

Manual Claplight MKII kit.



A project of the Service Kring JOTA-JOTI.

Do you like Claplight MKII, you have great ideas? Tell us, please read the last page how.



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Remarks

Unlike previous years, all the documentation around the kit included in one big document . This is , apart from the construction description , also to have all the background information and other information together.

To the guidance, in soldering, we want to advise you to read this entire document before carefully. It is sufficient to print only pages 6 and 7 for the purpose of building it. During construction, it can be easy, as a quick reference, to have page 8 also on hand.

TIP: To build one kit yourselves before the JOTA-is besides fun also educational:



It turns out, and we are very pleased with that, the solder activities are not only limited to the JOTA-JOTI minded people, but also on group –weekends, international camps and schools activity's soldering is practiced. Because of the continuing demand for the Claplight and simple electronics kits we facelifted the famous and popular Claplight 2009 whit a new look.

The Claplight MKII:

Broadly Claplight MKII is similar with the version from 2009 but with some extra features. The build-up is also changed completely so that mounting is made easier and more universal. We will come back to that later. The LEDs used are also replaced by larger ones.

Usage

As we were accustomed to the old version is to turn the MKII by clapping or tapping the board, whistles ore any random sounds, in the MKII sensitivity can be adjusted, and this is convenient when the entire circuit is built in somewhere. We can also choose the MKII to switch off the LEDs after a fixed time or switch them off with any infrared remote control.

Have fun with the construction and use of the Claplight MKII!





Content of the package:

The table below can be used to check the contents of the kit . Solder , and a 9 volt battery must be added by yourselves

| Component | Value | Qty | Pos. on board | Remarks | |
|--------------|-----------|-----|-----------------|------------------------------|--|
| Resistor | 10 ΚΩ | 4 | R1, R3, R8, R14 | brown, black, orange, gold | |
| Resistor | 270 ΚΩ | 2 | R2, R11 | red, purple, yellow, gold | |
| Resistor | 39 ΚΩ | 2 | R4, R6 | orange, white, orange, gold | |
| Resistor | 1 ΚΩ | 3 | R7, R9, R10 | brown, black, red, gold | |
| Resistor | 330 Ω | 2 | R12, R13 | orange, orange, brown, gold | |
| Potmeter | 100 ΚΩ | 1 | R5 | trimmer | |
| Capacitor | 100 μF | 1 | C1 | black, Mind the polarity, | |
| Capacitor | 100 nF | 4 | C2, C3, C4, C5 | yellow, marked 104 | |
| Zenerdiode | 4V7 | 1 | D1 | Mind the polarity | |
| 150 | white, 10 | 2 | D2 D2 | Mind the male site. | |
| LED | mm | 2 | D2, D3 | Mind the polarity | |
| Transistor | 2N3906 | 2 | Q1, Q2 | Mind the correct seating | |
| IC feet | 8 pins | 1 | U2 | Mind the Notch | |
| | | | | Kind of transistor with bold | |
| IC | TSOP58238 | 1 | U1 | side | |
| IC | NE555 | 1 | U2 | Mind the Notch | |
| Switch | 2 ways | 1 | S1 | | |
| Microphone | | 1 | MK1 | Mind the correct seating | |
| Battery clip | 9 Volt | 1 | | see Description | |
| Board | | 1 | | | |



Component Numbering and component values:

| Board txt | Component | Board txt | Component |
|-----------|----------------|-------------|----------------|
| | | | 4V7 emitter- |
| R1 | 10 ΚΩ | D1 | diode |
| R2 | 270 ΚΩ | | |
| R3 | 10 ΚΩ | D2 | LED white |
| R4 | 39 ΚΩ | D3 | LED white |
| R5 | 100 KΩ trimmer | | |
| R6 | 39 ΚΩ | Q1 | 2N3906 |
| R7 | 1 ΚΩ | Q2 | 2N3906 |
| R8 | 10 ΚΩ | | |
| R9 | 1 ΚΩ | U1 | 8 pins IC-feet |
| R10 | 1 ΚΩ | | |
| R11 | 270 ΚΩ | U1 | TSOP58238 |
| R12 | 330 Ω | U2 | NE555 |
| R13 | 330 Ω | | |
| R14 | 10 ΚΩ | S1 | Switch |
| | | | |
| C1 | 100 μF | MK1 | microphone |
| C2 | 100 nF | | |
| C3 | 100 nF | Diversen: | |
| C4 | 100 nF | Batteryclip | |
| C5 | 100 nF | | |





Construction description of the Claplight MKII:

It is easiest to assemble the components of low to high. All resistors should be mounted lying down. For this purpose bend the two wires at an angle of 90 degrees, taking into account the distance between the holes on the PCB. Insert the resistance through the board wholes and bend the wires on the copper side of the print gently slightly apart. The print can now be turned to solder without the resistor or diode falls out. Cut of the legs of the resistance after soldering just above the soldering, do the same for all other components with longer legs such as capacitors and LEDs.



