LEDsGrow

by ThinkTinker on November 26, 2015

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Intro: LEDsGrow

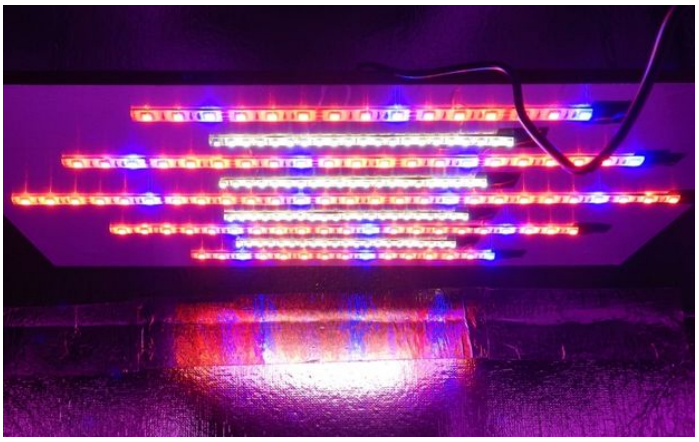
MY FIRST PUBLISHED PROJECT.
Every constructive comment, good or bad, is appreciated.

Here is my example of a basic GROW PANEL with LED strips.
Feel free to modify the details as you go along. (Bigger, more LED's, ...)

The LED strips are sold in 5m rolls for €10 or less.
Power supply can be bought for €20 or less.

All the other stuff needed, I already had or got for free.
- Wood plank.
- Aluminium tape.
- 2-wire cable, 0,75mm² audio cable works fine.
- Connectors.
- 4x screw hook.
- Chain. (Plastic would be great, metals works too.)
- Electric tape. (White would be best, others work too.)

Equipment:
- Drill.
- Solder iron & tin.
- Sharp knife.
- Tool to cut chain.



Step 1: Choosing the LED's.

In short:
Plants mostly require far red 660nm and blue 440nm lighting.

White light, like summer daylight, is needed during the first stages of growth.
While at the later flowering phase, far red light becomes more important. As it resembles the coming of cold weather.

So, a white light for a young plant and a far red light for a maturing plant.

LED strips have some great advantages:
- Waterproof, if needed.
- Less soldering then individual LED's
- 12Volt DC, already in serie/parallel assembly.
- Easily upgradable by added strips.

What's needed exactly?
- cold white LED strip, 12Vdc, waterproof.
- grow LED strip*, also 12Vdc, waterproof.

*grow LED strip contain multiple far red LED's for each blue one. For example, 4red/1blue.
** I bought my LED-strips at AliExpress

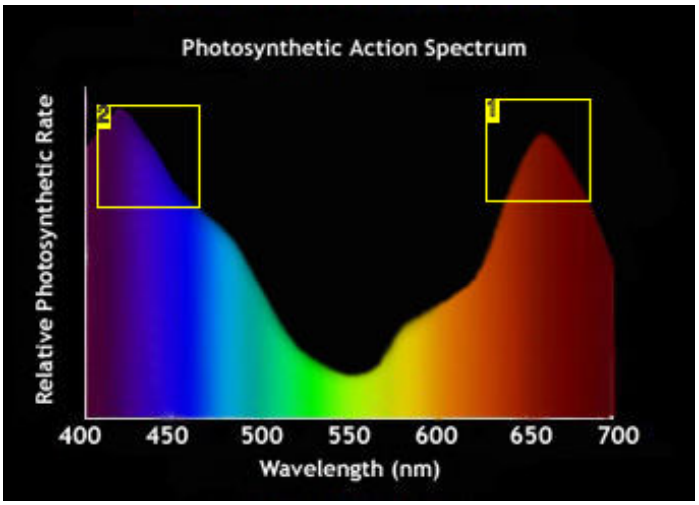
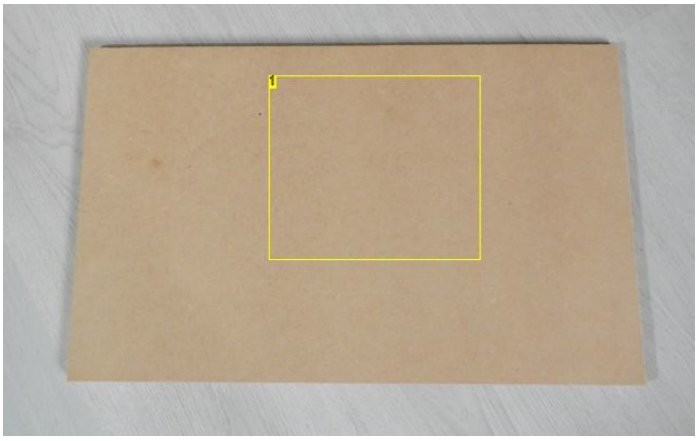


