

Using serial communication to transfer data from the robot to a computer.

The DE2 board on the DE2Bot has a serial port, and the provided Quartus files include an IO peripheral for SCOMP that can send data through it.

Included in SimpleScanDemo.asm is a subroutine named SendData that will transmit the 360 values acquired during the sonar scan. One good way to incorporate the subroutine into your code is to conditionally call it during the initialization; for example, the following addition to the WaitForSafety loop will transmit the data if PB1 is pressed instead of SW17 being flipped.

```
WaitForSafety:
    ; Check for PB1 to initiate data transmission
    IN      XIO
    AND     Mask0
    JZERO   SendData
    ; This loop will wait for [ ... ]
```

Also on Canvas are several MATLAB scripts to help you acquire and parse the data:

- SerialConnect.m
 - This only needs to be run once. It opens the computer's serial port with the correct settings and creates a buffer that will hold the data as the robot transmits it.
- ClearBuffer.m
 - This script empties the serial buffer on the computer, getting rid of any previous data. It is a good idea to run this before sending data from the robot, so that you only get the most recent 360 values.
- ParseData.m
 - This script takes the data from the serial buffer and interprets it as 16-bit values, creating an array of 360 numbers for you to use as you wish.

Assuming that you incorporate the assembly code above, the general process for getting data would be:

1. Run SerialConnect.m to open the serial port.
2. Run the robot normally, allowing it to acquire its 360 sonar values.
3. Reset the robot (using PB0, *not* by turning it off, or reprogramming it, which will wipe out the acquired data).
4. Connect the robot to the computer using a serial cable.
5. Run ClearBuffer.m to clear the serial buffer.
6. Press PB1 on the robot to initiate the data transfer.
7. Run ParseData.m to parse the data in the buffer.
8. Repeat from step 2 as needed.