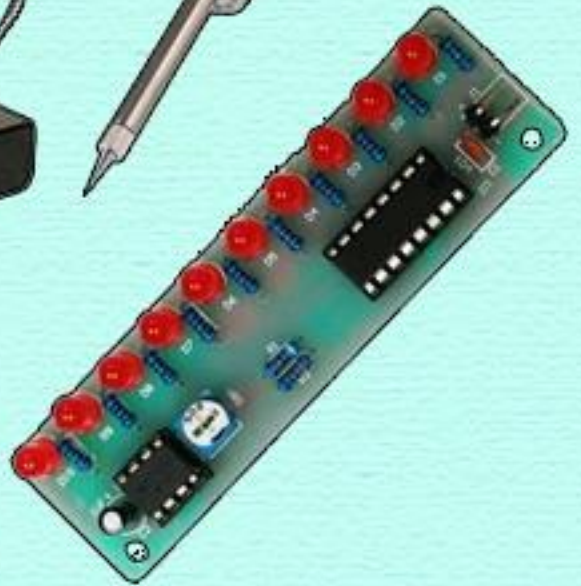
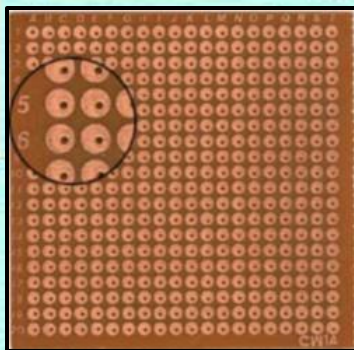


LEARN HOW TO SOLDER KIT

Provides you with tools and practice material to get you started with soldering.



Build your own
LED Flasher kit!

SOLDER-KIT

LEARN HOW TO SOLDER KIT

CONTENTS OF THIS KIT

QTY	ITEM	DESCRIPTION	ABRA #
1	Solder Iron	30 Watt Soldering Iron	SI-3771
1	Solder Iron Stand	Solder Stand with Sponge	TSH-007
1	Solder	0.8mm 60/40 Solder	S-TUBE
1	Diagonal Cutter	5" Diagonal Cutter	DC5
1	PCB1	87 x 87 cm	BRD-150
1	PCB2	46.2 cm x 65 cm	BRD-140
40	Resistor	1/4 Watt Resistor	R1/4-10K
2	IC	24 Pin Integrated Circuit	HOUSE #
1	Led Flasher Kit	Led Flasher Kit	AK-75

INTRODUCTION

Soldering is an essential skill to master for electronic assembly and repair. This kit will provide you with the techniques and enough practice material to learn how to solder efficiently. This practice kit consists of two exercises soldering various electronic components such as resistors, capacitors, transistors and integrated circuits to a printed circuit board (PCB) and a LED Flasher Kit.

SAFETY

When turned on, soldering irons are EXTREMELY HOT! It might sound like a no-brainer until you or someone else gets a painful reminder if the tip is touched. The molten solder itself can be hot too because it can spill or splash like water. Even a ball of solder from a loose wire can fly around hitting anywhere, including your eye. The use of safety goggles is recommended. Safety goggles also provide protection when you cut the excess leads of your components. All solders will produce fumes that result from the heated rosin flux in the solder. Avoid inhaling the fumes. Practice in a well-ventilated area.

WHAT IS SOLDERING?

Soldering is a process in which two or more metal items are joined together by melting a metallic alloy called solder into the joint, the solder having a lower melting point than the components being connected.

WHAT IS SOLDER?

Solder is a metallic alloy designed to melt at a relatively low temperature and make low resistance electrical connections. There are many different solder alloys available, but they are all classified as with lead or lead free. For hand soldering solder usually comes in the form of solder wire.

Solder wire will contain rosin flux in a center core that when the solder is melted it cleans the surface of the contact and component lead to produce an excellent contact.

The most common lead solder alloy is a mixture of 60% lead and 40% tin with a melting temperature of approximately 340 degrees Celsius.

Lead free solder usually contains a mixture of tin, silver and copper and has a higher melting temperature of approximately 380 degrees Celsius.

Lead free solder is a mandatory requirement of ROHS (Reduction of Hazardous Substances) regulations in Europe since July 1, 2006.

ROHS regulation was introduced to prevent heavy metal contamination of groundwater from the millions of electronic components such as cellphones and computers that are disposed of each year into the ground. ROHS is not yet mandatory in North America.

