

# LineBot Assembly Notes

(Preliminary 08/11/07)

## Board Assembly

Tack and hold thru-hole parts when soldering to insure that parts are down flat to board

Cut battery holder tabs flush with bottom of the board **before soldering** to avoid interference with motors.

Installing the QRD1114 - This part can be put in backwards so verify correct orientation before soldering. The emitter (clear) side of the part should be on the outside of the board. Clip leads prior to soldering. Tack part and double check alignment before soldering completely. This part is easily damaged by heat so solder as quickly as is reasonable.

Notice that there is a pad layout for an optional 1N914 diode on the bottom of the board. More information on this option later.

The excess flux can be cleaned from the board after soldering with alcohol. I suggest using pipe cleaners to do this. Be sure you do not get the kind of pipe cleaners that have metal wire in them that will scratch the board.

## Motor Installation

Cut the motor leads to  $\frac{3}{4}$ " and tin with soldering iron **before** installing. The wire is tiny and easily damaged so practice stripping it on the excess you cut off before attempting to do the actual motor leads.

The GM-10 motors require modification for continuous rotation before installation. We will discuss this procedure at the meeting. The ears will also need to be removed. I will give you an excellent procedure for this at the meeting.

Before you glue the motors down, you should sand the bottom to rough it up and also make sure it is absolutely flat. This is very important! I use a fine grit adhesive backed paper on a flat surface for this procedure.

There are two alignment lines on the bottom of the board to help you position the motor. The motors should be centered between these lines and be even with the outside edge of the board. Take a good look at this before you glue. The glue sets very quickly and if you don't get the motors on straight, the robot will want to turn.

Attach the wheels to the motors **before** you glue. You don't need the screws in the wheel so long as they are fully seated. You only have a few seconds to get perfect alignment before the glue sets. The wheels will help you tell if the motor is correctly aligned. Glue the motors to the

pcb with either “Gap Filling” or “Extra Thick” CA. Do not use the normal “Thin” CA for this purpose. Mild To Wild hobby shop has small bottles of this CA.

Before you solder the motor wires you will need to determine which one goes where. I have seen many cases where the wires on these motors were not color coded the same. You will need to verify the direction of rotation before soldering. Connect a 1.5v battery to the motor and change the polarity such that the motors are moving the robot forward. Which ever wire is connected to the plus (+) lead after this test should be connected to the “square” motor pad on the pcb.

### **Miscellaneous Notes**

I have seen some of the switches be a little intermittent after going through the soldering process. You may need to push the button a couple dozen times to get it working reliably again after assembly. This should not continue to be a problem. It can just be an issue when it is used for the first time.

I have seen cases where the QRD1114 sensors were grossly mismatched (out of spec). This can make the bot want to follow other than the center of the line. This is not a common problem, but it can happen. We will discuss what to do if you think this is happening to you.

### **Software For Your Bot**

The whole idea behind my making the LineBot project a reality was to inspire everyone in the club to get seriously involved with Atmel programming. This little bot should make that process a lot of fun. We will be discussing various programming procedures and concepts at meetings, but I have no intention of publishing finished code for anyone to use. The basic idea here is for **you** to write the code! I will however post on the website a HEX file of some very primitive code that will let you verify that your hardware is working correctly and that you can in fact download from the STK500 to your bot successfully. I hope everyone maintains the spirit of this project and has a lot of fun. I have written several variations of code for this already so I know it should work when it’s done. ☺

### **Website For This Project**

Because the club does not have a website where we can post project information, I am going to setup a LineBot page at: [www.wildrobots.com/linebot/](http://www.wildrobots.com/linebot/)

I will be posting updated and hopefully more complete copies of these notes on that page. I will also post some pictures that should be helpful. Be sure to check the page periodically for updates.