Image Notes
1. Far Red, +BLOOM
2. Blue, +Grow

Step 2: Panel & reflection.

The very basic solution is to cut the desired dimensions out of a fairly rigid but light material.
After that, cover the bottom side with aluminium tape.

You could add a down facing edge. Slightly improving light efficienty.



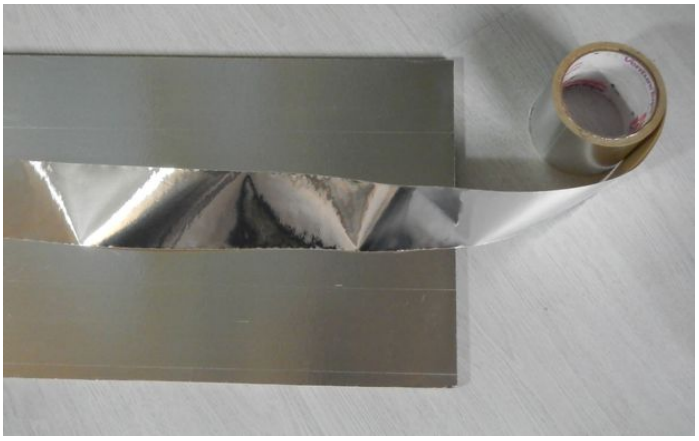


Image Notes
1. MDF, Mid-Density Fibre

Step 3: LED lay-out & installation.

Note: LED strips are cut on specific places. (for example, every 3 LED's)

As explained before, I made a small white square shape and a bigger oval shape of coloured LED's.
During the lay-out I kept a clearance of twice the width of the strips.
This way I can easily double the capacity and still have 1:2 width of clearance.

Use the knife to cut away the clear plastic on top of the solder points.
I also did NOT YET glue the solder ends. After soldering, we'll put some tape underneath for isolation.

My panel will only serve a small plant.
So I'm going for a bare minimum of lights and add some strips only if needed.

Next, drill a whole near the solder end of each strip.
... The cable goes through,
... solder solder*,
... tape between solder-point and panel,
... tape covering the solder point.
* The coloured strips need your +wire on the +12v point and your -wire connects the 3 remaining points, together.