PREPARING TO SOLDER

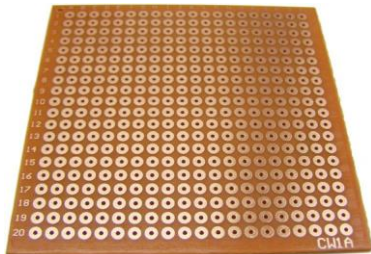
- Plug in your solder iron and allow a few minutes for it to warm up.
- Moisten the sponge on the solder stand with water to clean your solder tip during soldering.
- Once the solder iron has warmed up, melt a small amount of solder onto the tip.
- This is called tinning. This will accelerate the heat transfer between the soldering iron tip and the components you want to solder.
- The key to successful soldering is using a clean and tinned soldering iron tip every time you start to solder.
- Tinning creates a larger contact surface area and forms a heat bridge between the tip and the parts being soldered.
- Pick up the habit of wiping the tip clean on the wet sponge and tinning the tip every time before you start to solder.

SOLDERING GUIDELINES

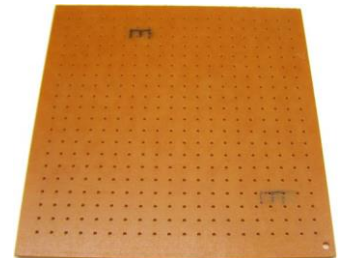
- Support the PCB by hand, or if necessary by placing it between two items that are equal in height to allow the longest component leads to completely pass through the PCB.
- On the side without the copper traces insert the components you want to solder.
- You can make the work easier to solder by placing all the lowest height components like the resistors or the IC's in first. Then after they have been soldered in, go to the next highest level component.
- Turn the board over carefully so as not to let the components fall out.
- Bend the component leads slightly to keep them in place for soldering.

- If all the components are equal height like the IC's or resistors, you can place the PCB component side flat on your work bench
- Clean and tin your soldering iron tip every time you start to solder.
- Touch the component lead and the solder pad junction with the soldering iron tip.
- Apply just enough solder to the junction to fill the solder pad.
- This should take not more than 1-2 seconds if you are making good contact with the tip.
- A good solder joint will appear shiny and conform smoothly to the component lead.
- When you are finished soldering, trim off the excess component lead length.

EXERCISE #1: BRD-150



**BRD-150
SOLDER SIDE**



**BRD-150
COMPONENT SIDE**



IMAGE 2

- The BRD-150 has 3mm diameter solder pads to provide a large forgiving contact point for the first soldering experience.
- Assemble the Soldering Iron Stand by inserting the screw through the spiral holder into the stand and tighten with the supplied wing nut. (Image1)
- Place the soldering iron into the soldering iron stand and plug it into a 115VA outlet. Allow a few minutes for the soldering iron to warm up.
- Completely wet the soldering iron stand sponge & place in the holder. (Image2).



IMAGE 1

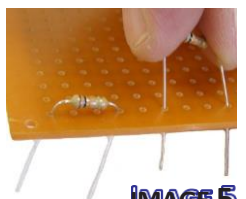


IMAGE 5

- Clean and tin the tip. (Image3)
- Locate the 40 ¼ watt 10K ohms resistors. (Image4)
- Separate the resistors from the tape.
- Insert 4 resistors in a line on the BRD-150 separated by one mounting hole. (Image5)



IMAGE 4



IMAGE 3

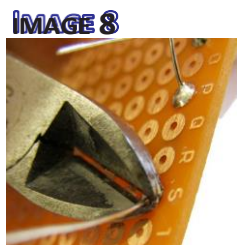


IMAGE 8

- Turn the board over and bend the leads on the solder side to the component side. (Image6)
- Solder the leads of the four resistors. (Image7)
- Remember to clean and tin the tip frequently to get good heat transfer for quick solder connections.

