

# **VORG**

## **build guide**



# **VORG BUILD GUIDE**

**Thank you very much for acquiring the Vorg DIY kit. This guide will walk you through the whole assembly process.**

**Before you start we recommend you to read the guide, specially the Notes that some of the steps have.**

**Since this is an SMD kit, you need to be very careful when you solder the components. Specially some of the small IC components since you can create bridges and not seen them with the naked eye. Using a magnifying glass or a microscope is highly recommended.**

## **Disclaimer**

**Remember that by purchasing a DIY kit you are responsible if your build fails. We cannot provide repair services for failed builds. The main reason is that, depending on the extent of the damage, the total cost you'll end up paying would be higher than buying the assembled module in the first place.**

**We want you to succeed. For that reason we tried to make this guide as detailed as possible. We also provide you the components organized to minimize the risk of mixing them up.**

# VORG BUILD GUIDE

## How to use this guide

This guide contains one page for each different component you are gonna place. The components are placed starting from the lower values. For example, 1k $\Omega$  resistors are placed before the 2k $\Omega$  resistors.

At every step we have highlighted with **RED** the locations where you need to place the components. The locations marked with **GREY** are the places where you should have already placed a component in a previous step.



Place a  
component  
here



You should  
have placed a  
component here  
in a previous step

# **VORG BUILD GUIDE**

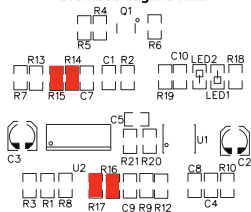
**We hope you enjoy building your own Vorg and if you like it share your results in social media.**

**Leonardo, Radost and Andrey**

# **ASSEMBLING THE MAIN BOARD**

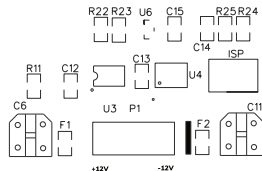
# VORG BUILD GUIDE

## Vult Vorg v1.1 Leonardo Laguna Ruiz



R26  
R27

U5



+12V -12V

Component: **Resistor**

Value: **220Ω**

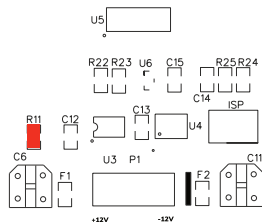
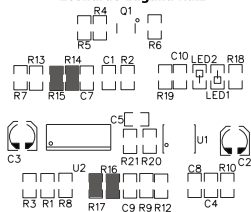
Quantity: **4**

Designators: **R15, R14, R17, R16**



# VORG BUILD GUIDE

## Vult Vorg v1.1 Leonardo Laguna Ruiz

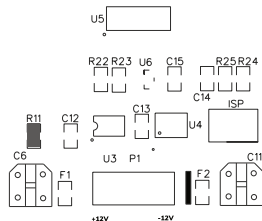
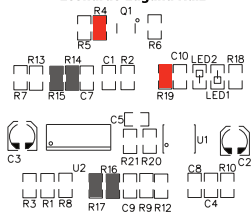


Component: **Resistor**  
Value: **1k $\Omega$**   
Quantity: **3**  
Designators: **R11, R26, R27**



# VORG BUILD GUIDE

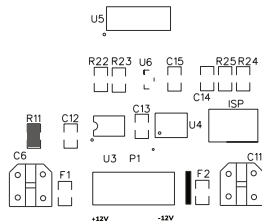
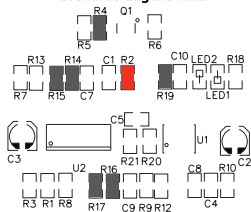
## Vult Vorg v1.1 Leonardo Laguna Ruiz



Component: **Resistor**  
Value: **1.8k $\Omega$**   
Quantity: **2**  
Designators: **R19, R4**

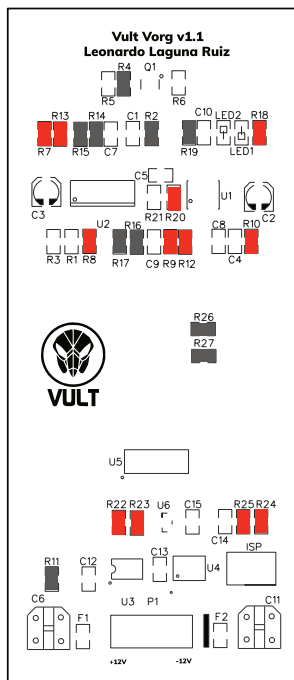
# VORG BUILD GUIDE

## Vult Vorg v1.1 Leonardo Laguna Ruiz



Component: **Resistor**  
Value: **4.7k $\Omega$**   
Quantity: **1**  
Designators: **R2**

