

Explosive Ordnance Disposal Challenge

ME3-HECM COURSE PROJECT

Alvaro Prat
Theophile Sautory

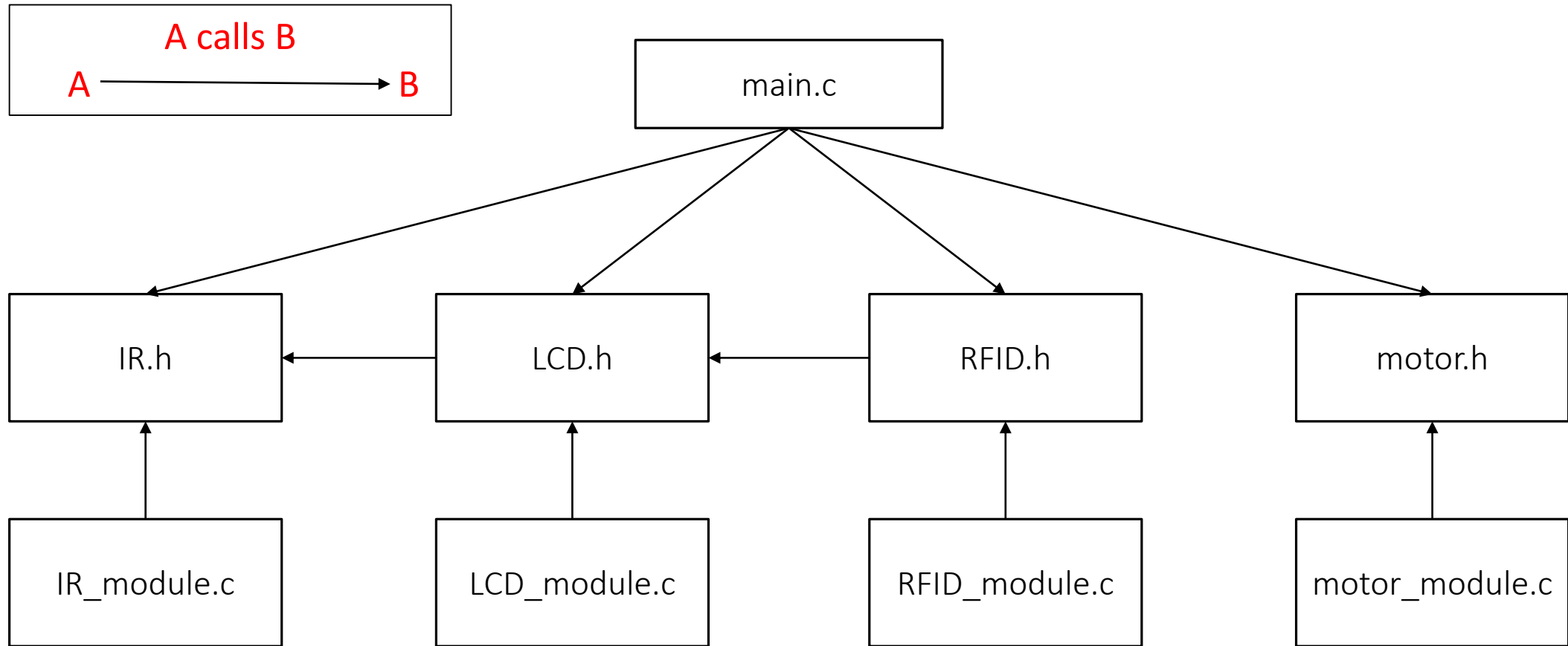
Contents

1. File organisation

2. Main C source file

- Main loop
 - Working with the IR signals
 - Finding the beacon
 - Motor control
 - Returning to initial position

Files organisation tree diagram



Main C source file

1. **Calls the header files and initialises global variables**
2. **Sets up the interrupts**
 - Button press interrupt
 - RFID interrupt
3. **Calls C module functions and initialises the main loop**
 - Sets up motor and IR structures values
 - Initialises module registers
 - Enables interrupts
 - Creates main loop variables
 - Sets up the main loop

Interrupts

External interrupts are used to update the 'card_read' flag value.

