Flashing your Bear altimeter

Version	date	Author	Comments
1.0	13/05/2013	Boris du Reau	Initial version

Rocket Type

Micro-max	Model Rocket	Mid power	High power
No	yes	yes	yes

Category

Construction technic	Ground Support	Electronic	Other
		X	X

1 Goal

The goal of this document is to explain how to upload some new code to your altimeter. This document is applicable to all altimeters that I am designing.
This document assumes that you have some knowledge of the Arduino framework. If you need to download the Arduino framework go to the following page:
http://arduino.cc/en/Main/Software
Test have been conducted with version 1.01 of the Arduino framework.

The documents covert 3 micro controllers: ATtiny 85, ATtiny 84 and ATMega 328. It first shows how to upload the boot loader (which is something you do once) and then how to upload the program itself.
I recommend using an AVR programmer with an adaptor and a ZIF socket if you need to do lot's of them. If you do it only occasionally and you do not mind using a bread board them use your Arduino board to program it.

Before your start
Remember that it is a kit and that you can modify the program and behaviour of your altimeter.
The country where you live might not even allow the use of such device. You have to assume total legal responsibility for any damages or claims including personal injury that may results from the use of this device. I shall not be responsible for the above. If you disagree with that, please do not build it or use it.

If you are modifying the code of your altimeter make sure that you build a vacuum chamber (only cost a few euros) to test it one the ground before you fly it.
http://rocket.payload.free.fr/index.php?option=com_content&view=article&id=8&Itemid=6&lang=en

2 Alti duo altimeter or flight logger

2.1 Installing the boot loader

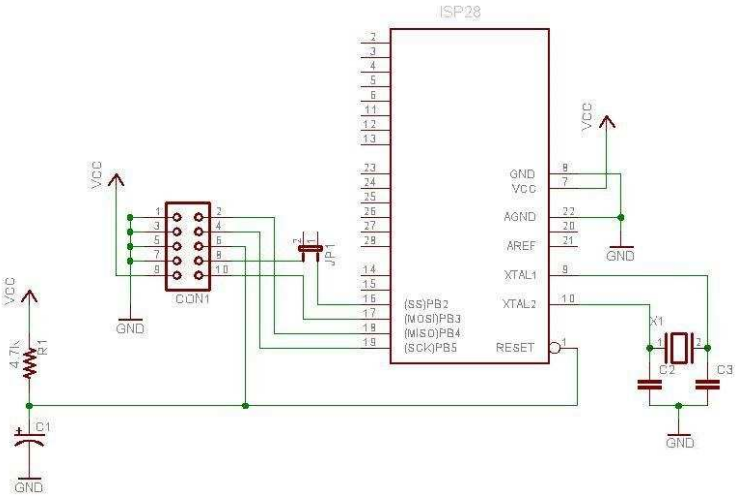
The microcontroller used by the Alti duo is an ATMega 328. If you are using a bran new processor you will need to load the Arduino Uno boot loader first.
In order to do that you can either use an AVR programmer or use your Arduino board as an AVR programmer.

2.1.1 Loading the boot loader using an AVR programmer

You need to get an AVR programmer like the one below and buy or build an adaptor for the ATMega 328.

You can make your own adaptor easily and I am planning on making adaptors kits available so that people can flash their altimeters and contribute to the program.

