PRESENTED BY GROUP 3

DIGITAL CLOCK

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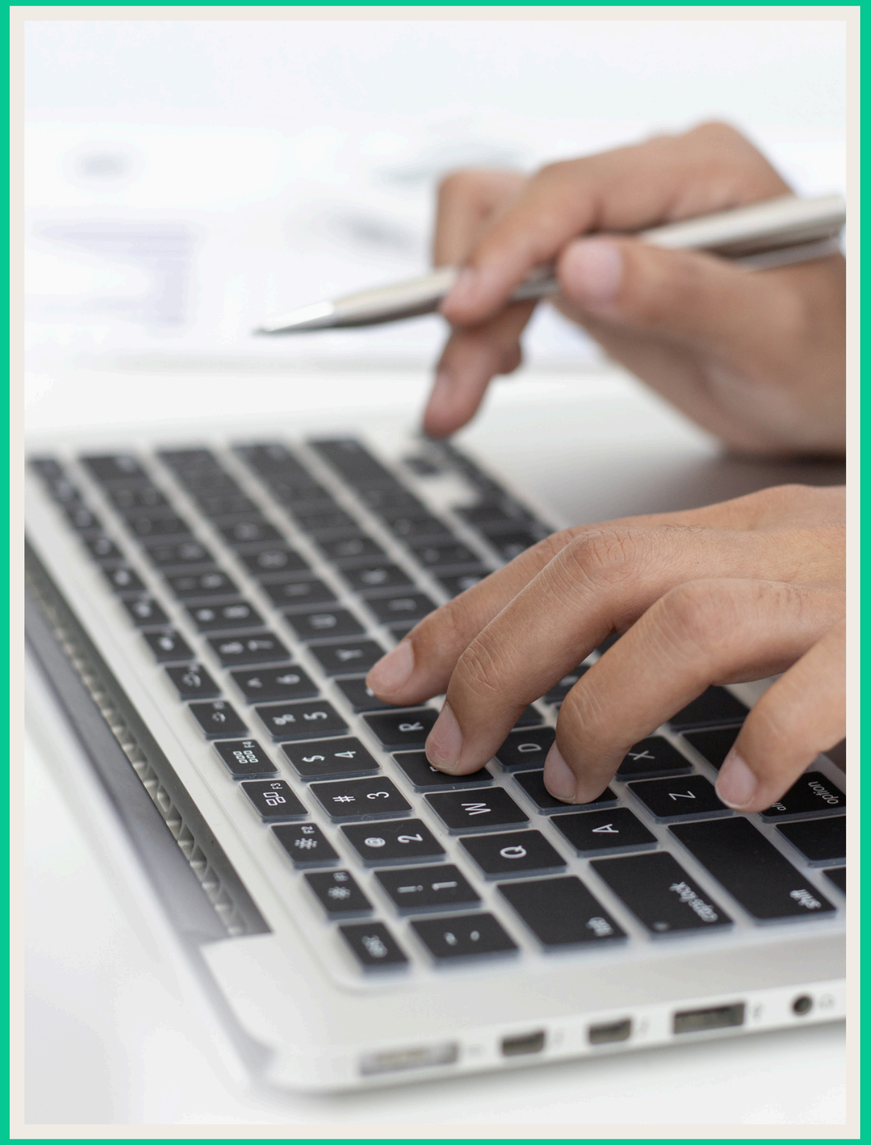
INTRODUCTION

