



智慧型桌燈 *Smart Desk Lamp*

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function

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- Switch on / off

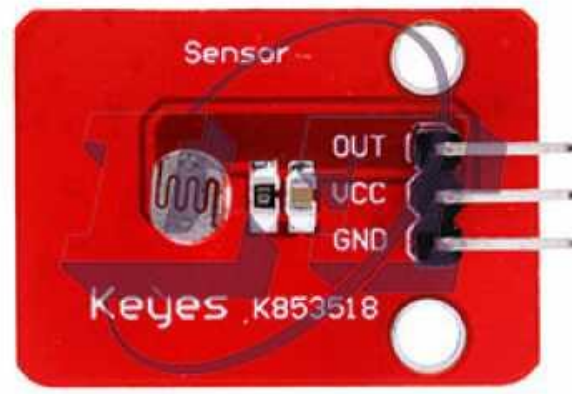
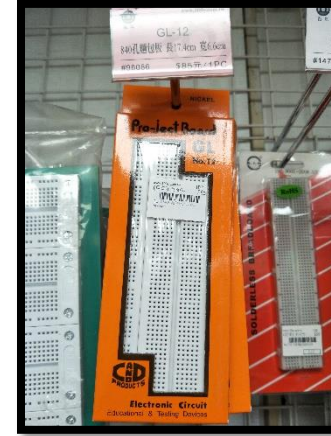
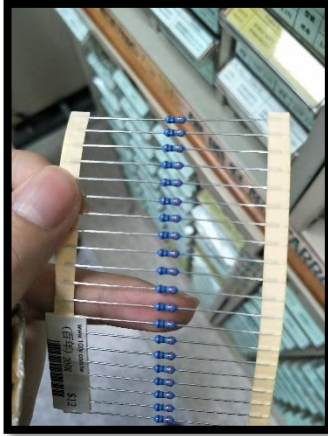
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- Light intensity (Manual controlled by FPGA)

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- Light intensity (Auto controlled by Photoresistor with Arduino Uno)

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- Timer

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- Alarm + blinking

Material



- ✓ FPGA
- ✓ Keyboard
- ✓ Pmod Audio

Basic concept of the design

- **LED**

- Powered by Pmod

- **Manual light intensity control**

- Using PWM module with duty cycle 5% ~ 25%

- **Auto light intensity control**

- Using Arduino to convert the analog signal by photoresistor module to digital signal

- Output the digital signal to Pmod for further control

Basic concept of the design (continue)

- **Timer**

- Using LED 7-segment display + keyboard as input

- **Alarm**

- Using Pmod Audio device

- **Blinking**

- Using PWM module with approximately duty cycle 0.5%

Difficulty explanation

- **Normal**

- The project divided into four modules
- Seems easy as a single module
- But the difficulty is combined all the modules since needs to redesign a finite state machine and debug

Completion

- As expected, all the functions were implemented

Task division

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- Timer
- Auto light intensity control with photoresistor and Arduino Uno

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- Alarm
- Manual light intensity control

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- Combine all the module
- Design FSM
- Debug

A vintage-style lamp with a tiered metal shade and a glowing bulb, set against a textured, aged background. The lamp has a dark metal frame with a curved arm and a pull chain. The shade consists of two stacked, square, metal plates. The bulb is a standard incandescent bulb with a visible filament. The background is a light-colored, textured surface, possibly a wall or a piece of paper, with some faint, dark markings.

Demo time