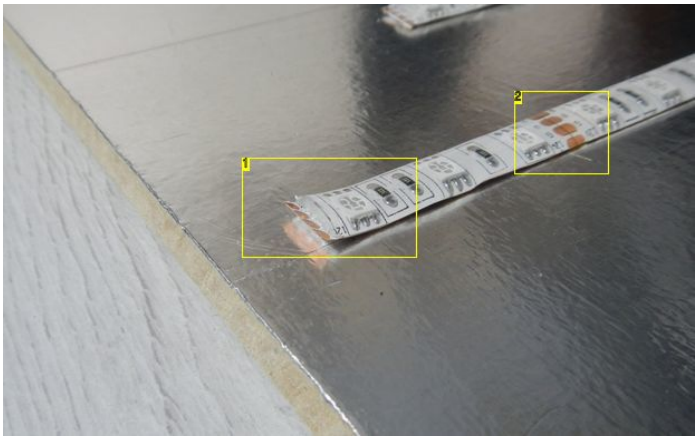
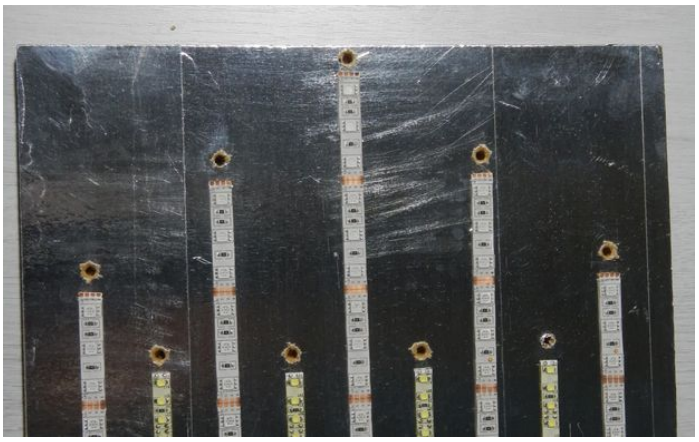


Image Notes
1. Don't glue down solder side.
2. Another CUT mark.



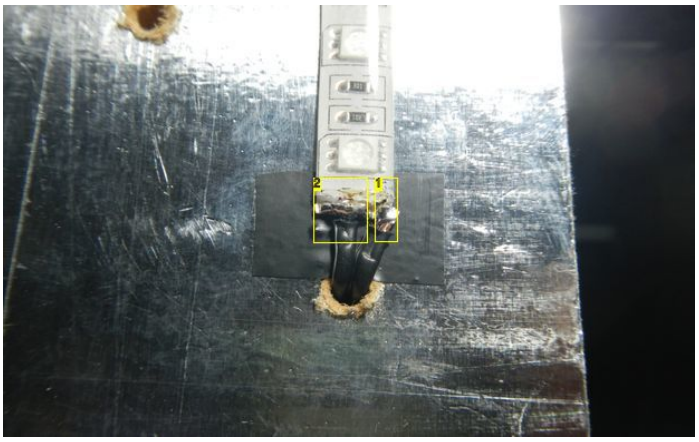
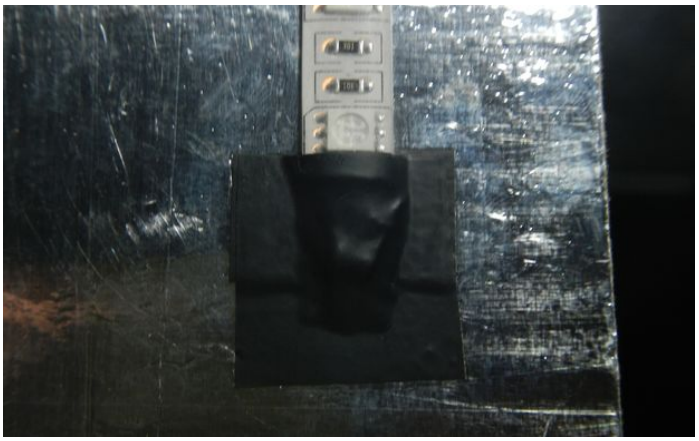


