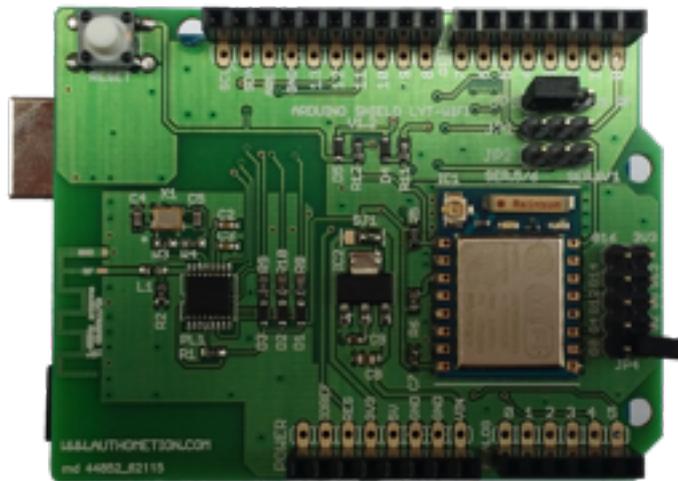




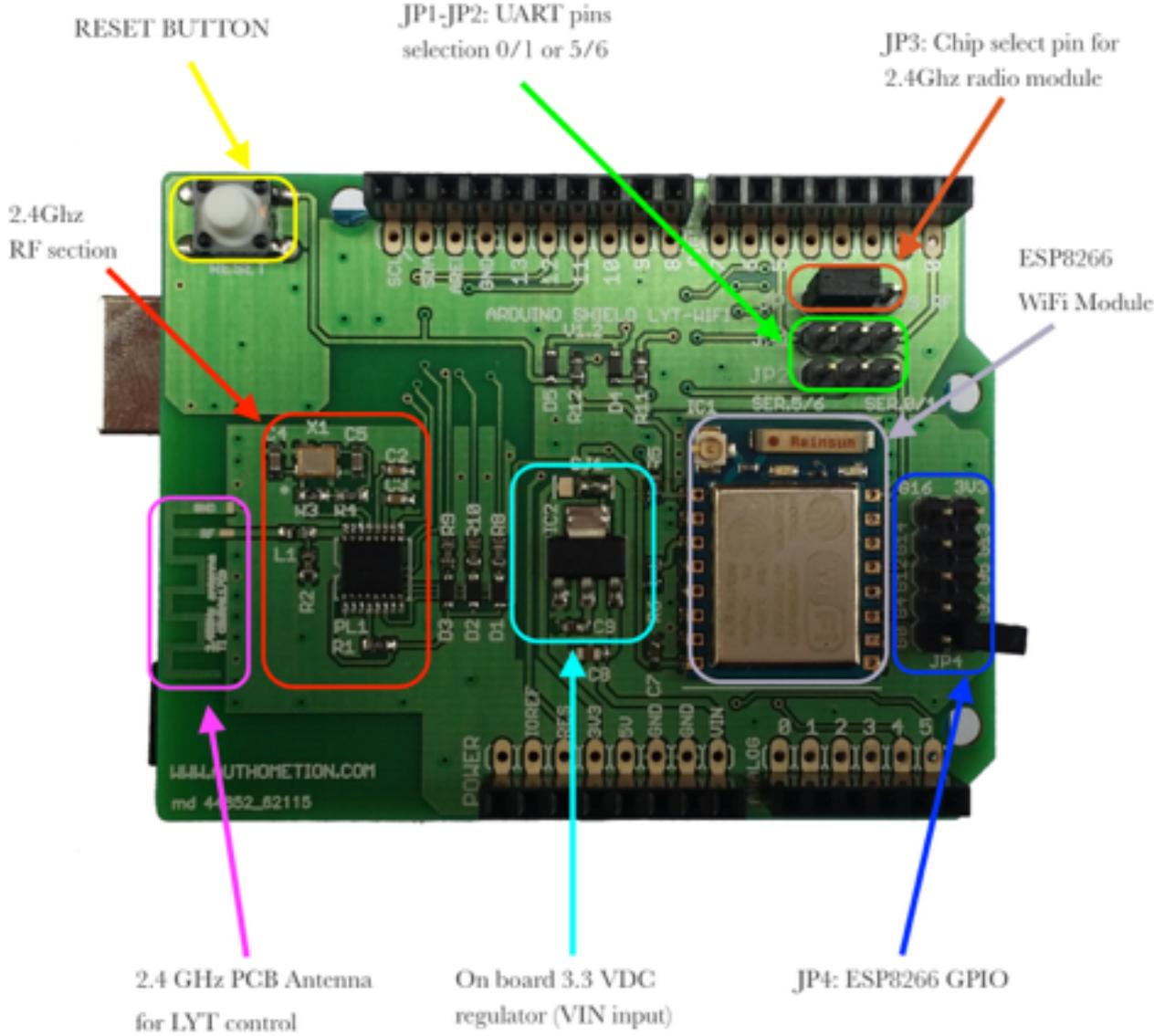
AUTHOMETION Arduino LYT/WiFi shield



Arduino compatible shield with integrated ESP8266 WiFi module and 2.4Ghz radio transceiver for Authometion LYT smart light bulb control.

If you bought a radio LYT before October 12th 2016 please read the addendum at page 11.

SECTIONS DESCRIPTION



JUMPERS DESCRIPTION

RF 2.4 GHz SPI Chip Select (JP3)

This jumper is used to select the SPI CS for the radio transceiver PL1167.



Chip select on PIN 9



Chip select on PIN 10

ESP8266 UART pins selection (JP1 and JP2)

Those 2 jumpers are used to choose if control the ESP8266 module from the the Arduino hardware serial or from the Arduino software serial.



UART on pins 0 and 1
(hardware Serial)



UART on pins 5 and 6
(software Serial)

ESP8266 GPIO (JP4)

On JP4 are routed all the GPIOs coming from the ESP8266 module plus GND and 3V3 pins. If you want to flash a new firmware on the ESP8266, using an USB to UART cable, you need to set a jumper between G0 and GND.



Position of the jumper if you want to
flash a new firmware on the ESP8266

**Note: some ESP07 modules have an error on
silkscreen: GPIO4 and GPIO5 are exchanged!**

QUICK START

To test your new LYT/WiFi shield you can use our sketch named [demo_firmware_lytwifi.ino](#). Copy the libraries “Messenger”, “PL1167” and “LYTWiFi” inside your Arduino libraries directory. Open your Arduino environment (**for this manual we used the arduino version 1.6.x**) and select from **File>Examples->LytWiFi** the *demo_firmware_lytwifi* sketch. Attach the LYT/WiFi shield on your Arduino board then set the jumper JP3 to configure radio transceiver CS on pin 10. In this example we will use the software serial to communicate with ESP8266 WiFi module so please set up JP1 and JP2 jumpers accordingly (SER.5/6 position). If you have a LYT radio bulb please connect and power on it. Connect your Arduino board to your PC, upload the sketch and open the serial monitor. Select a speed of **9.600** and CR +LF as string terminators. The sketch will print the radio channel and the two default SyncWords used to secure your radio network.