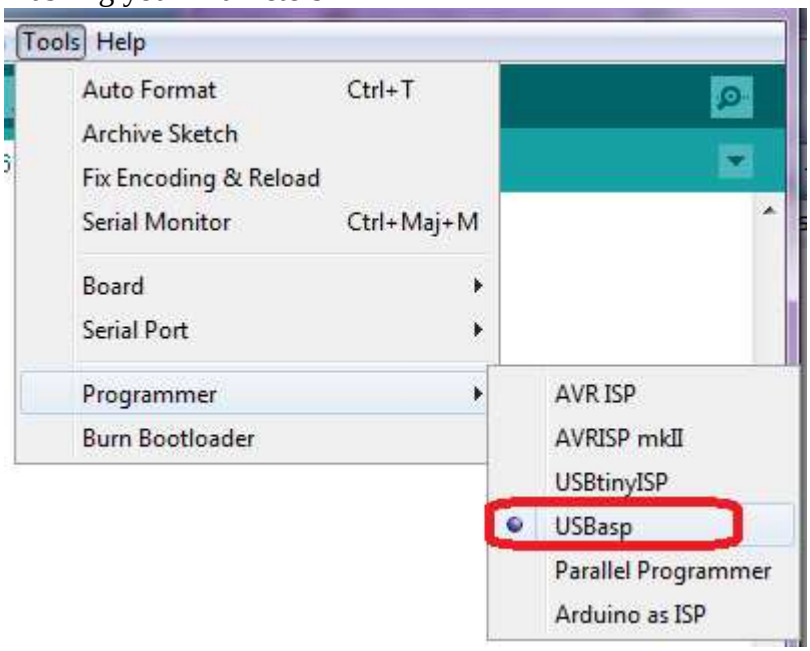
The adaptor looks like the schema below



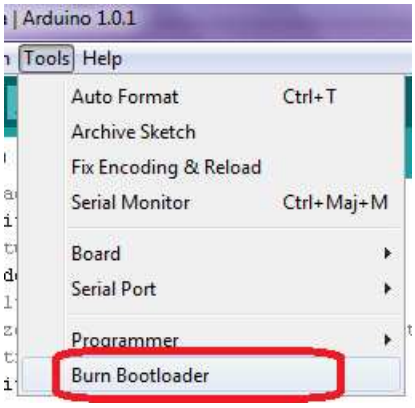
You can then quickly build it and use a ZIF socket

On the Alti Duo uses an ATMega 328. On the Arduino framework choose the board Arduino Uno and then select your AVR programmer

Flashing your Altimeters



Then click on
Burn boot loader

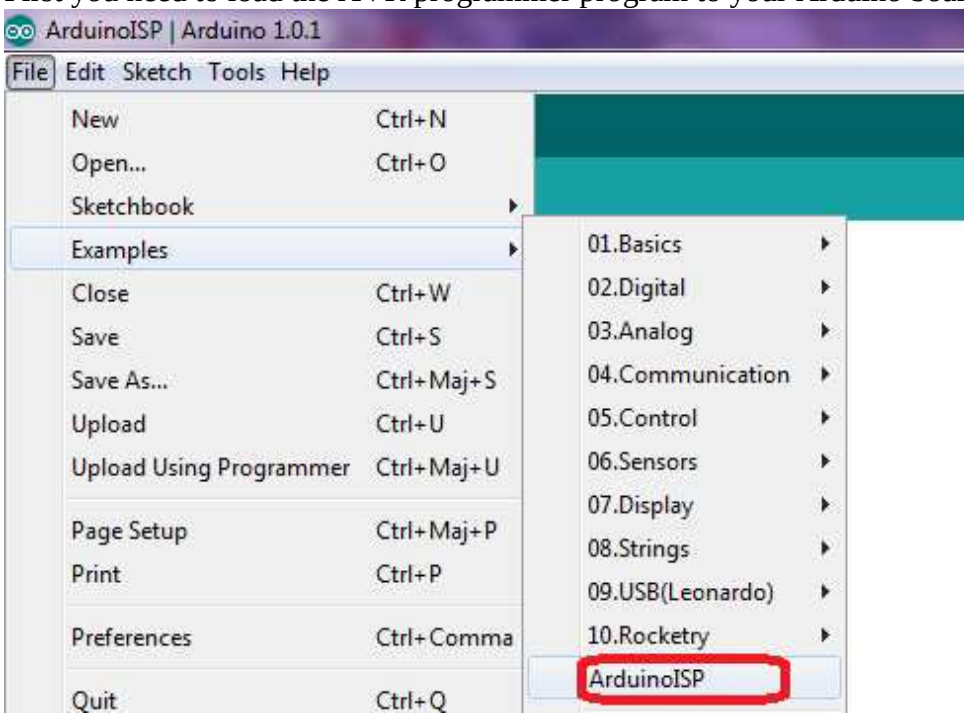


This will upload the Arduino Uno boot loader to you ATMega 328

Make sure it says successful. If not you will need to try again. Sometime it does not work; and in this case you will have to use a special programmer to reset your chip.

