Smart SPI Controller User Manual

TÜV · CE · FC · RoHS COMPLIANT

Important: Read All Instructions Prior to Installation

Function introduction

OLED panel

Please check the operation voltage of LED strip and confirm the input voltage

SPI LED Controller

PRI:
Uin=5-24VDC
Iin=0.2A Max
SEC:
Uout=SPI Signal

• tc=75℃
TEMP RANGE:-20℃-+50℃

DC power input

DC power output

Connect with digital IC LED lights

DMX512 signal input

DMX512 signal output

Learning button
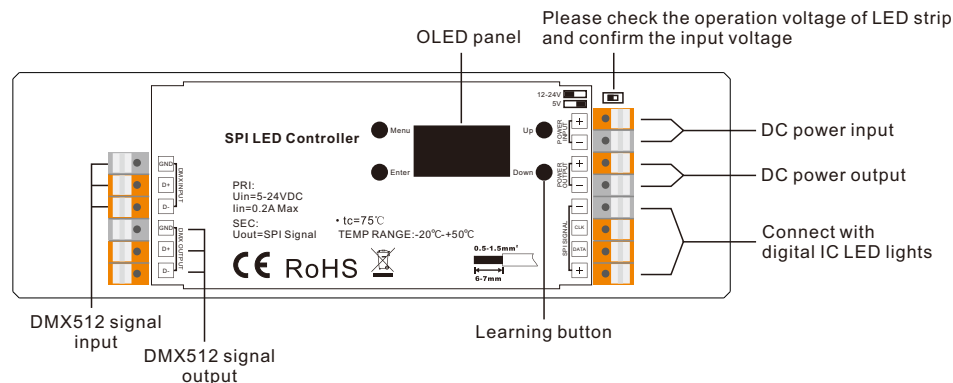
Product Data

Input Voltage	DC5V/DC12-24V
Input Current	0.2A Max.
Input Signal	RF + DMX512
Output Signal	SPI
Radio frequency	869.5/916.5/434MHz
DMX Decoding Channels	512 Channels
Driving Pixels	Max. 3333 (RGB pixels)
Product Dimension	170x53.4x28mm
Working Temperature	-20℃ to 50℃
Waterproof Grade	IP20

• SPI signal output for control of RGB/RGBW pixel lights
• DMX512 controllable and RF remote controllable
• Capable of addressing up to 3333 RGB pixels at the same time
• Addressing up to 170 RGB pixels or 128 RGBW pixels individually
• The built-in, backlit OLED panel allows for easy configuration of most settings
• Four push buttons available for control of the OLED functions
• Supports 44 types of driving IC
• RGB/RGBW color order configurable
• 512 DMX decoding channels
• Support max. 9999 output channels configurable
• 35 built-in sequencing, chasing, changing and static colors under RF mode
• Compatible with a variety of RGB/RGBW RF remotes
• Works with PC interface DMX consoles and sequencing software

Safety & Warnings

• DO NOT install the device with power applied.
• DO NOT expose the device to moisture.

Function Introduction

Menu · MENU Select / >1 set mode / 2 IC conf ig / 3 LED type · Up · Enter · Down
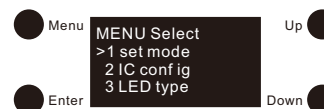
There are four buttons for configuration of settings with the OLED display: "Menu", "Enter", "Up" and "Down", Click "Menu" button to enter the menu selection interface, and keep clicking "Up" and "Down" buttons you will get 5 settings one by one as follows:

Menu · 1 set mode / >1:DMX mode / 2:RF mode · Up · Enter · Down
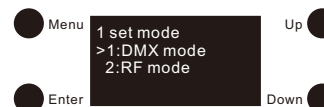
1.Set mode: to select an operation mode, click "Enter" button to enter the configuration interface, then click "Up" and "Down" buttons to choose RF or DMX mode, click "Menu" button to confirm the setting and return to menu selection interface.

Menu · 2 IC config / >1:TM1812 / 2:WS2801 / 3:WS2812 · Up · Enter · Down

2.IC config: to set driving IC type, click "Enter" button to enter the configuration interface, click "Up" and "Down" buttons to choose a IC type that drives your LED lights, click "Menu" button to confirm and return to menu selection interface. Total 44 kinds of driving IC available.

Menu · 3 LED type / >1:RGB / 2:RBG / 3:GRB · Up · Enter · Down
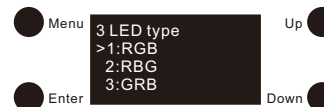
3.LED type: to set RGB/RGBW color order, click "Enter" button to enter the configuration interface, click "Up" and "Down" buttons to choose a color order, click "Menu" button to confirm and return to menu selection interface. Total 7 kinds of color order available.