These two SyncWords are very important because only the radio packets that are signed with them will be accepted on the network and validated.

Each single LYT can be registered on 5 different local addressees. The address is expressed on two bytes: LSB,MSB. The default one is 0,0. To test if your new LYT is working you can send the following command:

PON,0,0

If you bulb lights on you can go on.

Now try to send the following command to set a RED color on your LYT:

RGB,0,0,255,0,0

If your LYT now is RED everything is working properly.

Switch off your LYT using the POF command:

POF,0,0

You can find all the available commands and their explanation later on.

Now it's time to test your WiFi module.

Send the following command to list the access point available in your area:

LAP

After few seconds you will see the list of the access point on the screen.

If you can see your router in the list you can connect to it using the following command: **JOI,apname,pwd**

Where **apname** is the access point name and **pwd** is your password.

In few seconds you will see something like this:

```
Join: OK
Local IP Address :10.0.1.12
Local Mac Address:18:fe:34:a4:33:59
TCP Server: OK
```

If the join has been correctly executed the sketch will show you the IP assigned on your network, the MAC address and if the TCP server has been activated.

If the join fails try to check again that your access point name and the password has been typed correctly (max length 20 chars).

To test if the WiFi module is working properly on your network you can connect via TCP to the port 5001 of the WiFi module. For example you can use a simple telnet command like this:

```
MacBook-Pro-di-Pietro-2:~ Pietro$ telnet 10.0.1.12 5001
Trying 10.0.1.12...
Connected to 10.0.1.12.
Escape character is '^]'.
█
```

As you can see now you are connected to the ESP8266 WiFi module and you can send commands also from this channel. Try to send a PON command to the LYT:

```
Escape character is '^]'.
PON,0,0
PON!█
```

If your LYT goes on, your shield is now fully tested and you can start to enjoy writing you own incredible project!

