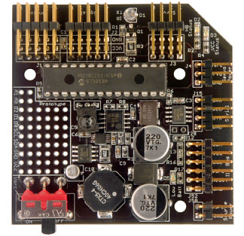


# BrainStem GP 2.0 Datasheet

## S25-GP2-BRD

Last Modified 2011-12-13

Acroname Robotics  
www.acroname.com



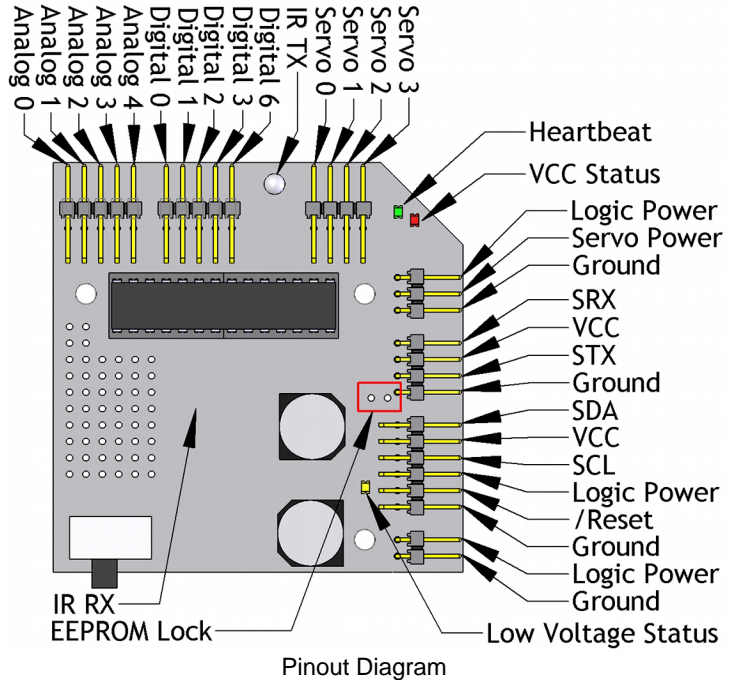
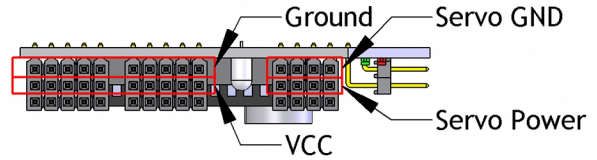
### Overview

The General Purpose (GP) module provides a collection of I/O functions for robotics and control systems. Combining programmability and a built-in command set, this module is both a stand-alone controller and real-world interfacing tool.

### Features

- 5 Analog Inputs with 10-bit resolution.
- 5 Digital Input/Outputs.
- I2C Fast Mode Plus (1MHz) support.
- 4 RC servo PWM control outputs.
- A prototyping area with 2 analog, 3 digital, I2C, Vcc, and Vsrc through holes.
- Onboard power switch and low battery indicator.
- Infrared I/O in RC5 and NEC protocols.

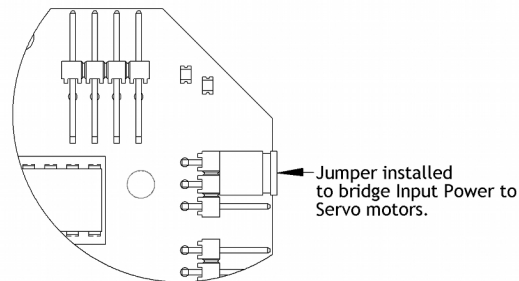
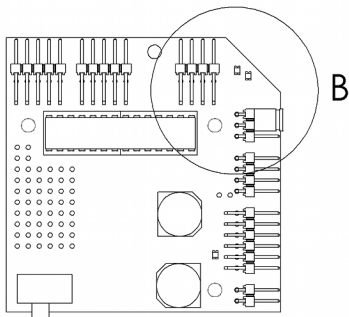
Recommended and Maximum Ratings			
Value	Minimum	Nominal	Maximum
Input Supply Voltage	3.2 V	-	28.0 V
VCC (Regulated)	-	5.0 V	-
I_VCC (Maximum)	-	-	1.0 A
Power Regulator Efficiency	-	90 %	-
Analog Voltage Input Range	0.0 V	-	5.0 V
Digital Output Isource	-	-	25 mA
Digital Input Isink	-	-	25 mA
Digital Logic High	4.7 V	-	5.3 V
Digital Logic Low	0.0 V	-	0.75 V



### Power Supplies

The BrainStem GP 2.0 module has two power supply inputs, one for logic and one for servos. Logic power is indicated by the words "Source Power" on the circuit board.

Servos have a secondary connector for power. This connector shares a common ground with the board with a starred connection at the "Source Power" pin, but the "Servo Power" pin is only connected to the four servo power pins of the servo connectors. This allows the servo power be completely isolated from the logic power if desired. The three pin header for the servo power can facilitate a jumper that can be added which will allow the servos and logic to share the same power supply. This modification is shown below.



