

ARDUINO PIN CURRENT LIMITATIONS:

Originally from Arduino Playground

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Fall 2012

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Be Nice to your Arduino!

A common misunderstanding concept is that one can wire everything to Arduino board. You may not realize this, but you may subconsciously intend to think like this when you try to wire up things with Arduino. A typical mistake due to this subconscious mis-concept is connecting a large load (such as a very large motor) to Arduino, which will draw a large current. To prevent any overload or even damage on Arduino board, you should be very clear about the limits of Arduino, especially current limitations. This article gives you a very good exposition on this regard. Please read it carefully!

Most of the follows are from Arduino Playground: playground.arduino.cc/Main/ArduinoPinCurrentLimitations, for more detail: arduino-info.wikispaces.com/ArduinoPinCurrents

Please also carefully read another article I posted on the Blackboard: "10 Ways to Destroy your Arduino".

A Few Definitions:

VOH - Voltage Output High (I/O Pin "HIGH")

VOL - Voltage Output Low (I/O Pin "LOW")

IOH - Current Output High (I/O Pin "HIGH")

IOL - Current Output Low (I/O Pin "LOW")

Microcontroller Current Specifications:

(ATMEL ATMEGA328 MCU used on UNO and Duemilanove)

Absolute Maximum Ratings

Max DC Current per I/O Pin : 40mA

Max DC Current VCC and GND Pins: 200mA

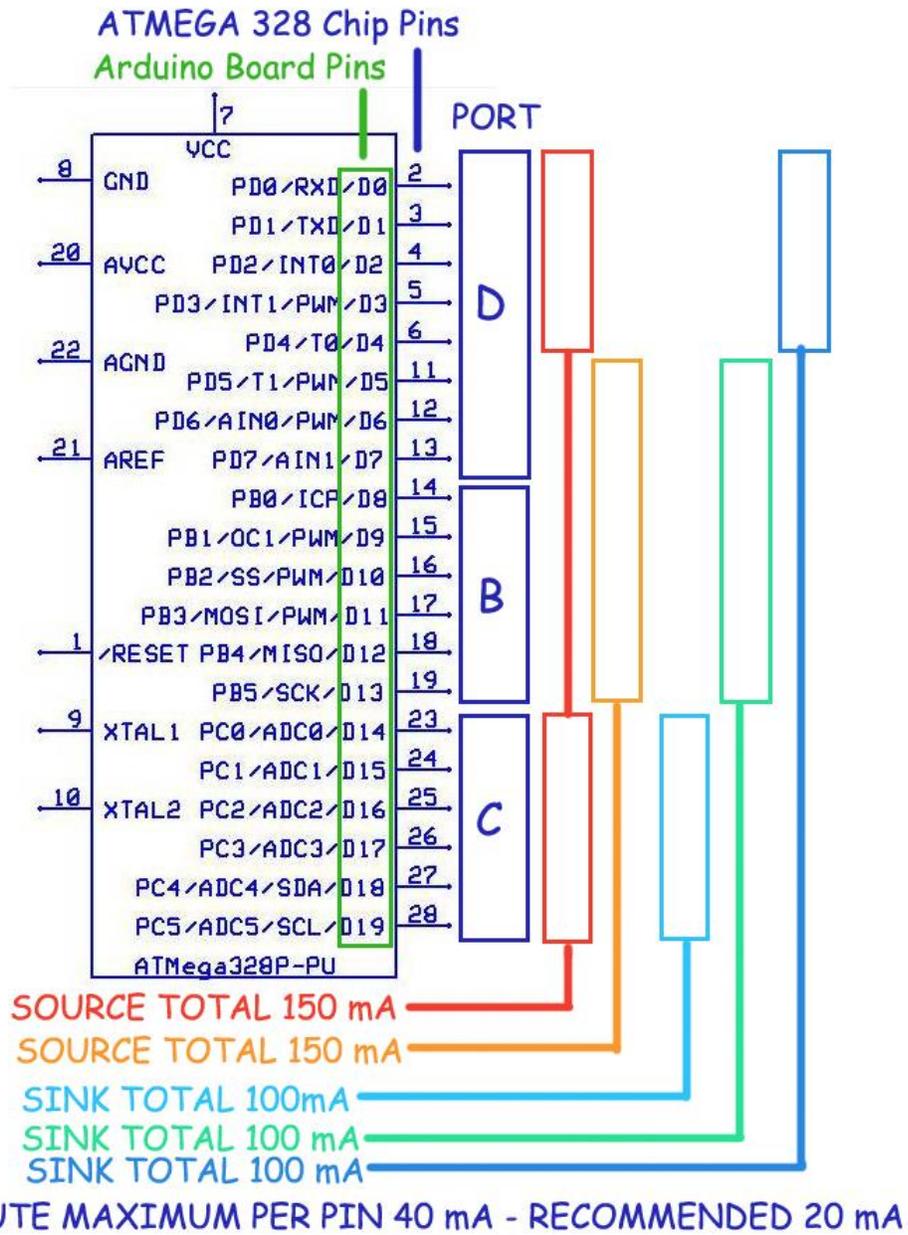
1 VCC pin: Means these Arduinos can Source a total of **200mA**

