MCP Project Report

1st June 2022

Course And Project guide: Dr.Satyadhyan Chickerur

1   Problem Statement :

Digital Wall Clock Using Atmega32 And DS1307 RTC

2   Content:

2.1   Team Members

2.2   Abstract

2.3   Introduction

2.4   Aim

2.5   Requirements

2.6   FlowChart

2.7   Working

2.8   Block Diagram

2.9   Model

2.10   Proteus Circuit And Explanation

2.11   Swot Analysis

3 Team Members:

TEAM MEMBERS:-	Roll No.:-
Siddhant Saptasagar	01FE20BCS101(236)
Sushma A.S	01FE20BCS091 (226)
Reemak.D	01FE20BCS066(204)
Sudeep Pingulkar	01FE20BCS070 (206)

4 Abstract

This documentation is about 'Digital Clock using DS1307 RTC' where the system is controlled using Arduino UNO and about a 'Digital clock without using rtc circuit' where the system is controlled by ATMEGA32 MCU.

5 Introduction:

1.Arduino UNO
The system consists of digital clock to display real time using a RTC DS1307, which works on I2C protocol. It contains a 3V cell due to which it runs even after power failure and when power is reconnected, it displays the real time irrespective to the time and duration it was in off state.
2.ATMEGA32
This system was designed using a simple DS1307 RTC and ATMega16 microcontroller. The RTC chip keeps track of the seconds, minutes, hours, day, month, and year. This chip feeds the AVR with real-time parameters. The fed parameters were then displayed on a simple LED screen. After writing into the chip, it starts tracking the time which will be read and displayed on the LED screen. Every digital clock has a crystal inside it to keep track of time. This crystal is not only present in the clock but also present in all computing real-time systems. This crystal generates clock pulses, which are needed for timing calculations. Although there are some other ways to get clock pulses for higher accuracy and frequency, the most preferred way is to use crystal to keep track of time.DS1307 RTC has a highly accurate crystal inside it, so no external Crystal oscillator is needed.

6 Aim

Building a Digital Wall Clock on PCB using:
1. AVR Microcontroller Atmega32 and DS1307 RTC
2. Arduino UNO without using DS1307 RTC

7 Components:

1. ATmega16 AVR Microcontroller

2. USBASP

3. Arduino UNO

4. DS1307 RTC IC

5. 16X2 LCD Display

6. Button cell 3v

7. Jumper wires

8. 1K Potentiometer

9. Breadboard

8 Tools:

1. Soldering Gun

2. Wire Cutter

9 Working

1) Digital Clock with DS1307 RTC on Arduino UNO:
This system consists of a 16X2 LCD screen, arduino UNO and RTC chip which keeps track of the seconds,minutes,hours,day,month and year. This chip feeds the AVR with the real time parameters. The fed parameters are then displayed in a simple LCD screen.
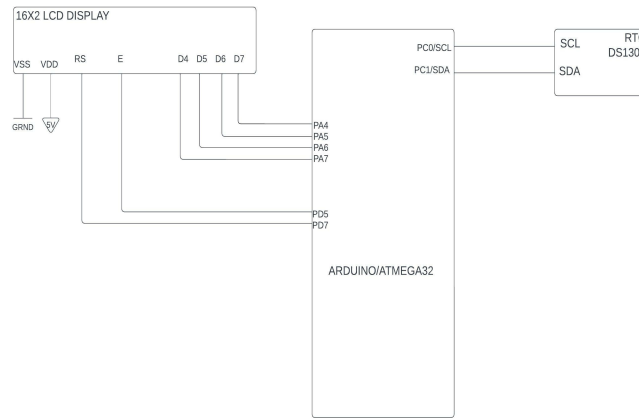The RTC is programmed initially with the desired values such as seconds, minutes, hours and so on through I2C interface. After writing into the chip , it starts tracking the time which will be read and displayed in the LCD screen.
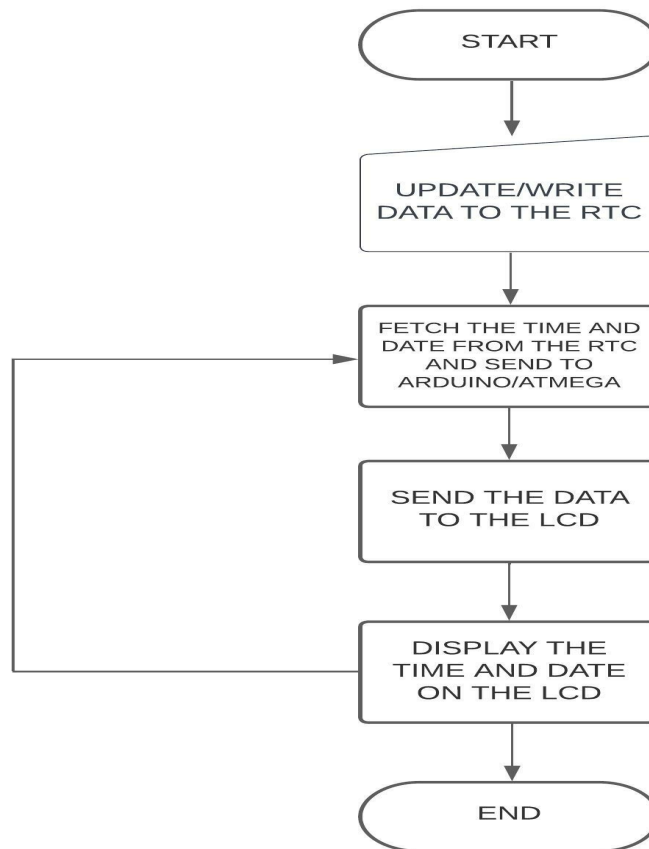2) Digital Clock without RTC on ATMEGA 32::
This system consists of a LCD screen which is controlled by using ATMEGA32. The properties of a clock are passed on to LCD by Arduino UNO through the 'FOR' loop of the program code.
When the power supply is ON, the clock displays the initialized time on the LCD and once it enters in OFF state, the time gets reset to the initialized time.

