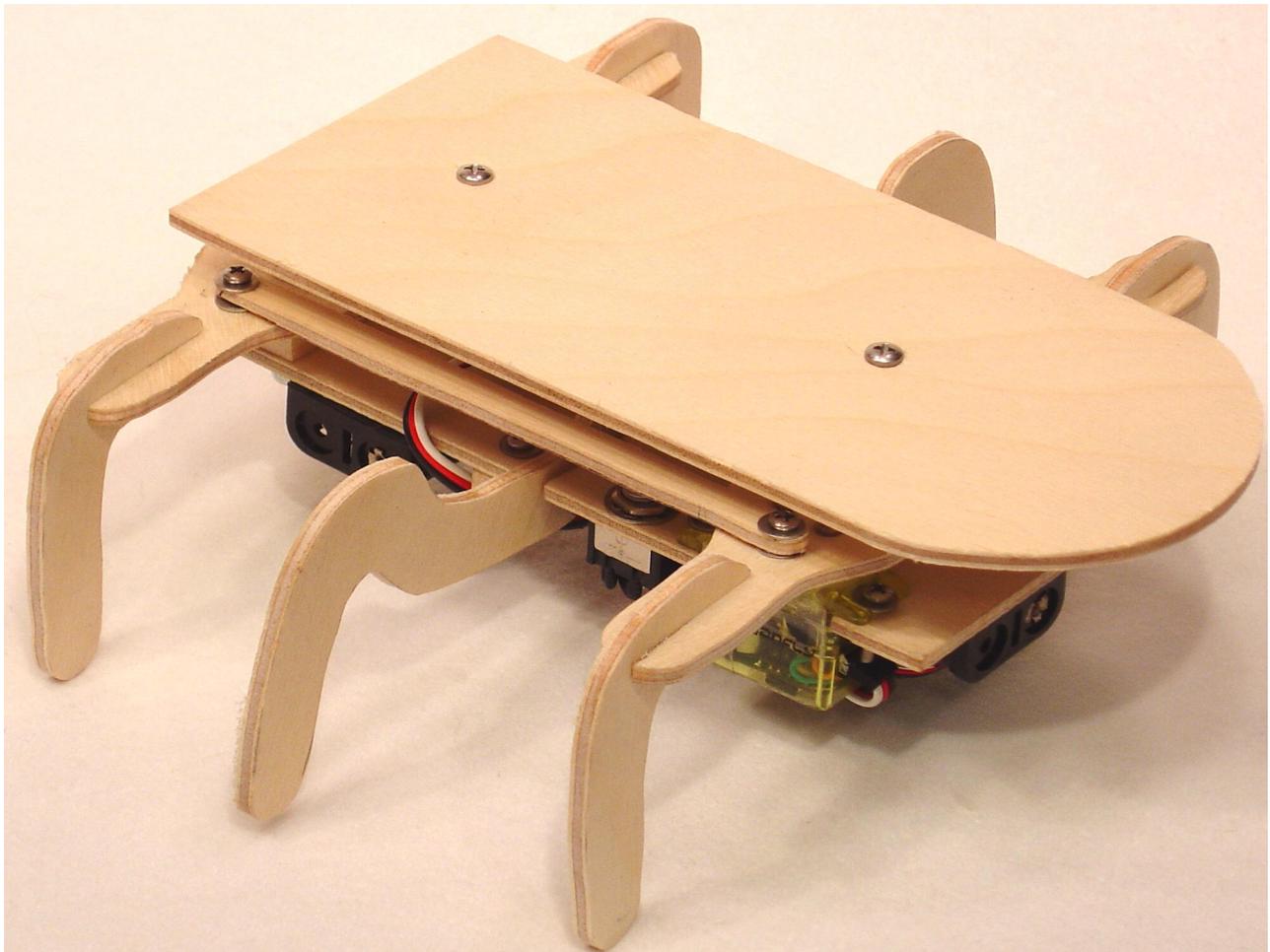

Build a Mini Servo Walker
as seen in
March/April 2005 of SERVO Magazine

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The mechanical portion of your walker robot is finished and its time to add power and a brain. Get your soldering iron out and lets get started.

Electrical Construction

We will use a Perseus microcontroller and a Perseus carrier kit to build the brain. They can be purchase from Kronos Robotics at www.kronosrobotics.com. We will also need a female header. All these parts will be listed in the source section at the end of the article.

