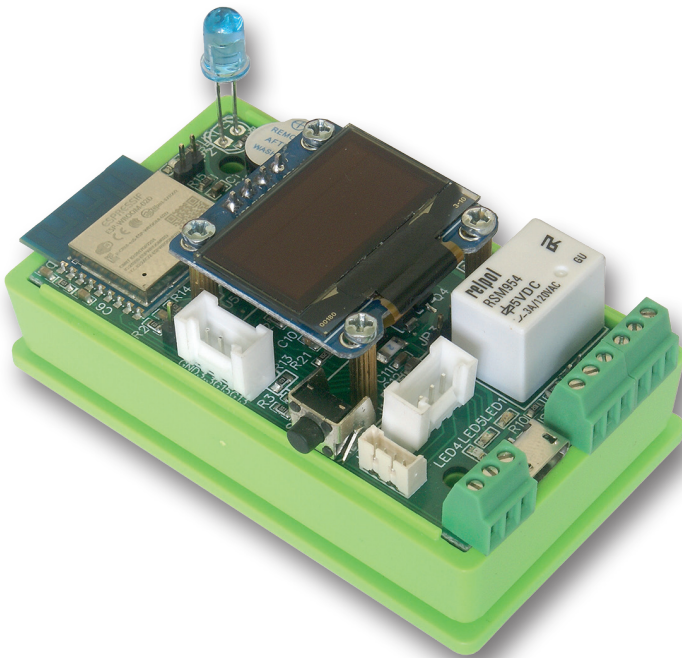


# **tinyESP – WiFi Controller**



## **Manual**

**tinyESP** is simple WiFi controller based on popular ESP8266 (4MB) module and excellent open source software ESP\_Easy. Below is only short sheet with most settings important for tinyESP version.

More information about ESP\_Easy system and it's possibilities you can find here:

<https://espeasy.readthedocs.io/en/latest/>

tinyESP use firmware:

ESP\_Easy\_mega\_actual\_release\_normal\_IRext\_no\_rx\_ESP8266\_4M2M.bin

Can be upgraded by any other firmware for 4MB version of ESP8266.

10 easy steps to use your tinyESP:

1. **Switch power on**, search wifi network on you computer or smart phone.

When you find network "**ESP\_Easy\_0**", connect to it.

Use password: **configesp**

2. **Open address 192.168.4.1** in your browser and choose your access point and put it's password.

Welcome to ESP Easy Mega AP

Wifi Setup wizard

Pick	Network info
<input type="radio"/>	bb Ch:1 (-47dBm) WPA/WPA2/PSK EP-1
<input type="radio"/>	Ch:1 (-43dBm) WPA/WPA2/PSK
<input type="radio"/>	mkt Ch:1 (-42dBm) WPA/WPA2/PSK
<input type="radio"/>	black Ch:1 (-62dBm) WPA2/PSK
<input type="radio"/>	mag Ch:2 (-88dBm) WPA2/PSK
<input type="radio"/>	zibi1 Ch:6 (-73dBm) WPA/WPA2/PSK
<input type="radio"/>	ats Ch:7 (-65dBm) WPA/WPA2/PSK
<input type="radio"/>	ats-tomek Ch:10 (-52dBm) WPA/WPA2/PSK

☐ other SSID:

password:

Connect

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3. **Click Connect**, you will be redirected to new address of tinyESP in your network.

If your computer not change WiFi network automatically, change to yours.

4. **Open tab Hardware** and set GPIO -> LED to GPIO16.

