# Build an Ares Sumo Bot

## Friday, April 16 2004 @ 09:17 PM EDT

 In this article we will show you how to build a Mini Sumo bot with the Ares Board.

**Prerequisites**

Before you start the Ares Sumo Bot project you should have completed two other tasks.

- Installed the Dios Editor Software
- Assembled and tested the Ares Board

## Ares Requirements

- Motor Controllers: None
- Heat Sink: None
- Screw Terminal: Recommended
- IR Module: Recommended

It is also recommended that you use the screw terminal as well. while the screw terminal is not necessary it will make hookup very easy.

**Materials**

Base:
The main base on the Ares Sumo Bot is made from a 3-1/8" x 5" x 1/32" metal plate. This plate can be picked up at most home centers for $1-$2. The manufacture is SIMPSON and the part number is TP35. The plate I am using has holes that are perfect for mounting servos.

Hook & Loop Tape:
you will need a small amount of hook and loop tape. This can be found in the sewing department of stores like Wall-Mart. You can also pick some up at various home centers. Prices vary. You only need about 4". I have also seen small hook and loop pads at various department stores.

Hardware:
This project requires some special standoffs and brackets for mounting the servos and Ares board. I will name the hardware components as they are used. Again I will offer a hardware package at the end of the project.

Ares Board:
See Above

**Assembly**

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## Step 1 - Clean and prep the base plate

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When you get the plate it will be covered with a light coat of oil. It may or may not have a UPC sticker. You must clean the plate before use.

Remove any stickers and sticker residue. You can use naphtha or Googone for this. Soap and water and a bit of elbow grease will work as well.

Clean the plate with some sort of degreaser. Again you can use naphtha.

Wash the plate with soap and water.

Optional

I go over my plate with a piece of 220 grit sand paper. This does two things, It gives the plate a brushed look and it makes the plate able to take and hold paint.

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## Step 2 - Mark the bend points on the plate

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Lay the plate as shown and from the left end place a mark 18mm from the edge. On the right side of the plate mark a line 28mm from the edge. Note this is done on the bottom bottom of the plate.

## Step 3 - Bend the plate
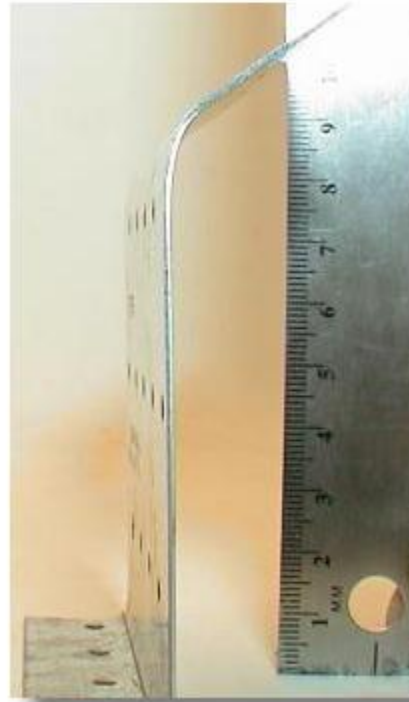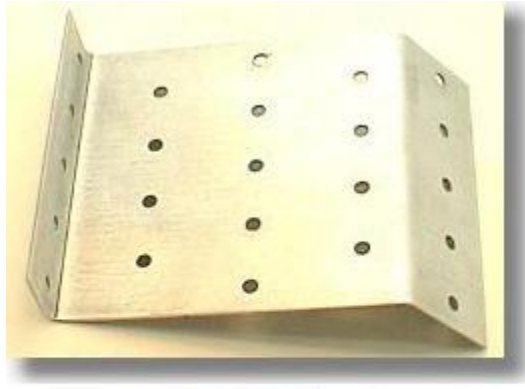
The 18mm side gets bent up at a 90 degree angle. The 28mm side gets bent down at a 60 degree angle (see text). You cant bend this by hand. You can use a vise or clamp the plate between two boards and bend with a hammer. The actual angle on the scoop is determined by the length of the bot.

