



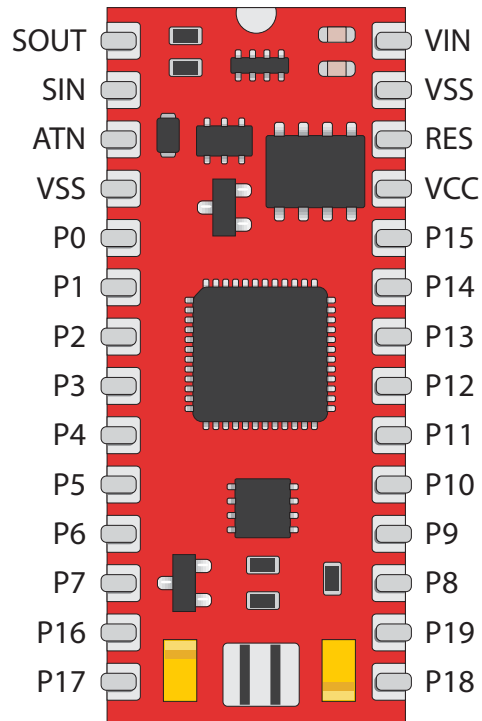
BASIC MICRO

TECHNOLOGY AT WORK

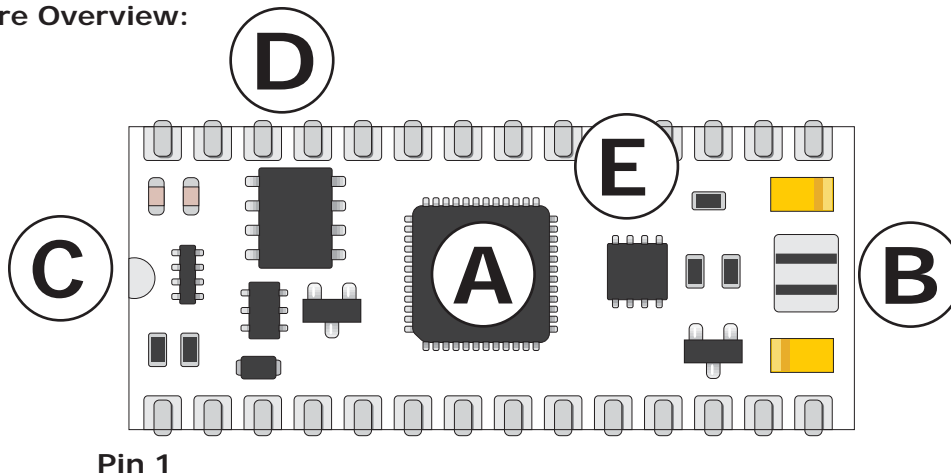
BasicATOM Pro 28-M Data Sheet

Feature Overview:

- 32 KB of Program Space (FLASH)
- 2 KB of User Memory (RAM)
- 4 KB of User Data Storage (EEPROM)
- 20 Input / Output Pins
- Built-in 5V Regulator
- RS232 Port for In-Circuit Serial Programming
- 8 Analog-to-Digital Capable I/O Pins
- Hardware Serial Port 256 Byte Buffer
- 3 Hardware Timers
- 3 Hardware PWM I/O Pins
- Hardware Interrupts
- 16 Servo Background Control
- 32 Bit Floating Point Math
- 32 Bit Integer Math
- 0.5us Timing Resolutions
- Over 100,000 BASIC Instructions Per Second

**Basic Description**

The BasicATOM Pro 28-M is a self contained microcontroller designed for demanding embedded system use. It is built upon the Hitachi HD64F3694GFYV processor and is designed to be pin-compatible to both the BasicATOM 28-M module and the Basic Stamp 2 line of modules.

Hardware Overview:

- A:** BasicATOM Pro CPU (Hitachi HD64F3694GFYV). Stores and executes program code.
- B:** Resonator circuit. Generates primary clock for CPU.
- C:** RS232 level shifting circuit. This allows the BasicATOM Pro to connect directly to a PC.
- D:** Power regulator. Input 6 to 9VDC.
- E:** 4K EEPROM.

