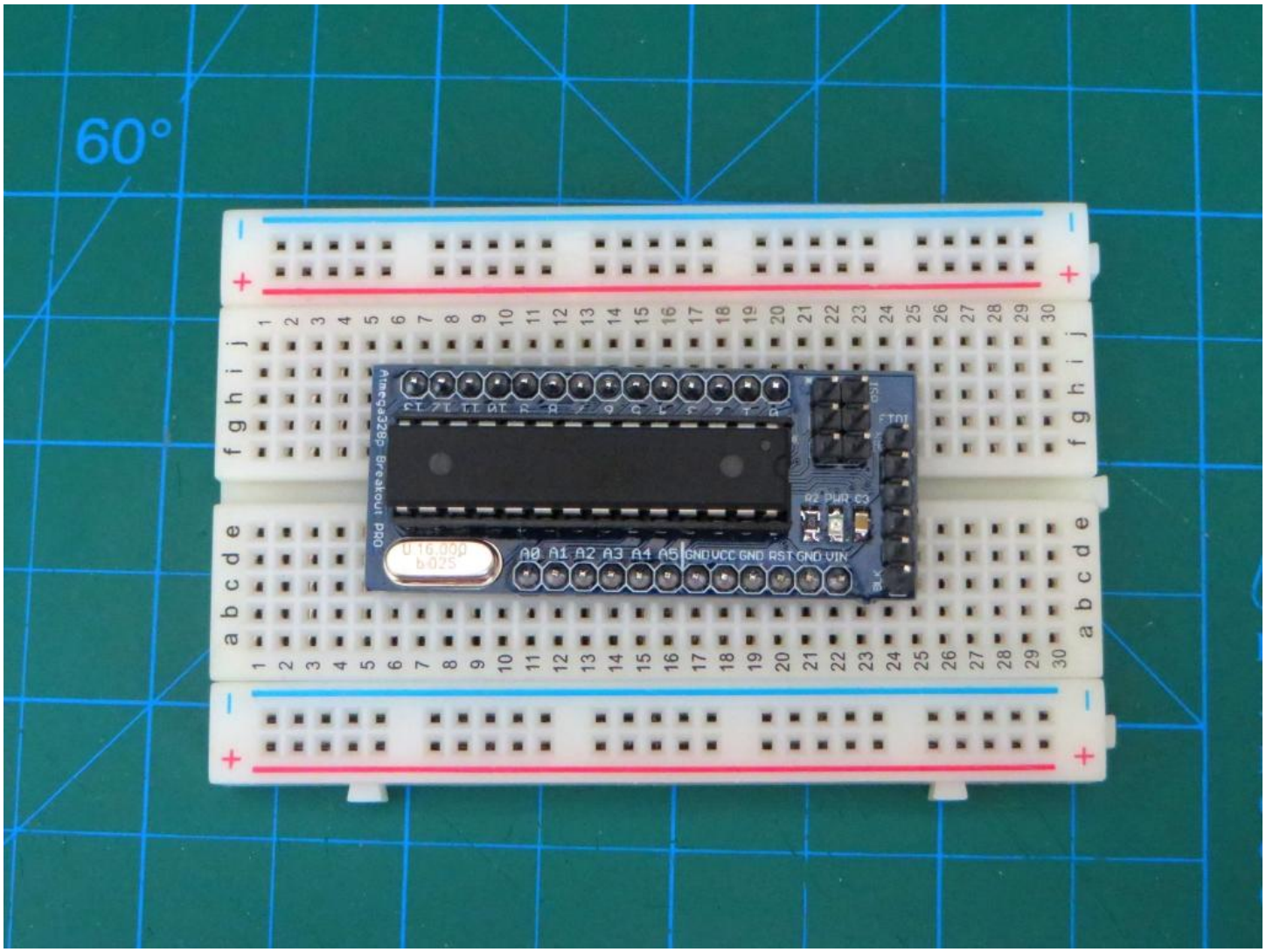
Atmega328p Breakout Board Pro (Revision C) Documentation



Last updated: January 26, 2017

Description

The Atmega328p Breakout Board is a small circuit board that can help you shrink your Arduino Uno based project.

Product page: https://www.tindie.com/products/mwhelectronics/atmega328p-breakout-board/.

Package Contents

- 1 x Atmega328p Breakout Board Pro

The Atmega328p microcontroller and headers are not included.

