Single altimeter with an ATtiny 85 microcontroller
Kit assembly instructions

Version	date	Author	Comments
1.0	11/04/2013	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

Goal

The goal of this document is to explain how to build the single pyro output altimeter kit designed around an ATtiny 85 microcontroller. The kit is using classic components on purpose so that anybody can do it without any major difficulties.

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 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.

Kit content

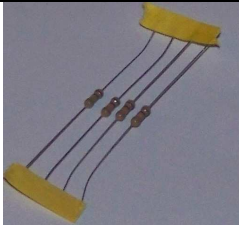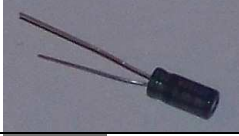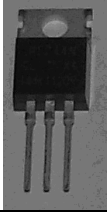An epoxy board with all the components drawn
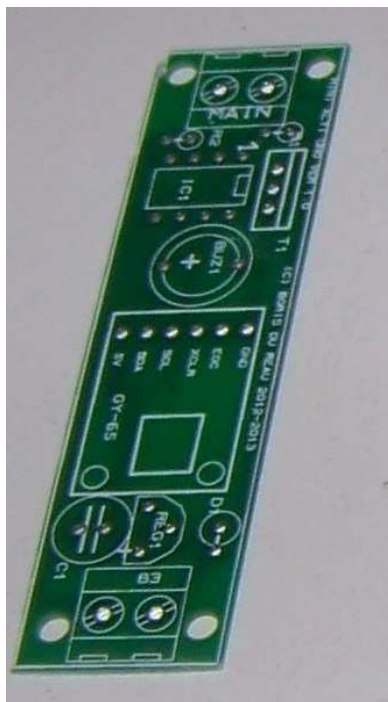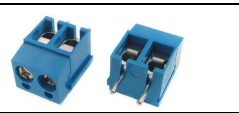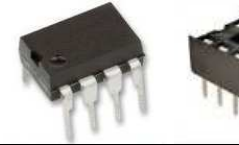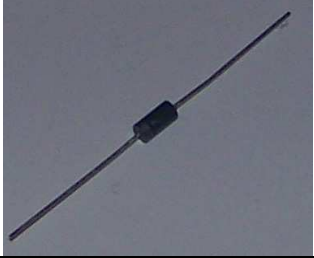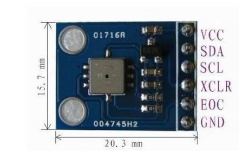
and the components in a plastic bag

The components list is as follow

R1, R2	100Kohm (brown, black and yellow) to 150Kohm (brown, green and yellow)	
C1	47µf (- is marked on the cap, + is the other lead)	
T1	Transistor (IRF540 or IRFZ44)	
Reg1	78L05 (TO92 package)	
B1, B2	2 screw terminal bloc pitch 5,08mm	
Buzz1	5 volts active buzzer	
IC1	Attiny 85 + 8 pins socket (programmed with an Arduino bootloader)	
D1	Can be 1N4001 to 1N4007	
Presure sensor	BMP085 (on a GY-65 module)	

