Modes of Operation

Normal Operation

State

The “normal operation” mode of the robot describes when the robot and base station are connected and communicating with each other properly. To be in this mode, the robot and base station must be on and running the proper software, and properly connected via Bluetooth.

--Event for each button, should resemble and implement communications protocol

Events

1. Receiving user input.

The base station will be constantly awaiting user input into its control or debugging GUIs. When the user modifies the GUI or presses a specified key, the GUI will report this on-screen and attempt to send a message to the robot.

1. Sending a message to the robot.

The base station will send a 10 byte message to the robot containing the specific command, which includes turning, moving forward or backward, arc-turning, stopping the robot, reading data from sensors, and setting the speed of the robot. Additionally, the command will carry parameters that specify the command. Upon sending a message, the base station will then wait a small amount of time for a “confirm” message from the robot, to signal that it has received the command. If sending a message to the robot fails, the software will attempt to re-send the message until it is confirmed. If a connection is determined lost, the robot and base station will switch to recovery mode.

1. Receiving a message from the robot.

A typical message from the robot will be sensor data, which will be requested by the base station. The robot will send a similarly-encoded message back to the base station containing data from the 4 types of sensors; touch, light, ultrasonic, and sound. In normal operation, the base station will periodically request data from all sensors that are not designated OFF, so that the GUI can constantly display sensor data in real time. If the base station does not receive the information it has requested even though the robot confirmed the message, it will attempt to again request the data until it receives it.

1. An error is thrown by the robot.

The robot may throw errors based on problems with communication or problems with the on-board software. When errors occur, the base station opens its debugging software so that the user can attempt to identify the problem. The robot quickly returns to normal operation after the problem is resolved.

1. A format check is failed.

If the robot or base station receives a message that is improperly formatted, this may suggest a bug in the software or, more likely, that the robot is reaching the end of Bluetooth range. When a format check is failed by either the base station or the robot, it will re-request the data from the other software.

1. Connection is lost to the robot.

Connection to the robot may be lost at some point during its operation. When connection is lost, the base station and robot switch to recovery mode.