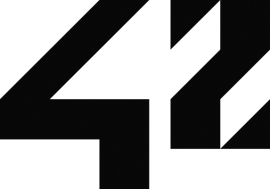
Rainbow Clock

Electronics

User’s manual

*Document Revision. A*

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# Glossary

1. Microcontroller

An embedded computer integrating a whole range of peripherals in a small package for convenience.

1. Bluetooth

A wireless communication standard permitting short-range exchange of data between electronic devices.

1. Refresh rate

A measure of the number of times an image can be drawn completely over the period of a second; this value is expressed in Hertz. Synonymous to *“FPS”*.

# Product overview

## Description

Rainbow Clock is an unusual timekeeping device characterized by an exotic look and designed with electronics in mind.

## Capabilities

* Display the current time of the day
* Synchronize itself via a Bluetooth connection
* Alter its color scheme depending on events

## Quick specs

* Microcontroller: PIC32MZ series
* LEDs: 60, RGB type
* Refresh rate: ~10Hz
* Power: 15Watt max, 0.5Watt minimal, 0.6Watt typical

# Basic operation

## Reading the time of day

Each color encodes a distinct time unit. For each unit:

* 3 red adjacent LEDs represent the hours.
* 2 green adjacent LEDs represent the minutes.
* The remaining blue LED represents the seconds.

To ease reading, the clock’s display is subdivided in four quadrants.

## Changing the color scheme

Using the central dial, navigate the menu looking for “Color Config.”

Validate your choice. You will be presented with a choice of colors on the screen. Use the dial again, select a color and validate your choice.

## Updating the time on the clock

Using the central dial, navigate the menu looking for “Time Config.”

Validate your choice.

# Advanced operation

## Synchronizing the clock using Bluetooth

Initiate a serial connection to the Rainbow Clock’s Bluetooth module configured for a rate of 115200 bauds. The code to be sent is structured as follows:

“T**ssmmhh**ddMMYYYY”

With ‘T’ designating the Time config function.

# Technical details

1. Block diagram

*Vivien peux-tu ecrire “UART” sur la double fleche entre le PIC et le bluetooth  
la meme chose sur la fleche entre le pic et les leds avec le texte “1 Wire”*

Buzzer

PIC 32

IR/Light sensor

Raspberry Pi \*

Pressure sensor

Temperature sensor

AC to DC Power supply

1. Components required for the project

* 1 *(one)* PIC32xxxxxx microcontroller. Ref: xxxxxxx
* 1 *(one)* strip of 60 RGB LEDs 1 wire. Ref fab: WS2812b
* 1 *(one)* incremental rotary encoder Ref: 1191733
* 1 *(one)* 20x4 alphanumeric LCD screen Ref: 2063162
* x *(xxx)* resistors xΩ Ref: xxxxxxx
* x *(xxx)* capacitors xF Ref: xxxxxxx
* 1 *(one)* tension regulator Ref: xxxxxxx
* 1 (one) Pressure and temperature sensor Ref fab: BMP280
* 1 (one)

1. …

# Planned features

* ***Display basic weather data and forecast using built-in sensors***

1. Data gathering could reveal itself being a nice addition to the project.

# Contributions

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# Endnotes