



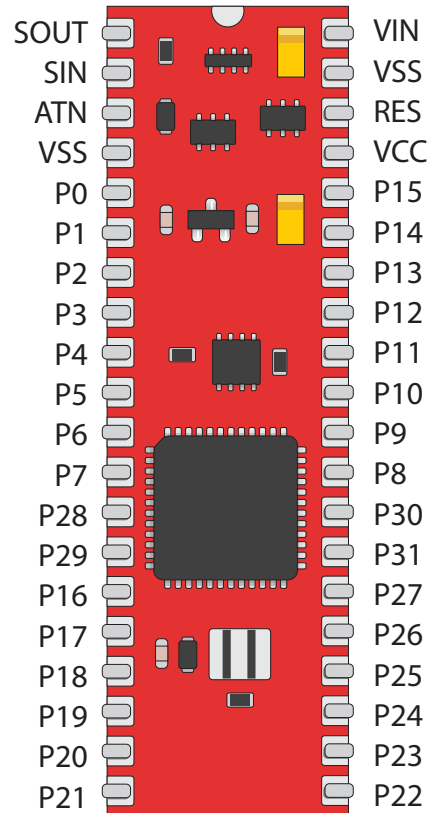
# BASIC MICRO

TECHNOLOGY AT WORK

BasicATOM Pro 40-M  
Data Sheet

**Feature Overview:**

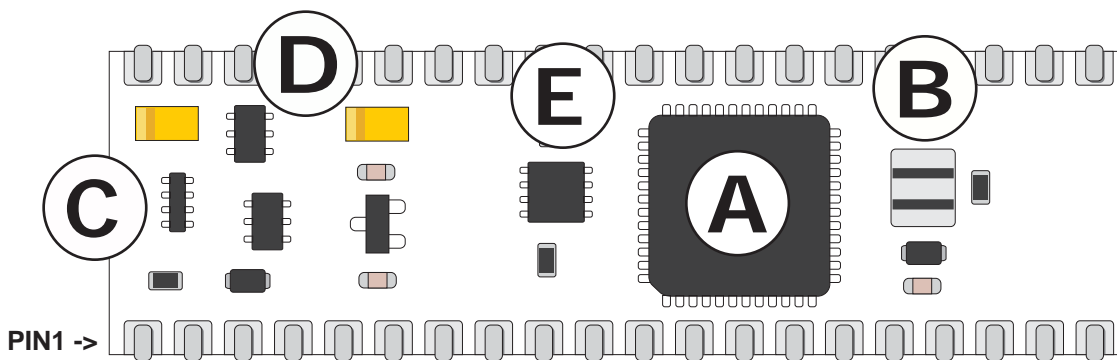
- 56 KB of Program Space (FLASH)
- 4 KB of User Memory (RAM)
- 4 KB of User Data Storage (EEPROM)
- 32 Input / Output Pins
- Built-in 5V Regulator
- RS232 Port for In-Circuit Serial Programming
- 8 Analog-to-Digital Capable I/O Pins
- 2 Hardware Serial Port with Buffers
- 3 Hardware Timers
- 6 Hardware PWM I/O Pins
- Hardware Interrupts
- 32 Servo Background Control
- 32 Bit Floating Point Math
- 32 Bit Integer Math
- 0.5us Timing Resolutions
- Over 120,000 BASIC Instructions Per Second



**Basic Description**

The BasicATOM Pro 40-M is a self contained microcontroller designed for demanding embedded system use. It is built upon the Renesas HD64F3687GFPV processor. The Renesas processor is a 32bit MCU operating at 20Mhz. The Pro 40-M module is on average 20% faster than the standard Pro.

**Hardware Overview:**



- A:** BasicATOM Pro CPU (Renesas HD64F3687GFPV). 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

