# Switchbox with BLE control

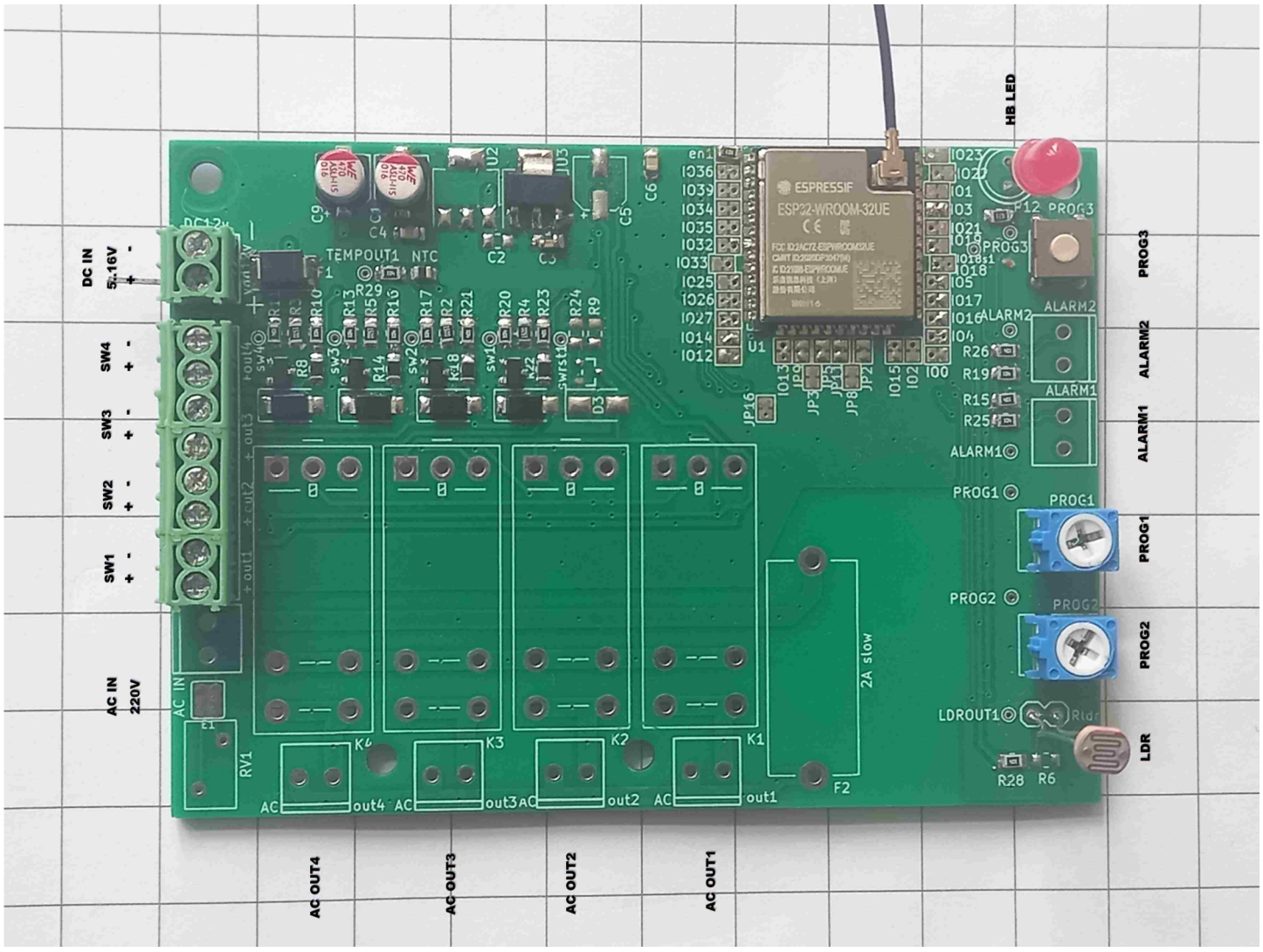



**Figure 1. SwitchBox Board 12V Version** *

## Function

SwitchBox with Bluetooth Low Energy (BLE) Control.
The SwitchBox operates in Sleep Mode. The BLE functionality is switched OFF by default. The BLE is switched ON by pressing the “PROG3” button, Programming the SwitchBox is done through the BLE interface.

