Electronics File

Name Shivank Bali
Class CSE sec 2 C10
Roll no. UE163095

Date __/__/__
Page _____
Puffin

Aim : Soldering And Desoldering Practice

Tools Used

Temperature controlled Soldering Station :-

It consists of electrical power supply, control for user to adjust temperature and display and a soldering iron whose tip has a temperature sensor. The station has a stand to hold the iron when not in use and a wet sponge to clean the tip. There is Brasswool to clean the tip as solder do not stick to brass.

Desoldering Pump :-

It is also known as solder sucker, it is a manually operated device which is used to remove solder from a circuit board. It has a cylinder with a spring loaded piston, which is pushed down and locks into place. When triggered, the piston goes up, creating suction that sucks the solder off the connection.


VISE-GRIP

Date __/__/__
Page _____
Puffin

Tweezers :-

Tweezers are small tools used for picking up the objects too small to be easily handled by human hands. They are probably derived from tongs, pincers or scissors-like pliers used to grab or hold hot objects.

Stripper :-

A simple stripper is a pair of opposing blades much like scissors or wire cutters. The addition of a centre notch makes it easier to cut the insulation without cutting wire. It peels of the insulation as it isn't bonded to the metal strands of the wire.

Date __/__/__
Page _____
Puffin

MATERIALS USED

General Purpose Board :- These are generalised form of PCB's like a PCB, it provides a means to hold components together as a single unit. But it doesn't provide connections between the components like a PCB. They have to be made by wires.

IC holder :- It is a protective component used as a place holder for IC chips because IC chips can be damaged by the soldering heat.

Connecting wire :- These are simple wire pieces used to attach two circuits or components together. The gauge or size of the wire must be large enough to support the amount of current flow, without high resistance or heating effects

Soldering wire :- It is a fusible metal alloy used to create a permanent bond between metal wires. A soldering wire is melted in order to make joints. Suitable alloys with melting point below the point wires are to be

Date __/__/__
Page _____
Puffin

Flux :— A flux is a chemical agent. They can have more than one function at a time. They are very commonly used in soldering where its necessary to prevent oxidation of filler alloy and the metal wire joint.

Date __/__/__
Page _____
Pulkit

THEORY

SOLDERING :-

It is a process of making a joint between two or more metal parts by heating the joint segments with the soldering tip and applying flux and solder. A good soldering joint doesn't compensate with the characteristics of conduction and mechanical strength of the joint.

DESOLDERING :-

It is a process of removal of solder and components from a circuit board for repair troubleshooting etc. Although many mechanical methods are present but commonly vaccum pump and soldering iron are used.

Date __/__/__
Page _____
Puffin

TINNING :-

Coating the soldering iron trip with solder is called tinning. It is important to prevent oxidation and to remove any oxides, if any present on the tip. It should be done time to time to have shiny clean soldering.

REASONS FOR UNWETTABILITY

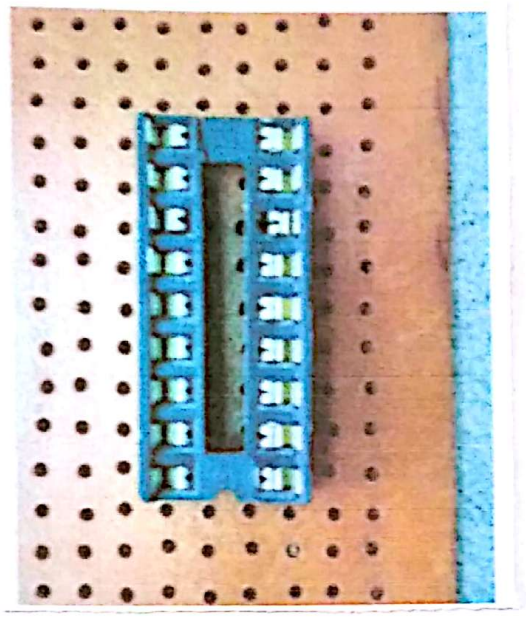
1) The selected temperature is too high, causing the solder to burn off rapidly and flowing off the joint causing oxidation as well.