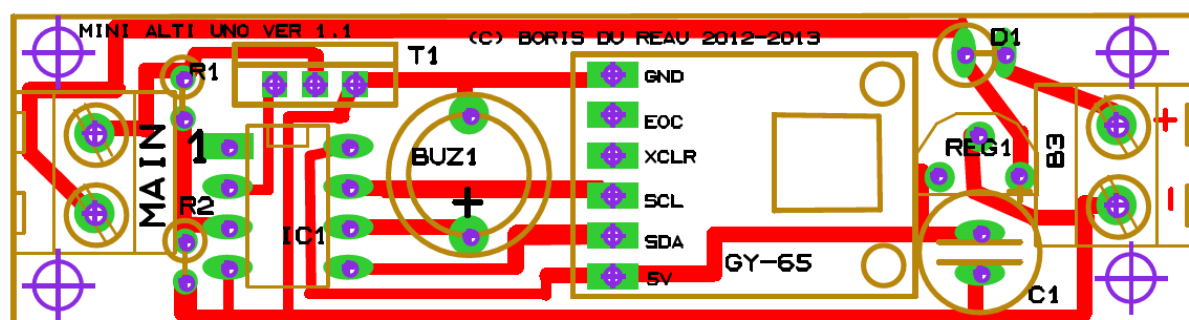|		
Battery Clip	9 volt battery clip	

Unlike the bigger alti Duo you cannot program it using a USB connector. You need to remove the chip and use an AVR programmer.
For more information about flashing the code contact me.
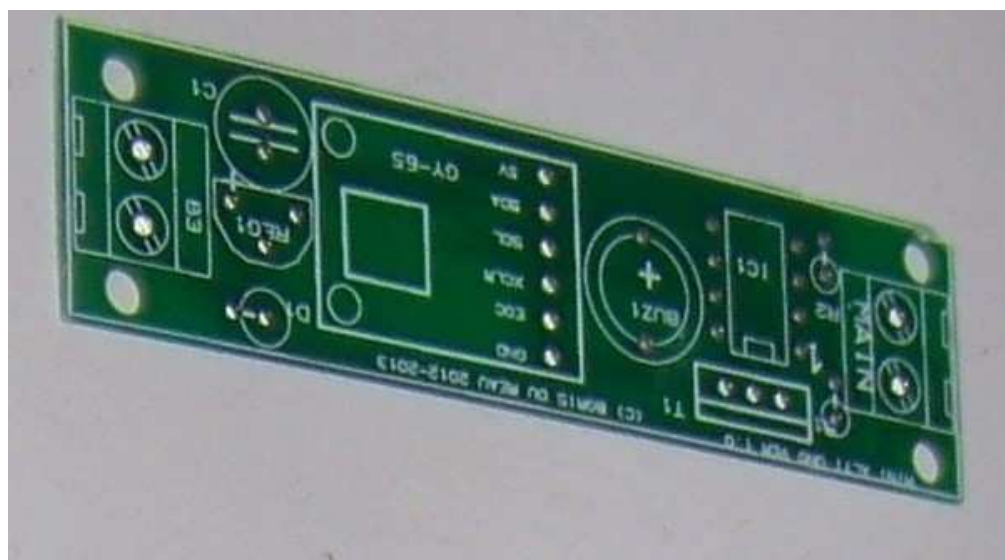
Components layout :

An epoxy board is provided with the kit, all components are drawn so that they can be quickly identified. This is a single sided board. This means that you only need to solder the components on one side.

Tools required

Holes in the board have already been drilled to the correct diameter depending on the component used, you just need to plug them and solder them.

The tools below are the minimum needed to build the kit.

Solder	
Wire cutter	
Needle-nosed pliers	
A soldering iron (a good one 25/30W, brand JBC for example)	
A magnifier on a double hand holder	

A sponge with a soldering iron stand	

Soldering the components

Before you get started here are some recommendations. Check the kit content and insure that you have indentified correctly all the components. Be careful to put the parts in the proper place, as it can be difficult to remove them. Make sure that you do not get mistaken between the transistors and the voltage regulator. Read the reference on the component with the help of the magnifier glass.

Do not revert active component such as the transistor and whenever there is a « + » sign on a component (ie; it has to be plugged one way and not the other) then it is mentioned

Always start by the thinner components so that after you plugged them you do not have to hold them while soldering.

Some advices to do good soldering

- Do not hesitate to clean up frequently your soldering iron in order to do good soldering.

- Always start by the thinner components and then plug them to the board.

- Heat the board and component lead together first and then bring the solder when hot enough.
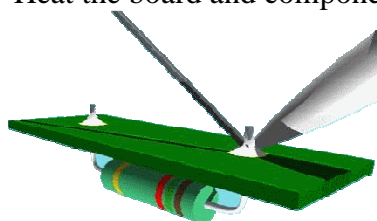
- Do not overheat the components as it could permanently damage them. Be careful to solder properly if you want them to last, something working today might not later. Just one missing connection can cause failure.

- Always work in a comfortable position on a tidy table with some space.

If you need help to solder your components just check on the internet there is lots of good tutorial out there that will teach you how to do some soldering.

Kit assembly

I am assuming that you have done electronics kits before, so if you have problems reading the following instructions ask for help.

The microcontroller socket
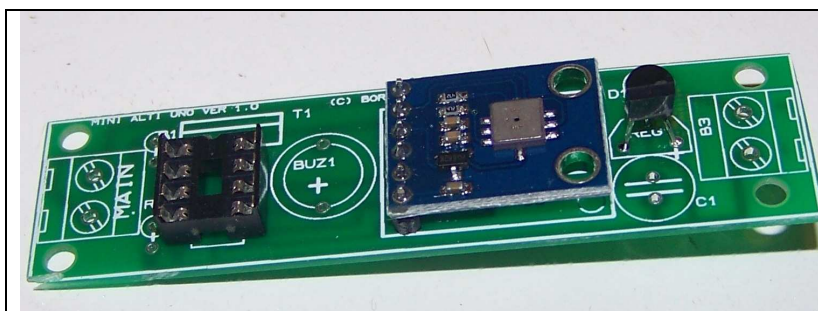
|	
	Plug the 8 pins socket and make sure that you do not miss any pin. You have a mark on the socket make sure it is on the top, this will help you later on when you plug the micro controller. Check the photo to position it

The pressure sensor board
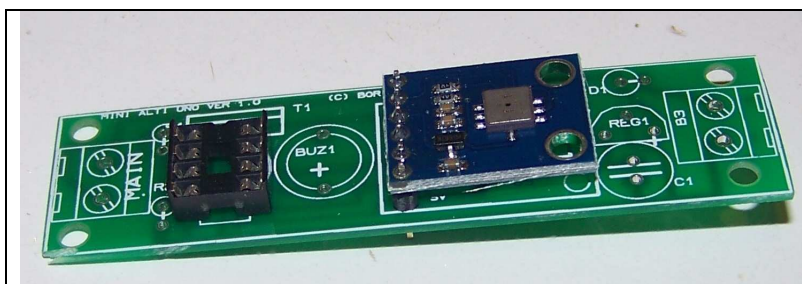
	Plug and solder the sensor board

