Swakeup

More Than A Simple Wakeup Light

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Introduction

Poka-yoke

Who knows what Poka-yoke is?

Poka-yoke

Poka-yoke (Wikipedia)

Poka-yoke [poka joke] is a Japanese term that means "mistake-proofing" or inadvertent error prevention.

Background

Figure 1: According to Sveriges Radio many Swedes suffer from the winter blues or seasonal affective disorder. Image Source: Visitsweden

System Requirements

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- Smart, small, USB charger included
- Spends happiness

System Overview

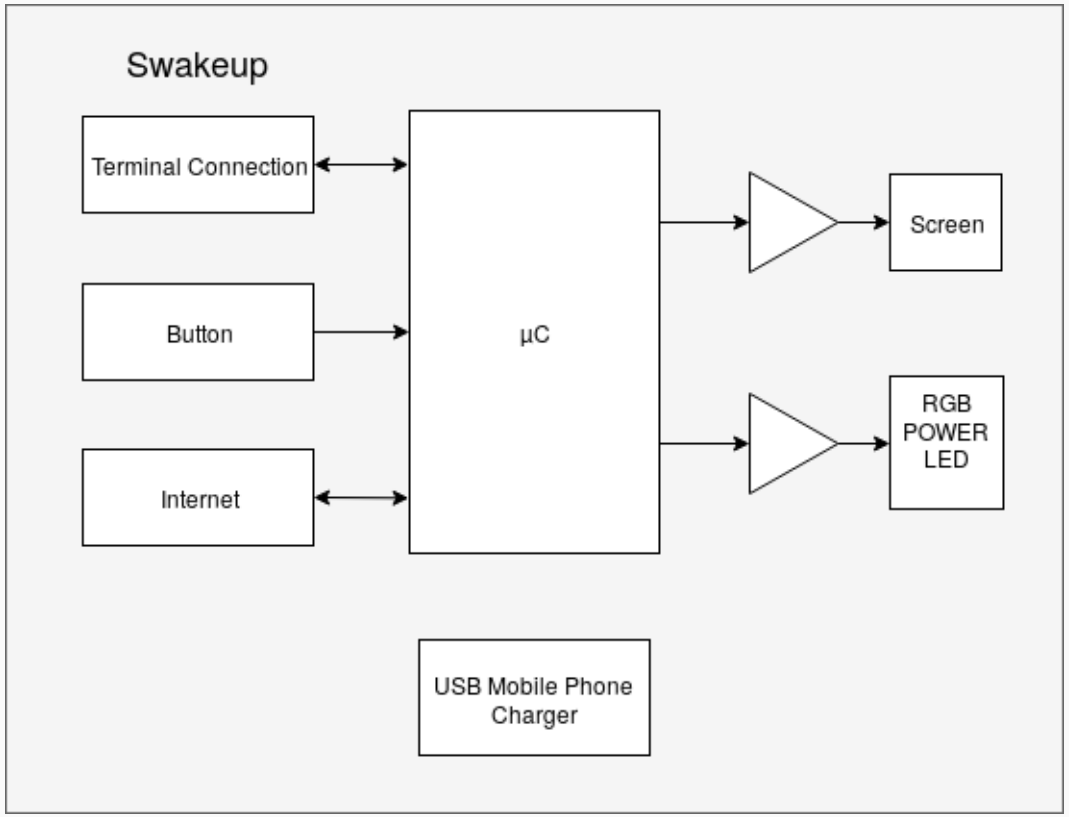

Figure 2: System Overview

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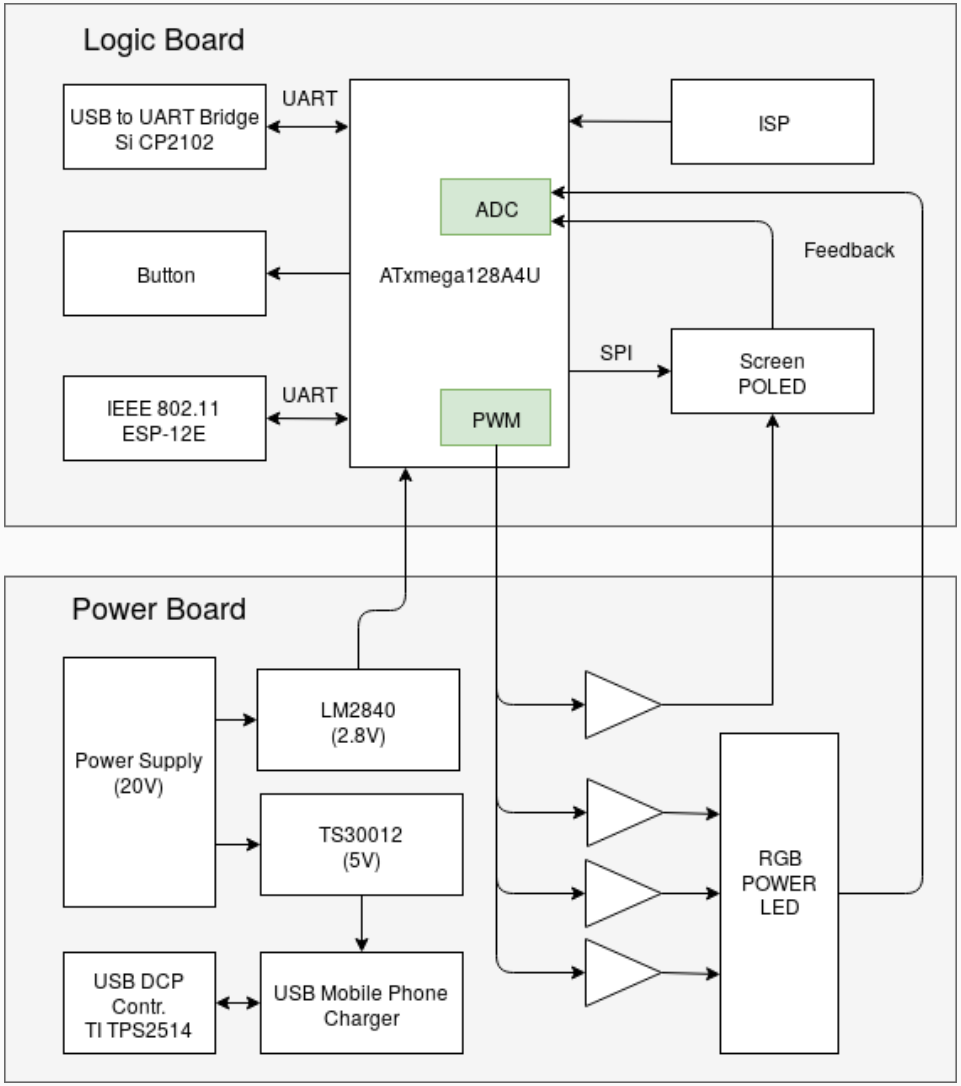


