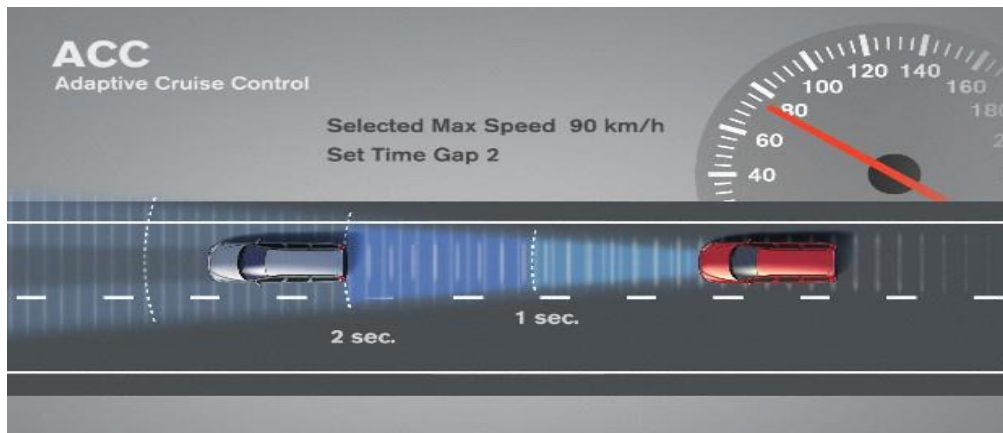


# Project: Adaptive Cruise Control (ACC)

## ABSTRACT:

ACC is an optional control system for vehicles that automatically adjusts the vehicle speed to maintain a safe distance from vehicles ahead. Control system consists of distance sensors like ultrasonic, radar. Following image provide an overview for ACC.



*Figure 1: Overview of Adaptive Cruise Control*

User control settings varies depending upon manufacturer, still basic functionalities are as follows:

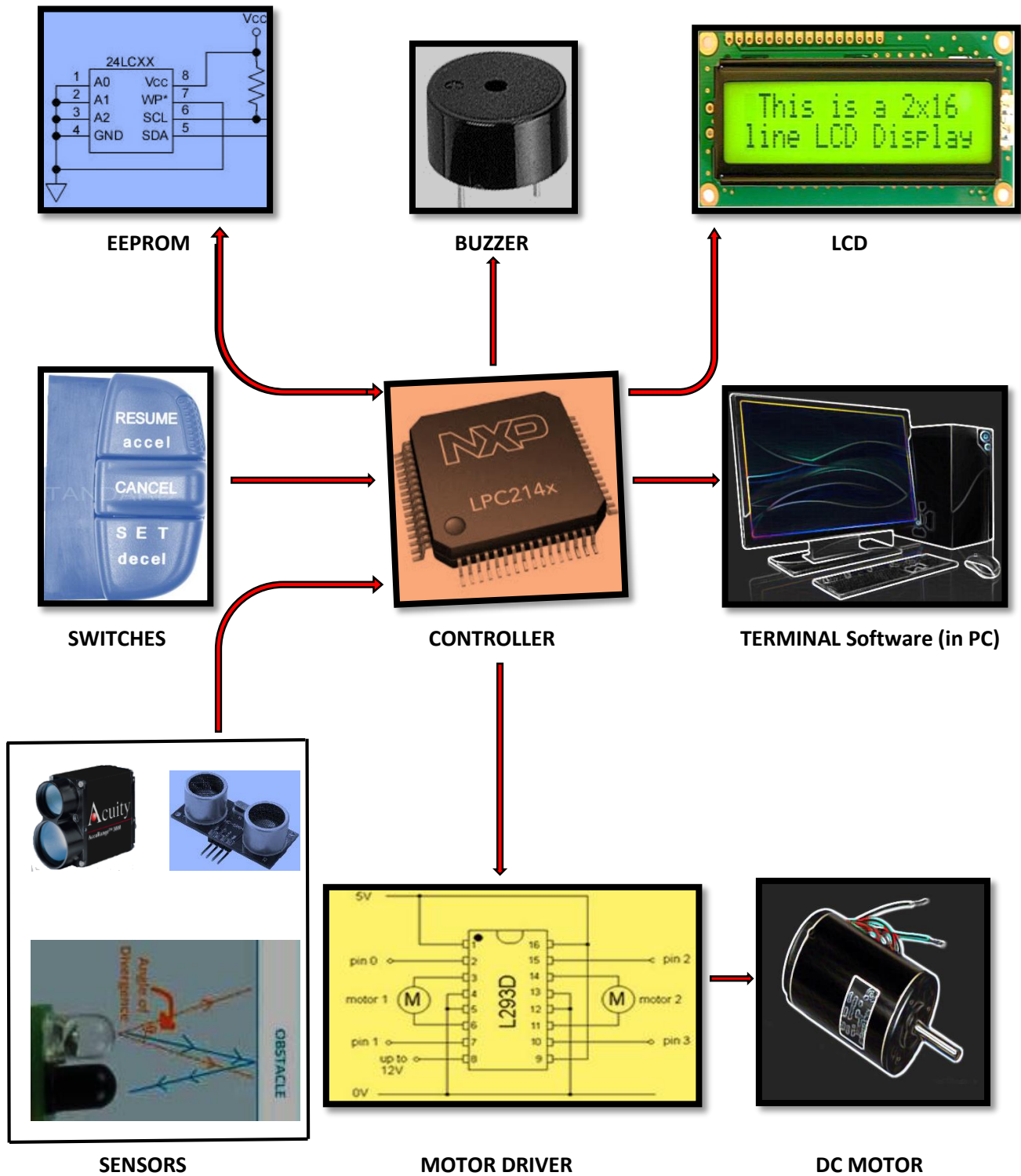
- 1) Set max speed to be maintained.
- 2) Set minimum distance to be allowed with that speed.
- 3) Start ACC mode
- 4) Stop ACC mode
- 5) Store set parameters

