

BUILD REPORT:

Mini Bot Hockey Bots — Part 3

● by Pete Smith

In Part 2 of this series, I discussed how I made the chassis and drive train. In this part, I will show you how I wired the bots and set up the transmitter and receiver.

Oftentimes, wiring in a bot can look like a rat's nest (**Figure 1**), and be rather daunting to someone who has never built a robot before. Fortunately, it's not as complicated as it looks.

The wiring diagram (**Figure 2**) shows where each wire goes to. Power flows from the battery on the left to the power on/off switch first. Since this is a hockey bot, I used a cheap commercial on/off switch that had a built-in LED indicator designed to run on 12V.

A combat bot should use switches such as those offered by Team Whyachi, or simply use a wire link as these are much less likely to get knocked to the "off" position in an impact, or fall apart.

I carefully checked out which terminal on the switch should be connected to the battery; it is the power out and the last one which is the ground for the LED indicator. In this switch, they are marked +, A, and the ground symbol, respectively. You could use spade terminals to connect the leads but I soldered them on as shown in **Figure 3**.

Try to stick with red for the positive (+) wires and black for the negative return (-) wires. This reduces the chances you will short out the battery or connect the ESCs up the wrong way which will often result in them being damaged.

The battery has to have its own connector so that it can be removed from the bot for safe charging. However, some builders like to solder all the other connections directly. This saves weight and space, but makes replacing any failed component that much harder — especially

when under pressure during an event.

I prefer each part to have its own connectors so that it can be quickly unplugged and replaced. In this bot, I used Deans type connectors for the power connections and 2 mm gold for the connection to the drive motors.

I modified the drive ESC (I used Banebots 12-45s, in this case) by removing the heat shrink and unsoldering the single motor leads, then replaced them with two smaller gauge wires on each side. I recovered them with new heat shrink tubing (Figure 4). This makes it easy to use one ESC to power both motors on one side of the bot.

Make sure you connect the right-hand ESC to the motors on the right and the left-hand ESC to the motors on the left. It's easy to plug them into the wrong motor since all the leads can get mixed up in the tight space between the ends of the motors.

I'm using a new radio in this bot: the HobbyKing HK6S (Figure 5). This is a simple entry-level 2.4 GHz spread spectrum radio with built-in mixing. It looks rather odd since it has no external antenna, but this is an advantage in my application as the kids who will be using the bots often end up breaking them off!

The radio failsafes correctly for combat use, and the channels are easily reversed using the switches on the front (Figure 6). If you use this radio in a combat bot, reverse the throttle channel or you will find the throttle is full on in the down position; most ESCs will not power up this way. It uses eight AA alkaline batteries (not included) and is already bound to the supplied receiver. Set up the switches on the radio as shown in Figure 6.

The signal leads from the ESC

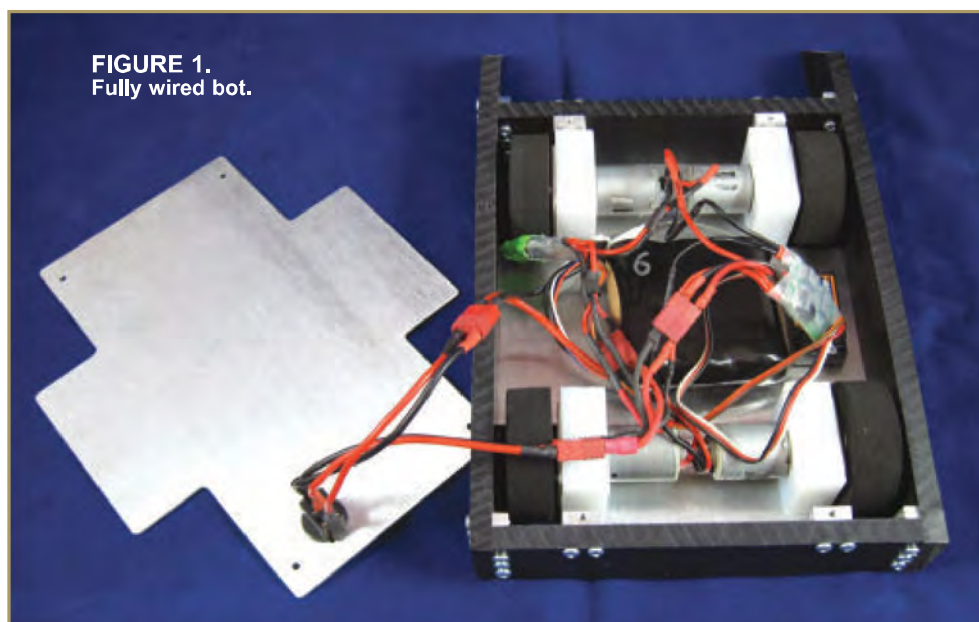


FIGURE 1.
Fully wired bot.

