Single Pyro Parachute Deployment Altimeter
ParUno (SMT) operating instructions

Rocket Type

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

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Goal

The goal of this document is to explain how to use the ParUno (SMT) altimeter that you just bought. The document assumes that you have already installed altimeters in a rocket payload bay.

Before your start
Remember that it is a rocket altimeter be sure that you know what you are doing and use with caution. 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 buy it or use it.

What is apogee detection?
The ParUno detect flight apogee and fire a pyro charge to eject the parachute. This replaces the motor ejection. This is more precise than the motor ejection which is a pyro delay and can fire the pyro charge exactly at apogee.

Choosing the power supply

The kit has been designed to use a 9Volt battery or a lipo battery with a voltage between 7 and 8 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!
Always use new or fully loaded batteries for each flight.

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 we used and tested. It can do more than 10 flights without recharging. They are about 10 dollars each, but they are worth it. Better than buying and building a new model rocket...

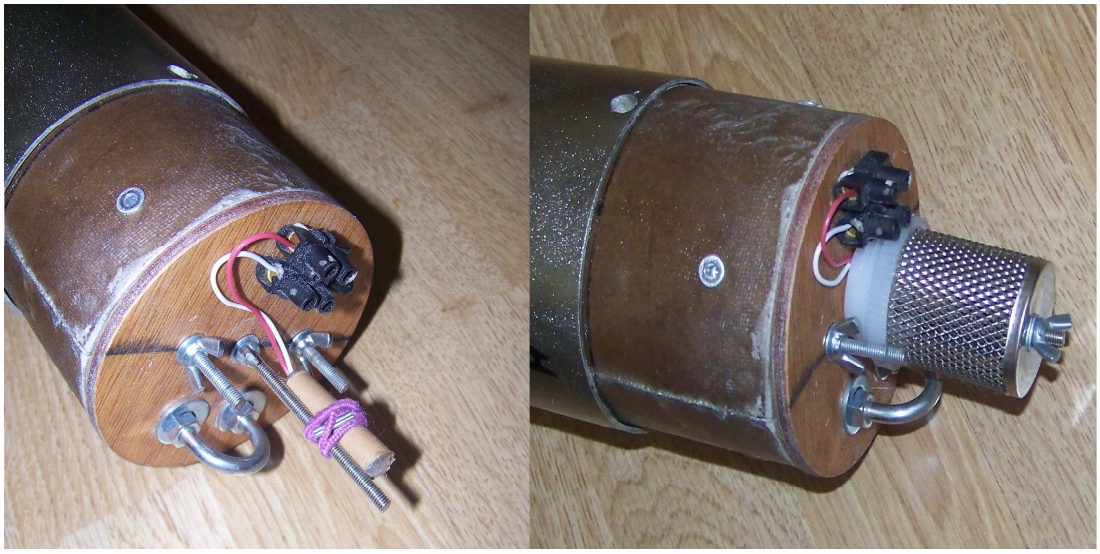
They are also a lot lighter less than 27g

Standard rechargeable battery

Li-Ion rechargeable battery

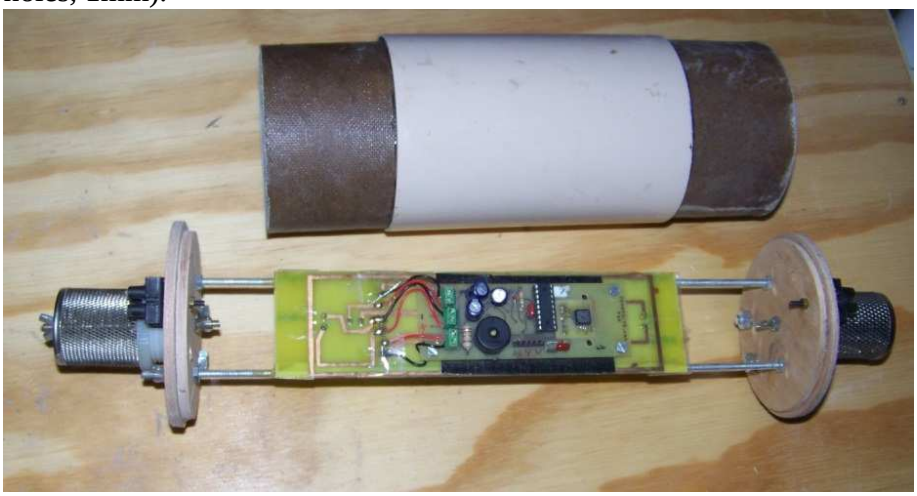
Installing the altimeter in the electronic bay
You need to install and maintain the altimeter using 4 screws inside the electronic bay. I use 3mm allen screw because it has a smaller head.

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.



Make sure that the electronic parts are protected from ejection smokes, which are very corrosive and could damage the altimeter board very quickly.

However remember that you have a pressure sensor which needs to measure (outside) pressure changes to work out altitude changes… so you need to drill pressure exchange holes in your payload bay (min.2x small holes, 1mm).