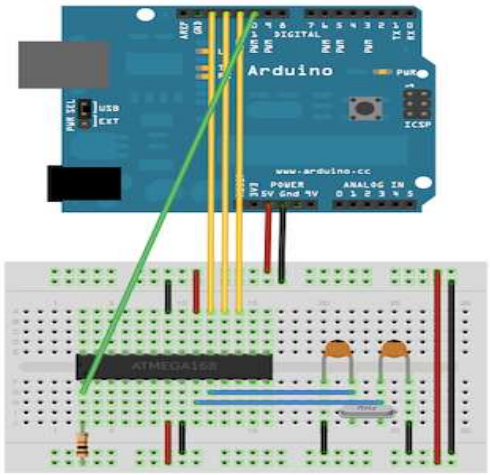
2.1.2 Loading the boot loader using an Arduino UNO

If you do not have an AVR programmer you can use an Arduino Uno board. Not that you should be able to do it with other Arduino board as well.
First you need to load the AVR programmer program to your Arduino board

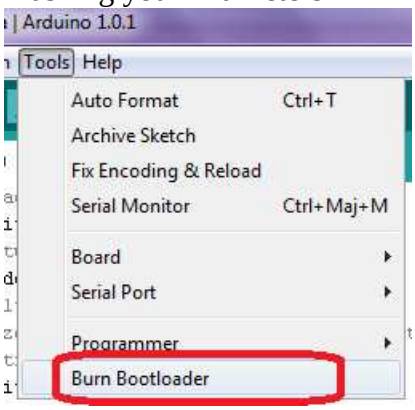


Open the ArduinoISP program and upload it to your Arduino board.

Then just wire your ATMega 328 like in the picture below



Then on the tools menu click on Burn Bootloader



Make sure it says successful. If not you will need to try again. Sometime it does not work; and in this case you will have to use a special programmer to reset your chip.

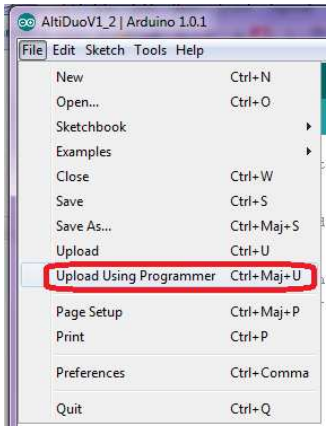
2.2 Flashing an existing Alti duo altimeter

This mean that you already have a boot loader and/or an existing program that you want either to upgrade to the latest version downloaded on the site or you want to change its behaviour.

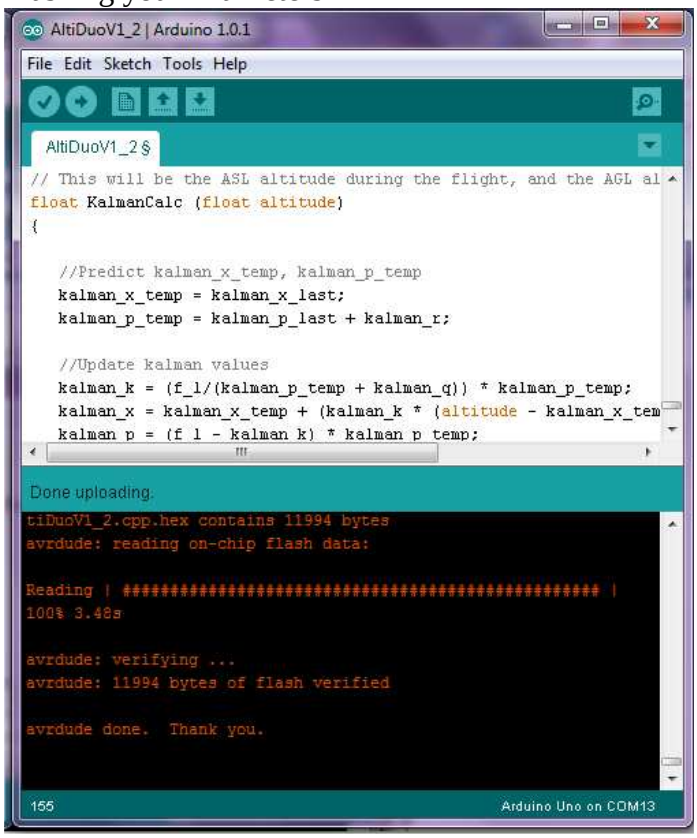
2.2.1 Flashing using an AVR programmer

Connect the AVR programmer to your PC exactly the same way that you did for burning the boot loader.
Remove the chip from your altimeter and plug it to your AVR programmer adaptor

On the Arduino framework when you upload the program choose the option



Flashing your Altimeters



When done plug back the chip to the altimeter.

2.2.2 Flashing using the USB adaptor

The advantage about this method is that you can reprogram the altimeter without removing the chip. It is very useful when you have soldered the chip on the board.

