



LIGO Laboratory / LIGO Scientific Collaboration

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Advanced LIGO

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**TwinCAT Library for
RF Amplifiers, Dividers and Doublers**

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LIGO Scientific Collaboration

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Library	
Title	RFAmplifier
Version	2
TwinCAT version	2.11
Name space	–
Author	Patrick Thomas, Daniel Sigg
Description	<p>Controls an RF amplifier, E1200111, an RF divider, E1200118 and E1200119, and an RF doubler, E1200117.</p> <p>Each of these chassis contains an RF power monitor and a voltage monitor. The RF power monitor will sample the RF signal after the amplifier, divider or doubler element.</p> <p>The RF power monitors which has the calibration</p> $P=12 \text{ dBm}-10 \text{ dBm/V} \times (U-4 \text{ V})$ <p>The RF power levels should be alarmed when outside $\pm 1 \text{ dBm}$ of nominal.</p>
Error codes	<p>0x0001 – Power supply voltages out-of-range</p> <p>0x0002 – Output RF power level out-of-range</p>
Library dependencies	Error

Hardware Input Type TYPE RFAmplifierInStruct : STRUCT OutputMon: INT; PowerOk: BOOL; END_STRUCT END_TYPE	
Type name	RFAmplifierInStruct
Description	Structure of the hardware inputs that are wired up for the RF amplifier, divider, or doubler
Definition	STRUCT
Element	Name: OutputMon Type: INT Description: Monitors the RF power at the output of the amplifier, divider or doubler element
Element	Name: PowerOk Type: BOOL Description: Voltage monitor readback

User Interface Type TYPE RFAmplifierStruct : STRUCT Error: ErrorStruct; OutputMon: LREAL; OutputNom: LREAL; PowerOk: BOOL; END_STRUCT END_TYPE	
Type name	RFAmplifierStruct
Description	Structure of the user interface tags that are used to control the RF amplifier, divider, or doubler
Definition	STRUCT
Output Tag	Name: Error Type: ErrorStruct Description: Error handling
Output Tag	Name: OutputMon Type: LREAL Description: Monitors the RF power after the output of the amplifier, divider or doubler in dBm
Input Tag	Name: OutputNom Type: LREAL Description: Nominal value for the RF power at the output in dBm
Output Tag	Name: PowerOk Type: BOOL Description: Voltage monitor readback

Function Block FUNCTION_BLOCK RFAmplifierFB VAR_INPUT RFAmplifierIn: RFAmplifierInStruct; END_VAR VAR_OUTPUT END_VAR VAR_IN_OUT RFAmplifier: RFAmplifierStruct; END_VAR VAR END_VAR	
Name	RFAmplifierFB
Description	Controls the RF amplifier, divider or doubler. One function block for each RF amplifier, divider or doubler chassis needs to be instantiated.
Input argument	Name: RFAmplifierIn Type: RFAmplifierInStruct Description: Input hardware structure
In/out argument	Name: RFAmplifier Type: RFAmplifierStruct Description: User Interface structure

Visual	
Name	RFAmplifierVis
Description	Displays the tags of four channels of whitening
Placeholder	Name: rfamp Type: RFAmplifierStruct Description: RF amplifier structure