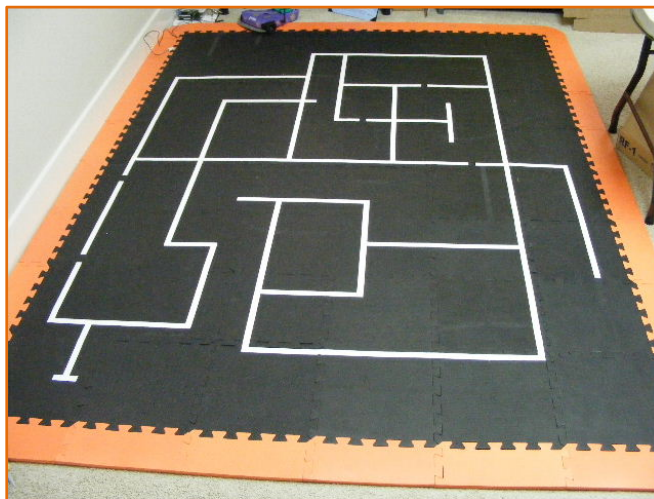




Arena Construction Guide for Maze & Line Following Environments

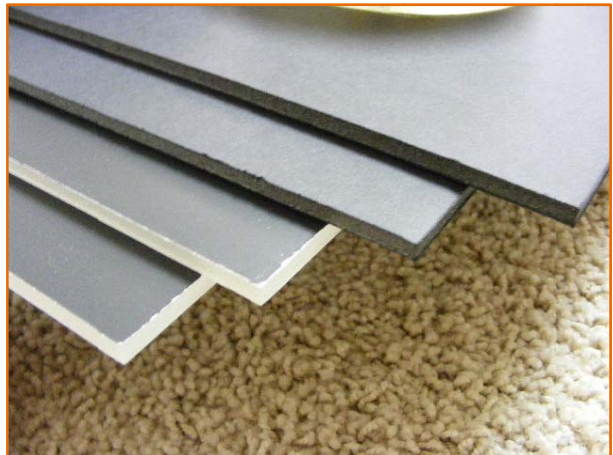


January 21, 2008



This guide was developed to help our customers construct an affordable arena for testing Maze solving and Line Following algorithms using our Stinger and Traxster Robot Kits.

1. The following supplies are required. You will have to determine how much black foam core poster board you will need based on the size of the arena desired.
 - Black Foam Core Poster Board (Office Max, Office Depot, Michael's)
 - Packaging tape (clear)
 - White $\frac{3}{4}$ " wide Electrical tape (Home Depot, Lowe's)
 - Utility knife/Razor blade
 - Tape Measure
 - Black Sharpie Marker



2. Turn each piece of black foam core board, so that the surface used for the robot to drive on is faced down. Connect each piece of foam core board with the clear packaging tape as shown below. Thus, you are basically applying the tape to the bottom of the arena.





3. Make sure you place a piece of clear packaging tape at the ends of two adjacent foam core boards, so that they remain tied securely together as shown below. The piece of tape should wrap around both sides of the foam core.



4. If your foam core board has a white core, and has white edges, you can use black Sharpie marker to touch up the white grooves so as to ensure the surface is completely black.