Tip 1: The beads may be coloured at the beginning of the line in order to indicate which components are already mounted.

Tip 2: When in doubt about the installation of a component look twice at the picture of the accumulated print, once soldered incorrectly repair can be tricky.

Tip 3: for the Resistors a components bending mold can be helpfull.

Mounting Sequence

Successively assemble the following Resistors:

R1, R3, R8, R14: 10 KΩ (brown, black, orange, gold)
 R2, R11: 270 KΩ (red, purple, yellow, gold)
 R4, R6: 39 KΩ (orange, white, orange, gold)
 R7, R9, R10: 1 KΩ (brown, black, red, gold)
 R12, R13: 330 Ω (orange, orange, brown, gold)



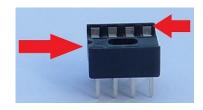
Mount diode D1.

NOTE: it can be mounted only in one way, shown in the drawing on the PCB. The black line on the diode must match the black stripe on the PCB.

o Mount IC-voet U1.

Make sure it's closely mounted against the PCB.

WATCH FOR: in one of the ends of the IC sockets is a notch, this should match the drawing on the board. Make sure all pins stabbing right through the PCB before you solder, at the top level all connections must be aligned and in line.



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Install microphone MK1, this look closely at the drawing on the board.
 The microphone should fit nicely in the circle on the board
 Mount the following Capacitors.

- o C2, C3, C4, C5: 100 nF (yellow, marking 104)
- Mount transistor Q1 en Q2.

Carefully bend the middle leg back slightly so that the transistor matches the print...

- o Mount Switch S1.
- o Mount the infrared sensor, U2.

The convex side of the sensor is on the outside of the circuit, this is the side that receives infrared light. See drawing on the PCB. To raise the sensitivity the sensor can be bend backwards slightly.

- o Mount the trimmer, R5.
- Mount the electrolytic Capacitor C1.

Note: The long leg of this is the plus and enters the hole in the + symbol on the board. The min (indicated by a dashed white) thus comes to the outside of the print at the - symbol

Mount both LED's, D2 en D3.

Note: The LEDs have a short and a long leg. The long leg is marked in the hole A(Anode), the short notice in the hole with C(Cathode).

Note: in one of the end faces of the IC is a notch (groove), this must match the pattern on the print and the notch in the previously-mounted IC socket.

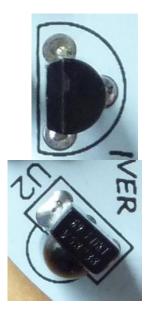
- o The board now has all the parts, but we are not quite ready.
- Under U1 are on the outside of the second printing surfaces with the RESET headed there on.
 Provide some solder on these points so touching it later will become easier.
- Place a link on the bottom to adjust the sensitivity.
 Connect before the middle patch to patch Hi or Lo pad (see page 8). In most cases, a connection will work with Hi.
- Mount the Battery clip.

So, insert the wires from below through the print over and then into the holes. Solder the wires.

Then pull the wires back, the red wire is connected to the + and black wire to the -. See the pictures.

Additionally the wires can enter first true the whole in the middel of + and – from top to down







The use and adjustment of the Claplight MKII:

Set Sensitivity Range:

At the bottom of the print we see 3 patches accompanied **Hi** and **Lo**. This is to establish how much noise needs the Claplight MKII to face. If there is established a connection between the center pad and the **Hi** Claplight MKII is set to the most sensitive range. In most cases, this connection will be sufficient for all purposes. **Hi** stands for High sensitivity and **Lo** stands for Low sensitivity.

Operation:

The Claplight MKII can be switched by, e.g. clapping the hands, when installed in a glass yar, or also by e.g. by tapping the jar. The Claplight MKII can be disabled with any infrared remote control. Point it at the board and press a button, the Claplight MKII will go off. An old remote, if you do not have one, are sometimes found at a recycle store.

The Switch can be selected on the PCB and the Claplight MKII is also automatically turned off. If the switch is in the ON position, the Claplight MKII is automatically turned off after about 45 to 50 seconds. Switching off with a remote control will always work too.

