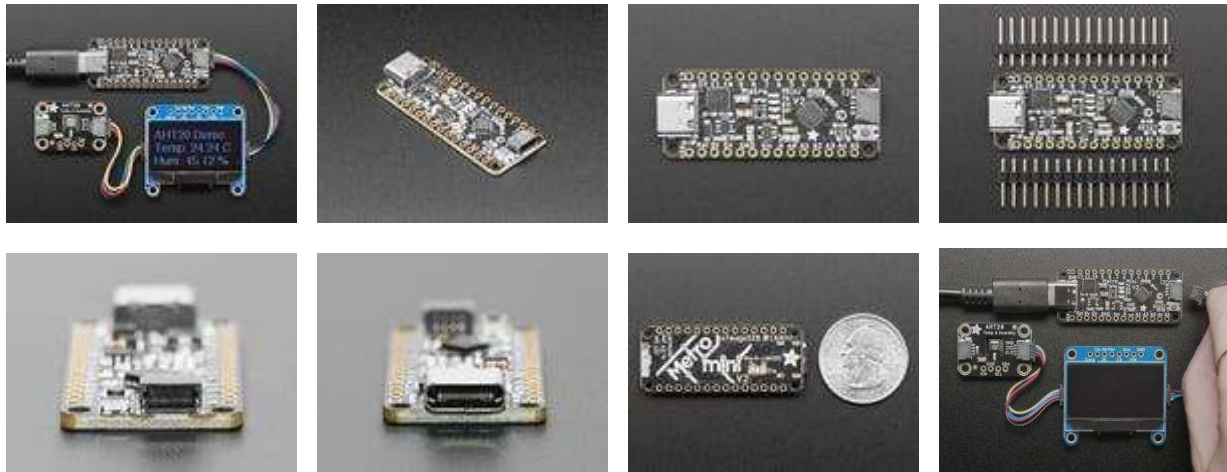# Adafruit Metro Mini 328 V2 – Arduino-Compatible – 5V 16MHz – STEMMA QT / Qwiic

Product ID: 2590

Description

One of our star development boards is the Adafruit METRO Mini 328, an excellent lil fellow that lets you make your Arduino-based project tiny. Recently we had to redesign this board to move from the obsolete CP2104 to the available CP2102N, and one thing led to another, and before you know it we made a completely refreshed design: the Adafruit METRO Mini 328 V2.

The V2 is a significant redesign, enough, so we consider it a completely new product. It *still* features the ATmega328 chip and is drop-in compatible with the original METRO Mini, but has many upgrades and improvements:

- Same ATmega328 chip, running at 16 MHz, which makes it compatible with all Arduino UNO based libraries, codes and examples
- Same pinout and size, same mounting hole locations – drop-in compatible!
- Additional STEMMA QT port for plug and play I2C connections

- USB Type C port instead of Micro B
- Upgraded USB to serial converter from CP2104 to CP2102 – same great reliable drivers!
- Can still be set to use 3.3V power and logic by soldering a jumper on the bottom.

The METRO Mini V2 works great with the Arduino IDE, and runs the ATmega328P at 16MHz so it is pin-compatible with Arduino UNO R3 – note you won't be able to plug in shields, but great for use with breadboards. You can use this with the Arduino IDE (both desktop and cloud version) by selecting 'Arduino UNO' in the Boards menu.

We sure love the ATmega328 here at Adafruit, and we use them *a lot* for our own projects. The processor has plenty of GPIO, Analog inputs, hardware UART SPI and I2C, timers, and PWM galore – just enough for most simple projects. When we need to go really small, we use a QT Py, but if you want to have USB-to-Serial built in and lots of GPIO, we reach for an Adafruit METRO Mini V2.

METRO Mini V2 is the culmination of years of playing with AVRs: we wanted to make a tiny, breadboard-friendly development board that is easy to use and has a STEMMA QT port for plug and play support with hundreds of devices. Metro Mini can be programmed with the Arduino IDE (select 'UNO' in the boards dropdown)

- ATmega328 brains – This popular chip has 32KB of flash (1/2 K is reserved for the bootloader), 2KB of RAM, clocked at 16MHz
- Power the METRO Mini with 6-16V polarity protected on the Vin pin, or plug the micro USB connector to any 5V USB source.
- METRO has 20 GPIO pins, 6 of which are Analog in as well, and 2 of which are reserved for the USB-serial converter. There's also 6 PWMs available on 3 timers (1 x 16-bit, 2 x 8-bit). There's a hardware SPI port, hardware I2C port, and hardware UART to USB.
- GPIO Logic level is 5V but by cutting and soldering closed a jumper on the bottom, you can easily convert it to 3.3V logic
- 5V onboard regulator with 150mA out, separate 3.3V 500mA regulator is also available.

- USB to Serial converter, there's a genuine SiLabs CP2102N hardware USB to Serial converter that can be used by any computer to listen/send data to the METRO, and can also be used to launch and update code via the bootloader
- USB C power and data
- Four indicator LEDs, on the top of the PCB, for easy debugging. One green power LED, two RX/TX LEDs for the UART, and a red LED connected to pin PB5 / digital #13
- Easy reprogramming, comes pre-loaded with the Optiboot bootloader
- Beautiful styling by PaintYourDragon and Bruce Yan, in Adafruit Black with gold plated pads.

The Metro Mini comes as a fully assembled and tested board, with bootloader burned in and also some 0.1" header. Some light soldering is required if you'd like to plug it into a breadboard, or you can solder wires or header directly to the breakout pads. Once headers are installed they can be fitted into 0.6" wide sockets.

Mac & Windows People! Don't forget to grab the SiLabs CP210x drivers from SiLabs to make the COM/Serial port show up right... The default OS drivers may not support the interface chip.

YouTube links:

https://www.youtube.com/watch?t=18&v=D_AJkSVZ-Zg&embeds_euri=https%3A%2F%2Fwww.adafruit.com%2F&feature=emb_imp_woyt

https://www.youtube.com/watch?v=yidxeCXrSTo&embeds_euri=https%3A%2F%2Fwww.adafruit.com%2F&feature=emb_imp_woyt

https://www.youtube.com/watch?t=251&v=S1JT6LL4GkQ&embeds_euri=https%3A%2F%2Fwww.adafruit.com%2F&feature=emb_imp_woyt

Technical Details

Detailed specifications:

- ATmega328 microcontroller with Optiboot (UNO) Bootloader

- USB Programming and debugging via the well-supported genuine SiLabs CP2102N
- Input voltage (Vin): 6-16V (a 9VDC power supply is recommended)
- 5V logic with 3.3V compatible inputs, can be converted to 3.3V logic operation
- 20 Digital I/O Pins: 6 are also PWM outputs and 6 are also Analog Inputs
- 32KB Flash Memory - 0.5K for bootloader, 31.5KB available after bootloading
- 16MHz Clock Speed
- Adafruit Black PCB with gold plate on pads
- JST SH 4-pin STEMMA QT port for plug and play I2C connections
- Derivative of "Arduino UNO R3 Reference design"
- Open source hardware files on github!
- Fritzing object in the Adafruit Fritzing Library

Product Dimensions: 44.3mm x 17.8mm x 4.9mm / 1.7" x 0.7" x 0.2"

Product Weight: 3.4g / 0.1oz