Don't forget to have a look also to the other sketches available in the provided example directory.

DEMO_FIRMWARE_LYTWIFI

SKETCH COMMANDS EXPLANATION

As you have seen from the QUICK START chapter all the commands use a two bytes address to reach the right LYT. In this document this address is indicated by ADDR_A and ADDR_B strings. Each single command can be sent using UNICAST or MULTICAST <MODE>. The UNICAST mode is used to send command to single LYT and then wait always for an answer. When an answer is received the “ReceivedAnswer.AnswerStruct.ui8Answer” will contain:

1. for RAT (Read Address Table) command, it is filled with five couples of bulb’s address (byte0/byte1, byte2/byte3, byte4/byte5, byte6/byte7, byte8/byte9);
2. for any other commands:
 - byte 0: ON/OFF state of bulb;
 - byte 1: PWM value of red color;
 - byte 2: PWM value of green color;
 - byte 3: PWM value of blue color;
 - byte 4: PWM value of brightness;
 - byte 5: RSSI value;

The MULTICAST mode can be used to send command to multiple LYTs, with same address, and will not wait for any answer. Also the LYT will not reply to a MULTICAST command. The MULTICAST mode is also very useful to **extend the radio transmission distance** because it repeats the command transmission tens of times instead of one single time as for UNICAST mode. There is one more parameter, to be used only in UNICAST mode, that executes the main commands (PON, POF, SBR, RGB) by changing the PWM gradually with a time ranging up to a max of 1 seconds. This parameter is indicated as STEP. The two parameters MODE and STEP are optionals and by default their value are: MODE=0 (Unicast) and STEP=0 (No delay). The STEP parameter can go from 0 to 100 (each step means 10ms).

Please note that this SKETCH has been created to demonstrate how to works with low level LYTWiFi library functions.

Skilled developers can check directly the library source code where also all the low level functions are well explained.

MAIN COMMANDS

PON (Power ON)

PON,ADDR_A,ADDR_B,<MODE>,<STEP>

POF (Power OFF)

POF,ADDR_A,ADDR_B,<MODE>,<STEP>

RGB (Set RGB values)

RGB,ADDR_A,ADDR_B,RED,GREEN,BLUE,<MODE>,<STEP>

SBR (Set Brightness)

SBR,ADDR_A,ADDR_B,VALUE,<MODE>,<STEP>

CONFIGURATION COMMANDS

RAT (Read Address Table)

RAT,ADDR_A,ADDR_B

This command is used to read the five addressees stored in LYT.

Please check the function `void LYTWiFi::vfSendAnswerToSerial(void)` into Lytwifi.cpp to understand how to access received data.

SEA (Set Address)

SEA,ADDR_A,ADDR_B,NEWADD_A,NEWADD_B

Set the new address NEWADD_A,NEWADD_B (one LYT up to 5 different addresses) on LYT with address ADDR_A, ADDR_B

DEA (Delete Address)

DEA,ADDR_A,ADDR_B,DELADD_A,DELADD_B

Delete address DELADD_A,DELADD_B from LYT with address ADDR_A,ADDR_B

SAV (Save current status)

SAV,ADDR_A,ADDR_B

Save LYT current status (on/off, dimming value, colors). The status will be restored each time the LYT is powered ON.

RIS (Read Info Status)

RIS,ADDR_A,ADDR_B

This command is used to fill the “ReceivedAnswer.AnswerStruct.ui8Answer” vector with LYT info without the need to send a real command.

SSW(Set Sync Words)

SSW,ADDR_A,ADDR_B,SYNC_A,SYNC_B

Warning: this command will change the SyncWords used by LYT radio transceiver! Only devices with same SyncWords can work together. This command will temporary change also the SyncWords on your shield but if you want to permanently save it use the command SLSW (SAVE=1) otherwise you will not communicate anymore with your LYT.

SLSW(Set Local Sync Words)

SLSW,SYNC_A,SYNC_B,<SAVE>

Warning: please refer to the previous command SSW. The <SAVE> parameter indicate if to memorize these values on Arduino EPROM.

SRC(Set Radio Channel)

SSW,ADDR_A,ADDR_B,CHANNEL

Warning: this command will change the radio channel used by LYT radio transceiver! Only devices with same radio channel can work together. This command will temporary change also the radio channel on your shield but if you want to permanently save it use the command SLRC (SAVE=1) otherwise you will have difficult to communicate anymore with your LYT. The value of the radio channel can be from 0 to 128 (from 2.402Ghz to 2.530Ghz).