The regulator

	Just position and solder the 5volt regulator. Make sure that the flat face follow the drawing on the board

The terminal blocs and buzzer
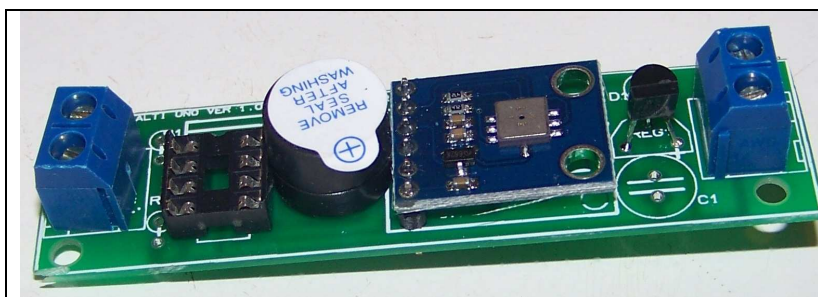
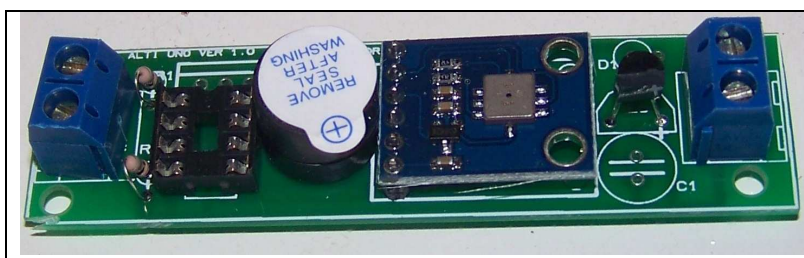|	
	Add the 2 terminal blocs and the buzzer. Make sure that the terminal blocs output are facing each end of the circuit board. Note that: you need to be careful the buzzer has a "+"

|	
	sign do not reverse it (remove the tape and check that you also have a + sign on the plastic cap). The "+" sign should be also the longest leg

The resistors

	Bend one of the leads about 180 degrees. Plug all the resistors vertically where they should be 2 of them: 2x 100K (brown, black and yellow)

Then cut all the components legs as short as possible

Protection diode, capacitor and transistor
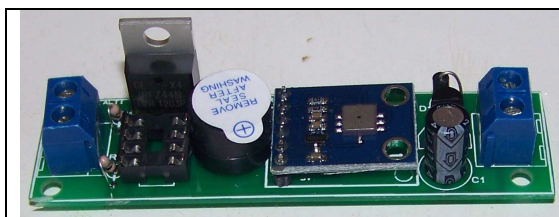
|	
	Position the transistor and the capacitor as in the picture. For the diode bend the legs without the circle; then plug it with the silver ring of the diode going to the circle drawn on the board.

The microcontroller

Plug the microcontroller in the correct direction. Before you plug it you have to bend the microcontroller legs if it has not been done already.

	On a new circuit, legs are wider than the socket		You need to bend them slightly do that you can safely plug the circuit in the socket.

ATtiny 85 single output Altimeter "Alti Uno"– kit assembly instructions
If you need to bend the microcontroller legs do it like in the picture below:
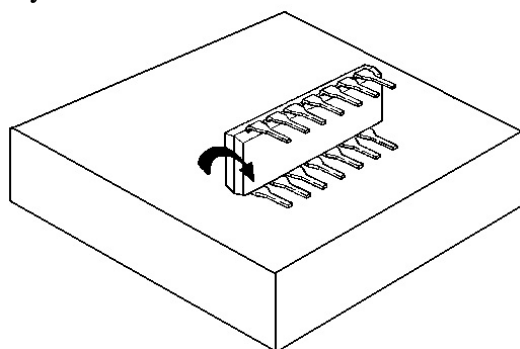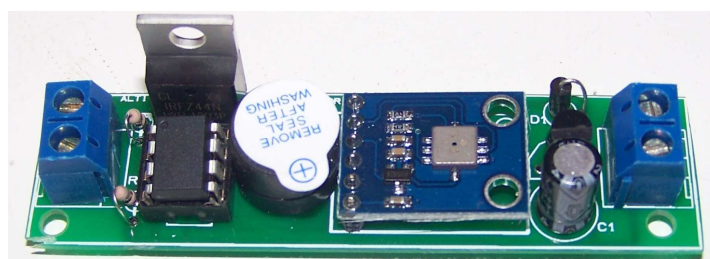

If the socket has been correctly soldered use the socket mark to place the microcontroller and align both marks.
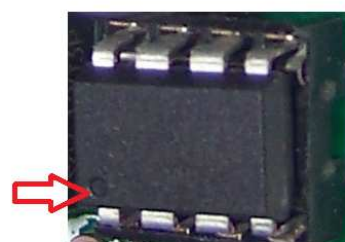
The finished kit is below

The finished kit looks like this. Double check yours and make sure all components have been correctly positioned. One mistake and the altimeter will not work and the components could be damaged.

Should you need additional help do not hesitate to ask.