Attach Leg Supports

Solder on two lengths of steel spring wire (A), each about 4 cm long to the V+ and V– pads as shown.

Thread a 3cm length of insulation (D) stripped off the yellow wire over each steel spring wire.

Bend a small "hook" on the end of the steel wire to prevent it from pulling out of the foot.

Use a 1 cm length of heat shrink (C), RED on the V+ side and BLACK on the V– side, to cover the foot magnet (B) and hold it to the steel wire (A)

Shrink the heat shrink gently with a small controlled flame until it is snug around the magnet and steel wire.

Attach to Battery

Attach the magnet feet to the top the 9V battery connections as shown on the front page of this manual. Watch the polarity and don't let the bare magnets or wires short together!

NOTE: Some 9V batteries, especially the cheap ones don't have connectors which attract to magnets. You might need to shop around!

Other CYBUG kits…

If you enjoyed surface mount soldering, we encourage you to purchase our solar powered surface mount kit, the CYBUG HORNET!

Your Cybug Smarti will enjoy the company of our other robotic lifeforms including the new Flitterbug, QueenAnt, Scarab, and the Solarfly (solar powered).   Visit our website to see all our robotic ecosystem members!

If you have any questions or problems with your kit, please to not hesitate to contact us! Full schematics and troubleshooting tips are on our webpage.

We'd like to hear what you think of the engine, and let us know what sort of application you've put your **"Smarti head"** to.

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Cybug SMarTi
Learn Modern Soldering Techniques!

Beginner Level Robot Kit

http://www.jcminventures.com

Learn Surface Mount Soldering… It's Easy!

The CYBUG Smarti (A play on SMT: Surface Mount Technology) uses the same cool technology found in todays electronics to make a funky flashy magnetic electro-guy.

- Uses modern surface mount components which allow the builder to become familiar with SMT soldering techniques.

- Includes fine-gauge surface mount solder!

- Comes with excellent and educational illustrated building guide!

- Magnetic Quick Connect feet

- Very Cool behavior! Springy legs! Flashy Led eyes!

JCM InVentures Inc. (c) 2006

Before you begin...

The CYBUG Smarti has been designed using a large number of modern "surface mount components" which allows the builder to become familiarized with surface mount soldering techniques! This type of component better reflects the typical electronics found in products today.

Take a moment and go through this parts list to make sure you have all the components accounted for. Be very careful that you don't loose any parts when you open the bag... some are VERY small.
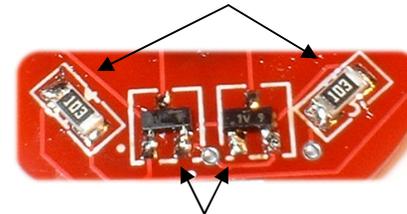
ALWAYS WEAR SAFETY GLASSES!

Qty	Description
2	SMD LED
2	SMD 10K ohm
2	Magnets
1	Decorative Feather
2	100uF eletr cap
2	MMBT642 darlingon
1	20 cm Feeler, guitar string
1	Manuals
2	1000 ohm resistors
1	90 cm Solder
1	4 cm heat shrink tubing
1	PCB

You will need the following tools to proceed with soldering your Smarti.

* Tweezers
* Magnifying glass
* Soldering iron with 0.01" (0.4mm) clean tip
* Fine (0.15" diameter) Rosin Core solder with flux
* Isopropyl alcohol (the purer, the better!)
* Small pliers and sidecutters
* small tray or egg carton to hold components
* Optional solder Rosin flux
* Optional small vise or "Helping Hands"
* Old Toothbrush

Using tweezers, place two "**103**" (10 K ohm) resistors in the locations on the lower portion of the circuit board as shown. Re-heat the solder bead from step 1 for 2 seconds to attach the one side of the resistors. Use some fresh solder to attach the other side of each resistor

LED's... now these take a careful inspection since polarity is important. If you look carefully, you'll see one side of the plastic base is a little longer than the other (the right side is shorter here). That's the NEGATIVE side of the LED.

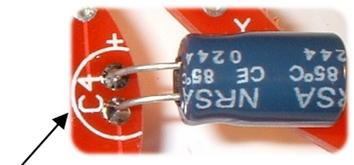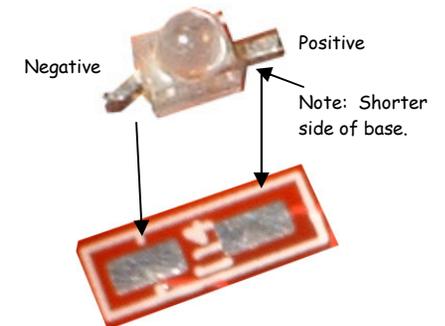Negative

Positive

Note: Shorter side of base.

Solder the two **transistors** as shown here.

Solder in the two 1000 ohm resistors into the positions above the LED's as shown! No polarity to worry about here!