Step 1

Assemble the Perseus Carrier using the included instructions. I install only the socket, resistor and 2 capacitors as shown in Figure 1. Don't install the headers.

Step 2

The headers included with the Perseus Carrier are of the snapable variety. Use needle nose pliers to break off 3, 3 pin headers. Install them into the positions shown in Figure 2. These will be the headers used to connect the servos.

Break off a 2-pin header and install it into the position shown at the top of Figure 2. This will become the power header.

Step 3

Use wire cutters to cut off a 3-pin header from the 36-pin female header and install it as shown in Figure 3. This will allow you to plug in an IR module so that you may control the walker with a universal remote.

Next, using a set of wire cutters, cut off a 5-pin female header and install as shown in Figure 3. This will become the program header. We will plug the EZ232 driver into this header in order to program the Perseus.

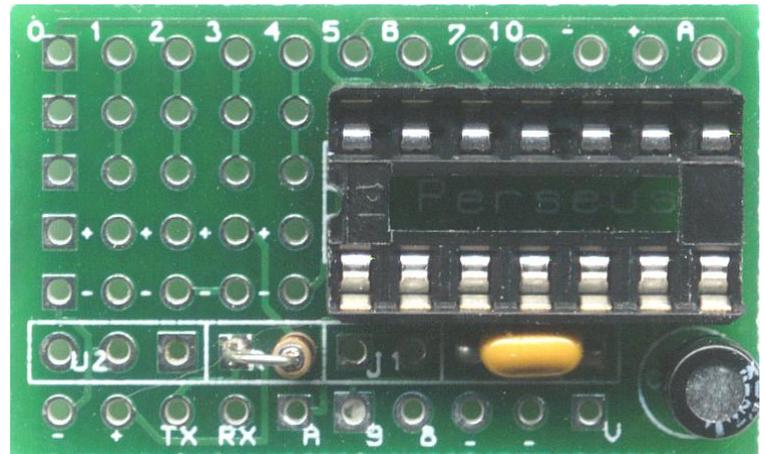


Figure 1

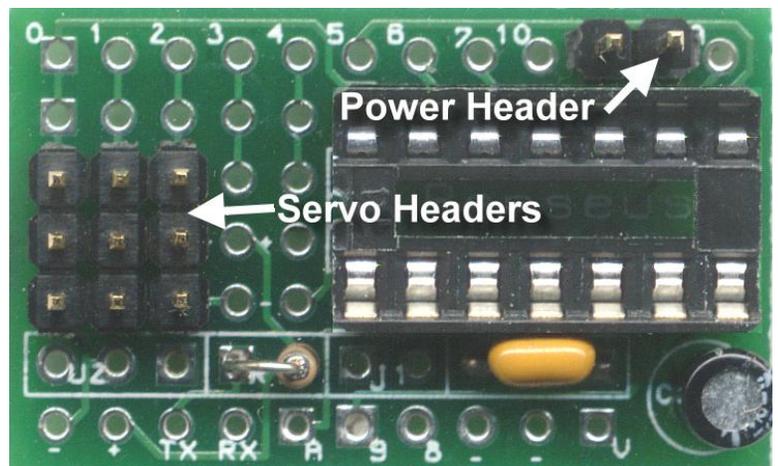


Figure 2

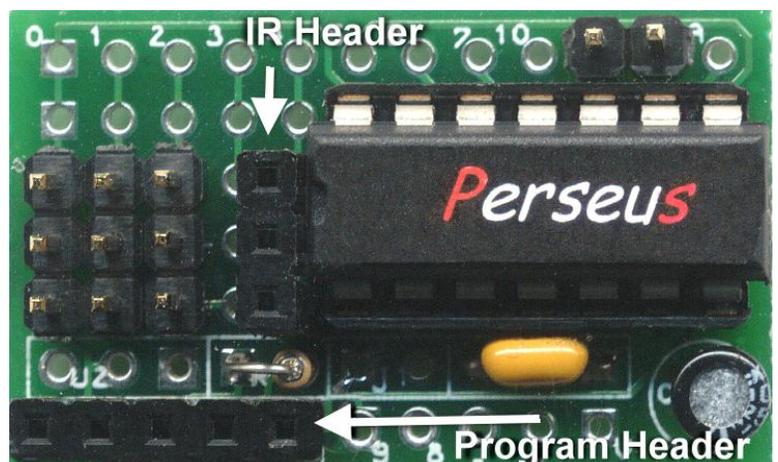


Figure 3

The brain is now complete. We will attach it a bit later. For now let's attach our walker's power source.

