



## Dual altimeter with an ATtiny 84 microcontroller Mini Alti Duo Kit operating instructions

Version	date	Author	Comments
1.0	03/05/2013	Boris du Reau	Initial version
1.1	15/09/2013	Boris du Reau	Reviewed and corrected doc

### Rocket Type

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

### Category

Construction technic	Ground Support	Electronic	Other
		<b>X</b>	<b>X</b>

Goal .....	2
Related documentation .....	2
What is dual deployment? .....	2
Choosing the power supply .....	3
Installing the altimeter in the electronic bay .....	4
Presetting the deployment altitude for the main.....	7
Powering on the altimeter .....	7
Testing the altimeter on the ground.....	8



## Goal

The goal of this document is to explain how to use the dual altimeter kit that you just built. The document assumes that you have already installed altimeters in a rocket payload bay.

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.*

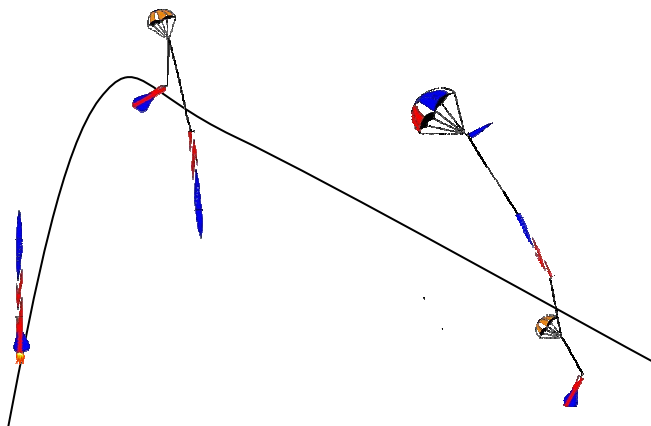
## Related documentation

This document assumes that you have successfully built the Mini Alti Duo kit altimeter and that you have read the kit building instructions. This will not cover things such as flashing the altimeter which will be discussed in another document.

## What is dual deployment?

The Mini Alti Duo kit is a dual deployment altimeter. The idea is that when you start reaching very high altitudes the rocket will land very far from the launch pad because it takes time to get back on the ground.

One solution is to use a dual deployment altimeter that will use a very small parachute called the drogue, slightly larger than the fins that you deploy at apogee. Ejecting the drogue prevents the rocket from doing a ballistic flight; then just before you land you deploy another parachute called the main.





## ATtiny 84 dual Altimeter “Mini Alti Duo”– kit operating instructions

### Choosing the power supply

The kit has been designed to use a 9Volt battery or a lipo battery with a voltage between 7 and 12 volts. If you are using a 9 Volts rechargeable battery make sure that you use a good one.

**Using a poor quality battery may result in an ejection failure which could cause a ballistic crash!!!!** Remember that when you power on the altimeter it is doing continuity test and beeping which is discharging the battery.

My recommendation would be to use a lipo battery. You can get 9Volts ones but be careful you will need a special charger.

This is the rechargeable battery that I am using. I can do more than 10 flights without recharging. They are about 10 dollars each but trust me it really worth it.



They are also a lot lighter less than 27g

Standard rechargeable battery

Lipo rechargeable battery





## ATtiny 84 dual Altimeter “Mini Alti Duo”– kit operating instructions



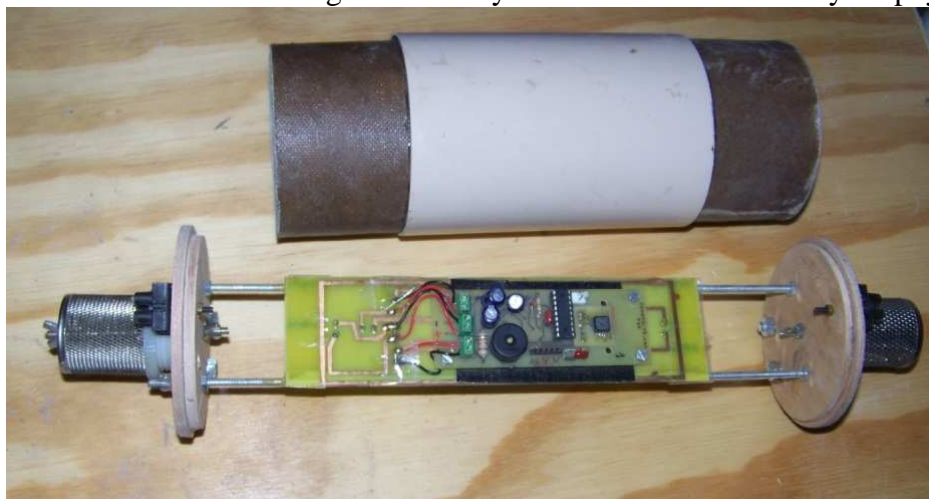
### Installing the altimeter in the electronic bay

You need to install and maintain the altimeter using 4 screws inside the electronic bay. I use 3mm allen screw because it has a smaller head.



