



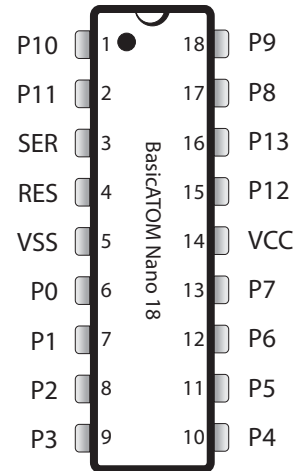
# BASIC MICRO

TECHNOLOGY AT WORK

BasicATOM Nano 18  
Data Sheet

**Feature Overview:**

- 7 KB of program space (FLASH)
- 368 Bytes of user memory (RAM)
- 256 Bytes of user memory (EEPROM)
- 15 Input / Output Pins
- 5V Input / Output Pins
- No External Components Required
- Internal Resonator
- Analog-to-Digital Capable I/O Pins
- 2 Capture Compare
- 2 Hardware PWM
- Hardware Interrupts
- Hardware Serial up to 57600 Baud
- Hardware Serial Buffer up to 44 Bytes
- Software Serial up to 38400 Baud
- 32 Bit Floating Point Math
- 32 Bit Integer Math
- Over 13,200 BASIC Instructions Per Second

**Basic Description**

The BasicATOM Nano 18 is a microcontroller designed for ease of use. It is built on the Microchip PIC16F88 processor and is designed to be software compatible to both BasicATOM and Basic Stamp line of modules.

The BasicATOM Nano 18 does not require any additional component such as a resonator to run. The processor runs from an internal clock of 8 Mhz. The code is highly optimized and in most cases is faster than comparable products.

**Documentation**

The BasicATOM Nano 18 uses the same IDE and language as the BasicATOM modules. However timings for certain commands will be different such as SERIN and SEROUT. Refer to the manual for additional details. Most application notes or sample code for the BasicATOM can be run without modification on the BasicATOM Nano series.

## Pin Name Assignment Overview

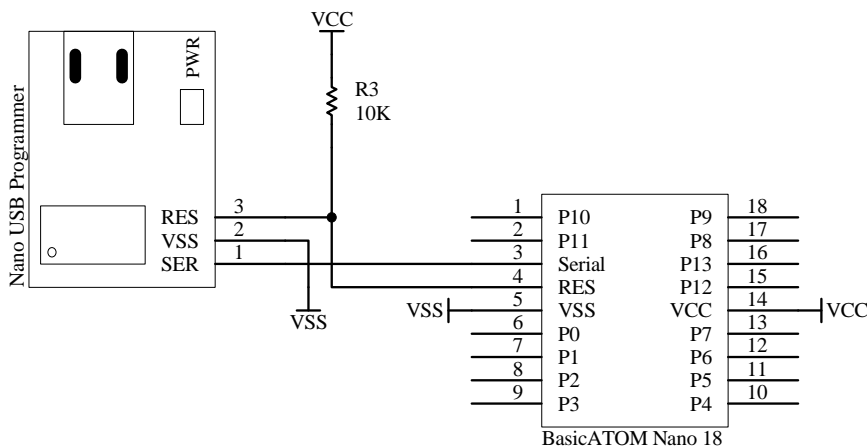
| Pin Name | Description   |
|----------|---|
| RES      | Active-low reset. Pin is pulled high with 10K pul-lup to run.   |
| SER      | Programming pin. Bidirectional I/O.   |
| VCC      | Regulated 5VDC input.   |
| VSS      | Ground (GND)  |
| P0       | <ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>Externally interrupt pin.</li> <li>PWM output, Capture, Compare input.</li> </ul>  |
| P1       | <ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>SPI data in.</li> <li>I2C data.</li> </ul>   |
| P2       | <ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>SPI data out.</li> <li>AUSART asynchronous receive.</li> <li>AUSART synchronous detect.</li> </ul>   |
| P3       | <ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>PWM output, Capture, Compare input.</li> <li>Hardware PWM Output.</li> </ul>   |
| P4       | <ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>Individually controlled interrupt-on-change.</li> <li>Synchronous serial clock I/O for SPI.</li> <li>Synchronous serial clock Input for I2C.</li> </ul>                        |
| P5       | <ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>Individually controlled interrupt-on-change.</li> <li>Slave select for SPI in Slave mode.</li> <li>AUSART asynchronous transmit.</li> <li>AUSART synchronous clock.</li> </ul> |
| P6       | <ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>Individually controlled interrupt-on-change.</li> <li>A/D Channel 5.</li> </ul>  |
| P7       | <ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>Individually controlled interrupt-on-change.</li> <li>A/D Channel 6.</li> </ul>  |
| P8       | <ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>A/D Channel 0.</li> </ul>  |
| P9       | <ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>A/D Channel 1.</li> </ul>  |
| P10      | <ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>A/D Channel 2.</li> </ul>  |
| P11      | <ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>A/D Channel 3.</li> </ul>  |
| P12      | <ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> </ul>  |
| P13      | <ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> </ul>  |