Image Notes
1. 1 positive connector pad.
2. 3 negative connector pads

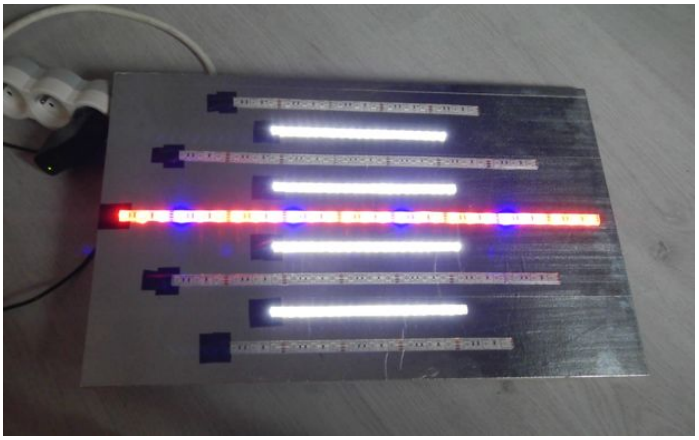


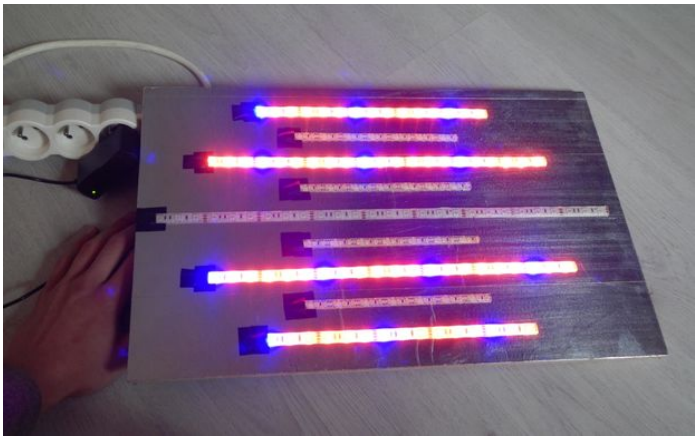
Step 4: Completing the circuit(s)

Although the pictures say otherwise, it's all pretty easy.
To combine the strips, just connect all **+**'s together and all **-**'s together. (parallel circuit)

I did this twice, creating 2 channels/ 3options:
- ALL WHITE + 1 REDnBLUE
- ALL WHITE + ALL REDnBLUE
- Only REDnBLUE

The connectors are very basic. But I already had them and free is always nice.
You could use just one connector and add a switch between the first and second channel.
I didn't bother because that switch will only be used every few weeks.





