LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

LIGO Laboratory / LIGO Scientific Collaboration

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TwinCAT Library for RF Amplifiers, Dividers and Doublers

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

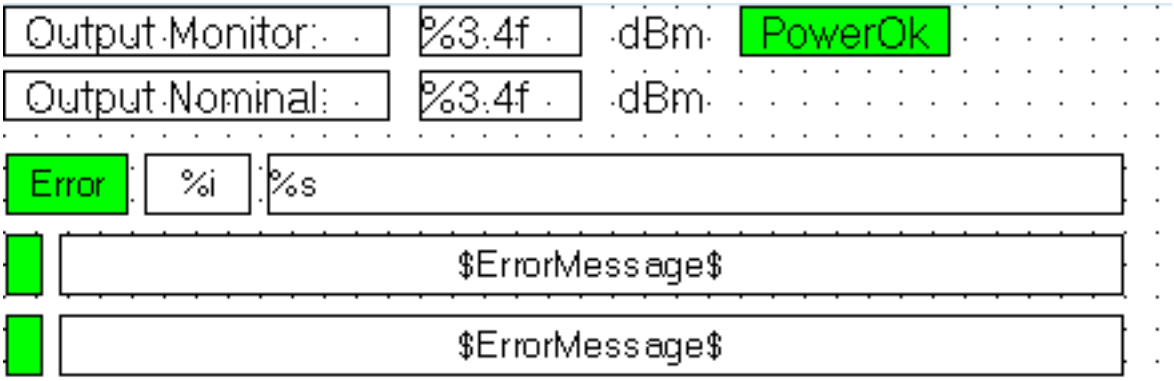
User Interface Type TYPE RFAmplifierStruct : STRUCT Error: ErrorStruct; OutputMon: LREAL; OutputNom: LREAL; PowerOk: BOOL; END_STRUCT END_TYPE	
Type name	RFAmplifierStruct
Description	Structure of the user interface tags that are used to control the RF amplifier, divider, or doubler
Definition	STRUCT
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
        Request:            SaveRestoreEnum;
        RFAmplifierIn:      RFAmplifierInStruct;
END_VAR
VAR_OUTPUT
END_VAR
VAR_IN_OUT
        RFAmplifierInit:    RFAmplifierStruct;
        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: Request Type: SaveRestoreEnum Description: Request save/restore/safemode or noop
Input argument	Name: RFAmplifierIn Type: RFAmplifierInStruct Description: Input hardware structure
In/out argument	Name: RFAmplifierInit Type: RFAmplifierStruct Description: Save/restore variable in persistent memory
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