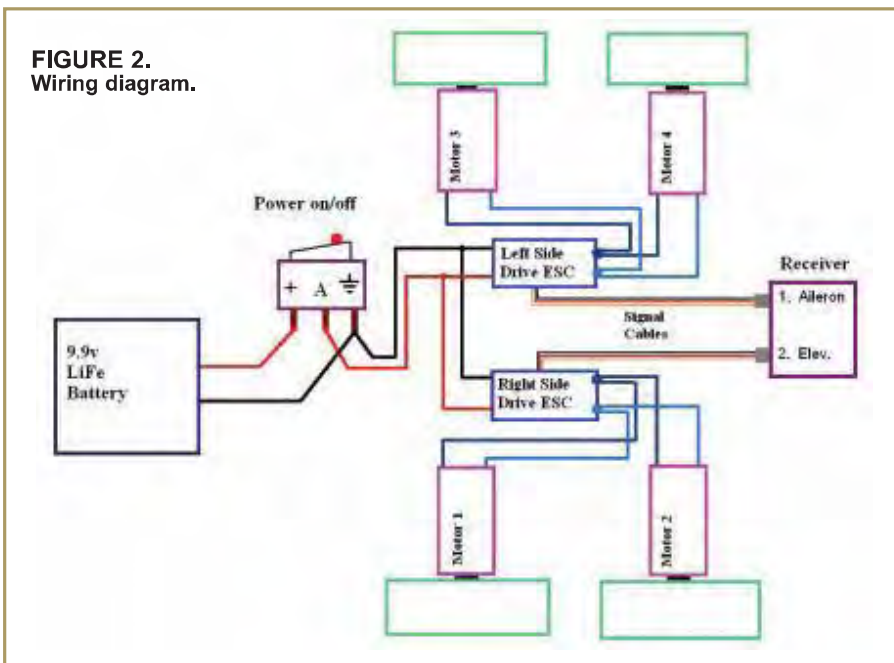


FIGURE 2.
Wiring diagram.

plug into RX Channels 1 and 2 which are Aileron and Elevator, respectively (Figure 7). The black wire in the signal leads goes to the outside as shown.

Set the bot up on a block of wood (or something similar) so that its wheels cannot touch the ground. Switch the transmitter on first, then switch on the bot. When you push the left lever on the radio forward, the wheels should all turn in the same direction that would make the

bot drive forward if it was on the ground.

If any of the wheels go in the wrong direction, swap around the leads going to that motor (this is where you'll find the 2 mm connectors make life much easier than if you had soldered them on).

Once you have all the wheels turning in the right direction for forward and back, push the lever to the left; the right side wheel should turn forward and the left side wheel

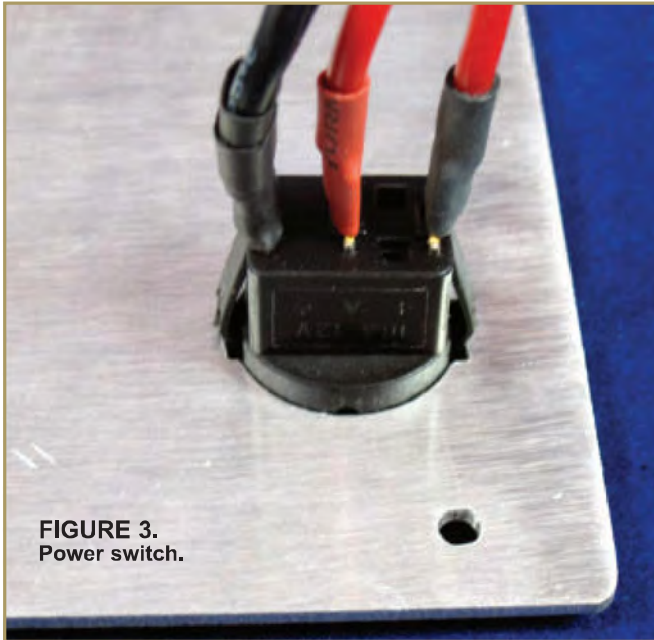


FIGURE 3.
Power switch.



FIGURE 5. HK6S transmitter.

should reverse. This will make the bot turn to the left.

If, however, the bot turns right instead, swap the signal leads in the receiver so that the wire in Channel 1 is now in Channel 2, and vice versa. You may have to reverse the leads on the motors again, but you should be able to get them all running in the correct direction when you move the lever forward and back and side to side.

Tidy up all the wiring so it's clear of the wheels using tiewraps, etc. You are now ready to go drive your bot.

This robot proved to be quite fast and powerful, but still easy to drive. In fact, it's ideal for its designed task: to let kids have fun playing bot hockey.

I've completed two of the bots. Now, I just have to get the rest finished before summer camp starts! **SV**

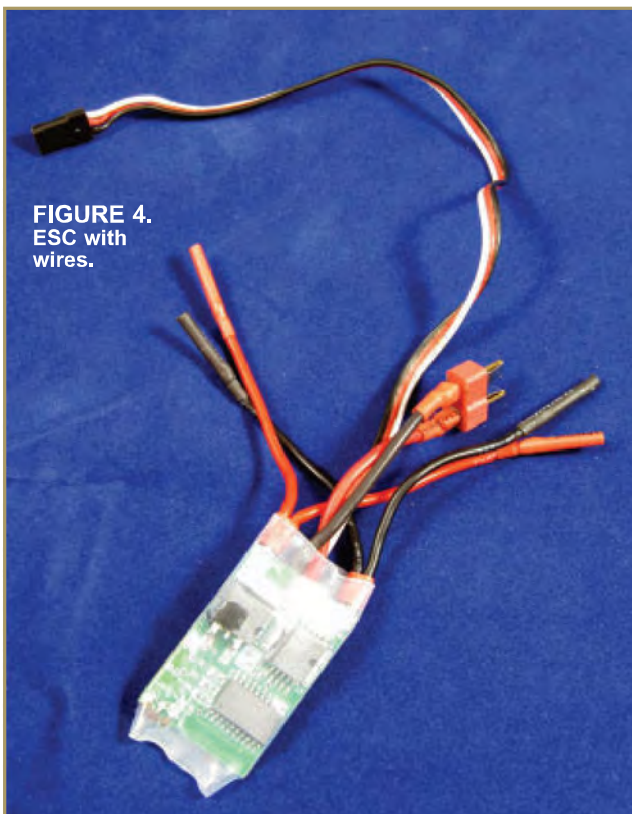


FIGURE 4.
ESC with wires.



FIGURE 6. Switch settings.



FIGURE 7.
Receiver.