

CG3002 Embedded System Design Project

AY 2017/2018 Semester 1

First Prototype Testing Guidelines (Communications/Firmware)

Overview

This first prototype test aims to test the communications and firmware in isolation from the hardware and software subsystems. It consists of three parts, getting the real-time OS up and running, getting serial communications working between the Rpi and Mega, and secure wireless socket communications working between the Rpi and Server.

Part 1: FreeRTOS

1a Installation:

Briefly explain FreeRTOS setup

1b Task definition:

Walk through task function

Discuss coordination between tasks, if applicable

Part 2: Serial communications between Rpi and Mega

2a Hardware connections:

Walk through your pin connections and hardware for the serial communications

2b Handshaking:

Explain your synchronization protocol by walking through the code

Demonstrate successful handshaking between the devices

2c Two-way communications:

Explain device IDs, packet types, packet format

Show dummy sensor data used for testing

Walkthrough code on Rpi and Mega

For each packet type, show transmission between the devices

Part 3: Socket communications between Rpi and Server

3a Socket communications:

Walk through code on how socket is created and connected

3b Secure communications:

Walk through code on how encryption is used

3c Message data:

Briefly explain message format

Show successful communications between Rpi and the server