*LIGO Laboratory / LIGO Scientific Collaboration*

LIGO- E1200631-v2 Advanced LIGO 9/04/2013

TwinCAT Library for   
Shutter Control

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| **Library** | |
| Title | ShutterControl |
| Version | 1 |
| TwinCAT version | 2.11 |
| Name space | – |
| Author | Alexa Staley, Daniel Sigg |
| Description | Controls the shutter controller |
| Error codes | 1 — Trigger |
| Library dependencies | Error, DCPower, ReadADC, WriteADC, SaveRestore |

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| **Shutter Controller Type**  TYPE ShutterControlTypeEnum : (ShutterSimple, ShutterHardwareTrigger);  END\_TYPE | |
| Type name | ShutterControllerType |
| Description | Enumerates means used to trigger the shutter |
| Definition | ENUM |
| Element | Name: ShutterSimple  Description: Simple Shutter |
| Element | Name: ShutterHardwareTrigger  Description: Shutter triggered by hardware |

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| **Shutter Controller State**  TYPE ShutterControlStateEnum : (ShutterOpen, ShutterClosed;  END\_TYPE | |
| Type name | ShutterControlType |
| Description | Enumerates the state of the shutter controllers |
| Definition | ENUM |
| Element | Name: ShutterOpen  Description: Shutter is open |
| Element | Name: ShutterClosed  Description: Shutter is closed |

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| **Hardware Input Type**  TYPE ShutterControlInStruct :  STRUCT  State: BOOL;  Trigger: INT;  END\_STRUCT  END\_TYPE | |
| Type name | ShutterControlInStruct |
| Description | Structure of the hardware input that are wired up for the shutter control |
| Definition | STRUCT |
| Element | Name: State  Type: BOOL  Description: Binary inputs for shutter monitor |

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| **Hardware Output Type**  TYPE ShutterControlOutStruct :  STRUCT  Close: BOOL;  Open: BOOL;  Threshold: INT;  END\_STRUCT  END\_TYPE | |
| Type name | ShutterControlOutStruct |
| Description | Structure of the hardware output that are wired up for the shutter control |
| Definition | STRUCT |
| Element | Name: Close  Type: BOOL  Description: Close shutter |
| Element | Name: Open  Type: BOOL  Description: Open shutter |
| Element | Name: Threshold  Type: INT  Description: Threshold to open/close shutter |

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| **User Interface Type**  TYPE ShutterControlStruct :  STRUCT  Error: ErrorStruct;  Name: STRING (40);  ControllerType: ShutterControlTypeEnum;  State: ShutterControlStateEnum;  Open: BOOL;  Close: BOOL;  Threshold: LREAL;  Trigger: DCPowerStruct;  END\_STRUCT  END\_TYPE | |
| Type name | ShutterControlStruct |
| Description | Structure of the user interface tags that are used to control the shutter control |
| Definition | STRUCT |
| Output Tag | Name: Error  Type: ErrorStruct  Description: For error handling |
| Output Tag | Name: Name  Type: STRING  Description: Location of the shutter |
| Input Tag | Name: ControllerType  Type: ShutterControlTypeEnum  Description: Type of shutter |
| Input Tag | Name: State  Type: ShutterControlStateEnum  Description: State of the shutter |
| Input Tag | Name: Close  Type: BOOL  Description: Close shutter when true |
| Input Tag | Name: Open  Type: BOOL  Description: Open shutter when true |
| Input Tag | Name: Threshold  Type: LREAL  Description: Threshold voltage for trigger PD |
| Output Tag | Name: Trigger  Type: DCPowerStruct;  Description: Trigger from PD |

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| **Function Block**  FUNCTION\_BLOCK ShutterControlFB  VAR\_INPUT  Request: SaveRestoreEnum;  ShutterControlType: ShutterControlTypeEnum := ShutterSimple;  ShutterControlIn: ShutterControlInStruct;  END\_VAR  VAR\_OUTPUT  ShutterControlOut: ShutterControlOutStruct;  END\_VAR  VAR  END\_VAR  VAR\_IN\_OUT  ShutterControlInit: ShutterControlStruct;  ShutterControl: ShutterControlStruct;  END\_VAR | |
| Name | ShutterControlFB |
| Description | Controls the shutter control |
| Input argument | Name: Request  Type: SaveRestoreEnum  Description: Request save/restore/safemode or noop |
| Input argument | Name: ShutterControlType  Type: ShutterControlTypeEnum  Description: Set shutter controller type |
| Input argument | Name: ShutterControlIn  Type: ShutterControlInStruct  Description: Input hardware structure |
| Output argument | Name: ShutterControlOut  Type: ShutterControlOutStruct  Description: Output hardware structure |
| In/out argument | Name: ShutterControlInit  Type: ShutterControlStruct  Description: Save/restore variable in persistent memory |
| In/out argument | Name: ShutterControl  Type: ShutterControlStruct  Description: User Interface structure |

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| **Visual** | |
| Name | ShutterControlVis |
| Description | Displays open and close buttons for the shutter and the shutter monitor |
| Placeholder | Name: ShutterControl  Type: ShutterControlStruct  Description: Shutter Control structure |