Pin Assignment Overview

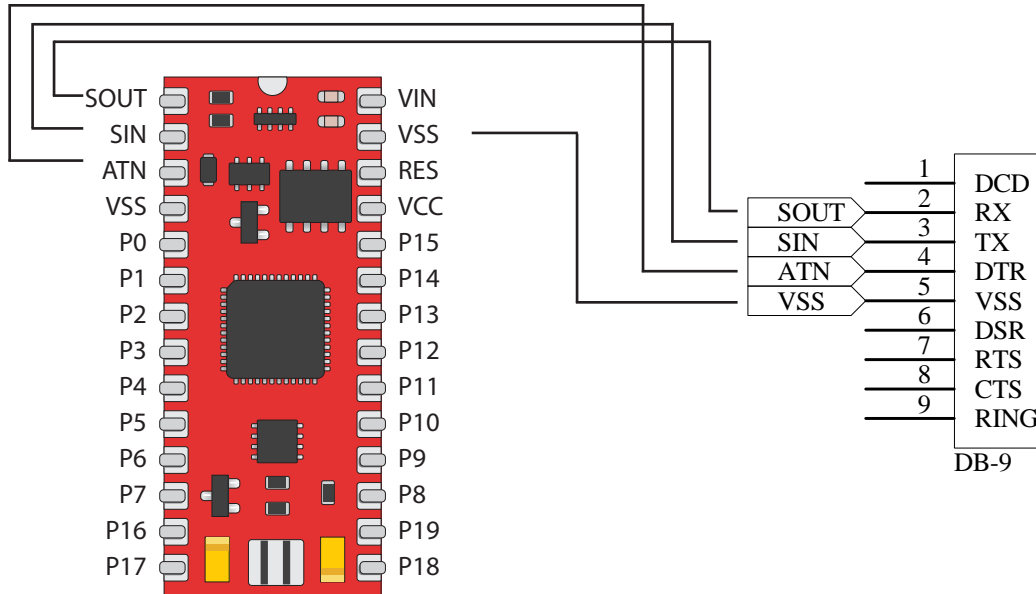
Pin	Description
P0	<ul style="list-style-type: none"> General purpose I/O Pin. Analog to Digital (A/D) AN0. Interrupt input pin WKPO (low enabled).
P1	<ul style="list-style-type: none"> General purpose I/O Pin. Analog to Digital (A/D) AN1. Interrupt input pin WKP1 (low enabled).
P2	<ul style="list-style-type: none"> General purpose I/O Pin. Analog to Digital (A/D) AN2. Interrupt input pin WKP3 (low enabled).
P3	<ul style="list-style-type: none"> General purpose I/O Pin. Analog to Digital (A/D) AN3. Interrupt input pin WKP3 (low enabled).
P4	<ul style="list-style-type: none"> General purpose Input / Output Pin. Interrupt input pin WKP4 (low enabled).
P5	<ul style="list-style-type: none"> General purpose I/O Pin. Interrupt input pin WKP5 (low enabled). Analog to Digital (A/D) Trigger input. Low enabled. ADTRH.
P6	<ul style="list-style-type: none"> General purpose I/O Pin. 3.3V Output only. 5V tolerant input. Interrupt input pin. Hardware I2C Data input pin (SDA). Pull-up resistance is required when using I2C.
P7	<ul style="list-style-type: none"> General purpose I/O Pin. 3.3V Output only. 5V tolerant input. Interrupt input pin. Hardware I2C Clock pin (SCL).
P8	<ul style="list-style-type: none"> General purpose I/O Pin. FTCI: External event input pin for Timer W.
P9	<ul style="list-style-type: none"> General purpose I/O Pin. FTIOA: Capture Compare Pin.
P10	<ul style="list-style-type: none"> General purpose I/O Pin. FTIOB: Capture Compare Pin. PWM Output Pin B for Timer W.
P11	<ul style="list-style-type: none"> General purpose I/O Pin. FTIOC: Capture Compare Pin. PWM Output Pin C for Timer W.
P12	<ul style="list-style-type: none"> General purpose I/O Pin. FTIOD: Capture Compare Pin. PWM Output Pin D for Timer W.
P13	<ul style="list-style-type: none"> General purpose I/O Pin. Synchronous Serial Pin (SCK)
P14	<ul style="list-style-type: none"> General purpose I/O Pin. Hardware USART Receive (RXD).
P15	<ul style="list-style-type: none"> General purpose I/O Pin. Hardware USART Transmit (TXD).

Pin Assignment Overview

Pin	Description
P16	<ul style="list-style-type: none">General purpose I/O Pin.Analog to Digital (A/D) AN7.
P17	<ul style="list-style-type: none">General purpose I/O Pin.Analog to Digital (A/D) AN6.
P18	<ul style="list-style-type: none">General purpose I/O Pin.Analog to Digital (A/D) AN4.Interrupt IRQ3.
P19	<ul style="list-style-type: none">General purpose I/O Pin.Analog to Digital (A/D) AN5.Interrupt IRQ2.
SOUT	Programming output pin (connects to RS232 RX pin).
SIN	Programming input pin (connects to RS232 TX pin).
ATN	Active-High reset signal for programming (Connects to RS232 RTS pin).
VSS	Ground (GND)
VCC	Regulated power input / output. 5VDC 50 mA output. 5VDC 100 mA input.
VIN	Unregulated power input. 9VDC maximum input.
RES	Active-low reset. Pin is pulled high internally and can be left disconnected (non-reset).

