open source
control systems

# RGBIO8 Module
## User Manual

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# Contents

# 1    Overview

The RGBIO8 Module was designed to provide software-based user input and indication for control applications. Software-based switches simplify control panel wiring. Only a single communication cable is required between the front-panel user interface and the controller. Alternatively, wiring switches and indicators in-line with controller outputs requires significantly more wiring and adds complexity to the design.

In addition, the use of software-based switches and indicators allows the control application more control over the entire system. For example, an external condition could override manual input in a way that ensures the system operates within parameters.

Finally, the RGBIO8 module supports RGB LEDs and color recipes allowing the user more control over how specific conditions should be indicated.

## 1.1   Safety Information

Integration of the RGBIO8 module into a control system requires electrical knowledge. It is solely the installer's responsibility to assure that the system is configured in a manner consistent with applicable safety requirements. Open Source Control Systems, Inc. does not control how this board is integrated into the control system and cannot be responsible for guaranteeing the safety of your system.

If the device is to be used with dangerous voltages care must be taken to prevent an operator or installer from coming into contact with these voltages. An enclosure that allows for modest ventilation, but prevents intrusion by operator's hands and foreign objects should be utilized with this board.

## 1.2   Features

- Eight RGB LED output channels (30mA per color with heat sink)

- Eight dual-input switch channels supporting tri-state operation

## 1.3   Before You Proceed

Please review all safety and connection information before attempting to connect and provide power to the device. Open Source Control Systems, Inc. is not responsible for damage caused to boards and devices caused by improper connections. If you have any questions please do not hesitate to contact support. You can find phone numbers and contact forms on our website (https://www.oscsys.com).

# 2 Connections

This section describes how to connect the RGBIO8 module to a controller, switches and LEDs.

## 2.1 I2C Connector

The I2C Connector supplies 12V DC power to the RGBIO8 module and connects the module to the controller's I2C interface. The following example illustrates connection of two RGBIO8 Modules.
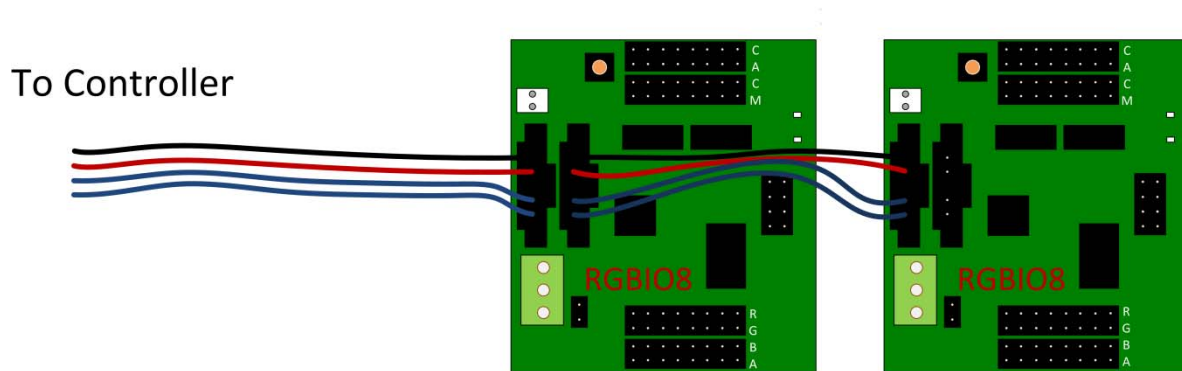
## 2.2 Switch Connection

Each channel on the RGBIO8 module supports two switch connections. These are typically used with a three position switch to allow tri-state control (for example, On/Off/Auto).

