Project Report

Surname	Sokolenko	**First name**	Maksym
Student number	160482159		
Project Letter	A	**Project title**	Reversing Alarm
GIT Hub Link	https://github.research.its.qmul.ac.uk/ECS642-714-EmbeddedSystems/ec16518-ProjectA		

1 System Requirements

Given Requirement	Status	Detailed Behaviour
1	Completed	When code is uploaded on micro controller it is offline. In order for the alarm to start working, user has to press the button. When pressed, the system generates a sound and a change in tone so that user knows that the distance changes. Closer – tone is higher, further – tone is lower. In order to turn the system off user has to press the button again.
2	Completed	When the user turns on the system by pressing the button, a louder tone is played for a short period of time (less than a second) to notify the user that the system is turned on now.
3	Completed	The maximum distance that the alarm can be seen detecting movement in front of it is around 15 cm. When the object starts moving closer to the detector the alarm sound becomes louder and more frequent.

2 Design System

2.1 Peripherals and Pins

Pins used in the project are:

PTD6 + GND, j9 Pin 12 – pin used to turn on/off alarm.

GND, j9 Pin 12 + Analog input PTB0, j10 Pin 2 + Digital Output PTD 7 + 3.3 voltage supply P3V3, j9 Pin 4 – IR Emitter and Detector

PWM: PTA4, j1 Pin 10 + Voltage supply: P5V_USB, j9, Pin 10 + Audio: PTA2, j1 Pin 4 + GDN, j9, Pin12

Analog Input PTB0, j10, Pin2 – Analogue to Digital Convertor (ADC)

TPM – TMP was used to control the volume of the connected speaker by creating a PWM signal.

PIT – PIT (Periodic Interrupt Timer) was used to generate several different frequencies to show that the sensor was working (further away from sensor or close to it generated different frequencies and volume changed). The PIT initiated interrupts to dial the signal from the speaker.

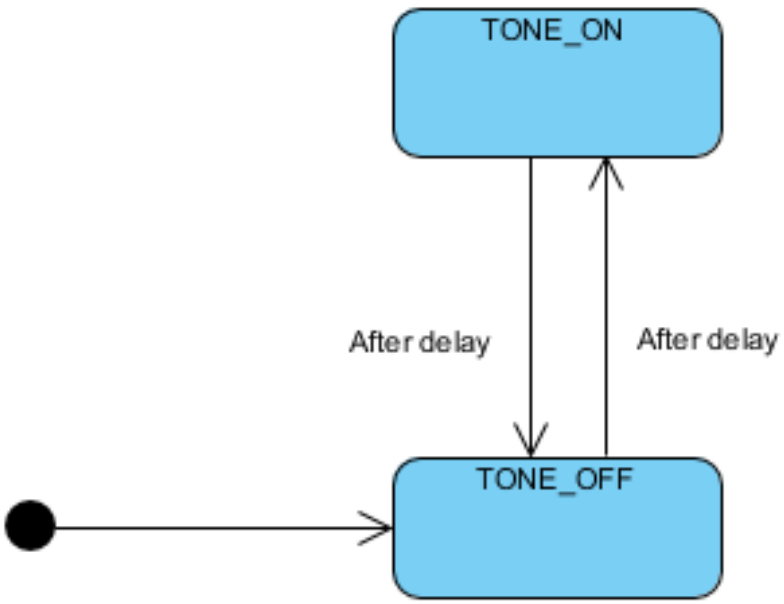
ADC – ADC (Analogue to Digital Convertor) was used to measure the voltage. The value produced would correspond to how far or close the object was from the sensor.

2.2 ISRs

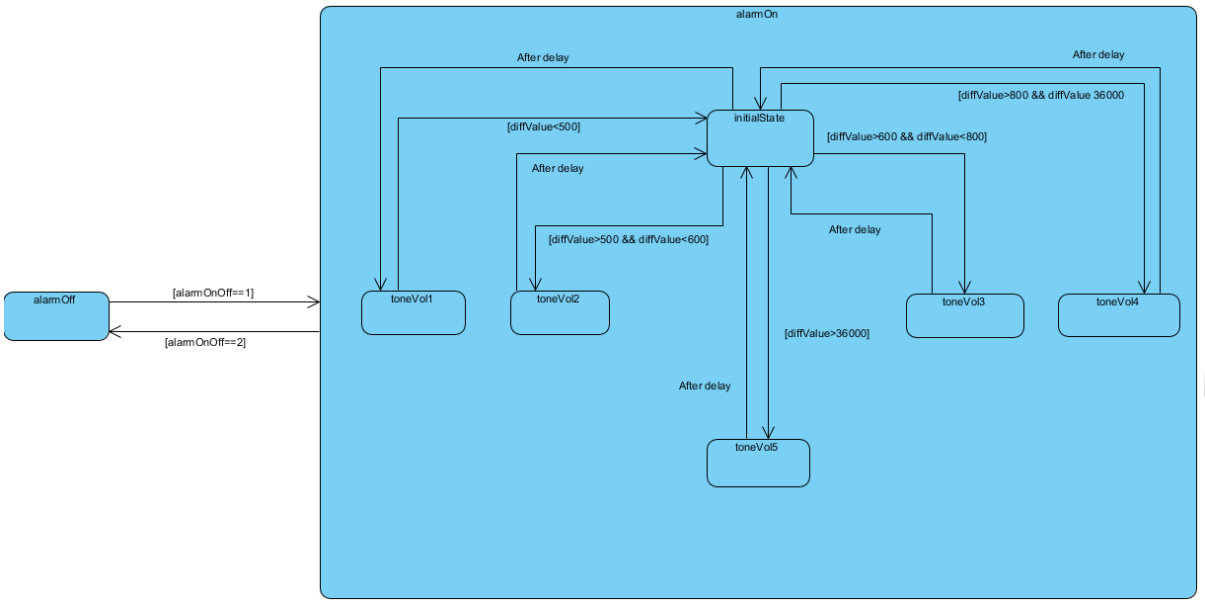
The IRSs used are the ones supplied in PIT, code was taken from the available folder for Lab 6.

2.3 Threads

1.This thread puts the system in armed or disarmed position.



2. This thread would produce a different tone by the speaker depending on the distance (voltage) that the object is located from the sensor. Originally the tone is off. The system switches between the tones based on the period from the current difference.



3. This thread checks whether the button connected was pressed or not.