1. Button press interrupt

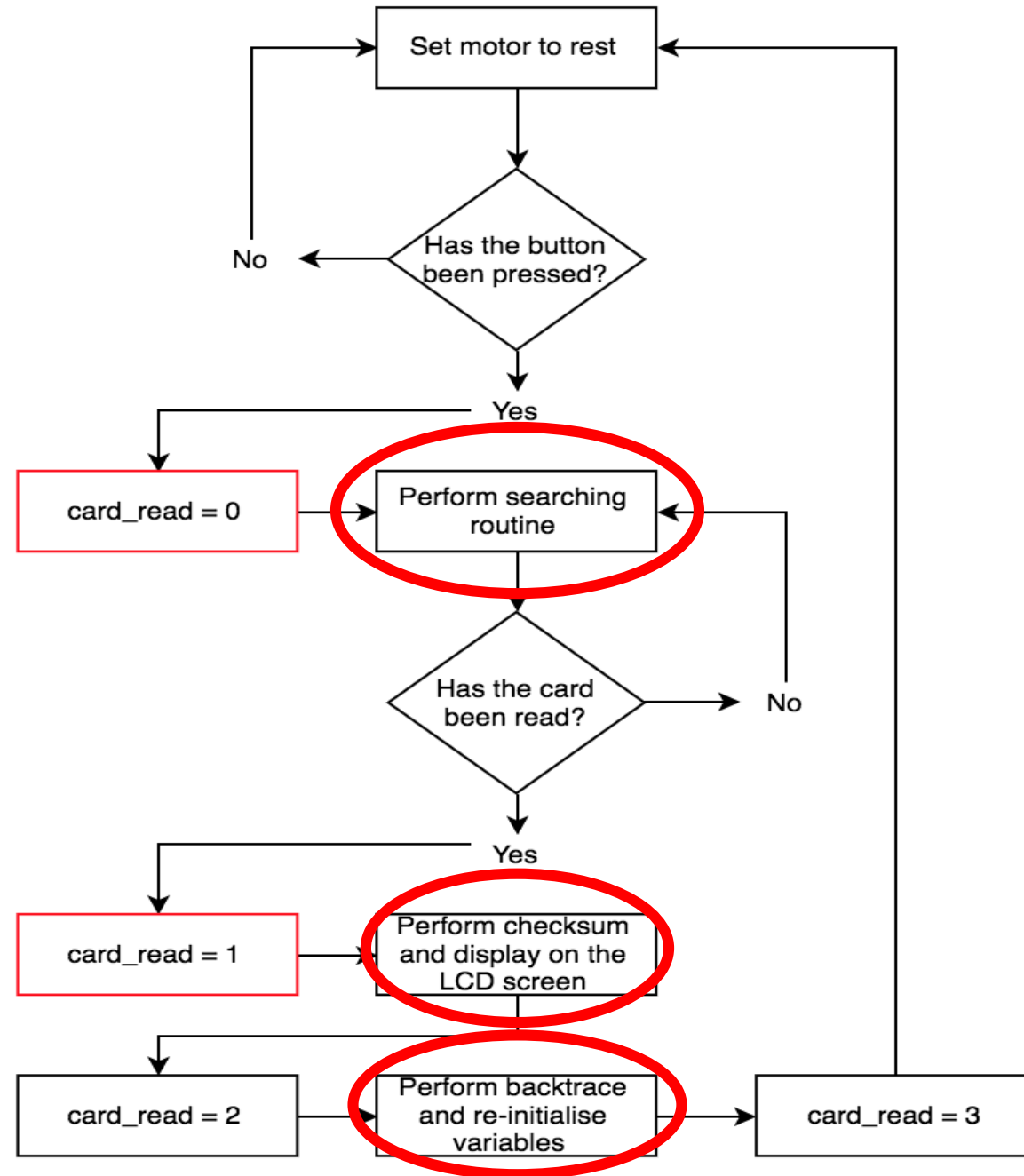
- Sets card_read = 0

2. RFID interrupt

- Sets card_read = 1
- Reads the RFID (RCREG) characters into a global character array

Main loop flow chart

- Red boxes indicate interrupt updated values.