The following examples illustrate how to connect a three position selector switch to the module:
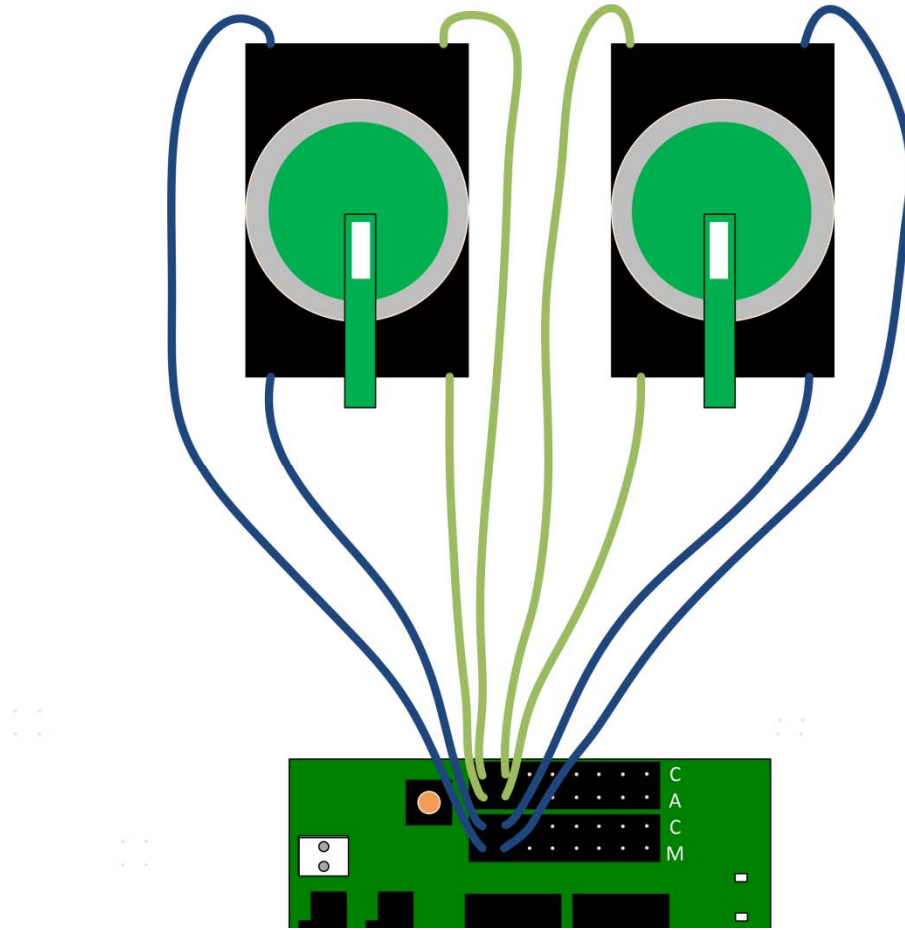
The following examples illustrate how to connect a toggle switch to the module:

C
A
C
M
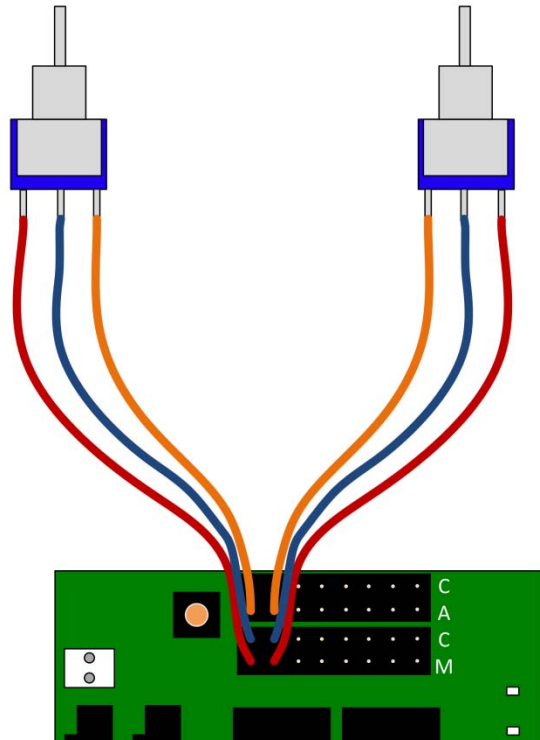
## *2.3 LED Connection*

The RGBIO8 Module is typically used RGB LEDs to allow custom color mixing.

The following example illustrates the connection of a Common Anode RGB LED to Channel 1 and Channel 2:
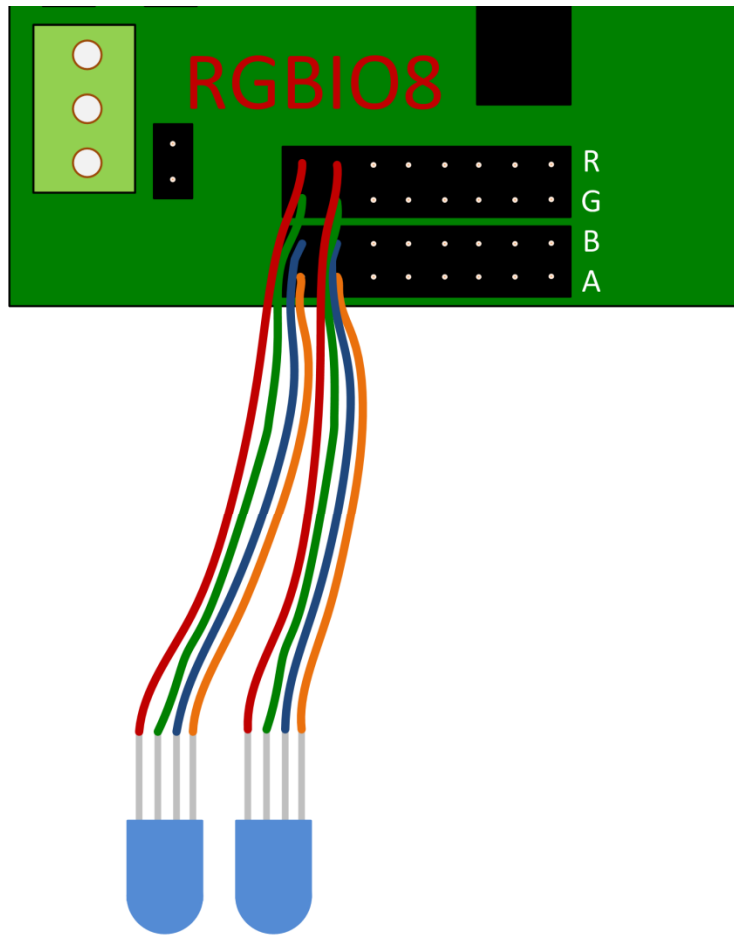
# 3    Board Reference

