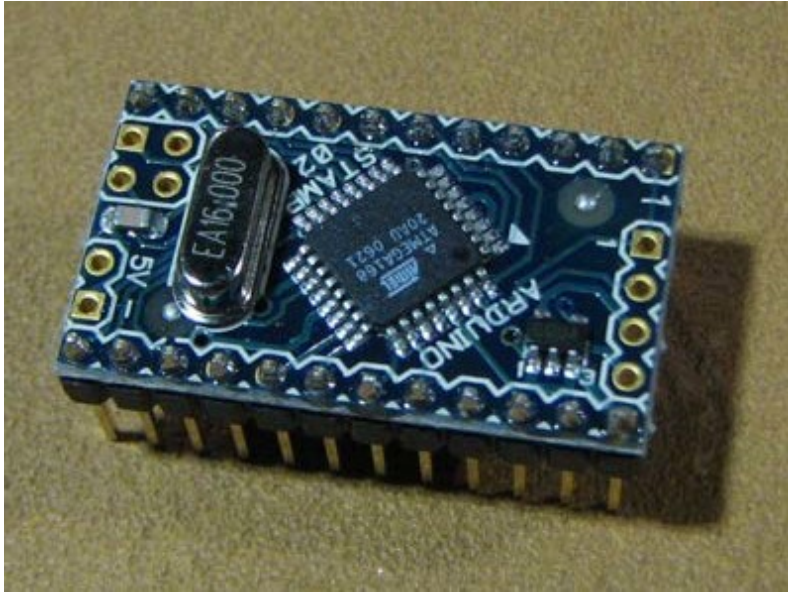




## Arduino Mini



### Overview

The Arduino Mini is a small microcontroller board based on the ATmega168 ([datasheet](#)), intended for use on breadboards and when space is at a premium. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 8 analog inputs, and a 16 MHz crystal oscillator. It can be programmed with the [Mini USB adapter](#) or other USB or RS232 to TTL serial adapter.

**Warning:** Don't power the Arduino mini with more than 9 volts, or plug the power in backwards: you'll probably kill it.

### Summary

|                   |  |
|-------------------|--|
| Microcontroller   | ATmega168  |
| Operating Voltage | 5V Input Voltage 7-9 V   |
| Digital I/O Pins  | 14 (of which 6 provide PWM output)                                   |
| Analog Input Pins | 8 (of which 4 are broken out onto pins) DC Current per I/O Pin 40 mA |
| Flash Memory      | 16 KB (of which 2 KB used by   |
| bootloader) SRAM  | 1 KB   |
| EEPROM            | 512 bytes  |
| Clock Speed       | 16 MHz   |

## Programming

The Arduino Mini can be programmed with the Arduino software ([download](#)). For details, see the [reference](#) and [tutorials](#).

To program the Arduino Mini, you will need a [Mini USB adapter](#) or other USB or RS232 to TTL serial adapter. See the page on [getting started with the Arduino Mini](#) for instructions.

The ATmega168 on the Arduino Mini comes preburned with a [bootloader](#) that allows you to upload new code to it without the use of an in-system-programmer. The bootloader communicates using the original STK500 protocol ([reference](#), [C header files](#)).

You can also bypass the bootloader and program the ATmega168 with ICSP (In-Circuit Serial Programming); see the page on [bootloading the Mini](#) for information on wiring up an ICSP header to the Mini and the [programmer](#) for instructions on using a programmer to upload a sketch.

## Input and Output

Each of the 14 digital pins on the Mini can be used as an input or output. They operate at 5 volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull-up resistor (disconnected by default) of 20-50 kOhms. Pins 3, 5, 6,

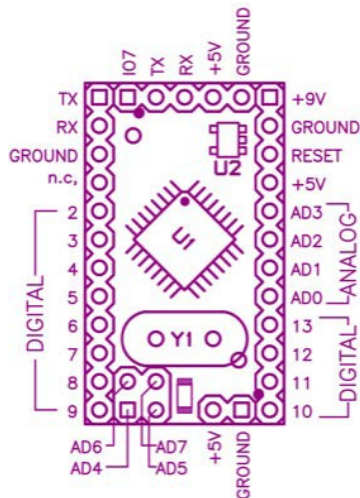
9, 10, and 11 can provide PWM output; for details see the [analogWrite\(\)](#) function. If anything besides the Mini USB (or other) adapter is connected to pins 0 and 1, it will interfere with the USB communication, preventing new code from being uploaded or other communication with the computer.

The Mini has 8 analog inputs, each of which provide 10 bits of resolution (i.e. 1024 different values). Inputs 0 to 3 are broken out onto pins; input 4 to 7 require soldering into the provided holes. By default the analog inputs measure from ground to 5 volts, though it is possible to change the upper end of their range using the AREF pin and some low-level code.

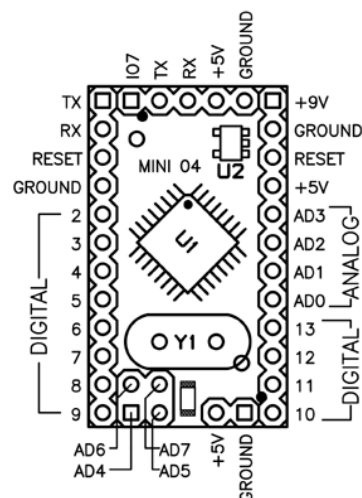
See also the [mapping between Arduino pins and ATmega168 ports](#).

## Pinout

**Note:** the pinout changed from version 03 to version 04 of the Mini, please be sure you use the right diagram.



*Pin out of the Arduino Mini 03.* (older versions are compatible, but missing the IO7 header at the top)



*Pin out of the Arduino Mini 04.* (Note that the ground pin on the left has moved down one pin.)