Arm and Gripper Overview

In this extension, an arm and gripper will be assembled and attached to the Ranger Bot. The Ranger Bot will be programmed to follow a line, pick up a cup, and put the cup in a box.

Estimated Time: 90 minutes

Preparation:

- Clear the workstation.
- Organize the TETRIX® and MINDSTORMS® sets.
- Charge the TETRIX and NXT batteries.

Materials:

- Completed Ranger Bot from Lesson 3
- TETRIX Education Base Set (739143)
- LEGO® MINDSTORMS® Education NXT Base Set (W979797)
- Software (ROBOTC® or LabVIEW™ for LEGO MINDSTORMS) installed on each computer

Resources:

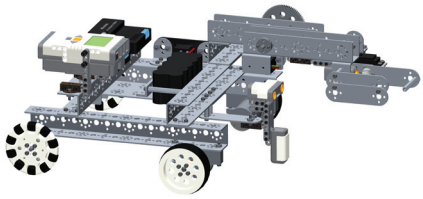
- Engineering Journal Worksheet
- Arm and Gripper Extension Overview
- Arm and Gripper Extension Building Guide
- Arm and Gripper Extension Programming Guide
- Arm and Gripper Extension Reference Guide
- Arm and Gripper Extension Sample Program
- *Arm and Gripper Extension – How It Should Work* video
- Arm and Gripper Extension 3-D Model

Building Objectives:

- Learn how to wire and attach a TETRIX Servo Motor.
- Integrate a MINDSTORMS touch sensor into a MINDSTORMS with TETRIX robot.

Programming Objectives:

- Learn how to program a TETRIX Servo Motor in order to pick up and place an object.
- Use sensor inputs to sense objects and navigate the robot.



Best Practices:

Be sure to review the General Best Practices Guide in the Introduction section of the TETRIX Getting Started Guide.

Building

- Use the small black screw to secure the horn on the Servo Motor.
- Use a bronze bushing any time an axle is used.
- Use axle spacers to keep components in place and correctly aligned.

Programming

- Be careful when setting the open/close values for the servo. It should open far enough to fit around an object and close tightly enough to securely hold the object.
- Note that the Wait function uses milliseconds.
- Note that for debugging purposes, the NXT Brick displays the sensor values when running the provided sample programs.
- Because different sensors may have different values for the same objects, the threshold values of the ultrasonic sensor and the light sensor may need to be changed and tested.
- Threshold values for the servos may require some adjustment, depending on the alignment and the position of the servo.

Programming (LabVIEW for LEGO MINDSTORMS)

- Make sure that the ports used in the program correspond with the schematic editor. For more information, consult the Schematic Editor Guide on the TETRIX Getting Started Guide DVD.
- Try to keep the code linear and well organized. This makes the code much easier to follow and debug.