## 3.1   Layout
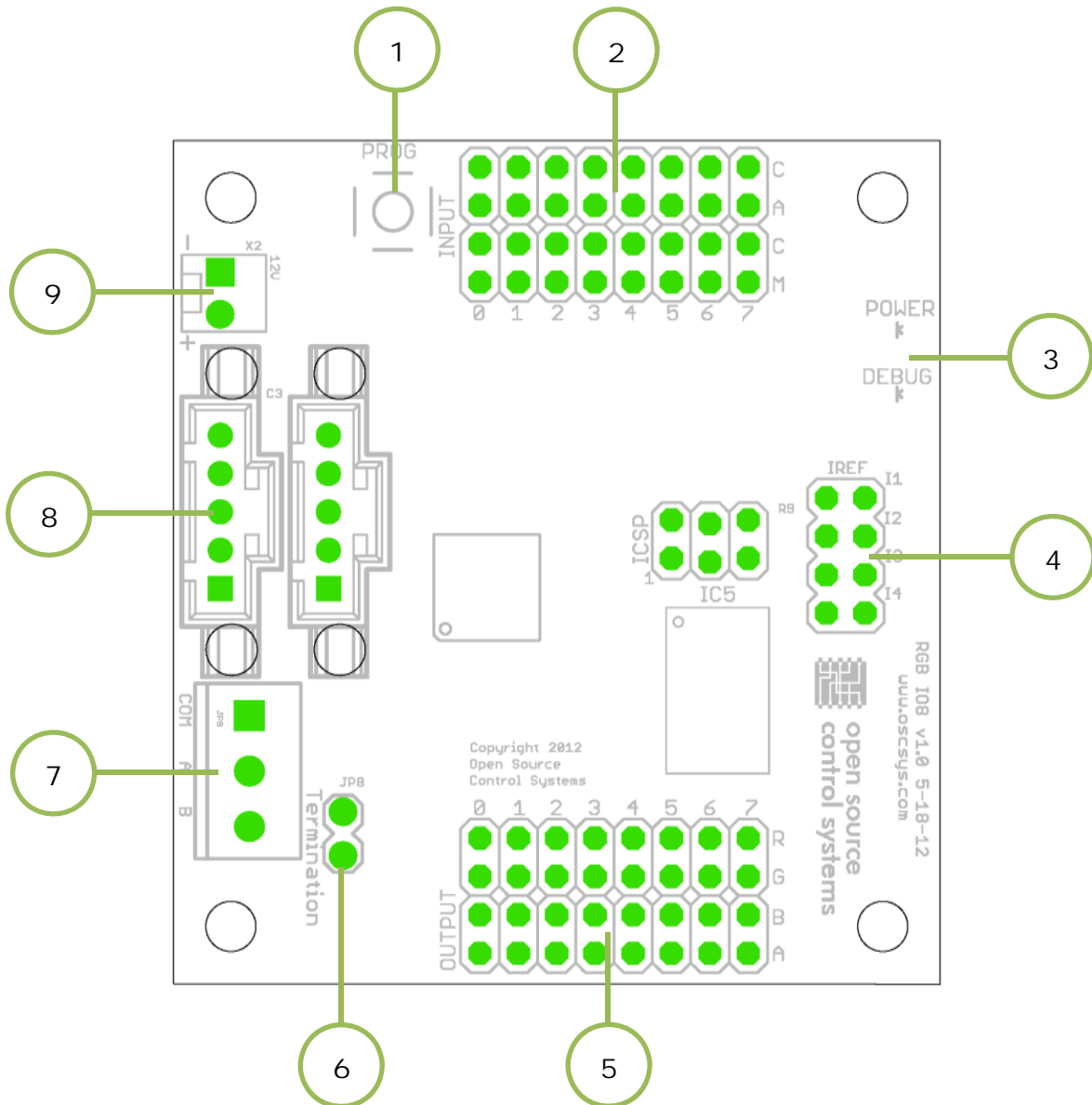


1.    ID Programming Switch
2.    Switch Headers
3.    Power/Debug LED Indicators
4.    LED Current Set Jumpers
5.    RGB LED Output Headers
6.    RS485 Termination Header
7.    RS485 Connection
8.    I2C Connectors
9.    Auxiliary Power Connection

## 3.2  ID Programming Switch

This push button is used when assigning the RGBIO8 to a controller.

## 3.3  LED Indicators

### 3.3.1      Power

Indicates power is connected to the board.

### 3.3.2      Debug

Indicates proper operation of the firmware.

Three flashes with a pause indicate the board is running but not assigned an address.

Rapid flashing indicates the board is receiving data from its host.

## 3.4  Jumpers

### 3.4.1      Current set jumpers (IREF)

To set the current limiting for the RGB LEDs the following table applies to the IREF header.

WARNING: It's not recommended to exceed 15mA per channel without adding a heat sink to the LED driver chip.

| Jumpers | Current |
|---------|---------|
| I1+I2 | 15mA |
| I1+I3 | 20mA |
| I2+I3 | 25mA |
| I1+I2+I3 | 30mA |
| I1 | 5mA |
| I2 | 10mA |
| I3 | 15mA |
| I4 | 2mA |

### 3.4.2      RS485 Termination

This jumper needs to be connected if the RGBIO8 module is the first or last device on the RS485 bus.

## 3.5 Connections

### 3.5.1 Auxiliary Power Connector
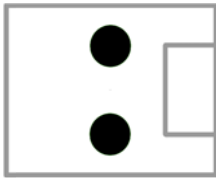
1. GND
2. 12VDC

### 3.5.2 RS485 Terminals
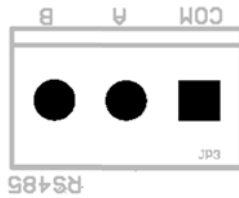
1. REF
2. A
3. B

### 3.5.3 I2C Communications Port
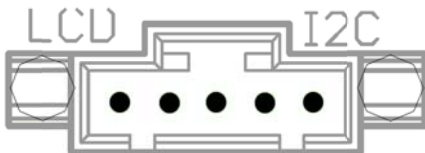
1. SDA
2. SCL
3. N/C
4. 12VDC
5. GND

# 4    Mechanical Specifications



# 5    Electrical and Environmental Specifications

| Main Power Input | 12VDC |
|---|---|
| Logic-Level Communication Ports | 5VDC |
| Temperature | 0° to +55° C |
| Relative Humidity | 20% to 80% relative humidity, non-condensing |