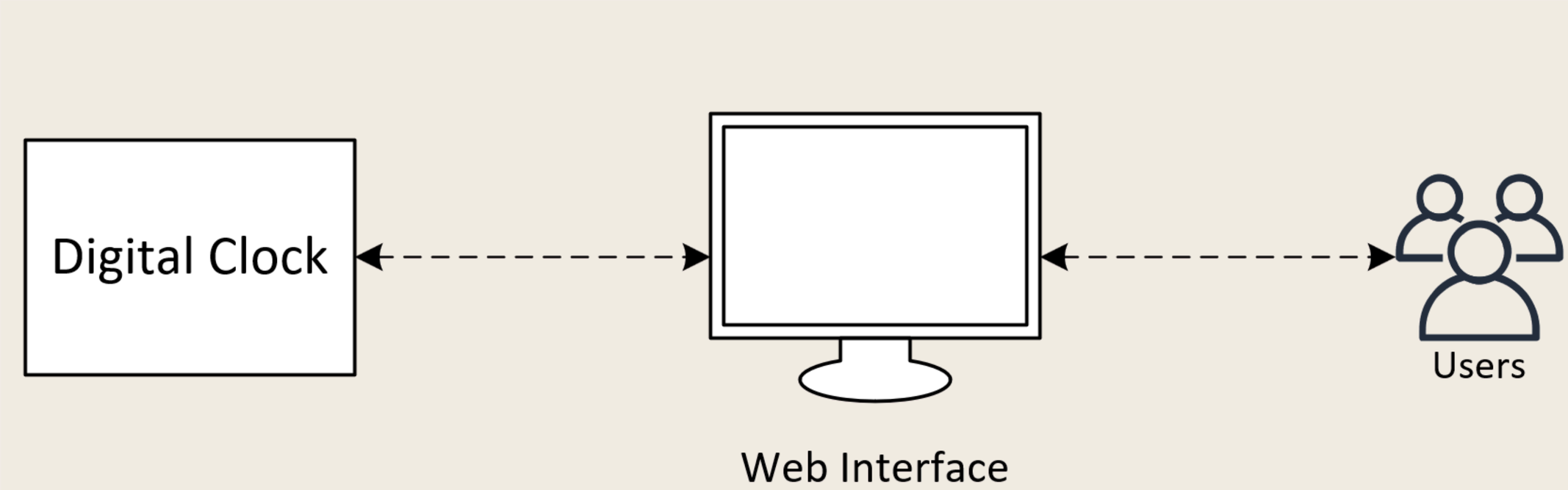
This project is a digital clock designed to combine both functionality and modern connectivity. It features an LCD display that shows the current date-time and temperature, making it a handy tool for everyday use. Beyond that, the clock can also display the date, time, and weather on a web server, allowing remote access to the information. Additionally, users can set alarms through a web interface, adding a convenient and interactive element to the system. This project blends hardware and software to create a practical, user-friendly device.

OBJECTIVE

- Easy for managament time
- Friendly desegin
- Help user monitor the room temperature
- Help user easily access the weather



SYSTEM ARCHITECTURE



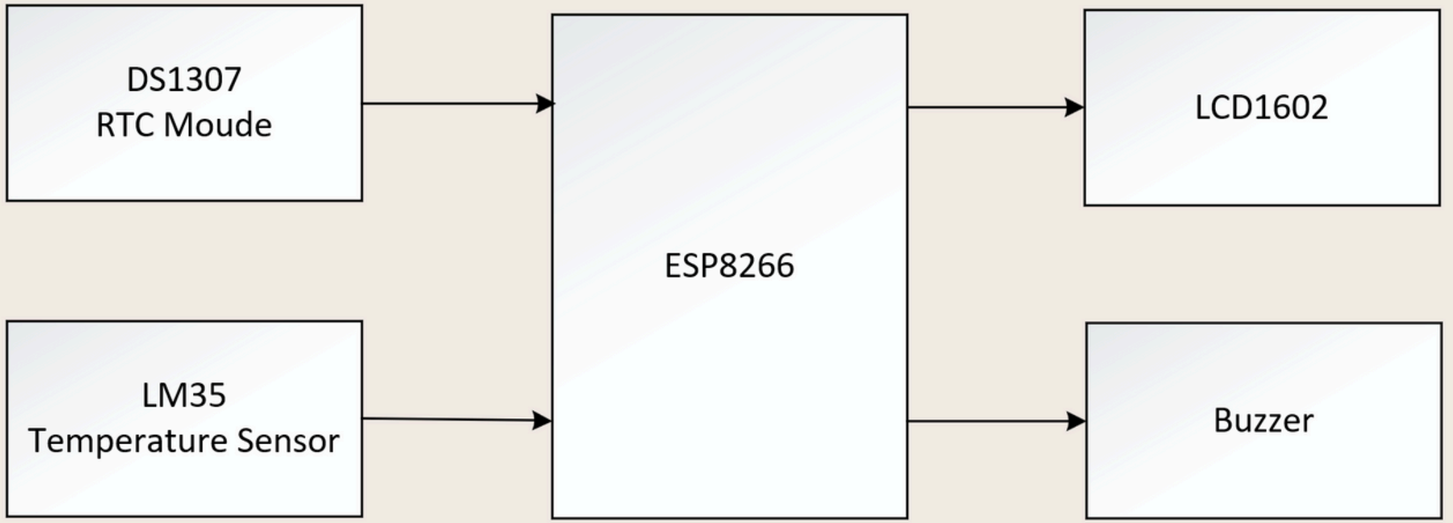
HARDWARE Hardware Structure

Companents:

- ESP8266
- DS1307 RTC Module
- LCD1602
- LM35 Temperature Sensor
- Buzzer

Function:

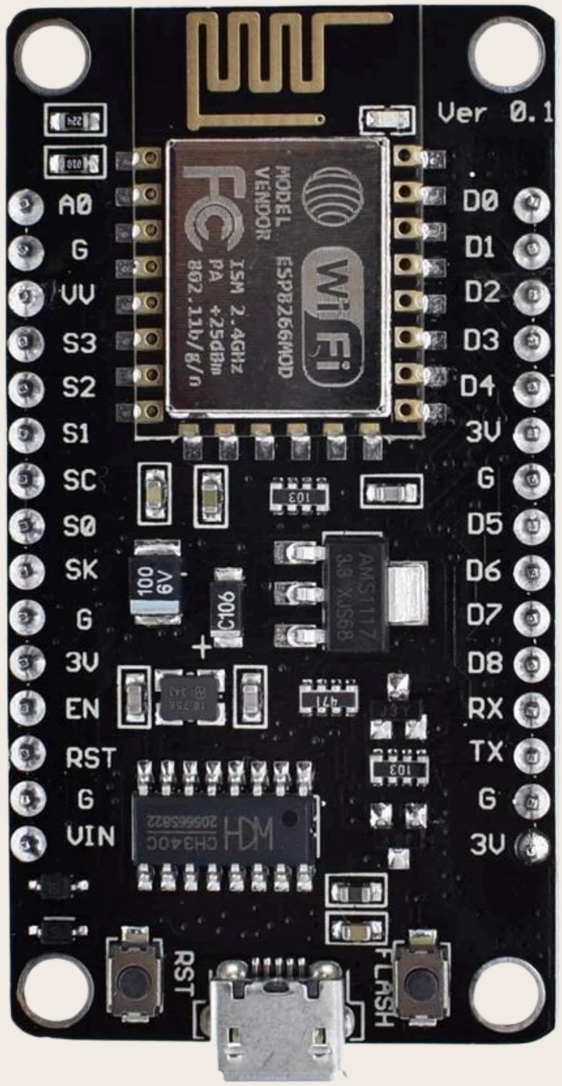
- Display date-time and temperature
- Alarm



HARDWARE

Hardware Selection

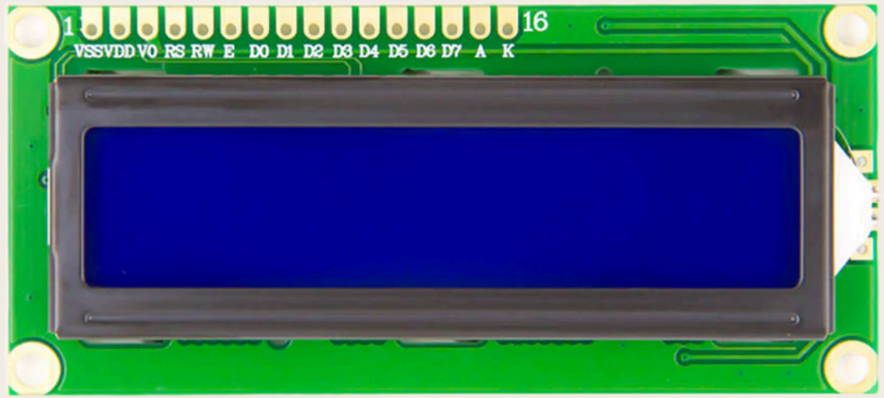
Feature/Specification	ESP8266 Module
Microcontroller	Tensilica L106 (32-bit)
Operating Voltage	3.3V
Clock Speed	80 MHz (up to 160 MHz)
Digital I/O Pins	17 (varies by model, limited PWM)
Analog Input Pins	1 (10-bit ADC, 1V max)
Flash Memory	1 MB (varies by model, up to 4 MB)
SRAM	160 KB
EEPROM	None (uses Flash for storage)
Wi-Fi Connectivity	Built-in 802.11 b/g/n
Power Consumption	Lower (~20-70 mA, deep sleep <10 A)
Programming	Arduino IDE, Lua, MicroPython
Cost	Low (~$2-5 depending on variant)