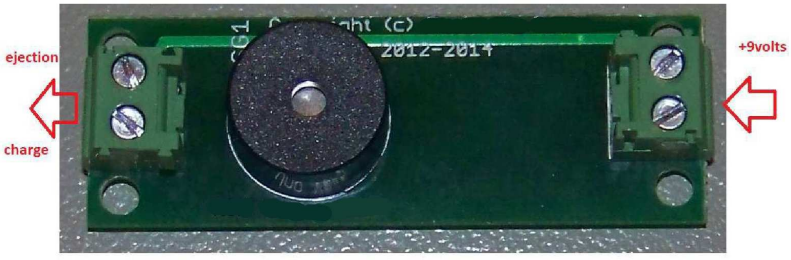


You will also need a switch to turn the altimeter on, when the rocket is installed on the launch pad. You can use a screw switch to turn the altimeter on or some sort of switch that will not turn itself off, due to acceleration forces (horizontal installation of the switch!). The hole for the (screw) switch in your body tube can also be used for exchanging pressures. If you have the switch below or above your electronics compartment, be sure your electronics compartment (with the ParDuo Altimeter) has its own pressure exchanging holes.

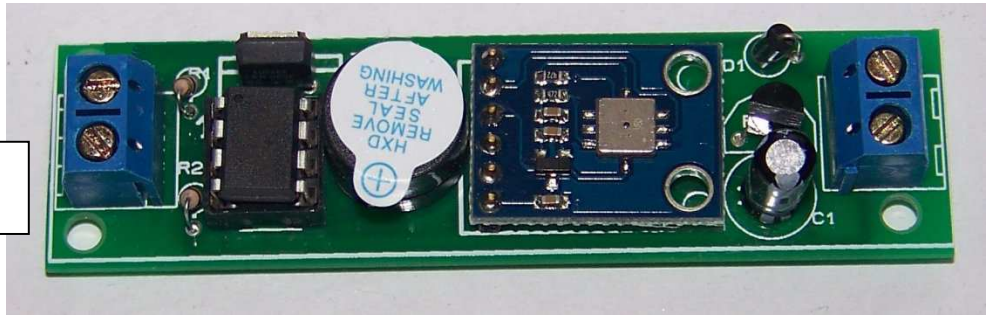
Double check yours and make sure all components have been correctly positioned. One mistake and the altimeter will not work and the components could be damaged.

Connect the **left** terminal bloc to the ejection charge that will push out your parachute.
Connect the **right** terminal bloc to the power supply.

SMT Version



Classic style version



Powering on the altimeter
Before using, remove seal from buzzer.
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 match is ok); basically if you get a long beep that mean that the circuit is open for your charge. This means that the charge is either not connected or bad. If you get one short beep that means your charge is fine.

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

After the altimeter has fired its charge then it will beep the apogee altitude.
Beep resolution is 10 meters so it will round up the results.

1 long beep = 100m
1 short beep = 10 m

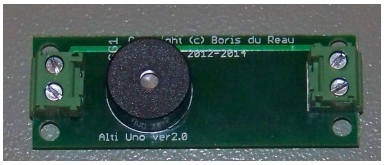
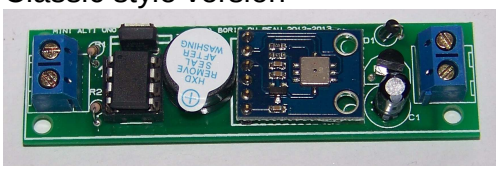
Note that the altimeter will keep on beeping the altitude of the apogee until it is switched off.
It does not save the altitude when powered off.

Testing the altimeter on the ground
We suggest that you build a very basic pressure chamber. It will cost you a couple of euro’s and you will make sure that your altimeter is working before you fly your rocket.

You can do so by using a cardboard postal cylinder as the pressure chamber.
Secure one end and use the other end to make the necessary connections.
Use a straw through the (plastic) lid, to suck the air out with your mouth. Seal all gaps with glue or silicone rubber. Make electric connections on either side of the lid. On one side attach your altimeter, on the other side attach your igniters, or better a led or Christmas tree light bulb.

Before launching your rocket:
Double check your entire setup and electronics and make sure all components have been correctly positioned and strapped into place. One mistake and the altimeter will not work properly and the components could be damaged.
Be aware that a 40gramme battery, at 15G’s, weighs more than half a kilogram!
Do not let anyone interrupt you, from your Mini Altimeter ParDuo doing your necessary checks, before launching!

ParUno characteristics
The altimeter is quite robust it has a protection diode which prevents polarity mistakes. It also uses a Kalman filter to prevent premature ejections.

Altimeter model	ParUno (SMT)
Picture	SMT version  Classic style version 
	SMT / Classic
Size in mm	44x16mm / 75x19mm
Weight	5.5 grams / 12 grams
Number of pyro output	1
Micro controller	ATtiny 85
USB interface connector	no
power supply	4.5V to 9V / 6.5 to 12V
Max Output Current	9A / 17A
Pressure sensor	BMP180 / BMP085
Memory	no
Pressure range	300-1100hPa
Altitude range	-500 to 9000m
Kit	no
Current software version	1.3 (stable)
Front end version	none
Software update	Impossible unless you have microcontroller dev tools. / AVR programmer only.
Unit	Metrics

The weight depends on the transistor used. The max output current depends also on the transistor used.