# 6   Appendix A – Warranty

Open Source Control Systems, Inc. (OSCSYS) warrants that this hardware product is in good working condition, according to its specifications at the time of shipment, for a period of 90 days from the date it was shipped from OSCSYS. Should the product, in OSCSYS's opinion, malfunction within the warranty period, OSCSYS will repair or replace the product without charge. Any replaced parts become the property of OSCSYS. This warranty does not apply to the software component of a product or to a product which has been damaged due to accident, misuse, abuse, improper installation, usage not in accordance with product specifications and instructions, natural or personal disaster or unauthorized alterations, repairs or modifications.

All warranties for this product, expressed or implied, are limited to 90 days from the date of purchase and no warranties, expressed or implied, will apply after that period.

All warranties for this product, expressed or implied, shall extend only to the original purchaser.

The liability of Open Source Control Systems, Inc. in respect of any defective product will be limited to the repair or replacement of such product. Open Source Control Systems, Inc. may use new or equivalent to new replacement parts.

Open Source Control Systems, Inc. makes no other representations or warranties as to fitness for purpose, merchantability or otherwise in respect of the product. No other representations, warranties or conditions, shall be implied by statute or otherwise.

In no event shall Open Source Control Systems, Inc. be responsible or liable for any damages arising

(a)     from the use of the product;

(b)     from the loss of use of the product;

(c)     from the loss of revenue or profit resulting from the use of the product; or

(d)     As a result of any event, circumstance, action or abuse beyond the control of Open Source Control Systems, Inc.

Whether such damages be direct, indirect, consequential, special or otherwise and whether such damages are incurred by the person to whom this warranty extends or a third party.