*LIGO Laboratory / LIGO Scientific Collaboration*

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TwinCAT Library for Error Handling

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| **Library** | |
| Title | Error |
| Version | 3 |
| TwinCAT version | 2.11 |
| Name space | – |
| Author | Daniel Sigg |
| Description | Handles error conditions for TwinCAT libraries.  The library exports an error structure for reporting error conditions. This structure is typically declared as the first element of an interface structure. A handler is provided to report errors. Errors are bit encoded into a DWORD. Error messages for multiple simultaneous conditions are concatenated until the maximum string length is reached. If there are additional error conditions, this is indicated with a ‘+’ character at the end of the string. Multiple error conditions can always be reconstructed from the bit-encoded error code. |
| Error codes | Library dependent |
| Library dependencies: | none |

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| **User Interface Type**  TYPE ErrorStruct :  STRUCT  Flag: BOOL;  Code: DWORD;  Msg: STRING;  END\_STRUCT  END\_TYPE | |
| Type name | ErrorStruct |
| Description | Structure in a user interface to define an error condition |
| Definition | STRUCT |
| Output Tag | Name: Flad  Type: BOOL  Description: Flag indicating any error condition |
| Output Tag | Name: Code  Type: DWORD  Description: Bit-encoded value describing the error condition(s) |
| Output Tag | Name: Msg  Type: STRING  Description: Human readable text describing the error |

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| **Enum Type**  TYPE ErrorMethodEnum : (Init, Report, Commit);  END\_TYPE | |
| Type name | ErrorMethodEnum |
| Description | Describes the handler method |
| Definition | ENUM |
| Enum tag | Name: Init  Description: Initializes the error handler |
| Enum Tag | Name: Report  Description: Reports an error condition |
| Enum Tag | Name: Commit  Description: Commit the error to the interface structure |

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| **Function Block**  FUNCTION\_BLOCK ErrorHandlerFB  VAR\_INPUT  ErrorMethod: ErrorMethodEnum;  Code: DWORD := 0;  Msg: STRING := '';  END\_VAR  VAR\_OUTPUT  END\_VAR  VAR\_IN\_OUT  Error: ErrorStruct;  END\_VAR | |
| Name | ErrorHandlerFB |
| Description | Handles error conditions. |
| Input argument | Name: ErrorMethod  Type: ErrorMethodEnum  Description: For initialization, report and commit |
| Input argument | Name: Code  Type: DWORD  Description: Error code |
| Input argument | Name: Msg  Type: STRING  Description: Error message string |
| In/out argument | Name: Error  Type: ErrorStruct  Description: Input and output of error structure |

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| **Example:**  VAR  ErrorHandler: ErrorHandlerFB;  END\_VAR  (\* Initialize \*)  ErrorHandler (ErrorMethod := Init, Error := LowNoiseVco.Error);  (\* read and process values... report an error... process further... \*)  ...  IF NOT LowNoiseVco.PowerOk THEN  ErrorHandler (ErrorMethod := Report, Error := LowNoiseVco.Error,  Code := 16#01, Msg := 'Power supply voltages out-of-range');  END\_IF;  ...  (\* Finally commit \*)  ErrorHandler (ErrorMethod := Commit, Error := LowNoiseVco.Error); |

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| **Visual** | |
| Name | ErrorCodeVis |
| Description | Displays error message with color indicator |
| Placeholder | Name: ErrorMesage  Type: ErrorStruct  Description: Displays the error message |
| PlaceHolder | Name: Error  Type: ErrorStruct  Description: Displays the alarm when error for the message is true |
| PlaceHolder | Name: Code  Type: ErrorStruct  Description: Code for the error message |

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| **Visual** | |
| Name | ErrorVis |
| Description | Displays error message and error code |
| Placeholder | Name: Error  Type: ErrorStruct  Description: Alarm is on when error is true; displays bit number; displays error message and include “+” for multiple errors |