

1.20 Activity: Adding Components - Advanced

Name: _____ Class/Period: _____ Date: _____

Overview:

In this advanced activity, you will mount a dry erase marker to the BaseBot and direct the robot to draw shapes on a laminated sheet using the dry erase marker.

Duration:

30 minutes

Equipment:

Test the dry erase marker on the playing field and verify it can be easily removed. Some markers are harder to remove than others, requiring a special cleaning solution. Red and Green markers tend to be harder to remove than Blue and Black markers. This could be brand specific, but always test your markers on the playing field just as a precaution.

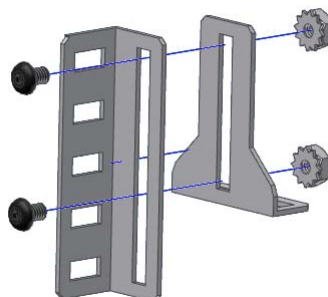
Do not leave the dry erase marker's writing on the playing field for long periods of time. The longer it is on there, the harder it tends to be to remove.

Qty	Description
1	BaseBot with power pack
1	Vex starter kit
1	Dry erase marker
1	Elastic band
1	Playing field

1.20.1: Mounting the Marker

- 1 Attach the gusset to the 2 –1/2" angle bar as shown in Diagram 1.20.1.1.

Diagram 1.20.1.1

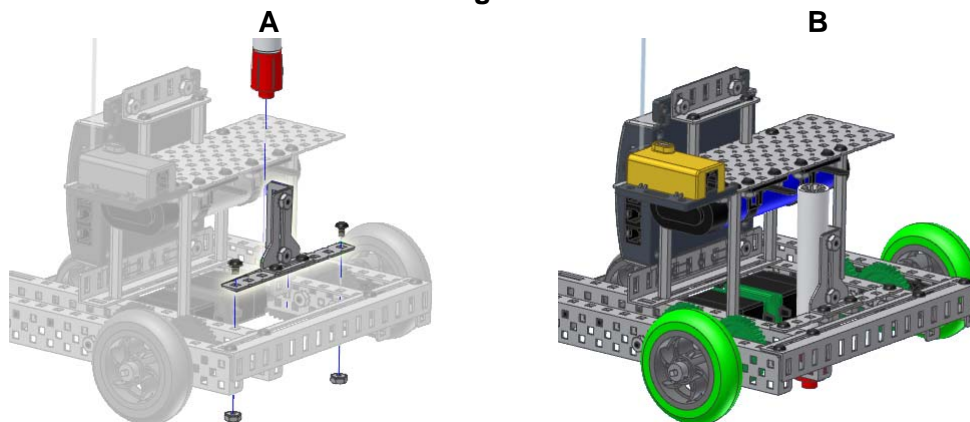


Materials

1	Gusset
1	2-1/2" angle bar
2	8-32 BHCS x 1/4"
2	Keps nuts

- 2 Attach the gusset assembly to the 4-1/2" bar. Mount the bar on the chassis and tighten the hardware as shown in Diagram 1.20.1.2A.

Diagram 1.20.1.2



Materials

1	Angle bar assembly from step 1
1	4-1/2" bar
4	8-32 BHCS x 1/4"
4	Keps nuts

- 3 Using the rubber band, mount the dry erase marker to the assembly as shown in Diagram 1.20.1.2B.

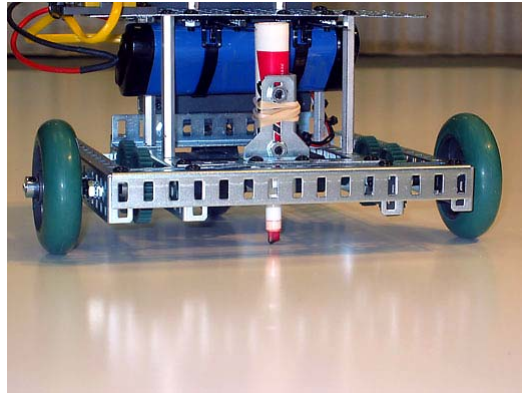
1.20.2: Drawing a Straight Line

- 1 Configure your BaseBot for tank control.

- 2 Verify that all the motor connections are correct and the transmitter is set to 23 mode.

The left motor should be in port #3 and the right motor should be in port #2. There should be no jumpers on the controller.

- 3 Place your BaseBot on the playing field with the cover off of the dry erase marker. Make sure the marker is in contact with the playing field surface.



