Getting Started with OPEN-ROBOT & MatchPort b/g

This document will help get you started with your MatchPort b/g equipped OPEN-ROBOT. You will be introduced to your robot along with the different sensors and where they are located. ***This document assumes that you have already assembled your robot and purchased a MatchPort b/g module, antenna, and UFL to SMA antenna cable.***

Getting to Know OPEN-ROBOT:

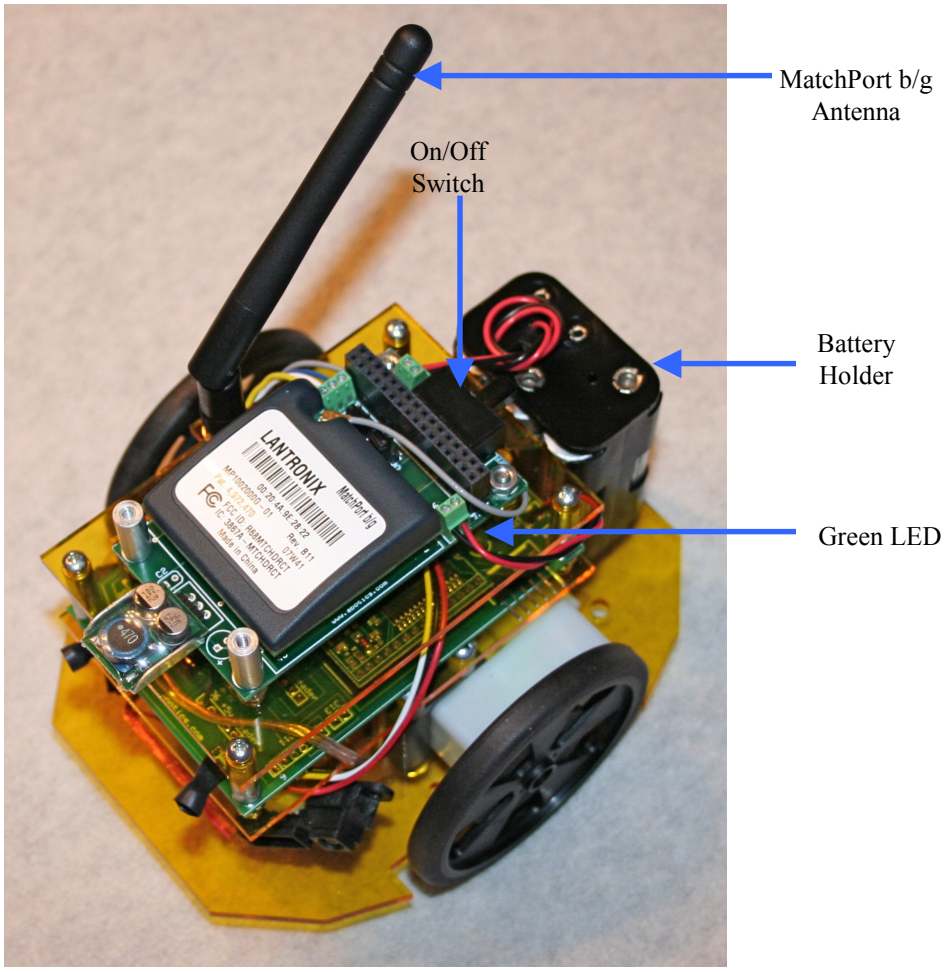

Figure 1. OPEN-ROBOT.

In figure 1 you can see the robot's on/off switch and the (6)-AA battery holder. Before we get started, remove the battery holder by unsnapping it from the robot's base plate. Firmly hold the robot with one hand while pulling the battery holder. Now load (6)-AA batteries into the holder while observing the proper insertion orientation. The negative (-) end of the each battery must be inserted such that it makes contact with the corresponding spring on the holder. ***Failure to do this will damage the robot's controller board.*** We recommend using 15-minute rechargeable AA-batteries, however, you can use regular alkaline batteries. After inserting the batteries snap the battery holder back onto the robot.

You will feel the holder lock into place when you press it onto the robot's base plate. Turn your robot on using the on/off switch. Once on you should observe a green LED on the controller board light up. If not be sure to check the orientation of each of the batteries and also make sure that they are fully charged if using rechargeable batteries.

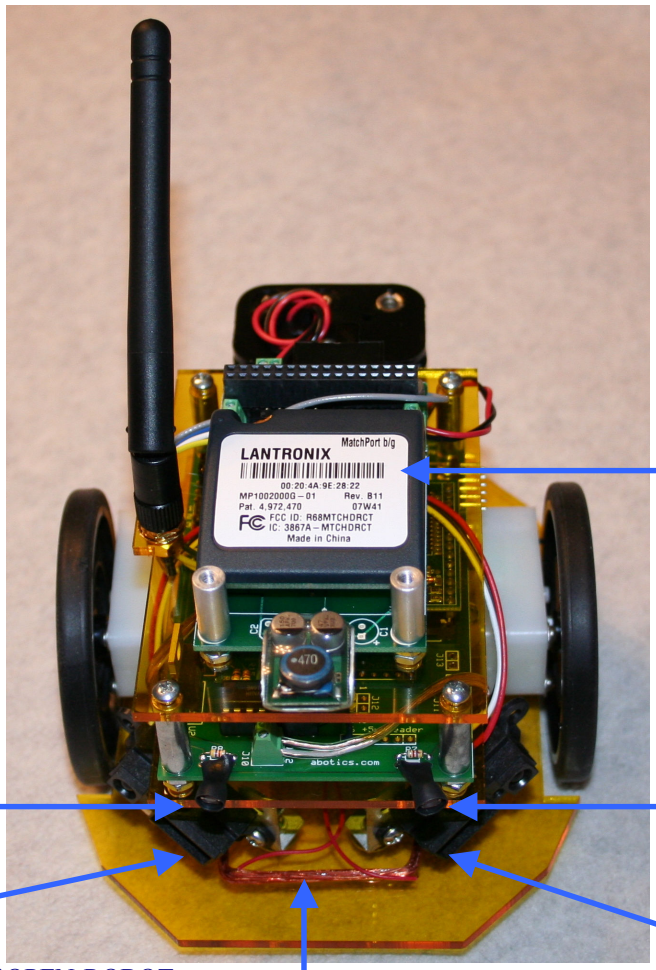

Figure 2. Front view of OPEN-ROBOT.