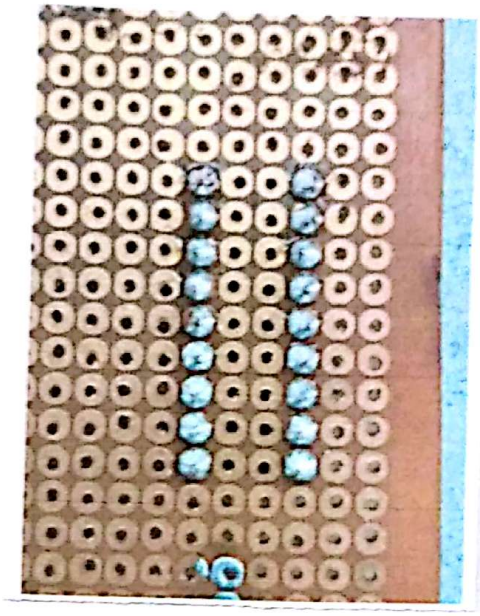
2) Using impure solder or flux can also cause loose joints

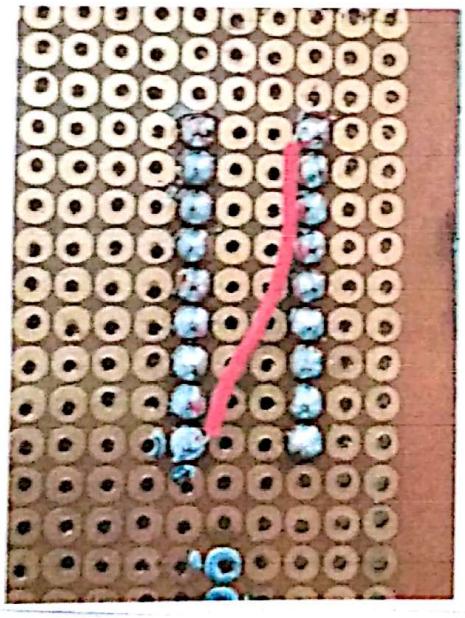
3) Insufficient time or temperature interface with the viscosity

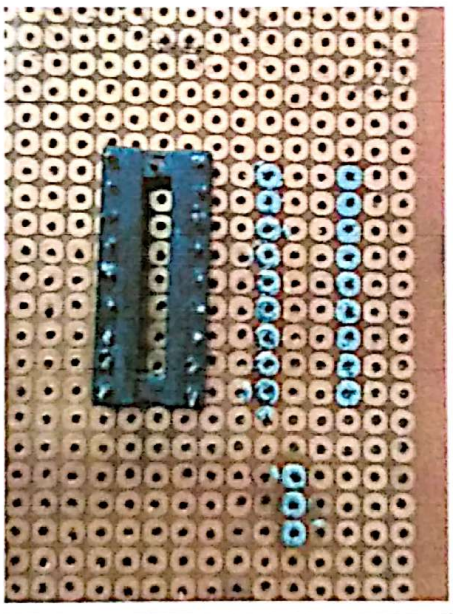
4) Insufficient tinning when working with high temperatures

5) Greases with similar impurities on components can cause it.









Date __/__/__
Page _____
Puffin

PROCEDURE

1) Setting up the Soldering Station :-

⇒ Before the Soldering station is turned on, note the wattage of the soldering station.
⇒ Place the iron in the state, plug in and set temperature
⇒ Wait for 20-30 seconds to let the iron heat.
⇒ Melt the solder on the tip and tin it. This will generate a shiny, clean tip.
⇒ Re-tin the tip time to time for quality.

2) How to Solder :-

⇒ From the handle, hold the soldering iron like a pen and touch the joint to be made.
⇒ Make sure iron touches both the component lead for few seconds, bring the solder to the joint.
⇒ The solder should melt quickly and flow on the joint
⇒ Inspect the joint carefully and you can clean it with isopropyl alcohol after it has cooled down.

3) Solder Joint Evaluation :-

⇒ A good soldered joint will be shining and concave
⇒ It will be free of voids
⇒ fully cover the pad, component lead will pass completely

Date __/__/__
Page _____
Paffin

4) Use of Desoldering Pump :-

=> Load the pump by pressing the piston fully until it looks.
=> Hold the soldering iron in one hand the loaded pump in other.
=> Heat the soldered joint with the iron
=> When the solder melts, press the trigger on the pump, keeping its nozzle close to the joint and at an angle of about 45°.
=> The molten solder will get sucked.
=> Inspect the point, if any solder still remains; desolder against following, The above steps.