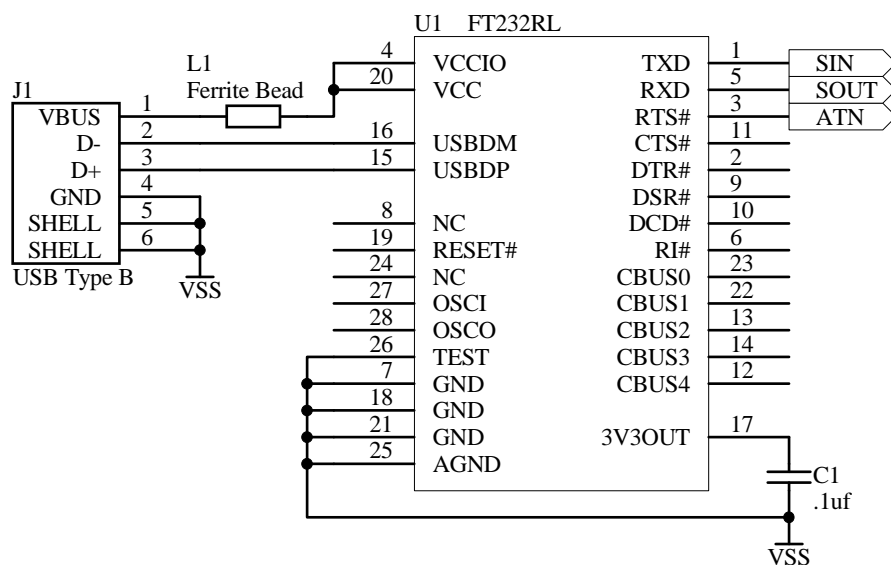
RS232 Programming Interface

The BasicATOM Pro 28-M can be programmed from a simple RS232 serial port. Only 4 connections to a RS232 DB9 cable are required. You can also use a USB to serial adapter or a Basic Micro development board.



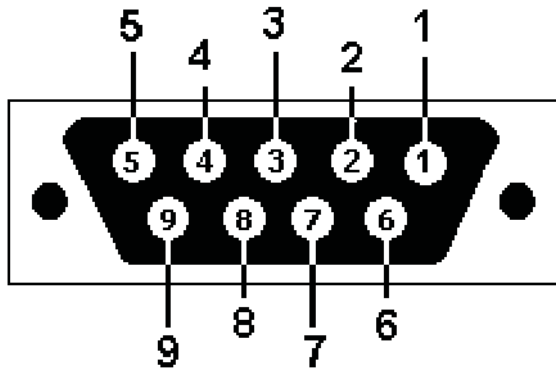
USB Programming Interface

The FTDI FT232 USB to serial microcontroller is recommended for your own custom designs requiring a USB interface. The schematic is setup for bus power. The FTDI is powered when plugged into a USB port. You will need to power the module separately through a normal power regulator.

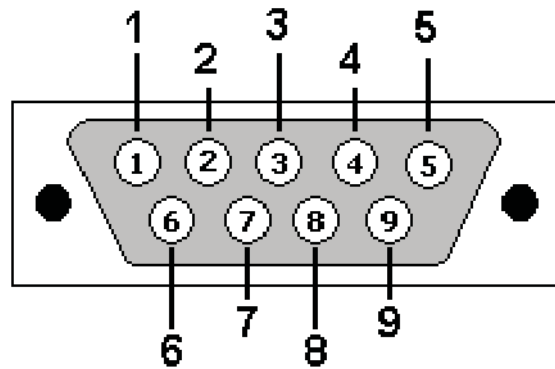


RS232 Cable Pinout

Below are pinouts for both male and female RS232 DB-9 cabling.



DB9 View Looking into
Female Connector



DB9 View Looking into
Male Connector

BasicATOM Pro Programming Interface Wiring Table

DB9 Pin	Signal	In/Out	Description	Atom Pro Pin
1	DCD	In	Data Carrier Detect	NC
2	RXD	In	Receive Data	SOUT
3	TXD	Out	Transmit Data	SIN
4	DTR	Out	Data Terminal Ready	NC
5	VSS	-	Ground	VSS
6	DSR	In	Data Set Ready	NC
7	RTS	Out	Request To Send	ATN
8	CTS	In	Clear To Send	NC
9	RI	In	Ring Indicator	NC

Electrical Characteristics

Characteristic	Value (Units)
VIN Range (min - max)	6 – 9VDC
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)	0.0V / 5.0V
I/O Logic	TTL
I/O Pin Assignments	P0-P19
I/O Maximum Current	3 mA sink, 3 mA source Note: Total current for all pins should not exceed 45 mA sink and 40 mA source
Memory (RAM)	2 KB
Memory (Flash)	32 KB
EEPROM Memory (For User)	4 KB
Temperature Range	-20 to +75 C

Warranty

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Contacts

Email: sales@basicmicro.com
Tech support: support@basicmicro.com
Web: <http://www.basicmicro.com>

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. 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.