Step 4

Take one of the 2 Cell AAA battery holders and attach it to the front of the main body between the 2 servos on the underside of the base. Make sure the holder is placed all the way forward as shown in Figure 4. Mark and drill a 1/8" hole by dry fitting the battery holder. Attach with a #4 1/2" machine screw and nut.

Take the other 2 Cell AAA battery holder and attach it near the rear of the main body on the underside of the base. Make sure it is up against the two lock nuts as shown in Figure 4. Use a #4 1/2" machine screw and nut.

Step 5

Take the red wire from the lower (rear) battery holder and the black wire from the upper (front) battery holder and twist them together as shown in Figure 4.

You can complete the power connection on one of 2 ways

You can solder the leads together and place a piece of tape over the connection, or you can connect these two leads to a switch as shown in Figure 5. If you opt for a switch you will have to drill a hole and mount the switch. The side opposite the 5/16" hole is a good location for a switch.

Step 6

Using a pair of wire cutters break off a 2-pin header from the 36-pin female header, then take the two remaining wires, black from the lower battery holder and red from the top, and solder the leads to the 2-pin header. Make sure you insert two pieces of 1/16" heat shrink before soldering in place. Once soldered, move the heat shrink up and shrink it



Figure 4

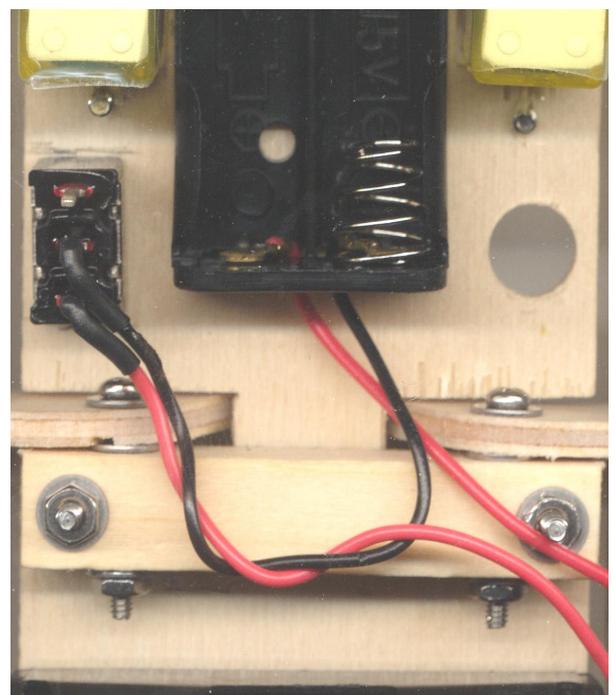


Figure 5

with a heat gun or flame. Figure 6 shows the completed connector.

This connector will plug into the 2-pin male header that we added to the Perseus carrier back in Step 2. If you did not install a switch you will use the header as the switch. Place the female header on the male header to turn the walker on. Otherwise you will leave the header in place and use the switch to control the power.

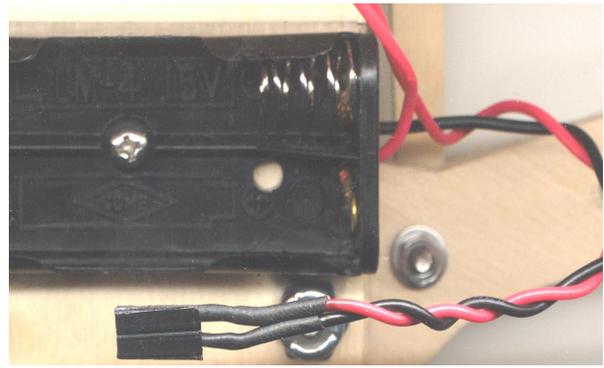


Figure 6

Step 7

Now it is time to attach the brain. To do this, stick three pieces of mounting foam to the underside of the Perseus PCB. The tape does not need to run the full length of the board; about an inch will do. Trim the excess from the sides, then stick the PCB in the position shown in Figure 7. We want the board to be as close to the center legs as possible without touching them. Leave about 1/8" gap.

Before we continue let's take a closer look at the servo and power connections using Figures 8 and 9.