- 4 Try to drive the robot so that the marker draws a straight line on the playing field.
 - How straight is your line?
 - What can you do to make the line perfectly straight?
- 5 Keep practicing until you can draw a straight line that is roughly 24 inches long.

1.20.3: Tank vs. Arcade Control

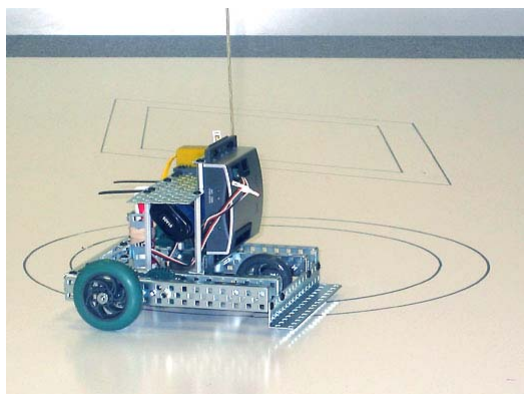
- 1 Configure your BaseBot for arcade control.
Move the left motor wire from port #3 to port #1. Install a jumper clip into port #14.
- 2 Try to draw the same 24" straight line.
 - How straight is your line?
 - What can you do to make the line perfectly straight?
 - Which control method is easier for you?

The switch between the two types of controls is relatively simple. However, practice makes perfect. If you stick with one type of control, your skill will improve as time goes on.

1.20.4: Drawing Shapes

In this exercise you will use both tank and arcade control to draw shapes with the BaseBot. You will complete three time trials to compare control modes.

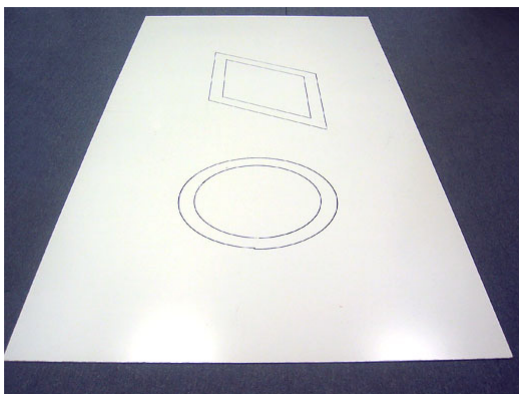
- 1 Set up the BaseBot for Tank control.
- 2 Place the BaseBot on the playing field with the marker touching the surface.



- 3 Have your partner time you while you draw an 18" parallelogram and an 18" circle.

You may first mark the playing field with an outline of each shape to use as a guide.

The teacher can draw these outlines for the students or they can have the students create them. The outlines should be made in a different color marker to easily identify the path of the robot.



- 4 Record the results in the Table 1 on your question sheet.
- 5 Erase your marks and time yourself two more times. Record the results in Table 1.

Table 1: Tank Control		
Trial	Time	
	Circle	Parallelogram
1		
2		
3		

- 6 Use a paper towel to remove any marks from the playing field so that the field is clear, then have each member of your group attempt the challenge.
 - Be sure to complete three time trials for each team member.

- Record all results on your question sheet
- Switch the BaseBot to Arcade control.
 - Record three time trials drawing a circle and a parallelogram in arcade control.
 - Record the time in Table 2 on your question sheet.

Table 2: Arcade Control

Trial	Time	
	Circle	Parallelogram
1		
2		
3		

- Which shape did you find most difficult to draw?
- When you finish, clear the playing field of all marks and outlines.

1.20.5: Engineering Notebook

Make an entry in your engineering notebook that includes:

- A sketch of the new marker attachment that you added to your BaseBot
- Notes on which control configuration you chose to draw the shapes and why you chose that option

Questions

Question 1 Which was the hardest shape to draw? Why?

Students tend to have more difficulty when drawing the circle because they constantly have to adjust the power to the left and right motors to get it to turn in the desired direction.

Question 2 Which driving style did you like better, Tank or Arcade? Why?

Answers will vary from student to student. You may find some students prefer tank control over arcade because of the greater precision with tank control. These students may have preferred Arcade control in the previous activity.

Question 3 Do you feel that one control configuration is always better, or would you choose Tank for certain driving tasks and Arcade for others? Why?

Answers will vary from student to student. Hopefully they have identified which control style they prefer. As the student gets more and more practice with one style, they will tend to learn to compensate for the weakness of each style.