Hold the plate upright and use a ruler to measure the length of the base. It should be less than 10cm. If it is not bend the front scoop down a bit and measure again. Once the plate if shaped this is the time to paint the plat if you wish. Use a paint meant for metal like Rust-Oleum. Allow sufficient time to dry. A note about painting. For bots that I use in competition I don't like to paint. The inevitably get all scuffed up. The bare plate will stay looking nice for a long time.

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### Step 4 - Attach Angle Brackets to Servos

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The servos should already be converted to continuous operation before starting this step. You can see how to convert your servo **here**.
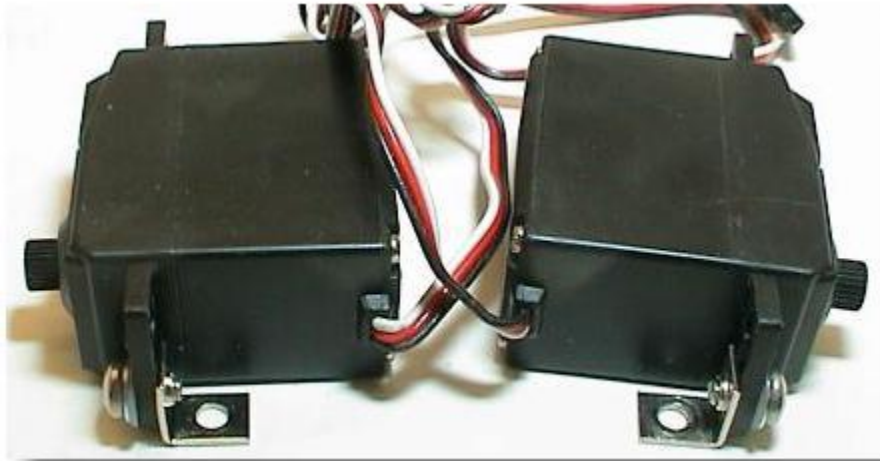
Take a 1/4" #6 machine screw and place a #6 lock washer and #4 nylon washer on the screw. The nylon washer will have to be twisted in place. Take this assembly and place it through the bottom hole on one side of the servo and attach it to the angle bracket. Only snug tighten the screw.

Do this with all the lower mounting holes on the servos. Make sure the servos are mirrored as shown.

**Step 5 - Attach Servos to Base**
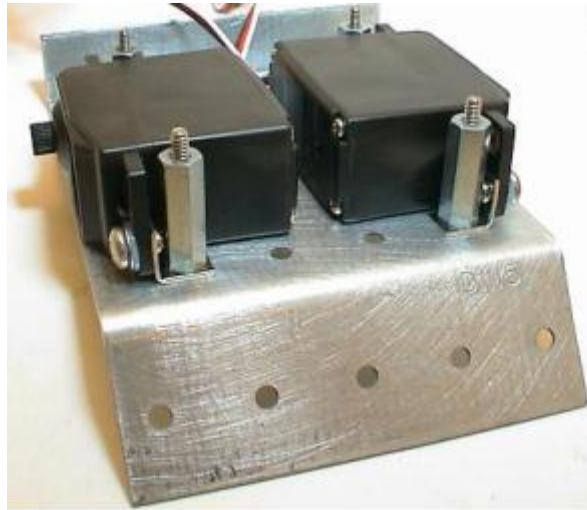
Place the servos on the base as shown. From the bottom take a 1" #4 machine screw and insert it through the hole shown. Take a 3/4" #4 stand off and attach it to the machine screw as shown. Make snug tight only.
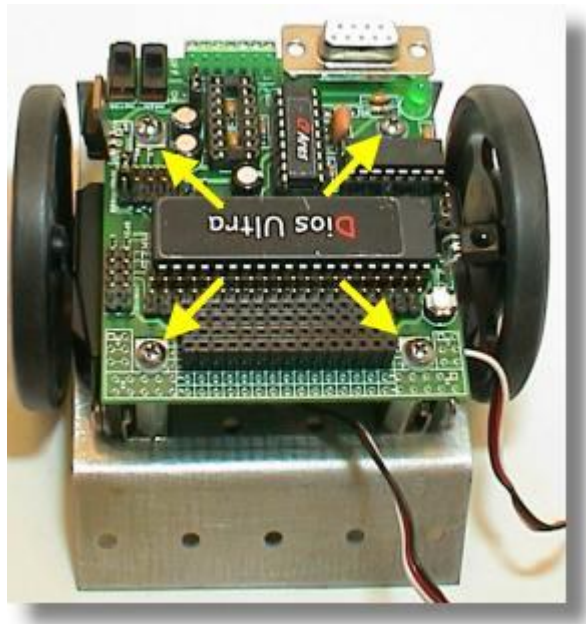
Attach four #4 (1/4) nylon standoffs to the part of the machine screw extending above the 3/4" stand off as shown. Snug tight only.