In figure 2 the front left infrared (IR,) front left light, front right IR, and front right light sensors can be seen. Additionally the RFID antenna is located on the robot's base plate. The IR sensors help the robot to see obstacles, other robots or even to follow walls. Ambient light levels can be sensed using the light sensors, which means the robot can sense whether it is light or dark in a given environment. Passive RFID tags can be read or written to with the RFID antenna. Tags can be used to store x-y coordinate information so that your robot can find its way in a room or small environment. The tags can also store virtual food so that your robot has to search out tags in a game of survival of the fittest. There are numerous other possible uses for the RFID tags and we have only touched on two. The MatchPort b/g allows you to connect and control your robot using wireless 802.11 b/g, WiFi.

Connecting to OPEN-ROBOT for the First Time:

By default the MatchPort b/g module is configured in Ad Hoc mode. This means that you will need to open your Wireless Network Manager and browse for either the LTRX_IBSS or OPEN_ROBOT Ad Hoc network. If you purchased your MatchPort from us then it will be configured with the OPEN_ROBOT Network Name (SSID). Once the LTRX_IBSS or OPEN_ROBOT Ad Hoc network is visible, simply connect. Be sure to wait for your computer to acquire an IP address before moving on to the next section.

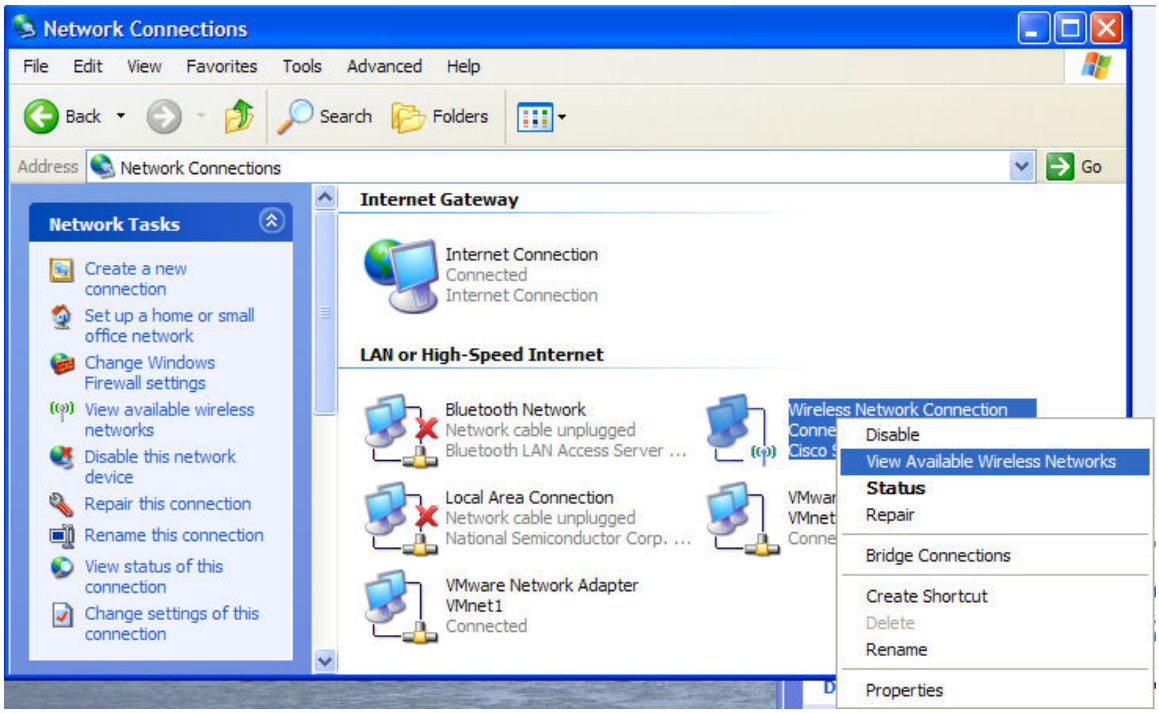

Figure 3. View Available Wireless Networks.

IMPORTANT NOTE - if your host computer is configured to use a static IP address, you need to configure your computer to use DHCP, at least for communication with the Matchport, or you need to assign a static IP address in the 169.254.xxx.xxx subnet. This is because the Matchport acts as a DHCP server for the "LTRX_IBSS" or "OPEN_ROBOT" Ad Hoc network, assigning addresses in the 169.254.xxx.xxx subnet, and if your host computer has a static IP address of 192.168.1.27, it will never be able to communicate with 169.254.xxx.xxx because the network driver won't know how to route packets to a different subnet without explicit routing instructions.