Connect a USB adaptor to your altimeter, upload the program and press the push button for 2 seconds.

Make sure the pin marked as TX on the adaptor board goes to RX on the altimeter board and that the RX on the adaptor goes to TX on the altimeter.

Note that if the altimeter is powered on, do not wire the +5v pin from the adaptor.
It is best to switch of the altimeter.

2.2.3 Flashing using an Arduino Uno

Remove the chip from your Arduino Uno board and replace it by the ship that you want to flash.
Then upload the program like you would normally do it.

3 ATtiny based altimeters

Before you can do anything with the ATtiny processors you need to patch your Arduino framework with the ATtiny board and some additional libraries.
You will also need to patch the Arduino framework linker because it is buggy with the ATtiny processors.

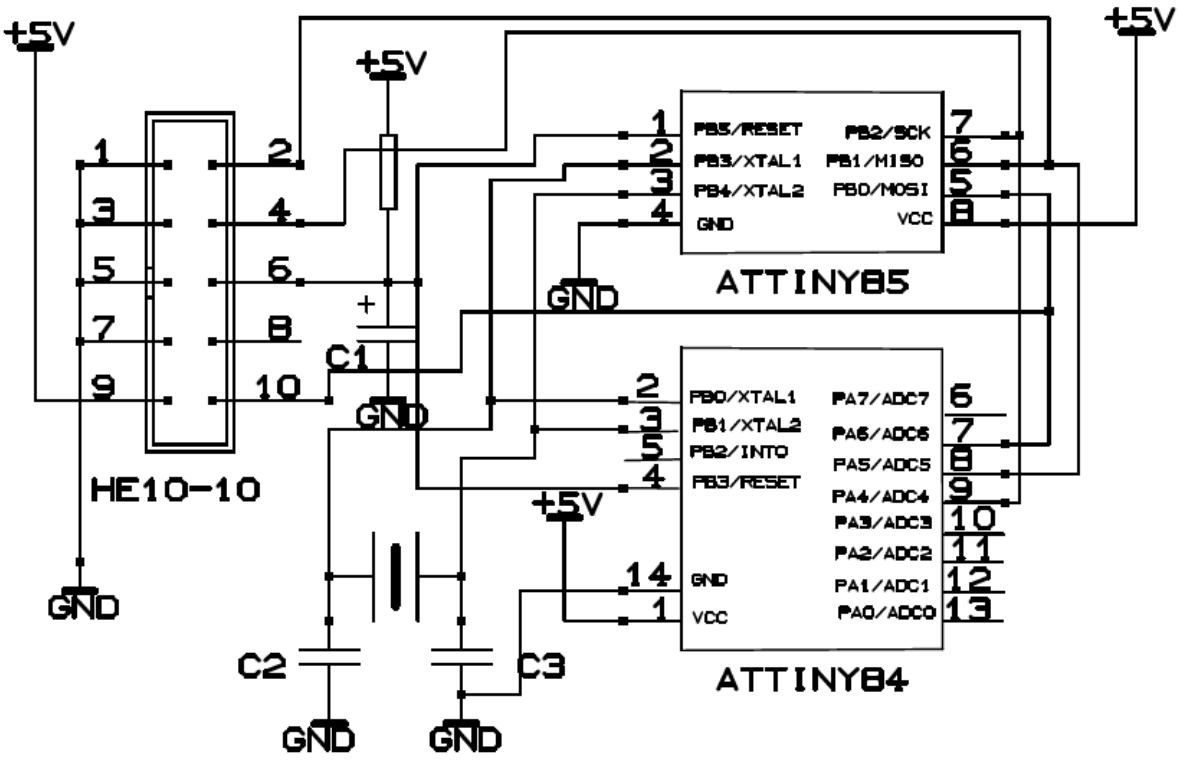
4 Alti Uno altimeter

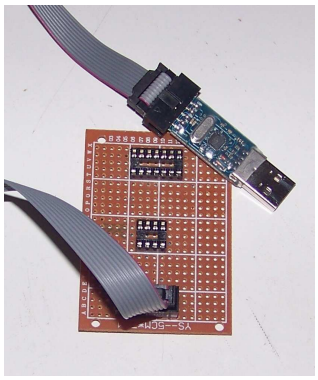
4.1 Installing the boot loader

The altimeter Uno uses an ATtiny 85 microcontroller. If you are using a bran new processor you will need to load the Arduino ATtiny 85 boot loader first. There are several ways to load the Arduino boot loader.