# VORG BUILD GUIDE



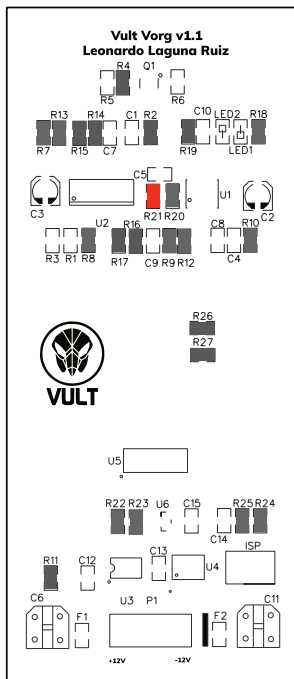
Component: **Resistor**

Value: **10kΩ**

Quantity: **12**

Designators: **R9, R12, R10, R18, R13, R7, R8, R20, R22, R23, R24, R25,**

# VORG BUILD GUIDE



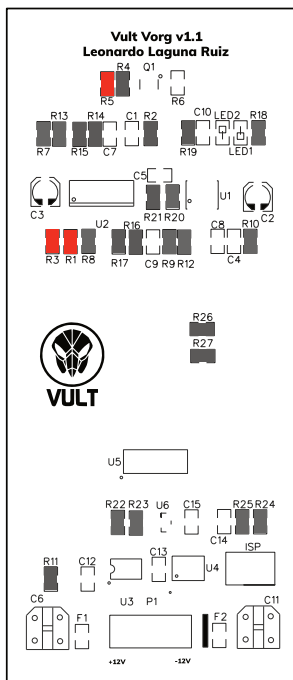
Component: **Resistor**

Value: **22kΩ**

Quantity: **1**

Designators: **R21**

# VORG BUILD GUIDE



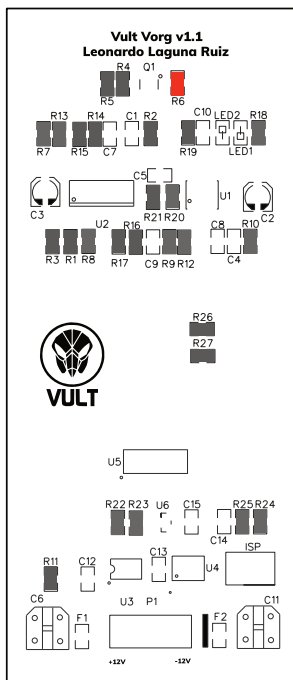
Component: **Resistor**

Value: **100k $\Omega$**

Quantity: **3**

Designators: **R1, R3, R5**

# VORG BUILD GUIDE



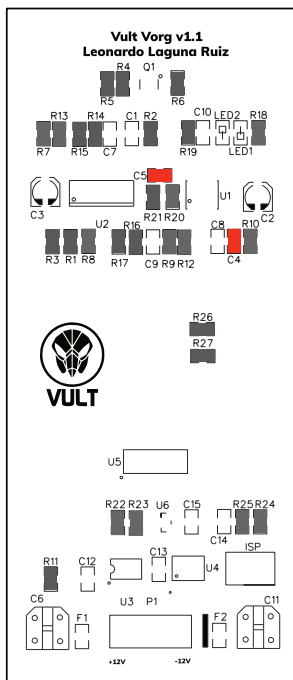
Component: **Resistor**

Value: **470k $\Omega$**

Quantity: **1**

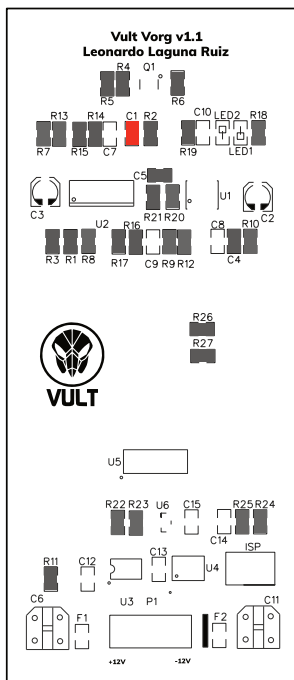
Designators: **R6**

# VORG BUILD GUIDE



Component: **Capacitor**  
Value: **1nF**  
Quantity: **2**  
Designators: **C4, C5**

