EP ASSIGNMENT

TEAM -14

WIRELESS MOBILE CHARGER

SOURCE FILE:

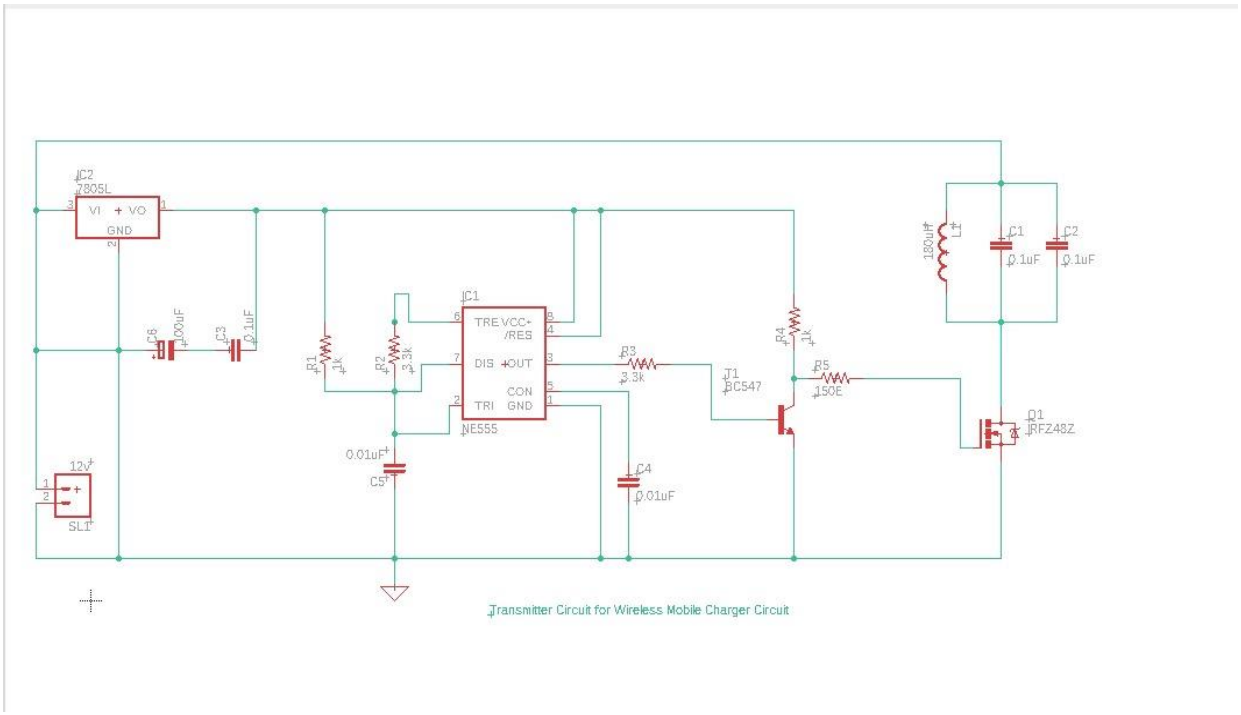
https://bestengineeringprojects.com/wireless-mobile-charger-circuit-diagram/

TRANSMITTER CIRCUIT FOR WIRELESS MOBILE CHARGER CIRCUIT:

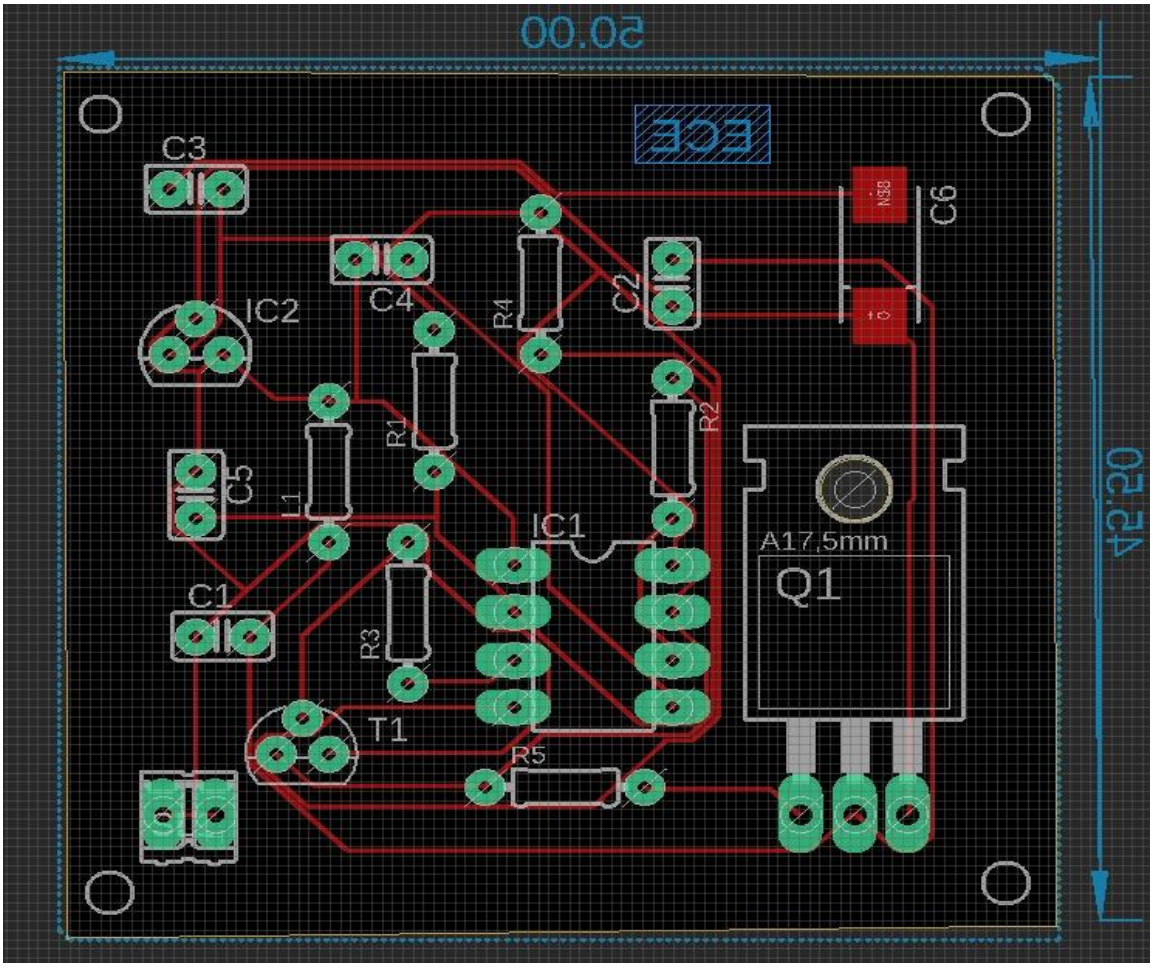
The transmitter circuit of the Wireless Mobile Charger Circuit Diagram is shown in figure 1 and is built around timer IC 555, a general-purpose NPN transistor BC547, N-channel MOSFET IRFZ44, LC-tuned circuit, and a 5-volt series voltage regulator 7805.
a tuned collector oscillator (L1 with C1 and C2). The tuned collector oscillator uses a parallel L-C circuit in the collector circuit as the load and this circuit determines the frequency of oscillation. The output voltage developed across the tuned circuit is inductively coupled to the base circuit. Timer IC 555 is used here for pulse generation thus it is arranged in astable multivibrator mode. The output of IC 555 (pin 3) is connected to the base of the general-purpose transistor T1 which is used to drive the MOSFET T2. The MOSFET T2 is used to switch the L-C tuned circuit which further transmits the oscillating magnetic field.

Series voltage regulator IC2 is used to provide operating voltage for the entire circuit (+5V) from +12V

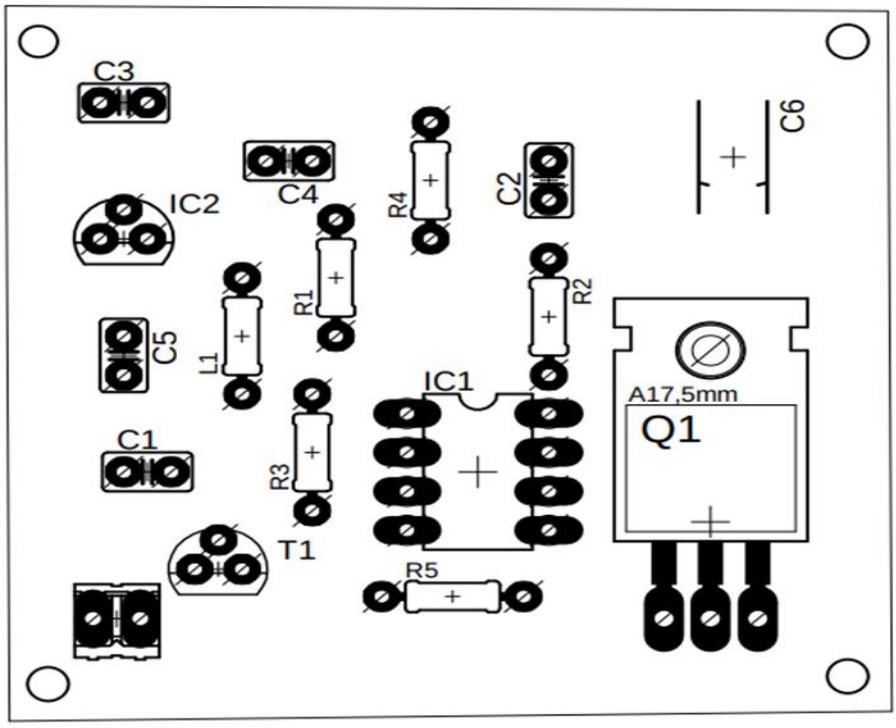
SNAP OF THE SCHEMATIC DIAGRAM:



SNAP OF THE PCB BOARD:

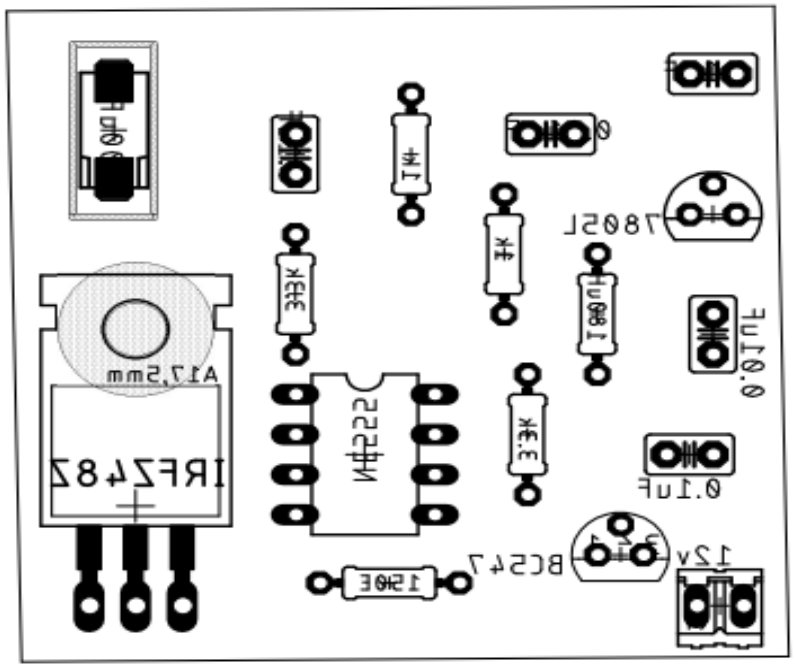


SNAP OF THE HOLES (which were made for package):



