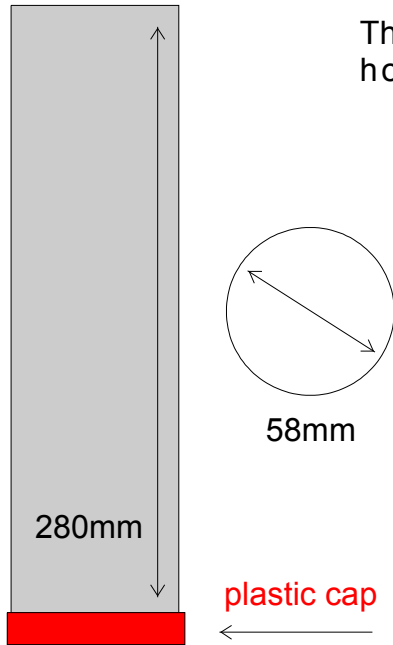


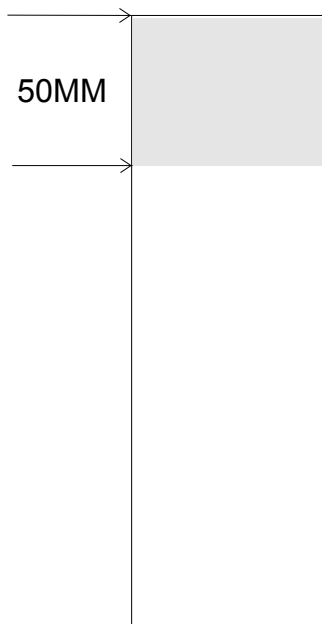
work in progress draft rough copy

sunshine recorder  
by Michael Parry-Thomas

The plastic tube was cut from an old fishing rod tube holder, you also need the bottom cap.

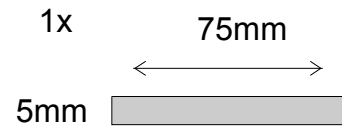


1 Tube 280mm x 58

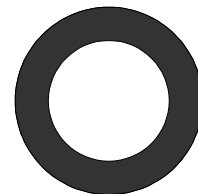


The plastic tube needs to have some aluminium foil around the inside of the plastic tube to act as a reflector, you can purchase this from eBay, you need the aluminium foil which has an adhesive backing.

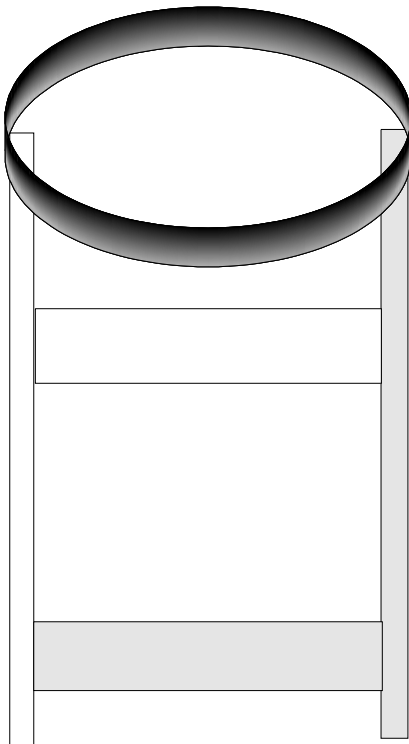
Make a top flange to hold the Glass Ball



