

16.070 Spring 2002  
Final Project User Manual

**Parts List:**

Car:

- 1 user manual
- 1 vehicle
- 1 Handyboard (onboard)
- 1 9V battery
- 1 short serial cable (modified)
- 1 log sheet
- 1 wiring diagram

Beacon:

- 1 brick
- 1 film canister with LED's
- 1 9V battery

**Warnings:**

Although this system is as robust as we can make it, it is still possible for you to break it.

Therefore:

Operate only on a hard, flat, low surface such as concrete, tile, or wood flooring.  
DO NOT operate on an elevated surface like a table or a desk.

NO Dropping

NO Moisture

NO Intentional breakage

NO Heavy objects on top of car

NO Pressure to the sidewalls.

Communicating between two Handyboards requires a modified serial cable.

Therefore:

**USE ONLY THE PROVIDED SERIAL CABLE TO CONNECT TWO  
HANDYBOARDS TO EACH OTHER.**

Using the wrong serial cable will damage the electrical components of your Handyboard.  
You will know if you are using the wrong cable by the smell of burning electronics  
coming from your Handyboard.

## Operational Use

1. Check that the Onboard Handyboard software is loaded.
  - a. Turn on the Onboard Handyboard
  - b. If the LCD shows "OBHB waiting for start bytes", then skip to step 2
  - c. If the LCD shows something else, then skip to Troubleshooting A.
2. If the Onboard Handyboard was removed from the vehicle, place it in the front section of the cargo area, with the IR receiver pointed toward the front of the vehicle.
3. Place the vehicle on the ground.
4. Place your Controller Handyboard in the rear cargo area of the vehicle with the LCD toward the front of the vehicle.
5. Connect the provided serial cable (short) to the two Handyboards. DO NOT use the long serial cable that came with your Handyboard box or any serial cable other than the short one that came with the vehicle (see Warnings).
6. Set up your IR source
  - a. Option 1: Provided IR Transmitter.
    - i. Place the IR Transmitter in an appropriate location. The infrared transmitter should be level with the on-board Handyboard's IR receiver. Use a significant weight to stabilize the transmitter as well as provide an impact point for the bumper. The provided brick or a few textbooks work well.
    - ii. Make sure the 9V battery is connected to the Transmitter.
    - iii. Turn on the Transmitter.
  - b. Option 2: Remote Control.
    - i. Obtain any remote control that sends IR codes.
    - ii. To produce a "visible" IR signal, point the remote in the general direction of the vehicle and push any button.
    - iii. To produce a "not visible" IR signal simply release the button.
    - iv. Most remote controls (including the PRS clicker) have very strong signals compared to the provided transmitter. This means that the angle between the remote and the IR receiver on the Onboard Handyboard does not have to be precise. In a small room with several reflective surfaces, the IR signal from a remote will probably be visible at any angle.
7. Turn on your Controller Handyboard
8. Turn on the Onboard Handyboard.
9. Press the Start Button on your Controller Handyboard to start the simulation.
10. To stop the vehicle, press the stop button on your Controller Handyboard or press the nose of the vehicle, which will activate the microswitches.
11. To reposition the vehicle, pick up the vehicle, supporting the underside of the car, and hold it with the platform level to the ground.

12. When all simulation trials are over
  - a. Turn off the IR Transmitter.
  - b. Turn off both Handyboards
  - c. Detach the serial cable.
  - d. Remove your Controller Handyboard.
  - e. Record any anomalies on the Log sheet that would indicate hardware problems.