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Home Décor

Embedded Systems 2025

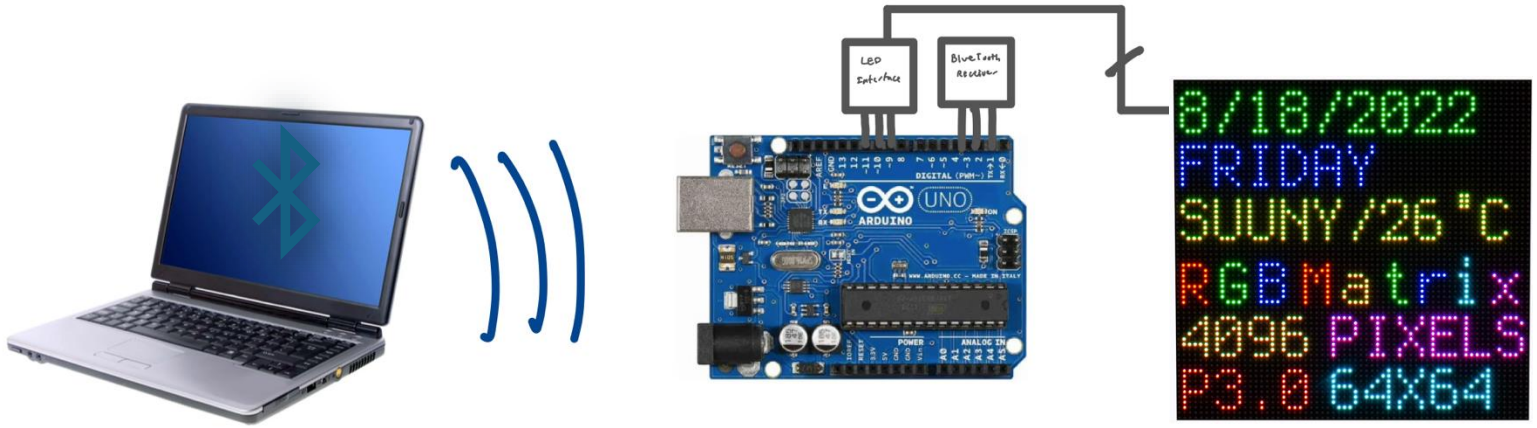
Project Description

- **Problem:** We want **unique electronic artwork** in our apartment
- **Solution:** Bluetooth controlled 64x64 LED Matrix

- This embedded systems project is a starting point for a Bluetooth controlled LED display project, utilizing an ATmega328P and an LED Matrix. Additional user interaction can be achieved with RPGs and pushbuttons as we have solid understanding of these components.

- Showed in class, The Bluetooth remote controlled car had **Bluetooth communication via an application**, we are envisioning a similar approach. If allowed, a locally run server would be easy to implement and allow for more features.

High Level Workflow



1. Bluetooth Application

Locally run application that Interfaces with Bluetooth.

User selects displays to be shown:

- Static
- Dynamic
- Game
- Upload? Maybe there is a C library for img -> 64x64 px

2. Arduino Analysis:

Interpret signal to drive LED

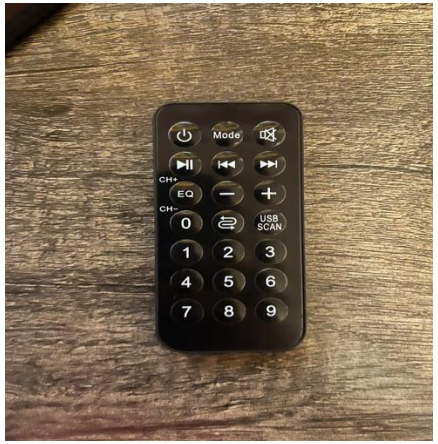
Handle selections via BT:

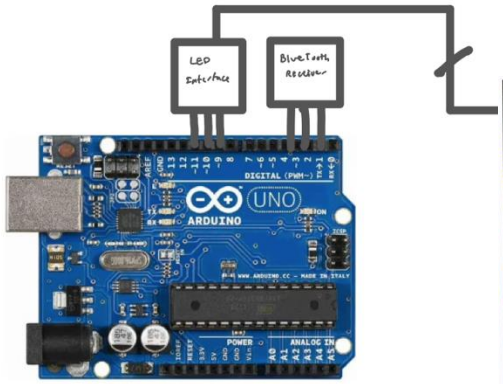
- Compute LED row/col and RGB
- Send to LED Matrix