The board switches one of the 4 Switch Outputs (SW1 to SW4), Only ONE Switch Output is Active at any given Time.
The Timing and Control of the Switches is programmed in the (Android) SwitchBox Application.

**Typical Application**

The SwitchBox is optimized for gardening applications such as a Green Wall. It can control a Water Pump, Water Oxygenator, Ventilator.

Unconnected Switch Outputs are Disabled Automatically. The Software checks for Short Circuited Load at the Moment a Load is to be switched ON.

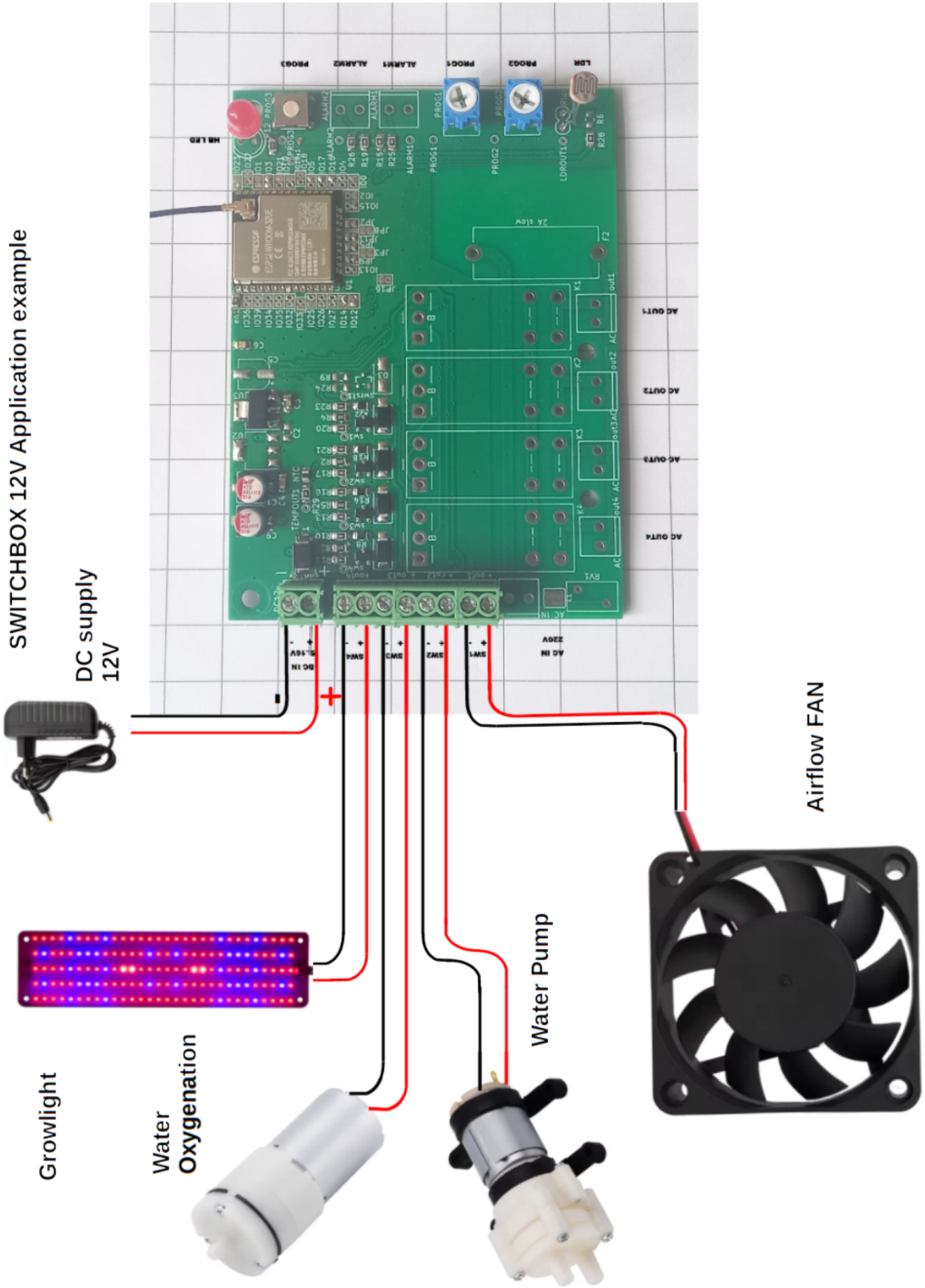
A Light Sensor (LDR) is integrated to Disable Operation at Night. A Temperature Sensor (NTC) is integrated to Prevent Overheating of the  SwitchBox Circuit Board.