4.1.1 Using an AVR programmer

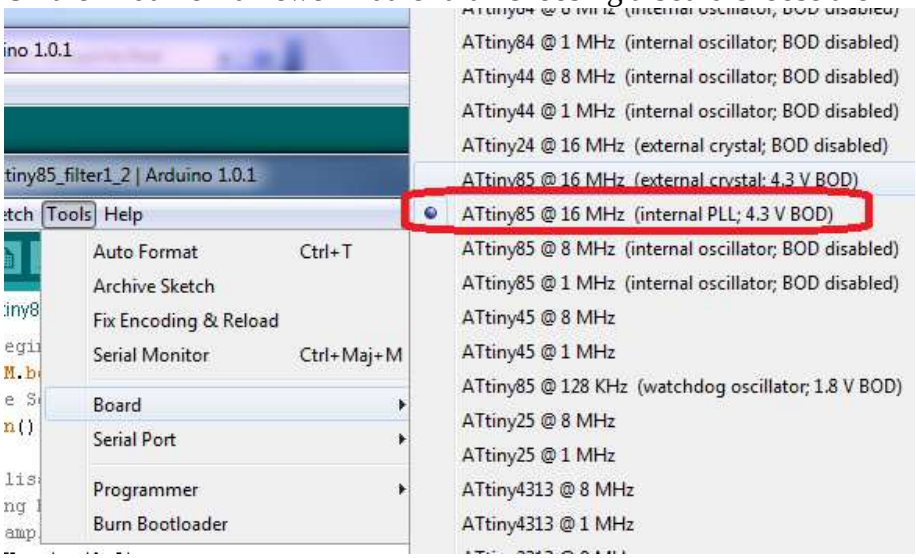
You need to do an AVR adaptor





I have made my own AVR adaptor that works for the ATtiny 85 and ATtiny 84

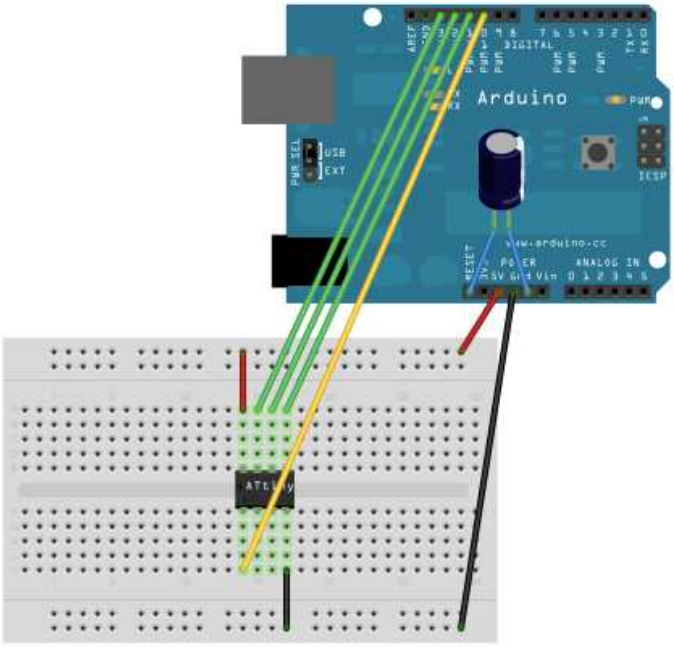
On the Arduino framework rather than choosing a board choose the ATtiny 85 chip.



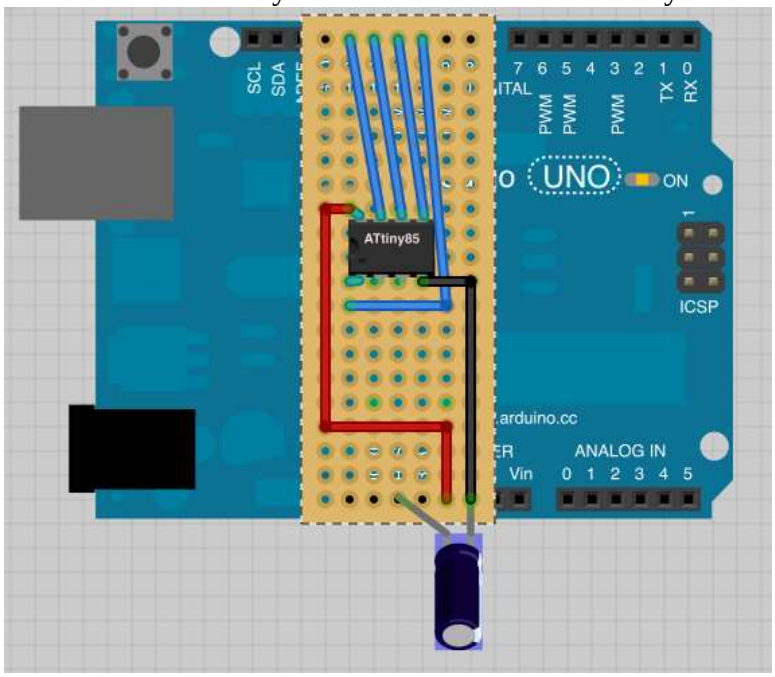
Note that we will be using the internal oscillator.
Then just do burn boot loader like you did with the ATMega 328

