

THE MEASURABLE DIFFERENCE.



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OXYGEN Training > TRION3-AOUT-8 Support



OVERVIEW

4 different output modes available

- ① Monitor Output
- ② Math Output
- ③ Constant Output
- ④ Function Generator

- TRION3-AOUT8 board must be used in combination with TRION3-1820-MULTI board
- Requires OXYGEN R5.4 and TRION Applications R5.4 or higher
- TRION3-AOUT boards provide the following two functions:
 - Conditioned signal output
 - Calculated channel output
- Conditioned Signal Output

A direct or processed output of each conditioned analog input of the TRION3-1820-MULTI is available here. This can be an analog signal as direct output or RMS or average value for the same ranges as processed output.
- Calculated channel output

Any channel or the TRION3-1820-MULTI can be used for basic calculations on the FPGA
- Voltage or current output is available for both functions with the following ranges:
 $\pm 5 \text{ V}$, $\pm 10 \text{ V}$, $0 - 5 \text{ V}$ or $0 - 10 \text{ V}$ $\pm 30 \text{ mA}$, $0 - 30 \text{ mA}$



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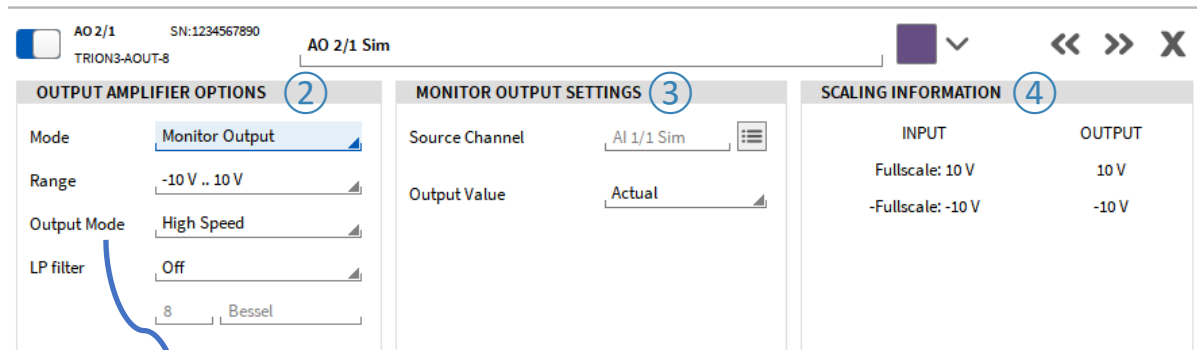
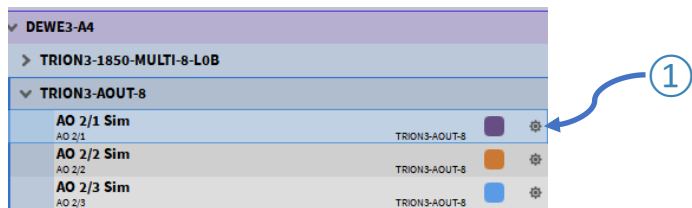
CHANNEL SETUP - OVERVIEW

① Click on the gear button to access the Channel Setup

② Output Amplifier Options. Selection of
- Mode
- Range
- Output Mode
- LP Filter

③ Includes specific settings depending on the Channel Mode

④ Includes the scaling information from Input to output
Can be edited by changing the reference channel's input range or the output channel's range



Output Mode	High-speed Mode	High-resolution Mode
Update Rate	2.5 MS/s	500 ks/s
Resolution	16 bit	32 bit
Latency	< 5 μs	< 100 μs

CHANNEL SETUP – MONITOR OUTPUT SETTINGS



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- 1 Select the reference input channel which shall be output
- 2 Select the output value Actual, Average or RMS
- 3 In case output value is *Average* or *RMS*, a *Moving* or *Fixed Window Type* can be selected
- 4 Calculation Window can be set from 1 ... 1000 ms

AO 2/1 SN:1234567890
TRION3-AOUT-8 AO 2/1 Sim

OUTPUT AMPLIFIER OPTIONS		MONITOR OUTPUT SETTINGS		SCALING INFORMATION	
Mode	Monitor Output	Source Channel	AI 1/1 Sim	INPUT	OUTPUT
Range	-10 V .. 10 V	Output Value	Actual	Fullscale: 10 V	10 V
Output Mode	High Speed			-Fullscale: -10 V	-10 V
LP filter	Off				
	8 Bessel				

MONITOR OUTPUT SETTINGS

Source Channel AI 1/2 Sim

Output Value Average

Window Type Moving

Calculation Window 1000 ms

- Monitor output provides the same functionality as a signal conditioner
- If *Output Value* is *Average* or *RMS*, the calculations will be done on the board's FPGA to ensure minimum latency times



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CHANNEL SETUP – MATH OUTPUT

- 1 Select the reference input channels
- 2 Select the Mathematical operation $A+B$, $A-B$ or $A*B$
- 3 Select the output value Actual, Average or RMS
- 4 In case output value is *Average* or *RMS*, a *Moving* or *Fixed Window Type* can be selected
- 5 Select the output value Actual, Average or RMS
Calculation Window can be set from 1 ... 1000 ms

