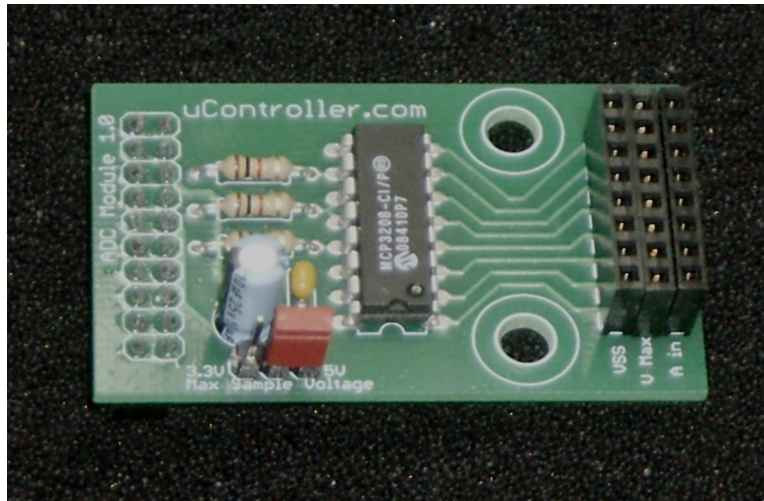


# SpinStudio ADC Module



The SpinStudio ADC adapter incorporates a MCP3208 ADC into a easy to use, plug-in module for the SpinStudio system. The MCP3208 is a very capable ADC with 8 channels and 12 bit resolution. The maximum sample rate (when using 5V max sample voltage) is 100K samples/second. A selectable jumper allows use of 3.3V or 5V as the maximum sample voltage, allowing measurements from either 0 - 5V or 0 - 3.3V in 4096 increments. An SPI interface is used for data transfer. Possible applications for this module include Data-logging and Sensing, Robotics and Industrial control.

---

## Setting up and connecting to SpinStudio.

First select the maximum voltage that you'd like to measure. The available ranges are 0 – 5V or 0 - 3.3V. Position the supplied jumper at the appropriate setting. If you plan to measure a signal that could fall outside of this range, a simple voltage divider can be constructed using resistors, or other methods can be used to bring the signal within the allowable range.

The ADC module can be plugged into any available SpinStudio Socket. Use the following pin settings in your code when plugged into the various SpinStudio Sockets.

	Socket A	Socket B	Socket C	Socket D
Clock	P0	P8	P16	P24
Din / Dout	P1	P9	P17	P25
CS	P2	P10	P18	P25

The three row header is set up as follows -

- Vmax is a supply for your sensors or other circuitry that you'd like to connect to your ADC to measure. The voltage seen on this row of connectors is +3.3V or +5V depending upon the position of the “Maximum Sample Voltage” jumper.
- Ain is the connection to the MCP3208 ADC. This is a direct connection to the ADC IC pins. When the PCB is held as shown in the images above, Input 0 is closest to the bottom of the photo, numbered through input 7 closest to the top of the photograph. These inputs can be configured as single ended inputs or pseudo-differential pairs.
- A VSS row is provided for your sensors or other circuitry that may be connected to your ADC input.
- Note – the input headers are arranged in such a fashion to match a standard “servo” type configuration, a servo extension cable can be utilized to connect to the curcuit or sensor being measured if male headers are used in the construction of this module.

There are several well written objects that already exist that you can seamlessly integrate into your Propeller program.

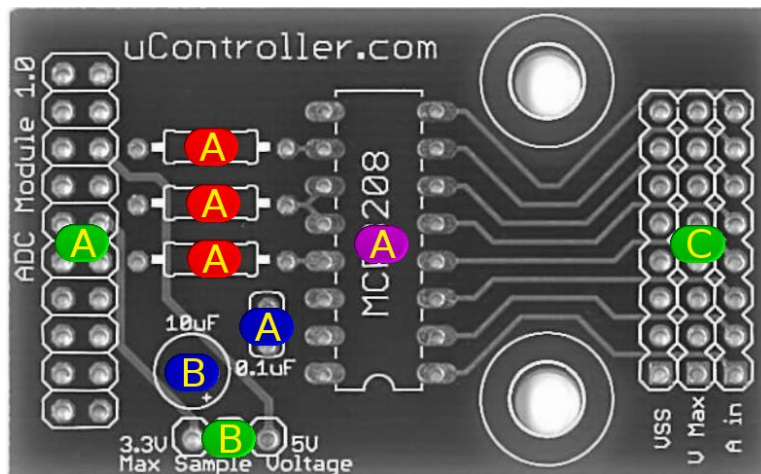
<http://obex.parallax.com/objects/488/> - written by Brandon Nimon

<http://obex.parallax.com/objects/180/> - written by Chip Gracey

<http://obex.parallax.com/objects/224/> - written by Jim Kuhlman

---

## Assembly



Start by inserting the three 1K resistors (marked with Red A in the diagram above). Turn PCB and solder in place. Clipping the excess leads off after soldering.

Next, insert the MCP3208 IC into the PCB (purple A in the above diagram). Making sure the notch on the IC matches the corresponding mark on the PCB silkscreen. The dot marking pin #1 should be in the lower right when the circuit board is held as shown above. Turn the circuit board over and solder the IC in place.

Now the Capacitors can be inserted and soldered in place. The 0.1 uF capacitor is inserted into the spot marked with a Blue "A" and the 10uF capacitor is marked with a Blue "B". The 10uF capacitor is polarized, and thus must be inserted in the correct orientation. The negative lead of this capacitor is marked with a black stripe on the part casing. This must be on the left side of the capacitor when inserted. The 0.1 uF cap has no polarity concerns. Bend the leads to hold in place while you solder them in place and clip excess leads from the bottom of the board.

Now install the 20 pin female SpinStudio connector, Green "A". **Note - This component is inserted from the bottom of the board, and soldered on the top, opposite of the other components!** You may want to solder 1 pin first, check to be sure the connector is positioned snugly against the bottom of the circuit board before soldering the remaining 19 pins. Also you may want to turn the circuit board while soldering, to "attack" the pins in each row from a different angle. How you solder is up to you, but just be careful not to create any solder bridges, or dry solder joints, as they may be difficult to track down later.

Next solder the 3 pin jumper in the spot marked with a Green "B"

Finally, you must decide how you'd like to outfit your ADC Module with connectors to the outside world. Included are three 8 pin female headers. These may be the best choice for experimenting and prototyping, as you can push wires into the headers for a reliable, yet temporary connection. If you'd like to use male headers, a servo extension wire could be used to connect to a sensor when using on a robot chassis or other similar application. Another option would be to solder wires right to the circuit board. How you complete this step is up to you.