10 Block Diagram:

11 Flowchart:

START

UPDATE/WRITE DATA TO THE RTC

FETCH THE TIME AND DATE FROM THE RTC AND SEND TO ARDUINO/ATMEGA

SEND THE DATA TO THE LCD

DISPLAY THE TIME AND DATE ON THE LCD

END

12 Proteus Circuit And Explanation

There are two parts of this Digital Wall Clock Circuit, one is display part which has 16x2 LCD and another is controlled Unit part which is responsible for fetching time from DS1307 RTC chip and send that data and time to LCD display.RTC DS1307 having an internal crystal is connected to PORTC's SDA and SCL pin because this chip works on I2C communication.
All the connections are shown in the circuit diagram below:
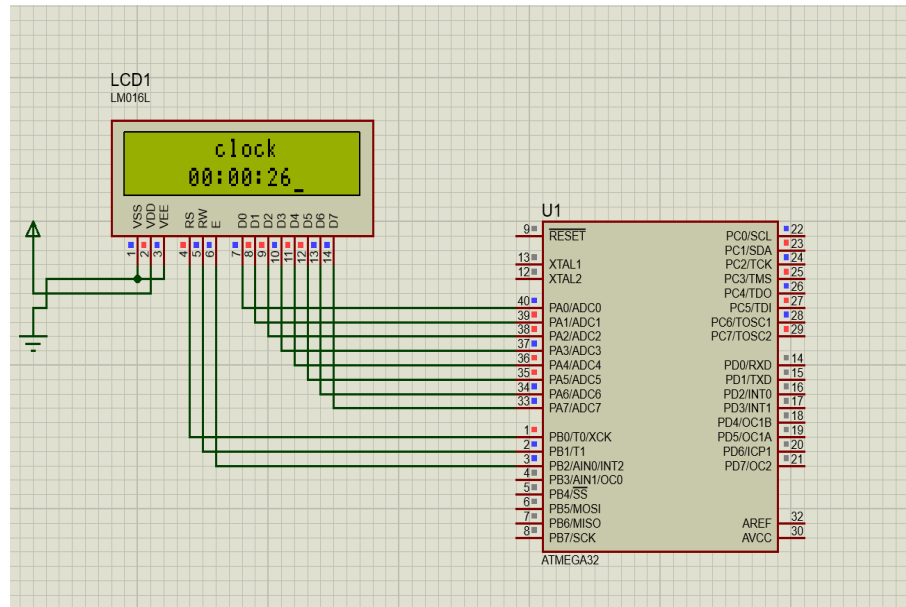
12.1 Model