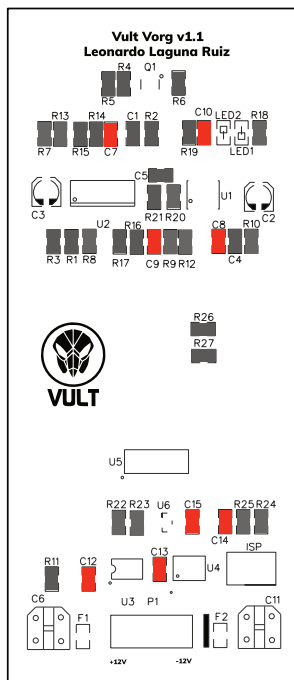
# VORG BUILD GUIDE



Component: **Capacitor**  
Value: **4.7nF**  
Quantity: **1**  
Designators: **C1**



# VORG BUILD GUIDE



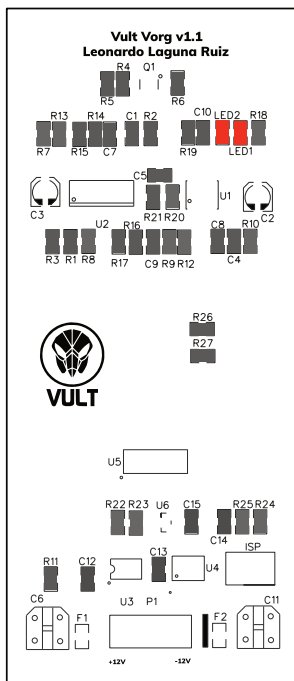
Component: **Capacitor**

Value: **100nF**

Quantity: **8**

Designators: **C7, C8, C9, C10, C12, C13, C14, C15**

# VORG BUILD GUIDE



Component: **LED**

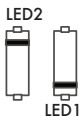
Value: -

Quantity: **2**

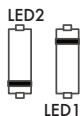
Designators: **LED1, LED2**

Notes: The LEDs must be placed inversely.  
The actual placement does not matter as long the marks are in the opposite side.

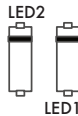
Look for the mark in the bottom of the LED.



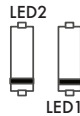
**OK**



**OK**



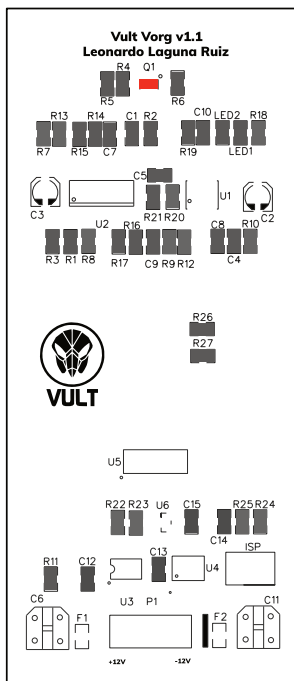
**ERROR**



**ERROR**



# VORG BUILD GUIDE



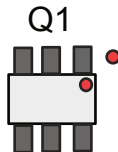
Component: **Transistor pair**

Value: **BCM857**

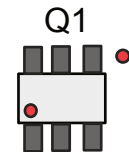
Quantity: **1**

Designators: **Q1**

Notes: Look for the mark in one of the corners of the package. Make sure it matches the orientation. The mark is tiny, you have to use a magnifying glass.

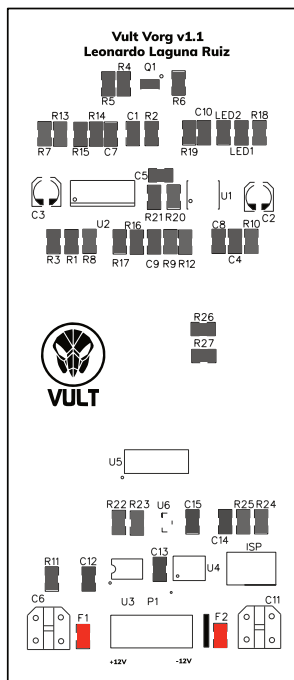


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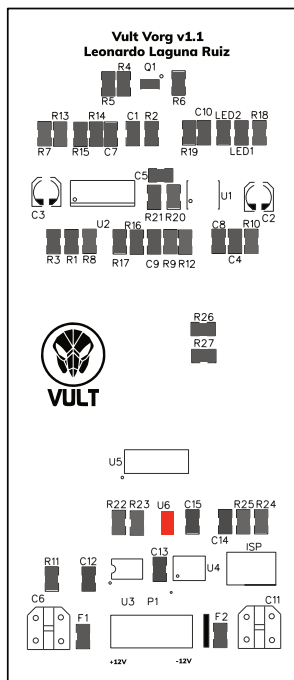
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# VORG BUILD GUIDE