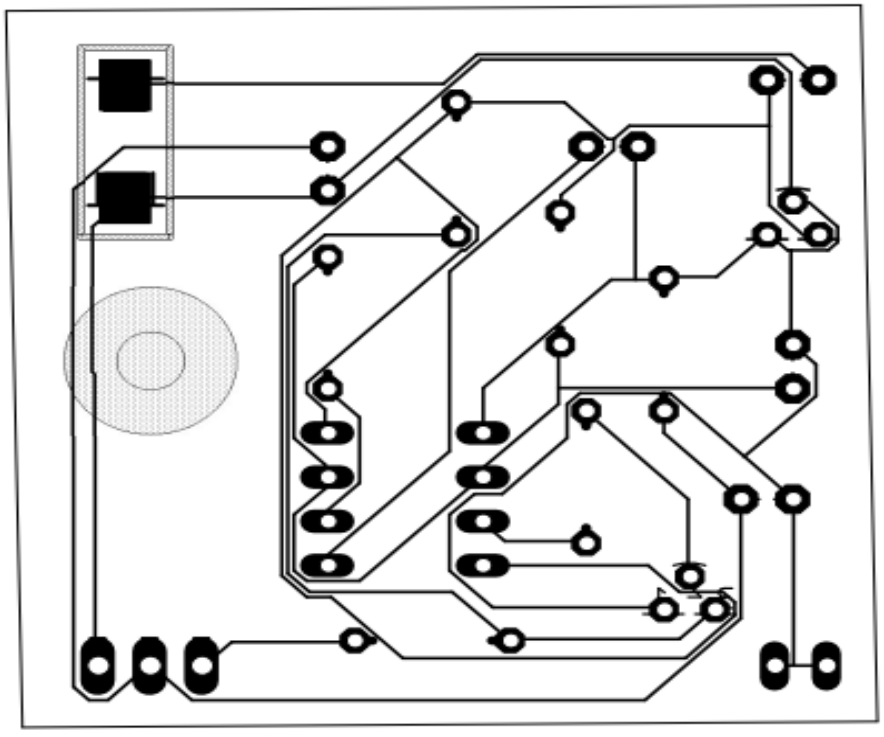
The holes are made to encapsulate the PCB

SNAP OF THE PCB COMPONENTS:



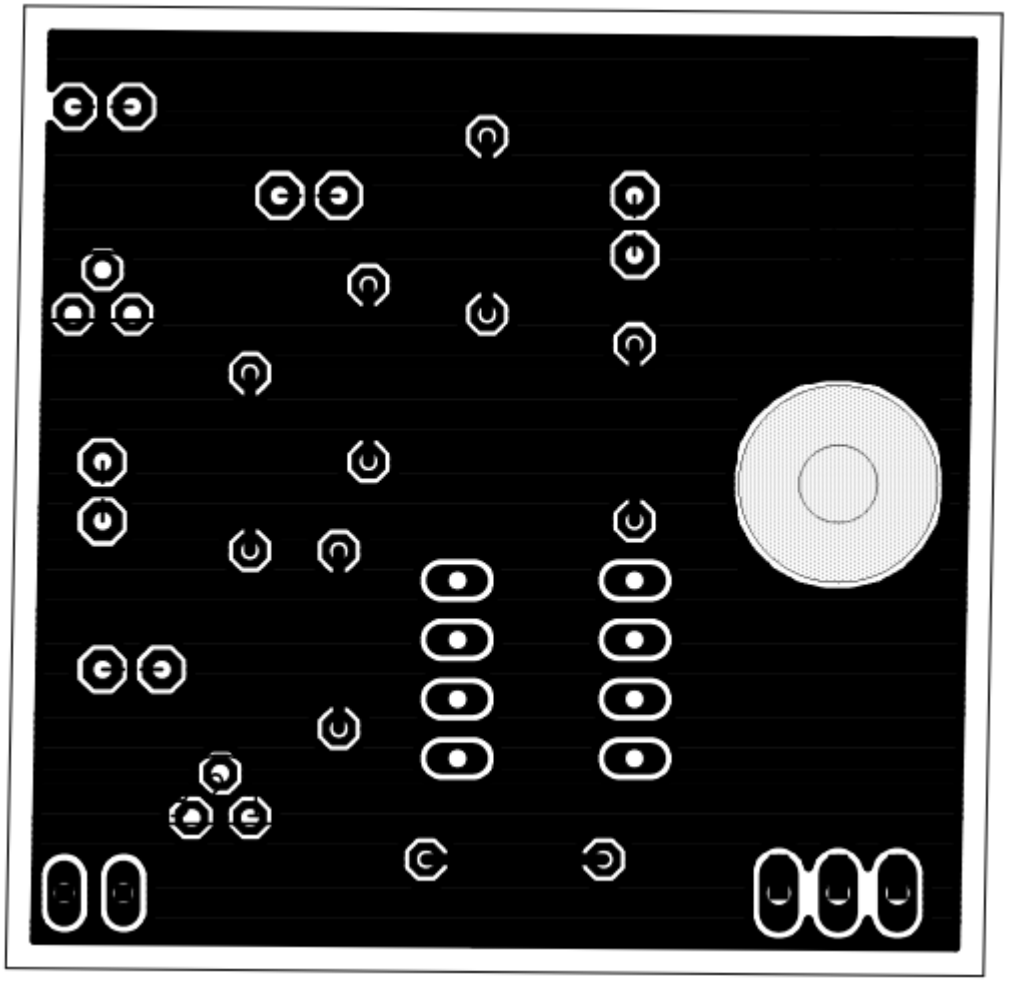
The components place on the PCB board

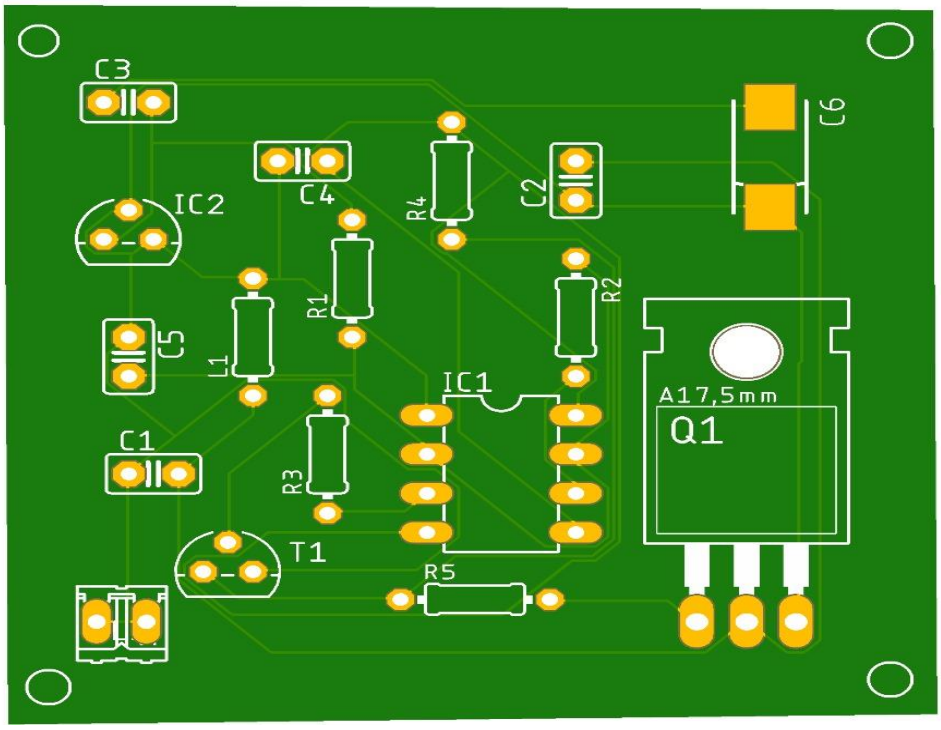
SNAP OF THE TRACES :



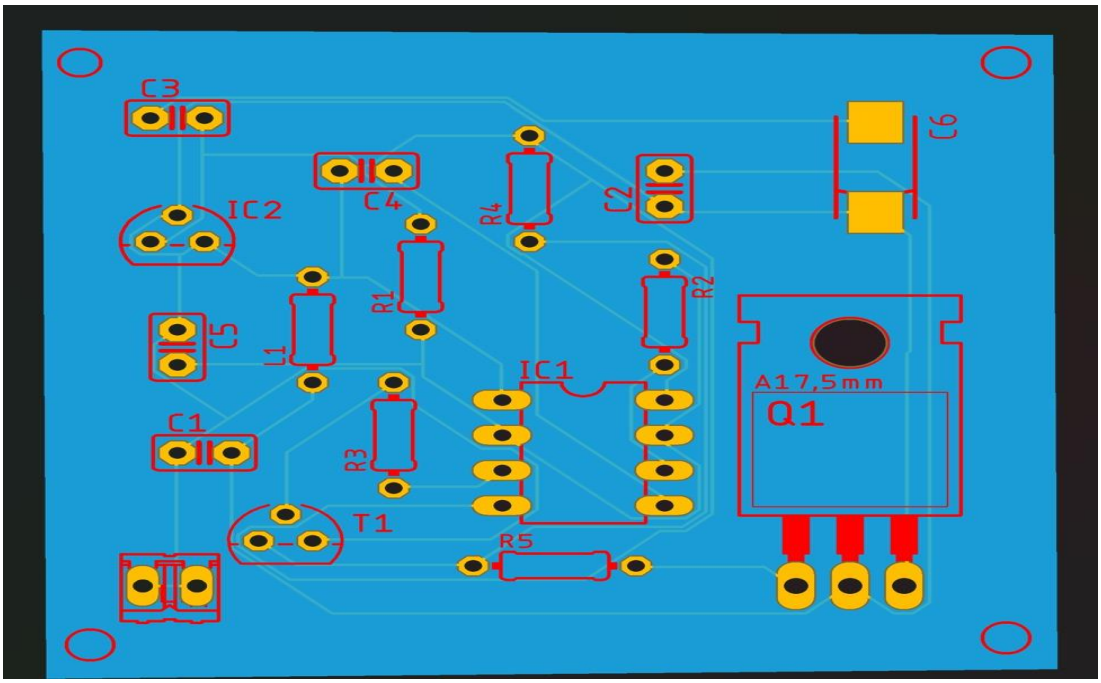
TRACES OR TRACK which used for making the interconnection

SNAP OF THE COPPER FILL: (Solder mask or solder resist)