Flatten out the two leads on the LED and solder them to the pad's where the "eyes" on your happy face would go. The Negative side of the LED MUST go on the same side as the white bar on the silkscreen. (Toward the RIGHT side in this picture.)

Solder the 100uF capacitor into the left and right side of the "face" (where the ears should go!). Watch the polarity. The negative lead of the capacitor is marked on the plastic case. It should go in the lower of the two pads! (not in the pad marked +)
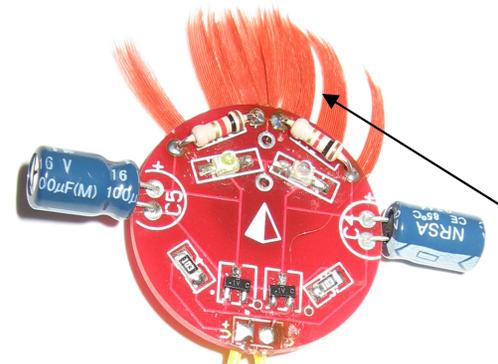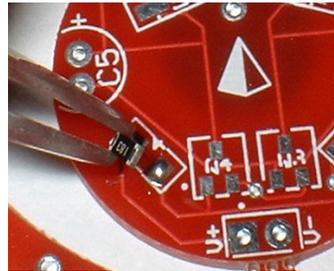
Use a tiny amount of hot-glue to affix the feather-hair to the backside of the head (or any other place you like!)
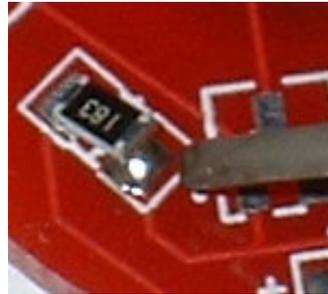
Soldering surface mount components...

4. Solder the component onto the PCB.

    - Use a very fine set of pliers or tweezers to pick up your component and place it over the pads you have just prepared in step 3. Make sure it is placed on the pads with the printed side up!

    - With the component on the pads, place the tip of the iron on the pad with the solder bead to re-melt that solder. Once you see the component settle into the solder, move the component to line it up with the pads. Once the component is aligned, remove the iron and allow the solder to cool.

    - Look carefully at the component to assure it is on straight and the part is flush with the printed circuit board (PCB) with both ends contacting the pad. The part should be nicely centered.

    - Apply a small length of solder (about the same length as the pad width) to the unsoldered end of the component by touching the solder, iron tip, the pad, and the component edge at the same time.

    - Visually inspect this last connection to make sure the solder has melted on the pad and the edge of the component. The solder should appear as a good fillet on the lower edge of the component and the pad. Watch out for "lumps" of solder which don't actually make a good electrical connection.

    - Go back to the first end of the part and reheat the solder to allow it to properly flow around the component. If the solder seems light, add a bit more.
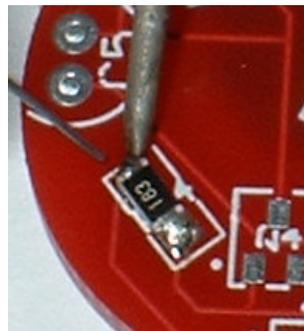
5. Clean off the excess rosin with isopropyl alcohol and a stiff brush… Toothbrushes work well.

Place component on prepared pad

Component about to be soldered

*Re-heat solder and let component settle in.*

*Solder other side of component.*

Soldering surface mount components...

1. Turn on the soldering iron and, once heated up, clean the tip by wiping it on the sponge. The tip should be bright silver without any trace of burnt rosin or other buildup. It is very important that you clean the tip of your soldering iron frequently to assure good soldering connections.

2. Place the printed circuit board on a flat surface with the silk screen side up. (The silkscreen is the white lettering on the circuit board which labels the components)

3. Place a bead of solder on one of the pads on the pcb you are going to solder.

    - Tin your soldering irons tip by placing a small bead of solder on it. This will help to conduct the heat from the soldering iron to the component being worked on.

    - Touch the tinned iron tip to the pad on the printed circuit

    - Melt on a length of solder equal to the width of the pad. (just a little bit!) This bit of solder will be used to secure the component a few steps later.

    - Lift the solder off the pad, then the iron.