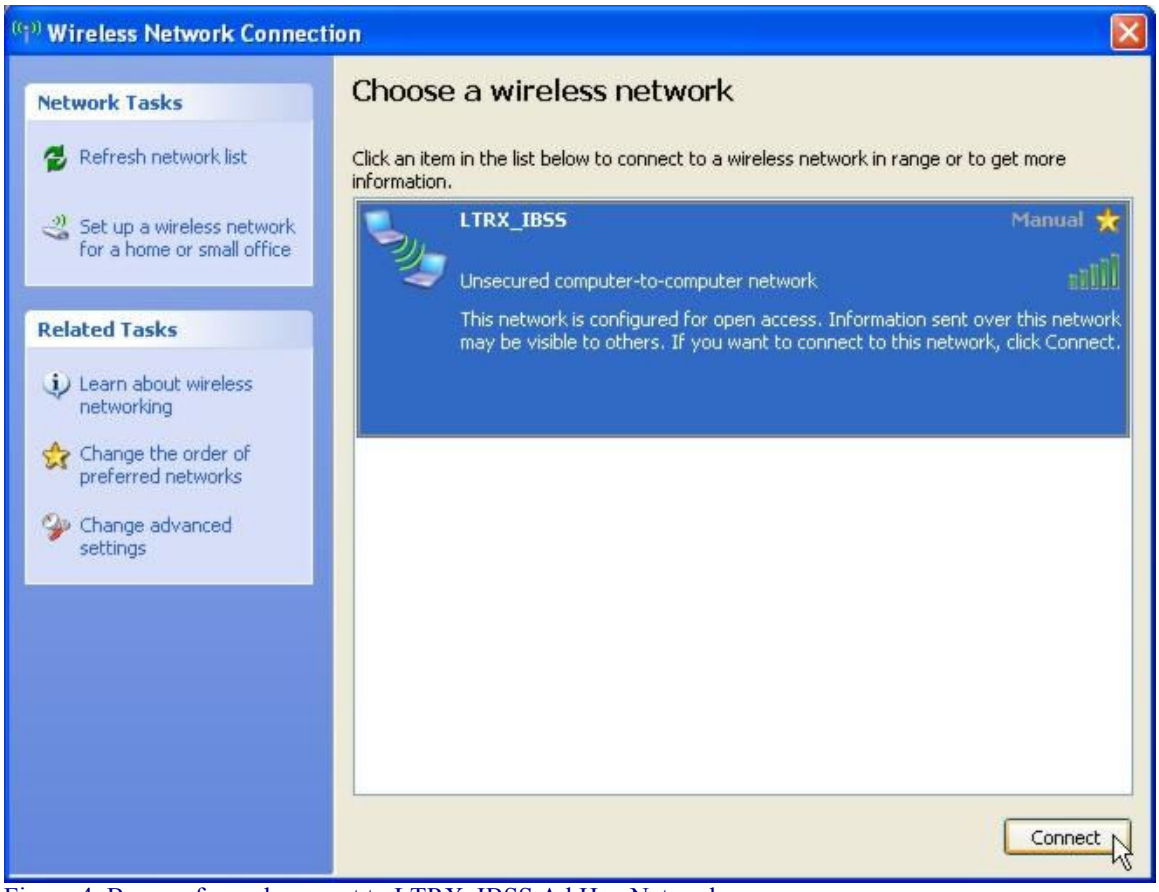

Figure 4. Browse for and connect to LTRX_IBSS Ad Hoc Network.

Click Refresh network list under Network Tasks. Once the LTRX_IBSS network is available simply click it and then click the Connect button. It may take a minute or so for your computer to acquire an IP address. Now that we are connected to the LTRX_IBSS network we can connect to the MatchPort b/g and command OPEN-ROBOT.

Connect Using the OPEN-ROBOT TCP-Socket Manual Control Program:

Download and install the OPEN-ROBOT TCP-Socket Manual Control Program. Run the program and enter your MatchPort's IP address and select **Open** from the **Socket** menu. If you purchased your MatchPort b/g module from us it will be configured for Ad Hoc mode with an IP Address of 169.254.0.10 and the baud rate will be set to 115,200 BPS so that it matches OPEN-ROBOT's baud rate. If you purchased your MatchPort from some place else, then you will need to scroll down to the next section, Reconfigure MatchPort Network Settings, to set the baud rate to 115200 BPS. After selecting Open, the program will attempt to create and open a TCP-Socket connection with the MatchPort. Be sure that the robot is turned on first.