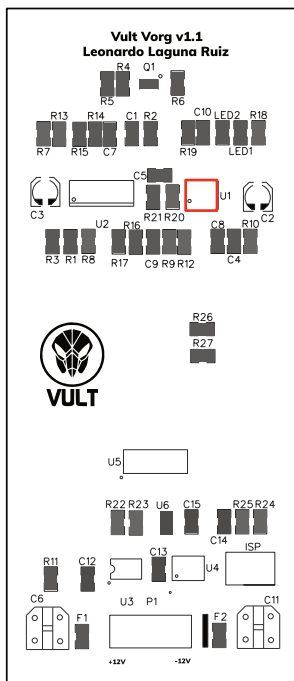
Component: **Ferrite**  
Value: -  
Quantity: **2**  
Designators: **F1, F2**

# VORG BUILD GUIDE



Component: **Regulator**  
Value: **TLV7605**  
Quantity: **1**  
Designators: **U6**

# VORG BUILD GUIDE



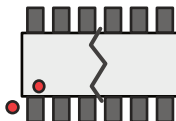
Component: **IC**

Value: **TL074**

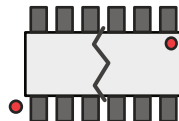
Quantity: **1**

Designators: **U1**

Notes: Double check the orientation. Look for the mark in the IC package

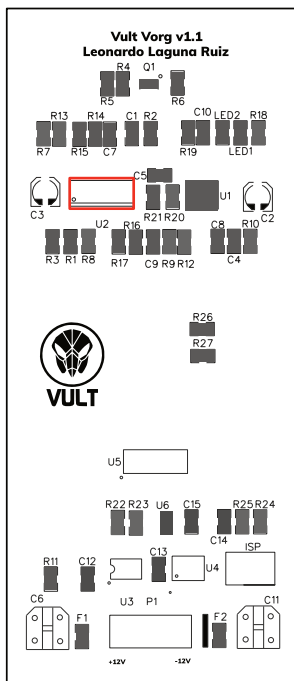


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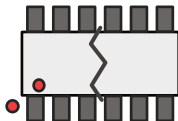
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# VORG BUILD GUIDE

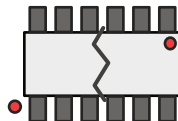


Component: **IC**  
Value: **LM13700**  
Quantity: **1**  
Designators: **U2**

Notes: Double check the orientation. Look for the mark in the IC package

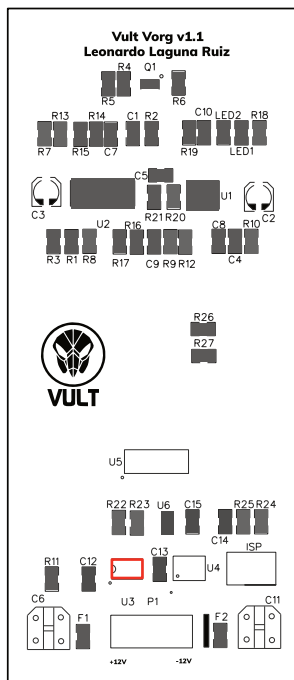


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**ERROR**

# VORG BUILD GUIDE



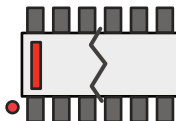
Component: **IC**

Value: **TL072**

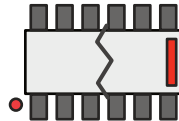
Quantity: **1**

Designators: **U3**

Notes: Double check the orientation. Look for the mark in the IC package



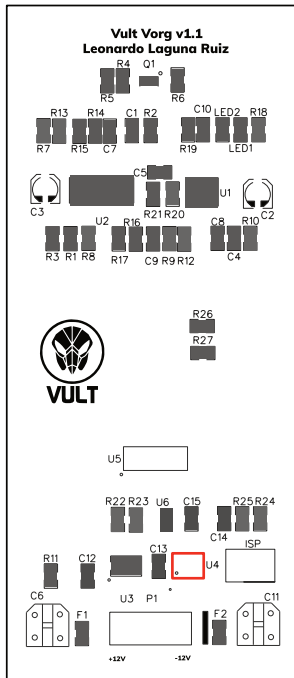
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**ERROR**