Following are few kinds of setting arrangements is being provided:



*Figure 2: Switch arrangement in vehicles*

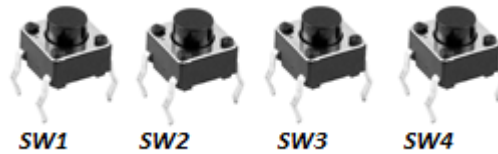
## BLOCK DIAGRAM:



## IMPLEMENTATION:

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In this project ACC demonstration is done using Photo diode sensor to measure distance and included all above basic features using tactile switches.



*Figure 3: Switches arrangement for demonstration*

### Operation:

- Press SW1 to go to speed and distance setting mode
- Using SW2 select parameter to select (Even press – Speed selected, Odd press – Distance selected)
- Using SW3 and SW4 for increment and decrement selected parameters respectively
- Press SW1 again will ask for ACC starting confirmation.  
[Note: Set data gets stored at this stage]
- Press SW1 again and ACC will start  
[Note: During ACC mode speed will vary according distance between vehicles, this speed variation is just displayed on LCD and PWM is also generated accordingly]
- Press SW1 to switch off ACC mode if turned ON.

### Constraints:

- Speed can be set is range between (40-80 Kmph) and distance (1-10m).  
[Note: these are not to the scale]
- If speed falls below 40Kmph ACC mode switched off with 3 beep indications.  
[Note: Each key stroke is provided with one beep stroke]