HARDWARE

Hardware Selection

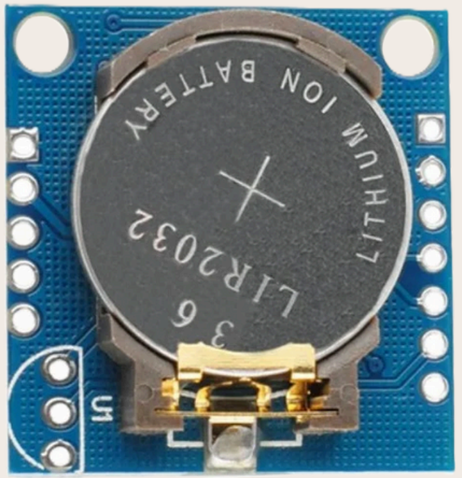
Display Name	Character LCD (16x2)
Resolution	16 characters x 2 rows
Display Technology	STN (Super-Twisted Nematic)
Operating Voltage	5V (typical), some variants support 3.3V
Controller	HD44780 or compatible (e.g., ST7066)
Interface	Parallel (4-bit or 8-bit mode)
Backlight	LED (optional, typically blue or green)
Backlight Voltage	5V (via resistor or current driver)
Contrast Adjustment	Via potentiometer (VO pin)
Operating Current	~2 mA (without backlight), ~20-50 mA (with backlight)
Dimensions	80 mm x 36 mm x 10 mm (typical)
Communication Pins	RS, RW, E, D0-D7 (8 data pins)
Power Consumption	Low (depends on backlight usage)
Cost	~$2-5

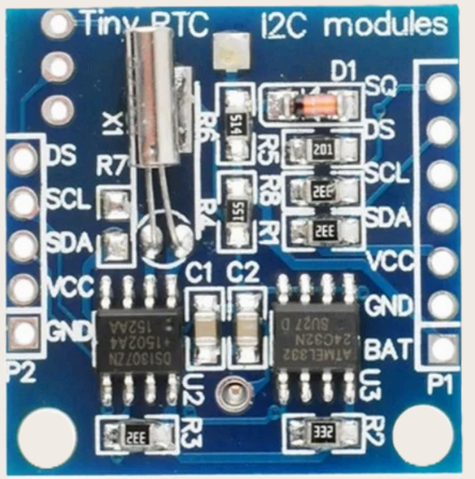


HARDWARE

Hardware Selection

Feature/Specification	RTC DS1307
Communication Protocol	I2C
Timekeeping Accuracy	±2 minutes/month (crystal dependent)
Temperature Compensation	No
Operating Voltage	5V (4.5V - 5.5V)
Backup Battery	Yes (CR2032 coin cell)
Temperature Range	0°C to 70°C
Additional Features	56 bytes SRAM, square wave output
Power Consumption	~1.5 mA (active), 500 nA (battery mode)
Crystal	External 32.768 kHz required
Cost	Lower (~$1-2)