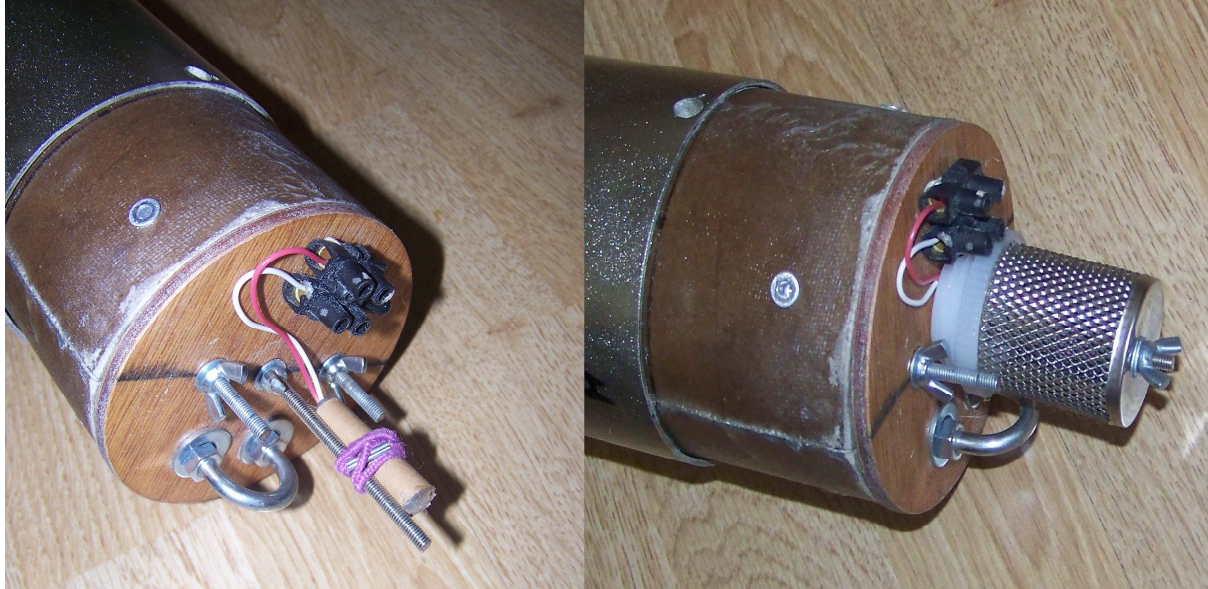
Make sure that the electronic is protected from ejection smokes which are very corrosives and could damage the altimeter board very quickly.

However remember that you have a pressure sensor which needs to measure pressure changes to work out altitude changes... hence you need to drill a hole in your payload bay.





## ATtiny 84 dual Altimeter “Mini Alti Duo”– kit operating instructions



In my rockets what I do is use screw switches to turn on my altimeter so the hole for the screw switch is also used for exchanging pressures.