**Step 6 - Attach the wheels to servos**
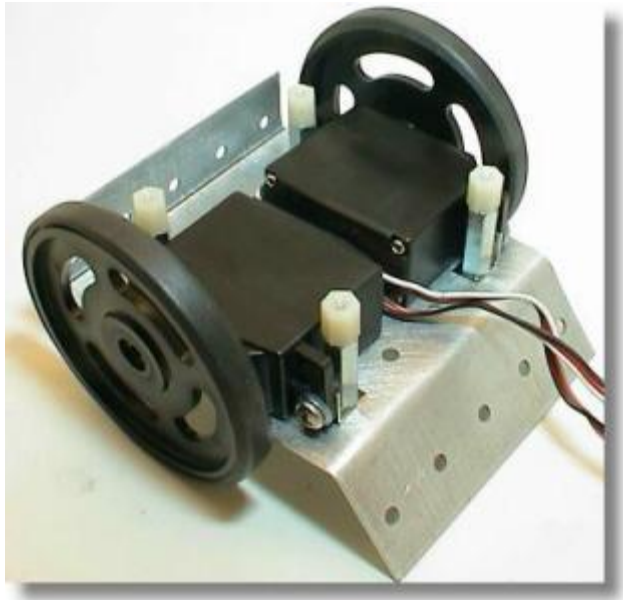
Attach the wheels to the servos as shown. Don't attach the wheel screws at this point.

## Step 7 - Test Ares Board Placement



The Ares board's mounting holes are very large so there is lots of room for play. Using four 1/4" #4 machine screws and four #4 nylon washers attach the board to the four nylon standoffs. If you can not mate the machine screws to the nylon stand offs you can loosen the 1" machine screw from the bottom of the base. This will allow you to move the standoffs so the holes will mate up.

Once the machine screws and nylon washers are in place pull the wheels toward each other and tighten all screws.

## Step 8 - Attach Lower Battery Holder
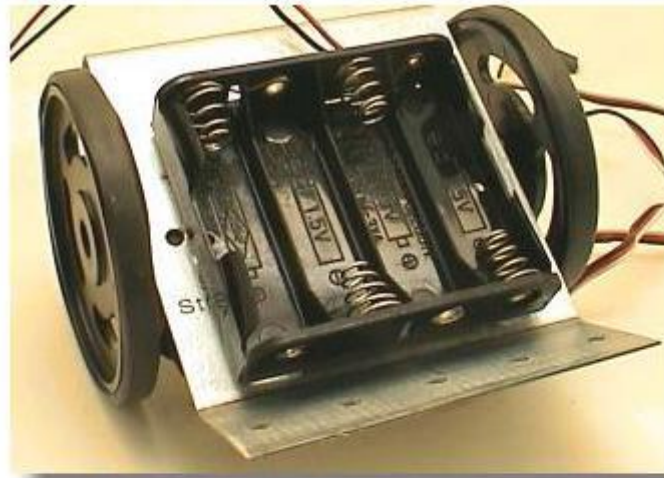
I recommend using hook and loop tape (Velcro) for this. This will allow you access to the machine screws for maintenance. The battery holder needs to be placed as far forward as possible. Make sure the two wires are facing the rear of the bot.
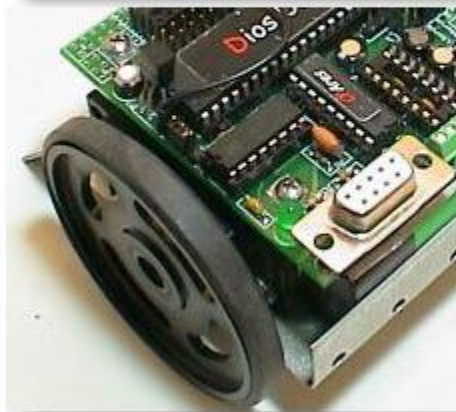
Insert the battery wires into the hole closest to the battery holder as shown.

