Understanding the Provided Documents

MT 3K04

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# *Doc1:* Tutorial1.1

## Apparent Purpose

* To explain what an embedded system is, in relation to the Pacemaker Project
* To give a high level understanding of what you’re doing

## Key Content

**Intro to Embedded Systems**

* The pacemaker is an embedded system.
* Software: In the context of the pacemaker system, the embedded computer is the pulse generator
  + Pacemaker software implements bradycardia operating modes (unsure what this means at this point)
* User Interface: Device Controller-Monitor (DCM) includes a remote graphical user interface (GUI) that allows the user to receive data from the pacemaker device and, given that the pacemaker is programmable, transmit a new set of instructions to alter the behaviour of the pacemaker device.
* Input variables: represent physical connection between pacemaker leads and the Cardiac Conduction System (CCS) that allows the pulse generator to sense the electrical activity of the heart.
* Output Variables: represent physical connection between pacemaker leads and the Cardiac Conduction System (CCS) that allows the pulse generator to send electric stimuli to the heart.
* MCU and Peripherals: Packemaker system is based on an MCU called FRDM-K64F. see [link1](https://os.mbed.com/platforms/FRDM-K64F/) and [link2](https://inst.eecs.berkeley.edu/~ee192/sp18/files/FRDMK64FUG.pdf)
* Timers: needed to time the pacemaker lol
* Serial Comms: Used for the DCM, to be explored later
* K64F Pinout:   
  A diagram of a computer chip

  Description automatically generated
* Additional Peripherals: K64F has an accelerometer that’s supposed to measure a person’s physical activity level
* Driver Circuit:
  + Driver circuit controls other electric components, and connected to GPIO
  + Driver circuit we’re using is called pacemaker shield, see pacemaker shield doc for explanation on what it does

**Intro to the Pacemaker Project**

* Goal: Design and implement system that operates a cardiac pacemaker under the specified modes
* Scope: Design and implement the embedded pacemaker software, the driver software, and the user interface for the DCM
  + Also required to verify and document your software
* Deliverables
  + MATLAB Simulink® model implementing the pacemaker operating modes
  + DCM software
  + Technical Documentation
  + Live demonstration

# *Doc1:* Tutorial1.2

## Apparent Purpose

* Explaining required software

## Key Content

* Install stuff
* May need to update board firmware if it doesn’t flash or has some bootloader error