PRECAUTIONS

=> Donot inhale the fumes from the soldering iron.
=> Always put the soldering iron back in the stand to prevent fire.
=> Switch off and unplug the soldering apparatus.
=> Allow soldering to cool before storing
=> Always keep your working area sorted and be beware of where you have placed your tools to prevent injuries due to confusion
=> Make sure that general laboratory rules like lab coats are followed
=> Ensure all the components are clean.

Date __/__/__
Page _____
Puffin

SWITCH OPERATIONS

1> Power Switch :

⇒ Power switch enables to switch on the power to the meter

2> Hold Switch :

⇒ When hold switch is pressed, the present data is locked and DH symbol appears on LCD. When HOLD switch is pressed again, The meter functions normally and DH design appears

3> Range Switch :

⇒ Range switch is pressed, to operate the meter in MANUAL mode '0' sign will be displayed on LCD. The present range of the meter will be increased by pressing the range switch. To come out of manual mode, press the range button for two seconds. The meter will operate in auto mode again and auto will be displayed on LCD.

4> AC/DC , Ω / •))) / ⊣⊢ Switch :

This switch is used for voltage, current and resistance measurement.

(a) In voltage and current measurement, initially DC value is measured and '=' is displayed on LCD. To measure AC value, the AC/DC switch is to be pressed once.

Date __/__/__
Page _____
Puffin

The display will change from '=' to '~'. To again switch over to DC, press the switch once more.

(b) In resistance measurement, this switch is used to change over between Ω,))))), ~~⊣⊢~~ measurement.

Date __/__/__
Page _____
Puffin

DC VOLTMETER

1. Switch 'on' the multimeter by pressing 'power' switch
2. Connect red test lead to 'V' terminal and black lead to 'COM' input terminal.
3. Set the function switch to 'V' position
4. Select DC (here) by pressing 'AC/DC' switch.
5. Connect Test lead to the device or circuit being measured
6. Turn on power to device / circuit, Voltage value will appear on the LCD along with the voltage polar.
7. Turn on power to the devices / circuit being tested and discharge all capacitors prior to disconnecting test lead

→ Multimeter has to be connected in parallel to the circuit/device ment to be tested.

→ Multimeter in this function has polarity.

Date __/__/__
Page _____
Puffin

AC VOLTMETER

1→ Switch on the multimeter by pressing power button.
2→ Connect red test lead to 'GV' input terminal and black test lead to 'COM' terminal
3→ Set the function switch to 'V' position
4→ Select 'AC' by pressing 'AC/DC' button
5→ Connect test lead to device/circuit being measured
6→ Turn on power to the device/circuit being tested Voltage value will appear on LCD.
7→ Turn off power to the device and discharge all capacitors prior to disconnecting the lead

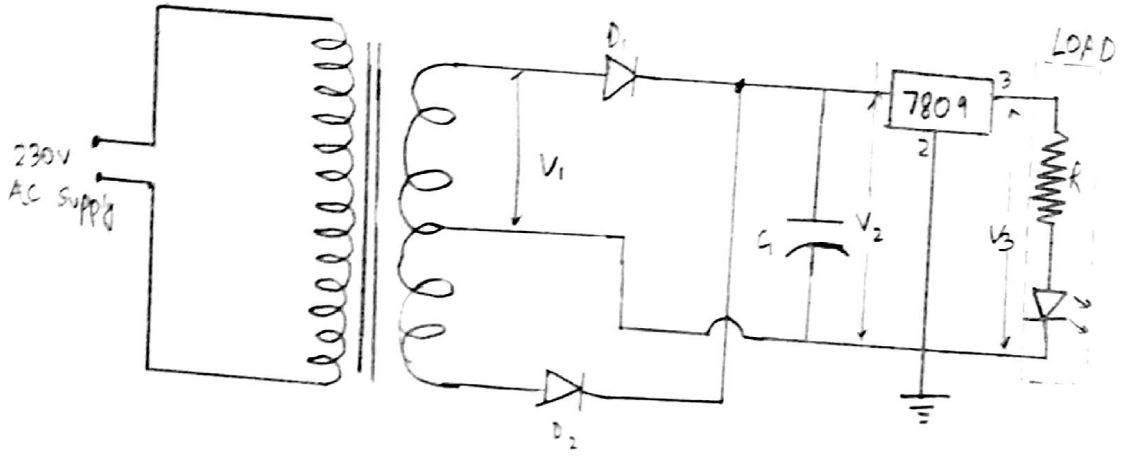
→ Multimeter has to be connected in parallel to the measuring circuit to use as voltmeter (AC)
→ There is no polarity when used as an AC voltmeter