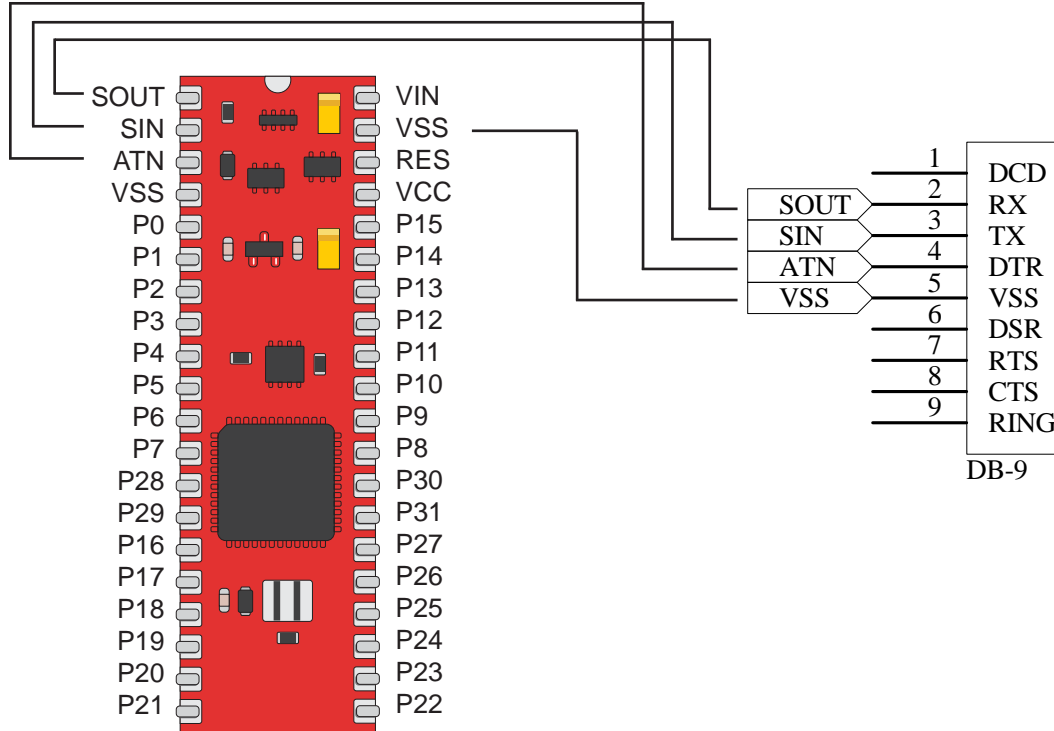
Pin	Description
P0	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>Analog to Digital (A/D) AN0.</li> <li>Interrupt input pin WKP0 (low enabled).</li> </ul>
P1	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>Analog to Digital (A/D) AN1.</li> <li>Interrupt input pin WKP1 (low enabled).</li> </ul>
P2	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>Analog to Digital (A/D) AN2.</li> <li>Interrupt input pin WKP3 (low enabled).</li> </ul>
P3	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>Analog to Digital (A/D) AN3.</li> <li>Interrupt input pin WKP3 (low enabled).</li> </ul>
P4	<ul style="list-style-type: none"> <li>General purpose Input / Output Pin.</li> <li>Interrupt input pin WKP4 (low enabled).</li> </ul>
P5	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>Interrupt input pin WKP5 (low enabled).</li> <li>Analog to Digital (A/D) Trigger input. Low enabled. ADTRH.</li> </ul>
P6	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>3.3V Output only. 5V tolerant input.</li> <li>Interrupt input pin.</li> <li>Hardware I2C Data input pin (SDA). Pull-up resistance is required when using I2C.</li> </ul>
P7	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>3.3V Output only. 5V tolerant input.</li> <li>Interrupt input pin.</li> <li>Hardware I2C Clock pin (SCL).</li> </ul>
P8	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>FTIOA0: Capture Compare Pin.</li> <li>PWM Output, Timer Z</li> </ul>
P9	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>FTIOB0: Capture Compare Pin.</li> <li>PWM Output, Timer Z</li> </ul>
P10	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>FTIOC0: Capture Compare Pin.</li> <li>PWM Output, Timer Z</li> </ul>
P11	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>FTIOD0: Capture Compare Pin.</li> <li>PWM Output, Timer Z</li> </ul>
P12	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>FTIOA1: Capture Compare Pin.</li> <li>PWM Output, Timer Z</li> </ul>
P13	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>FTIOB1: Capture Compare Pin.</li> <li>PWM Output, Timer Z, SCK3(2).</li> </ul>