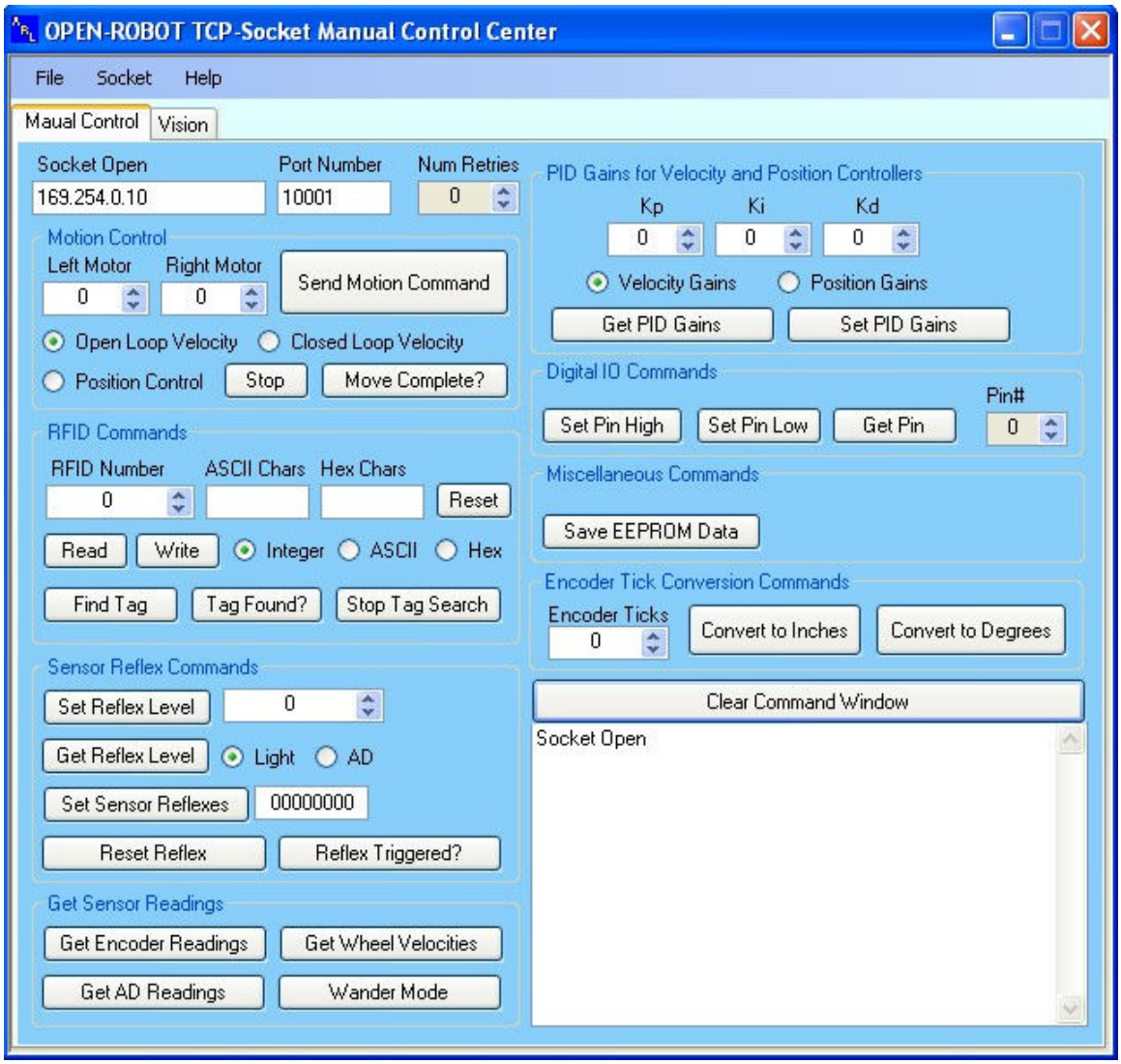

Figure 5. Use Manual Control program to test out OPEN-ROBOT.

Once the socket is open you can command OPEN-ROBOT. Try getting the analog-to-digital sensor readings by clicking on the Get AD Readings button.

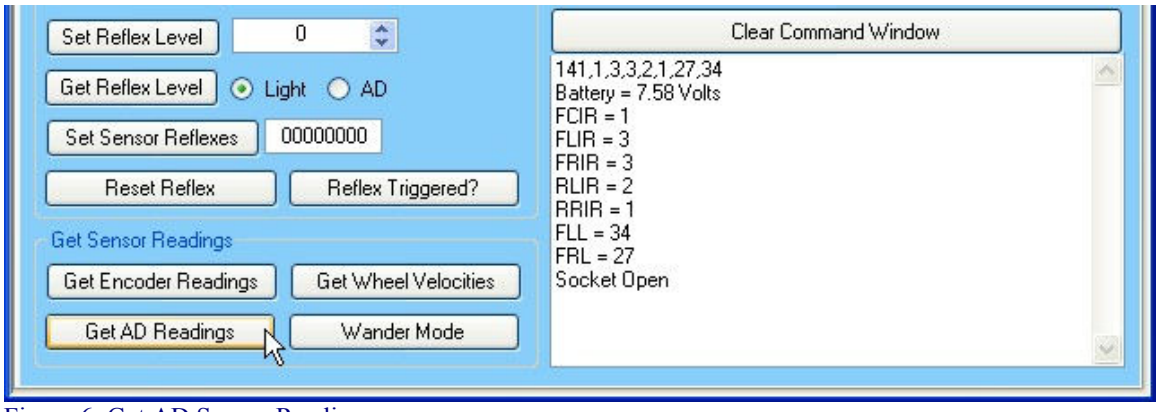

Figure 6. Get AD Sensor Readings.

(OPTIONAL) **- Reconfigure MatchPort Network Settings:**

If you didn't purchase your MatchPort b/g from Abe Howell's Robotics or simply want to change the Network Settings, then proceed on with this section. By default the MatchPort b/g's ship with a baud rate of 9600 BPS, but OPEN-ROBOT's controller is set to 115,200 BPS, so this needs to be changed. You need to download the Device Installer utility from Lantronix. Go to the Lantronix downloads web page: http://www.lantronix.com/support/downloads.html and click on Device Installer under the Configuration Utility column. Download and install the Device Installer.

Connect to the LTRX_IBSS Ad Hoc network using the method described above in "Connecting to OPEN-ROBOT for the First Time". Then run the Lantronix Device Installer utility. A pop-up window will display and ask if you would like a TCP/IP tutorial. Simply disregard this and click NO.

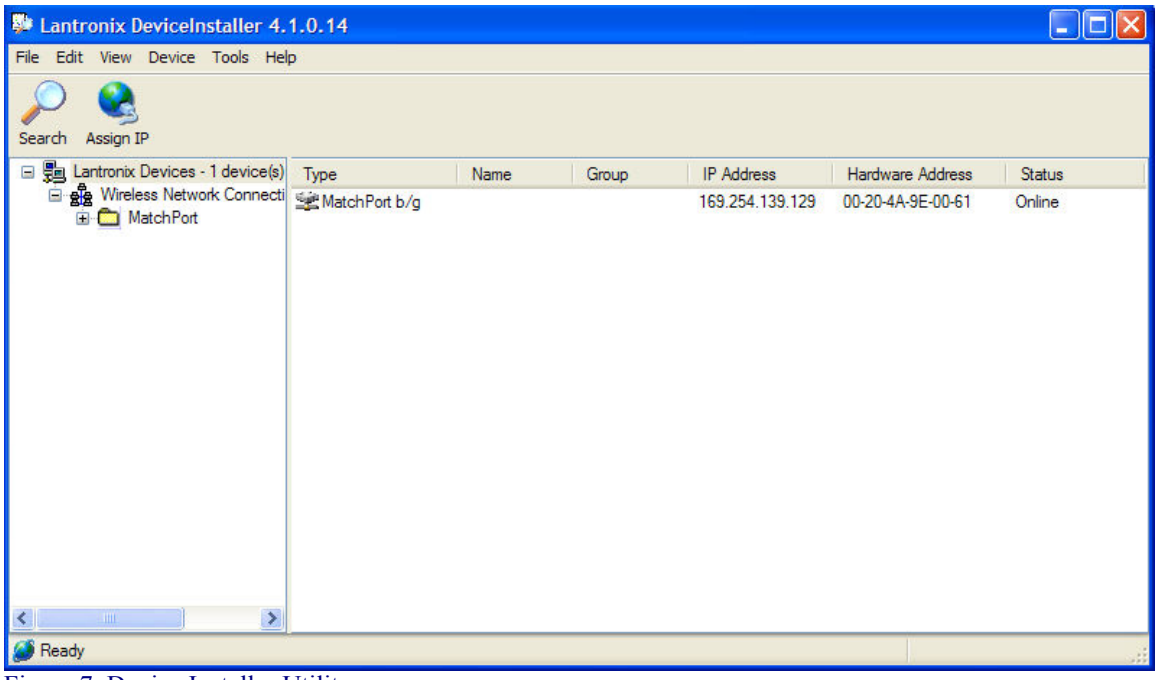

Figure 7. Device Installer Utility.