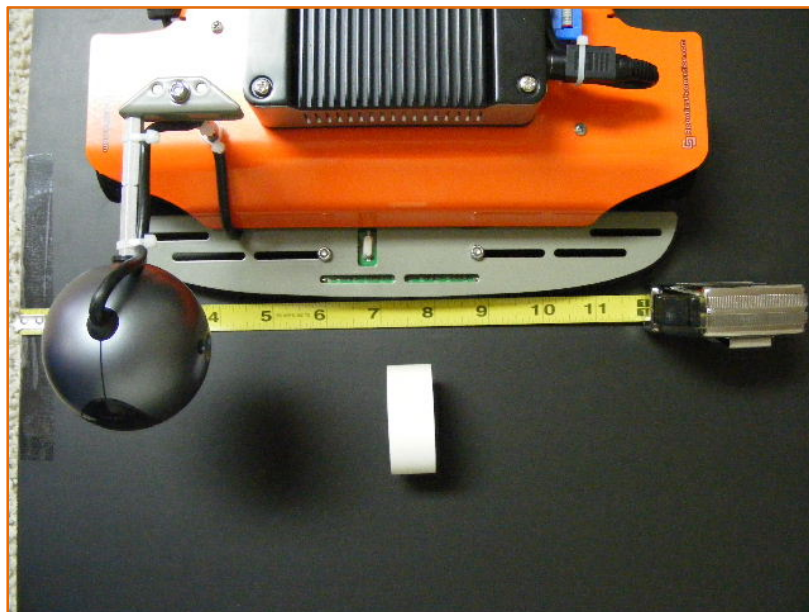




- Here, we have connected four 2' x 3' sheets of foam core together. Your arena will need to be larger, but for this guide we're constructing a sample demo arena.



- Now it's time to start laying out the white tape to form a line to follow. As you can see from the measurements, the center of the tape needs to remain about 7.5" inside the edge of the foam core board. This will leave about an inch of play to each side of the robot to prevent it from driving off the edge.





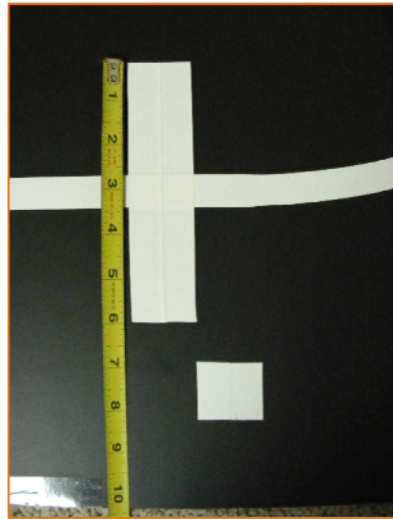
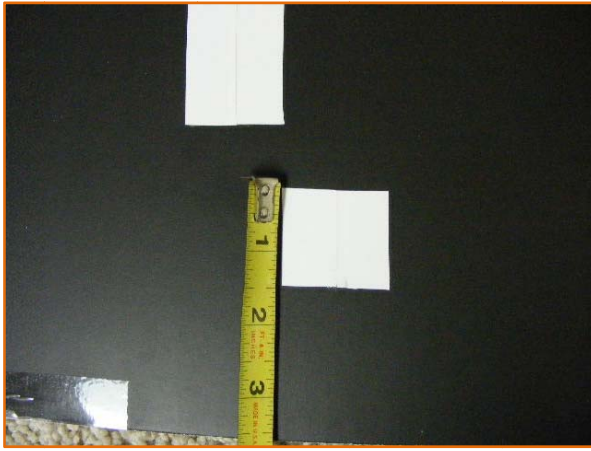
Arena Construction Guide

7. As your laying down the tape, you'll probably want to use at least an 8" or greater curve radius to begin with. Feel free to lay out any shape you like, and as you develop your line following algorithms, you'll probably want to 'spice' things up a bit to make following harder and more interesting.
8. In this example, we created a kidney shaped path, with some information encoded along the path (bottom left image), as well as a break in the path, each being about 2" in length. As the line following sensor on the robot encounters these conditions, it can take specific actions, such as 'Beep', or 'Take a Picture'. It's up to you what your robot does, but in the case of this guide, the Stinger CE Robot (pictured below) will immediately stop, and then use a Web Cam to take a picture of the shape to the right of the path. The robot then attempts to recognize the shape, and perform an action based on the specific shape.

