4WD1 Electronics Installation & Testing Instructions
Rev. 1.

Updated 02.02.05

Print this out and get the kit.

Note: Do not use Loctite or thread locks on the assembly. They are not necessary and may cause damage to the Lexan.

Image of 4WD1.

Step 1. Figure 1 illustrates providing power for both the Scorpion and the Bot Board using a single 7.2vdc battery. Solder the battery connector to some short sections of 20awg hookup wire (not included). The battery connector acts as a power switch.

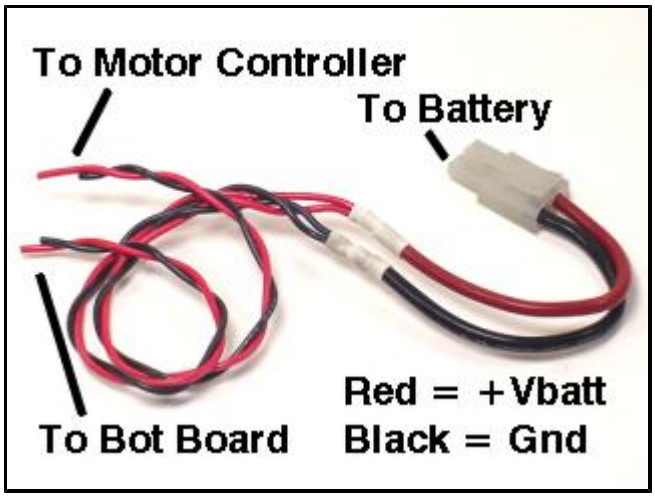

Figure 1.

Step 2. Install the Bot Board and Scorpion as shown, using eight of the .250" 4-40 screws.

8 x

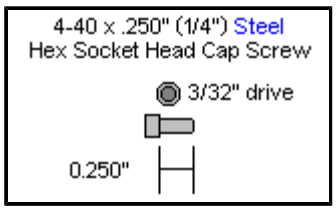

Figure 2.

Step 3. Connect the motors and battery to the Scorpion as illustrated. Install two 6" servo cables from P0 and P1.

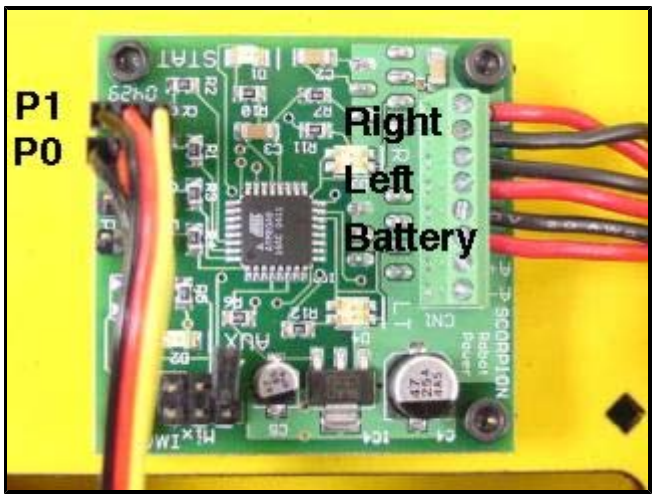

Figure 3.

Step 4. Install the Basic Atom as illustrated. Refer to Tables 4-1 and 4-2 for wiring connections. The robot is now ready for programming and experimentation.

Figure 4.

Connections			
P0	L Scorpion Ch. (Throttle)	P1	R Scorpion Ch. (Steering)
P4	A Button	P5	B Button
P6	C Button	P9	Speaker

Table 4-1

Bot Board Jumpers	
Connect	7.2vdc battery to VS
Enable	Speaker
Enable	A, B, C Button
Connect	VS to VL
Connect	AX 0-3 Power Bus to VL

Table 4-2

Step 5. Go to the Basic Micro web site and download the latest version of their Basic Atom development software. Follow the instructions on their web site to download, install, and run the program on your PC. This program is often called an editor, but the Basic Micro editor is a complete ISP (In System Programming) system. This allows you to test code changes on-the-fly without unplugging or switching cables around, and best of all the compiler and programming software comes in one easy to use windows interface. No more switching between applications for writing, compiling or programming. When you have a feel for the program you can load and program your Basic