Device Installer should recognize OPEN-ROBOT's MatchPort b/g module and then populate the list box as shown above in figure#7. Double-click the MatchPort b/g listing in the list box to bring up the device details.

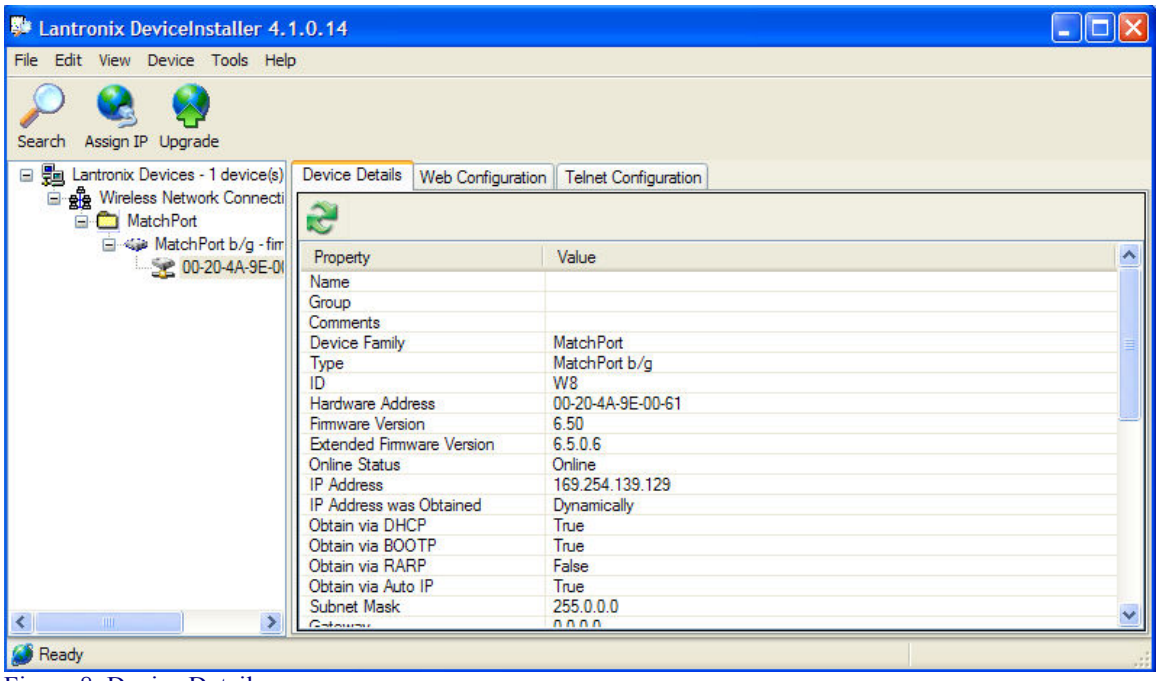

Figure 8. Device Details.

Now click on the Web Configuration tab.

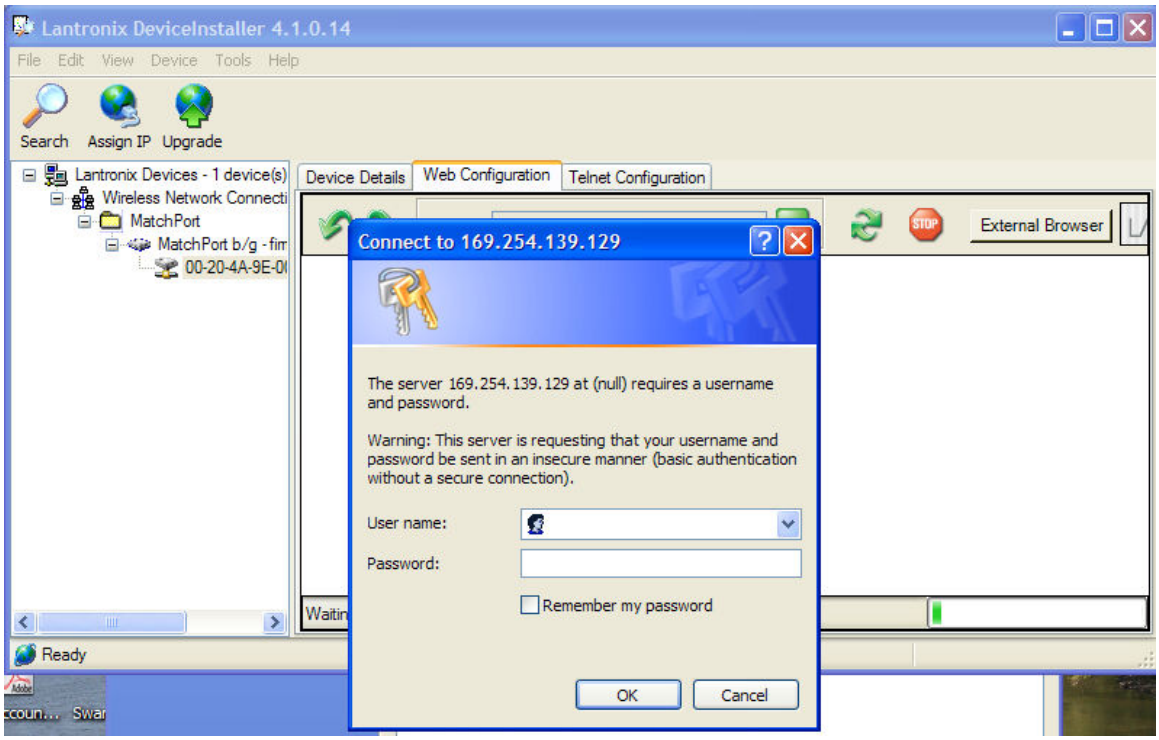

Figure 9. Connect via Web Configuration.

A password message box will appear. Simply click on the OK button and don't enter anything in the User name and Password fields because by default the MatchPort does not utilize a username/password.