The board requires DC supply of at least 5V to 16V maximum. The Current consumption is less than 1mA in Sleep Mode without Load.  The Maximum Load Current is 1A.

Caution: Only Add or Remove a Load in the Application when the DC supply is OFF.

*) Component shapes, Board Components and values may vary or change and not resemble the picture. The values in this document are an indication, accuracy of the circuit is optimized, but limited.  NO guarantees can be derived from this document.

# Application




*** Assure Correct Wiring Polarity.**

| | Description | Min | Max | Unit |
|---|---|---|---|---|
| VDCIN MAX | Supply Voltage | 5 | 16 | V |
| IDCIN MAX | Maximum Input Current | | 1 | A |
| PLOAD MAX | Maximum Load Power (@ VDCIN=16V) | | 16 | Watt |

**Table 1. Electrical Specification**

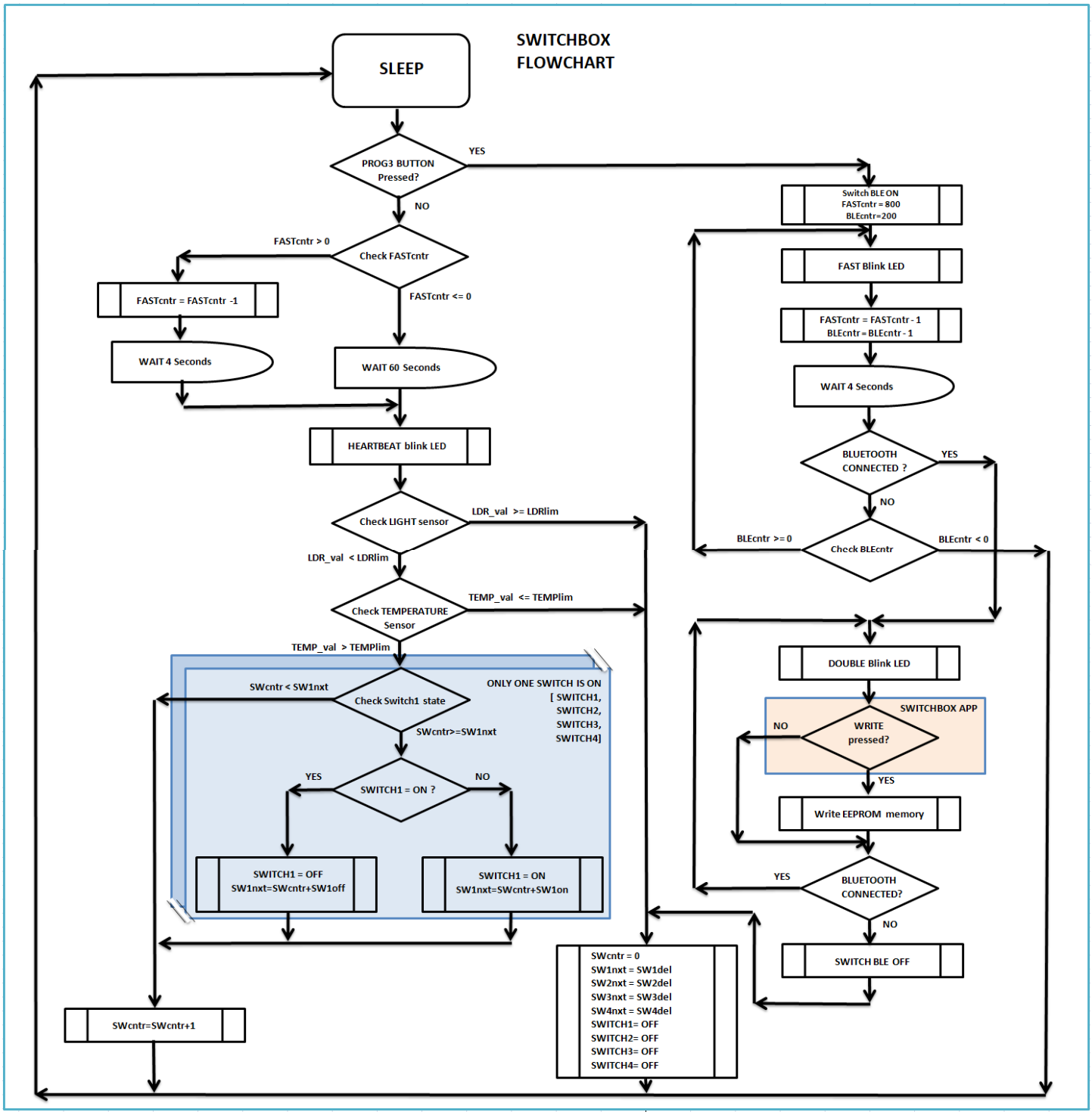



**Figure 2. SwitchBox Flowchart**

## Light Sensor

The Light Sensor is an LDR Resistor based series Circuit connected to VDD3V3. The Sensor Output Voltage as Function of Light Strength is shown in Figure 3.

