

HARDWARE MANUAL

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1 Special Handling Instructions

The Sinusoidal ROSIO Card circuit board contains CMOS circuitry that is sensitive to Electrostatic Discharge (ESD). Special care should be taken in handling, transporting, and installing the Sinusoidal ROSIO Card to prevent ESD damage to the board. In particular:

- Handle the circuit board only at grounded, ESD protected stations.
- Remove power from the computer system before installing or removing the circuit board.

2 Introduction

Sinusoidal RosIO Card that reduces cost by combining several interfaces and saves space. It has 3 ultrasonic module input decoder, up to six 0-5V range analog input, 1 joystick interface with 2 buttons, 2 pwm outputs, 3 digital outputs. Each ultrasonic module capable up to 4 ultrasonic horns.

3 Device and Vendor Identification

This is the information that identifies the Sinusoidal RosIO Card board in the computer system.

- Device ID: 0x483 (hex)
- Vendor ID: 0x5743 (hex)

4 Installation

The installation of the Sinusoidal RosIO Card into a computer system is straight forward as no special adjustment (jumpers) are required.

5 Connection Diagram

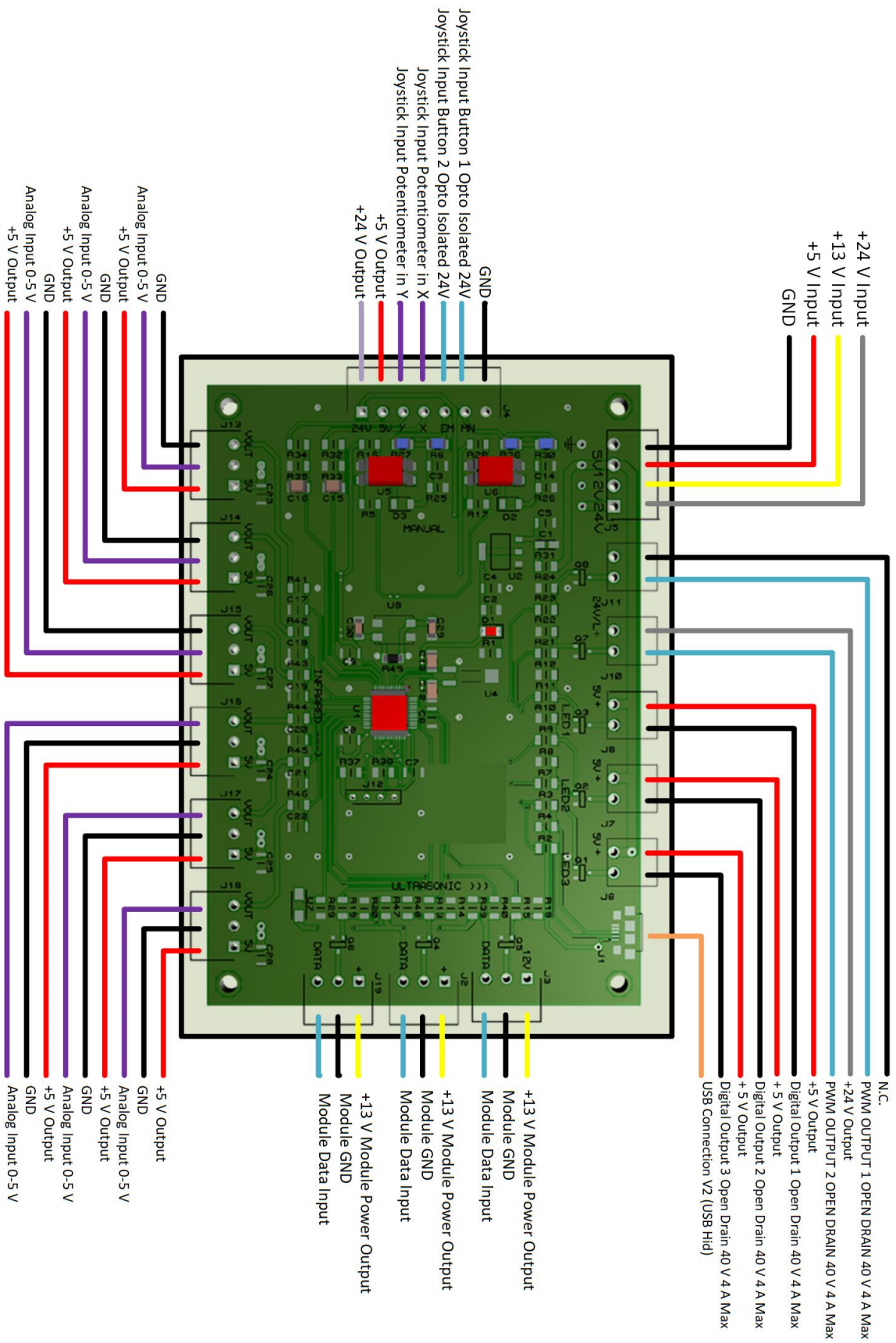


Figure 1 Connection Diagram

6 Ultrasonic Module Decoding Interfaces

Each ultrasonic module interface capable to decode 4 horn ultrasonic module. Each ultrasonic module interface can be energized from ros topics as Bool message. Ultrasonic modules' data handled at Sinusoidal rosIO Card driver and each horn's range message published as Range message with same frame id. Each decoder interface runs at 10 Hz.

7 Analog Input Interfaces

Each analog input interface can be used 0-5V with output analog sensors. Each interface has 12bit resolution. Each analog input interface supports varios of sensors like;

- Infrared distance sensors,
- Analog accelerometers,
- Analog gyroscopes etc.

Analog interfaces from 1-6 has handled at rosdriever as infrared inputs as example, each analog information scaled to max infrared range and published as Range message.

8 Joystick Input Interface

Joystick interface has 2 analog inputs for potentiometer inputs X, Y, and 2 digital 24V inputs for joystick button. The ros driver example publishes the sensor_msgs/Joy message.

9 Digital Output Interfaces

Each digital output interface has an open drain output 4.2A 40V maximum. 3 of them can be used for RGB led strip drive with one PWM output. Each digital output interface can be energized from appropriate ros topic as Bool message.

10 PWM Output Interfaces

Each digital PWM interface has an open drain output 4.2A 40V maximum with PWM frequency ~1Khz 8 bit resolution. Ros control topic of PWM output interfaces shown in example python test file. Ros message type is UINT8.

11 The Board Interface Specifications

Ultrasonic Interfaces	
Number of channels	3
Maximum supported horns	12
Ultrasonic module sensor accuracy	+/- 3 cm
ROS Publish Frequency	10 Hz
Analog Input Interfaces	
Number of channels	6
Resolution	12 bits
Accuracy	10 bits
Input Ranges	0 - 5V
Offset Error	+/- 2LSB
Conversion Time	20 us/channel
ROS Publish Frequency	10 Hz
Digital Output Interfaces	
Number of channels	3
Output Type	Open Drain
Max Output Voltage	40 V
Max Output Current	4 A
PWM Output Interfaces	
Number of channels	2
PWM Frequency	1000 Hz
PWM Resolution	8 bits
Output Type	Open Drain
Joystick Interface	
Number of input buttons	2
Number of analog channel	2
Communication Interface	
USB 2.0 Usb-HID protocol	1
Power Requirements	
24 V input for PWM Output 1	Optional
12 V input for Ultrasonic Modules	Required if ultrasonic modules will be connected.
5 V input for ROSIO Card paralleled with USB input	Optional