## Step 9 - Power Hookup

Select Dual Power Mode

4 Cell Holder +

9v Battery +

Both Negative Leads -
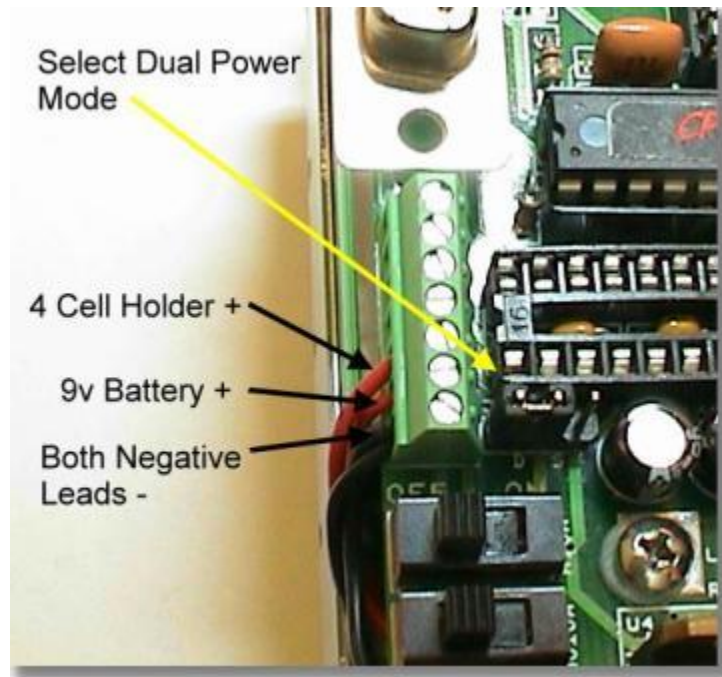
I recommend you leave the batteries uninstalled until after the wires have been connected to the Ares board. Select dual power mode as shown.

**Step 10 - Installing 9V Battery**

Remove the right servo wheel. Attach the battery to the clip. Note you will need to place a piece of tape on the top of the battery if it has a metal case. This is done to keep the battery from shoring out the Ares board. Slide the battery in as shown (2nd Photo) and attach the wheel.

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**Testing**

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With the batteries attached you can now **calibrate the servos**.

Once the servos are calibrated the easiest way to test your Ares Sumo Bot is to use the following program. To use the onboard IR module connect the module output to port 0 as shown here.