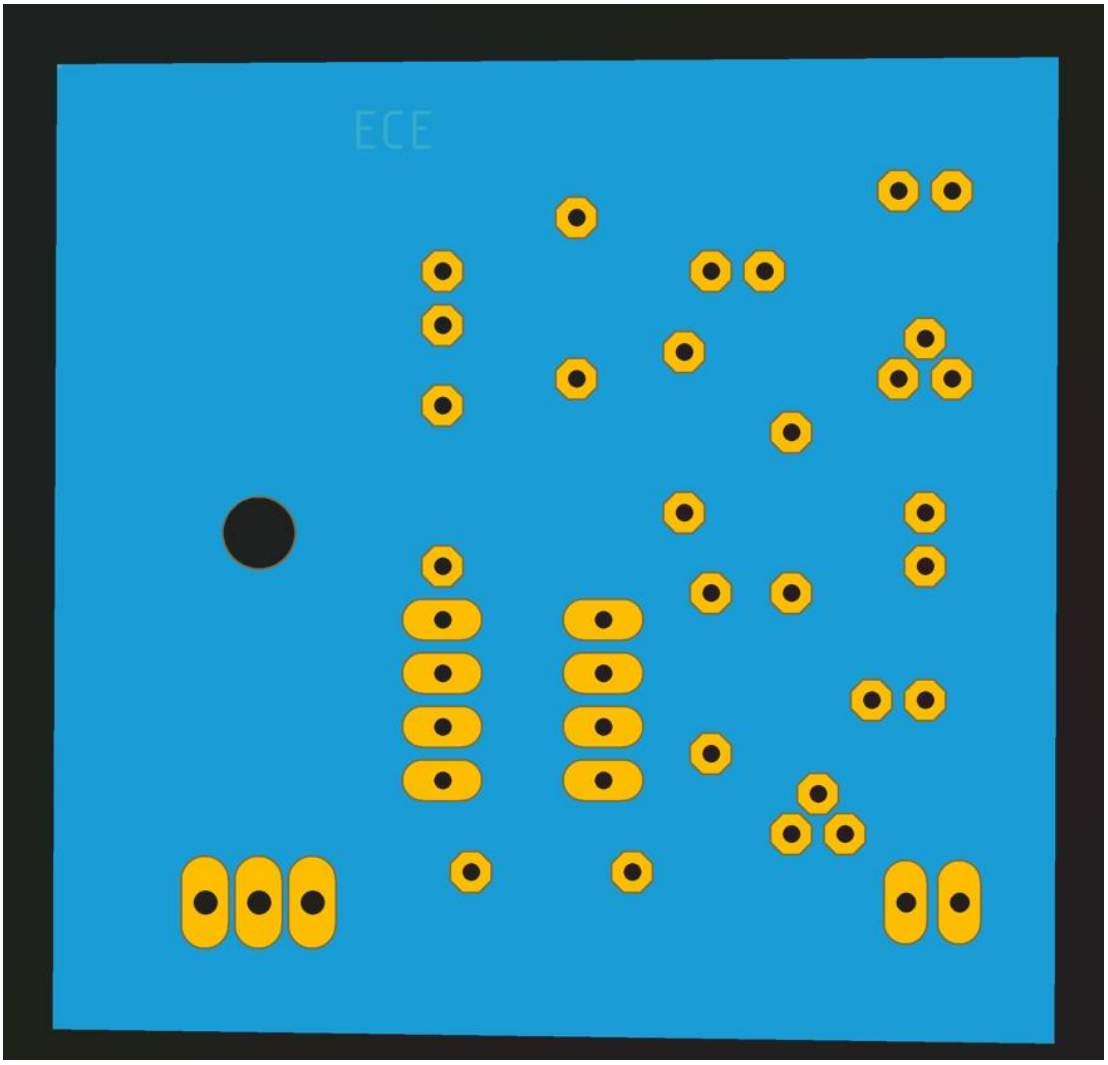


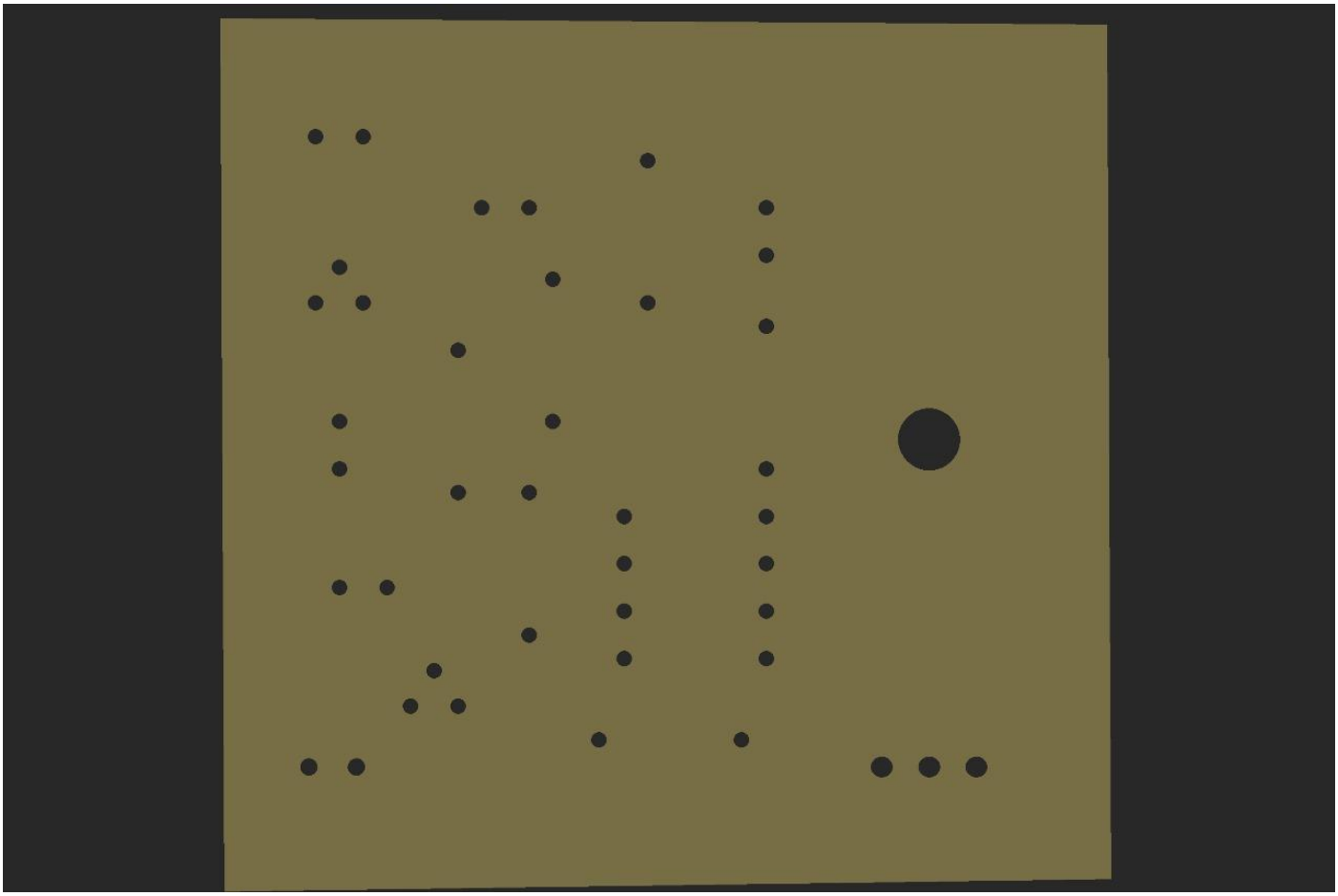


WE TRIED TO MODIFY THE COLOUR OF THE SOILDER MASK

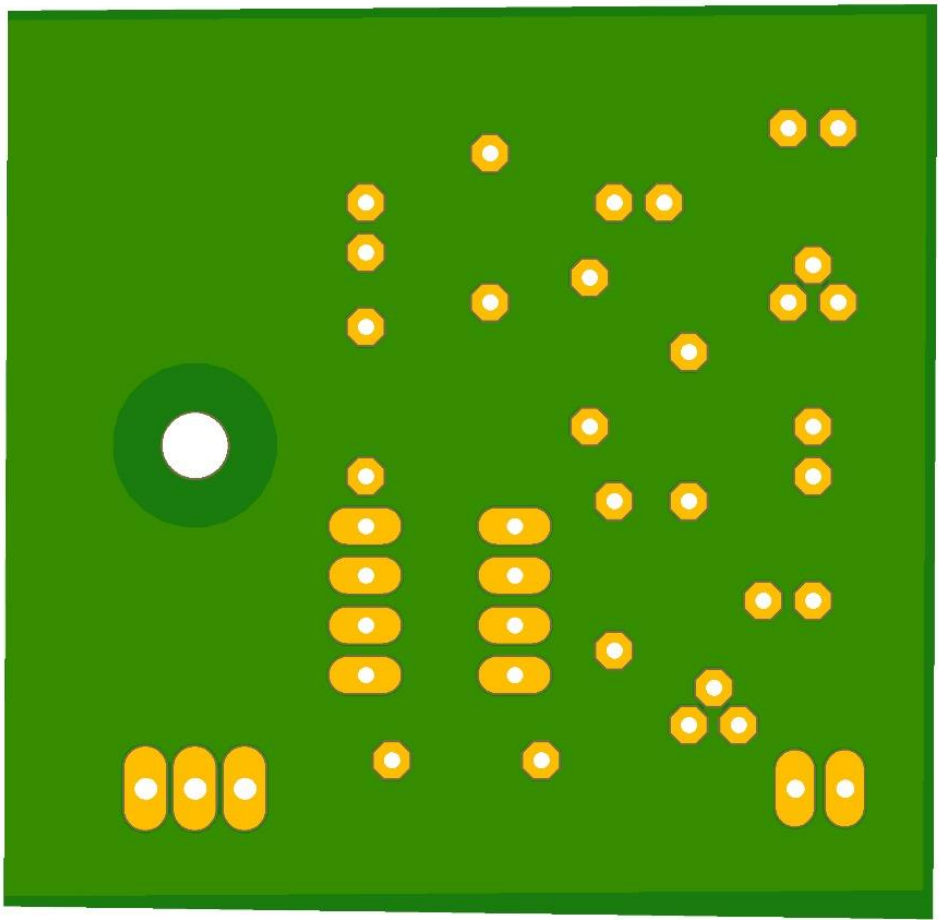


BLUE IS SOILDER MASK, RED IS SILK SCREEN, YELLOW IS COPPER ,WHITE IS TRACES



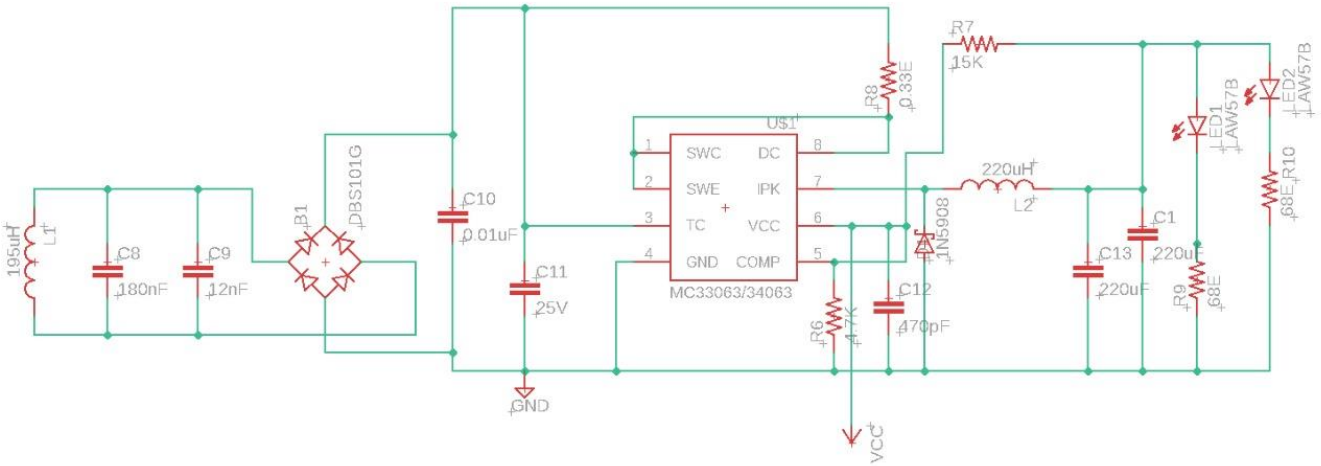


DRILLS USED TO PLACE THE COMPONENT ON THE PCB

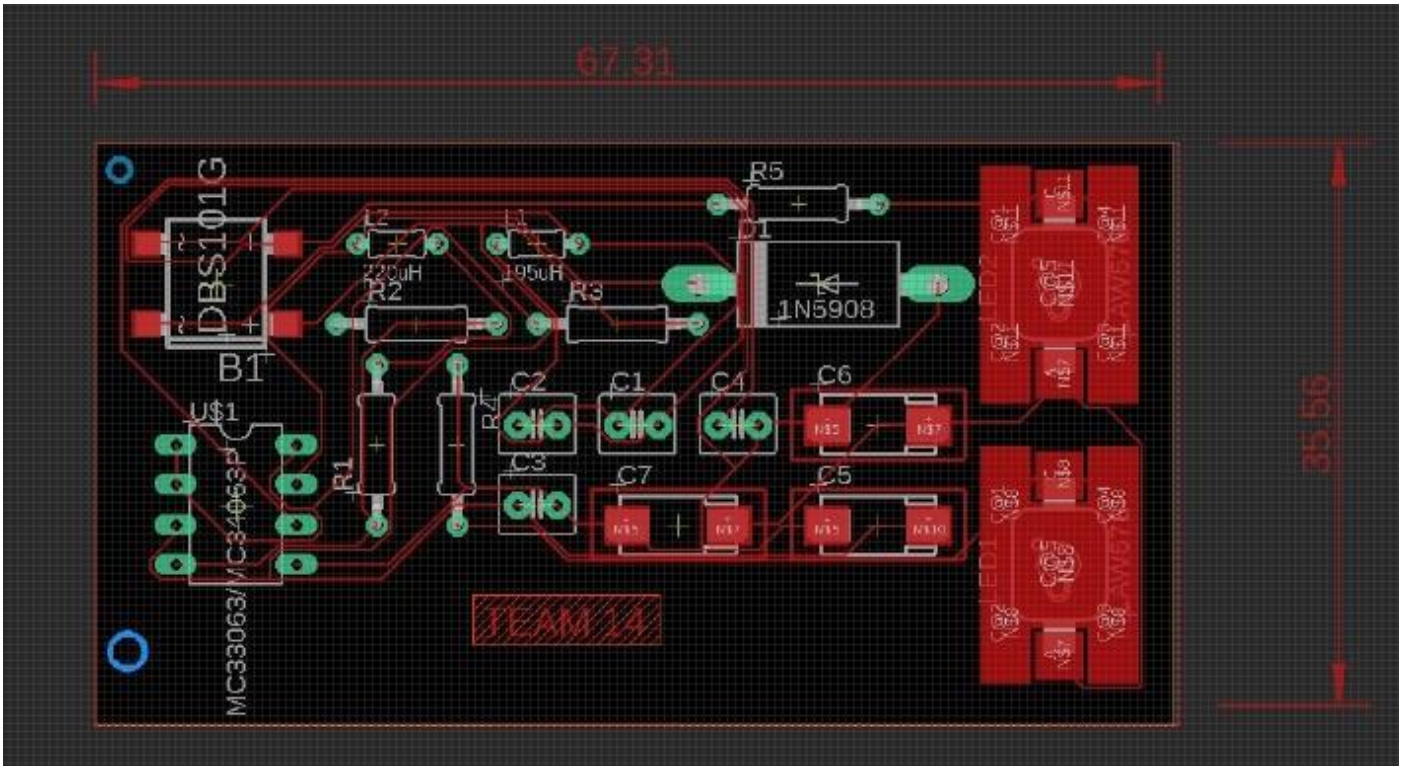


RECEIVER CIRCUIT FOR WIRELESS MOBILE CHARGER CIRCUIT:

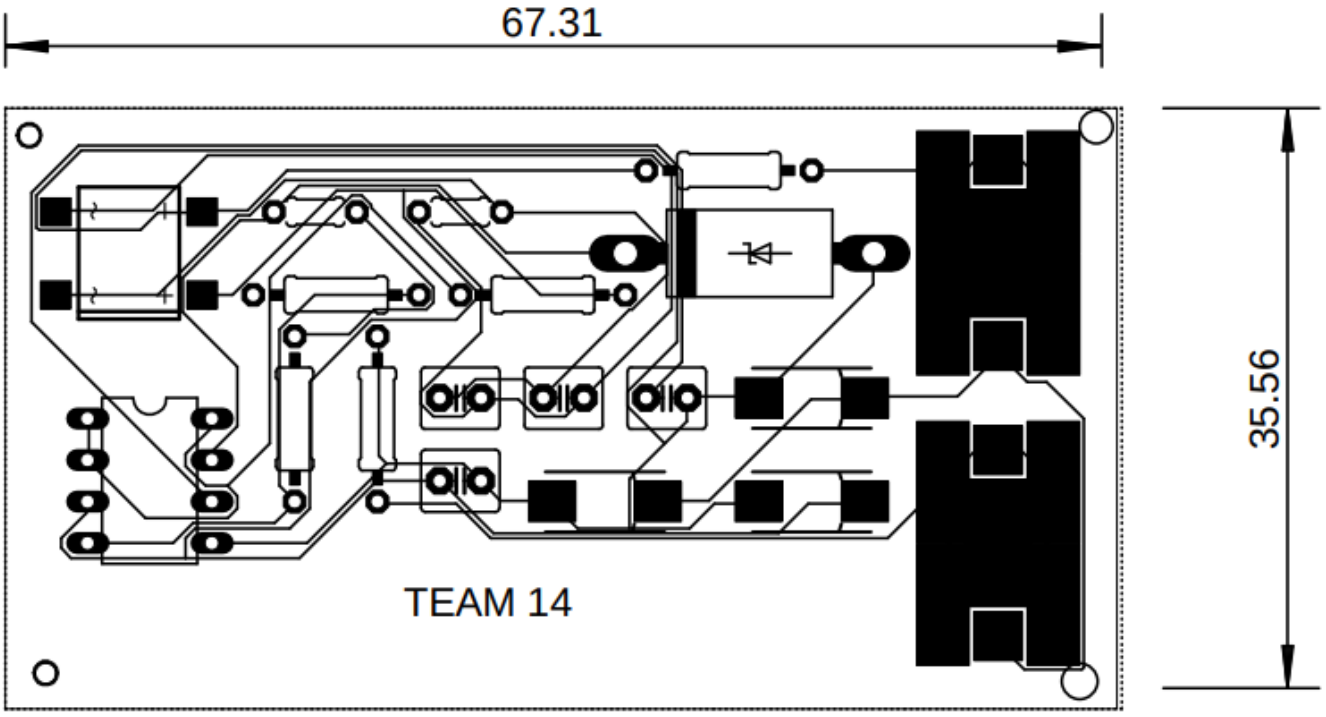
Receiver is built around LC tuned circuit (L2 with C7 and C8), a current regulator (buck and boost) IC MC34063, Schottky diode (1N5819), and a few passive components. The transmitted oscillation magnetic field is detected by L-C tuned build around inductor L2 with capacitors C7 and C8 which is further changed to DC voltage using bridge rectifier BR1(DBDB101G) and filtered using capacitors C9 and C10.
The ripple-free DC voltage is now given to buck/boost IC, configured into buck regulator mode. The output voltage is further filtered using an L-C filter and is connected to LED through current limiting resistors R9 and R10.



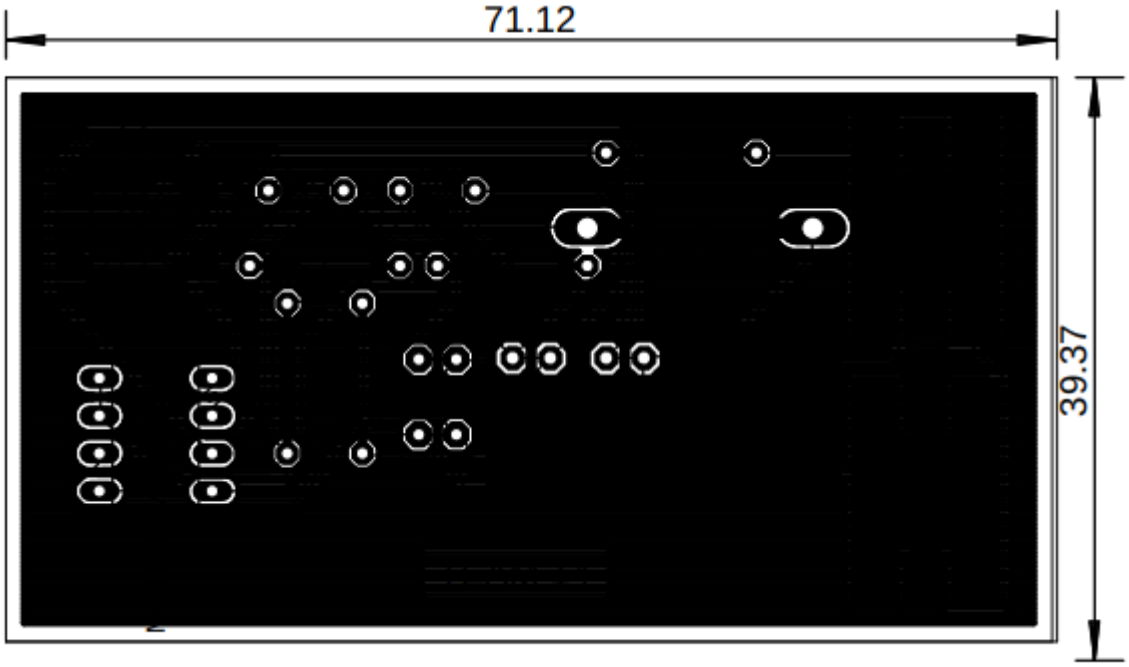
SNAP OF THE PCB BOARD:



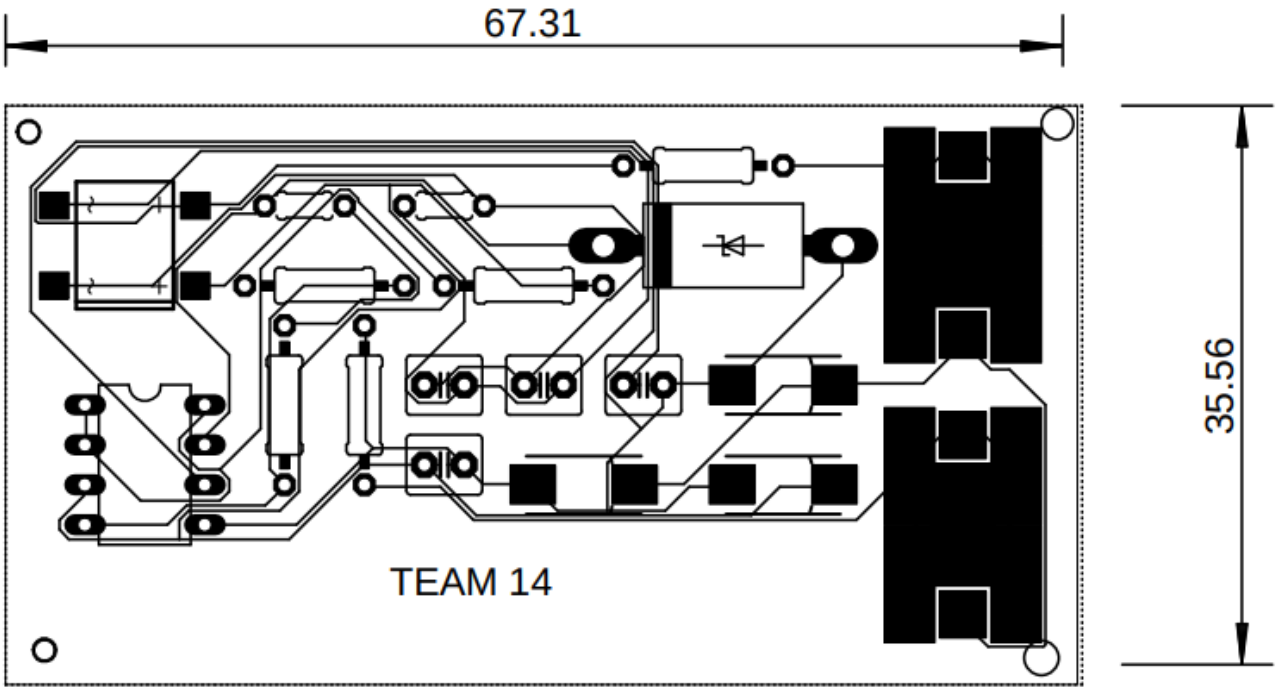
SNAP OF THE HOLES(which were made for package):



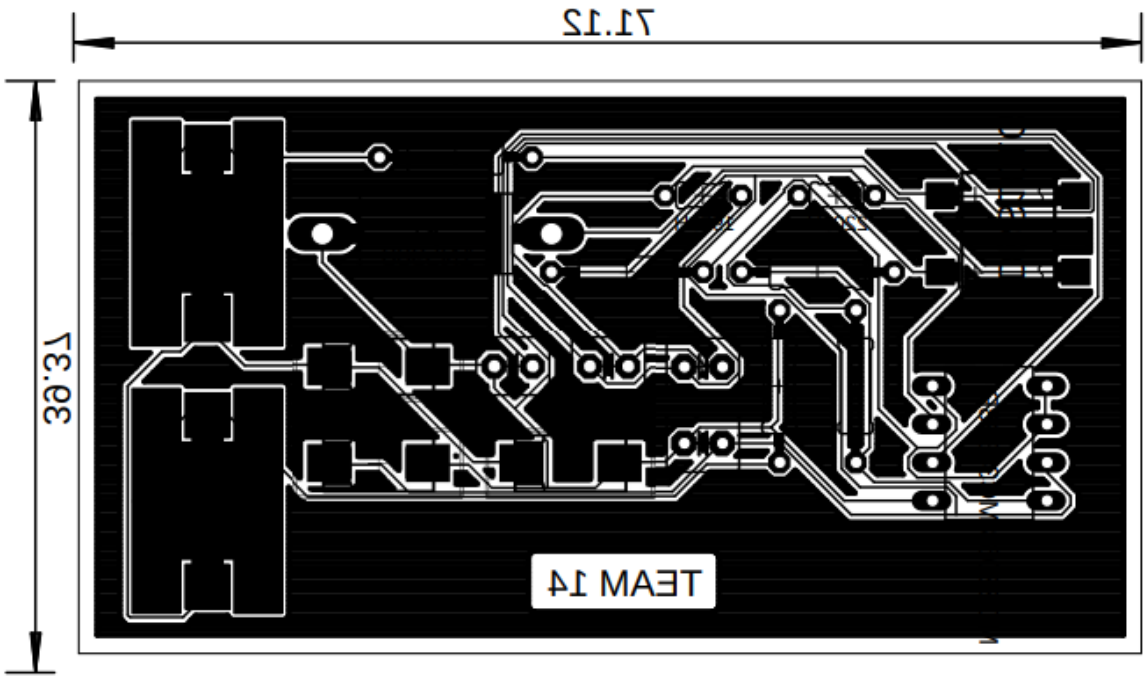
SNAP OF THE COMPONENTS OF THE PCB BOARD:

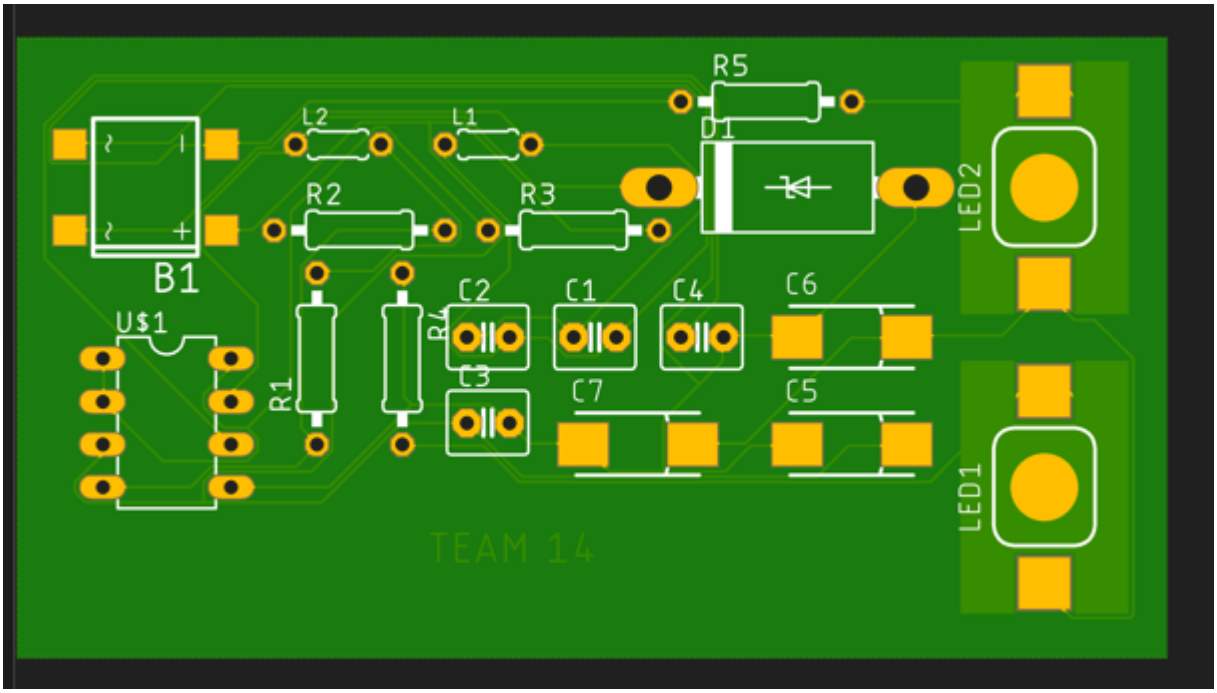


SNAP OF THE LAYOUT:

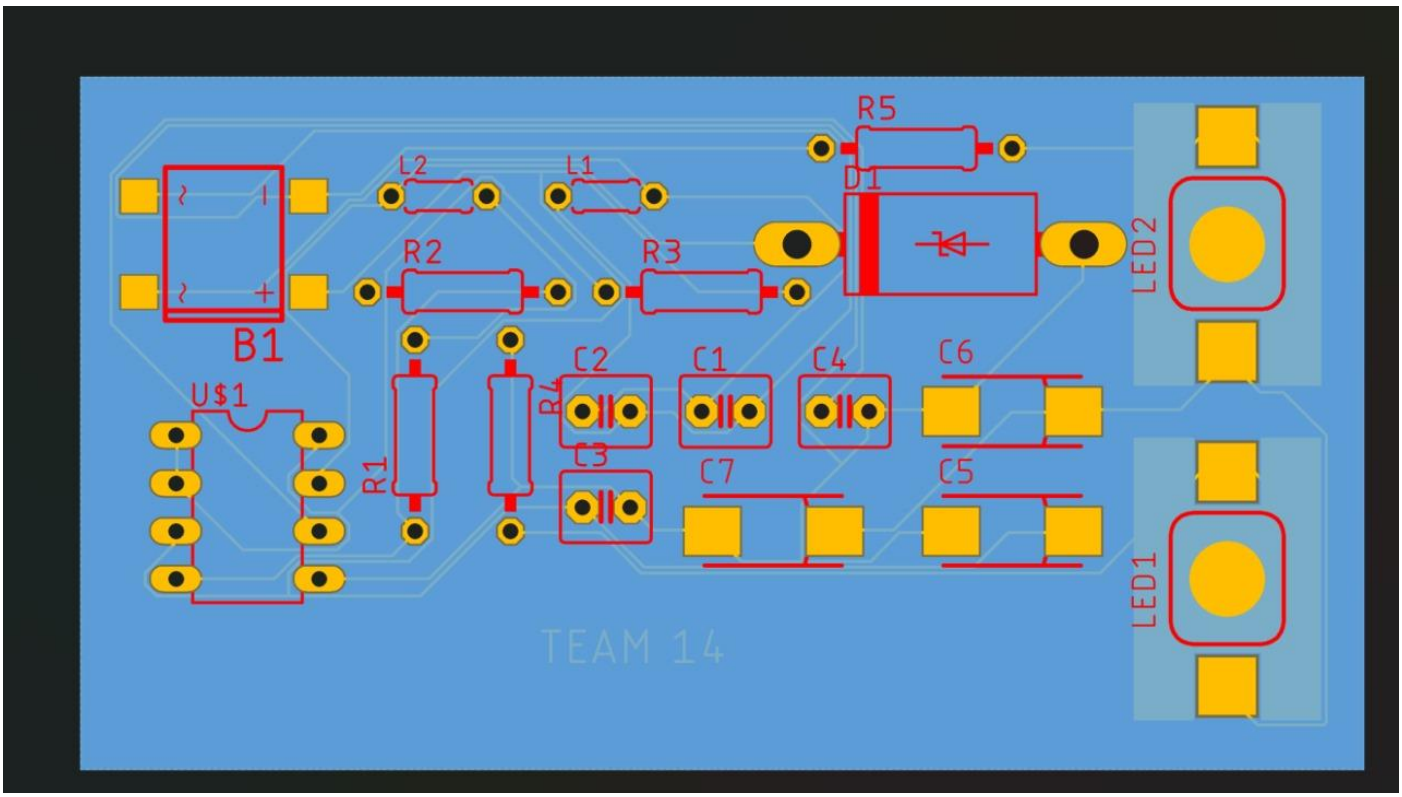


SNAP OF THE COPPER FILL: (Solder mask or solder resist)