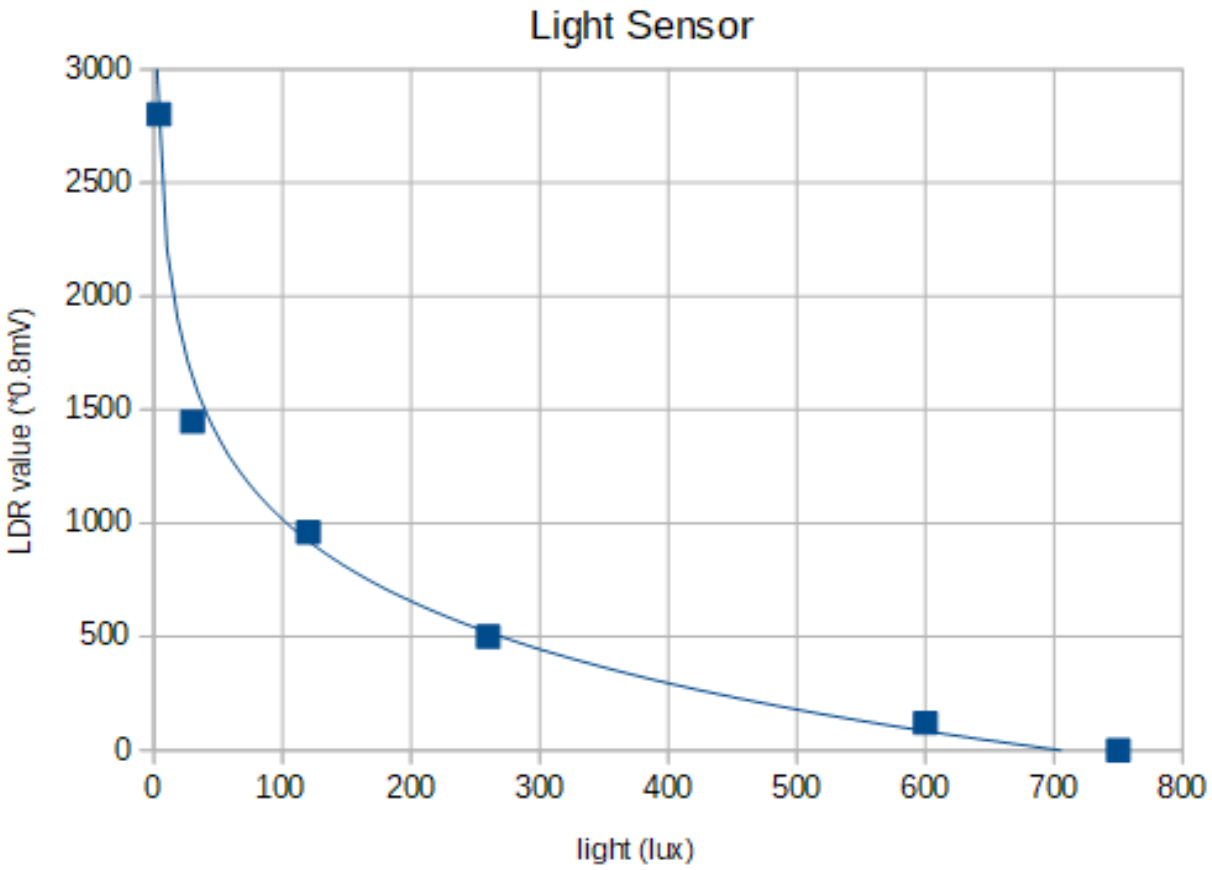



**Figure 3. Light Sensor Function**

## Temperature Sensor

The Temperature Sensor is an NTC Resistor based series Circuit connected to VDD3V3. The Sensor Output Voltage as Function of Temperature is shown in Figure 4.

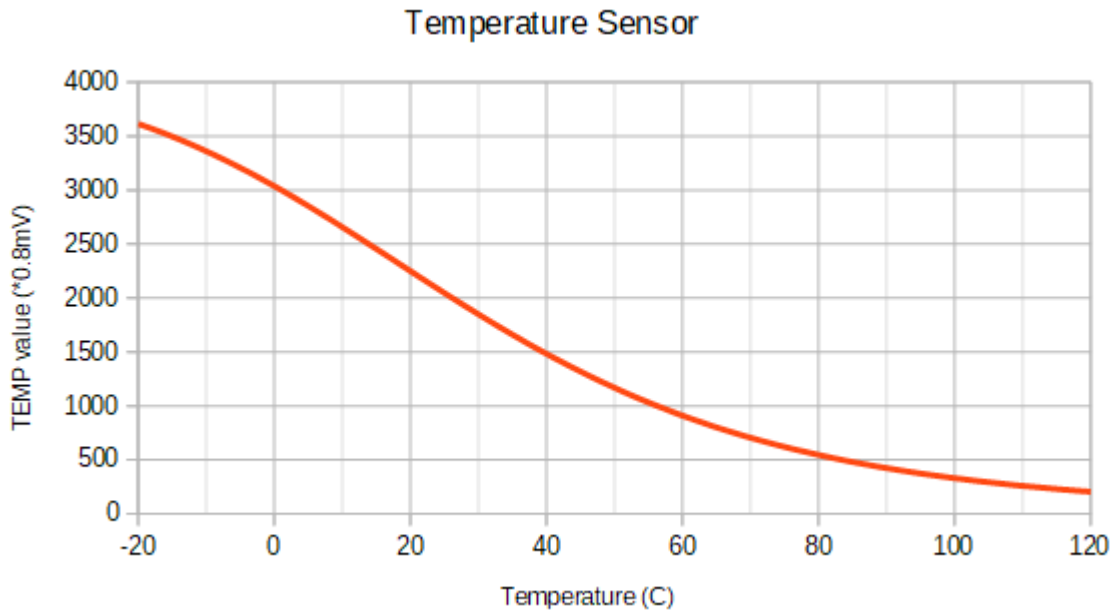



**Figure 4. Temperature Sensor Function**

## SwitchBox Functionality

1. When the Light Sensor limit is crossed and LDRstate=1 (LDRvalue<LDRlimit), minute counter SWcntr starts.
2. When the counter reaches the first SWcntr >= SW.n.nxt = DEL.n. (n=1,2,3,4). Only one Output is Active.
3. SWn is switched ON for ON.n minutes.
4. SW.n.nxt is updated (SW.n.nxt=SW.n.nxt+ON.n).
5. When the counter reaches SWcntr >= SW.n.nxt again, SWn is switched OFF for OFF.n minutes.
6. SW.n.nxt is updated (SW.n.nxt=SW.n.nxt+OFF.n).
7. The sequence 2 to 6 is repeated until the Light Sensor is Crossed again. (LDRvalue >= LDRlimit)