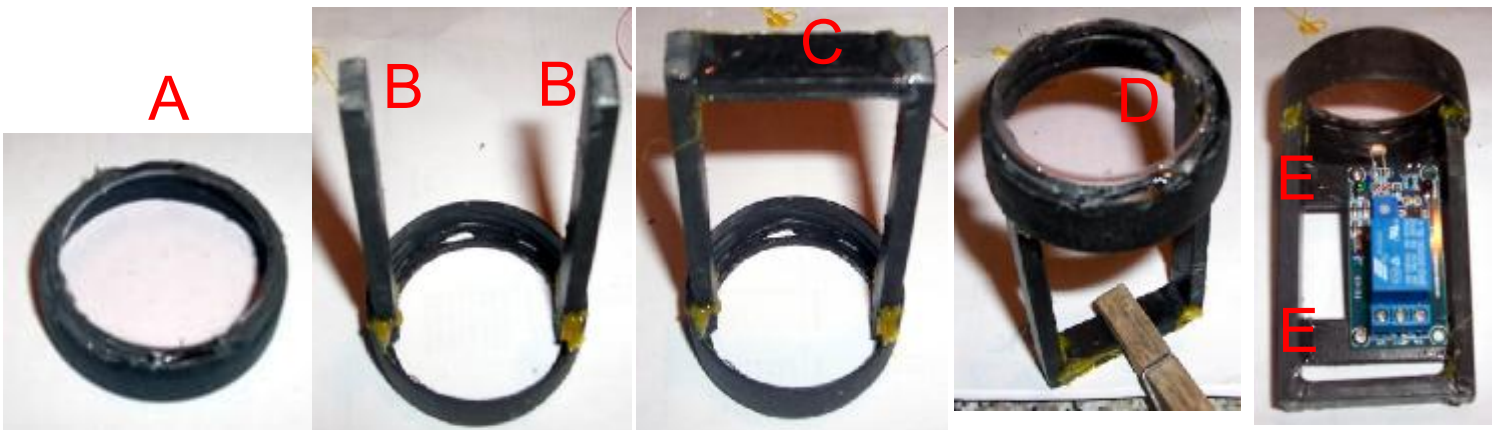
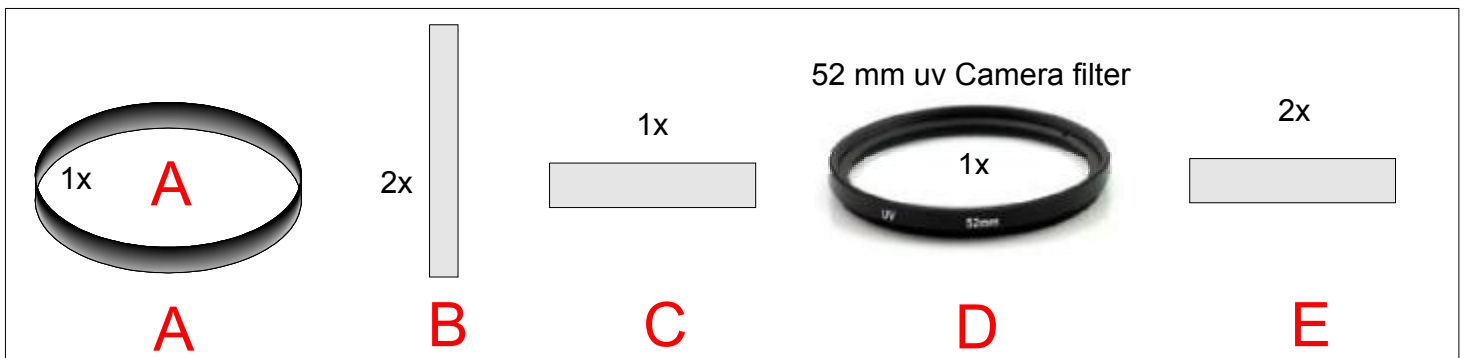
Top flange

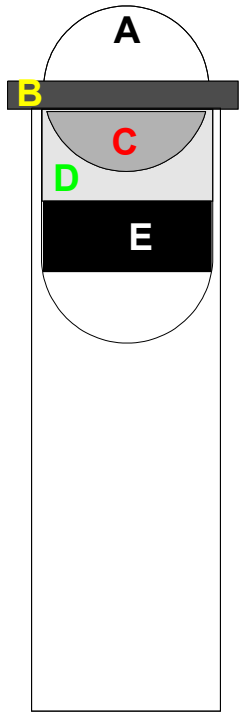


I made the flange out of some old plastic Flomax this is a plastic which is used in signmaking and it's very easy to cut.