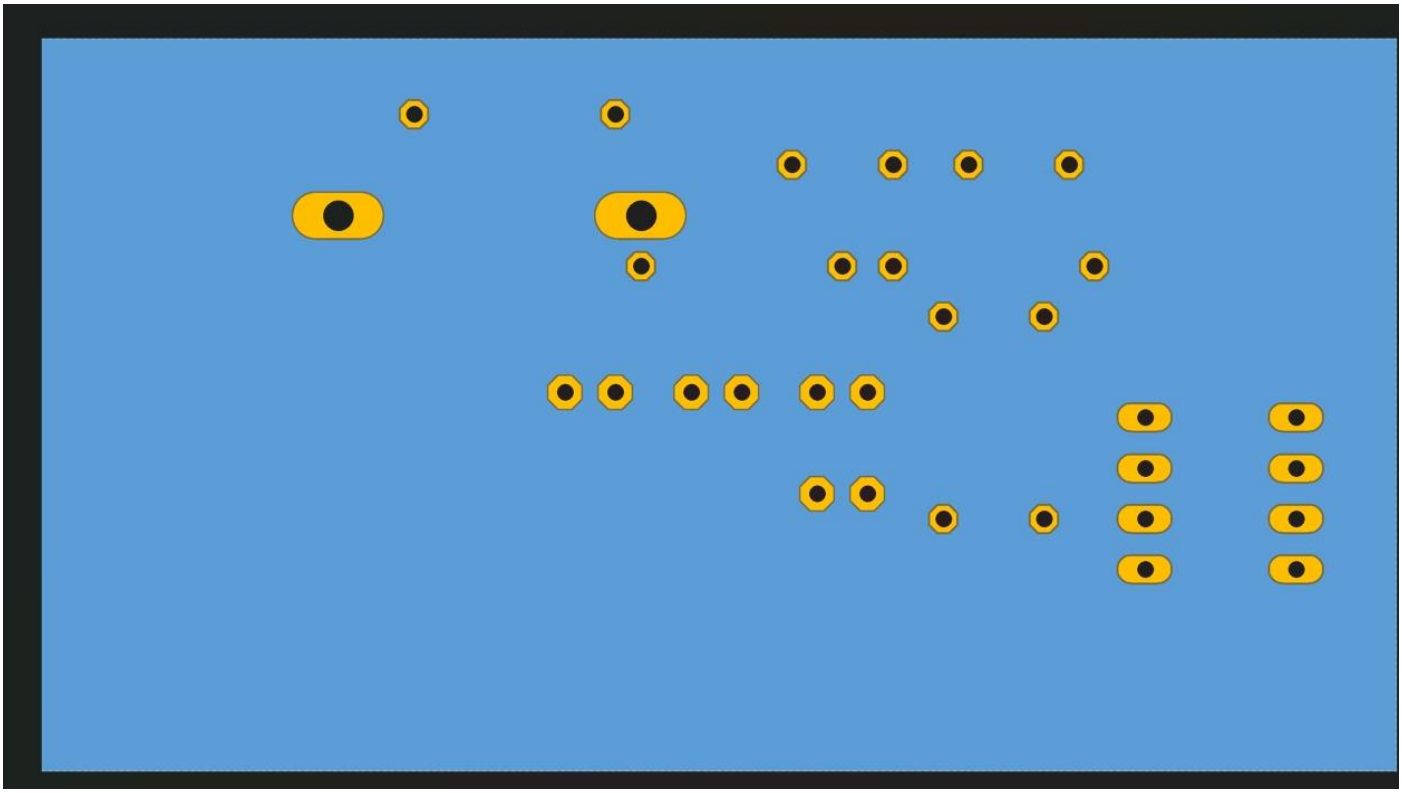


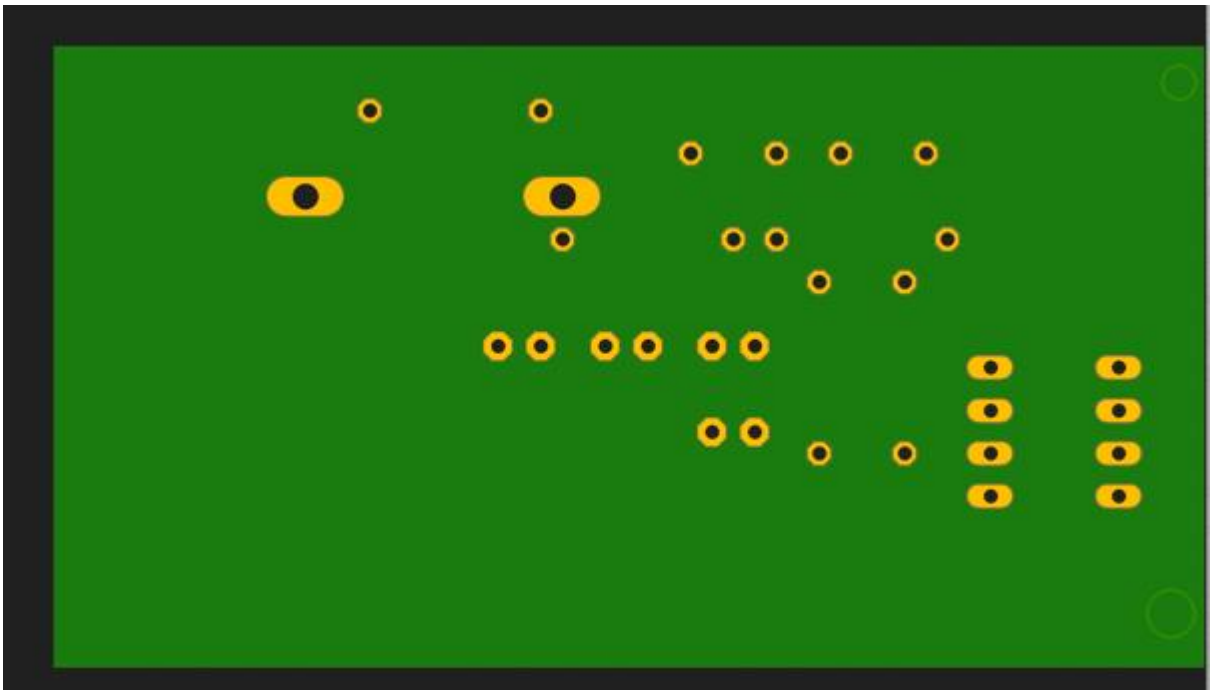


WE TRIED TO MODIFY THE COLOUR OF THE SOILDER MASK

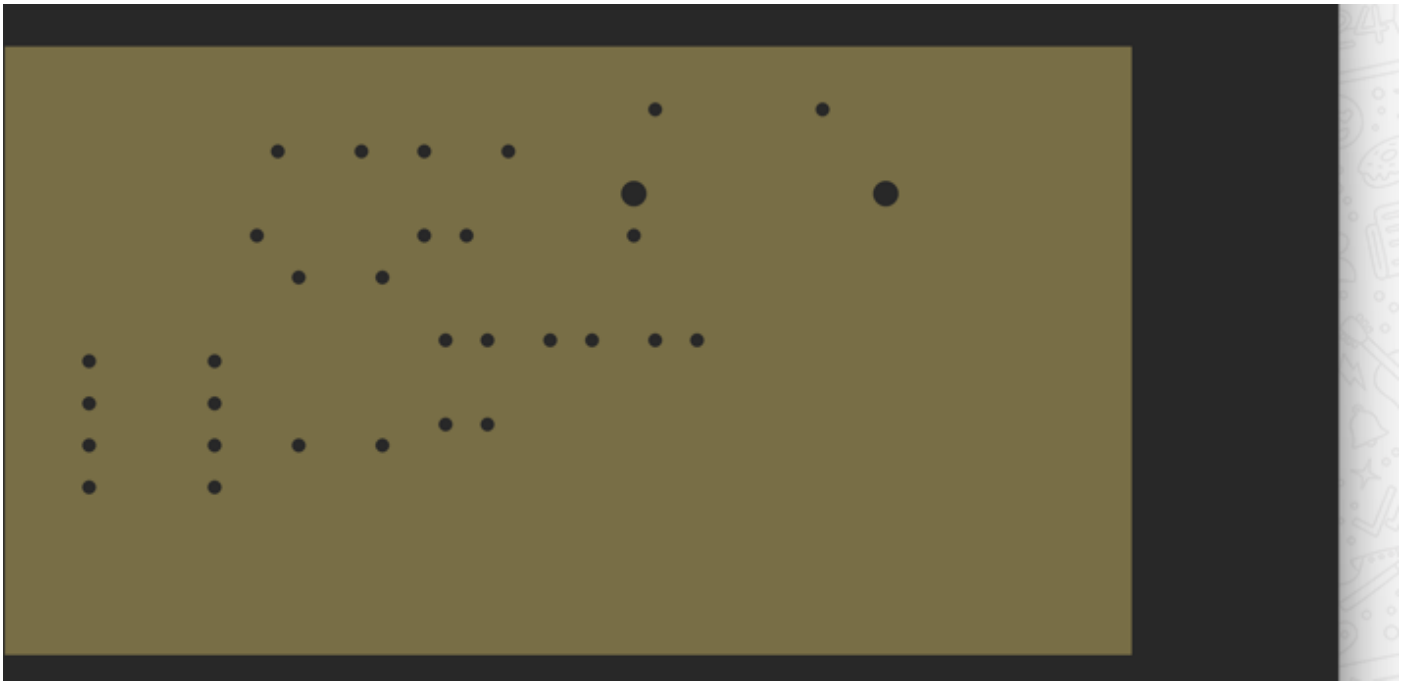


BLUE IS SOILDER MASK, RED IS SILK SCREEN, YELLOW IS COPPER ,WHITE IS TRACES





DRILLS USED TO PLACE THE COMPONENT ON THE PCB

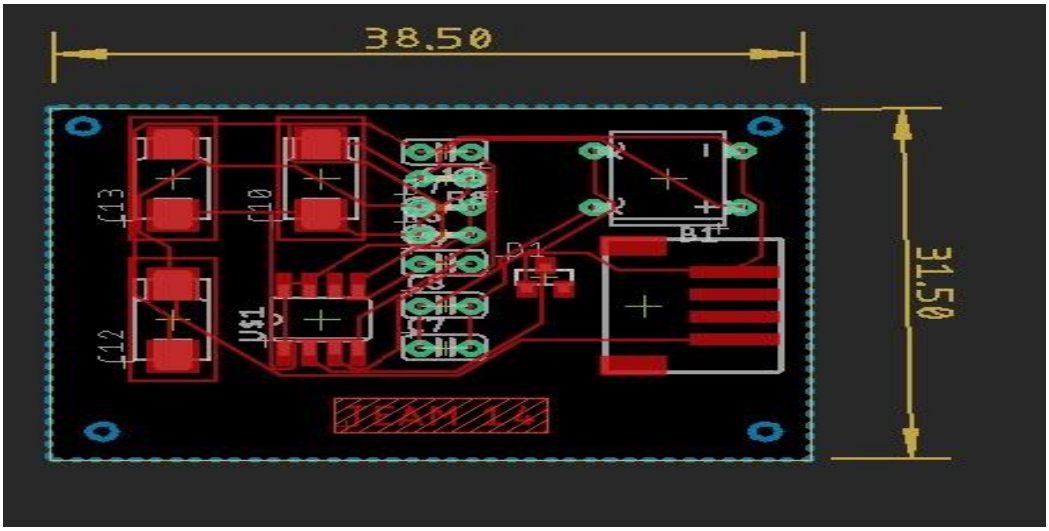


RECEIVER CIRCUIT FOR WIRELESS MOBILE CHARGER CIRCUIT USING USB CONNECTOR:

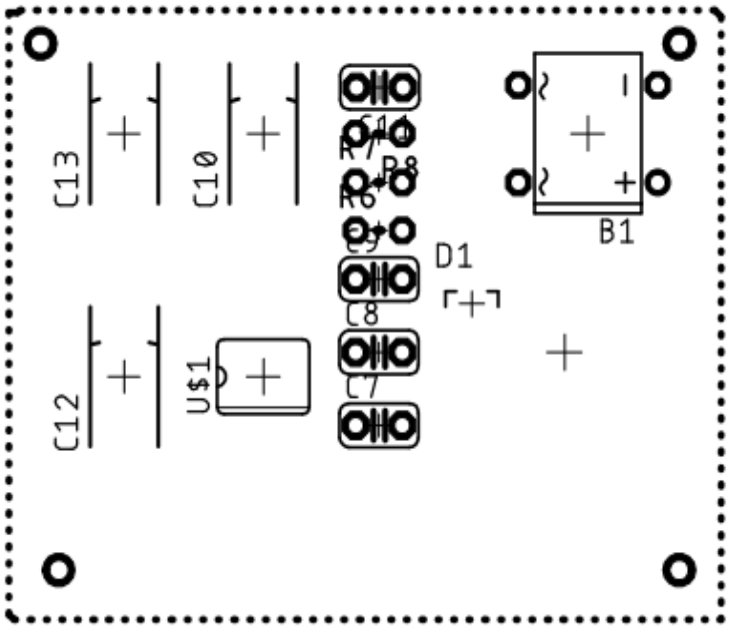
Receiver is built around LC tuned circuit (L2 with C7 and C8), a current regulator (buck and boost) IC MC34063, Schottky diode (1N5819), and a few passive components. The transmitted oscillation magnetic field is detected by L-C tuned build around inductor L2 with capacitors C7 and C8 which is further changed to DC voltage using bridge rectifier BR1 (DBDB101G) and filtered using capacitors C9 and C10.

The ripple-free DC voltage is now given to buck/boost IC, configured into buck regulator mode. Both the LED (LED1 and LED2) is replaced by a female USB connector. Connect the female USB a VCC (RED wire) is connected to the positive terminal of capacitor C13 where GND (Black wire) is connected to the circuit ground. Both the data pin (D- and D+) is not connected.

SNAP OF THE PCB:

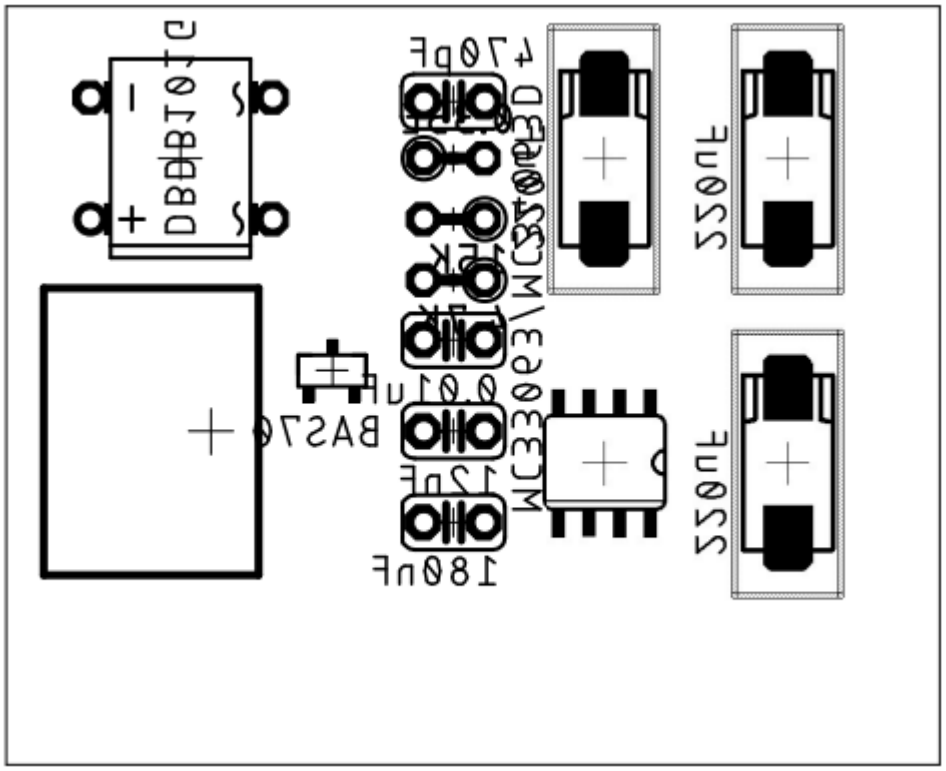


SNAP OF HOLES(which were made for pakage) :