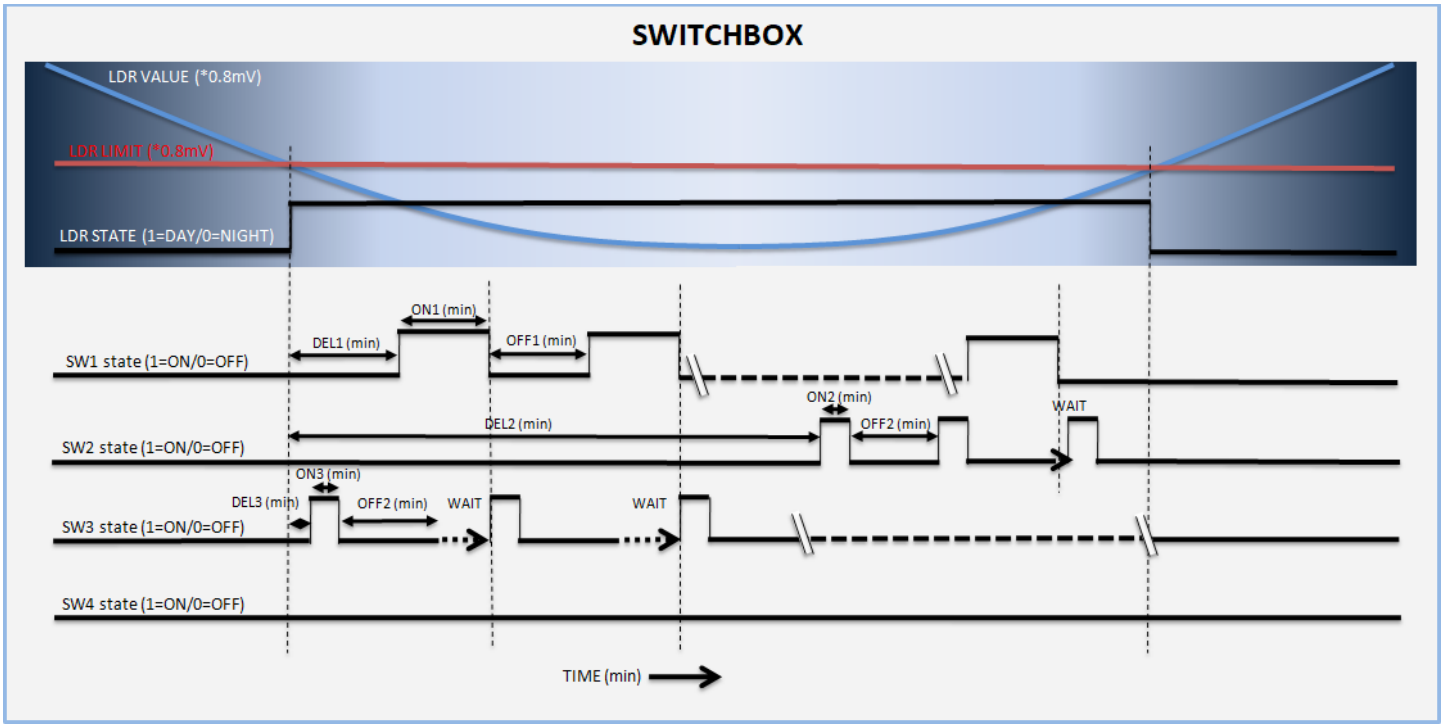



**Figure 5. SwitchBox Functionality**

## Android Application

If button PROG3 is pressed, the BLE Advertises for few minutes.
After Connecting with the Switchbox, the Limits can be changed.
The changed Limits are Saved on the Board by pressing WRITE on the Application.