1.Digital Clock without RTC on ATMEGA 32
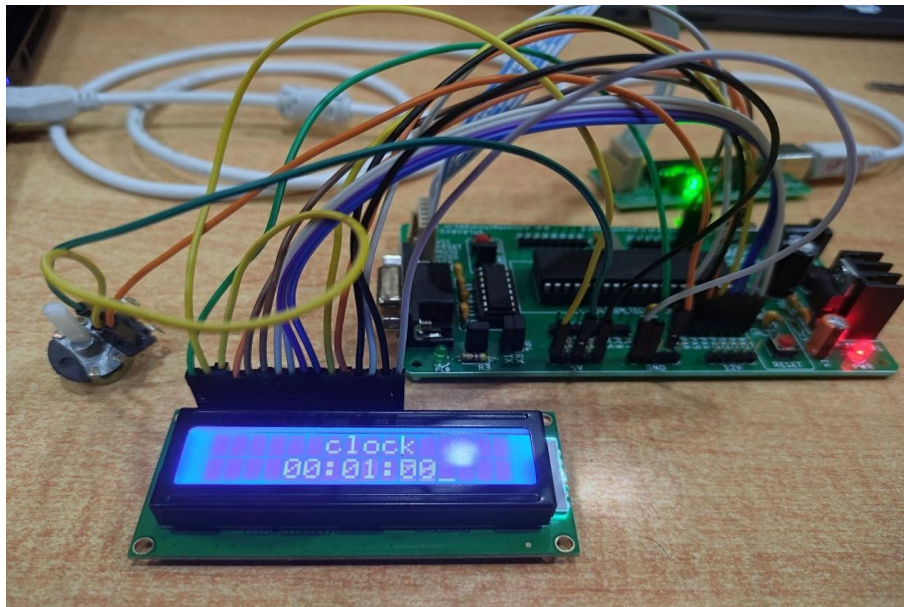
2. Digital Clock with DS1307 RTC on Arduino UNO
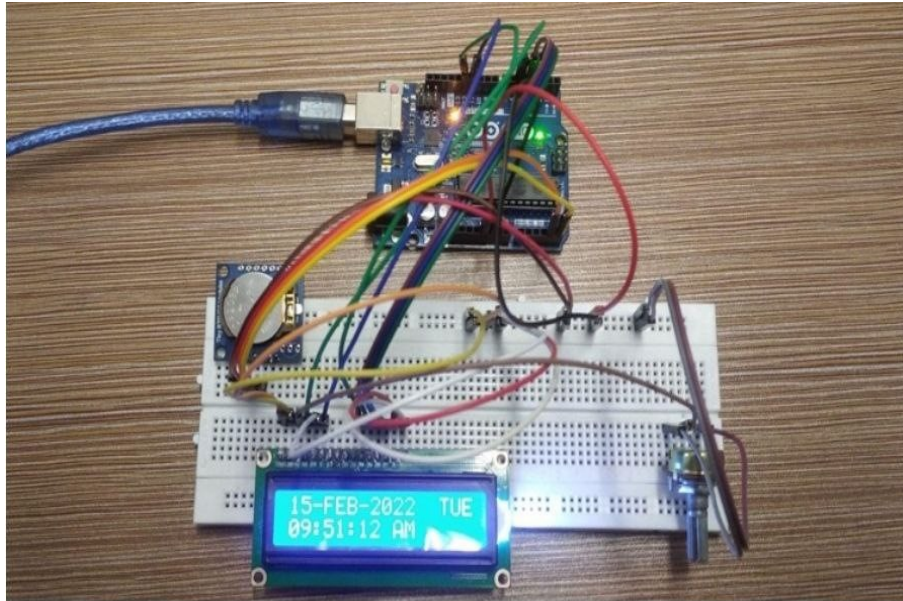
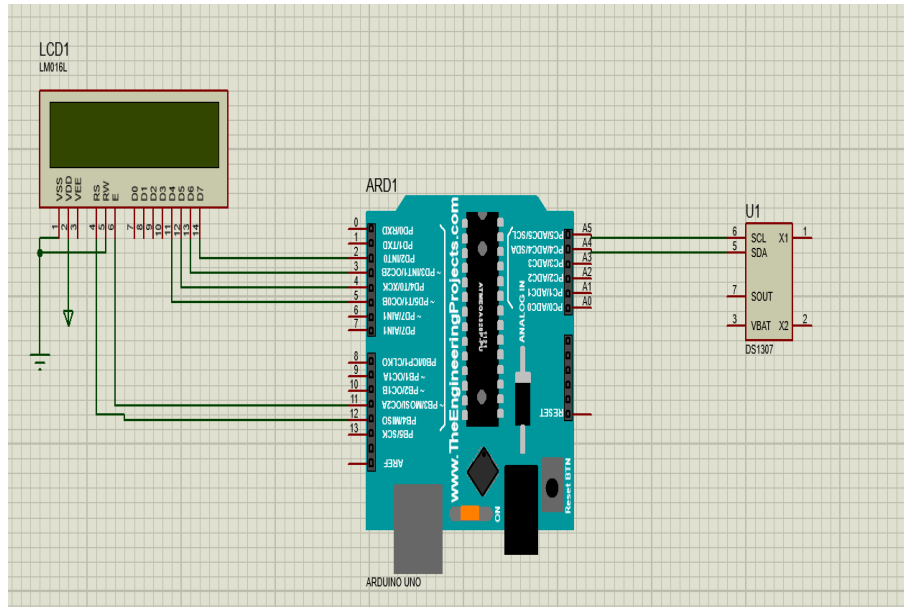## 12.2   Proteus

1. Digital clock using Atmega32 And LCD

2. Digital clock using Arduino UNO,LCD And RTC

13   SWOT Analysis:

Strengths :-

- **Siddhant**: Program implementation, 16-bit operations, basic instruction, which gives flexibility for better understanding.

- **Sushma:** Branches, Basic Arithmetic, and logic instructions.

- **Reemak:** Bit Manipulation Instruction and data transfer instructions.

- **Sudeep:** Timers and counters, status register, basic instructions

Opportunities

- By this project, we will learn circuit connections, multiplexing techniques to connect multiple segments, timing during synthesis and STA, improve problem-solving skills.

Weaknesses

- Siddhant: Timers and counters, ports

- Sushma: Should work on circuit connection of course project, ports

- Reemak: 16 Bit Operations

- Sudeep: Problem-solving logic, program implementation

Threats

- Should work more on timers and counters and very less knowledge about the same which may hinder our project's progress