Product Requirements Document

Digital clock with LCD display

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Overview

Internal Name	Digital clock
External Name	TBD
Launch Target	Q1 2024

The Digital Clock with an LCD display is a user-friendly product that enables individuals to effortlessly monitor the time, temperature, and humidity throughout the day. Moreover, it offers

the convenience of adjusting the time to match the local timezone and includes an alarm function to awaken users at their desired time.

This product boasts an appealing design, featuring a CNC Mica case and Bolts connector. Powering the device is a breeze, as it can be easily connected to an adapter.

The target audience for the Digital Clock is extensive, ranging from older individuals to children. Its simplicity lies in the presence of only four buttons, ensuring effortless usability, while the large numbers on the display guarantee clear visibility.

Priority Description

P0: Must Have Requirement i.e. Product will not launch without it
P1: Not a requirement for launch but is needed 3-6 months post-launch

Product Requirements

I. Industrial Design

#	Feature/ Characteristic	Product Requirements	Priority	Technical/Engineering Specifications	Comments
I.1	Color, Material, Finish (CMF)	Shall be made of mica acrylic sheet	P0		
I.2	Dimensions	Shall be 4inch x 6inch	P0		
I.3	Visual Interface	Shall have an 16x2 LCD display	P0		
I.4	Touch Interface	Shall have buttons to select the time, set the alarm, select time mode(AM/PM), and check for the Temperature as well as the humidity during the day.	P0		
I.5	Connectors	Shall have a RS232 port	P0		
I.6	Adhesive/ Fastener	Shall have Anti-slip sticker so thath user can put it anywhere they want without the fear that it will affect the product outlook or falling. Shall have glue to connect every part of the product's case.	P0		

		A user shall be able to remove/place the clock easily			

II. Component Selected

#	Component	Component feature	Priority	Technical/Engineering Specifications	Comments
II.1	16X2 LCD with HITACHI HD44780 MPU	• Power Supply: 5V • Interface: GPIO	P0		
II.2	PCF 8574LM	• Power Supply: 5V • Interface: I2C	P0		
II.3	Real Time Clock (DS1307)	• Power Supply: 5V • Interface: I2C • Data: Day, Month, year, second, minute, hour, week day. • Backup Battery: CR2032 • Output Frequency: 1Hz • Crystal Frequency: 32.768kHz	P0		
II.4	NodeMCU ESP8266 Module	• Power Supply: 3V3 • Interface:UART/I2C • SPI Flash: Default 32Mbit • UART Baudrate: Support 300 ~ 4608000bps, Default 115200bps • Wifi:802.11 b/g/ n support (2.4 GHz), up to 72.2 Mbp	P0		
	LM 7805 with heatsink	•			
	2x5 IDC cable	•			
	47uF electrolytic capacitor	•			

	100nF ceramic capacitor	•			
	10uH inductor	•			
	Button x5	•			
	Resister: 10kOhm x5	•			
	DC port	•			
	Rail (Female/Male)	•			
	Atmega 328P	•			

III. Display Screen

#	Feature/ Characteristic	Product Requirements	Priority	Technical/Engineering Specifications	Comments
III.1	Always On	The display shall always show: - Current Date (AM/ PM) - Current Time - Humidity /Temperature of current day	P0		
III.2	Setting time	During this mode, user can see the target value such as hour, minutes, date, moth, year blink when you choose to change it's value.	P0		
III.3	Setting Alarm	Shall display hour and minutes of the time to turn alarm on: - ON/ OFF alarm - AM/ PM alarm - Blink value when change	P0		
III.4	Stop watch	Shall display time to backward counter: - Timer count	P0		

IV. Connectivity

#	Feature/ Characteristic	Product Requirements	Priority	Technical/Engineering Specifications	Comments
IV.1	WiFi Frequency Bands	Shall operate on both 2.4GHz and 5GHz	P0		

V. Power

#	Feature/ Characteristic	Product Requirements	Priority	Technical/Engineering Specifications	Comments
V.1	Power	Shall be operated by 12V through an adapter.	P0		
V.2	RTC Power Batteries	RTC batteries shall provide a 5V DC(LIR 2032)	P1		
V.3	Idle Power Consumption	Shall be Energy Efficient and consume less than 0.25W of power when in the Always on display mode	P1		

VI. Durability

#	Feature/ Characteristic	Product Requirements	Priority	Technical/ Engineering Specifications	Comments
VI.1	Humidity	Shall be fully functional and operational under room humidity	P0		
VI.2	Drop Test	Shall survive and be operational when dropped from at least 2.5 feet height	P0		
VI.3	Operating Temperature Range	Shall be fully functional and operational within the range of 64°F (18°C) to 72°F (27°C)	P0		
VI.4	Touch Discomfort	Shall not cause discomfort (sharp, hot)when touched or held	P0		
VI.5	Lifetime	Shall last for at least 3 years	P0		
VI.6	Adhesive/ Fastener	The product shall not cause damage to whatever surface it is placed on	P0		

VII. Appearance

#	Feature/ Characteristic	Product Requirements	Priority	Technical/Engineering Specifications	Comments
VII.1	Case	The product have mica case: ● CNC ica case ● Have T-joint connector between pieces, connect by bolts. ● Have space for sreen, button, source.	P0		
VII.2	PCB	Use Double Side Copper Prototype PCB to hold every component	P0		

VIII. Security & Privacy

#	Feature/ Characteristic	Product Requirements	Priority	Technical/Engineering Specifications	Comments
VIII.1	WiFi Security Protocol	Security: WEP / WPA-PSK / WPA2-PSK	P0		