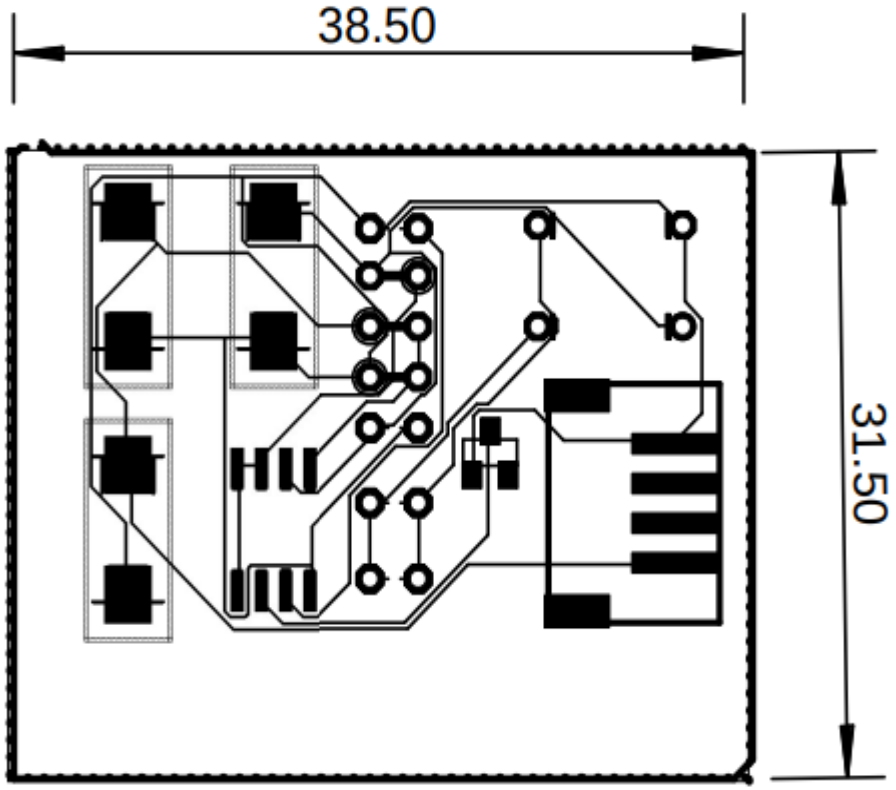


THE DOTED LINE REPRESENT COMMON GROUND

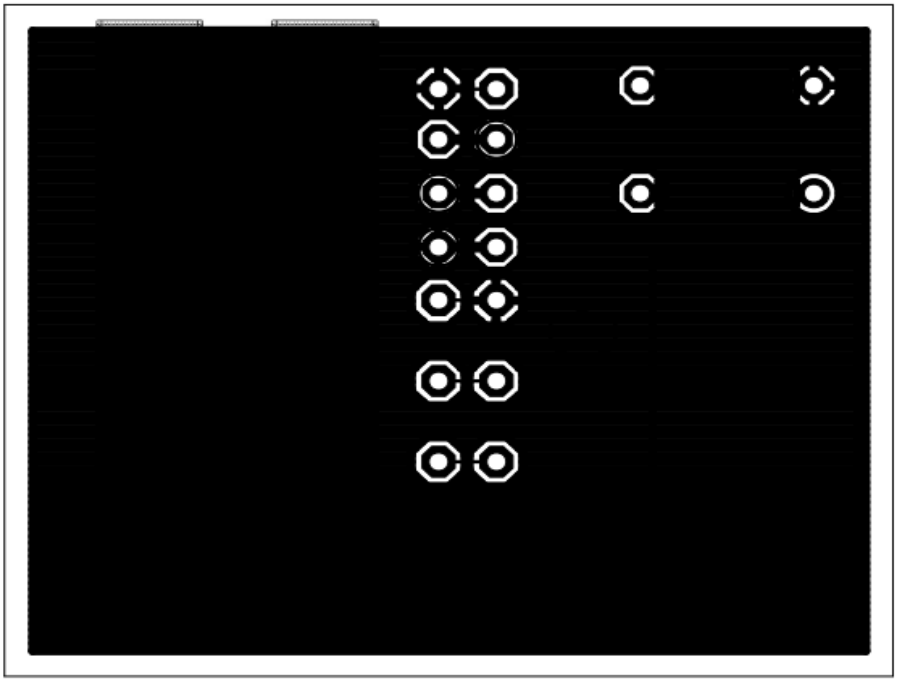
COMPONENTS OF THE PCB:



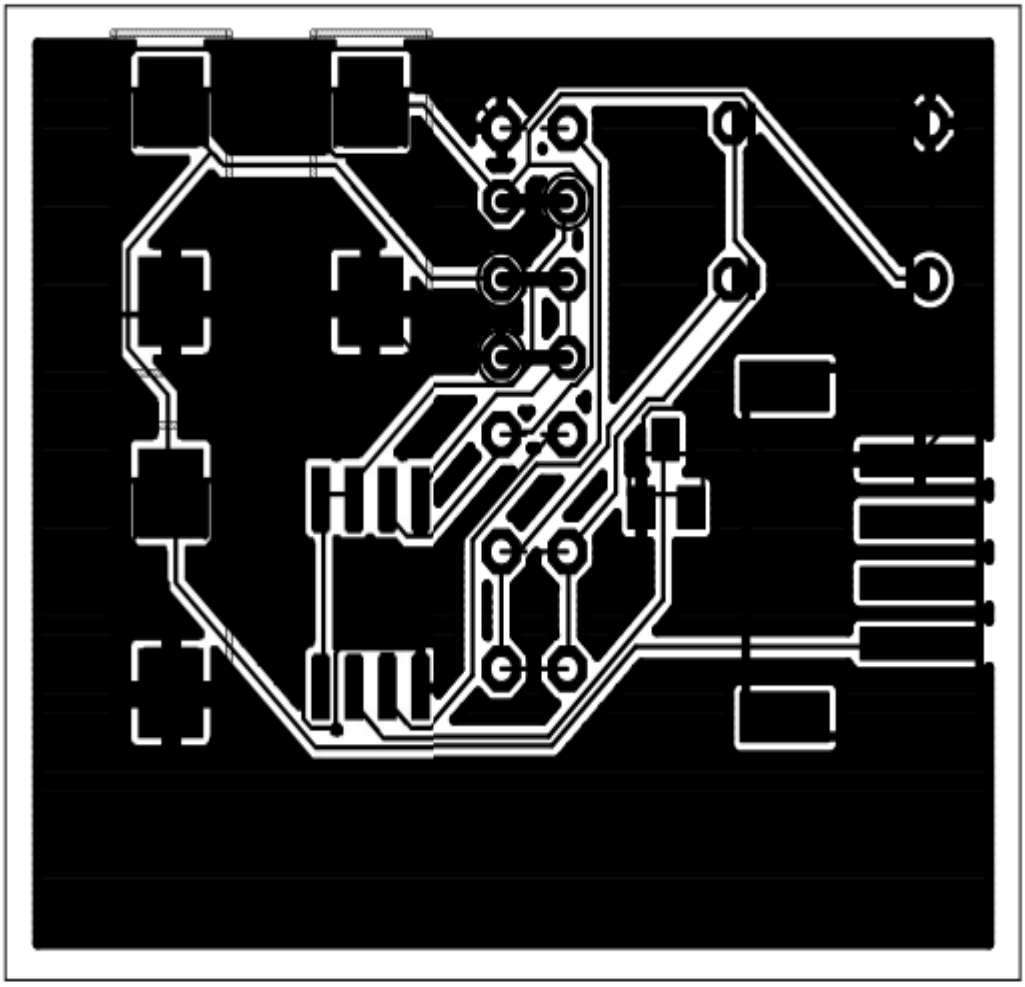
SNAP OF THE LAYOUT AND TRACESE FOR THE INTER CONNECTION AND DIMENSION:



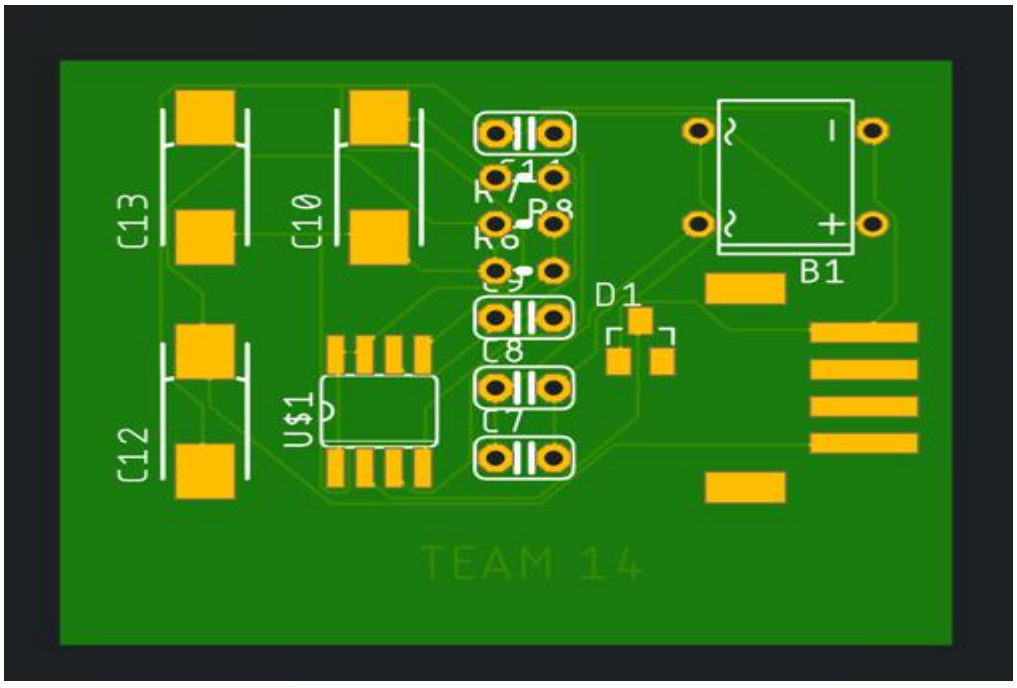
SNAP OF THE COPPER FILL WITH HOLES :



SNAP OF THE COPPER FILL AND THE LAYOUT:



Solder mask or solder resist:



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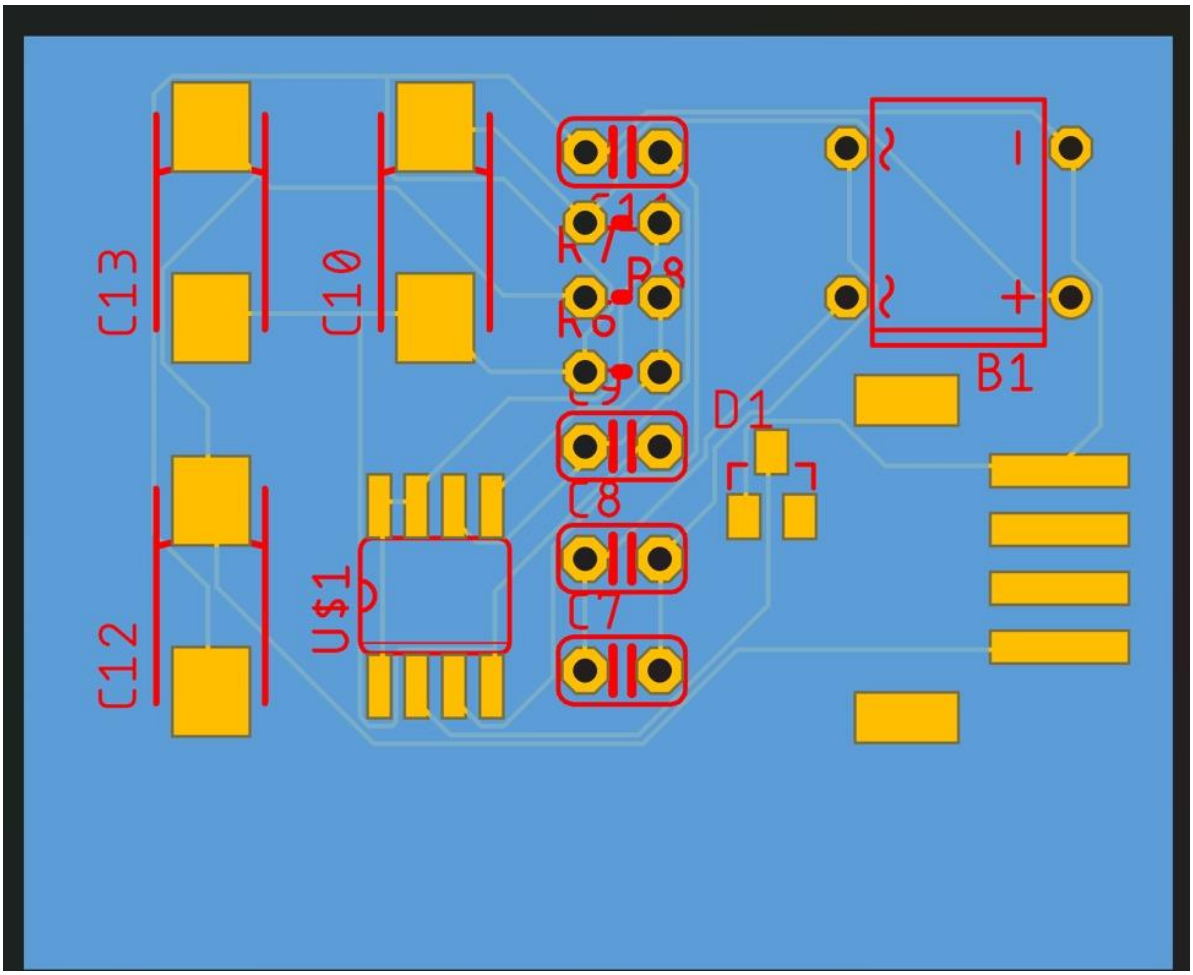

