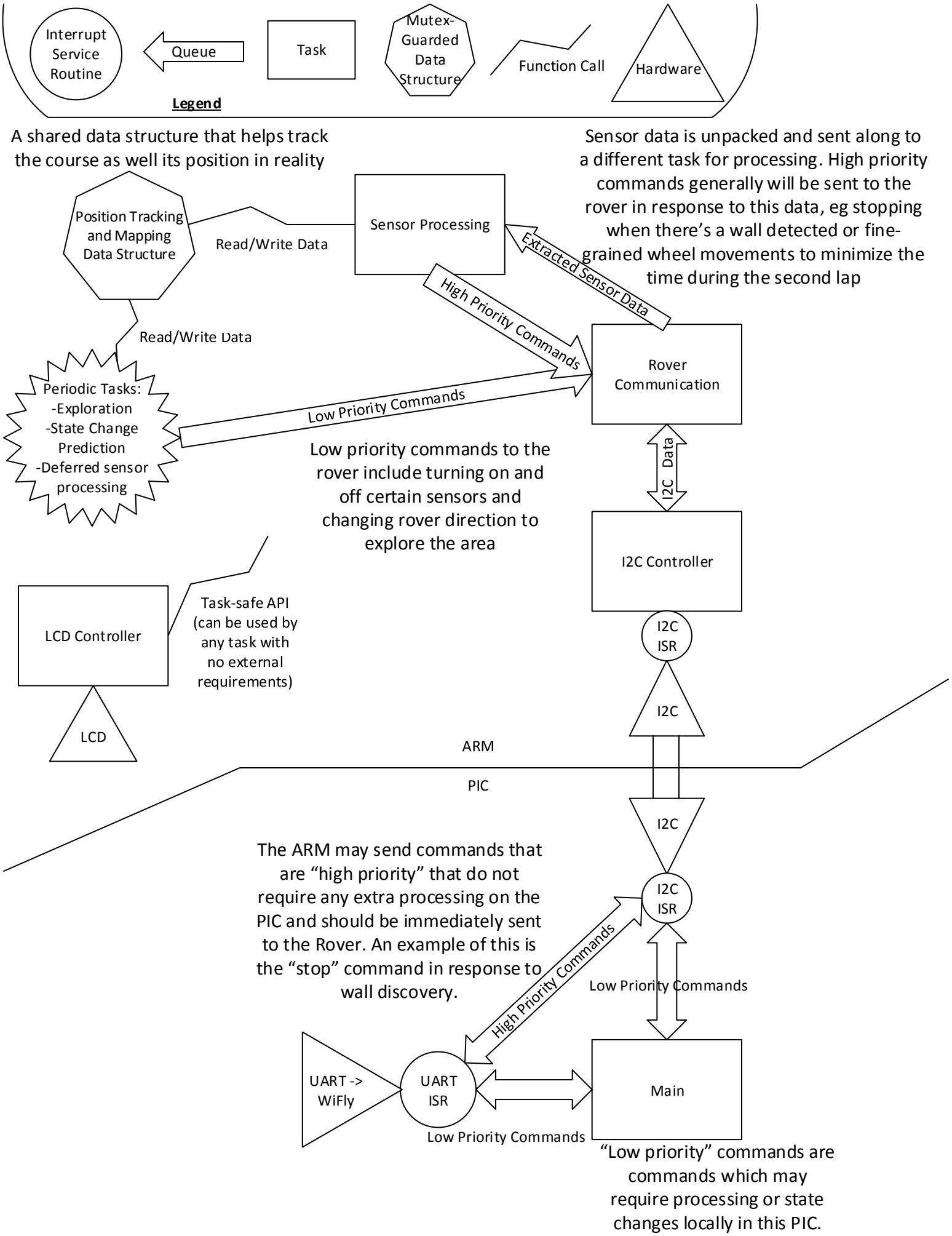
Interrupt Service Routine
Queue
Task
Mutex-Guarded Data Structure
Function Call
Hardware
Legend
A shared data structure that helps track the course as well its position in reality
Sensor data is unpacked and sent along to a different task for processing. High priority commands generally will be sent to the rover in response to this data, eg stopping when there's a wall detected or fine-grained wheel movements to minimize the time during the second lap
Position Tracking and Mapping Data Structure
Read/Write Data
Sensor Processing
Extracted Sensor Data
High Priority Commands
Read/Write Data
Rover Communication
Periodic Tasks:
-Exploration
-State Change Prediction
-Deferred sensor processing
Low Priority Commands
Low priority commands to the rover include turning on and off certain sensors and changing rover direction to explore the area
I2C Data
I2C Controller
LCD Controller
Task-safe API (can be used by any task with no external requirements)
I2C ISR
I2C
LCD
ARM
PIC
I2C
The ARM may send commands that are "high priority" that do not require any extra processing on the PIC and should be immediately sent to the Rover. An example of this is the "stop" command in response to wall discovery.
I2C ISR
High Priority Commands
Low Priority Commands
UART -> WiFly
UART ISR
Main
Low Priority Commands
"Low priority" commands are commands which may require processing or state changes locally in this PIC.