



LightDNA

LightDNA System

Pattern Protocol Documentation

REVISION HISTORY

Revision	Date	Revisor
A0	13/07/2015	Ânderson Ignácio da Silva
A1	09/10/2015	Ânderson Ignácio da Silva
A2	17/10/2015	Ânderson Ignácio da Silva
A3	28/10/2015	Ânderson Ignácio da Silva

ABREVIATION

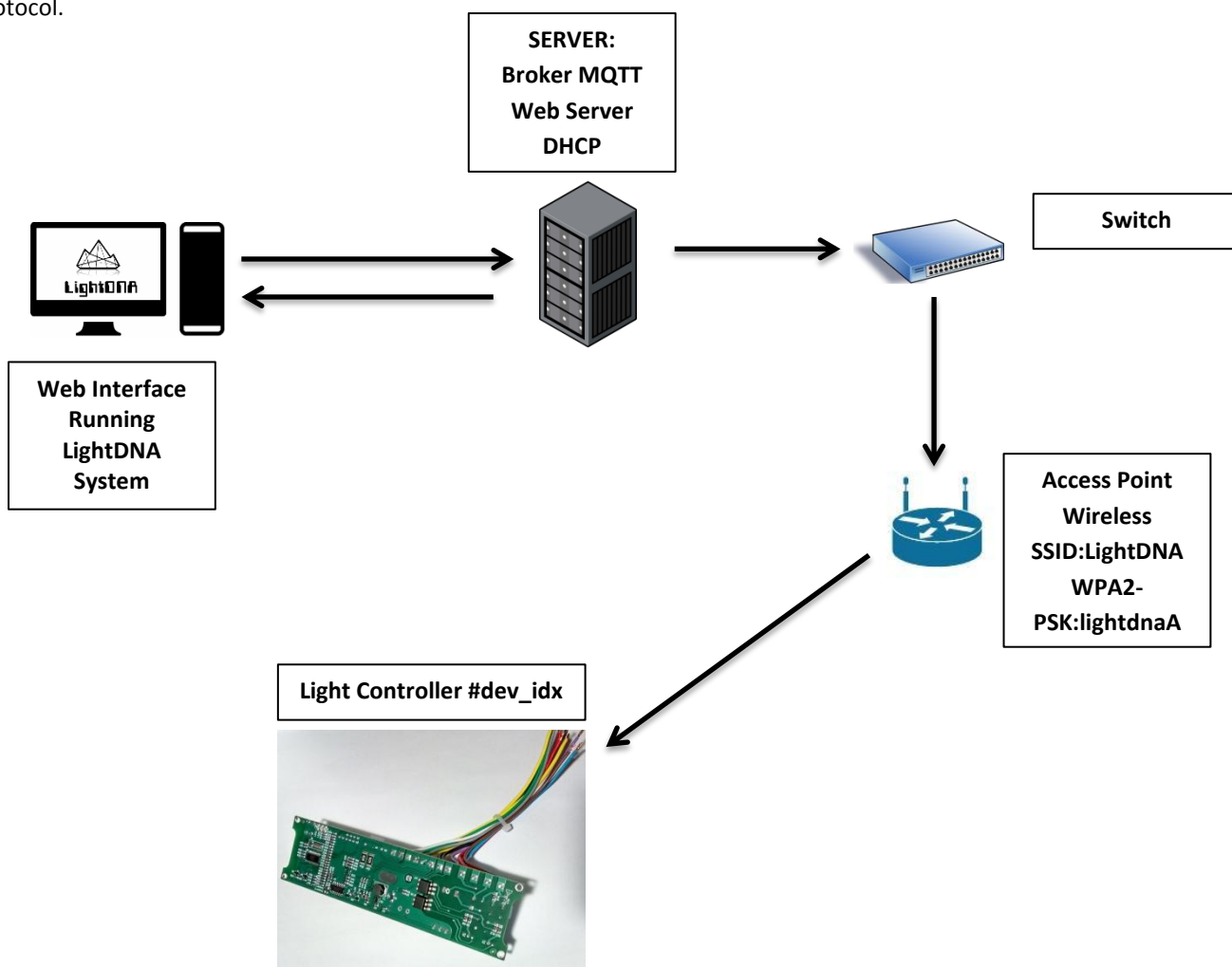
- LWT – Last Will Teastment – Message delivered by the module when he dies
- QoS – Quality of Service

INTRODUCTION

This document describes how to communicate with the light controller following the pattern protocol over the MQTT, this commands collects the information about module healthy and how to act inside him. Next you will see a datagram of communication and how this works.

DATAFLOW

The light controller works receiving commands in MQTT protocol over the Wi-Fi(802.11) Wireless. The default configuration of the system it's composed by a **server**, where the **DHCP**, **WEB SERVER** and **MQTT Broker** will be running. When the controller connects to the network, it will request to connect in the **MQTT Broker**, once a connection has been established, it'll receive the **latest** command sent in the **mqtt topics** that it has subscribed. Above there is a simple datagram of how the system works, from web interface and the controller using MQTT protocol.