Figure 2: System Overview

Hardware

Power Board

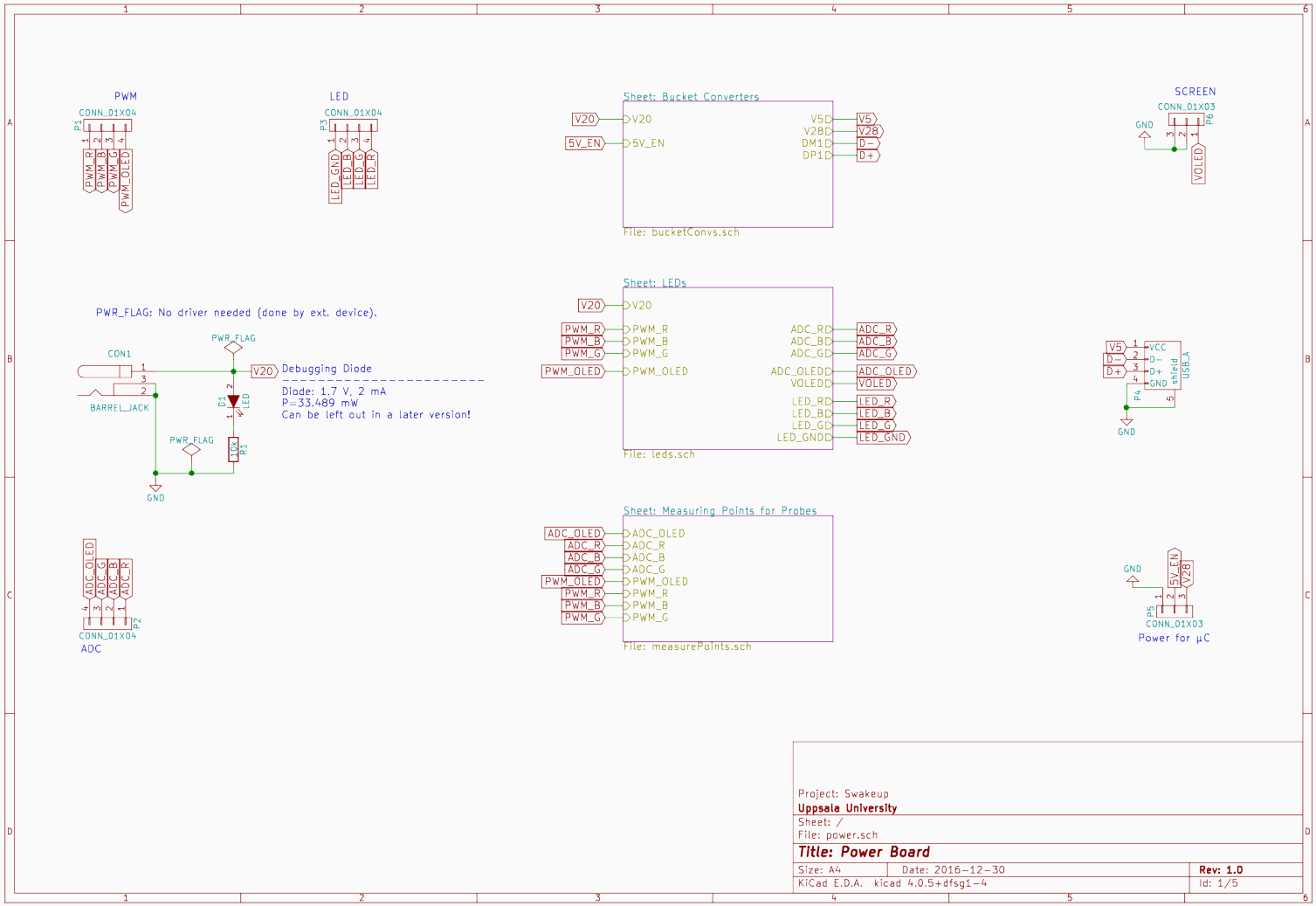
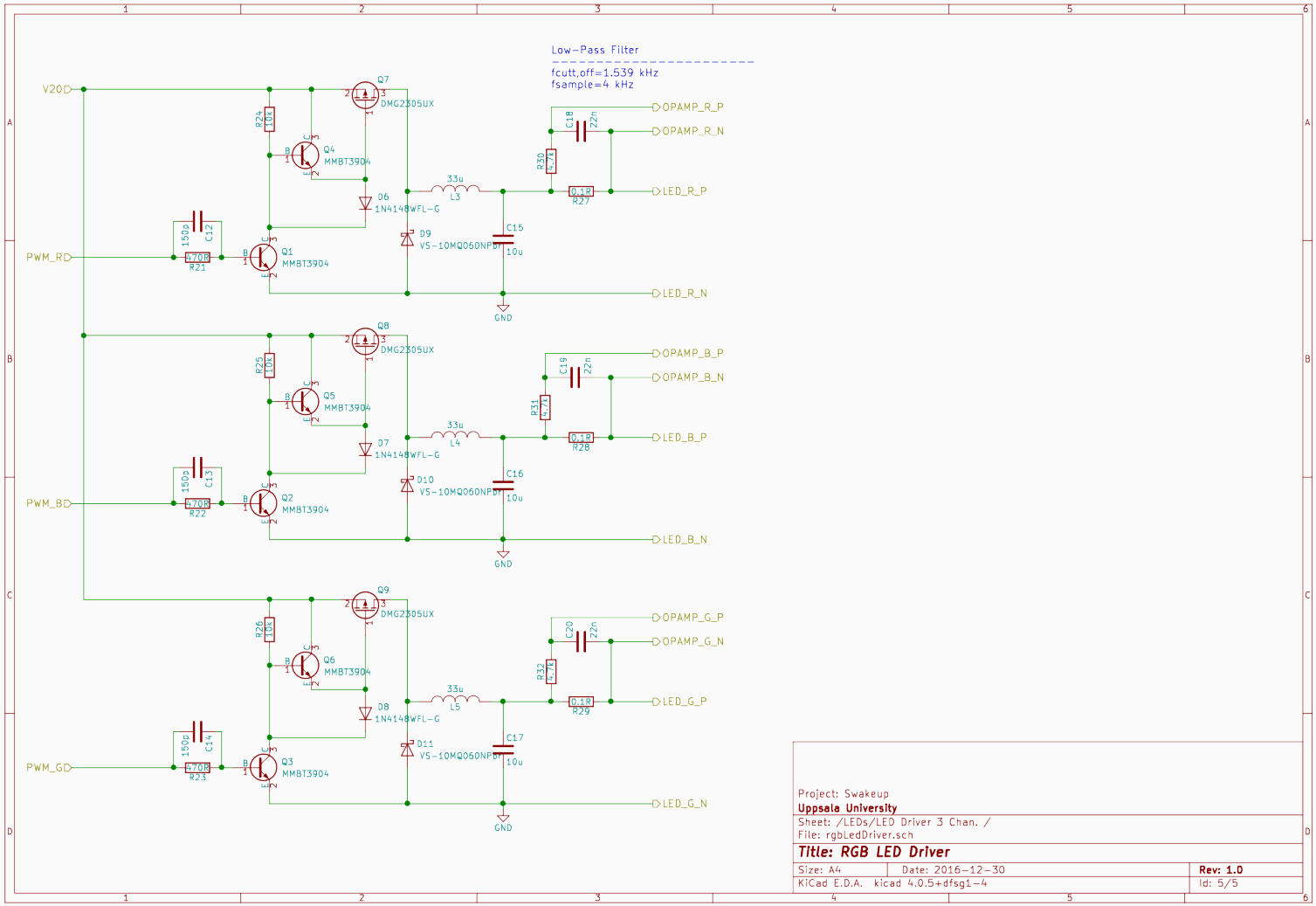


