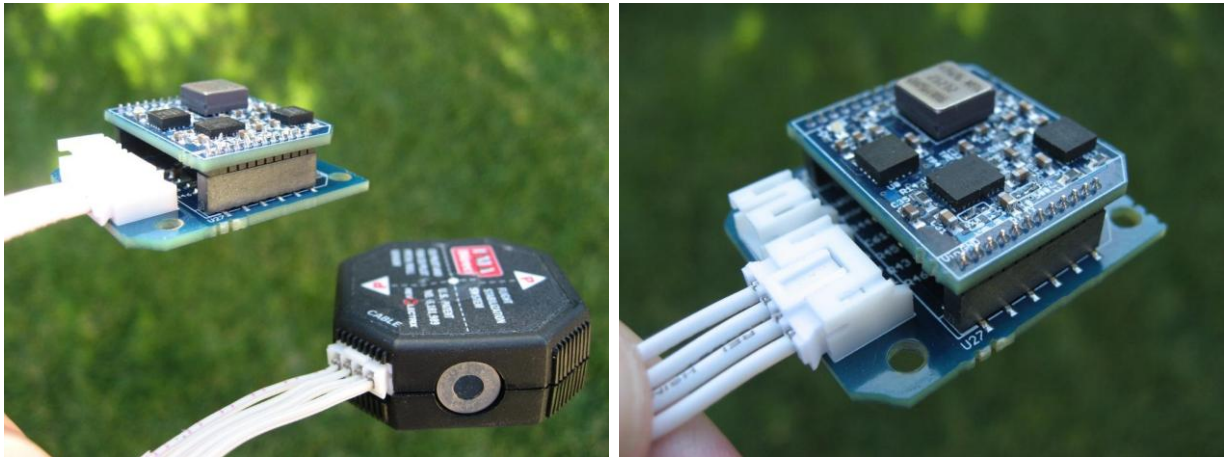


Analog Node User Manual

Introduction

The Analog Node works with the CHIMU AHRS unit to output scaled voltages representing either angle or rate in the pitch and roll orientations. The unit also allows speed input via hardware to allow the CHIMU unit to calculate centripetal corrections.

The Analog Node and CHIMU combination can effectively replace (in systems that use a microprocessor to scale inputs accordingly) an IR horizon detector like the FMA Co-Pilot module. Physically, the Analog Node fits within the same constraints as the FMA Co-Pilot IR sensor module as well. Shown below is a comparison of the two modules.



Warning on Use

The FMA Co-Pilot module is typically intended for flight stabilization of remote control aircraft. Replacement of this module or any other use of this node with the CHIMU module must be performed in accordance with local, state and Federal rules, laws and regulations.

Connections

There are two connectors on the Analog Node, a 4 pin main connector and a 2 pin optional speed input connector.

The 4 pin connector is identical to an FMA Co-Pilot connector.

The connector is a JST (Digi-Key P/N 455-1721-ND). Mating cable example is JST (Spark Fun PRT-09240).

Table 1. 4 Pin Connector Description

Pin	Function
1	GND
2	Vss (3.3 to 5V)
3	Roll output channel
4	Pitch output channel

The board labels the connections on the bottom silkscreen.

The 2 pin connector is unique to the Analog Node.

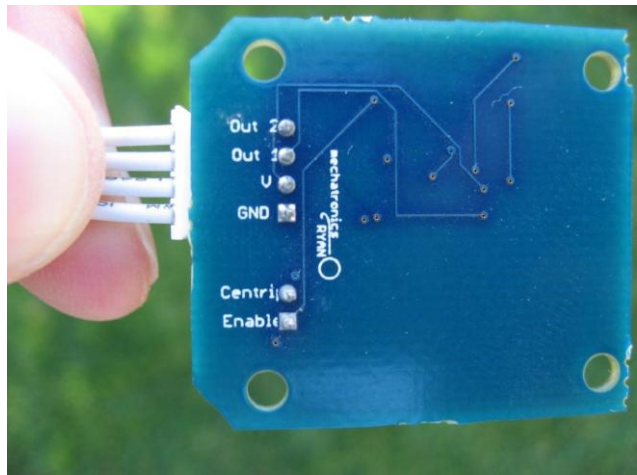
The connector is a JST part (Digi-Key P/N 455-1719-ND). Mating cable example is JST (Spark Fun PRT-08671).

Table 2. 2 Pin Connector Description

Pin	Function
1	Centripetal enable*
2	Speed input

** Pin 1 = Centripetal enable. Ground this pin to enable centripetal speed input. Leave unconnected or hold at 3.3V to disable centripetal corrections. Do NOT exceed 3.3V on this pin!

For details on centripetal speed input scaling, see CHIMU user manual.



Output Definition

The unit has two modes of operation, rate and angle. Angle mode is selected by jumping the pads labeled “ANA2” and “GND” together.

If left unconnected, the unit outputs corrected rate data for pitch and roll.

If connected, the unit outputs corrected angle reference data for pitch and roll.

Angle Mode

In angle mode, the output on each channel is scaled similar. However, tests should be conducted in the final application to verify angles and output for the application requirements.

Pitch

The pitch output equation is: $V_{out,pitch} = 1.5 + 0.5 * (\text{Pitch Angle (deg)} / 90 \text{ (deg)})$

Roll

The Roll output equation is: $V_{out,roll} = 1.5 + 1.5 * (\text{Roll Angle (deg)} / 180 \text{ (deg)})$

Roll angle is defined as -180 deg to +180 deg range. At an upside down orientation (180 deg), the unit will seem to oscillate between extreme ranges. This is normal.

Rate Mode

In rate mode, the output on each channel is scaled identically. However, tests should be conducted in the final application to verify angles and output for the application requirements.

Pitch

The pitch output is approximately 72 degrees per second per volt.

Roll

The pitch output is approximately 72 degrees per second per volt.