**Programming Interface**

The BasicATOM Nano can be programmed using several methods. The Nano uses a single bidirectional I/O pin for programming. A typical RS232 circuit or USB to Serial adapter like the Nano USB programmer can be used.

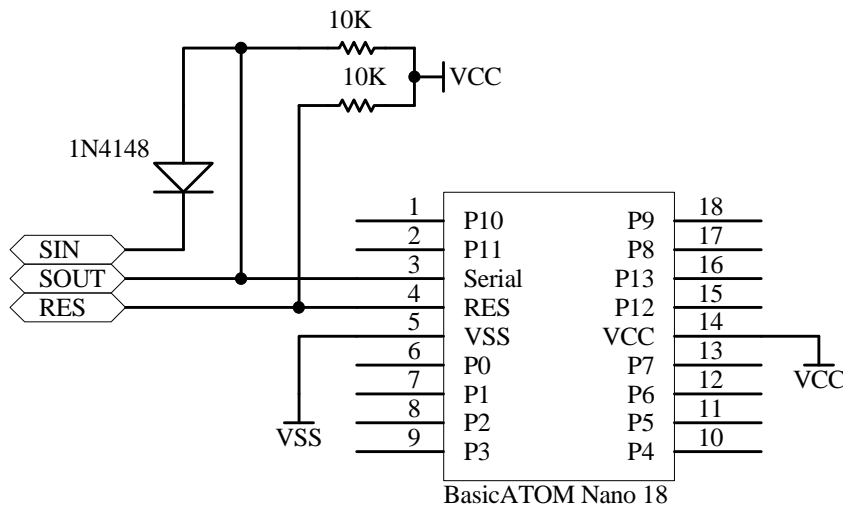
**Nano USB Programmer Interface**

The Nano USB programmer only requires 3 connections. Pin 6 of the Nano which is the Serial pin, connects to the SER pin of the programmer. Pin 1 of the Nano is the RESET control pin and should be connected to the RES pin of the programmer. RES requires a 10K pullup resistor. Pin 5 of the Nano is the ground pin VSS and should be connected to a shared ground (GND) with the programmer.