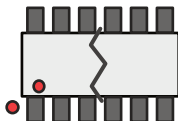


# VORG BUILD GUIDE

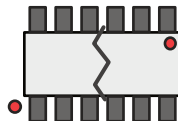


Component: **IC**  
Value: **ATTINY85**  
Quantity: **1**  
Designators: **U4**

Notes: Double check the orientation. Look for the mark in the IC package

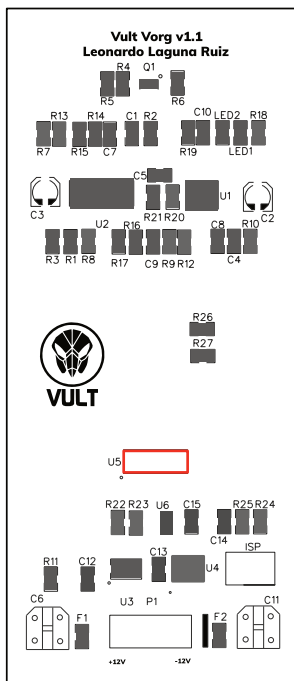


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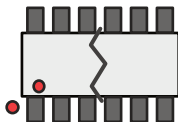
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# VORG BUILD GUIDE

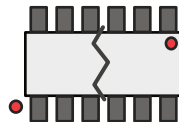


Component: **IC**  
Value: **DG403**  
Quantity: **1**  
Designators: **U4**

Notes: Double check the orientation. Look for the mark in the IC package

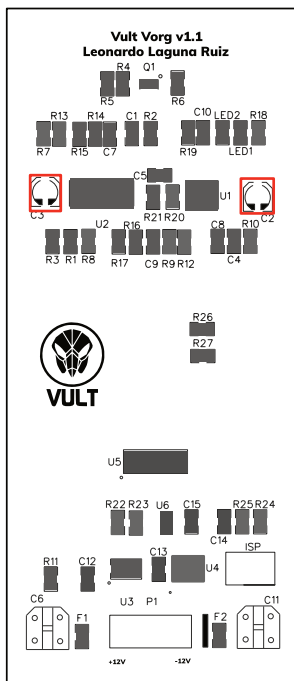


**OK**



**ERROR**

# VORG BUILD GUIDE



Component: **Capacitor (Polarized)**

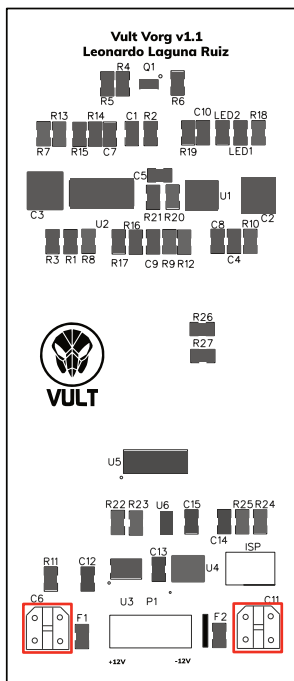
Value: **10uF**

Quantity: **2**

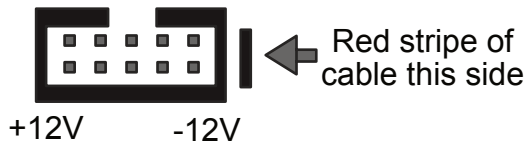
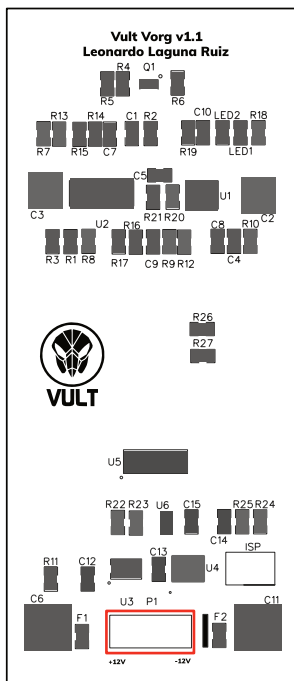
Designators: **C2, C3**

Notes: These capacitors are polarized  
make sure they point in the direction marked  
in the silkscreen.