Welcome to ESP Easy Mega AP

ESP is connected and using IP Address:  
**192.168.1.106**

Connect your laptop / tablet / phone back to your main Wifi network and

Proceed to main config

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If you like to use **Sleep Mode**, you have to choose **-None-**

For reset function set GPIO-0,

For I2C interface choose following settings:

SDA GPIO-2

SCL GPIO-14

and confirm by **Submit**

**ESP Easy Mega: IR**

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Config
Controllers
**Hardware**
Devices
Rules
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**Hardware Settings**

**Wifi Status LED**

GPIO → LED: GPIO-16 (D0)

Inversed LED: ☒
  
*Note: Use 'GPIO-2 (D4)' with 'Inversed' checked for onboard LED*

**Reset Pin**

GPIO ← Switch: GPIO-0 (D3)
  
*Note: Press about 10s for factory reset*

**I2C Interface**

GPIO ↔ SDA: GPIO-2 (D4)

GPIO → SCL: GPIO-14 (D5)

**SPI Interface**

Init SPI: ☐
  
*Note: CLK=GPIO-14 (D5), MISO=GPIO-12 (D6), MOSI=GPIO-13 (D7)*
  
*Note: Chip Select (CS) config must be done in the plugin*

**GPIO boot states**

Pin mode GPIO-0 (D3) Δ: Default

Pin mode GPIO-1 (D10) TX0: Default

Pin mode GPIO-2 (D4) Δ: Default

Pin mode GPIO-3 (D9) RX0: Default

Pin mode GPIO-4 (D2): Default

Pin mode GPIO-5 (D1): Default

Pin mode GPIO-9 (D11) Δ: Default

Pin mode GPIO-10 (D12) Δ: Default

Pin mode GPIO-12 (D6): Default

Pin mode GPIO-13 (D7): Default

Pin mode GPIO-14 (D5): Default

Pin mode GPIO-15 (D8) ⇒ Δ: Default

Submit

## 5. Add Buzzer

Open tab **Notification/Edit** and add buzzer on GPIO-15. Please check if you have jumper on **JP1**. If you like signal on boot, open **Tools/Advanced** menu and check first check box **Rules** and press **Submit**.

ESP Easy Mega: IR

oMain Config Controllers Hardware Devices Rules Notifications Tools

**Notification Settings**

Notification: Buzzer ?

1st GPIO: GPIO-15 (D8) ?

Enabled: ☒

Close Submit Test

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**Advanced Settings**

Rules Settings

Rules: ☒

Old Engine: ☒

Controller Settings

Refresh browser and in new tab **Rules** paste below rule (an example) and **Submit**:

On System#Boot do

```
rtttl,15:d=10,o=6,b=180,c,e,g
```

endon

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**Rules**

Rules Set 1 ?

```
On System#Boot do
rtttl,15:d=10,o=6,b=180,c,e,g
endon
```

If like use buzzer as notification from other devices (like Lan Controller), you can use http command:

**<http://<tinyESP IP address>/control?cmd=tone,15,1300,200>**

for playing single tone.

More information you find on this site:

**[https://espeasy.readthedocs.io/en/latest/Plugin/P000\\_Buzzer\\_RTTL.html](https://espeasy.readthedocs.io/en/latest/Plugin/P000_Buzzer_RTTL.html)**

## 6. Using Relay

For using relay you need to send http command from browser or other device (like Lan Controller)

**<http://<tinyESP IP address>/control?cmd=GPIO,5,1>**

to switch on

**<http://<tinyESP IP address>/control?cmd=GPIO,5,0>**

to switch off

## 7. Add Sensors

Open tab **Devices/Edit** and choose from list sensors you like to use.

### 7.1 DS18B20 (1wire) - add on GPIO-4

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**Task Settings**

Device: Environment - DS18B20 ⓘ ⓘ

Name: DS

Enabled: ☒

**Sensor**

GPIO pin 1 Wire: GPIO-4 (D2)

Device Address:

Device Resolution: 9 Bit

**Data Acquisition**

Send to Controller ☐

Interval: 60 [sec]

**Values**

#	Name	Formula ⓘ	Decimals
1	Temperature		1

Close Submit Delete

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### 7.2 BMx280 - on default I2C address

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**Task Settings**

Device: Environment - BMx280 ⓘ ⓘ

Name: BME

Enabled: ☒

I2C Address: 0x76 (118) - (default)

Note: SDO Low=0x76, High=0x77

Altitude: 180 [m]

Temperature offset: 0 [x 0.1C]

Note: Offset in units of 0.1 degree Celsius

**Data Acquisition**

Send to Controller ☐

Interval: 1 [sec]