Servo power input connection options.

## Power and Voltage Ratings

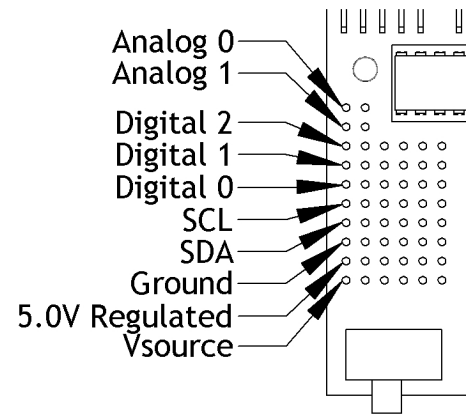
The range of acceptable input voltages for the GP 2.0 module onboard voltage regulator is 3.2V to 28.0V. This wide range of power will get regulated to 5.0V (Vcc) regardless of the actual voltage supplied. A SEPIC (Single Ended Primary Inductor Converter) will increase (boost) or decrease (buck) the input voltage to provide a 5.0V regulated supply. Voltage conversion efficiency is approximately 90 percent.

Voltages below 3.2V will trip the built-in voltage supervisor that disables the power regulation to the microprocessor and other devices using the VCC regulation line. When a low voltage condition is detected, the controller turns off and a low voltage status LED is illuminated.

The voltage regulator has an output current rating of 1 Amp. The regulator can safely provide power for several extra sensors. The VCC pins on the analog and digital headers are all tied and are current limited only by the regulator's 1 Amp maximum.

## Prototyping Area

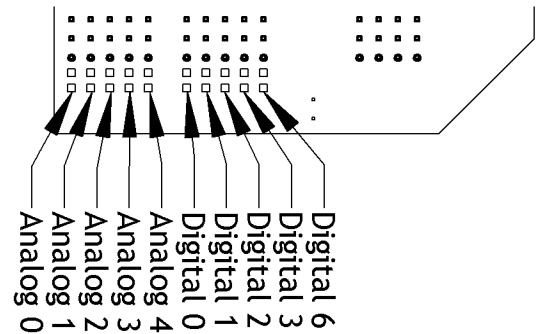
A small area on the module is set aside to facilitate simple breadboarding projects. Holes are spaced at 0.1 inch intervals. A few locations are defined as passthrough holes that supply regulated power, source power, I2C bus, and digital and analog ports.



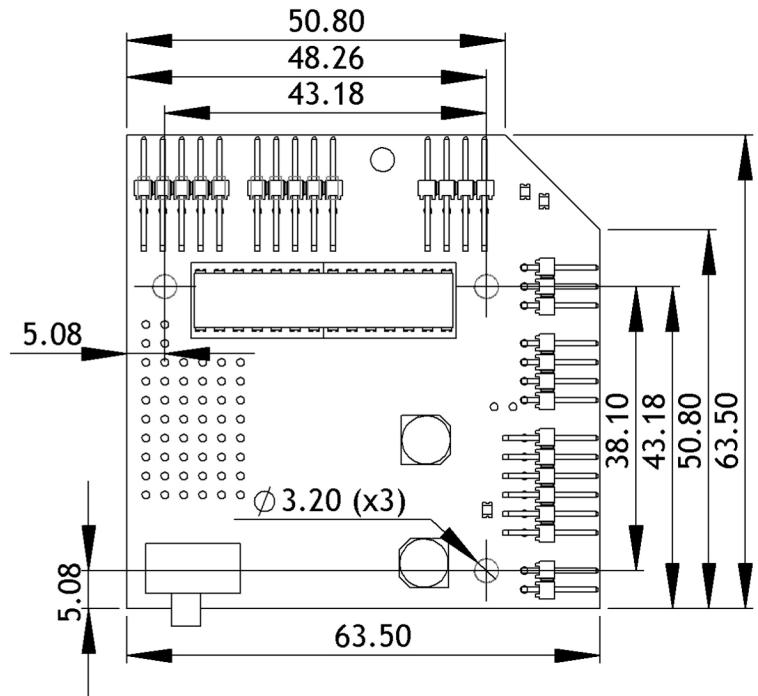
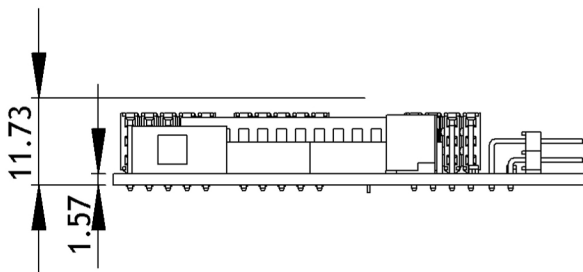
Prototyping area electrically connected through holes.

## Pull-up Resistor Pads

On the bottom side of the module, surface mount pads are included to allow the addition of pull-up resistors to both the digital and analog lines. The footprints are 0603 surface mount package size. The following figure shows the location and order of the unpopulated pads.



Exposed surface mount pads for pull-up resistors.



Dimensions are in millimeters