EXP
 - EXP_REAL
 - EXP_LREAL
 - SIN
 - SIN_REAL
 - SIN_LREAL
 - COS
 - COS_REAL
 - COS_LREAL
 - TAN
 - TAN_REAL
 - TAN_LREAL
 - ASIN
 - ASIN_REAL
 - ASIN_LREAL
 - ACOS
 - ACOS_REAL
 - ACOS_LREAL
 - ATAN
 - ATAN_REAL
 - ATAN_LREAL
 - EXPT
- Bitwise Operations
 - SHL
 - SHL_BOOL
 - SHL_BYTE
 - SHL_WORD
 - SHL_DWORD
 - SHR
 - SHR_BOOL
 - SHR_BYTE
 - SHR_WORD
 - SHR_DWORD
 - ROL

- ROL_BOOL
- ROL_BYTE
- ROL_WORD
- ROL_DWORD
- ROR
- ROR_BOOL
- ROR_BYTE
- ROR_WORD
- ROR_DWORD
- Select Functions
 - SEL
 - SEL_SINT
 - SEL_USINT
 - SEL_INT
 - SEL_UINT
 - SEL_DINT
 - SEL_UDINT
 - SEL_REAL
 - SEL_LREAL
 - SEL_BOOL
 - SEL_BYTE
 - SEL_WORD
 - SEL_DWORD
 - SEL_DATE
 - SEL_TIME_OF_DAY
 - SEL_DATE_AND_TIME
 - SEL_TIME
 - SEL_QTIME
 - SEL_STRING
- Maximum/Minimum/Limit Functions
 - MAX
 - MAX_SINT
 - MAX_USINT
 - MAX_INT
 - MAX_UINT
 - MAX_DINT
 - MAX_UDINT
 - MAX_REAL
 - MAX_LREAL
 - MAX_BOOL
 - MAX_BYTE
 - MAX_WORD
 - MAX_DWORD
 - MAX_DATE
 - MAX_TIME_OF_DAY
 - MAX_DATE_AND_TIME
 - MAX_TIME
 - MAX_QTIME
 - MAX_STRING
 - MIN
 - MIN_SINT
 - MIN_USINT
 - MIN_INT
 - MIN_UINT
 - MIN_DINT
 - MIN_UDINT
 - MIN_REAL
 - MIN_LREAL
 - MIN_BOOL
 - MIN_BYTE
 - MIN_WORD
 - MIN_DWORD
 - MIN_DATE
 - MIN_TIME_OF_DAY
 - MIN_DATE_AND_TIME
 - MIN_TIME
 - MIN_QTIME
 - MIN_STRING

- LIMIT
- LIMIT_SINT
- LIMIT_USINT
- LIMIT_INT
- LIMIT_UINT
- LIMIT_DINT
- LIMIT_UDINT
- LIMIT_REAL
- LIMIT_LREAL
- LIMIT_BOOL
- LIMIT_BYTE
- LIMIT_WORD
- LIMIT_DWORD
- LIMIT_DATE
- LIMIT_TIME_OF_DAY
- LIMIT_DATE_AND_TIME
- LIMIT_TIME
- LIMIT_QTIME
- LIMIT_STRING
- Multiplex Functions
 - MUX
 - MUX_SINT
 - MUX_USINT
 - MUX_INT
 - MUX_UINT
 - MUX_DINT
 - MUX_UDINT
 - MUX_REAL
 - MUX_LREAL
 - MUX_BOOL
 - MUX_BYTE
 - MUX_WORD
 - MUX_DWORD
 - MUX_DATE
 - MUX_TIME_OF_DAY
 - MUX_DATE_AND_TIME
 - MUX_TIME
 - MUX_QTIME
 - MUX_STRING
- String Manipulating Functions
 - LEFT
 - RIGHT
 - MID
 - CONCAT
 - INSERT
 - DELETE
 - REPLACE
 - FIND
- Eurotherm Specific Functions
 - Sample Time Functions
 - SAMPLE_TIME
 - REAL_SAMPLE_TIME
 - REAL_MS_SAMPLE_TIME

TASKS Library

The TASKS library contains the definition of TASK blocks required to build a RESOURCE image.

Each build target requires its own TASK block if a RESOURCE image needs to be built.

The following TASK blocks are provided in this TASKS library:

- Windows - TASK block for the Windows build target
- F4 - TASK block for the F4 68000 build target

Generic Control Library

The GENCTRL library contains sample control and control simulation function blocks.

Below is a list of function blocks provided:

- Basic PID - basic PID functionality
- Integrate - basic integrator function block
- Rate Limit - rate of change limiting function block
- PID - PID function block
- PID Load - simulates a load that the PID function block can control

The BASIC PID, Integrator and Rate Limit function blocks are used by the PID function block.

Generic I/O Library

The GENIO library contains sample generic I/O simulation function blocks for Analogue and Digital input and output.

Below is a list of function blocks provided:

- AnalogIn
- AnalogOut
- DigitalIn
- DigitalOut

Note that these function blocks provide no interface to real I/O.



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