# FubarinoSD Reference Manual

Last Revision: September 23rd, 2012 – Applies to version 1.4 of FubarinoSD hardware

## Introduction:

The FubarinoSD is a small microcontroller board that uses a powerful PIC32 microcontroller. It is chipKITTM/MPIDE compatible and can run the same sketches that run on an ArduinoTM. It is designed to have all I/O pins on either side of the board in a traditional DIP pattern so that it can easily be plugged into a breadboard. It has a USB connector for power, programming, and a connection to a PC. It also has a microSD slot for increased storage.

Features:

* PIC32MX440F256H microcontroller, which includes 256KB Flash and 32K RAM
* Supported as development target from within MPIDE
* 45 I/O pins
* microSD slot connected to hardware SPI port
* Pads for 32 KHz crystal
* USB connector for power, programming, and connection to PC (serial, mass storage, etc.)
* Two buttons: RESET for resetting the board, and PRG for getting into bootloader mode and user application use
* USB bootloader pre-programmed at the factory – no other hardware needed to program board

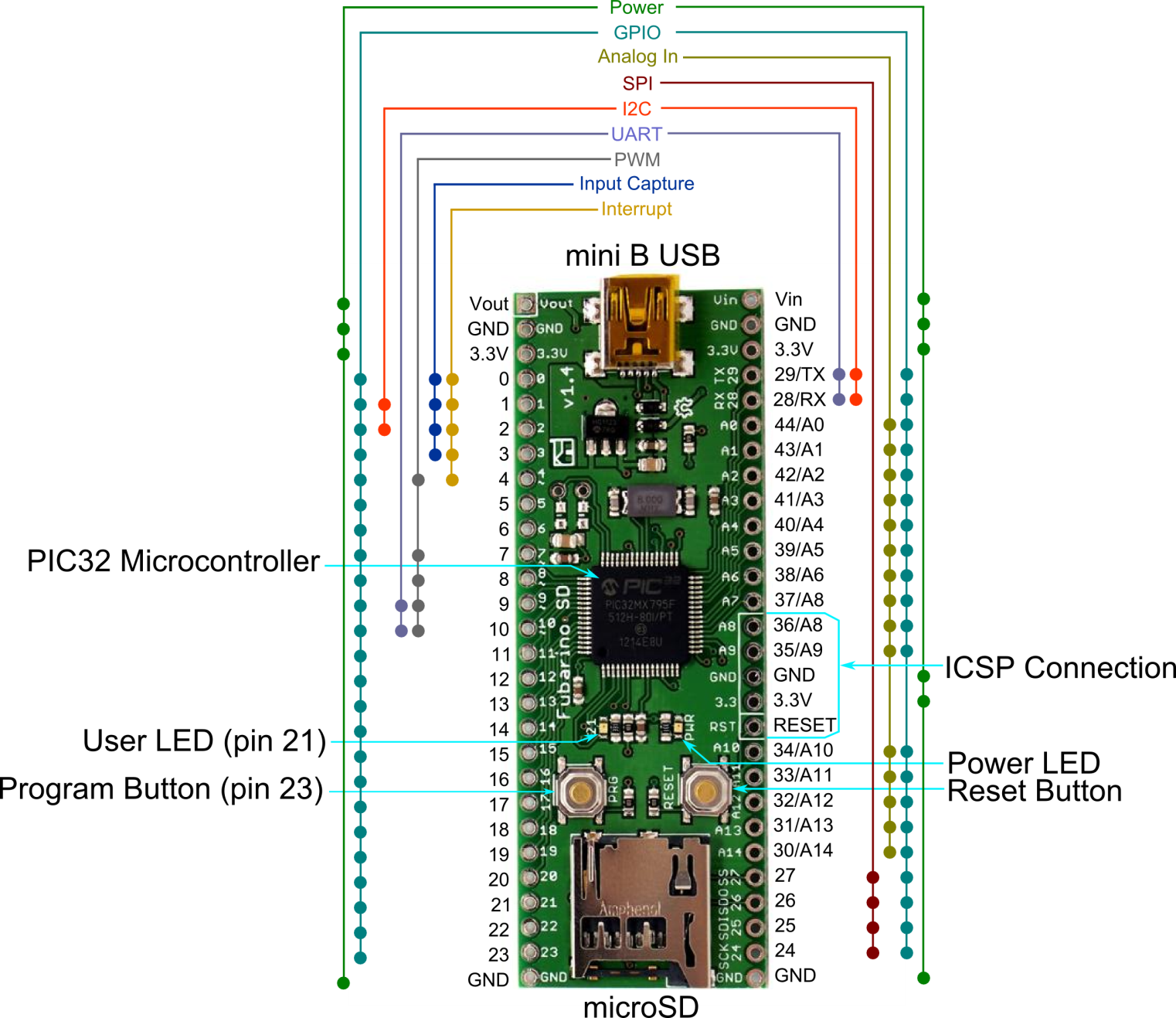


Figure : FubarinoSD Pin Map

## Entering Bootloader Mode

To enter bootloader mode (also called programming mode) simply press the PRG button while pressing and releasing the RESET button. As long as the PRG button is held down when the part comes out of reset, the bootloader will start waiting for a new program to be downloaded over USB. It will wait indefinitely.

The bootloader on the FubarinoSD implements the avrdude STK500 v2 protocol, just like the other chipKITTM/MPIDE boards.

## Programming in MPIDE

To program the FubarinoSD board from within MPIDE, simply download the latest MPIDE version, unzip and run it, and select FubarinoSD from the Tools->Boards menu. Then, put the FubarinoSD into bootloader mode (see above), and then select the proper serial port in the Tools->Serial Port menu.

After you enter your sketch and click the Upload button, MPIDE will compile your sketch and then upload it to the FubarinoSD. After the upload is complete, the FubarinoSD will automatically reset and immediately begin running your sketch code.

## Serial communications

The FubarinoSD board has two hardware serial ports: UART2 on pins 29 (TX) and 28 (RX), and UART1 on pins 9 (TX) and 8 (RX). It also has a USB serial port that operates as the default serial port. See the Code Examples wiki page on the FubarinoSD website for example sketch code on how to uses the three serial ports.

## Using the microSD

The FubarinoSD has a single SPI port, which is tied to the microSD memory card slot as well as pins 24 through 27. The standard SD library that comes with MPIDE will work with the FubarinoSD microSD slot without modifications.

## Power

The FubarinoSD can be powered in a number of different ways.

1. USB : When 5V are present on the USB connector (from a PC or a powered hub for example), the FubarinoSD will use this power source. This power source has a reverse protection diode connection to the 3.3V regulator. If both USB and Vin are powered, whichever is higher will end up providing the power to the regulator.
2. Vin pin: You can also place 2.8V to 13.2V on the Vin pin to power it from an external power source. This power source has a reverse protection diode connection to the 3.3V regulator. If both USB and Vin are powered, whichever is higher in voltage will power the device.
3. 3.3V pin(s): You can power the FubarinoSD by connecting a 3.3V source to either 3.3V pin. You must be careful not to exceed 3.6V on these pins or the PIC32 will be destroyed.

## Pin Reference

To be completed: This table will list each FubarinoSD pin and the corresponding functions (ArduinoTM pin number, alternate functionality, 5V compatibility, etc.)

## Schematic

For the schematic, please see the Fubarino\_SD\_v14\_sch.pdf file on the FubarinoSD website.