

## **Chapter 7 - Why I Prefer an Arduino Nano Instead of an Uno for Model Railroads**

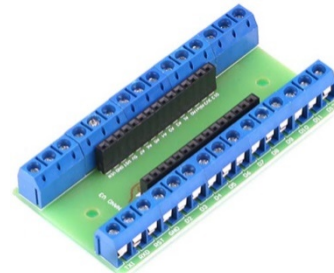
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For model railroad applications, I generally prefer the Arduino Nano instead of the Arduino Uno, primarily because when connecting it to other devices, the Uno is limited to jumper wires connections, and the Nano has pins which can be plugged into an expansion board which has sockets and screws to tighten the wires into the sockets.

Let's take a look at the Nano. If you search, you can find Nanos with pins (aka: "headers") already soldered to the board; not all Nanos have the headers pre-soldered, but some manufactured by LAVFIN do (AMAZON ASIN: B07G99NNXL). And there also exists an expansion board which fits perfectly with the LAVFIN Nano (AMAZON ASIN: B07MGVC18K, \$12 for a 5-pack).

What makes this combination nice is that the expansion board uses screw terminal block connectors, which are much more secure than the female jumper sockets on the Uno.



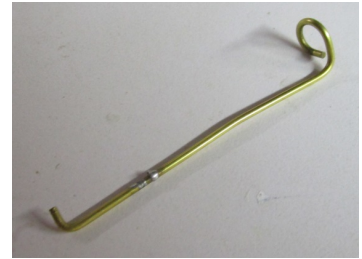
And the Nano with an expansion board is less expensive than the Uno. A Nano from Lavfin can be bought for about \$4.70 when bought in a 3-pack, and the expansion board in a 5-pack is \$12, or about \$2.40 each, so the combination is about \$7.10. An Uno (AMAZON ASIN: B01EWOE0UU) made by Elegoo is about \$11.

The Nano performs almost totally, but not exactly, like an Uno. The Uno has a round 2.1MM connector where you can connect an external power supply. The Nano has no such connector, but the Nano does have a VIN (Voltage IN) and a Ground pin, which can easily be connected to an external power supply once you cut off the power supply's connector and tin its wires (while the black wire is usually the ground and the colored wire is usually the positive voltage, I suggest you always use a volt meter and check it, just to be sure).

While I do like using jumper wires when prototyping a project, if a jumper requires only a male pin or a spade connector, I often use 20-24 gauge hookup wires and tin the wire before inserting it into a socket or screw terminal block. Such wires are just sturdier

than a male pin on a jumper. If you ever have a male jumper pin break off in a socket and have to spend 15 minutes digging it out, you will understand.

But admittedly, sometimes I have difficulty inserting tinned wires or jumpers into the fittings in the expansion board. I found that if I take a piece of 3/32" brass rod and insert it into the fitting, things "open up" inside and the wire slips right into place. I took a 4" piece and bent about 1/4" at one end, and it's a useful tool.



One other reason I might not use a Nano is if I wanted to drive more than 9 or so LEDs from a single board, while also using a MP3 player, like in my waterfall or campfire projects. The Nano has only 14 digital pins to start with, and the player requires 3 digital pins, which leaves only 11 pins for LEDs (well, not exactly; analog pins can be used as digitals, but you get the idea; also remember than any one pin is limited to 40ma, and the entire board is limited to 200ma.). In such a case I would use either 2 Nanos (if accurate synchronization was not required), or an Arduino Mega. The Mega from Elegoo (AMAZON ASIN: B01H4ZLZLQ ) has over 50 digital pins, although some are generally used for very specific purposes.