Technical Notes & Considerations

Atmega328p Datasheet

The Breakout Board's operating ratings are the same as the actual Atmega328p microcontroller. View the datasheet for the Atmega328p microcontroller here:
http://www.atmel.com/Images/Atmel-8271-8-bit-AVR-Microcontroller-ATmega48A-48PA-88A-88PA-168A-168PA-328-328P_datasheet.pdf

The most relevant operational ratings to consider are supply voltage (1.8-5v) and current per I/O pin (20mA).

Power Supply

The Breakout Board does not have a voltage regulator. This means that you must supply a voltage within the operating voltage rating of the Atmega328p microcontroller, which is 1.8v to 5.5v. The input voltage will affect the brightness of the power LED indicator. 5v is recommended.

The positive side of your power supply should be connected to the Vin pad. Vin is connected directly to Vcc, where Vcc can be used to bring power to components in your project if you wish.

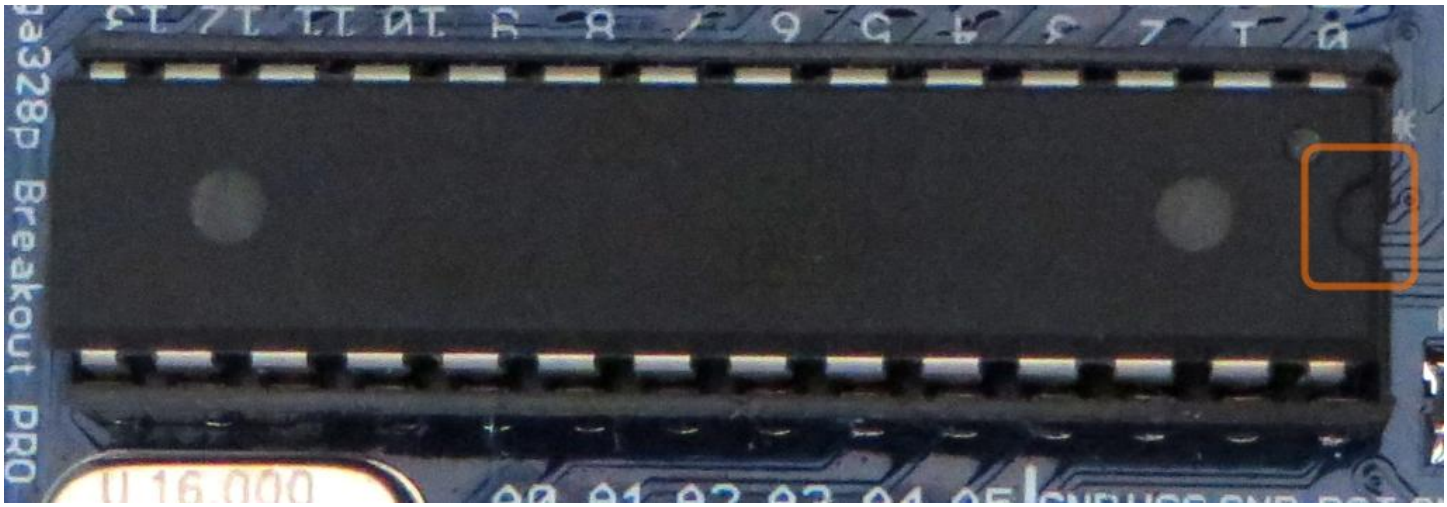
You should only have one power supply connected to the Board at a time. Your FTDI Basic and USBtinyISP boards supply power, so they should not be connected at the same time or when there is power supplied to the Vin pin.

Reset Pin

The reset pin is labeled RST next to a GND ground pin. Connecting these two pads together (grounding the reset pin) by the closure of a button will reset the microcontroller. If you do not need a reset button, leave the pads alone.

Socket

Make sure your Atmega328p microcontroller is sitting in the socket properly. Line up the U-shape on the microcontroller with the one on the socket. This indicates the top of the microcontroller. Putting in the microcontroller the wrong way, or placing or removing the microcontroller while the Board is powered may cause damage.



Push down on the microcontroller firmly so that it sits completely into the socket, while making sure the pins are lining up with the socket. Make sure no pins have been bent and that all pins are seated into each pin socket.

