# 16. COP-ADA (Analogue IO)

COP-ADA   611042130

The COP-ADA module is equipped with eight fast analogues 16-bit inputs and outputs. The inputs are differential, and the outputs apply to the GND line of the COP node power supply. For the inputs, a hardware filter can be configured, which will average up to 64 sample values. In addition, there is a 10V power supply, including feedback, for connection to an external measuring bridge. The outputs can be configured as voltage or current outputs.
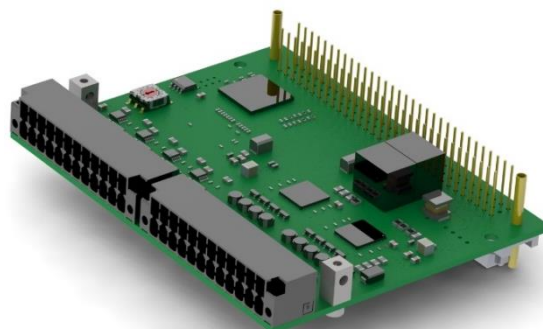
16.1. Technical Specifications

Analogue Inputs		
Number of inputs	8	
Technology	Differential	
ADC sampling rate	200	kHz
COP bus sampling rate	1 … 16	kHz
Voltage ranges	± 0.1, ± 1, ± 10	V
Resolution	16	Bit
Deviation ±10 V / ± 1 V / ± 0.1V	< 0.01 / 0.01 / 0.02	% FSR[3]
Input impedance	10	MΩ
Hardware filter [1]	Mean value filter: 4, 32, 64 values	
Full scale drift	20	ppm/K
Common mode	± 12 relative to GND	V
Analogue Outputs		
Number of outputs	8	
Technology	Single-ended	
Sampling rate for all channels	16	kHz
Voltage range [2]	0 … 5, ± 10	V
Deviation Voltage Output	< 0.02	% FSR[3]
Maximum output current in the voltage mode	16	mA
Current range [2]	0 … 20	mA
Resolution	16	Bit
Deviation Current Output	< 0.025	% FSR[3]
Full scale drift	50	ppm/K

Measuring Bridge		
Bridge voltage	10	V
Minimum load resistance	250	Ω
Drift	50	ppm/K
Module		
Warm-up time	15	min
Maximum power consumption at 24V node power supply	260	mA

1) The hardware filter applies for all eight inputs.
2) Switching between different ranges during 120µs returns incorrect values on all channels.
3) FSR: Full-Scale Range. E.g. ± 10 V Range: FSR = 20V

16.2. **Pin Assignment**
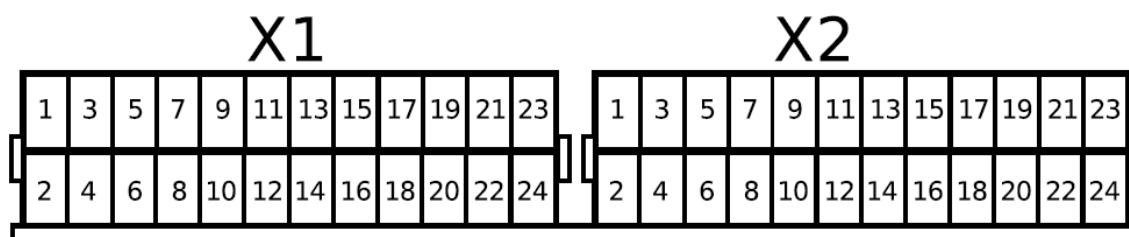
X1					
No.	Dir	Id.	Id.	Dir	No.
2	In	+A 01	+A 00	In	1
4	In	-A 01	-A 00	In	3
6		Shield	Shield		5
8	In	+A 03	+A 02	In	7
10	In	-A 03	-A 02	In	9
12		Shield	Shield		11
14	In	+A 05	+A 04	In	13
16	In	-A 05	-A 04	In	15
18		Shield	Shield		17
20	In	+A 07	+A 06	In	19
22	In	-A 07	-A 06	In	21
24		Shield	Shield		23

| X2					
No.	Dir	Id.	Id.	Dir	No.
2	Out	A 01	A 00	Out	1
4		GND	GND		3
6	Out	A 03	A 02	Out	5
8		GND	GND		7
10	Out	A 05	A 04	Out	9
12		GND	GND		11
14	Out	A 07	A 06	Out	13
16		GND	GND		15
18		GND	GND		17
20	Out	-Vcc MB	+Vcc MB	Out	19
22	In	-FB MB	+FB MB	In	21
24		Shield	Shield		23

Remarks on the versions:
- In HW-Rev0 the pins 23 and 24 are connected to GND.
- From HW-RevA the pins are connected to the shield.

16.3.   Connection Examples

Measuring bridge

The module has an extra interface for connection to a measuring bridge. The voltage of the measuring bridge is regulated by the module independently via feedback. The bridge voltage is measured using any of the COP-ADA card's analogue inputs.
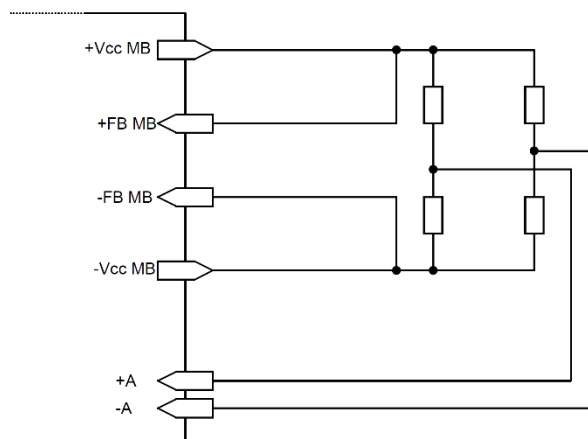
16.4.   Available Options

Item Number	Label	Option	Description
611042130	COP-ADA		8 x ADC 16kHz, 16Bit, multi-range, 8 x DAC current and voltage outputs