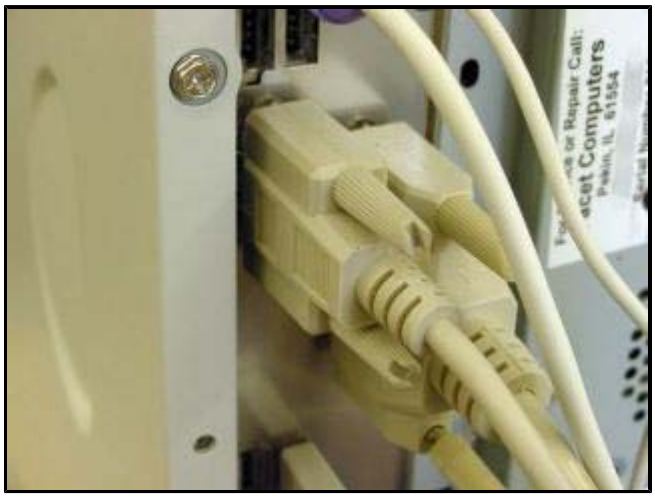

Figure 5.

Atom with the BASIC programs listed below.

Step 6. Download this file (4wd1tst1.bas) and run it.

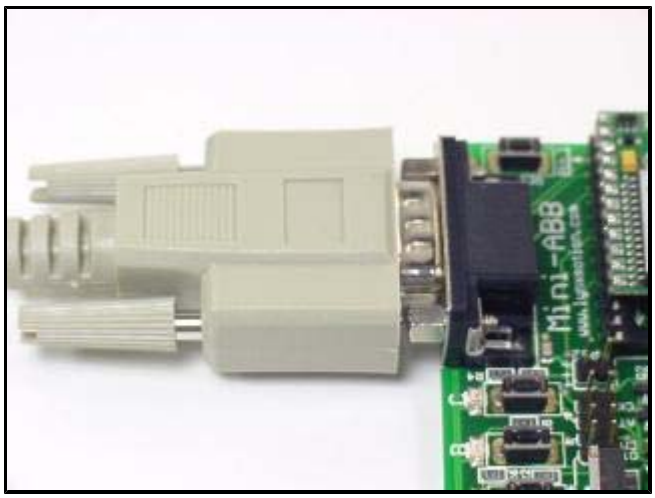

Figure 6.

Upon powering up the robot, you should hear four ascending notes. The green LED on the Scorpion should blink briefly and then turn on steady. Pressing B once results in a beep and slow forward motion (10%). Pressing nine more times results in 100% power. Note, the motor will reach full speed at approximately 70%. This is due to the programming in the Scorpion. After the motor is at 100% power, pressing B will reduce the speed in 10% increments until it stops. Continue to press B to make the robot move as above, only in reverse.

Press Reset, then B twice. Now press C a few times to see the robot make a gradual left turn. Pressing A a few times will return to forward motion, and continuing to press A will result in gradual right turn.

Experiment with these buttons to understand how throttle and steering can be used to control the vehicle's motion.

Step 7. Download this file (4wd1tst2.bas) and run it.

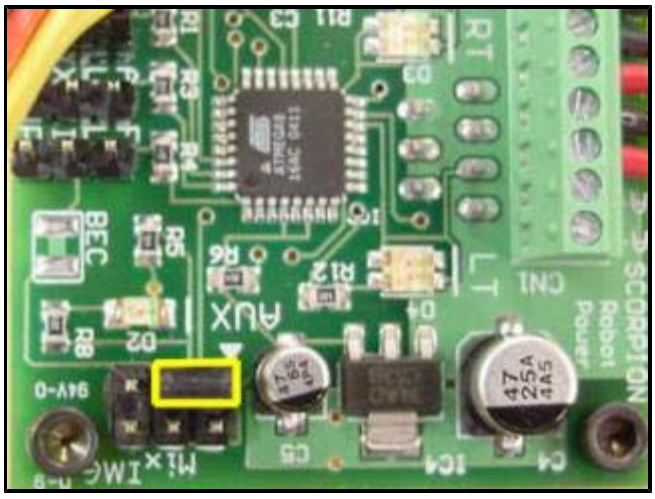

Figure 7.

This program requires the Scorpion mixer to be disabled. This is done by installing a jumper as illustrated in Figure 6. This will put the Scorpion in differential mode, where the left and right speed and direction are controlled separately.

Upon powering up the robot, you should hear four ascending notes. The green LED on the Scorpion should blink briefly and then turn on steady. Pressing A once results in a beep and slow forward motion (10%) on the left channel only. Pressing nine more times results in 100% power. The motor will reach full speed at approximately 70% as before. Continuing to press A will make the motor act as above, except only for the right channel. The C button will control the left motor in a similar manner. Pressing the B button will reset the speed and direction of both left and right.

This should provide enough information to help you write a program for autonomous control of the robot. These hardware setups are used for our autonomous and remote control tutorials.