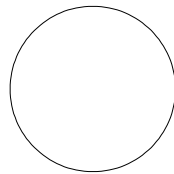


To make the circuit board holder UV filter glass protection you need a plastic tube which will fit inside the large housing. Tube is to be approximately 10mm in-depth, this is to hold the UV glass filter in place and the circuit board housing, this will need to be able to slide up and down in side the tube holder, it must be a good fit so it will not slip down on its own. The UV glass filter protects the components on the circuit board.

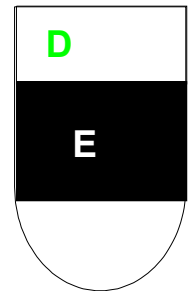




You need to prepare the glass ball before using it in this project, please do not skip this process



Glass Ball



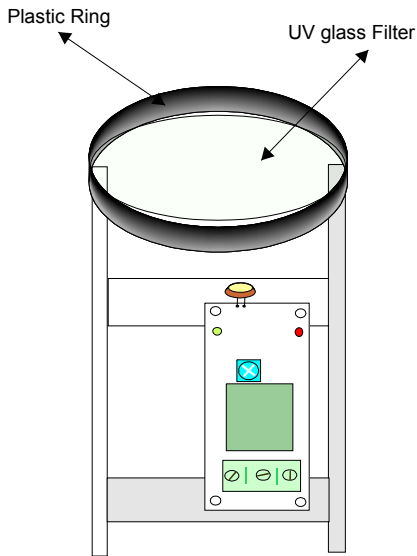
glass dome

**It is very important to make the optic diffuser correctly, please do not skip any of these processes**

.Half of the glass ball needs to be etched, I used a piece of sandpaper and carefully sanded half of the glass ball until it was completely semitransparent you need this so it will diffuse the sunlight, you do not want any focused sunlight going into the plastic tube. The second part is a glass dome, I purchased this from a pound shop. It was part of a glass ornament I simply removed all the inside items and I was left with the glass dome, this also needs to be etched from the open end approximately 30MM in-depth, I use sandpaper to achieve a transparent frosting effect. This acts as part of a diffuser,



When the sun is out, you'll see its reflection in the clear glass ball top, this is then diffused by the bottom part which has been frosted, a combination with the outer frosted glass dome makes the unit glow with diffused sunlight, as this is mounted inside a black tube. You get a big contrast between daylight and sunlight, this is detected by a small circuit board, which has a sensor and operates a relay which can be used to connect to a counter, analog clock, datalogger, and also can be connected to a computer using a USB port



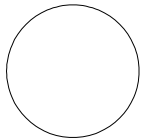
Circuit boards were purchased from eBay, the company offers two types, one with a single sensor, and another with two sensor, I am currently using the one sensor.

You will need to experiment with the different types of boards to get the optimum results for your area.  
(option one)

I connected a quartz analog clock to the output on the relay this records how much time of sunshine during the day

(option two)

you can connect a digital counter on the normally closed contact and a data logger on the normally open contact, both circuit boards can be powered by a 4.5v battery ,I'm using three AA 1.5 in a battery plastic holder, the data logger and counter are self powered,



2PCS CLEAR GLASS QUARTZ CRYSTAL SPHERE BALL 40mm £5.01 purchased from eBay



Sensor board

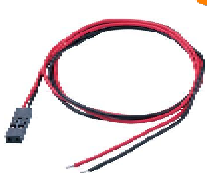
0A 250VAC/ 30VDC Relay Photo Resistor Sensor Module 1 Channe £3.79

**you can either use one channel or the two channel board**

0A 250VAC/ 30VDC Relay Photo Resistor Sensor Module 2 Channe £5.72



1 x Battery Holder Case 3x AAA 4.5V with 6" Leads Box £1.37



power lead

CONNECTOR SOCKET WITH 2-WIRE LEAD PCB CONNECTION £3.37



Analogue clock £1 .8 0

## (Option two)



£5.22 from eBay

the advantages of using a digital counter is you can simply reset it with a small button on the front of the module and the module is very small

