

LIGO Laboratory / LIGO Scientific Collaboration

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**TwinCAT Library for
Motorized Flipper/TTL IO Controller**

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LIGO Scientific Collaboration

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Library	
Title	MotorizedFlipper
Version	1
TwinCAT version	2.11
Name space	–
Author	Daniel Sigg
Description	<p>Interfaces the motorized flipper/TTL IO controller, D1700170.</p> <p>This library provides a function block to support a single channel of the 8-channel motorized flipper controller/3-channel relay driver. Each motorized flipper channel consists of a TTL digital output for control and a TTL digital input as a readback. Similarly, each channel of the relay driver consist of a coil contact and a readback.</p> <p>The hardware readbacks of the power ok are daisy chained among the 11 channels of a board.</p>
Error codes	<p>0x01 – Power supply voltages out-of-range</p> <p>0x02 – Illegal readback (mismatch between control and readback)</p> <p>0x04 – Readback not nominal (state not as expected)</p>
Library dependencies	Error, SaveRestore

Hardware Input Type TYPE MotorizedFlipperInStruct: STRUCT Readback: BOOL; PowerOk: BOOL; END_STRUCT END_TYPE	
Type name	MotorizedFlipperInStruct
Description	Structure of the hardware inputs that are wired up for the motorized flipper/TTL IO controller
Definition	STRUCT
Element	Name: Readback Type: BOOL Description: TTL readback
Element	Name: PowerOk Type: BOOL Description: Voltage monitor readback

Hardware Output Type TYPE MotorizedFlipperOutStruct: STRUCT Control: BOOL; PowerOk: BOOL; END_STRUCT END_TYPE	
Type name	MotorizedFlipperOutStruct
Description	Structure of the hardware output that are wired up for the motorized flipper/TTL IO controller
Definition	STRUCT
Element	Name: Control Type: BOOL Description: TTL output
Element	Name: PowerOk Type: BOOL Description: Voltage monitor readback (daisy chained from input)

User Interface Type	
TYPE MotorizedFlipperStruct:	
STRUCT	
Error:	ErrorStruct;
Name:	STRING;
Control:	BOOL;
Negate:	BOOL;
Readback:	BOOL;
Inverted:	BOOL;
Check:	BOOL;
Nominal:	BOOL;
Mismatch:	BOOL;
PowerOk:	BOOL;
END_TYPE	
Type name	MotorizedFlipperStruct
Description	Structure of the user interface tags that are used to control the motorized flipper/TTL IO controller.
Definition	STRUCT
Output Tag	Name: Error Type: ErrorStruct Description: Error handling
In/Out Tag	Name: Name Type: STRING Description: Name of flipper or channel
Output Tag	Name: Control Type: BOOL Description: Control value (TTL output)
In/out Tag	Name: Negate Type: BOOL Description: Positive or negative logic for TTL output
Output Tag	Name: Readback Type: BOOL Description: Logic readback (TTL input)
In/Out Tag	Name: Inverted Type: BOOL Description: Readback is inverted
In/Out Tag	Name: Check Type: BOOL Description: Check readback against nominal

In/Out Tag	Name: Nominal Type: BOOL Description: Nominal readback value
Output Tag	Name: Mismatch Type: BOOL Description: Readback is not at nominal
Output Tag	Name: PowerOk Type: BOOL Description: Voltages are ok

Function Block FUNCTION_BLOCK MotorizedFlipperFB VAR_INPUT Request: SaveRestoreEnum; MotorizedFlipperIn: MotorizedFlipperInStruct; END_VAR VAR_OUTPUT MotorizedFlipperOut: MotorizedFlipperOutStruct; END_VAR VAR_IN_OUT MotorizedFlipperInit: MotorizedFlipperStruct; MotorizedFlipper: MotorizedFlipperStruct; END_VAR	
Name	MotorizedFlipperFB
Description	Controls a channel of the motorized flipper/TTL IO controller
Input argument	Name: Request Type: SaveRestoreEnum Description: Save/restore command
Input argument	Name: MotorizedFlipperIn Type: MotorizedFlipperInStruct Description: Input hardware structure
Output argument	Name: MotorizedFlipperOut Type: MotorizedFlipperOutStruct Description: Output hardware structure
In/out argument	Name: MotorizedFlipperInit Type: MotorizedFlipperStruct Description: Interface structure for save/restore
In/out argument	Name: MotorizedFlipper Type: MotorizedFlipperStruct Description: User Interface structure