4.1.2 Using an Arduino Uno

You can also burn the boot loader using an Arduino Uno. Just do exactly like you did it for the ATMega 328 and wire it like below:



You could eventually do an Arduino Uno shield if you have a lot to do.



4.2 Flashing an existing Alti Uno altimeter

Unlike the Alti Duo Altimeter the only solution is to remove the chip from the board and re-program it either using an Arduino Uno board or an AVR programmer.

5 Mini Alti Duo altimeter

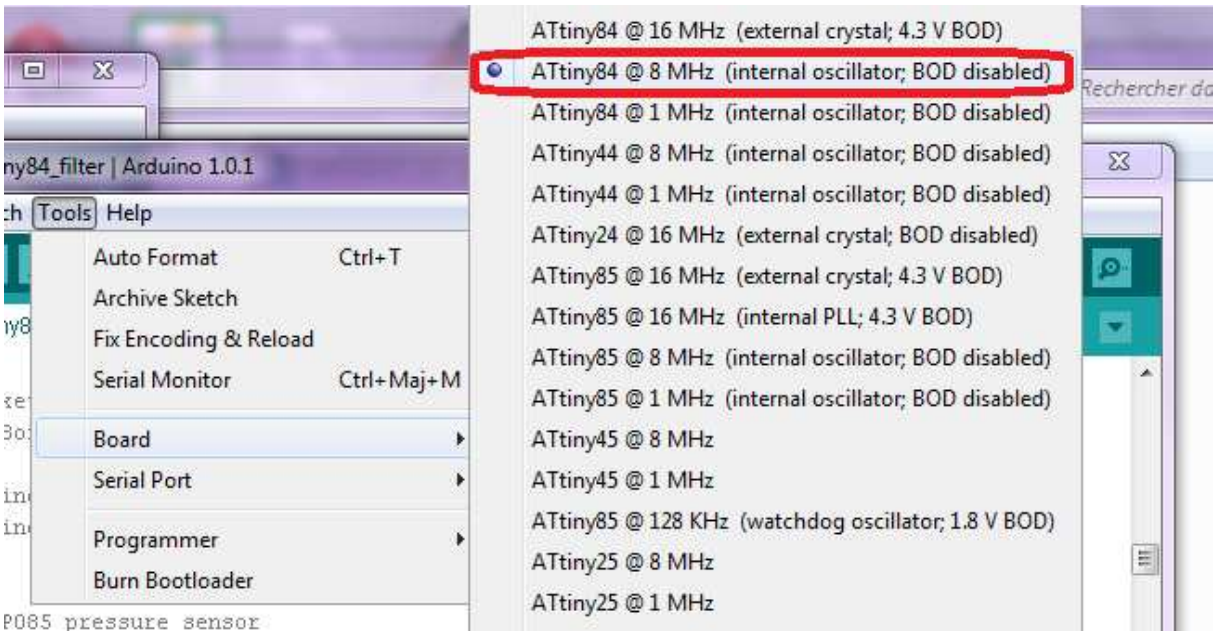
5.1 Installing the boot loader

The Mini Alti Duo altimeter uses an ATtiny 84 microcontroller. If you are using a bran new processor you will need to load the Arduino ATtiny 84 boot loader first.