## Pin Assignment Overview

Pin	Description
P14	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>FTIOC1: Capture Compare Pin.</li> <li>PWM Output, Timer Z, RXD(2).</li> </ul>
P15	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>FTIOD1: Capture Compare Pin.</li> <li>PWM Output, Timer Z, TXD(2).</li> </ul>
P16	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> </ul>
P17	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> </ul>
P18	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> </ul>
P19	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> </ul>
P20	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>SCK3 Pin, Clock I/O Pin.</li> </ul>
P21	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> </ul>
P22	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> </ul>
P23	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> </ul>
P24	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>TMOV</li> </ul>
P25	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>14 Bit PWM Square Wave Pin.</li> </ul>
P26	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> </ul>
P27	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> </ul>
P28	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>IRQ0, Analog to Digital (A/D) AN7.</li> </ul>
P29	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>IRQ1, TMIB1, Analog to Digital (A/D) AN6.</li> </ul>
P30	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>IRQ2, Analog to Digital (A/D) AN5.</li> </ul>
P31	<ul style="list-style-type: none"> <li>General purpose I/O Pin.</li> <li>IRQ3, TRGV, Analog to Digital (A/D) AN4.</li> </ul>
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).

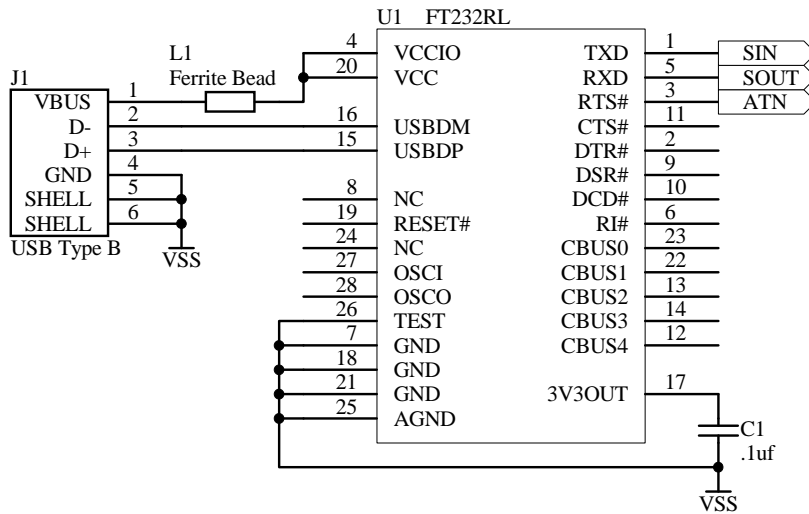
### RS232 Programming Interface

The BasicATOM Pro 40-M can be programmed from a simple RS232 serial port. Only 4 connections are required to the RS232 DB9 cable. You can also use a USB to serial adapter or a Basic Micro development board. In addition you will need to supply 6 to 9VDC to the module.



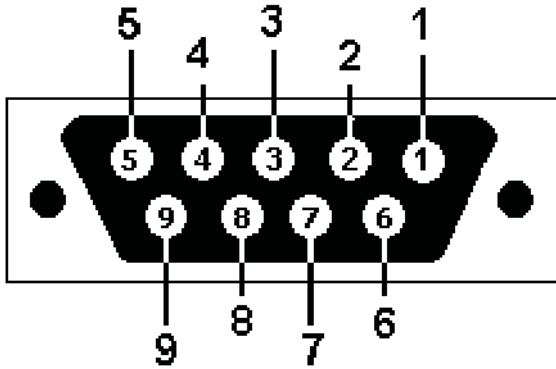
### USB Programming Interface

The FTDI FT232 USB to serial microcontroller is recommended for custom designs or USB to serial adapters based on the FTDI micro. To connect the BasicATOM Pro 40-M to the FTDI micro see the schematic below.

