

A Short Note: Using Arduino Nano as a substitute for Arduino UNO

David R. Brooks, © 2018

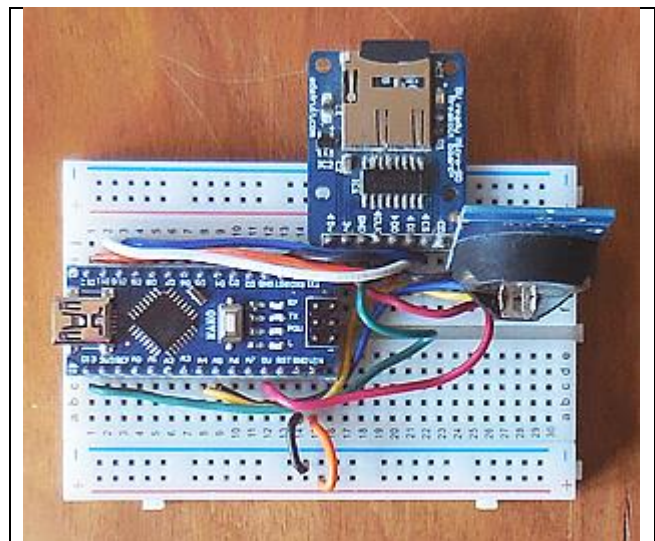
For first-time Arduino users, the most popular board option is the Arduino UNO. This board can be powered with a USB A-B cable when communicating between an Arduino board and the integrated development environment (IDE) to you create sketches and send them to the Arduino, or by 7-12 V from some other DC voltage source, through an on-board 2.1 mm power jack to an on-board voltage regulator, when a sketch is already in place. There are *many* shields that fit on the UNO headers to add additional capabilities to the board – for example the Adafruit datalogging shield that includes both a date/time clock (set from your computer clock) and a microSD card module for logging data from sensors.

There are alternatives to the Arduino UNO. The Arduino Nano is a small board that has all the capabilities of a UNO in a much smaller and less expensive package. These are available from allelectronics.com (ARD-20, \$8.95) and other several other online sources, sometimes for less than \$4 each. (Somewhat surprisingly, a Nano from robotshop.com, which usually has very competitive prices, is \$35; “Genuine” Arduino UNOs cost only about \$25!) The only Nano I have tried, which is not an “official” Arduino product, is the one from allelectronics.com, so I can’t guarantee performance of any of the others.

Nanos don’t support the many Arduino UNO shields, but Arduino Nano is one of the boards supported by the Arduino IDE and it performs just like an UNO without any code modifications. Here is a breadboard layout using an allelectronics.com Nano board. The mini-B USB connector is on the left edge. The Adafruit microSD card (ID 254, \$7.50) is at the top center and a real time clock, larger than but compatible with the Adafruit DS1307 module (ID 3296, \$7.50) is to the right. There is a little layout room for sensors in the lower right-hand corner of the breadboard.

For external power, 7-12 V would be applied to the on-board 5-V regulator through the VIN pin (the orange and black wires at the bottom of the breadboard). Power for the clock and microSD card modules is taken from the +5 V pin. For all the other connections, refer to the documentation for the Adafruit microSD and clock modules. On the Nano, pins A4 and A5 are used for the clock’s SDA and SCL connections. (It is an I2C device.) Note that the 3.3 V pin is not active when the board is powered by an external source, rather than from the USB connection.

Is the Nano an attractive alternative to a UNO? That depends on your needs. For some projects it will be a less expensive alternative to the UNO. Because of the built-in USB connector, it is a little more convenient to use than the SparkFun ProMini, for example. For indoor projects with access to an AC outlet to power a DC supply, the added convenience of using an UNO with shields probably outweighs the Nano advantages.



Here is some code to test this layout. It sends date and time information to the serial port and the microSD card.

```
/* NanoLogTest.ino, D. Brooks, March 2018
   Tests operation of Nano with RTC and microSD modules for logging data.
*/
#include <Wire.h>
#include <SD.h>
#include <RTCLib.h>
#include <SPI.h>
#define SDpin 10
RTC_DS1307 rtc; // real time clock module
File logfile;
char filename[] = "NANOTEST.CSV";
void setup() {
  Serial.begin(9600);
  Wire.begin(); rtc.begin();
  if (!rtc.isrunning()) {
    Serial.println("RTC not running."); exit;
  }
  if (!SD.begin(SDpin)) {Serial.println("Card failed.");
  delay(50);exit(0);}
  Serial.println("card initialized.");
  logfile=SD.open(filename,FILE_WRITE);
  rtc.adjust(DateTime(__DATE__,__TIME__));
}
void loop() {
  DateTime now=rtc.now();
  Serial.print(now.year()); Serial.print('/');
  Serial.print(now.month()); Serial.print('/');
  Serial.print(now.day()); Serial.print(',');
  Serial.print(now.hour()); Serial.print(':');
  Serial.print(now.minute()); Serial.print(':');
  Serial.print(now.second()); Serial.println();
  delay(10);
  logfile.print(now.year()); logfile.print(',');
  logfile.print(now.month()); logfile.print(',');
  logfile.print(now.day()); logfile.print(',');
  logfile.print(now.hour()); logfile.print(',');
  logfile.print(now.minute()); logfile.print(',');
  logfile.print(now.second()); logfile.print(',');
  logfile.println(); logfile.flush();
  delay(1000);
}
```