**Values**

#	Name	Formula ⓘ	Decimals
1	Temperature		1
2	Humidity		0
3	Pressure		0

Close Submit Delete

### 7.3 Analog input - use below formula to have right voltage values:

$\%value\%/214$

**NOTICE- if you use battery and have battery jumper JP3, not use analog input on P1 connector.**

The screenshot shows the 'Task Settings' window for 'Analog input - internal'. The 'Name' is 'INA'. 'Enabled' is checked, and 'Oversampling' is unchecked. Under 'Two Point Calibration', 'Calibration Enabled' is unchecked. 'Point 1' is 0 with a multiplier of 0.000, and 'Point 2' is 0 with a multiplier of 0.000. The 'Current' is 7 + 7.000. Under 'Data Acquisition', 'Send to Controller' is unchecked. The 'Interval' is 60 seconds. A table of values shows one entry: 'Inpa1' with the formula '%value%/214' and 2 decimals. Buttons for 'Close', 'Submit', and 'Delete' are at the bottom.

#	Name	Formula	Decimals
1	Inpa1	%value%/214	2

### 7.4 Display - OLED SSD1306: choose default I2C address Rotated, Display Size 128x64.

In 8 lines and using 16 characters you can display plain text, sensor values - in square brackets first enter the name of the sensor and the value name separated by the „#“ sign. You can also display system values between the characters „%“ e.g. „% sys-time%“.

If you change Display Button to GPIO-0 and set Display Timeout - will display for chosen time after pressing switch button.

The screenshot shows the 'Task Settings' window for 'Display - OLED SSD1306'. The 'Name' is 'OLED'. 'Enabled' is checked. 'I2C Address' is 0x3C (60) - (default). 'Rotation' is Rotated. 'Display Size' is 128x64. 'Font Width' is Optimized. The display lines are configured as follows: Line 1: IP%i%, Line 2: H:[BME#Humidity] T:[BME#Temperature]C, Line 3: (empty), Line 4: I LOVE tinyESP ;-), Line 5: (empty), Line 6: (empty), Line 7: (empty), Line 8: (empty). 'Display button' is GPIO-0 (D3) and 'Display Timeout' is 5 seconds. The 'Interval' is 60 seconds. Buttons for 'Close', 'Submit', and 'Delete' are at the bottom.

**7.5** You can use **Extension port** and **Serial Port** for using with other sensors according to ESP\_Easy settings.

## 8. Add IR LED

To transmit infrared commands to home appliances.

Choose **Devices/Edit - IR Transmit** and setup on GPIO-13.

Commands with code can initialized in **Rules**, from Server or by http:

`http://<tinyESP IP address>/control?cmd=IRSEND,<Encoding>,<Value>,<Bitlength>`

### Example:

Samsung TV on:

**`http://192.168.2.165/control?cmd=IRSEND,SAMSUNG,e0e09966,32`**

Samsung TV off:

**`http://192.168.2.165/control?cmd=IRSEND,SAMSUNG,e0e019e6,32`**

*(Right code for your device you have to find on specialized websites)*

ESP Easy Mega: IR

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**Task Settings**

Device: Communication - IR Transmit ? i

Name: IRDA

Enabled: ☒

**Actuator**

GPIO -> LED: GPIO-13 (D7)

Command: IRSEND,[PROTOCOL],[DATA],[BITS optional],[REPEATS optional]  
BITS and REPEATS are optional and default to 0

Close Submit Delete

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## 9. Battery usage

tinyESP has special chip for use uninterrupted power with Li-Po batteries.

It change power between USB and battery, charge battery and boost voltage from battery to 5V.

It allow use tinyESP as mobile device for environmental off-road measurement and with Sleep Mode for battery powered only monitoring. To switch on **Sleep Mode** you have to switch off WiFi LED (GPIO16), next in **Config** menu choose sleep time and awake time. Data will be send to server during awake.

**Sleep Mode**

Sleep awake time: 15 [sec] ?