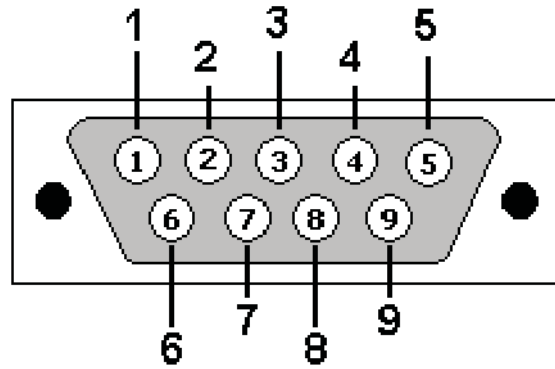


RS232 Cable Pinout

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



DB9 View Looking into Female Connector



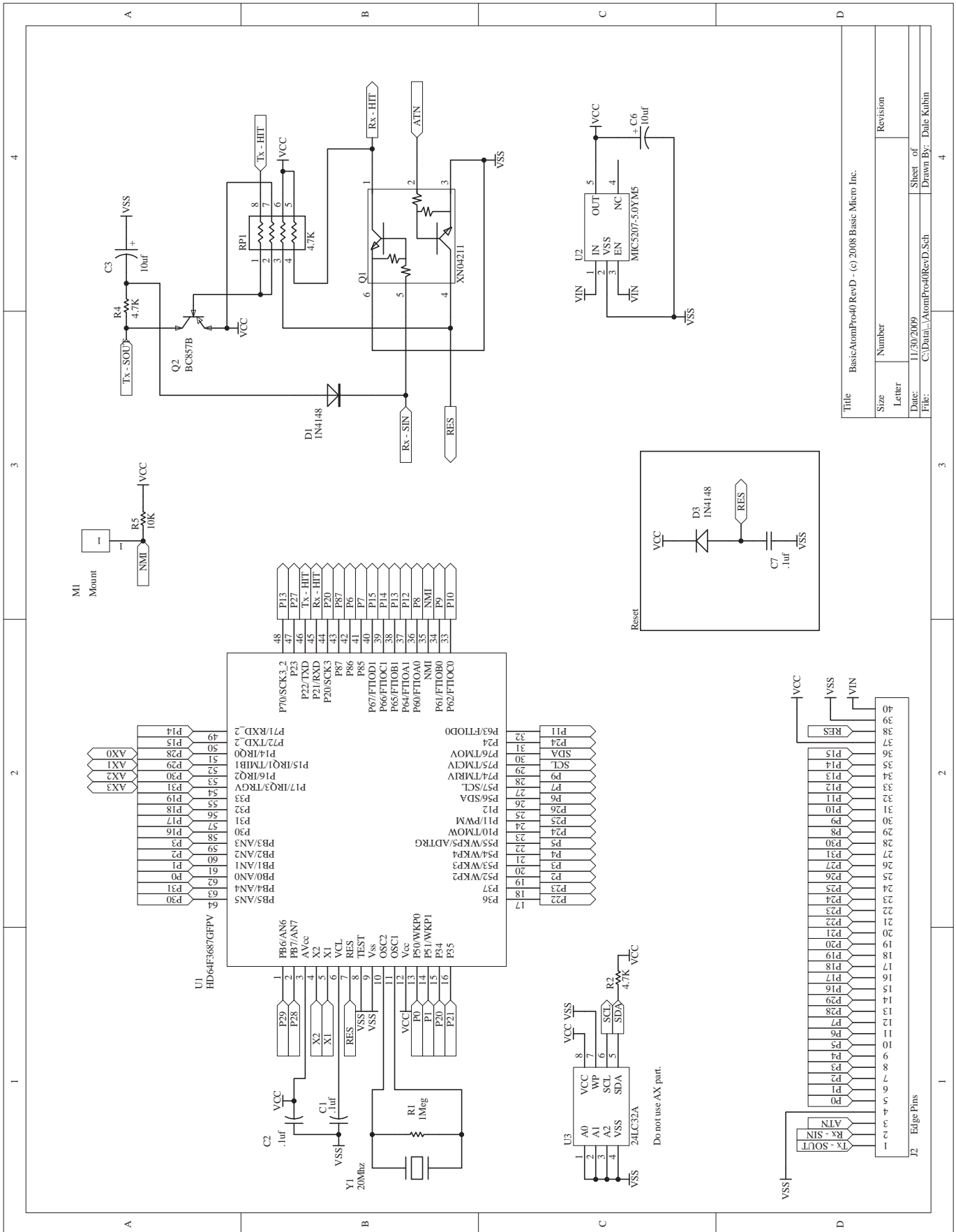
DB9 View Looking into Male Connector

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-P30
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)	4 KB
Memory (Flash)	56 KB
EEPROM Memory (For User)	4 KB
Temperature Range	-20 to +75 C



Title		BasicAtomPro40 RevD - (c) 2008 Basic Micro Inc.	
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