Figure 3: Power Board Schematics

Power Board



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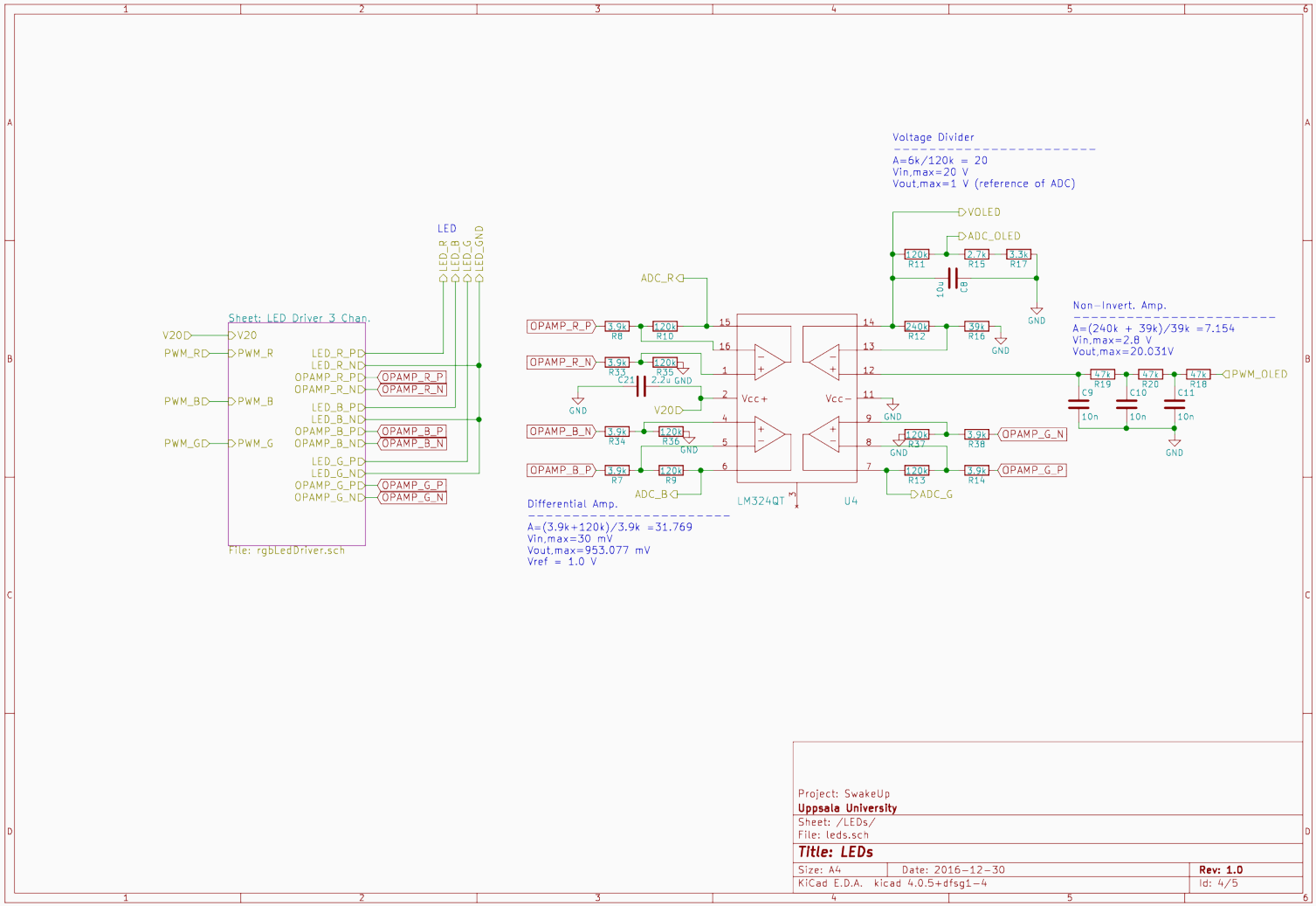