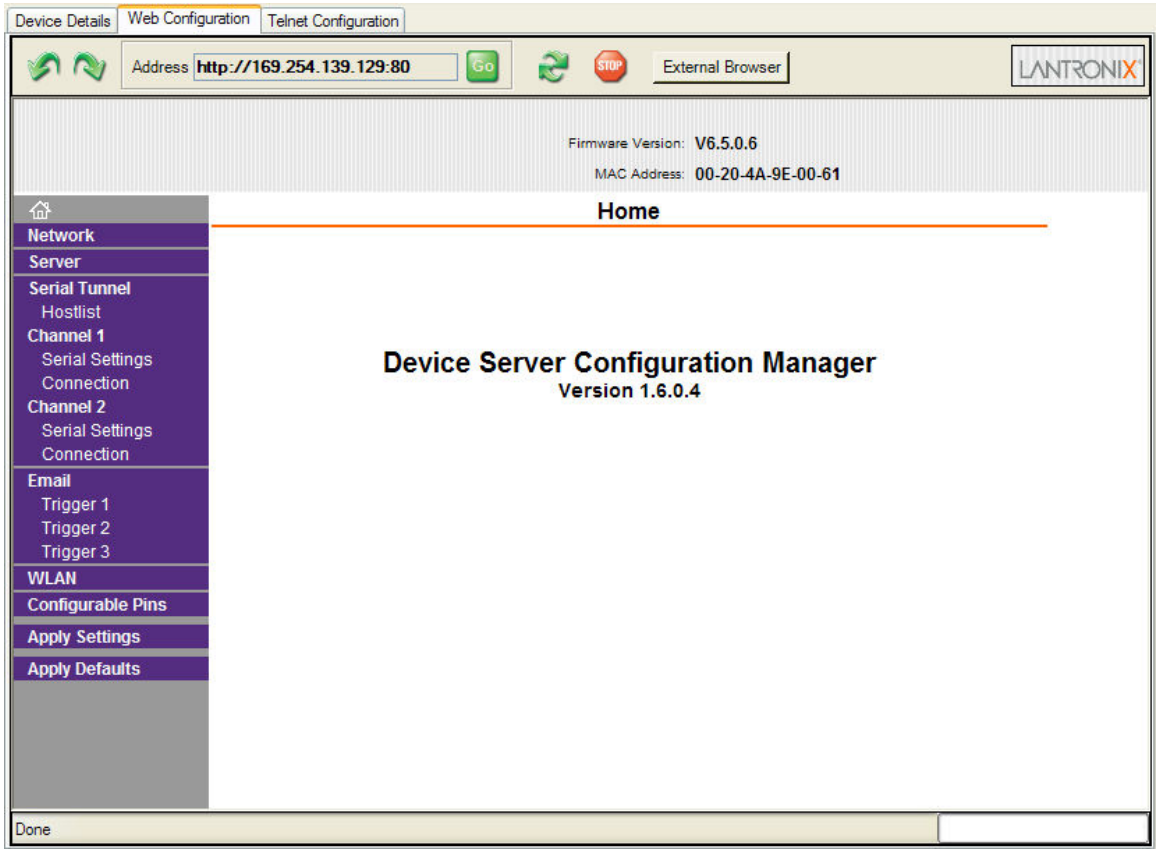

Figure 10. Web Configuration Home.

Click on the WLAN link so that we can change these settings. By default the MatchPort is configured for Ad Hoc mode and the Network Name (SSID) is set to LTRX_IBSS. You can change from Ad Hoc to Infrastructure under Network Type and also change the Network Name (SSID) to match your own wireless network name. For this example I will be using abes_wireless for my Network name as shown below in figure#11. Also be sure to disable Radio Power Management under the Advanced Settings section. Disabling Radio Power Management will make the MatchPort more responsive during the initial connection upon power-up and will prevent it from going into Radio Power Management during robot operation. Once you have made these changes be sure to click on the OK button. ***NOTE: Be sure to write down all WLAN Settings or take a screenshot.***