H7ET-BM-s 0 - 99h59m59s Counting Range No-voltage Required Time Timer Counter



Datalogger EL-USB-5  
Counter, Event and State USB Data Logger

<http://www.lascarelectronics.com/>

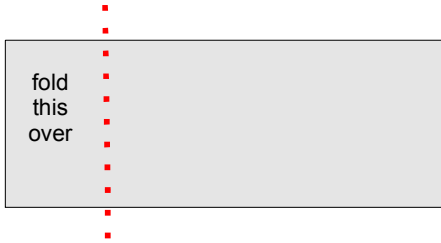
the datalogger will record the duration between the periods when the sun was shining, it will also timestamp each event after you've recorded your data. You can view the information on your computer you can do it in graph form and exported to Microsoft excel for further processing

## (option three)

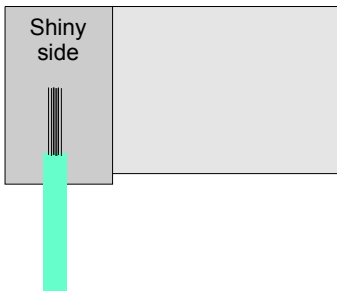
you can connecting output from the relay to a RS 232 connector and have the device record the data in weather display software (not yet implemented or tested)  
More information to follow

# how to make the switch wire connectors for the analog clock

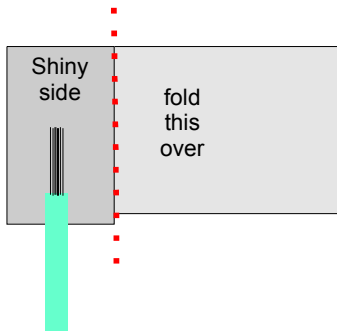
you're going to need 2 pieces of wire long enough to connect to the circuit board relay terminal block and some aluminium foil or copper foil which has adhesive on the back and a thin piece of plastic or Sellotape



Peel the backing of the aluminium foil or copper foil you need the sticky side facing up. fold a third of the foil over



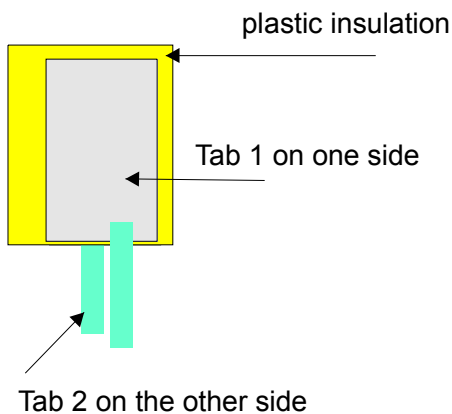
place in the centre of the shiny side a piece of wire, don't forget to strip the installation of the end of the wire



you need to fold over the foil again and carefully rub all around, securing the wire, fold again until you have a foil tab with the wire coming out of it. You need to make 2 of these

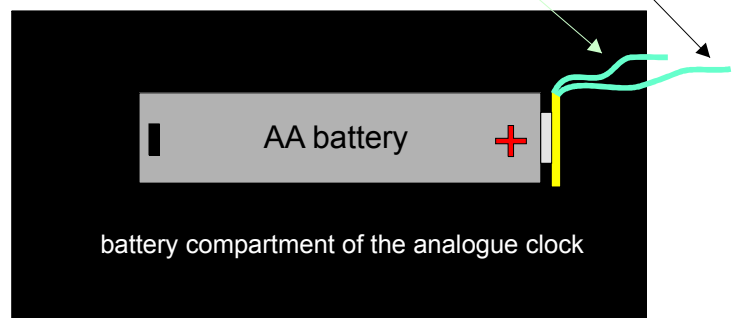


you then need to insulate one side of the tab, then you need to stick the other tab on top of it like a sandwich