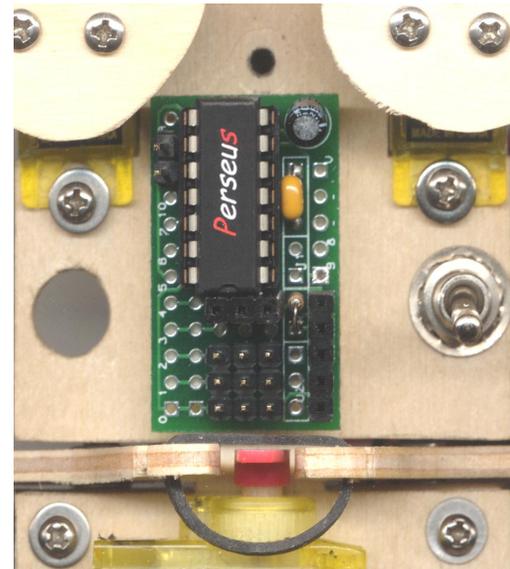


Figure 7

The power connector plugs into the header marked - + near the top of the PCB.

As you can tell from the schematic diagram (Figure 9) there are 8 more ports available to connect sensors or LED's. One of these (Port 4) we show connected to the IR module that we will use later.

Step 8

Enlarge the 5/16" hole a bit so that the servo connectors will fit. Once the hole has been enlarged pass the power connector up through the hole and plug it into the 2-pin header. Make sure the red lead is facing the front of the walker. Note that if you did not install a switch you will have to plug and un-plug this header to switch the walker on and off.

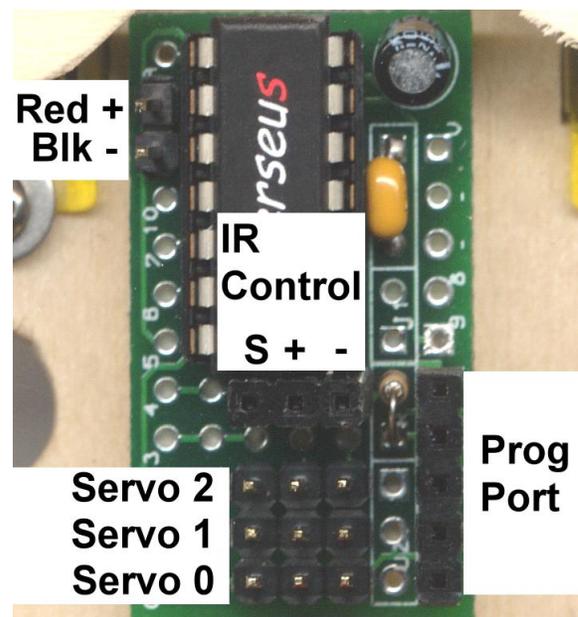


Figure 8

Next plug the EZ232 driver into the 5 pin program header as shown in Figure 10. You can now program the Perseus.

Step 9

To program the Perseus you need the Athena compiler. Download and install the Athena compiler from the Kronos Robotics web site at www.kronosrobotics.com

Connect a 9 pin cable from the EZ232 driver to the PC and you should be ready to go. The Athena software comes with a complete manual that includes hookup instructions along with a complete tutorial.

With the PC connected to the EZ232 driver and the driver plugged into the 5 pin program port turn on the power to the carrier board. Load the debug terminal in the Athena software by hitting F6. With power applied to the Perseus you should see test data as shown in Figure 11.

That's it.

Next month we will calibrate and program the walker. Until then play with the Perseus by running through the tutorial. You can actually run through the tutorial with out connecting to the walker by using the included simulator.