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Logic Board

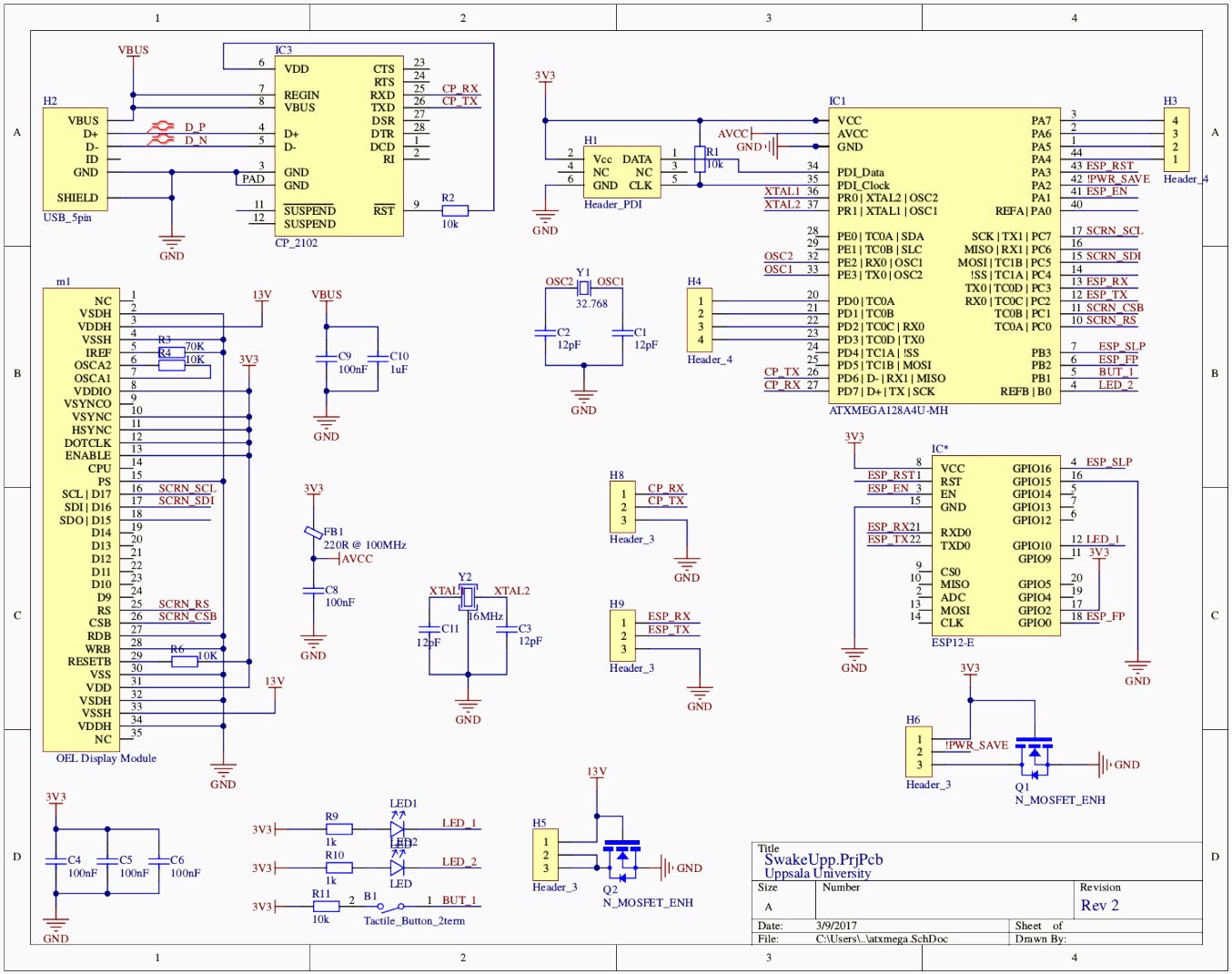


Figure 4: Logic Board Schematics

Software

Code Structure

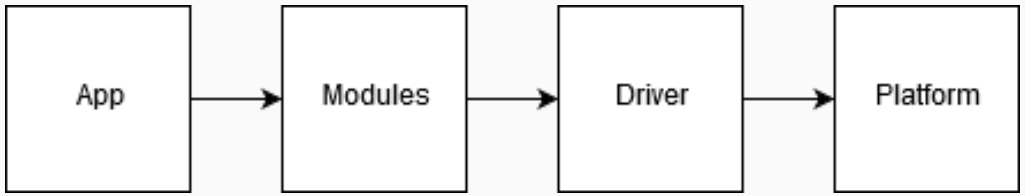


Figure 5: Abstract Layering Model

Code Organisation

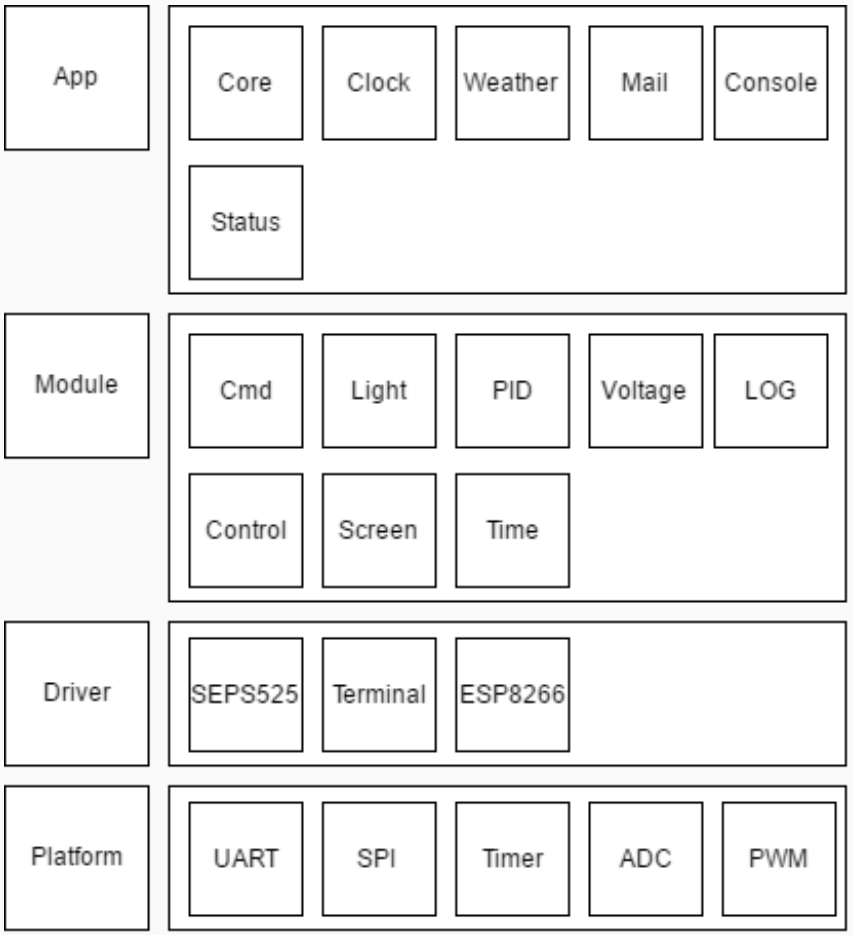


Figure 6: Block Diagram Of The Code Organisation

Operating System - Modules And Events

```
#define MODULE_DEFINE(VAR, DESC, INIT, DEINIT, ...)     \
        Module VAR = {                                  \
                .init = INIT,                           \
                .deinit = DEINIT,                       \
                .cnt = 0,                               \
