

Arduino® Tutorial

Power

Powering an Arduino while leaving the USB port open for programming is tricky. There are a few options; which is best depends on your circumstance.

1. The recommended V_{in} input range on Arduino is 7 to 20V, due to its input regulator. When the robot is not charging, you can plug this directly into Create's main battery voltage, but while the Create® 2 is charging, this bus can get as high as 21V. If you choose this option, be sure to unplug your circuit from the Create2 when charging. We don't recommend this option, as it could be easy to forget to unplug your circuit before you charge your robot.
2. One hack around this problem would be to "drop" a volt from the robot's V_{batt} before feeding it into the Arduino. This can be accomplished by putting two rectifier diodes (like the 1N4001 or similar) in series with V_{batt} . These diodes may get warm if a lot of current is pulled from the Create 2.
3. Another solution is to use a linear regulator or buck regulator to step the robot's V_{batt} to another voltage, like 12V, before feeding it into the Arduino's V_{in} . This will be more efficient, and will also keep the Arduino happier (since it is using a linear regulator to step to 5V).

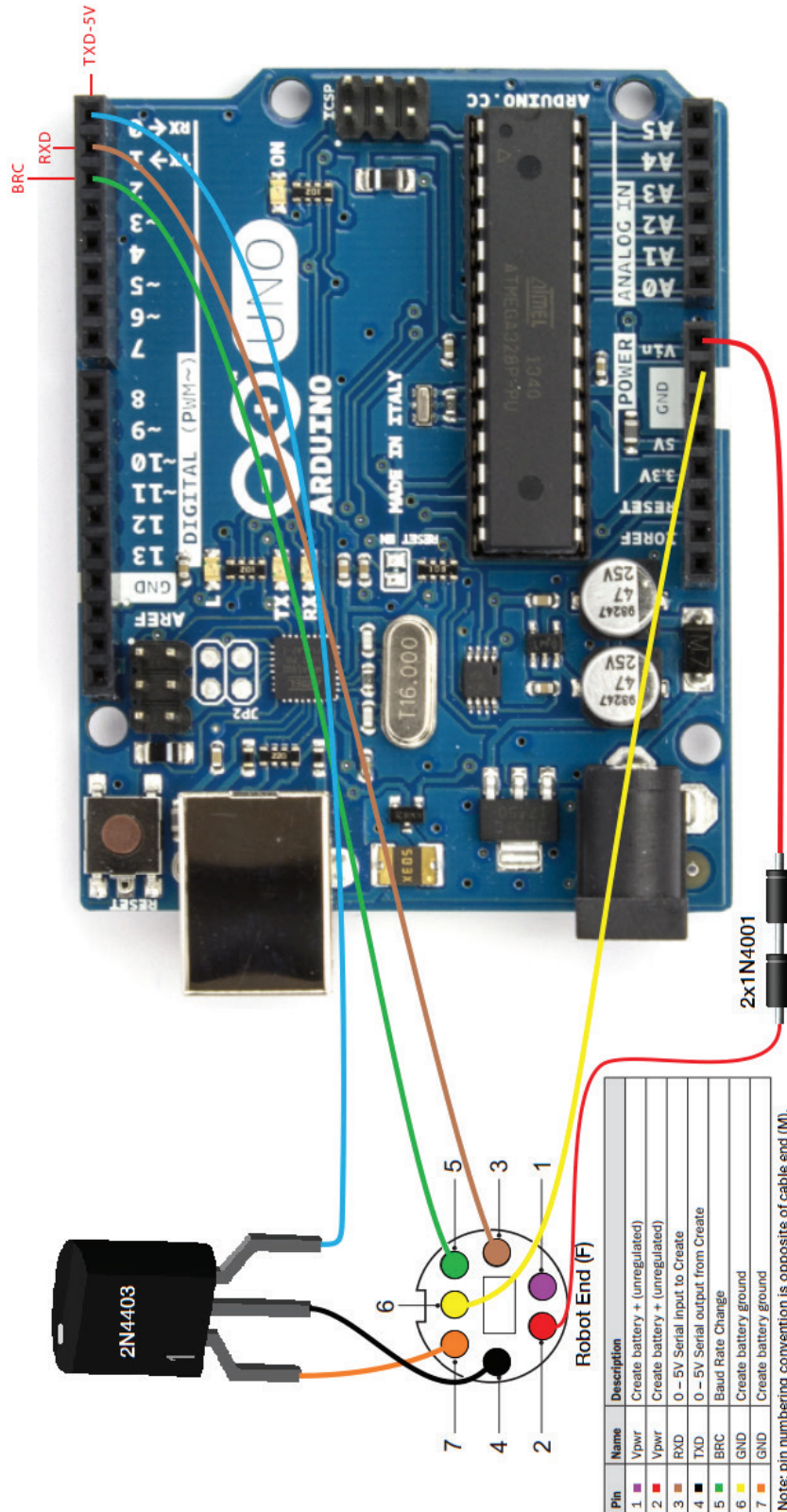
You may be tempted to use a 5V DC to DC converter to step the robot's battery voltage down to 5V, but plugging this voltage into the 5V bus on the Arduino is not recommended and may damage the board. It may work fine before you plug the USB in to program the Arduino, but your mileage may vary and we do not recommend this option.

Serial I/O

- To keep the Create 2 alive while you are talking to it, we recommend tying the Create BRC pin either to a spare output on the Arduino which is kept low most of the time, or else directly to ground.
- To hook up the TX and RX lines, see the [Create®2to5VLogic](#) tutorial, taking note of the necessary PNP transistor if you are using the hardware serial port.
- Depending on your Arduino, there are a few choices as to which RX and TX lines you choose to use. Most Arduinos have only one hardware serial port. This is shared with the bootloader/programming port. It is possible to use this port to control the Create 2, but it may conflict with the robot when you are programming, and will conflict with the ability to use the debug monitor. It is also possible that the act of programming the Arduino may put the robot into an undefined state. Because of these, it may be easier to control your Create 2 with a "software serial" port; however, this has other disadvantages (like tying up peripherals on the Arduino). If you use the hardware serial port tied to the bootloader to talk to your Create 2, we recommend unplugging the Create 2 while programming.
- iRobot Create 2 uses 115200 baud serial, by default. Unfortunately, any Arduino using an ATmega core cannot reliably reproduce 115200 baud. At 16 MHz, the best that an ATmega USART can do is either -3.5% or +2.1% error, which is not within spec (and it's even worse at 8MHz). Therefore, we recommend the use of a lower baud rate, like 19200 baud. To put your Create 2 into 19200 baud, please see the Serial Port Settings on page 4 of the Open Interface Specification.



Example Cable with Diode Drop and Hardware Serial.



Note that the picture of the Arduino is from arduino.cc and was released with a CC Sharealike 3.0 license.