A note about being Breadboard-Friendly

While the Breakout Board does fit in a breadboard, the pins are slightly misaligned so the board sits at a slight angle, as seen in the image on the first page of this document. The misalignment is not large enough to cause any difficulties in inserting the Breakout Board into the breadboard.

Placing the Breakout Board in the middle of a breadboard allows access to two breadboard pins for each pin of the Breakout Board. The angle of the board makes it difficult to access some of the pins with dupont male jumper wires but is not an issue for solid-core wire. This issue will be addressed in the future. Apologies for any inconvenience.

Assembling the Board

Tools You'll Need

You will need soldering tools and skills to complete your power and I/O connections. The tools you will need are:

- Safety glasses
- Soldering iron
- Cleaner for the iron: A damp sponge and/or brass cleaner
- Solder
- Wire cutter

There are plenty of guides and videos online if you are just learning how to solder. The general idea is to get both the component lead and pad on the board hot enough so that the solder melts directly to make the connection.

Assembly Tips

- Whatever your plans are for the Board will decide how you will make your I/O connections.
    - Permanently integrating it into your project?
        - Solder your wire connections directly to the board.
    - Using it to prototype on a breadboard?
        - Solder male headers so that it can sit directly in a breadboard.
    - Using it to prototype without a breadboard?
        - Cut some female headers to size and solder them so that you can make temporary connections, or solder male headers so that you can connect female jumper wires..

Programming

The Atmega328p Breakout Board Pro offers three ways to program the Atmega328p microcontroller.