3. User Interface:

Display image on 64x64 LED matrix

Alternative 1





1. IR Remote

Included in Embedded Systems Kit

User selects displays to be shown:

- Static
- Dynamic
- Game

2. Arduino Analysis:

Interpret signal to drive LED

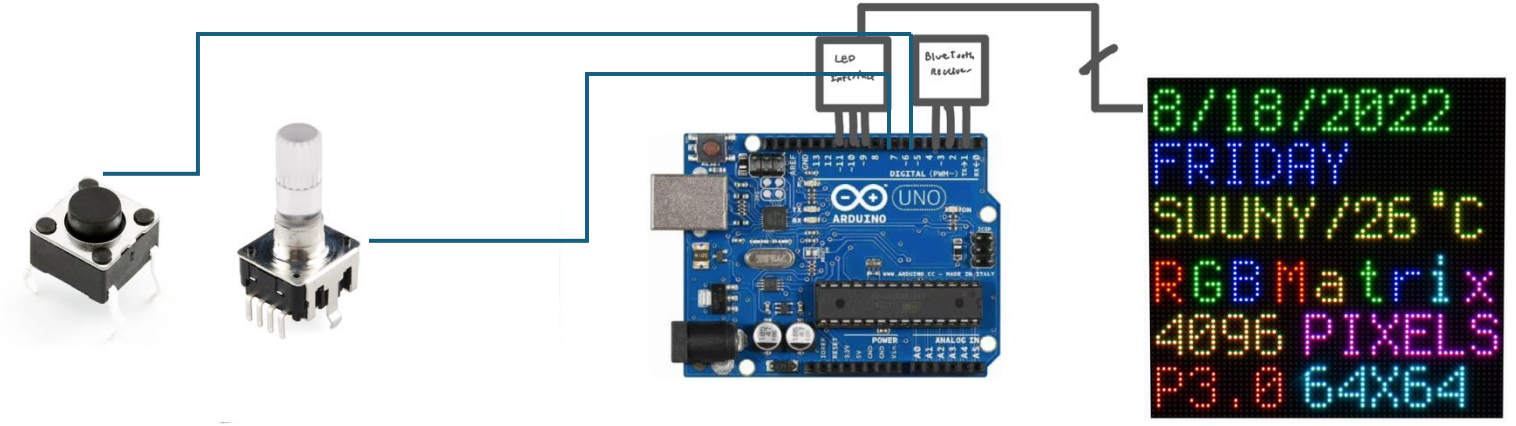
Handle selections via Interrupts:

- Compute LED row/col and RGB
- Send to LED Matrix

3. User Interface:

Display image on 64x64 LED matrix

Alternative 2



1. Button(s) & RPG(s)

Included in Embedded Systems Kit

User selects displays to be shown:

- Static
- Dynamic
- Game

2. Arduino Analysis:

Interpret signal to drive LED

Handle selections via Interrupts:

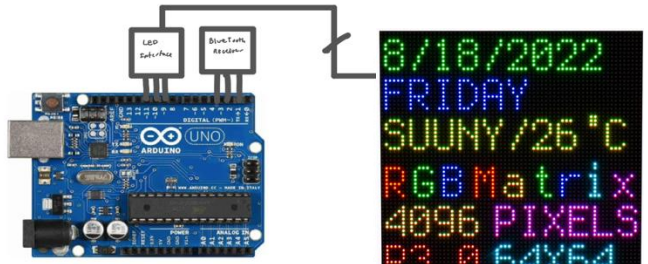
- Compute LED row/col and RGB
- Send to LED Matrix

3. User Interface:

Display image on 64x64 LED matrix

Required Components

Component	Amount	Usage
Arduino Uno µc	1	Analysis and LED Matrix Interface
HC-05 Bluetooth Chip	1	Interface for µc Bluetooth transmission/reception
64x64 LED Matrix	1	Display availability
RPG/Button/IR transmitter	TBD	Additional UI for µc



*We have matrix and IR already… just need to buy the HC-05 BT chip