COMMUNICATION

Considering that the system reads some information about the controller, some commands pattern must be used to transfer this information. Next, you will read how the commands works and the specific answer that returns:

Command	Reply	Description
R0000	#XXXXXX#	Reads info from microcont.
R0001	#C0000mA#	Reads Current from LED module
R0002	#PATIVO# ~ #PNATIVO#	Reads PIR Sensor
R0003	#L0000#	Reads LDR Value
R0004	#T0000#	Reads Temperature
R0005	#D0000#	Reads Dimmer Value
R0253	xx.xx.xx.xx	Reads IP address of module
R0254	-xxdBm	Reads RSSI in dBm
R0255	OK – FW – DEV/MAC	Reads Data from ESP Info
W0001-XXX	Success or Fail	Write Dimmer Value

Table 1 – Commands recognized by the module

UNICAST:

If you want to send unicast commands to the lights controller, publish one of the messages above in *table 1* in this topic and format:

- **lights/device_address**

Remember that **device_address** it's a unique address for each controller and by default it's available in the light stick identifier.

Example:

It'll be request a controller firmware version information, rssi signal and ip address with the commands **R0253**, **R0254**, **R0255** to specific light:

```
File Edit View Search Terminal Help
aignacio@aignacio:~$ mosquitto_pub -h localhost -t "lights/009E7D26" -m "R0253" -r
aignacio@aignacio:~$ mosquitto_pub -h localhost -t "lights/009E7D26" -m "R0254" -r
aignacio@aignacio:~$ mosquitto_pub -h localhost -t "lights/009E7D26" -m "R0255" -r
aignacio@aignacio:~$ _
PUBLISHER
Device Address

File Edit View Search Terminal Help
root@aignacio:/home/aignacio/projects/esp_lightdna# mosquitto_sub -h localhost -t "#" -v
lights R0253
lights/009E7D26
lights/009E7D26 R0253
lights/009E7D26/ip IPv4 - 192.168.0.110
lights/009E7D26 R0254
lights/009E7D26/rssi -32
lights/009E7D26 R0255
lights/009E7D26/status OK - 1.3-Retain Fixed and Added read IPv4-27/10/2015 - DEV: 009E7D26 MAC: 18-FE-34-9E-7D-26
CONTROLLER
```

Where *device_address* is a unique device id address, that means a unicast to the specific controller.

MULTICAST:

If you want to send multicast commands to the lights controller, publish one of the messages above in *table 1* in this topic and format:

- **lights**

In this topic, all the lights controller connected to the broker will receive and answer to the MQTT specific topic of it's own *device address*.

Example:

It'll be request a controller firmware version information, rssi signal and ip address with the commands **R0253, R0254, R0255** to all lights controller:

The image shows two terminal windows. The top window, titled 'aignacio@aignacio: ~', shows three 'mosquitto_pub' commands being executed to publish messages to the 'lights' topic with payloads 'R0255', 'R0254', and 'R0253'. The bottom window, titled 'aignacio@aignacio: ~', shows a 'mosquitto_sub' command being executed to subscribe to the 'lights' topic. The output of the subscription shows several messages, including 'lights R0255', 'lights R0254', and 'lights R0253', along with status and device information.

```

aignacio@aignacio: ~
File Edit View Search Terminal Help
aignacio@aignacio:~$ mosquitto_pub -h localhost -t "lights" -m "R0255" -r
aignacio@aignacio:~$ mosquitto_pub -h localhost -t "lights" -m "R0254" -r
aignacio@aignacio:~$ mosquitto_pub -h localhost -t "lights" -m "R0253" -r
aignacio@aignacio:~$ _

PUBLISHER

aignacio@aignacio: ~
File Edit View Search Terminal Help
root@aignacio:/home/aignacio/projects/esp_lightdna# mosquitto_sub -h localhost -t "#" -v
lights R0255
lights R0255
lights/009E7D26/status OK - 1.3-Retain Fixed and Added read IPv4-27/10/2015 - DEV: 009E7D26 MAC: 18-FE-34-9E-7D-26
lights R0254
lights/009E7D26/rssi -39
lights R0253
lights/009E7D26/ip IPv4 - 192.168.0.110
_

CONTROLLER

```

ANSWER MQTT:

All the modules must to reply the commands its own specific topics, the topics implemented until this version are:

- R0005 -> lights/device_address/dimmer
- R0001 -> lights/device_address/current
- R0002 -> lights/device_address/pir
- R0003 -> lights/device_address/ldr
- R0004 -> lights/device_address/temperature
- R0253 -> lights/device_address/ip
- R0254 -> lights/device_address/rssi
- R0255 -> lights/device_address/status
- R0000 -> lights/device_address/msp

ADDITIONAL INFORMATION:

If some module has gone offline for more than **5 minutes**, by default it's implemented in each module a LWT information, where the broker will publish a message in this format:

- lights/device_address/status - Device **device_address** it's offline!

When the module connect to the network, it publishes retained in this form:

- lights/**device_address** - Hello AWGES DEV: **XXXXXXXX** MAC: **XX-XX-XX-XX-XX-XX**

MQTT CONFIGURATION:

Each controller has it's own particular topic and are programmed with the above settings MQTT:

TOPIC SUBSCRIBED:

- lights - QoS – Level 1/ At least once
- lights/device_address - QoS – Level 1/ At least once

TOPIC PUBLISH:

- lights/device_address

MQTT PORT: 1883

MQTT Buffer Size:1024b

MQTT Keep Alive: 120s

MQTT Reconnect Timeout: 5s

SSID DEFAULT: LightDNA

WPA2-PSK: lightdnaAWGEShda