Adjustment of the sensitivity:

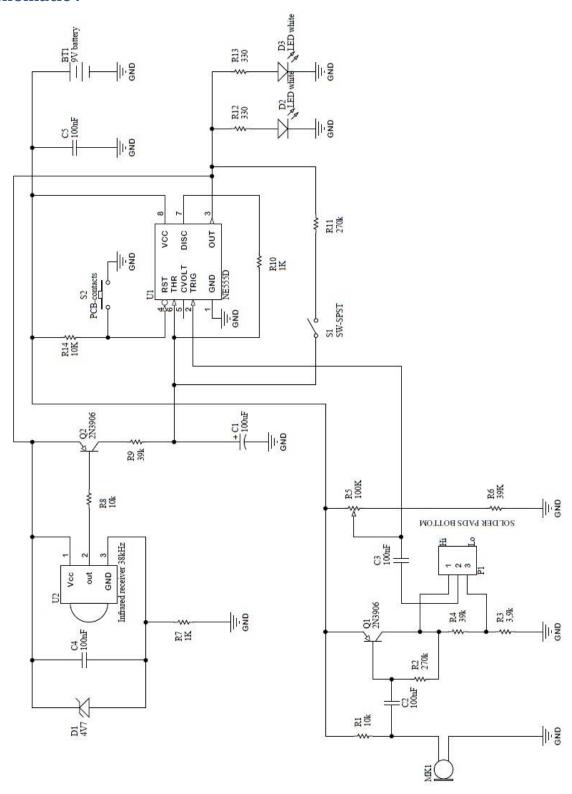
The adjustment is best done by R5 potentiometer with a small screwdriver to turn completely counter clock side. If the Battery connected, the potentiometer can gently rotate clockwise. At some point the lights of the LEDs start burning, this is the point just past the maximum sensitivity. Turn then the potentiometer a little bit back. The LEDs can be switched off with a remote control or by the RESET points next R5 as, for example, to close circuit them briefly with a screwdriver. Now check that the LEDs come on when clapping hands, now control the sensitivity to desired

Usage:

The Claplight MKII can be used in various ways. Therefore the 9 Volt Battery can be attached to both sides of the PCB. Do the connections of the Battery, from above or from below, through the print and snap the Battery Clip it on. The Claplight MKII can be put down, as table light, are serve as, for example, automatic tent illumination. In the print are holes where you can string a rope through it to hang on the board. In order to make it waterproof, the Claplight MKII can also be incorporated into, for example, a glass jar of jam, frozen food box or translucent Christmas ball.



Schematic:





Component assembly and solder side:





Complete ready build board:





Soldering with children:

There are at soldering with children some pitfalls imaginable, by avoiding this, it is likely that the new little project is successfully completed.

The following items we see in the field:

- The making of the soldered connection takes (much) too long, a good soldered connection is made in about 3 seconds. Approximately 1.5 seconds for pre-heat (with a little solder to the tip for good heat conduction), attach solder, solder and remove the soldering iron. Children do not have this skill yet and the materials are heated for too long and thus too hot.
- Children often tend to put solder on the soldering iron and then "stick" the solder on the board, the flux is already burning and poor soldering is the result. In an attempt to get it right, the solder connection heats up too long, causing component failures etc..
- Temperature-controlled soldering irons are set at too high a temperature, for leaded solder around 320° C is a good temperature for soldering.
- NON-controlled soldering irons often have to high power, and the pin temperature can reach 450 500 °C. A iron with a power of about 15 to 20 W is for this purpose the most suitable.
- The assistant has previously not read the manual and do not know exactly what to do.
- There is too little guidance in relation to the number of participants. Certainly the youngest children, many need much guidance. A directive is to go aim for one attendant on one beaver, with cubs / gnomes one supervisor per soldering (2 scout members per soldering station). With older Scouts go for one supervisor on four members. As the members are more experienced this can be adjusted of course.
- It is advisable to have besides the solder guidance, one supervisor who controls the PCB with components build on it and (if applicable) places the IC's ect. This trouble-shooter can also look at mail functional PCB that do not work right away.

Feedback:

Do you have comments or would like to give you feedback about the Claplight? Do you have comments or questions about the Service Kring JOTA-JOTI? Please contact us via the contact form on the site www.kitbuilding.org

On behalf of the Service Kring JOTA-JOTI, we wish everyone a lot of fun building but also enjoy the Claplight MKII