### Feature:

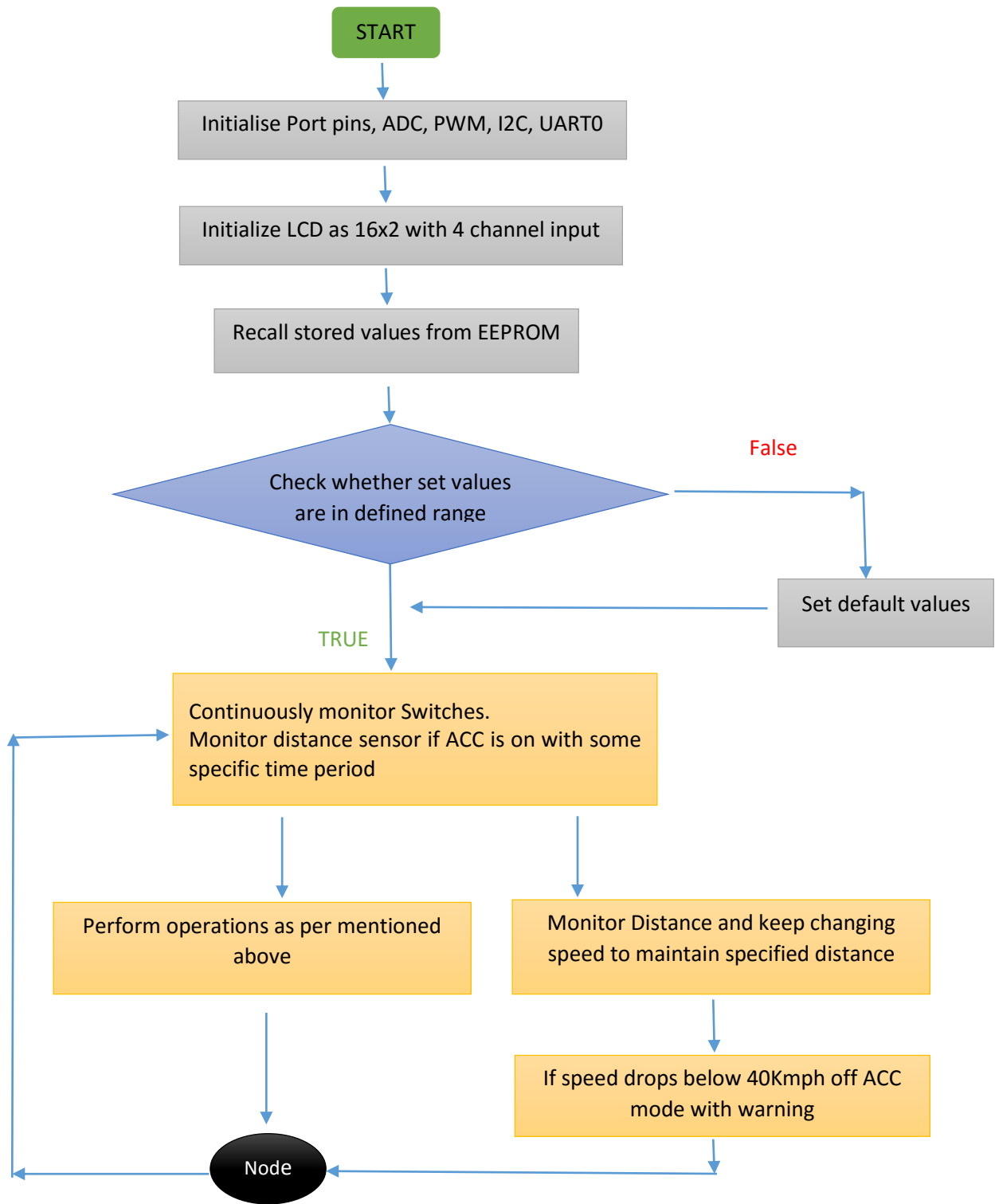
- Set values are stored in external EEPROM chip and are recalled during starting ACC mode.
- Per Speed change beep is provide to notify driver.

Following are components used:

- 1) LPC2148 development board
- 2) Photo diode sensor
- 3) UART to USB converter
- 4) Buzzer
- 5) LCD
- 6) EEPROM IC

## PROGRAM FLOWCHART:

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## SIMULATION:

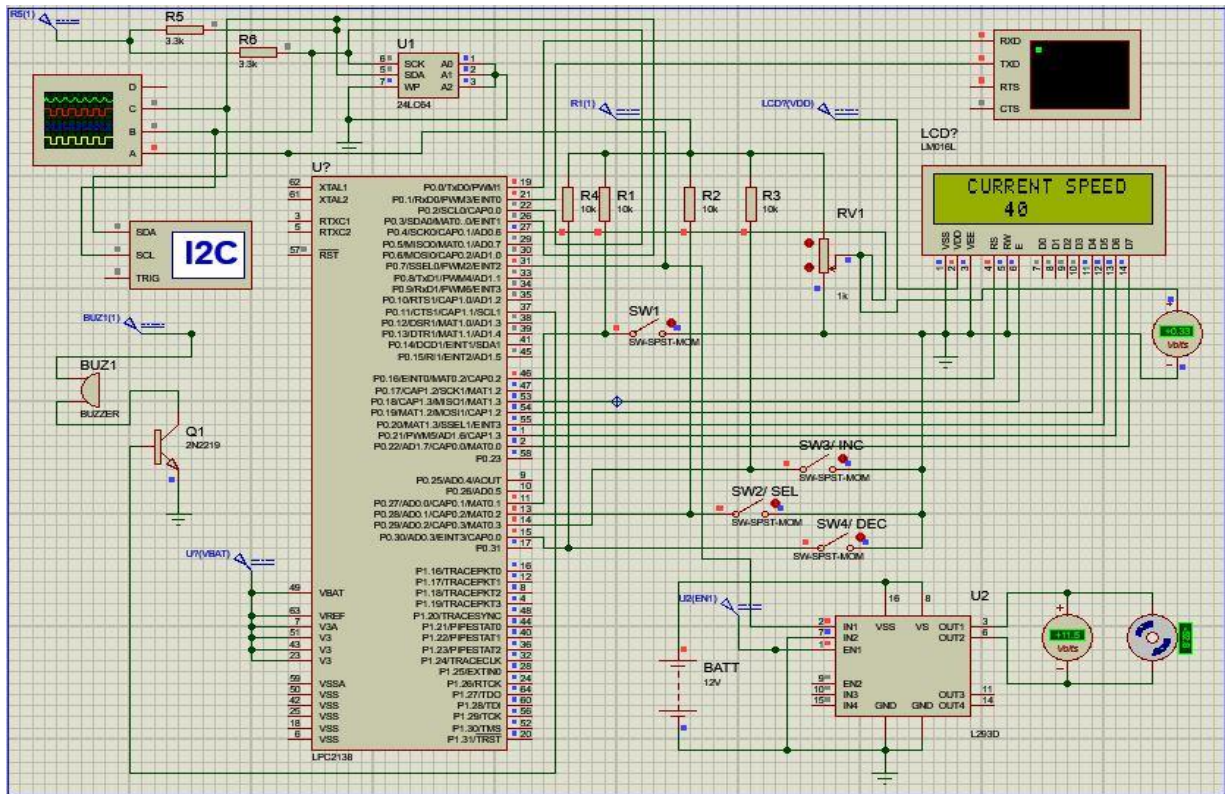
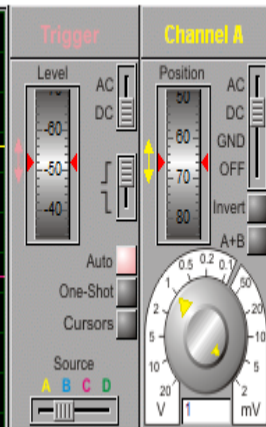
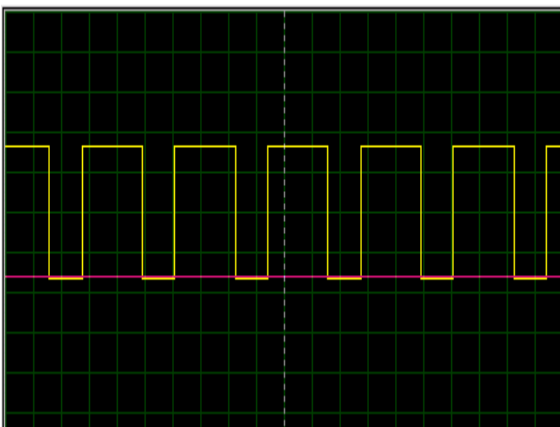


Figure 4: Simulation circuit in proteus

Digital Oscilloscope



Virtual Terminal

Figure 5: Scope & terminal outputs



## RESULTS:

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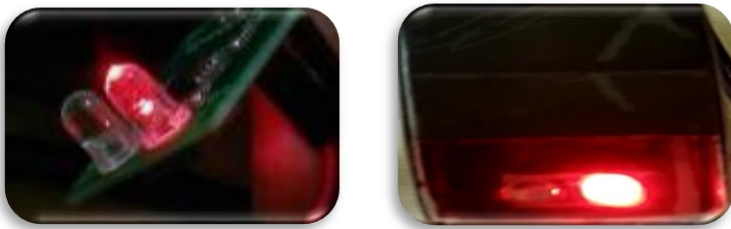