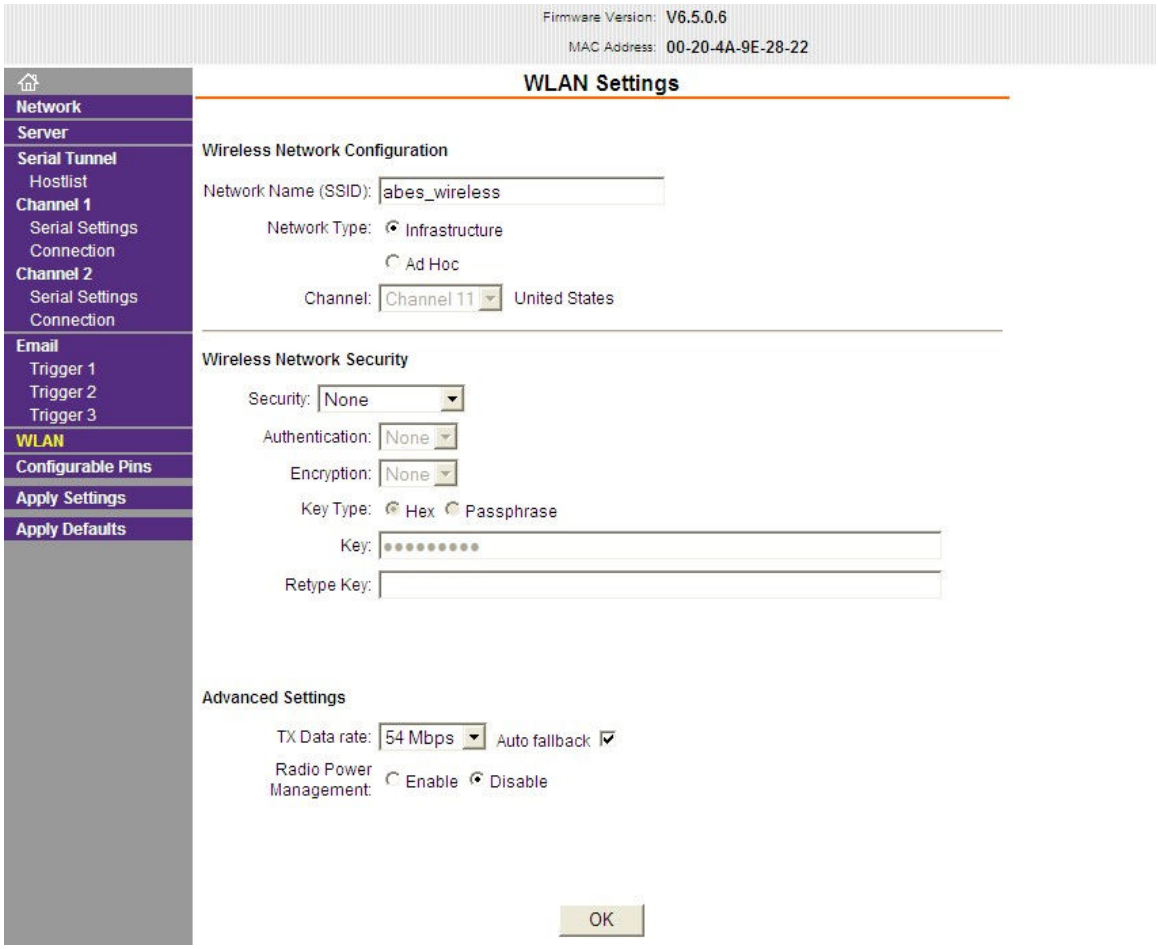

Figure 11. New WLAN Settings.

Now we need to change the Network settings, so click on the Network link, which is right below the Home icon. Under the IP Configuration we need to select Use the Following IP Configuration and then enter a suitable IP Address for the MatchPort, a Subnet Mask, and a Default Gateway. The settings shown in figure#12 should work for most wireless setups, but you must be sure to check your own setup and verify that the IP Address you enter is an available address on your network otherwise you will be unable to connect to the MatchPort. The Subnet Mask and Default Gateway must match your network setup as well. Once the new information is entered be sure to click on the OK button. If you do enter and apply the wrong settings, you will need to perform a recovery process. Surveyor Corp does have a suitable recovery process documented in the link below. You can also contact Abe Howell's Robotics for assistance if you purchased the MatchPort from us. ***NOTE: Be sure to write down all Network Settings or take a screenshot.***

http://www.surveyor.com/cgi-bin/yabb2/YaBB.pl?num=1200515001

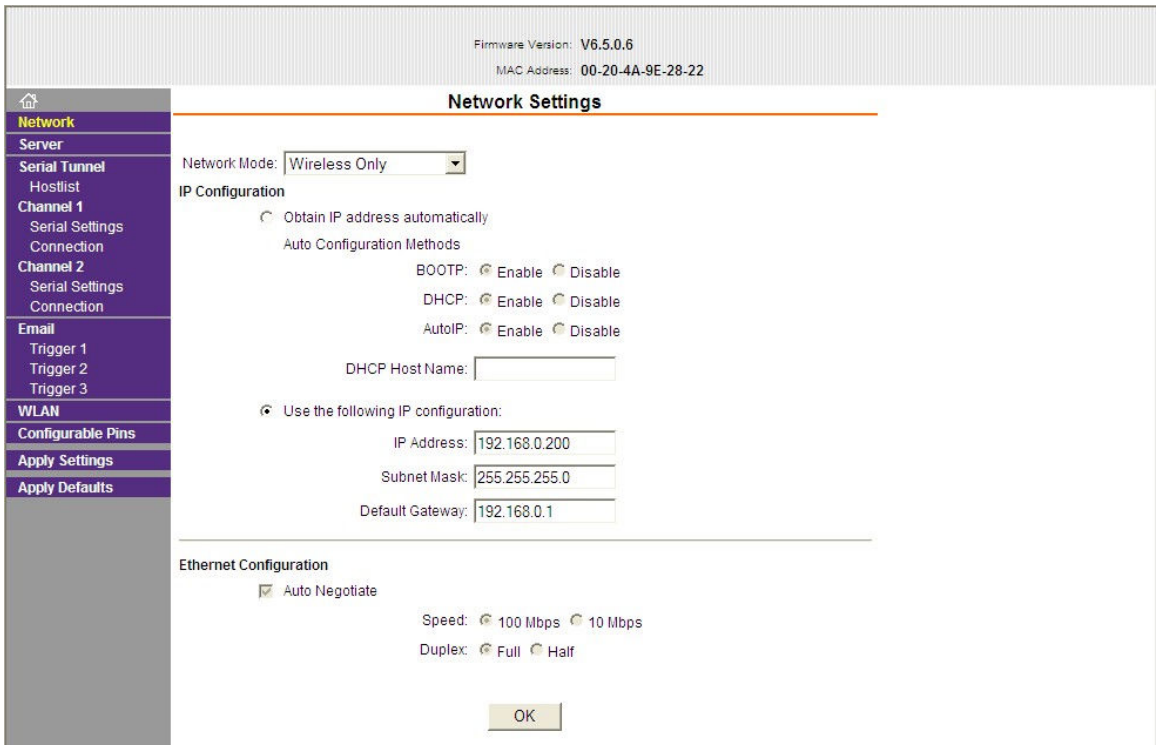

Figure 12. New Network Settings.

You should also change the CPU Performance Mode to High. Click OK when done.