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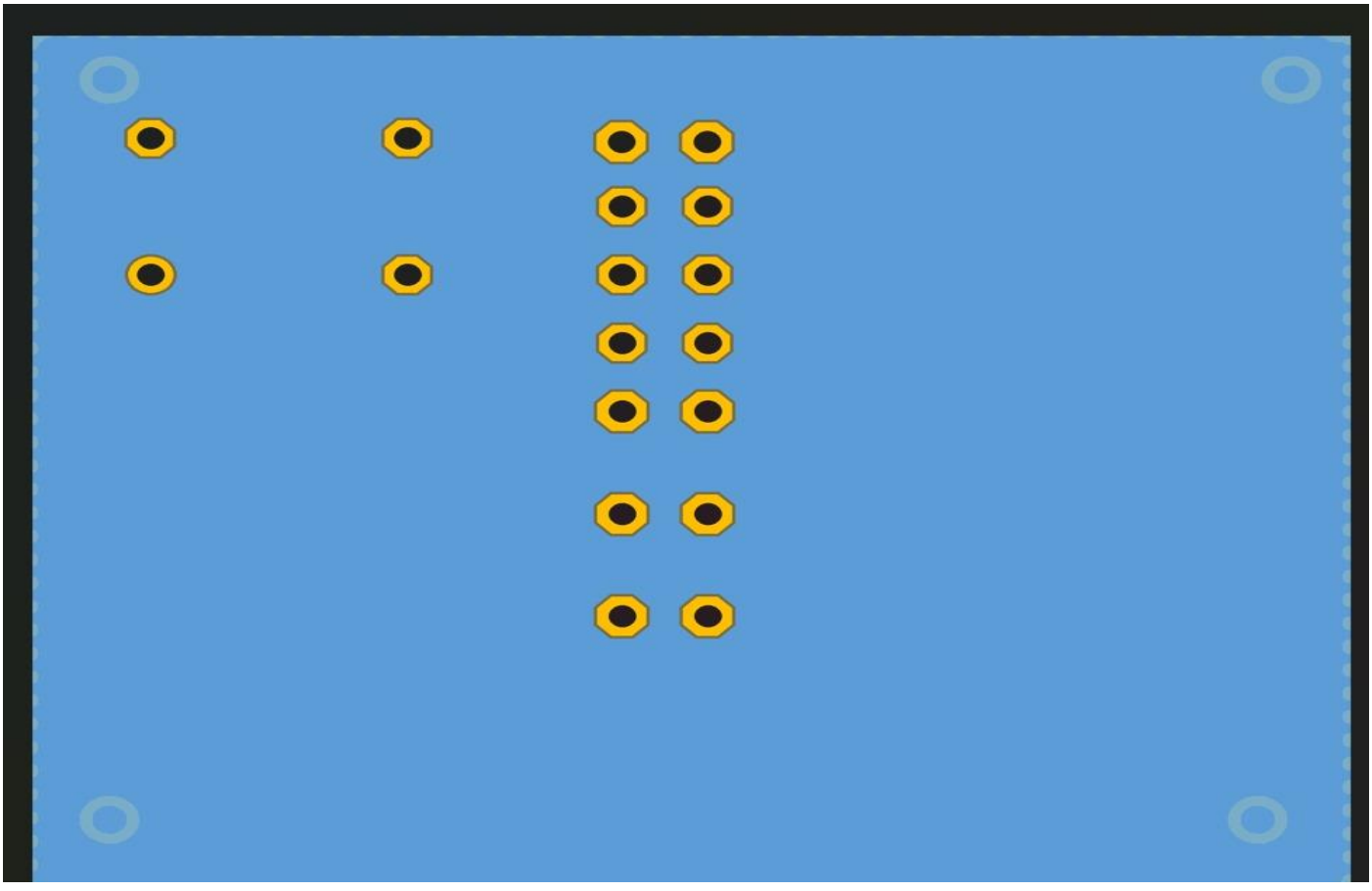

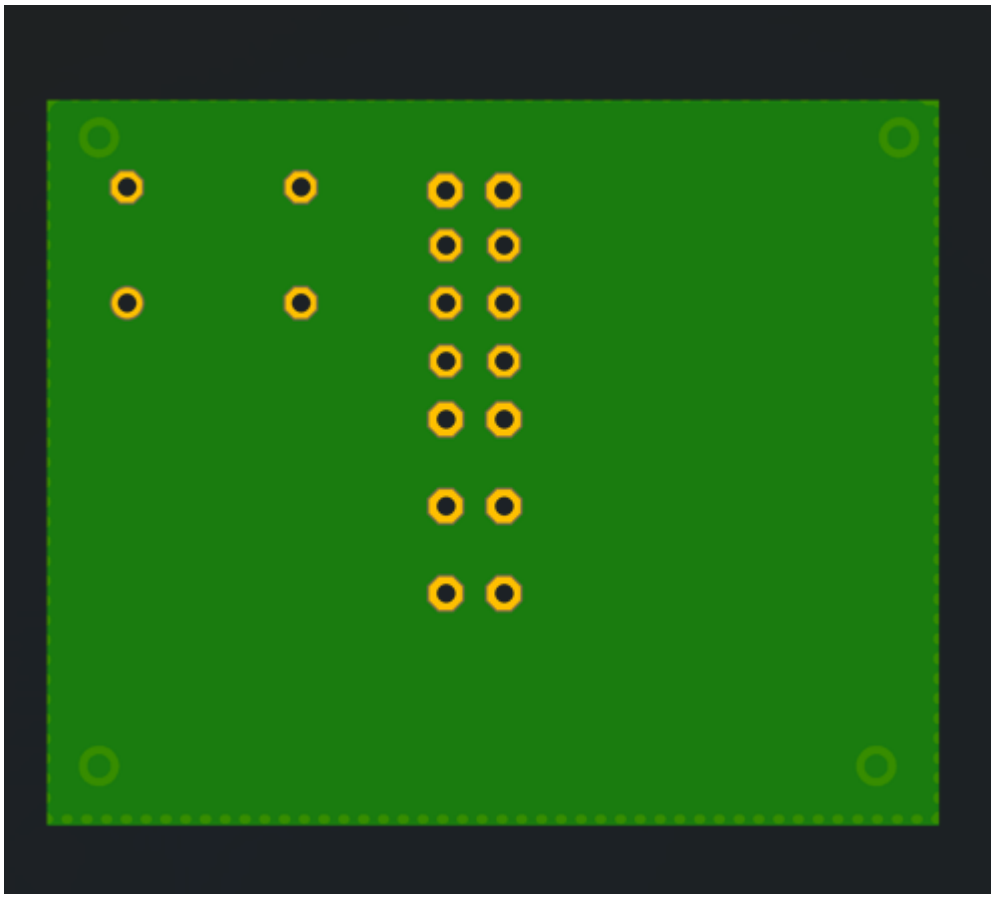

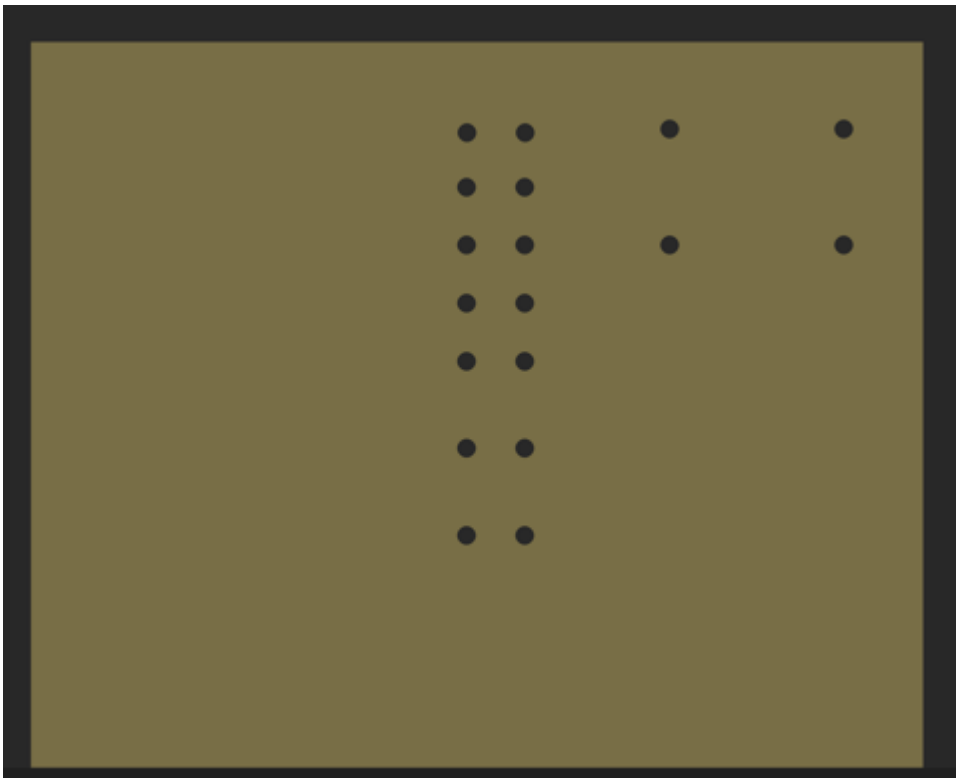

DRILLS USED TO PLACE THE COMPONENT ON THE PCB

COMPONENTS USED:

R1, R4 = 1 KΩ

R2, R3 = 3.3 KΩ

R5 = 150 Ω

R6 = 4.7 KΩ

R7 = 15 KΩ

R8 = 0.33 Ω

R9, R10 = 68 Ω

C1, C2 = 0.1 µF (Polyester Capacitor)

C6 = 0.1 µF (Ceramic Disc)

C3, C4, C9 = 0.01 µF (Ceramic Disc)

C5 = 100 µF/25V (Electrolytic Capacitor)

C7 = 180 nF (Polyester Capacitor)

C8 = 12 nF (Polyester Capacitor)

C10, C12, C13 = 220 µF/25V (Electrolytic Capacitor)

C11 = 470 pF (Ceramic Disc)

IC1 = NE555 (Timer IC)

IC2 = LM7805 (Series Voltage Regulator, 5V)

IC3 = MC34063 (Buck/ Boost Regulator IC)

D1 = 1N5819 (Schottky Diode)

T1 = BC547 (General Purpose NPN Transistor)

T2 = IRFZ44 (N-Channel MOSFET)

BR1 = DBDB101G (Bridge Rectifier)

LED1, LED2 = 1-watt LED (1N5908)

THE CHANGES WE MADE:

- Instead of IRF540 IC at transmitter circuit we used IRFZ44 IC due to

The IRFZ44 is 60V, and 50amp at 25 degrees C and the IRF540 is 100V and 28amp at 25 degrees C

- We used R_US Resistor in all the circuits which is 5mm &2 inch we alter this from source

- Even we changed the capacitors and inductors model which is in smaller size
- The rectifier which we used to implement the circuit is different from the source and it occupies less space (DBDB101G) in the receiver circuits
- We used light emitting diode (1N5908) in the receiver circuit
- We reduced the pad and hole size in each PCB board
- PCB has two layers
- We maintain the minimum clearance between object in the single layer
- We optimized the size of the PCB
- In our PCB minimum width is 6mil and minimum drill is 0.35 mm, min micro via is 9.99 mm

CONCEPTS:
In this assignment we have used interconnect level 2 and level 1
Electronic packaging level of the PCB we designed is level 2
We connected all ground wire to the common ground dotted line the PCB board
We have done silk screening on PCB board TEAM NAME (TEAM 14)
Routing concept is used we used both manual and the auto routing
Solder mask or solder resist : we tried to change the colour of the solder mask

CONTRIBUTION:

RASAGNA SRI: implemented all above snaps in transmitter Circuit for Wireless Mobile Charger Circuit Diagram and searched how to download the library for the Ic's alternatives for the components

SRUTHI N: Implemented all above snaps in Receiver Circuit for Wireless Mobile Charger with LED and searched the source file and topic for the project searched

DIVYA M: Implemented all above snaps in Receiver Circuit for Wireless Mobile Charger with Female USB Connector
and researched about the reduction in the size, researched about the via fillings holes and clearence, DRC rules