Figure 6: Photo diode Sensor

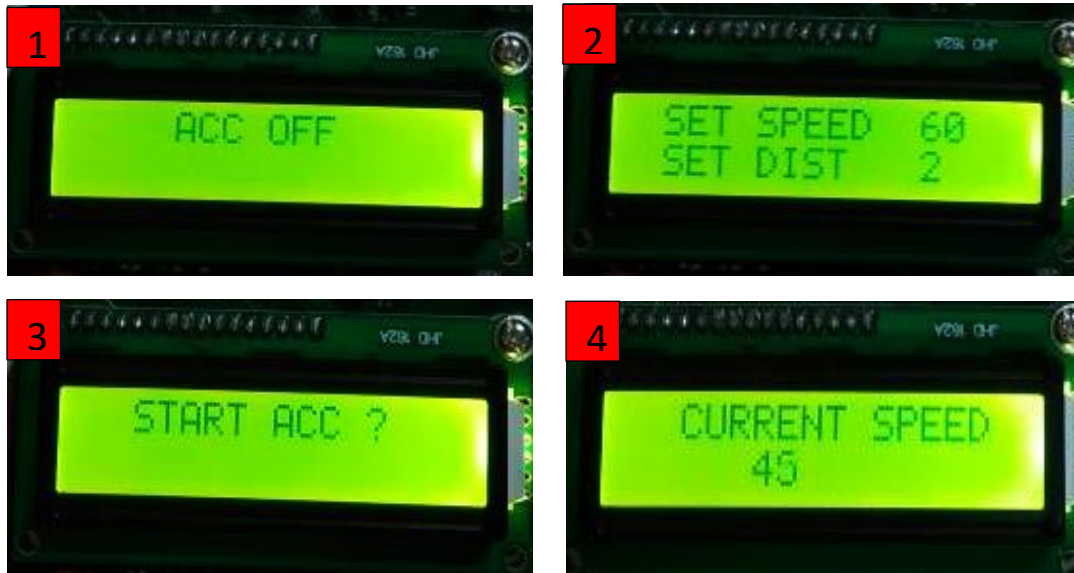


Figure 7: LCD display as per mode change

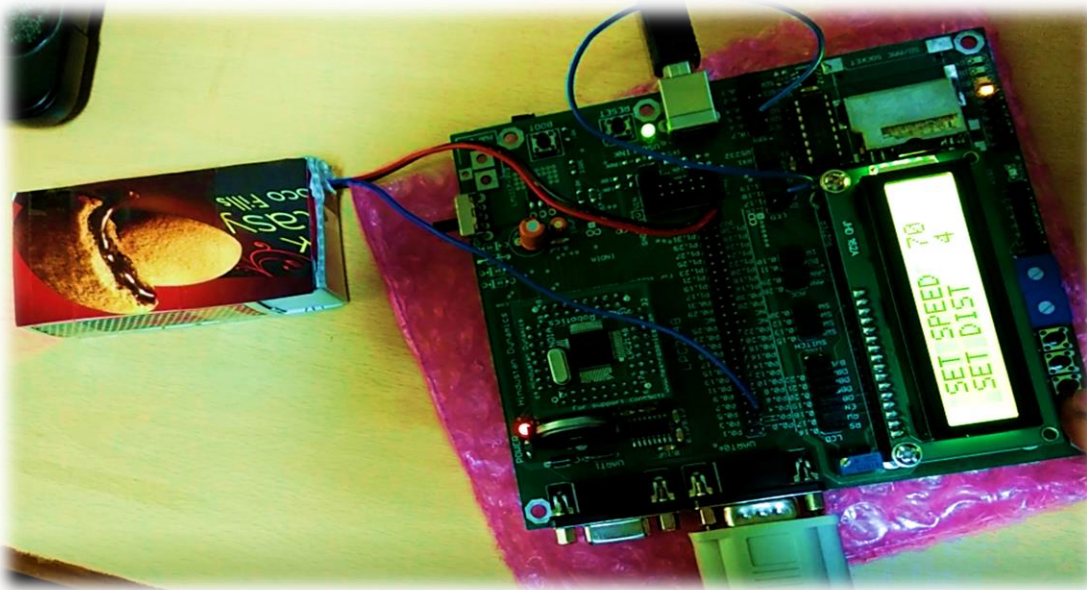


Figure 8: Final demonstration setup