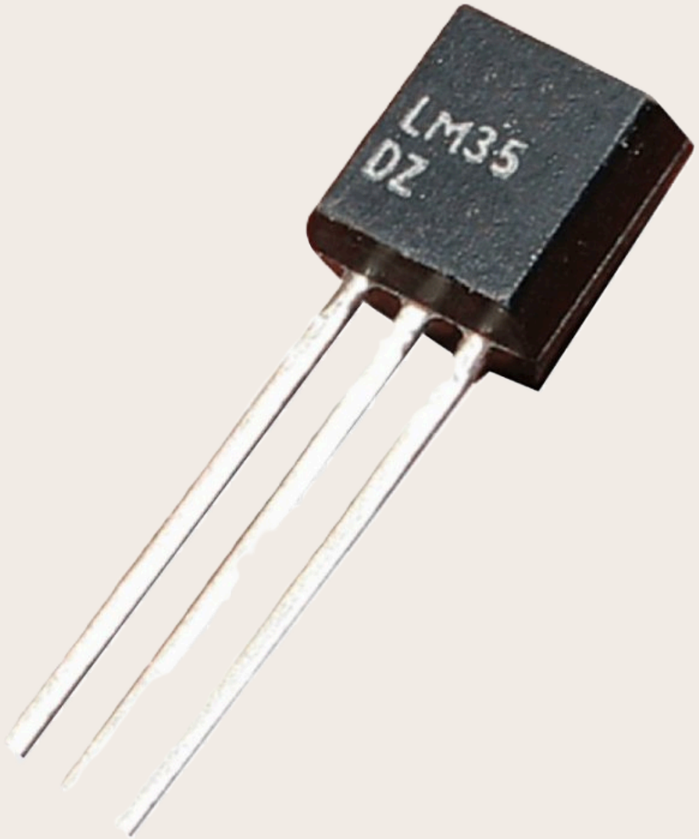




HARDWARE

Hardware Selection

Feature/Specification	LM35
Type	Analog Temperature Sensor
Temperature Range	-55˚C to 150˚C
Accuracy	±0.5˚C (at 25˚C)
Output	Analog (10 mV/˚C)
Humidity Measurement	None
Resolution	Continuous (analog)
Operating Voltage	4V to 30V
Power Consumption	~60 µA
Response Time	Fast (analog output)
Ease of Use	Requires ADC for microcontrollers
Cost	Moderate (~$1-2)