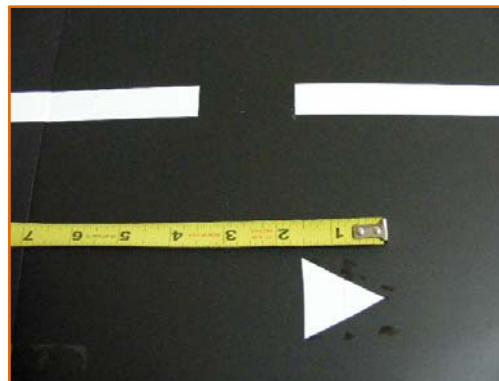
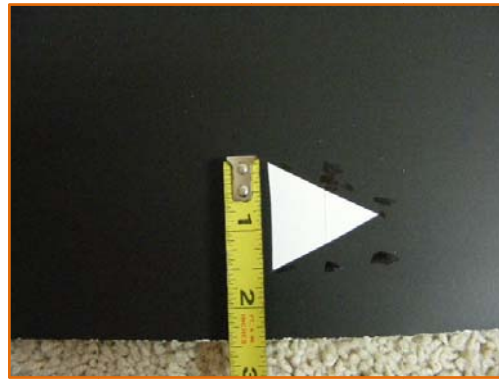
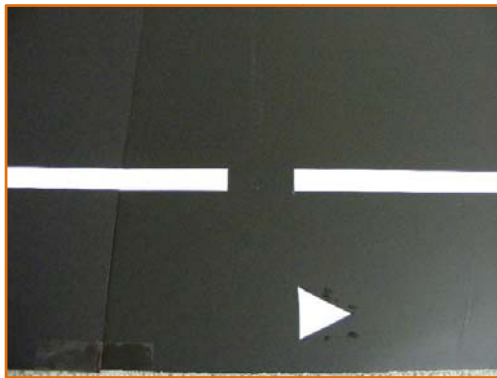


9. In the case of the Stinger CE (used for the WERoC competition), the shape being recognized has to be located in a specific position for the camera to see it in its field of view. Below are some dimensions that can be used to place a shape to the right of the path.



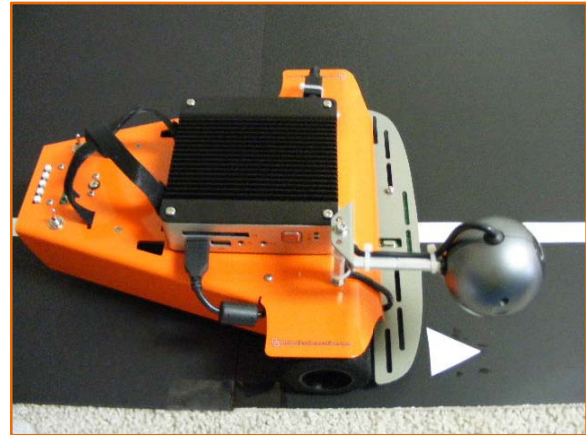
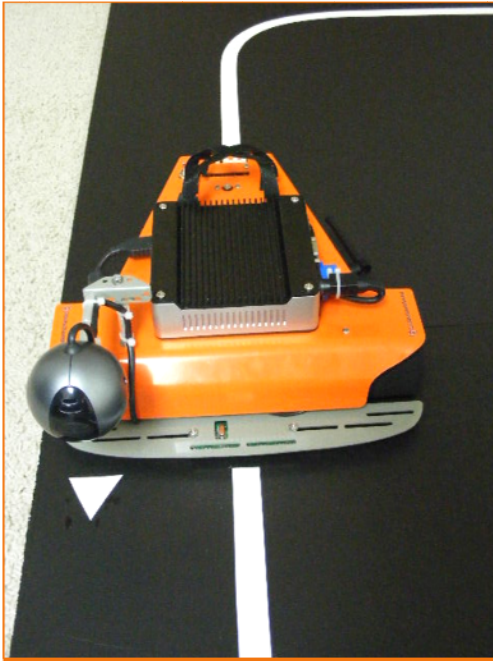


10. Here are some more dimensions for the break in the path, with a triangle shape.





11. Here is a snapshot of the Stinger at the break in the path, and the triangle located directly beneath the camera.



12. If you want a more durable arena, then you can order a “WonderMat” (www.wondermat.com). These mats are 5/8” thick, very sturdy, very affordable, and light weight. They are also easy to disassemble and transport between competitions/classes. You can also walk on the mat and not have to worry about damaging it, which isn’t the case with the foam core board. Below is a picture of our 9’ x 7’ arena, with a maze path applied to it.