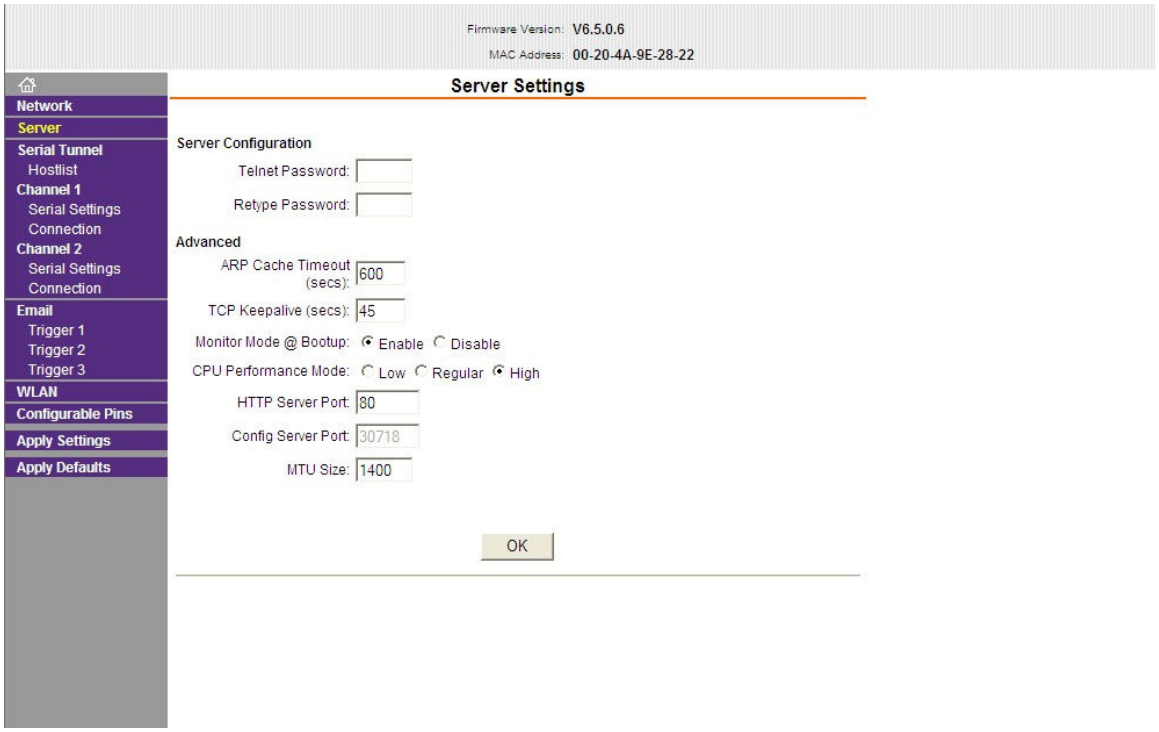

Figure 13. Set CPU Performance Mode to High.

If you purchased your OPEN-ROBOT fully assembled then the serial port settings should already be set. However, if you need to set them please enter as shown in figure#14 below. You should only have to change the Baud Rate to 115200, Flow Control to None, Data bits = 8, Parity = None, and Stop Bits = 1. Click OK when done.

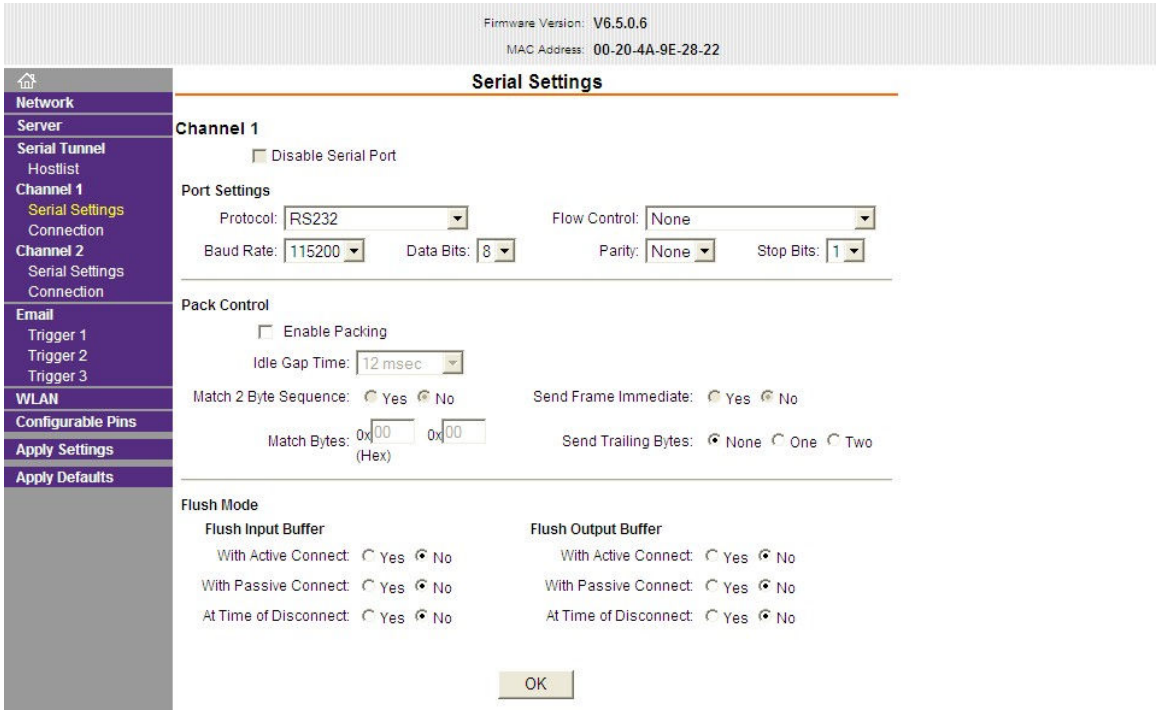

Figure 14. Channel 1 Serial Settings.

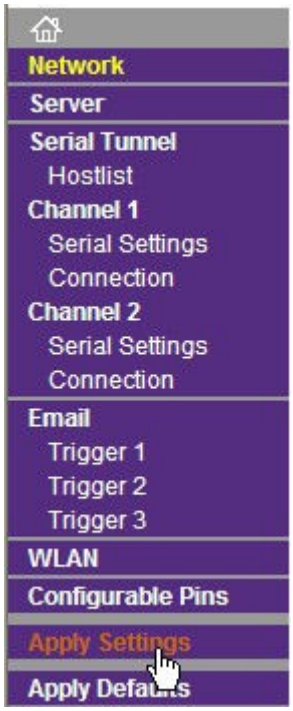

Figure 15. Apply Settings

None of the settings you just changed are permanent until you click on the Apply Settings link as shown above in figure#15. Once you click on Apply Settings, the MatchPort will save the new values and then reboot so that they take effect. The MatchPort reboot may take a minute or two. ***NOTE: Before applying the new settings, be sure to write them down or take screenshots. This information will be important in case for example you forget the assigned IP Address or Network Name (SSID).***

Please send all questions and issues to abe@abotics.com