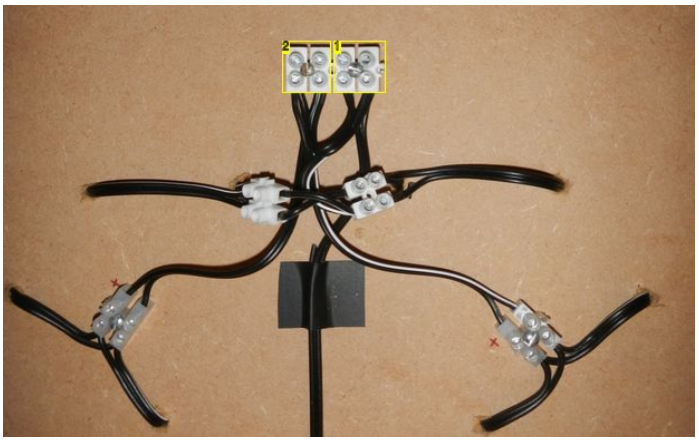


Image Notes
1. First channel
2. Second channel

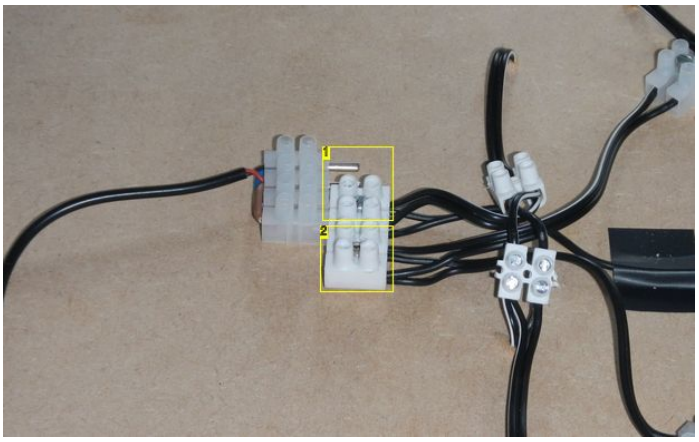


Image Notes
1. ALL White + 1RnB
2. 4x REDnBLUE

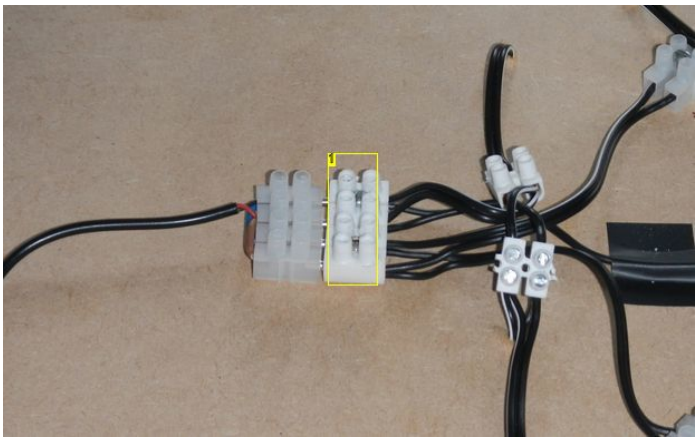


Image Notes
1. ALL lights ON

Step 5: Power supply

The most important part here is to **GO FOR MORE.**

In the .pdf you can check the precise calculation.
First I calculated the needed power for each "uncut piece" of LED strip. (each 3LED's)
After that, just sum up the "uncut pieces" and multiply by power for each piece.

In my case, it's only around 26Watts.
But, I may need to double in the future. So that would make 52Watts.

FOR SAFETY, only use a power supply for 90% capacity.
So I'll need a minimum power supply of 60Watts. (12Volt DC @ 5A)
Check: 60Watts -10% = 54Watts (> 52Watts needed)

I bought a power supply unit at TME
A very fast but more expensive retailer, compared to AliExpress

File Downloads

PilotPanel25W.pdf (27 KB)
[NOTE: When saving, if you see .tmp as the file ext, rename it to 'PilotPanel25W.pdf']

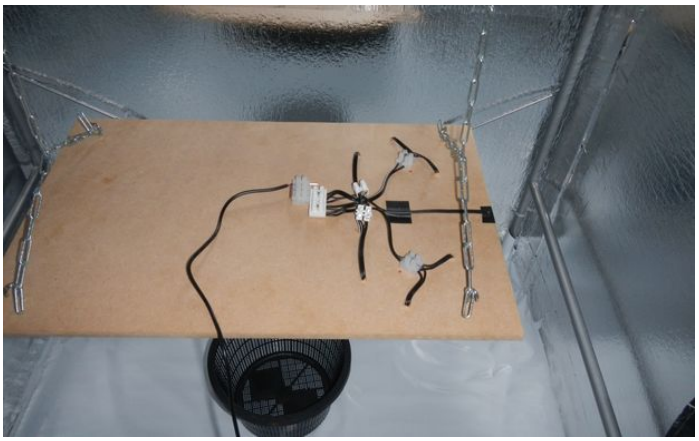
Step 6: Almost there...