**Program**

```
'Ares Servo Bot IR control program
'Use the CH+ and CH- for forward and reverse movement
'Use the Vol keys for the left and right movement
func main()
   dim stat,stat2,x
   print "reset"
   pause 1 ' Give CoProc time to resync
   dim cmd

   CPAresinit(0,1,0,0)

   CPAresRamp(12)
   CPAresLspeed=800
   CPAresRspeed=800
loop:

   cmd = IRread(0,10000) 'IR on Port 0

   if cmd = 0 then
      CPAresBotstop
      goto loop
   endif

   print cmd," ",IRdevice

   if cmd = 17 then
      CPAresBotfwd
      goto loop
   endif

   if cmd = 18 then
      CPAresBotrev
      goto loop
   endif

   if cmd = 20 then
      CPAresBotleft
      goto loop
   endif

   if cmd = 19 then
      CPAresBotright
      goto loop
   endif

   goto loop

endfunc

include \lib\DiosCPAres.lib
include \lib\DiosIR.lib
```
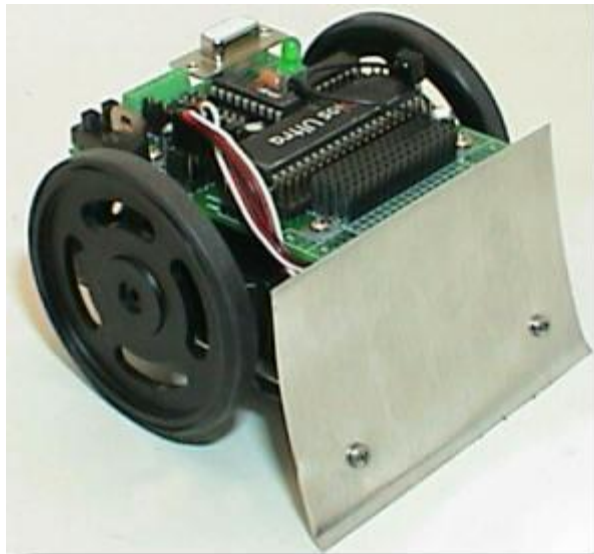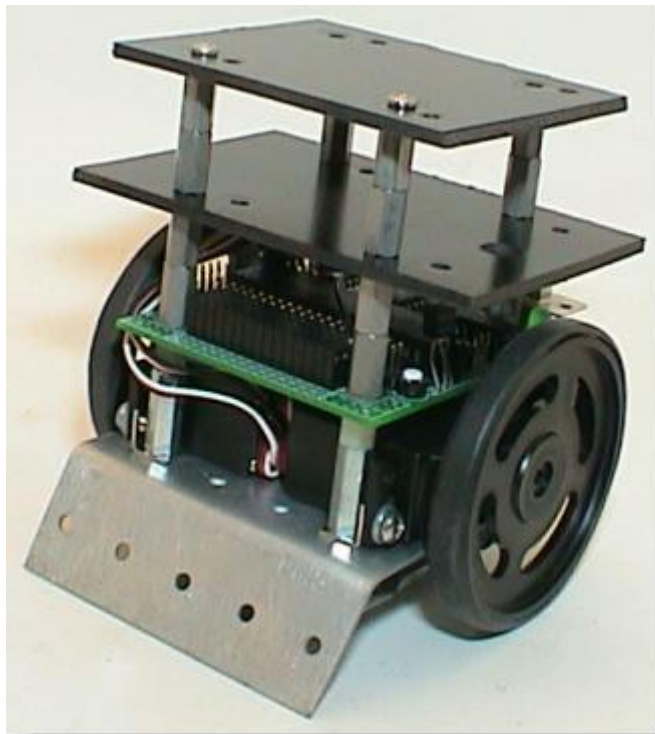
**Variations**

Here I added a very thin front scoop made from aluminum flashing. The bot that can get under its opponent has a distinct advantage.



Here I used some standard #4 male/female stand-offs and a couple pieces of scrap plastic to create multi levels. Most Sumo rules allow unlimited height as long as you don't go over the weight limits.

**Related Products**

[Ares Robot Board](#)
[Sumo Mounting Kit](#)
[9v Battery Clip](#)
[Battery Holder](#)
[Modified Servo](#)
[UnModified Servo](#)
[Servo Wheel](#)
[Hook and Loop](#)
Steel Plate: Home Center, Manufacture = Simpson, Part# = TP 35
If you can not locate any of the steel plates let us know we have some in stock.

[0 comments](#)

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[http://kronosrobotics.com/gl/article.php?story=20040416211729946](http://kronosrobotics.com/gl/article.php?story=20040416211729946)