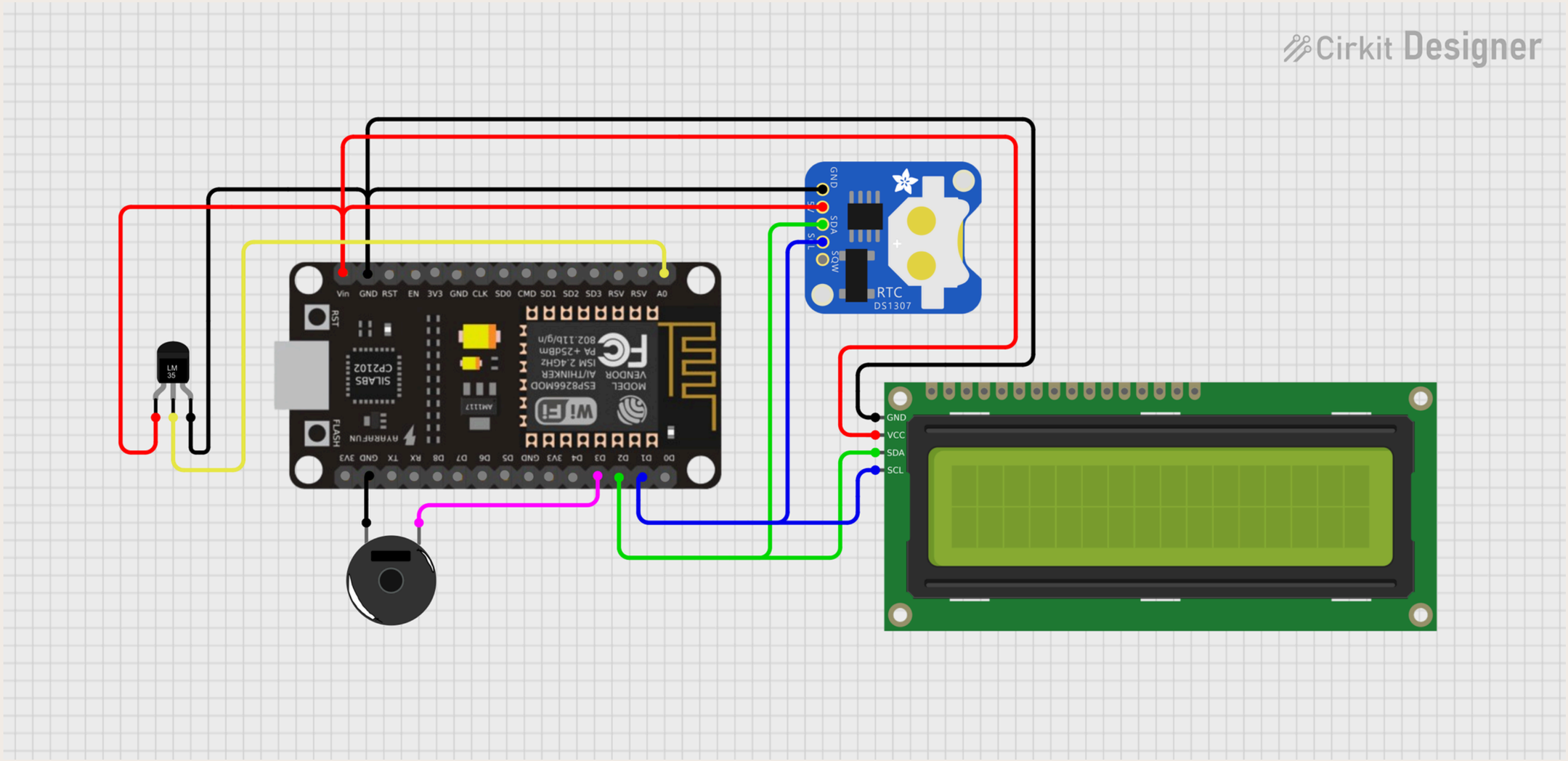
HARDWARE

Hardware Selection

Name	**Active Buzzer (with internal oscillator)**
Operating Voltage	3.3V to 5V (common range)
Frequency	2 kHz - 3 kHz (typically ~2300 Hz)
Sound Output	70-85 dB at 10 cm (varies by model)
Current Consumption	15-30 mA (at 5V, depending on model)
Control Method	Digital signal (HIGH/LOW to activate)
Pin Configuration	2 pins (positive and ground)
Tone	Fixed (single tone, continuous beep)
Power Supply	DC (direct from microcontroller pin)
Cost	~$0.5-1

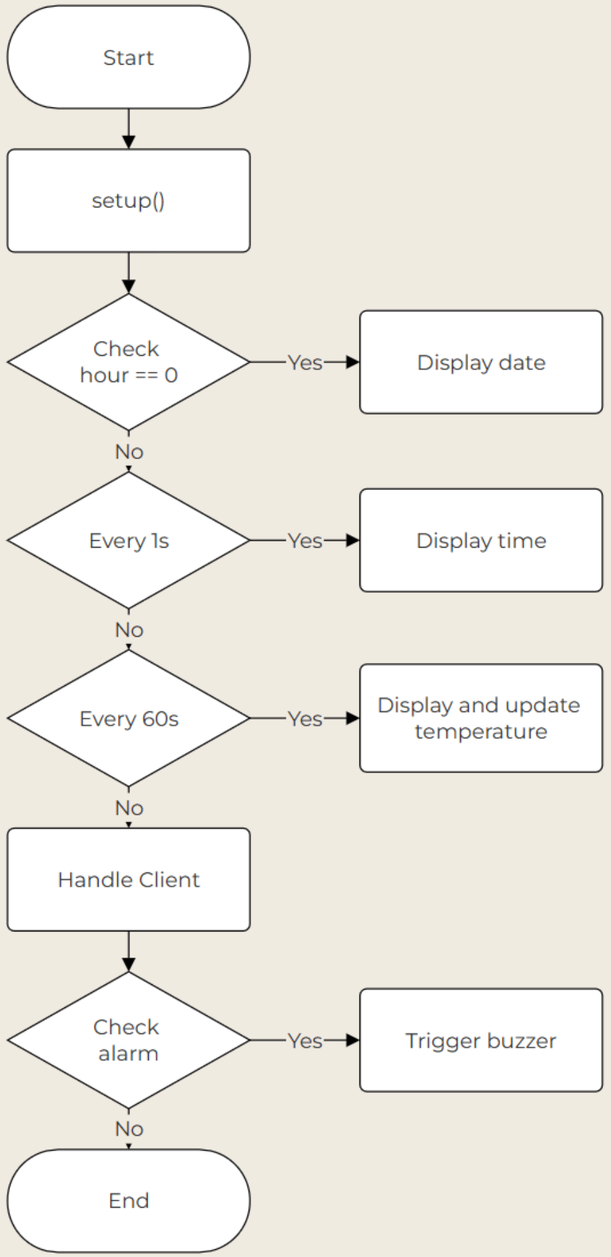
HARDWARE

Connection Diagram



FIRMWARE

Flow chart



DEMO

THANK YOU VERY MUCH!