IR Signals Processing

Reading

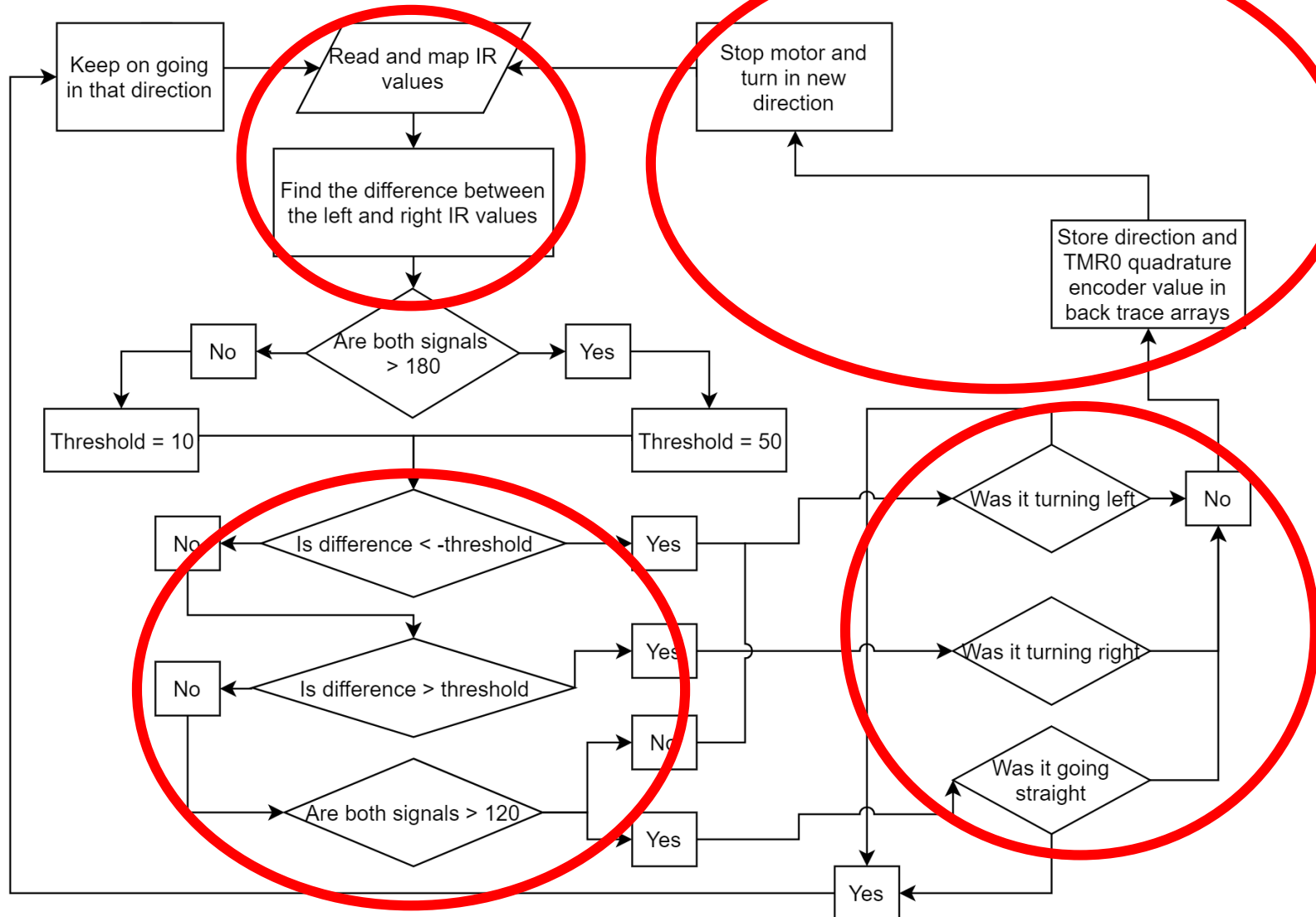
1. TMR5 module is configured at 250KHz
2. CAPxCON module is set to pulse width measurement mode in CAP1 and CAP2 pins
3. Every falling to rising edge CAPx buffers are updated with the TMR5 clock
4. These values range from 0 to 12500 ($50\text{ms} * 250\text{kHz}$)
5. Recorded in IR structure

Mapping

1. Map (0 -> 12500) to (0 -> 200)

Flow chart for the IR searching routine

card_read = 0



Backtrace Routine and Motor Control

Motor Control

- Motor speed controlled by its PWM Low/High duty cycle

Search Mode

- Directions and distances stored in searching routine
- Distances stored using a quadrature encoder
 - TMR0 is written through the external TOCKI pin
 - Re set to 0 in every direction change

Return Mode

- Back trace values are accessed with array pointers
- Movements repeated in reverse order and direction

Thank you very much for listening !

Questions?