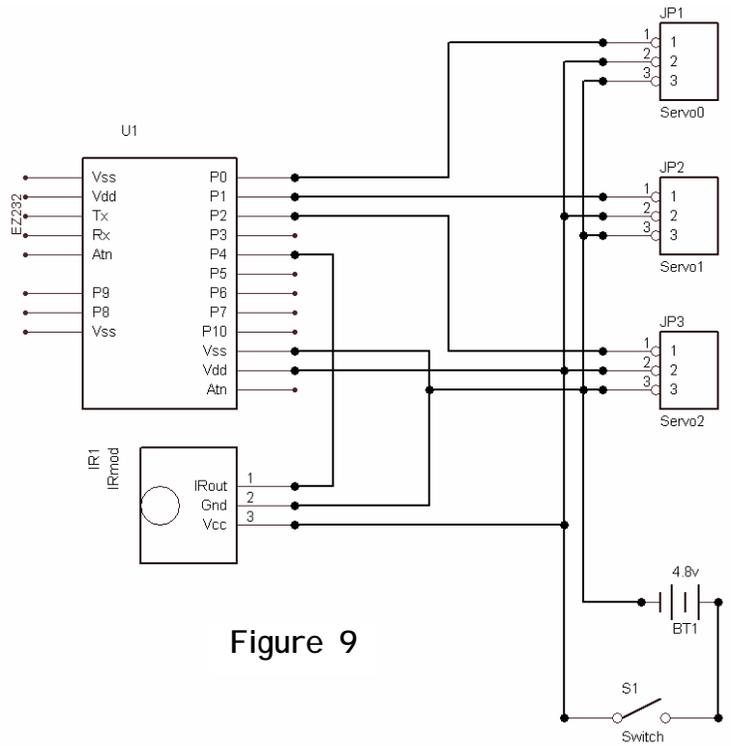


Figure 9

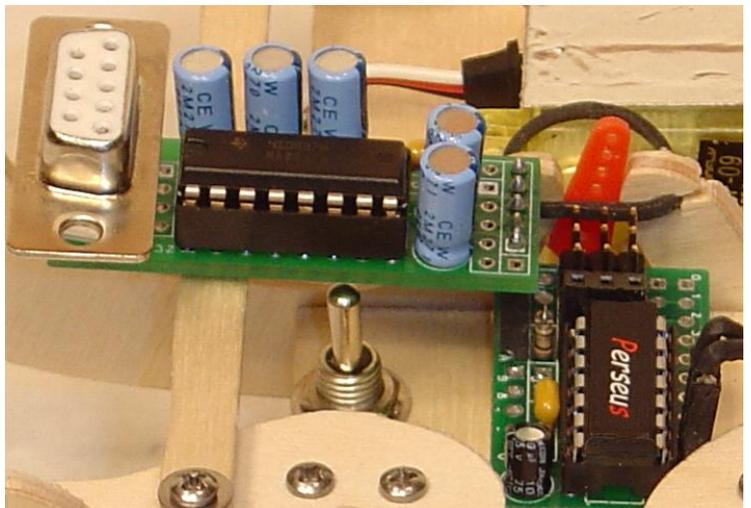


Figure 10

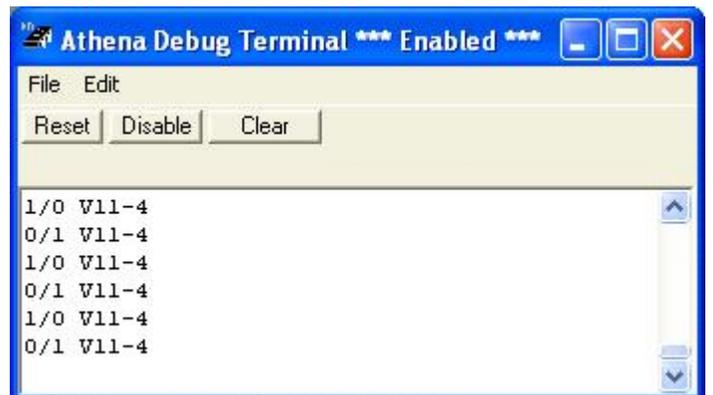


Figure 11

Parts List

1 Perseus Microcontroller Kronos Robotics # 16382

<http://www.kronosrobotics.com/xcart/customer/product.php?productid=16382>

1 Perseus Carrier 1 kit Kronos Robotics # 16390

<http://www.kronosrobotics.com/xcart/customer/product.php?productid=16390>

1 36 pin female header Kronos Robotics # 16291

<http://www.kronosrobotics.com/xcart/customer/product.php?productid=16291>

1 EZ232 Driver Kronos Robotics # 16167

<http://www.kronosrobotics.com/xcart/customer/product.php?productid=16167>

1 IR Module Kronos Robotics # 16226

<http://www.kronosrobotics.com/xcart/customer/product.php?productid=16226>

1 SPST Switch Kronos Robotics # 16241 or All Electronics # MTS-4

<http://www.kronosrobotics.com/xcart/customer/product.php?productid=16241>

2 2 Cell AAA battery holder All Electronics # BH-42 or Radio Shack # 270-398

1 Athena Compiler Free download from Kronos Robotics web site.

<http://www.kronosrobotics.com/downloads/AthenaSetup.exe>