                .name = DESC,                           \
                .deps = { __VA_ARGS__ }                 \
        }
MODULE_DEFINE(CORE, "Central core", init, deinit, &TIME, &COMMAND, &ESP8266);
```

```
#define EVENT_REGISTER(eventName, desc)\
        Event eventName = \
        {.eventId = __COUNTER__, .data = 0, .description = desc, .descLen = sizeof(desc) }
EVENT_REGISTER(EVENT_UART_DELIMITER, "Got UART delimiter");
```

```
event_addListener(&EVENT_UART_DELIMITER, callback);
```

```
event_fire(&EVENT_UART_DELIMITER, SYSTEM_ADDRESS_CAST (&delimiters[USART_ID][i]));
```

Realization (1)

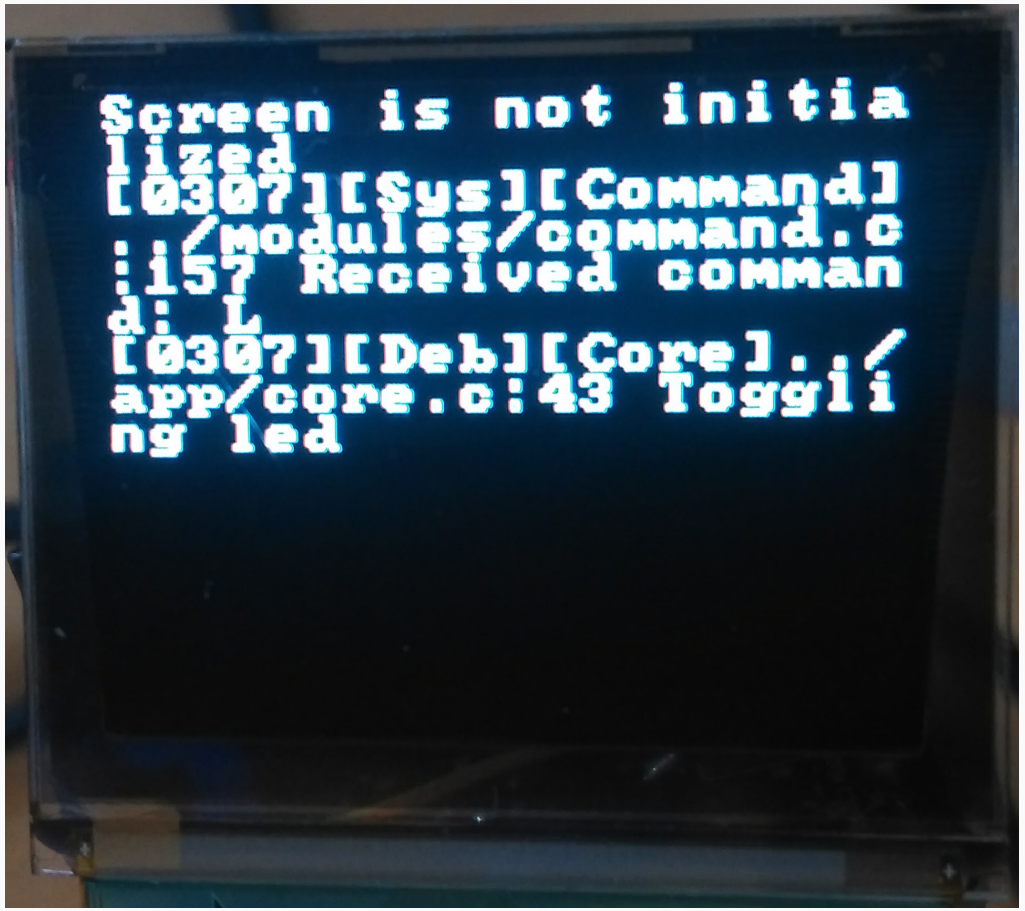


Figure 7: Screen Logging

Realization (2)