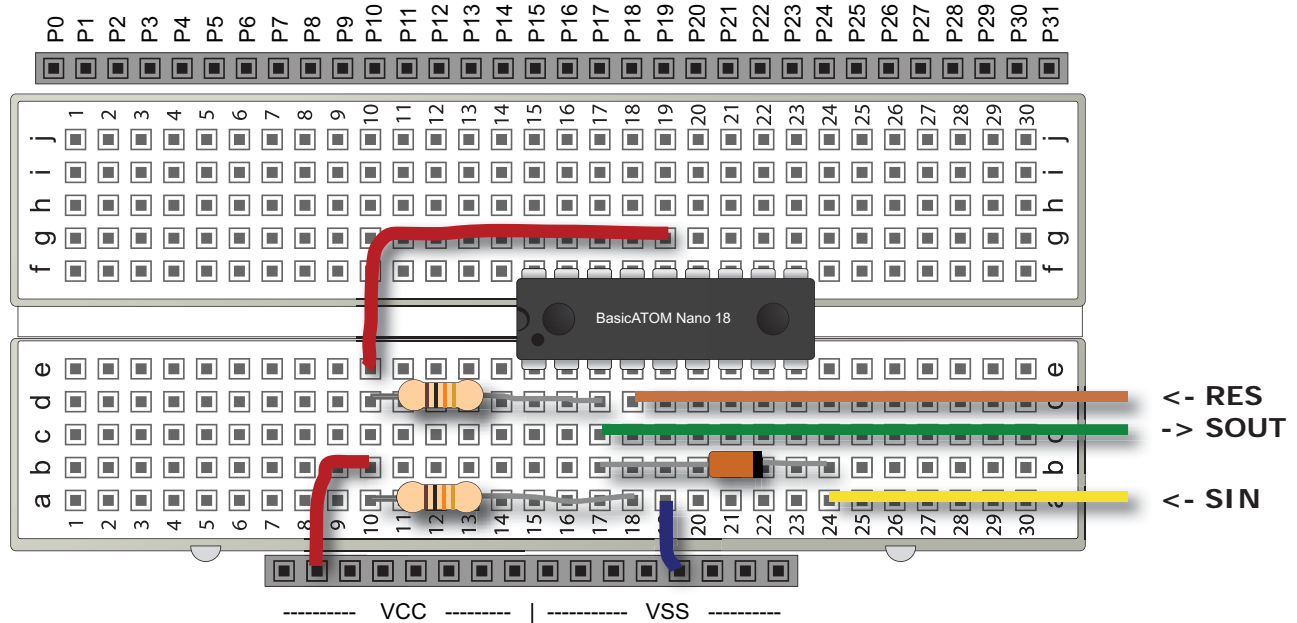
**Nano RS232 Programmer Interface**

The Nano uses a single bidirectional I/O pin for programming. 3 common parts are required to create the Nano programming circuit. A RS232 or USB to Serial circuit is required. The 10K resistors and diode used in the programming circuit are common and can be purchased from RadioShack.



### Solderless Breadboard Programmer Circuit

The Nano programming circuit is very simple and is shown on a solderless breadboard. The Nano reset pin (RES) must be pulled up with a 10K resistor and is required to run the Nano. The second resistor and diode make up the programming circuit which allows the Nano to use only one pin for programming.



### SIN, SOUT and RES

RES from the Nano must be connected to RTS of the RS232 circuit or USB to serial adapter. SOUT is connected to the RX (receive) pin and SIN is connected to the TX (transmit) pin of the RS232 circuit or USB to serial adapter.

## Electrical Characteristics

| Characteristic            | Value (Units)  |
|---------------------------|--|
| VCC Range (min - max)     | 4.9 - 5.2VDC   |
| Current Draw (Sleep mode) | 10 mA  |
| Current Draw (Idle)       | 20 mA  |
| Current Draw (maximum)    | 50 mA  |
| I/O Voltages (Low / High) | 0.0 V / 5.0V   |
| I/O Logic                 | TTL  |
| I/O Pin Assignments       | P0-P13   |
| I/O Maximum Current       | 25 mA sink, 25 mA source<br>Note: Total current for all pins should not exceed 90 mA sink and 90 mA source |
| Memory (RAM)              | 368 Bytes  |
| Memory (Flash)            | 14 KB  |
| EEPROM Memory (For User)  | 256 Bytes  |
| Tempature Range           | -40 to +125 C  |

**Warranty**

Basic Micro warrants its products against defects in material and workmanship for a period of 90 days. If a defect is discovered, Basic Micro will, at our discretion, repair, replace, or refund the purchase price of the product in question. Contact us at [support@basicmicro.com](mailto:support@basicmicro.com). No returns will be accepted without the proper authorization.

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**Discussion List**

A web based discussion board is maintained at <http://www.basicmicro.com>.

**Technical Support**

Technical support is made available by sending an email to [support@basicmicro.com](mailto:support@basicmicro.com). All email will be answered within 48 hours. All general syntax and programming questions, unless deemed to be a software issue, will be referred to the on-line discussion forums.