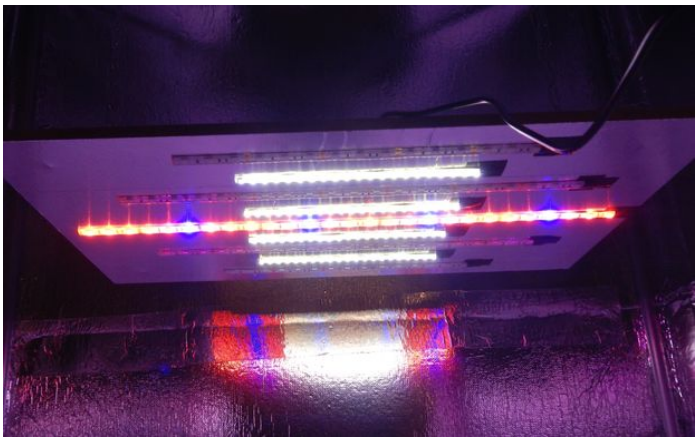
Last stop: How to hang the panel.
I used 4hooks coming together with 2chains.
This way it's cheap and easy to adjust the height.

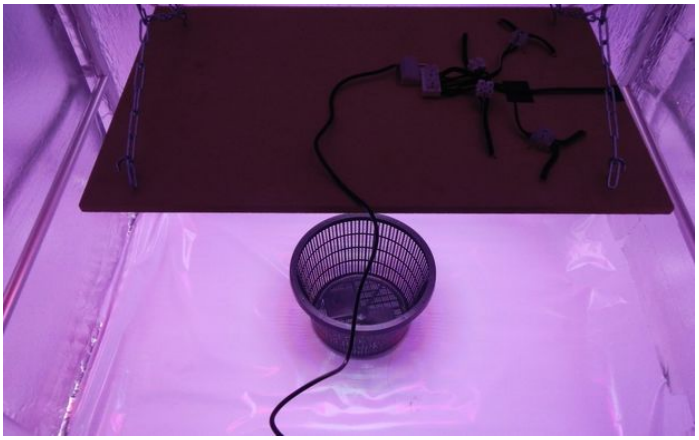
Because these LED strips barely heat up, the lamp can be very close to the plant without burning it.

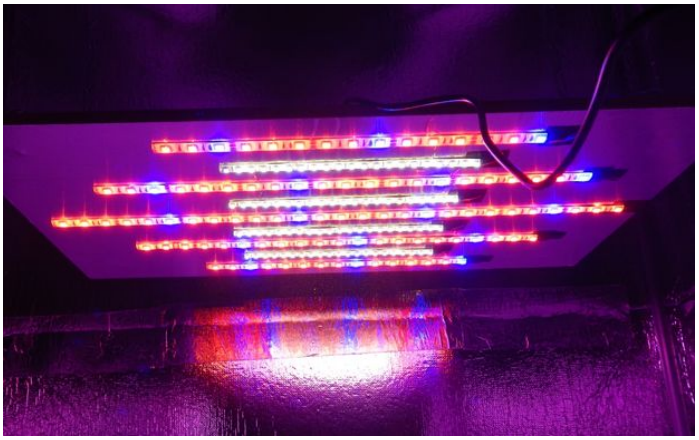
Now the experiment can start: Growing with the bare minimum of electricity.
In this micro-garden I'll also add a 140mm 12Vdc computer fan and an air purifier to suck in fresh air.
This totals to LESS THAN 70watts.
Even if the lights need to be doubled, it'll still be less than 100Watts.

Fingers crossed for the results....









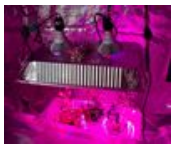
Related Instructables

Grow High Light Plants Indoors Without Hydroponics by Tom Hargrave

How to Garden! Basics by wereluva

How to Grow Vegetable Plants! by build52

by BerryF



$78 Grow light - Full-Spectrum, 22 Watts, No Heat by mart33n33

Gardening Tips Caring for Plumeria Plants and Frangipani Trees (video) by bobwalshplumerias

Comments

2 comments **Add Comment**

Nabiel says:
I like it. I think it would be great for side lighting. Try a par force bat wing for the top ;)

Nov 27, 2015. 12:05 PM **REPLY**

DIY Hacks and How Tos says:
Very cool project. Thanks for sharing.

Nov 27, 2015. 11:13 AM **REPLY**