# VORG BUILD GUIDE



# VORG BUILD GUIDE



## **VORG BUILD GUIDE**

**This is a good moment to check your board. Use a magnifying glass or microscope to check that all the IC terminals are soldered and there are no bridges between the pins.**

**Use a multimeter to measure the resistance between +12V and ground and also from ground to -12V. The readings should be over the hundreds of kilo ohms. If you have a low resistance, you may have a short circuit.**

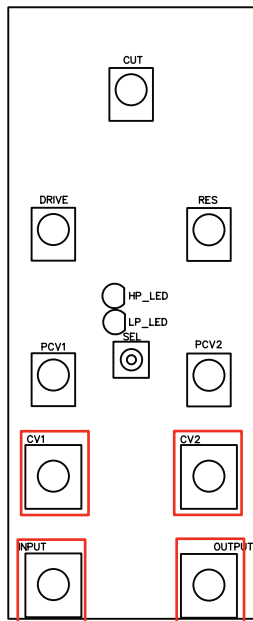
# **ASSEMBLING THE FRONT SIDE**

## **VORG BUILD GUIDE**

**To assemble the front side, we recommend you to first place all components then place the panel. Once you have everything in place solder the components.**



# VORG BUILD GUIDE



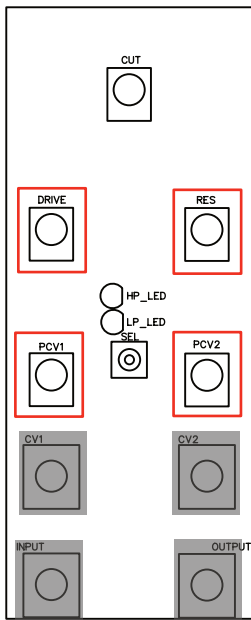
Component: **Jacks**

Value: -

Quantity: **4**

Notes: Make sure the jacks are correctly  
Placed before soldering.

# VORG BUILD GUIDE



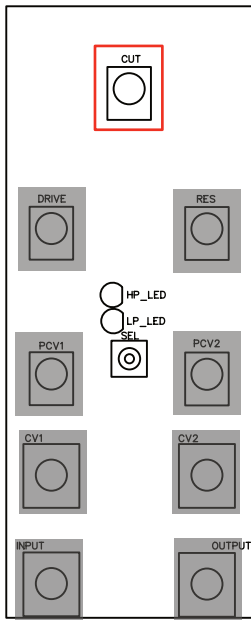
Component: **Potentiometers**

Value: **B100k $\Omega$**

Quantity: **4**

Notes: Make sure the potentiometers have gone completely through the holes and are aligned. Before soldering, check that the potentiometers can be turned without friction with the panel in place.

# VORG BUILD GUIDE



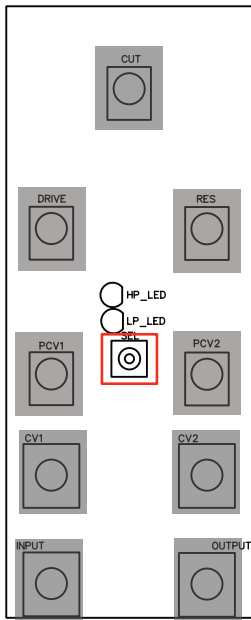
Component: **Potentiometers**

Value: **B50k $\Omega$**

Quantity: **1**

Notes: Make sure the potentiometers have gone completely through the holes and are aligned. Before soldering, check that the potentiometers can be turned without friction with the panel in place.

# VORG BUILD GUIDE



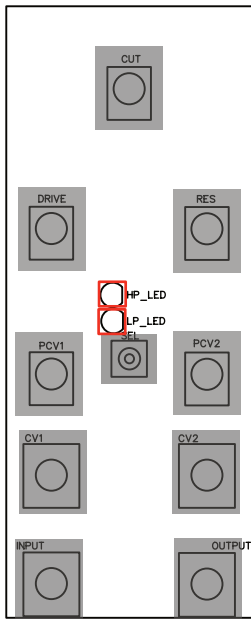
Component: **Push Button + Cap**

Value: -

Quantity: **1**

Notes: Place the switch cap before the putting the panel for the last time.

# VORG BUILD GUIDE



Component: **Red LEDs**

Value: -

Quantity: **2**

Notes: The LEDs have a direction. Make sure the flat side of the LED points in the correct direction.

Before soldering, make the LEDs go through the panel.



OK



ERROR

# **VORG BUILD GUIDE**

## **Final Steps**

**One more time, check that you don't have any bridges between the component pins. Look carefully. All ICs are critical.**

**Make sure that you don't connect the cable backwards. Connecting it backwards will break the module. Make sure the red stripe of your cable has -12 volts.**

**If you think that everything is correct, then power your module.**