SLRC(Set Local Radio Channel)

SLRC,CHANNEL,<SAVE>

Warning: please refer to the previous command SRC. The <SAVE> parameter indicate if to memorize this value on Arduino EPROM.

RES (Reset)

RES

Warning: this command will factory reset your LYT and can be sent only during the first 3 seconds after power on your LYT. After reset your LYT will be configured with the following factory values:

SYNC WORDS: 66,49

RADIO CHANNEL: 33

DEFAULT ADDRESS: 0,0

ESP8266 WiFi MODULE COMMANDS

LAP (List Access Point)

LAP

This command will list all the access point that can be seen from the ESP8266 WiFi module.

JOI (JOIN access point)

JOI,AP_NAME,AP_PWD

This command is used to join your ESP8266 WiFi module to your router and start a TCP server on port 5001.

RIP(Read IP)

RIP

This command is used to read IP address assigned to your ESP8266 WiFi module from your router.

STCP(Start TCP Server)

STCP

This command will start a TCP Server on port 5001.

BRIDGE(Open communication with ESP8266 module)

BRIDGE

This command will open a direct communication with ESP8266 module.

You can find many more functions to manage the ESP8266 module looking into the Lytwifi library.

Some commands example:

PON,0,0 - Power ON LYT with address 0,0 (UNICAST)

PON,0,0,0,100 - Power ON LYT with address 0,0 using 2 seconds delay (UNICAST)

POF,0,0 - Power OFF LYT with address 0,0 (UNICAST)

RGB,0,0,0,255,0,1 - Set green color on LYT with address 0,0 (MULTICAST)

SBR,0,0,255 - Set brightness to 255 (max) on LYT with address 0,0 (UNICAST)

SEA,0,0,5,5 - Add new address 5,5 on LYT with address 0,0

DEA,0,0,5,5 - Delete address 5,5 from LYT with address 0,0

SAV,0,0 - Save LYT (with address 0,0) configuration in memory

SSW,0,0,25,50 - Set new SyncWords 25,50 on LYT with address 0,0

SLSW,25,50,1 - Set new SyncWords 25,50 locally on arduino eeprom

SRC,0,0,75 - Set radio channel to 2.477Ghz on LYT with address 0,0

SLRC,75,1 - Set radio channel to 2.477Ghz locally on arduino eeprom

OTHER SKETCHES AVAILABLE

demo firmware lytwifi analog

This sketch will demonstrate how to modulate the brightness of one LYT in a manner proportional to the reading of an analog input with hysteresis value to avoid continuous flickering during adjustment.

demo firmware lytwifi cmd fast

This sketch will demonstrate how to send several fast MULTICAST commands to your LYTs.

demo firmware lytwifi random

This sketch will change randomly the color of your LYTs.

demo firmware lytwifi disco

This sketch will show how to use a LYT/WiFi shield to sync LYT radio bulb with music. (<http://www.instructables.com/id/Use-a-LYTWiFi-shield-to-sync-LYT-radio-bulb-with-m>)

demo firmware lytwifi sound control & demo firmware lytwifi clap control

These sketches will demonstrate how to use ambient sounds to control your LYTs (<http://www.instructables.com/id/Automatic-lighting-management-using-ambient-sounds>)

ADDENDUM FOR THE NEW RADIO LYT 2.0

From October 15th 2016 we are selling only the new radio LYT version 2.0. This bulb is exactly like the previous radio LYT but it has a new firmware inside. The major feature of the new firmware is related to the UNICAST and MULTICAST transmission mode. On the 2.0 version the UNICAST mode can reach the same control distance of the MULTICAST mode. In this way it will be more easy to control and read the status of your bulbs also if very far from the shield. For this purpose we wrote new libraries (compatible with the radio LYT 1.0) where we added a new field on last position to specify if you want to control a radio LYT 1.0 or 2.0. If not specified the library will control 2.0 radio LYT as default.

In example the PON command will have the following format:

PON (Power ON)

PON,ADDR_A,ADDR_B,<MODE>,<STEP>,<VERSION>

where <VERSION> can be:

0 for the new radio LYT 2.0

1 for the old radio LYT 1.0

If you want to control a new radio LYT 2.0 in UNICAST mode it is enough to write:

PON,0,0

If you want to control an old radio LYT 1.0 you need to specify all the fields:

UNICAST:

PON,0,0,0,0,1

MULTICAST:

PON,0,0,1,0,1