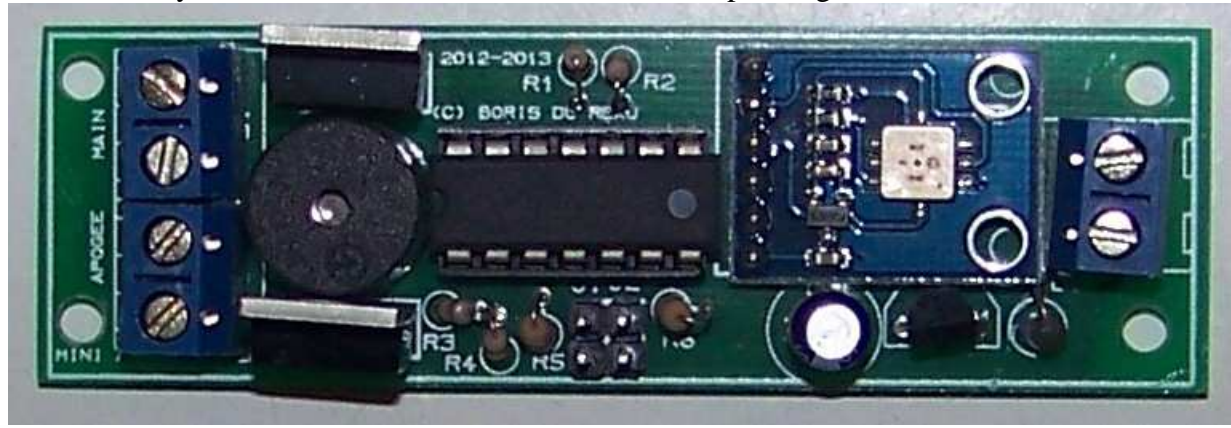


Double check yours and make sure all components have been correctly positioned. One mistake and the altimeter will not work and the components could be damaged.

Connect the left terminal bloc to the ejection charge that will push out your main parachute ie: the big one. Connect the top right terminal bloc to the drogue charge and connect the bottom right terminal bloc to the power supply.



# ATtiny 84 dual Altimeter "Mini Alti Duo" – kit operating instructions

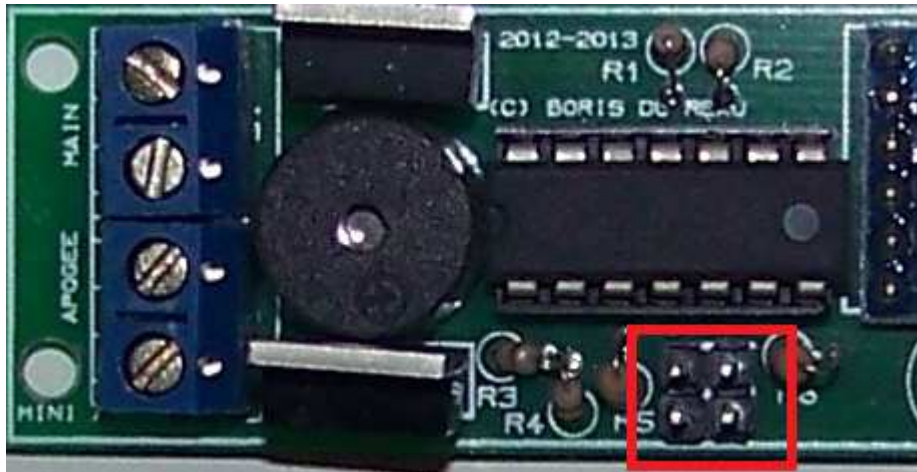






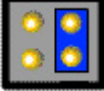

## ATtiny 84 dual Altimeter “Mini Alti Duo”– kit operating instructions

### Presetting the deployment altitude for the main

The main deployment altitude can be preset using a couple of jumpers. With version 1.0 and 1.1 of the program you can choose from 4 different altitudes. They are 50, 100, 150 or 200 meters.



Here is a table with all possible options:

50m	
100m	
150m	
200m	

### Powering on the altimeter

Now that you have everything installed in your rocket you can turn it on. It will then initiate, beep the version and then continuously beep. Beeps are for the continuity test (ie: to make sure that your electric matches are ok); basically if you get a long beep that mean that the circuit is open for one of the charges. If you get 2 long beeps that mean that both charges are either not connected or bad. If you get 2 short beeps that mean both charges are fine.

The altimeter will continuously beep until lift off is detected. Lift off being reference altitude + 20 meters.

After the altimeter has fired both charges then it will beep the apogee altitude and the main deployment altitude.

Beep resolution is 10 meters so it will round up the results.



## ATtiny 84 dual Altimeter “Mini Alti Duo”– kit operating instructions

1 long beep = 100m

1 short beep = 10 m

Note that the altimeter will keep on beeping the altitude of the apogee and main until it is switch of.

It does not save the altitude when powered off.

### **Testing the altimeter on the ground**

As it is a kit obviously unlike any other altimeter than you buy it has not been tested. I suggest that you build a very basic pressure chamber. It will cost you a couple of dollar and you will make sure that your altimeter is working before you fly your rocket.

Should you need additional help do not hesitate to ask, my contact details are on <http://rocket.payload.free.fr/>