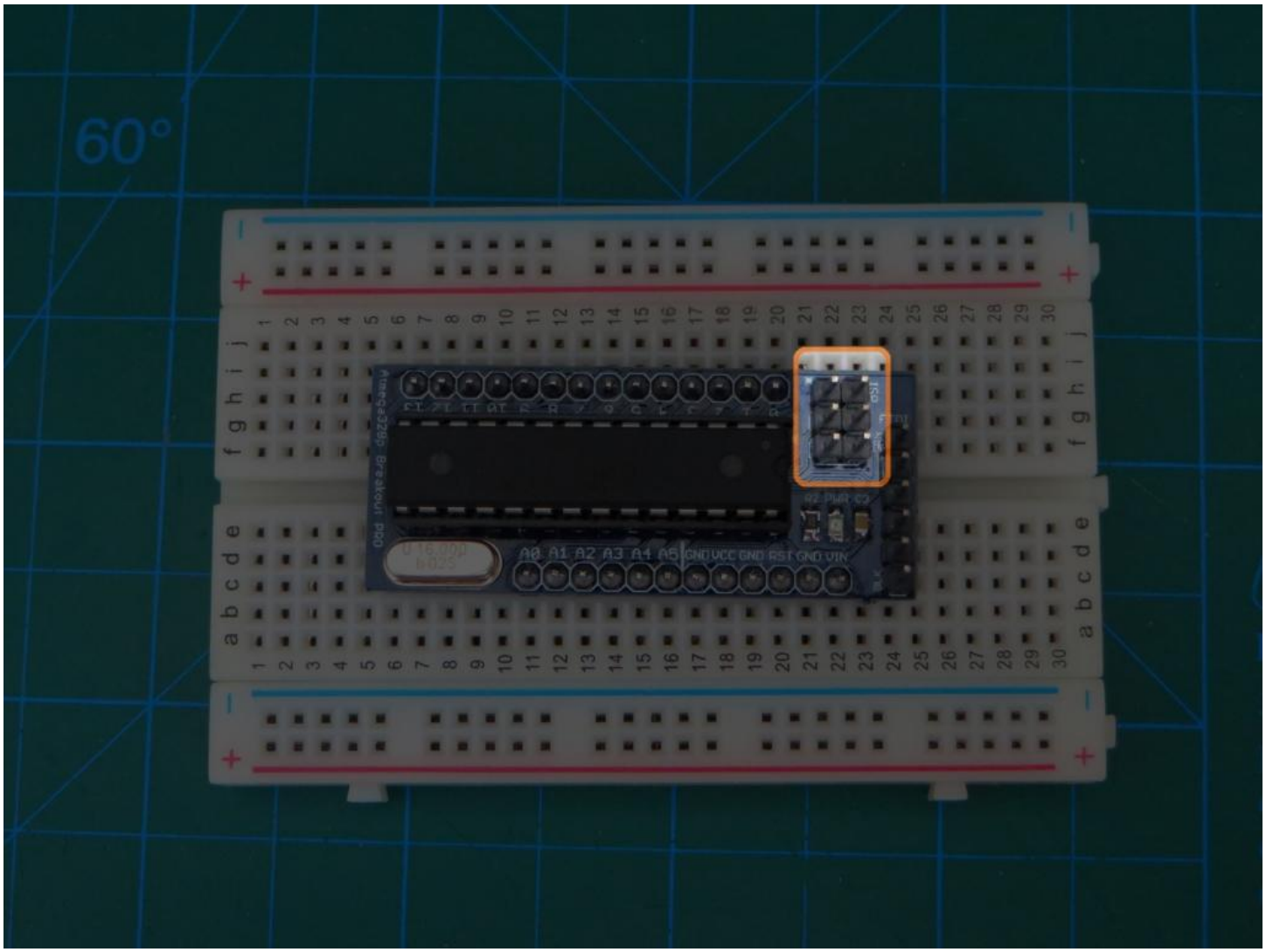
Using your Arduino Uno

The simplest way to program the Atmega328p microcontroller is by using the socket on your Arduino Uno. Once programmed, all you have to do is transfer the microcontroller over to the Breakout Board.

Be very cautious placing and removing the microcontroller into and out of the socket as the pins of the microcontroller can be damaged in the process. This method is recommended for projects that are nearly complete, where you would rarely have to upload new code.

Using your USBtinyISP

The USBtinyISP allows you to upload new code and burn the bootloader, but it does not allow for serial communication.



USBtinyISP driver install guide (by Adafruit):
https://learn.adafruit.com/usbtinyisp/drivers

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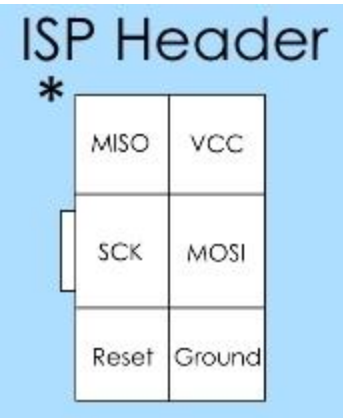


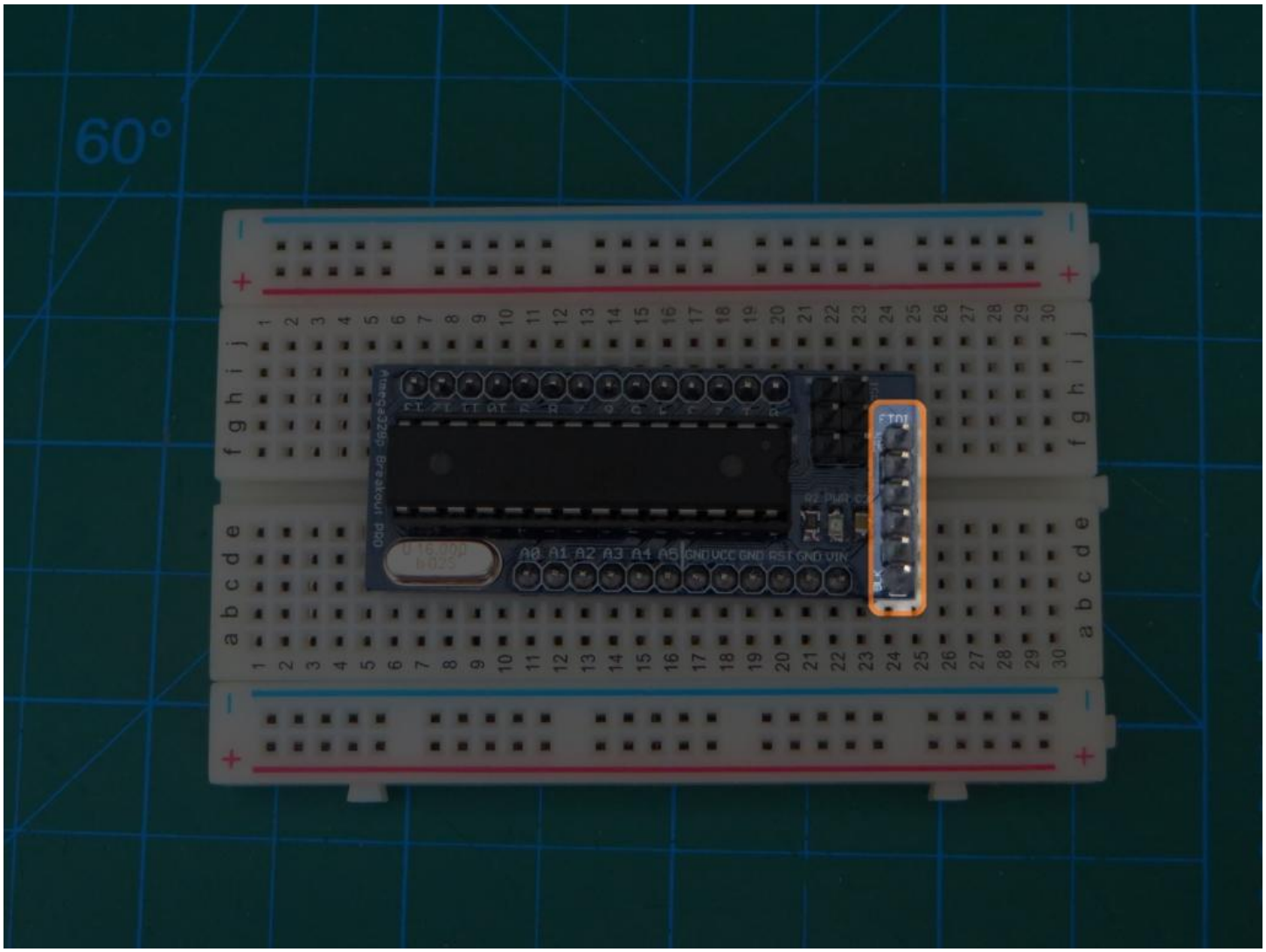
To upload to the Breakout Board using your USBtinyISP with the Arduino IDE:

1. In the Arduino IDE, select Tools>Programmer>USBtinyISP.
2. Connect the USBtinyISP 6-pin ribbon cable connector to the ISP header on the Breakout Board. Make sure it is in the correct orientation. See the pinout to the left. If unsure, the easiest way is to find where Vcc by measuring for +5V across those pins.
3. Hold shift as you click the Upload button, or click Sketch>Upload Using Programmer.

Note that, after you have used the USBtinyISP to upload a sketch to the Atmega328p, you must burn the bootloader to be able to upload a sketch using an Arduino Uno or FTDI Basic.

Using your FTDI Basic

The FTDI Basic allows you to upload new code and have a serial connection between your computer and the Atmega328p microcontroller (great for debugging).



FTDI driver install guide (by Sparkfun):
https://learn.sparkfun.com/tutorials/how-to-install-ftdi-drivers/windows---quick-and-easy

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To upload to the Breakout Board using your FTDI Basic with the Arduino IDE:

1. In the Arduino IDE, select Tools>Programmer>Arduino as ISP.
2. Connect the FTDI Basic to the FTDI header on the edge of the Breakout Board. Note where the BLK (Black) and GRN (Green) labels are for the correct orientation.
3. Click the Upload button.

Questions & Feedback

If you have any questions after reading through this document or working with the product, please let me know and I will try to help.

If you have any compliments or constructive feedback, let me know by leaving feedback on the product page or sending me a message. I am constantly working on revising products and their listings to ensure the best experience for everyone.

Previous Documentation

Revision B

https://docs.google.com/document/d/1FHcPpH7GgUtGlA-Ypvo9dxUWRpgWTDG4NF-RLNlBpFs/edit?usp=sharing

Revision A

N/A

Warranty Disclaimer

Returns & Refunds

Returns are not accepted. However, full or partial refunds may be offered in cases where a manufacturing defect in the product is reported within the 30 days after the order was shipped. Refunds will not be offered if the product is soldered or modified in anyway, or if the product is incorrectly assembled or used.

Safety

Safety should always be your top priority. Take appropriate safety precautions when assembling and using this product. Wear personal protection equipment. Keep the product away from children and pets as it may present a choking hazard. Always stay within the operating ratings of the product for your safety and for the longevity of the product. Do not leave the product unattended while powered. This product must only be used in low-power hobbyist applications.

The designers, suppliers, and manufacturers of this product shall not be held liable for any damages or losses from the use or misuse of this product.