

# Notes on building your own

There is a lot that can be said on how to make your modified Plasma Ball, but 1<sup>st</sup> I will advise that you print the following two pictures from the website;

1. Plasma PCB1
2. Plasma PCB2

Next, download the PDF 'Plasma Ball Circuit Pictorial.pdf' along with this 'Notes on...' PDF.

To start, the 'Pictorial' is a semi-schematic representation of what I did and not a complete reverse engineering of the Plasma Ball circuit board. My priorities are too numerous to mention and I'll only say I'm a little short on time. However the pictorial with this description gives you everything you need know, in order to do this modification.

First you have to figure out how to get the circuit board completely out of the enclosure. If that turns out to be problem, then I would suggest you turn this project over to someone that is skilled in both mechanical construction and electronics.

Once the board is out you have to remove two resistors. They are R6 and R8. Refer to the 'Plasma PCB2' picture to see where these resistors are. They are both 10k resistors that you will be using again. Next you will need to solder a 6" piece of wire on one end of each resistor. The solder connection should be heat shrink protected so it will not short to the mother board.

Now turn the board over and compare it to the 'Plasma PCB1' picture. If you look carefully you will see the two free ends of the resistors were solder back into the board. They both had their free end soldered back into one of the holes they were just removed from. Pay attention to the Pictorial and PCB1 pictures to see exactly where they were put. They are connected to the BASE of the transistor they are intended to drive. Do Not put them into the wrong position because the circuit will not work properly and potentially result in damage to the transistors they are suppose to be driving.

Next you will need to solder a 6" peace of wire into the other or matching hole of each resistor. You want to do this just like the 'Plasma Ball Circuit Pictorial' shows and like what the Plasma PCB1 picture' shows.

Now you need to solder a final piece of wire to the ground land on the board. I drilled a hole and cleaned off a little solder mask to connect the ground wire. Once you have completed this you will have 5 wires, two with inline resistors, coming off the back of the board. Glue the wires to the middle edge of the board so they will not move around on you.

Now look at the bottom of the 'Plasma PCB1'. The bottom is the opposite end of the board from where the wires come off the board. You will see what is a land cut. That cut isolates the collector of the TIP122 darlington driving transistor. You need to cut the land and drill a hole for one end of the thermal heat switch. The collector is the middle leg of the transistor. On the other side of the transistor there is

already a free hold on the collector land for the other lead of the thermal switch. The how may have some solder on so you might have solder suck it away or drill the hole clean. The thermal switch bridges the land you just cut back to the collector of TIP122. If TIP122 gets too hot the thermal switch opens and the transistor will cool down.

If you look at the Plasma PCB2 picture you will see the switch is heat sink glued to the TIP122 transistor. Yes, they make a heat sink compound that is also a glue! This thermal switch is extremely important because it will mean you will never cook the transistor because of over driving it. You will be extremely sorry if you do not add this component.

Once you glue and solder the heat sensor to the TIP122 transistor, you are all finished with the board modifications. There is a picture of the heat sensor switch I used on the Plasma Ball webpage. Although the picture shows several, you only need one of them for each Plasma Ball you modify. 85 degree Celsius is a good value to get. However I'm sure you could push the transistor a little harder by using a 90, 95 or even 100 degree Celsius switch. However, running cooler means running for year(s) verse just running for a year or less.

Put the board back onto the base plate mount you removed it from. Where you drill the switch and connector holes and the type of switches and connectors to use will be your choice. I would suggest you follow my lead shown in the Plasma Ball webpage picture window.

Last but most important is that I do not have the time to become a consultant for this modification. This is meant to be a gift as part of my open source philosophy. It is not meant to be a source of torture causing me to fall behind on my other tasks and obligations.

I sincerely hope those that attempt this modification succeed and then pass what was learned onto other potential builders or users.

Consider passing back any working design changes to this 6" or other working Plasma Ball circuit designs, so as to give others access to the benefits this Plasma Technology offers.

In thoughts of wellness to all;

Respectfully and offered friendship,

Steve

Creed: NEVER LIE to yourself or anyone else and always practice the GOLDEN RULE