Optionally, apply a small amount of rosin based flux to this pad, and to the pad on the other side of the component. Rosin flux removes oxides from the surfaces you are soldering and keeps them removed during the soldering process. There is rosin inside rosin core solder, but the best joints occur when using the externally applied rosin flux.
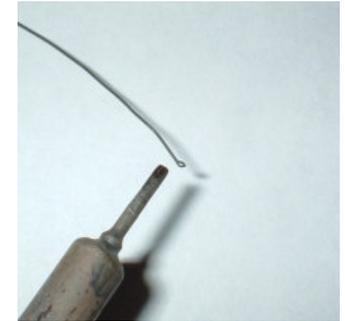
Tin your tip and keep it clean!
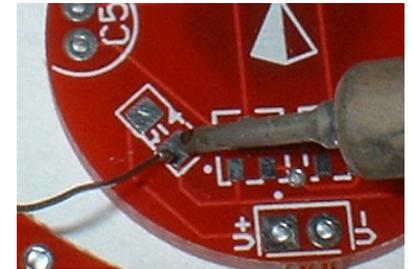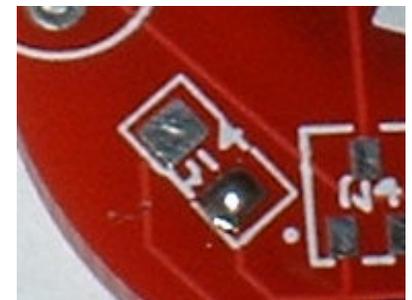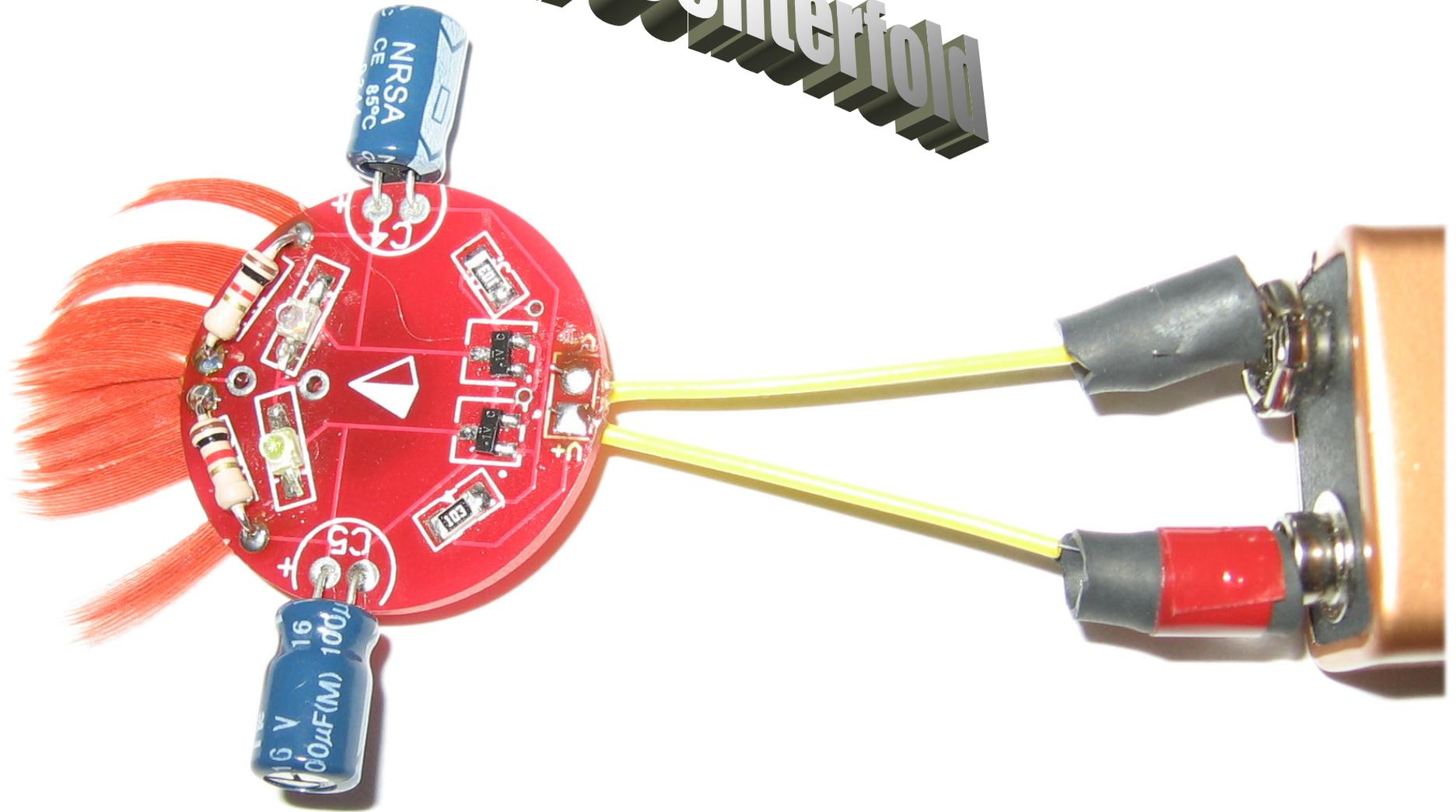

Apply a small amount of solder to one pad

Image of pad with bead of solder on it

Smarti Centerfold

Use this photo for reference while you're building your SMarTi