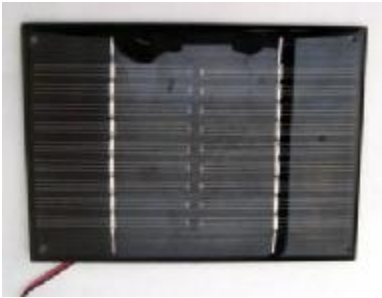


Connect to the relay terminal Normally Open

Connect to the relay terminal COM



I have added a solar panel to charge the 3 AA rechargeable batteries, which powers the circuit board sensor



MONOCRYSTALLINE SOLAR PANEL 6V50MA  
<http://www.cpssolar.co.uk/>

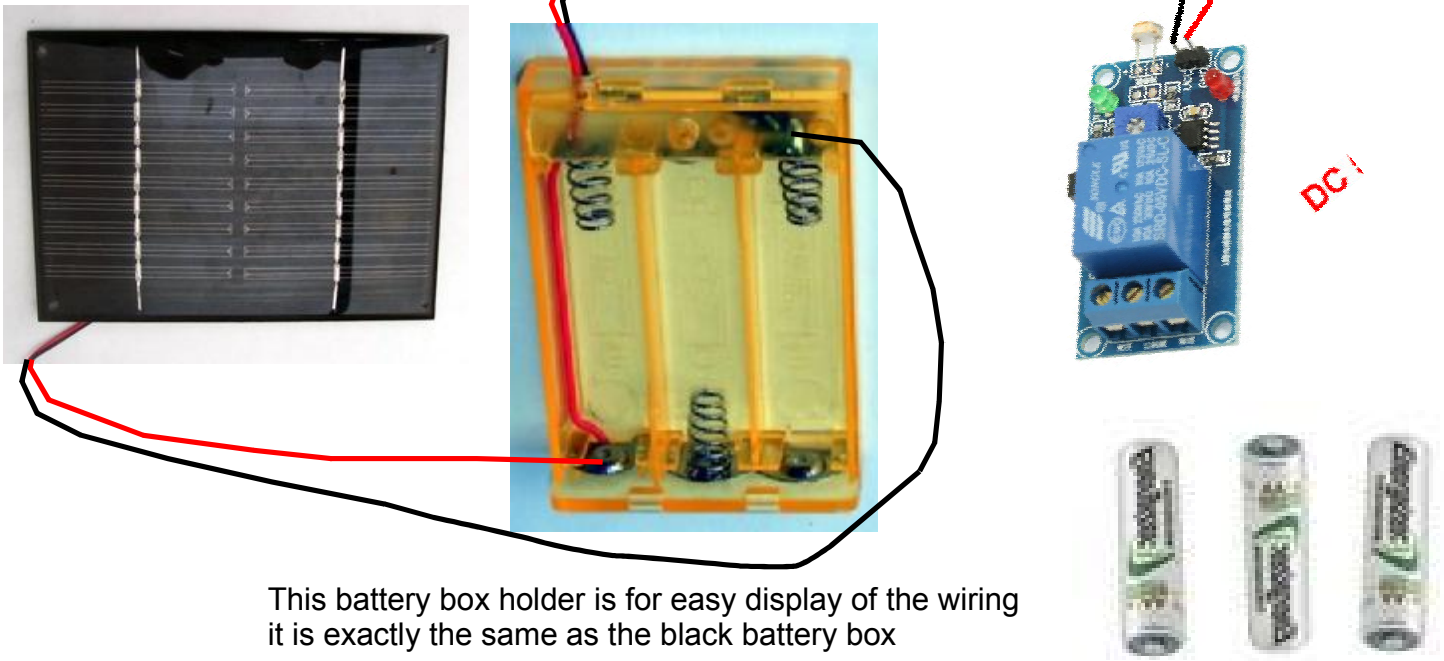


I mounted my solar panel to an old security light ,solar panel bracket .



All the wires and circuit board and battery compartment push into the black tube

Wiring diagram for the solar panel



This battery box holder is for easy display of the wiring it is exactly the same as the black battery box