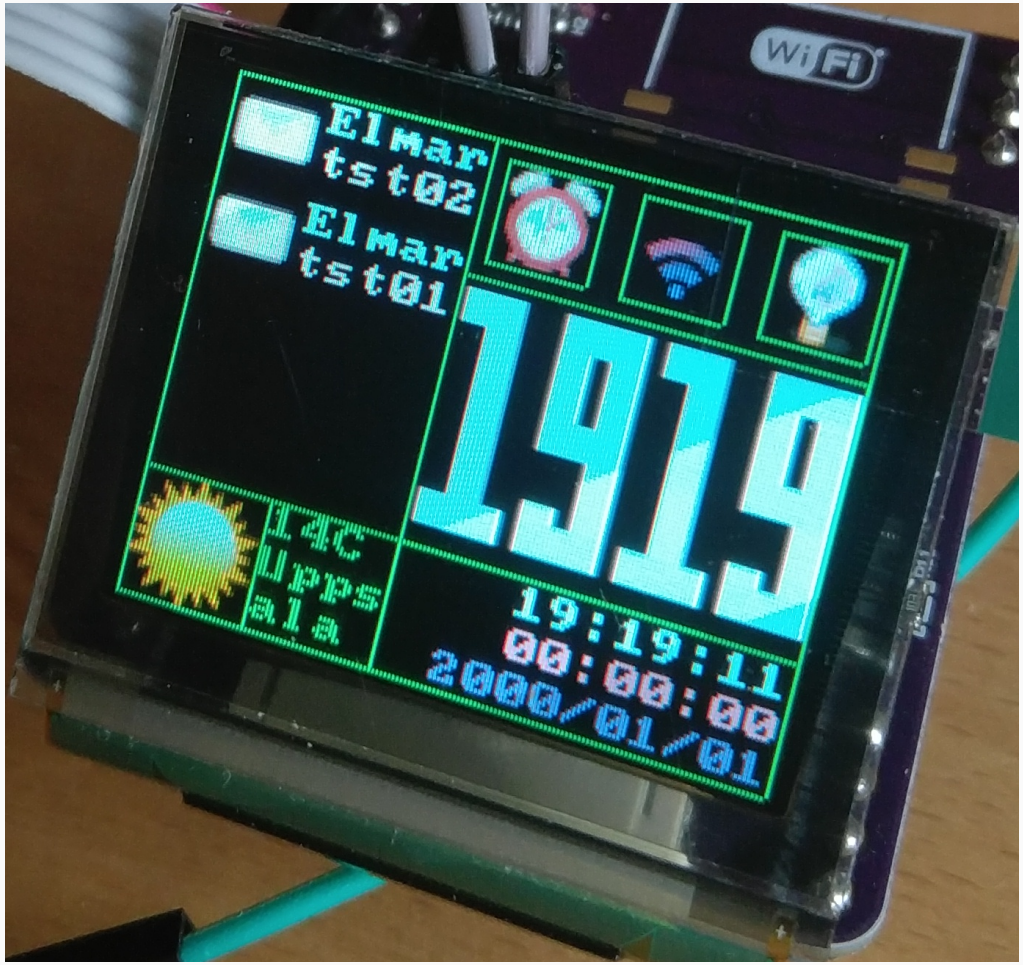


Figure 8: Appearence Of The Clock

Realization (3)

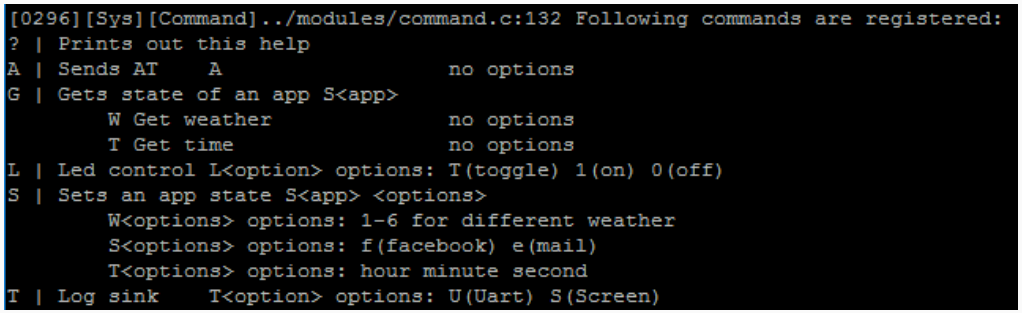


Figure 9: USART Command Interpreter

Realization (4)