2 GND pins: Means these Arduinos can Sink a total of **400mA**

Only the 32 pin surface mount packages (UNO Surface-Mount version) have 2 VCC pins.

Arduino (UNO and Duemilanove) Chip Pin#s VS Ports:

ARDUINO UNO / Duemilanove CURRENT SOURCE/SINK LIMITS



Max DC Current on V_{CC} and GND Pins: 200mA

Max DC Current per I/O Pin : 40mA

Pin SOURCE Current Limitations:

NOTE: Although each I/O port can source more than the test conditions (20 mA at VCC = 5V, 10 mA at VCC = 3V) under steady state conditions (non-transient), the following must be observed.

- The sum of all IOH, for ports Co - C5, Do- D4, ADC7, RESET should not exceed 150 mA.
- The sum of all IOH, for ports Bo - B5, D5 - D7, ADC6, XTAL1, XTAL2 should not exceed 150 mA.
- If IOH exceeds the test condition, VOH may exceed the related specification. Pins are not guaranteed to source current greater than the listed test condition.

Pin SINK Current Limitations:

NOTE: Although each I/O port can sink more than the test conditions (20 mA at VCC = 5V, 10 mA at VCC = 3V) under steady state conditions (non-transient), the following must be observed:

- The sum of all IOL, for ports Co - C5, ADC7, ADC6 should not exceed 100 mA.
- The sum of all IOL, for ports Bo - B5, D5 - D7, XTAL1, XTAL2 should not exceed 100 mA.
- The sum of all IOL, for ports Do - D4, RESET should not exceed 100 mA.
- If IOL exceeds the test condition, VOL may exceed the related specification. Pins are not guaranteed to sink current greater than the listed test condition.

ATMEL ATMEGA2560-1280-640 Current Specifications:

(Used by Arduino Mega)

Absolute Maximum ratings:

DC Current per I/O Pin 40.0 mA

DC Current VCC and GND Pins..... 200.0 mA

This apparently is saying you get 800mA to play with as there are 4 Vcc and 4 Gnd pins, further limited by subgroups of pins for Sink (IOL) and Source (IOH) current:

Pin SINK Current Limitations:

- The sum of all IOL, for ports Jo-J7, Ao-A7, G2 should not exceed 200 mA.
- The sum of all IOL, for ports Co-C7, Go-G1, Do-D7, Lo-L7 should not exceed 200 mA.
- The sum of all IOL, for ports G3-G4, Bo-B7, Ho-B7 should not exceed 200 mA.
- The sum of all IOL, for ports Eo-E7, G5 should not exceed 100 mA.
- The sum of all IOL, for ports Fo-F7, Ko-K7 should not exceed 100 mA.

[looks like 800mA Total!]

NOTE: If IOL exceeds the test condition [(20mA at VCC = 5V, 10mA at VCC = 3V) under steady state conditions (non-transient)], VOL may exceed the related specification. Pins are not guaranteed to sink current greater than the listed test condition.

Pin SOURCE Current Limitations:

- The sum of all IOH, for ports J0-J7, G2, A0-A7 should not exceed 200 mA.
- The sum of all IOH, for ports C0-C7, G0-G1, D0-D7, L0-L7 should not exceed 200 mA.
- The sum of all IOH, for ports G3-G4, B0-B7, H0-H7 should not exceed 200 mA.
- The sum of all IOH, for ports E0-E7, G5 should not exceed 100 mA.
- The sum of all IOH, for ports F0-F7, K0-K7 should not exceed 100 mA.

[looks like 800mA Total!]

NOTE: If IOH exceeds the test condition [(20mA at VCC = 5V, 10mA at VCC = 3V) under steady state conditions (non-transient)], VOH may exceed the related specification. Pins are not guaranteed to source current greater than the listed test condition.