AO 2/2 SN:1234567890
TRION3-AOUT-8 AO 2/2 Sim

OUTPUT AMPLIFIER OPTIONS		MATH OUTPUT SETTINGS		SCALING INFORMATION	
Mode	Math Output	Source Channel A	Al 1/2 Sim	INPUT	OUTPUT
Range	-10 V .. 10 V	Source Channel B	Al 1/2 Sim	Fullscale: 100 V	10 V
Output Mode	High Resolution	Math Operation	A+B	-Fullscale: -100 V	-10 V
LP filter	Off	Output Value	Actual		
	8 Bessel				
		Output Value	Average		
		Window Type	Moving		
		Calculation Window	1000 ms		

- Math Output can be used to output the sum, difference or product of two reference input channels
- The calculations will be done on the board's FPGA to ensure minimum latency times

CHANNEL SETUP – CONSTANT OUTPUT



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① Select the desired constant value

AO 2/2 SN:1234567890
TRION3-AOUT-8 AO 2/2 Sim

OUTPUT AMPLIFIER OPTIONS		CONSTANT VALUE OUTPUT SETTINGS		SCALING INFORMATION	
Mode	Const Output	Source Channel A	CONST1	INPUT	OUTPUT
Range	-10 V .. 10 V	Constant Value	① 0 V	Fullscale: 100 V	10 V
Output Mode	High Resolution			-Fullscale: -100 V	-10 V
LP filter	Off				
	8 Bessel				

- Constant Output can be used to output a constant reference value within the selected channel Range



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CHANNEL SETUP – FUNCTION GENERATOR

- 1 Select the desired waveform: Sine, Square, Triangle or a customized pattern
- 2 Select the desired signal frequency from 1 mHz to 1 MHz
- 3 Select the signal amplitude from 0 ... 10 V or 0 ... 30 mA as *Peak* or *RMS* value
- 4 Select a signal offset within the output range
- 5 Select a phase shift from -180° ... 180°
- 6 Select a Duty cycle from 0.01 ... 100%
Only available from Square and Triangular signals

AO 2/1 SN:1234567890
TRION3-AOUT-8 AO 2/1 Sim

OUTPUT AMPLIFIER OPTIONS		FUNCTION GENERATOR OUTPUT SETTINGS		CUSTOM WAVEFORM STORE	
Mode	Function Generator	Waveform	1 Square	Waveforms are shared per module.	
Range	-30 mA .. 30 mA	Frequency	2 1000 Hz	0	Click or drop waveform file here
Output Mode	High Resolution	Amplitude	3 1 mA	1	Click or drop waveform file here
LP filter	Off	Peak		2	Click or drop waveform file here
	8 Bessel	Offset	4 0 mA	3	Click or drop waveform file here
		Phase	5 0 deg		
		Dutycycle	6 50%		

- Function generator provides the ability to output different predefined waveforms or customized patterns
- The calculations will be done on the board's FPGA to ensure minimum latency times



CHANNEL SETUP – CUSTOM WAVEFORM PATTERNS

- Instead of a predefined Sine, Rectangular or Triangular, a customized waveform can be used
- 4 customized waveforms are shared by the entire module
- Waveforms are stored to the dms-setup file
- One waveform can be selected per channel

① Select the desired pattern in the waveform dropdown or select the desired waveform directly in the custom waveform menu

② Load a waveform by dragging and dropping the file into the respective waveform field or by clicking on the field to open a dialog window

③ The defined waveform corresponds to one period and will be repeated periodically. Output rate can be defined by using the Frequency selection

- The waveform file must fulfill the following demands:
 - The file must be a .csv format (④)
 - Each row is one value or sample
 - Only values between -1 and 1 are allowed
 - The signal will be scaled according to the selected Amplitude (⑤)
 - The separator must be a . (dot)
 - A maximum of 16384 rows are allowed

```

waveform1.csv
Datei Bearbeiten
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
  
```

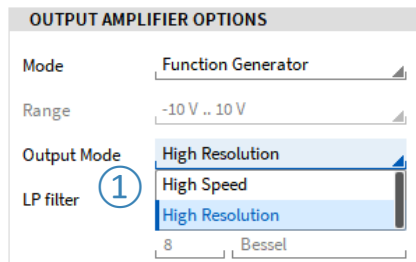



OUTPUT RATE VS SAMPLE RATE

① The output rate (sample rate of the D/A converter) is only depending on the selected output mode.

High Speed mode corresponds to 2.5 MS/s

High Resolution mode corresponds to 500 kS/s



② The output channels can also be stored to the dmd-file. The sample rate for storing the channels can be selected in the *Sample Rate* column of the Channel List

Channel	Color	Active	Stored	Scaled Value	Mode	Sample Rate
LocalNode						
DEWE3-A4						
TRION3-1820-MULTI-8-LoB						
TRION3-AOUT-8 (2)						
AO 2/1 Sim				-0.0000000	AVG	10000 Hz
AO 2/2 Sim				0.0406436	AVG	10000 Hz
AO 2/3 Sim				-5.9999996	AVG	10000 Hz
AO 2/4 Sim				5.1999997	AVG	10000 Hz
AO 2/5 Sim				-2.7999998	AVG	10000 Hz
AO 2/6 Sim				-6.9999996	AVG	10000 Hz
AO 2/7 Sim				0.0000000	AVG	10000 Hz
AO 2/8 Sim				0.0000000	AVG	10000 Hz