Note: 0 = Sleep Disabled, else time awake from sleep

Sleep time: 3600 [sec (max: 4294)]

Sleep on connection failure: ☒

Submit

**10. Controllers tab** - allow to send data to server or control from server.

The example shows the configuration with the **mqtt.ats.pl** server.

**10.1** After initial setup (WiFi, access settings, etc.). In ESP Easy, go to the **Config** tab and in the **Unit Name** field, enter the device prefix generated on mqtt.ats.pl (visible next to the device on the **Devices** page). This value will be used as host name, MQTT client ID, and part of MQTT topics.

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Main Settings

Unit Name:

00ad

Note: Hostname 00ad

Unit Number:

0

Append Unit Number to hostname:

☐

Admin Password:

Wifi Settings

SSID:

bb

WPA Key:

\*\*\*\*

Fallback SSID:

Fallback WPA Key:

Note: WPA Key must be at least 8 characters long

Include Hidden SSID:

☐

Note: Must be checked to connect to a hidden SSID

WPA AP Mode Key:

\*\*\*\*

Note: WPA Key must be at least 8 characters long

Don't force /setup in AP-Mode:

☐

Note: When set you can use the Sensor in AP-Mode without being forced to /setup. /setup can still be called.

Do Not Start AP:

☐

Note: Do not allow to start an AP when configured WiFi cannot be found

Client IP filtering

Client IP block level:

Allow Local Subnet

Access IP lower range:

192.168.1.0

Access IP upper range:

192.168.1.255



In the **Controllers** tab, click **Add** next to the first item, select **Home Assistant (openHAB) MQTT** and fill in the form:

Locate Controller: *Use Hostname*

Controller Hostname: *mqtt.ats.pl*

Controller Port: *1883*

Client Timeout: *1000*

Use Extended Credentials: select

Controller User: MQTT client username (*available on account info page*)

Controller Password: MQTT client password (*available on account info page*)

Controller Client ID: enter *%sysname%*

Controller Subscribe: enter *%sysname%/#*

Controller Publish: enter *%sysname%/%valname%*

Enabled: select

Optionally, you can also select **Send LWT to broker** and **Will Retain**.

The screenshot shows the 'Controller Settings' form for a Home Assistant (openHAB) MQTT controller. The form is organized into several sections: Protocol, Controller Queue, Credentials, and MQTT. The 'Protocol' section has a dropdown for 'Home Assistant (openHAB) MQTT'. The 'Controller Queue' section includes fields for 'Minimum Send Interval' (100 ms), 'Max Queue Depth' (10), 'Max Retries' (10), 'Full Queue Action' (Ignore New), 'Allow Expire' (checkbox), 'De-duplicate' (checkbox), 'Check Reply' (Ignore Acknowledgement), and 'Client Timeout' (1000 ms). The 'Credentials' section has 'Use Extended Credentials' checked, 'Controller User' set to 'test', and 'Controller Password' masked with dots. The 'MQTT' section includes 'Controller Client ID' (set to '%sysname%'), 'Unique Client ID on Reconnect' (checkbox), 'Current Client ID' (set to '0ad'), 'Publish Retain Flag' (checkbox), 'Controller Subscribe' (set to '%sysname%/#'), 'Controller Publish' (set to '%sysname%/%valname%'), 'Controller LWT Topic', 'LWT Connect Message', 'LWT Disconnect Message', 'Send LWT to broker' (checked), 'Will Retain' (checked), 'Clean Session' (checkbox), and 'Enabled' (checked). At the bottom, there are 'Close' and 'Submit' buttons.

ESP Easy Mega [redacted] /0ad

◻ Main ◻ Config ◻ Controllers ◻ Hardware ◻ Devices ◻ Notifications ◻ Tools

**Controller Settings**

Protocol: Home Assistant (openHAB) MQTT ⓘ

Locate Controller: Use Hostname

Controller Hostname: mqtt.ats.pl

Controller Port: 1883

**Controller Queue**

Minimum Send Interval: 100 [ms]

Max Queue Depth: 10

Max Retries: 10

Full Queue Action: Ignore New

Allow Expire: ☐

De-duplicate: ☐

Check Reply: Ignore Acknowledgement

Client Timeout: 1000 [ms]

**Credentials**

Use Extended Credentials: ☒

Controller User: test

Controller Password: .....