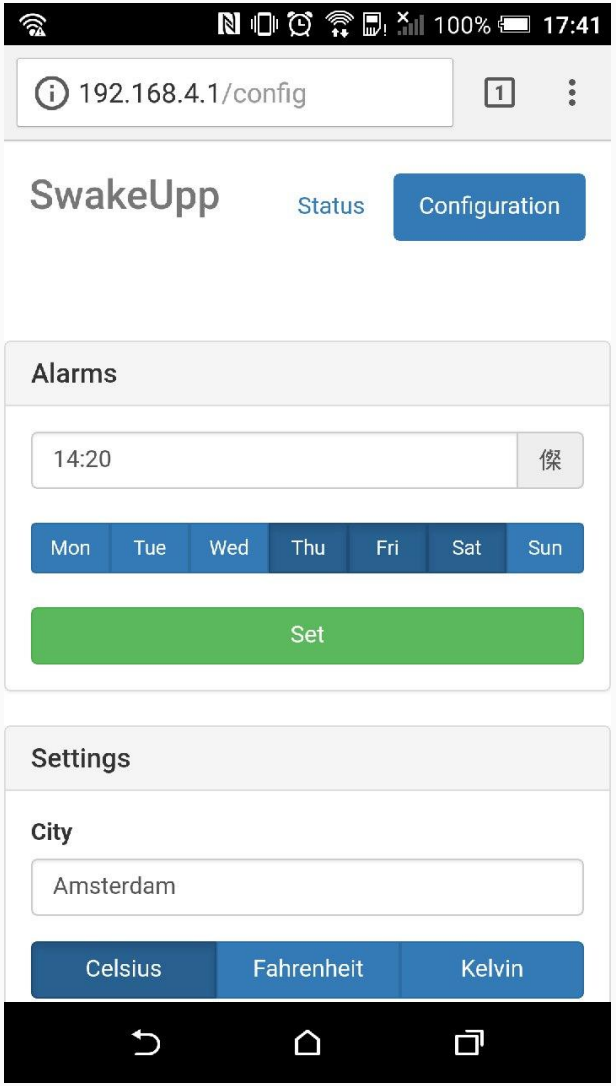
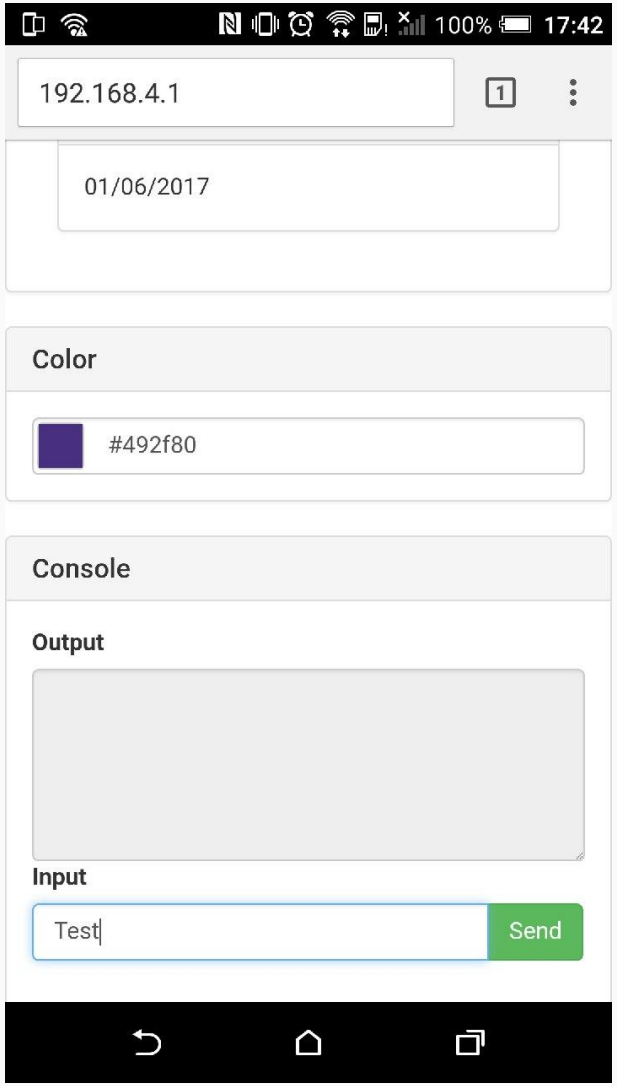


Figure 10: Website: Main User Interface

Realization (4)



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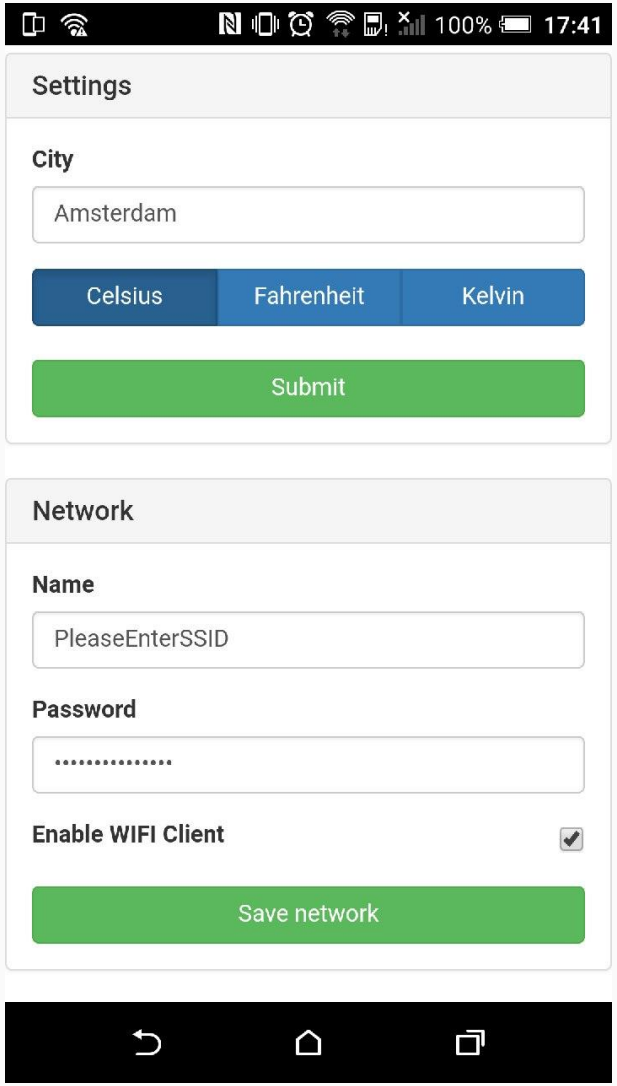