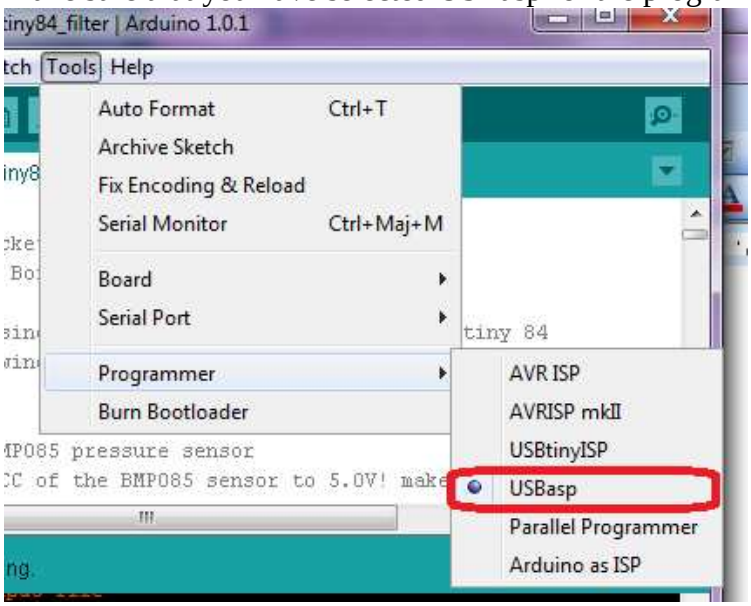
5.1.1 Using an AVR programmer

You can use the AVR adaptor that was built for the ATtiny 85 and 84.
Not that the crystal is not necessary in our case because we are using the internal oscillator.

Select the ATtiny 84 chip rather than a board



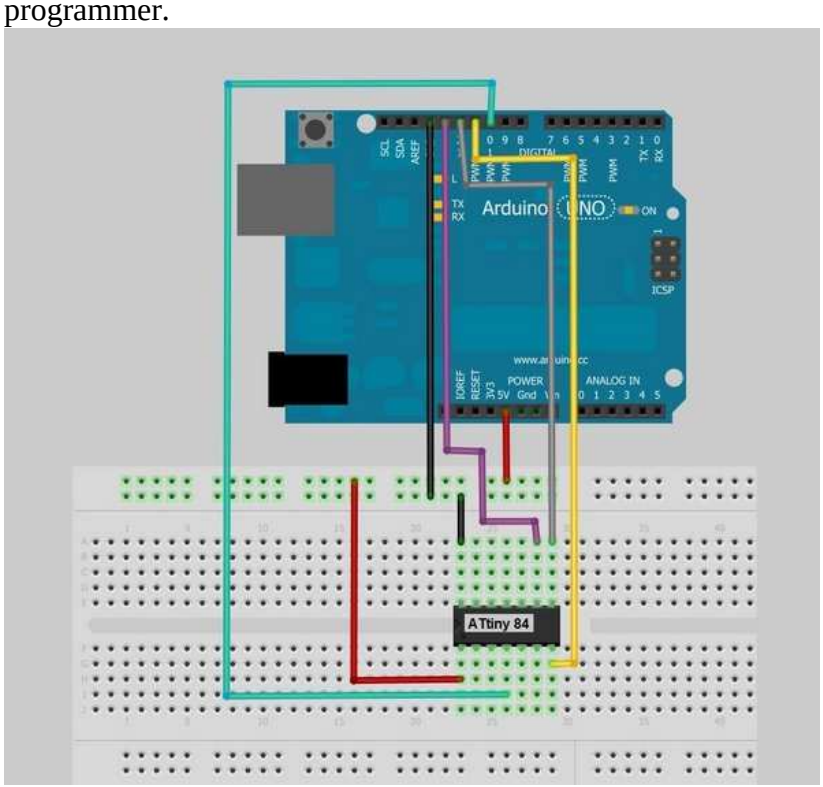
Make sure that you have selected USBasp for the programmer



And then do burn boot loader.