**MQTT**

Controller Client ID: %sysname%

Unique Client ID on Reconnect: ☐

Current Client ID: 0ad

Note: Updated on load of this page

Publish Retain Flag: ☐

Controller Subscribe: %sysname%/#

Controller Publish: %sysname%/%valname%

Controller LWT Topic:

LWT Connect Message:

LWT Disconnect Message:

Send LWT to broker: ☒

Will Retain: ☒

Clean Session: ☐

Enabled: ☒

Close Submit

**10.3** Then configure the connected sensors/modules in the **Devices** tab.

a) **Relay out0** - add **Switch input - Switch** changing only:

Name: *output*

Enabled: select

GPIO: *GPIO-5 (D1)*

Send To Controller: select next to the first item (MQTT controller set in step 10.2)

Interval: *300*

Values: 1 - *out0*

ESP Easy Mega: IR Extended, no IR RX

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★Hardware

↑Devices

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🔔Notifications

🔧Tools

Task Settings

Device: Switch input - Switch

Name: output

Enabled: ☒

Sensor

Internal PullUp: ☐

Inversed Logic: ☐

Note: Will go into effect on next input change.

GPIO  $\pm$ : GPIO-5 (D1)

Switch Type: Switch

Switch Button Type: Normal Switch

Send Boot state: ☐

Advanced event management

De-bounce (ms): 0

DoubleClick event: Disabled

DoubleClick max. interval (ms): 1000

Longpress event: Disabled

Longpress min. interval (ms): 1000

Use Safe Button (slower): ☐

Data Acquisition

Send to Controller: ☒

Interval: 300 [sec] (Optional for this Device)

Values

#	Name
1	out0

Close

Submit

Delete

## b) BME280 sensor (temperature, humidity and pressure) - add **Environment - BMx280**:

Name: *bme*

Enabled: select

I2C Address: likely *0x76 (118)* - (*default*)

Send To Controller: select next to the first item

Interval: *300*

Values: 1 - *t1*, 2 - *h1*, 3 - *p1*

Optionally, you can set **Altitude** and **Temperature offset** as desired.

ESP Easy Mega: IR Extended, no IR RX

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**Task Settings**

Device: Environment - BMx280

Name:

Enabled: ☒

I2C Address:  [Detected: BME280]

Note: SDO Low=0x76, High=0x77

Altitude:  [m]

Temperature offset:  [°C]

Note: Offset in units of 0.1 degree Celsius (also correct humidity)

**Data Acquisition**

Send to Controller: ☒

Interval:  [sec]

**Values**

#	Name	Formula	Decimals
1	<input type="text" value="t1"/>	<input type="text"/>	<input type="text" value="2"/>
2	<input type="text" value="h1"/>	<input type="text"/>	<input type="text" value="2"/>
3	<input type="text" value="p1"/>	<input type="text"/>	<input type="text" value="2"/>

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c) With other sensors, remember that the value entered in the **Values** section **has to correspond to the topics of the available series** on the [mqtt.ats.pl](http://mqtt.ats.pl) website **Series settings**, e.g. *ds1*, *custom1*, etc.

**ENJOY tinyESP!**

Contents of the instructions is regularly checked and if necessary corrected. If the observations errors or inaccuracies, please contact us. It can not be ruled out that, despite best efforts, however, some discrepancies arose. To get the latest version, please contact us or distributors.

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contact details:

**Konsorcjum ATS Sp.J.**

**ul. Mazowieckiego 7G, 26-600 Radom, POLAND**

**tel./fax: +48 48 383 00 30, e-mail: [sales@ledats.pl](mailto:sales@ledats.pl)**

**[www.tinycontrol.eu](http://www.tinycontrol.eu), [www.ledats.pl](http://www.ledats.pl), [www.wirelesslan.pl](http://www.wirelesslan.pl), [www.ats.pl](http://www.ats.pl)**