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Status Quo and Outlook

Basic System Functionality is Given

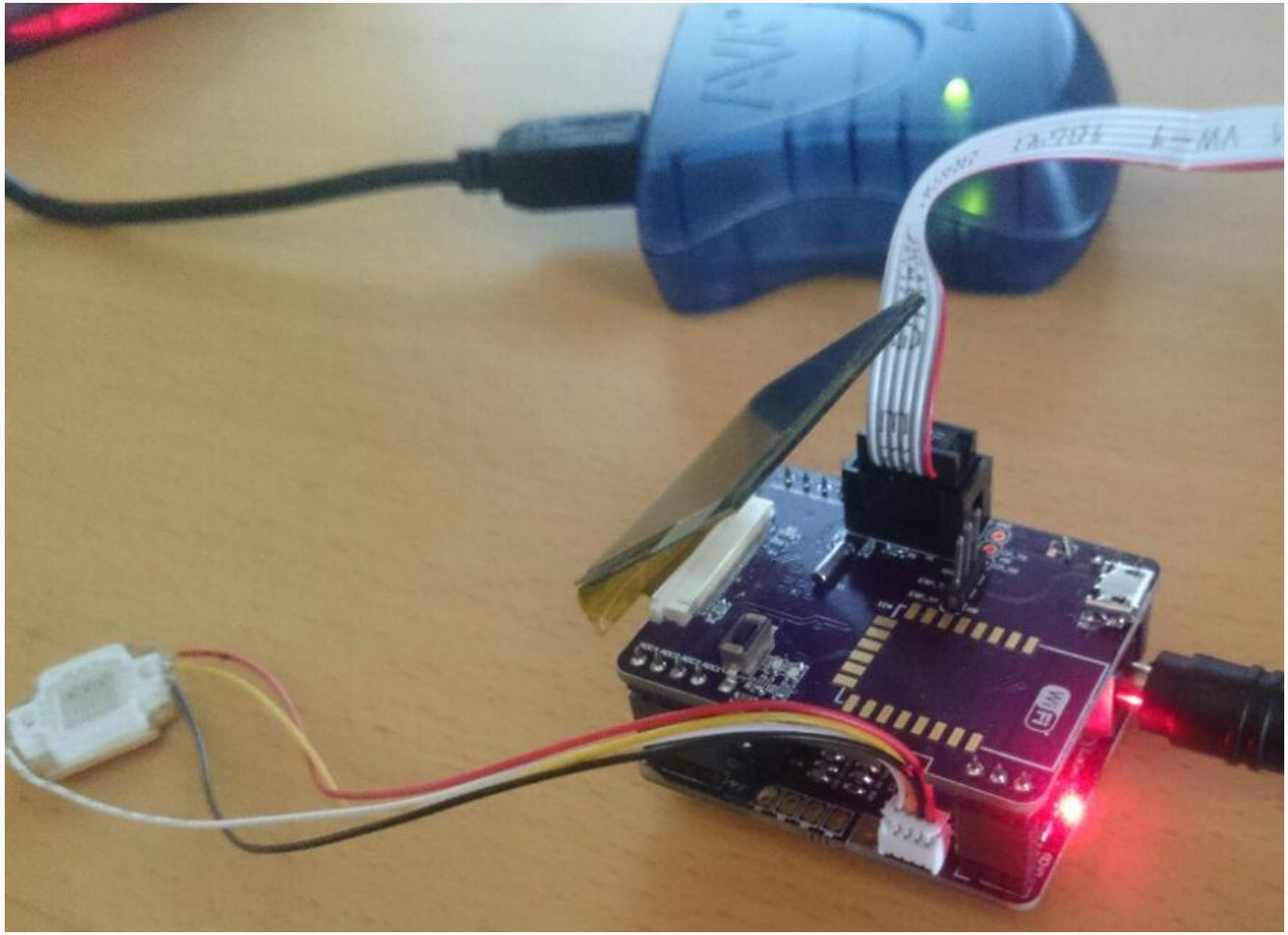

Figure 11: Picture of Nake HW

Hardware

HW Block	Working	Problem
USB Charging	✓	
Screen Driver	✓	
Screen Driver Feedback	✓	
Vcc for C	✓	
ESP	✓	
Terminal	✓	
LED Driver	✓	
LED Driver Feedback		Reversed inputs of the differential ampifier
USB DCP	✓	
Reverse Polarity Protection	✓	

Table 1: Status Quo Hardware

Software

SW Block	Working	Problem
UART	✓	
SPI	✓	
EPROM	✓	
Timer	✓	
ESP8266	✓	
Terminal	✓	
SEP525F	✓	
Wifi	✓	
Command	✓	
Log	✓	
Screen	✓	
Timekeeper	✓	
Controller		
Core	✓	
Weather	✓	
Clock	✓	
Social		Not implemented yet
PWM	✓	
ADC	✓	
Lightcontroller	✓	
PID	✓	
Advanced Light Patterns		Debugging still ongoing
Play 8 bit sounds		Not implemented, HW missing

Table 2: Status Quo Software

Outlook

- HW revision 3 is under construction

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- Different functionality shall be added

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Outlook

- HW revision 3 is under construction
- Different functionality shall be added
- Housing will be constructed
- Social connectivity and calendar functions will be implemented
- Take part in Swedish Embedded Award (Embedded Priset)

Open Source

E: Elmar.Vanrijnswou.9818@student.uu.se
E: Maximilian.Stiefel.8233@student.uu.se

`github.com/s3xm3x/SwakeUp`

Happy Coding :)