5.1.2 Using an Arduino Uno

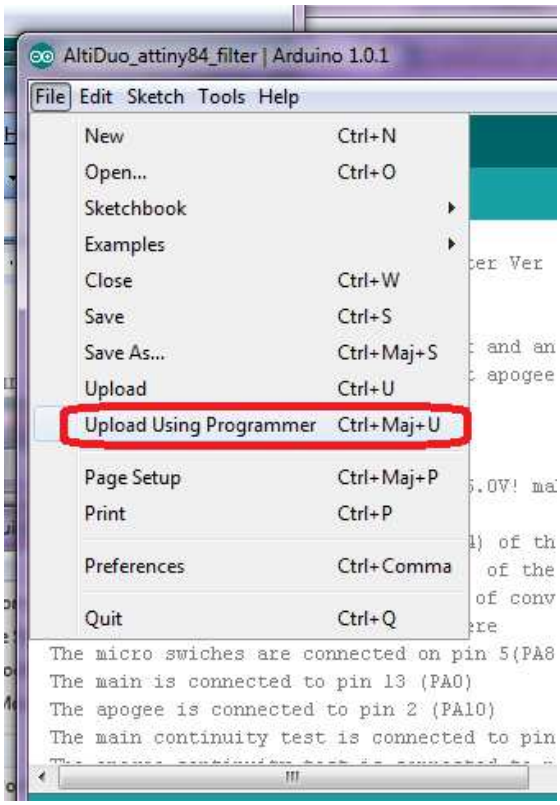
Like the other Atmel microcontroller you can use an Arduino Uno board as an AVR programmer.

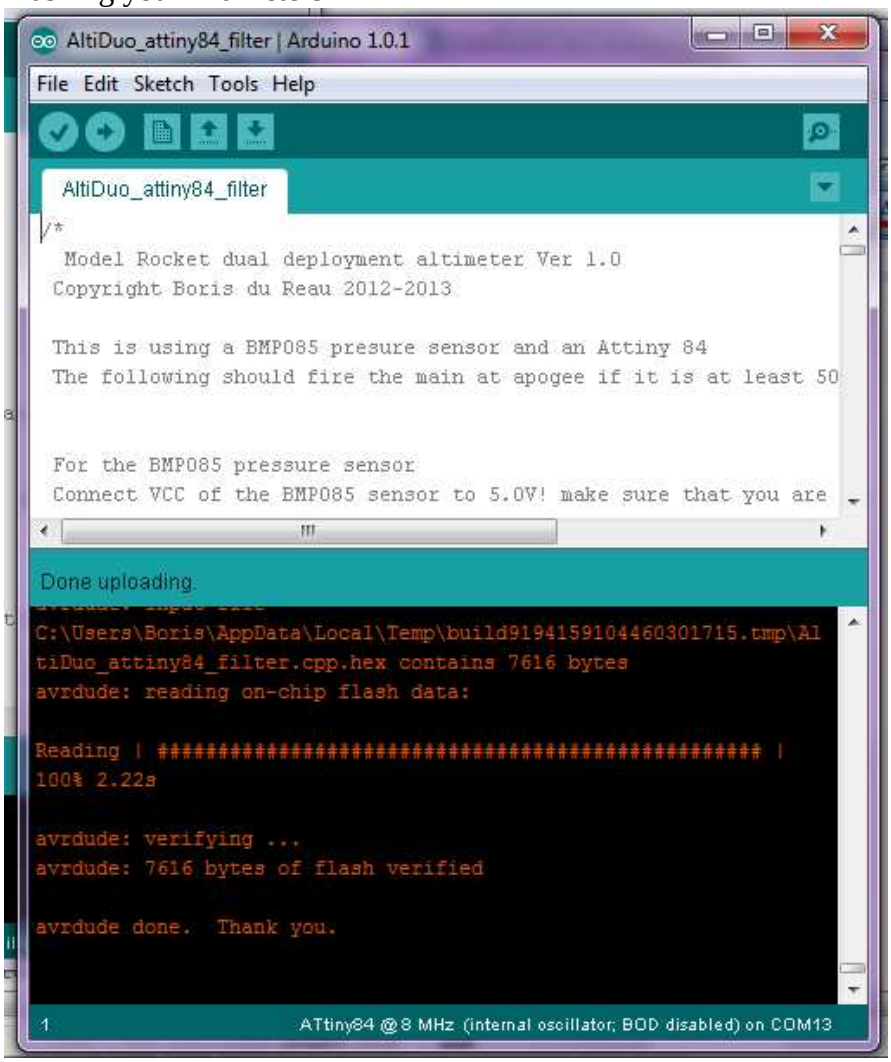


5.2 Flashing an existing Mini Alti Duo altimeter

Unlike the Alti Duo Altimeter the only solution is to remove the chip from the board and re-program it either using an Arduino Uno board or an AVR programmer.
First you need to download the program from my web site

5.2.1 Flashing a Mini Alti Duo using an AVR programmer





5.2.2 Flashing a Mini Alti Duo using an Arduino Uno board

Just wire it like you did for burning the boot loader. Select the ATtiny 84 chip. And upload the program.

