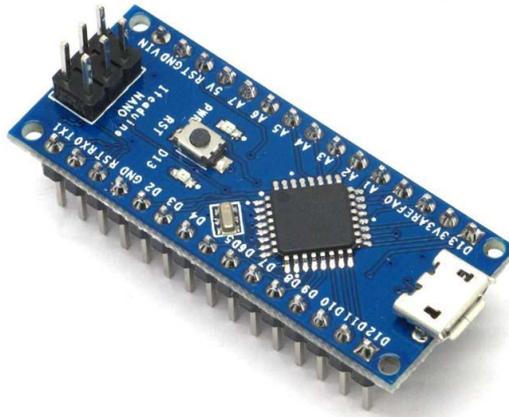


Iteaduno Nano

Overview

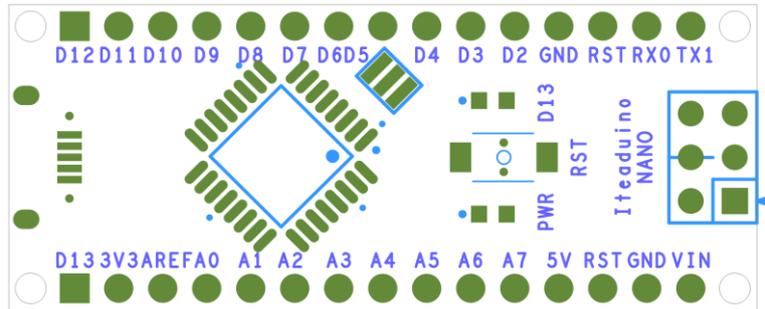


The Iteaduno Nano is a small, complete, and breadboard-friendly board based on the Arduino Nano 3.0. It has more or less the same functionality of the Arduino Duemilanove, but in a different package. It lacks only a DC power jack, and works with a Micro USB cable instead of a standard one.

Specifications:

Microcontroller	Atmega328
Operating Voltage	5V
POWER Supply Voltage(recommended)	7~12V
Power supply Max Voltage	12V
Digital IO pins	20
Analog Input pins(ADC)	8
DC Output current on per IO lines	40mA
Flash Memory	32 KB of which 2 KB used by boot loader
SRAM	2 KB
EEPROM	1KB
Clock frequency	16 MHz
Dimension	43.18X17.78X1.6mm

Hardware top view



Power:

The Itead Studio Nano can be powered via the Micro-B USB connection, 6-12V unregulated external power supply (pin 30), or 5V regulated external power supply (pin 27). The power source is automatically selected to the highest voltage source.

The DP2102 chip on the Nano is only powered if the board is being powered over USB.

Memory:

The ATmega328P has 32 KB, (also with 2 KB used for the bootloader), the ATmega328P has 2 KB of SRAM and 1 KB of EEPROM.

Input and Output:

Each of the 14 digital pins on the Nano can be used as an input or output, using `pinMode()`, `digitalWrite()`, and `digitalRead()` functions. 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. In addition, some pins have specialized functions:

- Serial: 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data. These pins are connected to the corresponding pins of the DP2102 Serial chip.
- External Interrupts: 2 and 3. These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value. See the `attachInterrupt()` function for details.
- PWM: 3, 5, 6, 9, 10, and 11. Provide 8-bit PWM output with the `analogWrite()` function.
- SPI: 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communication, which, although provided by the underlying hardware, is not currently included in the Arduino language.
- LED: 13. There is a built-in LED connected to digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.

The Nano has 8 analog inputs, each of which provide 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to 5 volts, though it is possible to change the upper end of their range using the `analogReference()` function. Additionally, some pins have specialized functionality:

I2C: 4 (SDA) and 5 (SCL). Support I2C (TWI) communication using the Wire library (documentation on the Wiring website).

There are a couple of other pins on the board:

- AREF: Reference voltage for the analog inputs. Used with `analogReference()`.
- Reset: Bring this line LOW to reset the microcontroller. Typically used to add a reset button to shields which block the one on the board.

Communication:

Itead Studio Nano has a number of facilities for communicating with a computer, another Arduino, or other microcontrollers.

The ATmega328 provide UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX). An CP2102 on the board channels this serial communication over USB and the Silabs driver provide a virtual com port to software on the computer. The Arduino software includes a serial monitor which allows simple textual data to be sent to and from the Arduino board.

A SoftwareSerial library allows for serial communication on any of the Nano's digital pins.

The ATmega328 also support I2C (TWI) and SPI communication. The Arduino software includes a Wire library to simplify use of the I2C bus; see the documentation for details. To use the SPI communication, please see the ATmega328 datasheet. Programming

Iteaduino Nano can be programmed with the Arduino software (download). Select "Arduino Duemilanove or Nano w/ ATmega328" from the Tools > Board menu (according to the microcontroller on your board).

The ATmega328 on the Iteadduino Nano comes preburned with a bootloader that allows you to upload new code to it without the use of an external hardware programmer. It communicates using the original STK500 protocol (reference, C header files).

You can also bypass the bootloader and program the microcontroller through the ICSP (In-Circuit Serial Programming) header.

Automatic (Software) Reset:

Rather than requiring a physical press of the reset button before an upload, the Iteaduino Nano is designed in a way that allows it to be reset by software running on a connected computer. One of the hardware flow control lines (CTS/RTS) of the DP2102 is connected to the reset line of the ATmega328 via a 100 nanofarad capacitor. When this line is asserted (taken low), the reset line drops long enough to reset the chip. The Arduino software uses this capability to allow you to upload code by simply pressing the upload button in the Arduino environment. This means that the bootloader can have a shorter timeout, as the lowering of CTS/RTS can be well-coordinated with the start of the upload.

This setup has other implications. When the Nano is connected to either a computer running Mac OS X or Linux, it resets each time a connection is made to it from software (via USB). For the following half-second or so, the bootloader is running on the Nano. While it is programmed to ignore malformed data (i.e. anything besides an upload of new code), it will intercept the first few bytes of data sent to the board after a connection is opened. If a sketch running on the board receives one-time configuration or other data when it first starts, make sure that the software with which it communicates waits a second after opening the connection and before sending this data.