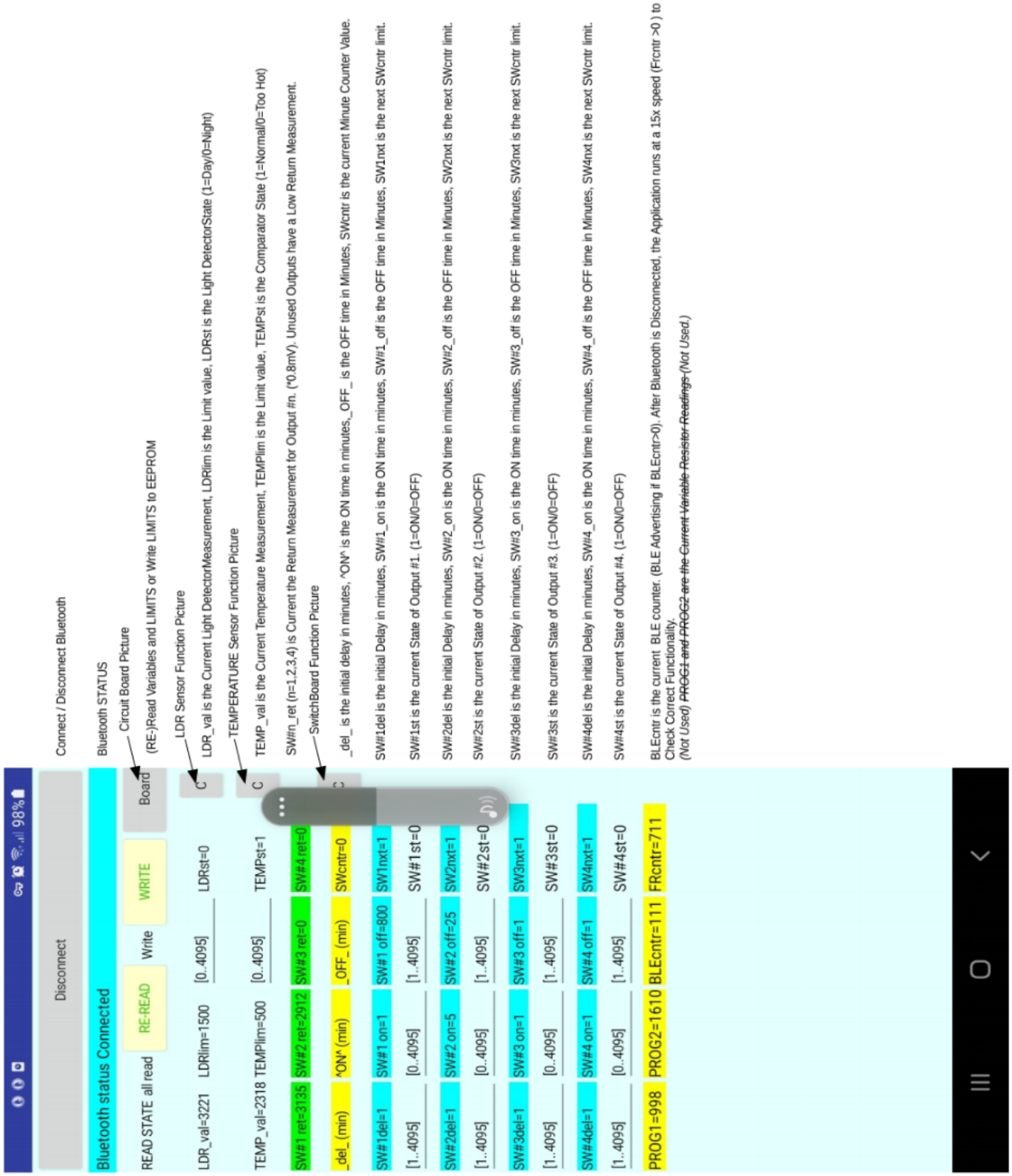



**Figure 6. SwitchBox Application**