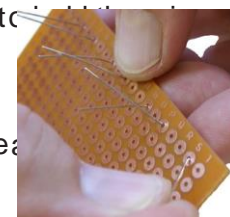


IMAGE 6

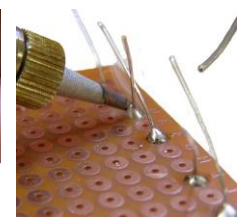


IMAGE 7

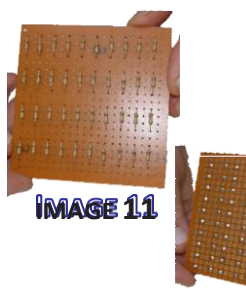


IMAGE 11

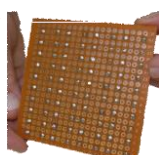


IMAGE 12

- Trim the leads flush with the PCB using the supplied DC5 diagonal cutter. (Image8)
- Inspect your work for shiny solder joints that are smoothly formed to the junction. (Image9)
- Repeat the solder exercise w/ 4 more resistors. (Image10)
- Inspect your work for shiny solder joints that are smoothly formed to the junction.
- Repeat until all 10 rows are complete. (Image11)
- Inspect your work for shiny solder joints that are smoothly formed to the junction. (Image12)
- Refer to the illustrations in the following Solder Joint Appearances section to see solder joints that are not acceptable.



IMAGE 9



IMAGE 10

EXERCISE #2: BRD-140

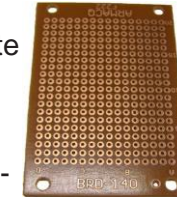
- The BRD-140 has 2mm diameter solder pads to emphasize quick and accurate soldering technique.

IMAGE 15



- Locate the 24 pin IC's to be soldered. (Image15)
- Note that the leads on the IC's are slightly bent outwards for automated manufacturing and must be bent in on one side to fit into the hole pattern in the PCB.
- Take one IC & place it vertically w/ one row of pins on your bench. (Image16) Push down to bend the pins inwards slightly so they make a right angle w/ the edge of the IC. Check that the IC pins fit easily into the BRD-140.(Image17) If the pins do not fit easily, repeat the bending procedure until they fit. Check to see that all the pins have been inserted. (Image18)
- Repeat straightening pins & inserting the second IC into the PCB. (Image19)
- Support the IC's while turning the board over carefully on the table to prevent the IC's from falling out.
- Solder both IC leads in place. (Image20)
- Remember to clean & tin the tip every time you start to solder.
- Inspect your work for shiny solder joints that are smoothly formed to the pin junctions. (Image 21)
- Refer to the illustrations in the following Solder Joint Appearances section to see solder joints are not acceptable.

SOLDER SIDE



COMPONENT SIDE



IMAGE 16

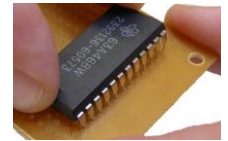


IMAGE 17

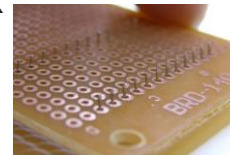


IMAGE 18

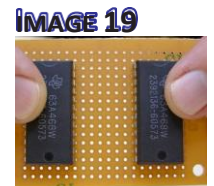


IMAGE 19

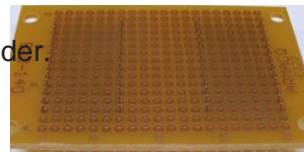


IMAGE 20

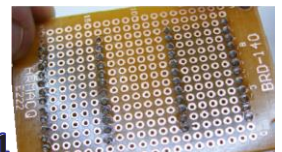
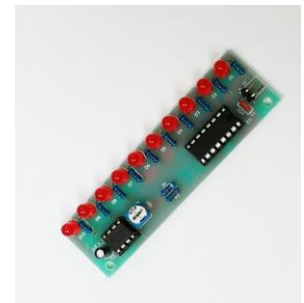


IMAGE 21

EXERCISE #3: LED FLASH KIT

To put your soldering skills to use, locate the LED FLASH KIT package and follow the instructions to make your very own LED FLASHER.



SOLDER JOINT APPEARANCES

GOOD SOLDER JOINT



Normally, a good solder joint looks smooth and only goes to the mask boundary as well as having no pits and holes in it.

BAD SOLDER JOINTS



Cold solder: often when the iron was pulled out too soon, thus not giving time to smooth out on its own.



Insufficient Solder: Not enough solder was applied for the joint.



Excess solder: Too much solder was used for the joint.



Overheated Joints: cause by repeating repair of wetting properly.



Rosin Joint: Cause by too little heat & the more flux took over the soldering joint.



Disturbed Joint: cause is by movement of soldering solidification.