Date __/__/__
Page _____
Puffin

Ohm Meter

1 ⇒ Switch on the Multimeter by pressing 'POWER' button
2 ⇒ Connect red test lead 'Ω' input terminal and black lead to the 'com' terminal
3 ⇒ Set the function switch to 'Ω' position.
4 ⇒ If the resistance being measured is part of a circuit turn off power to the circuit and discharge all capacitors
5 ⇒ Connect test leads to the device / circuit being measured. When measuring high resistance be sure not to contact adjacent points even if insulated because some insulation have low insulation resistance, causing the measured resistance to be lesser than actual value

→ Multimeter has to be connected in parallel in this function and there is no polarity.


230V
AC Supply
D1
D2
V1
C1
V2
7809
3
2
V3
R
LOAD

JOB

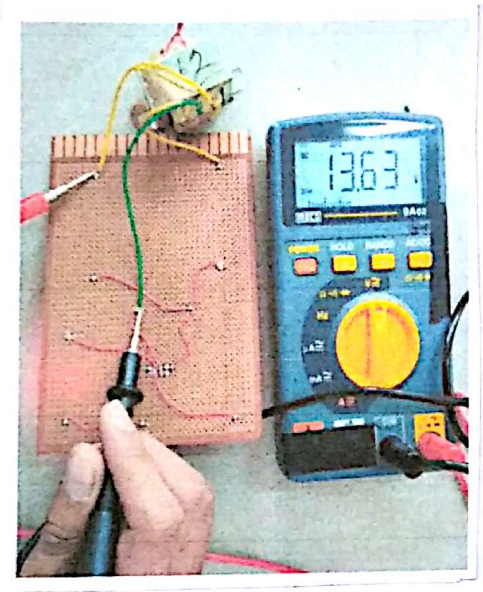
To assemble The circuit of 9V regulated DC supply.

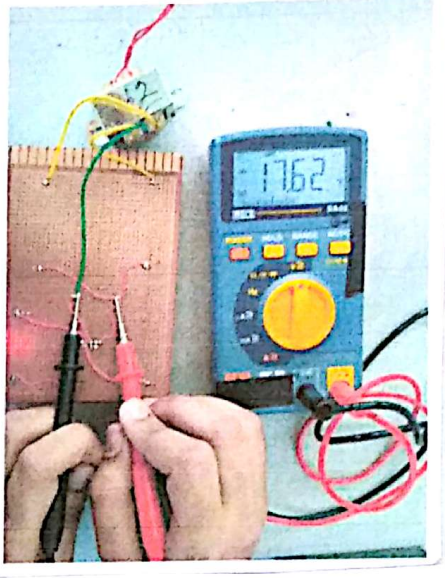
Objective :—

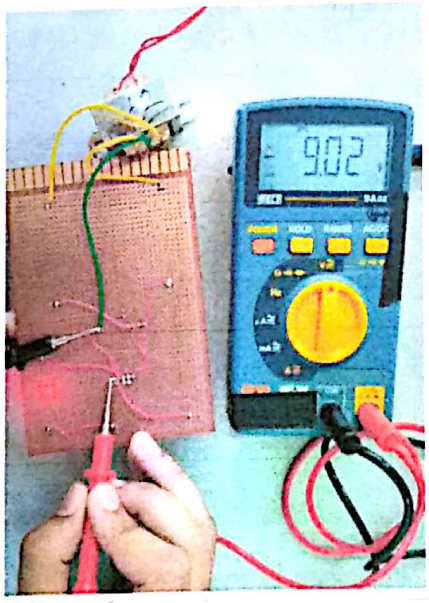
1) Available 220V AC. Voltage can be converted to desired DC voltage
2) Circuit is represented by combination of five electronic components components represented by their symbols. They are connected in a particular way to get output.
3) To relate the component symbol with actual component.
4) To get the information given by manufacturer for the user on component
5) Step-wise testing of the circuit.

Procedure :—

1) Note down the value of each given component
2) Try to identify the polarity marking on the components. Resistance has no polarity.
3) Test each component using multimeter (except IC 7809)
4) Assemble the circuit as per circuit diagram Make connections


13.63


17.62


9.02

5) Connect transformer primary winding to 220V AC mains measure input voltage V_i (A.C.) at secondary.

6) Measure D.C. voltage at input of IC (Pin 1 and 2 of IC) and at Output of IC. (Pin 3 and 2)