Menu · 4 DMX address / start: 000 / end: 060 · Up · Enter · Down
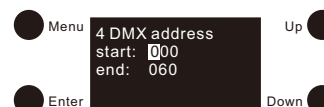
4.DMX address: to set DMX address under DMX mode, click "Enter" button to enter the configuration interface, the cursor will be on the "hundreds" position of the start address, click "Up" and "Down" buttons to change the number, click "Enter" button to confirm and move the cursor to "tens" position and set, then "units" position, and then the end address, and click "Menu" button to confirm the setting and return to menu selection interface.

Menu · 5 Output length / ✱ 9999 · Up · Enter · Down

5.Output length: to configure total output channels, click "Enter" button to enter the configuration interface, the asterisk is on the "thousands" position, click "Up" and "Down" buttons to change the number, click "Enter" button to confirm and move the asterisk to "hundreds" position and set, then "tens" position and "units" position, and click "Menu" button to confirm and return to menu selection interface. The SPI controller supports max. 9999 output channels.

Menu · 6 Group length / ✱ 003 · Up · Enter · Down
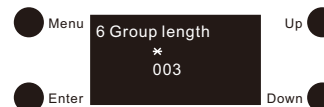
6.Group length: to divide the total output length of pixels into different groups which will be controlled individually and set the controlled pixel quantity within each group under DMX mode.
Click "Enter" button to enter the configuration interface, the asterisk is on the "hundreds" position, click "Up" and "Down" buttons to change the number, click "Enter" button to confirm and move the asterisk to "tens" position and set, then "units" position, and click "Menu" button to confirm and return to menu selection interface.

Set mode

The controller has two working modes: RF and DMX. Follow the instructions to choose a mode you would like. Under RF mode, it converts RF signal to SPI signal, and shall be paired to a RF remote. Under DMX mode, it converts standard DMX signal to SPI signal, and can be controlled by universal DMX consoles.

IC config (Setting Pixel Protocol)

This SPI controller works with all common pixel protocols, make sure that the pixel protocol used by your lights is compatible with the controller. See the exact 44 protocol types supported as follows:

• WS2801	• LPD1101	• TM1804H	• TM1829L	• UCS1912	• UCS6912	• APA104
• WS2803	• LPD6803	• TM1809L	• TM1829H	• UCS2903	• P9813	• SK6812
• WS2811L	• LPD8803	• TM1809H	• TM1834	• UCS2904BL	• D705	• UCS2904
• WS2811H	• LPD8806	• TM1812	• UCS1903L	• UCS2904BH	• TLS3001	• XT1506S
• WS2812	• TM1803	• TM1825L	• UCS1903H	• UCS2909L	• TLS3002	• SM16704BP
• WS2813	• TM1804L	• TM1825H	• UCS1909L	• UCS2909H	• APA102	
• WS2814			• UCS1909H	• UCS2912		
				• UCS6909		

LED type (Setting RGB/RGBW color order)

There are 7 types of RGB/RGBW color order available: RGB, RBG, GRB, GBR, BRG, BGR, RGBW.

DMX address (Setting start and end address)

Under DMX mode, the DMX start address and end address can be set via buttons. The address can be set from 001-512.

For example, when the start address is set as 001, and end address as 003, then the controller will use 3 decoding channels. When the start address is set as 001, and end address as 004, then the controller will use 4 decoding channels.

When the start address is set as 001, and end address is set as 512, then the controller will use 512 decoding channels.

Output length (Setting output channel quantity)

Output length means total output channels or the number of pixels from the start pixel that you would like to address. Each RGB pixel has 3 channels output, and each RGBW pixel has 4 channels output. The controller support max. 9999 output channels.

For example, when the output length is set as 0003, the controller will be capable of addressing 1 RGB pixel, when the output length is set as 0004, the controller will be capable of addressing 1 RGBW pixel.

When the output length is set as 9999, the controller will be capable of addressing 3333 RGB pixels or 2499 RGBW pixels.

Group length (Setting the number of pixels within each Group)

Group length is to divide the total output length of pixels into different groups which will be controlled individually and set the controlled pixel quantity within each group under DMX mode.

For RGB pixels, please set the Group length as multiples of 3, which means the controlled pixel quantity within each group is the multiples, each group will need 3 DMX addresses, please set DMX address range according to the number of groups you would like to divide the total output length to, which means the required DMX channel quantity equals to the number of groups multiplying by 3.

For RGBW pixels, please set the Group length as multiples of 4, which means the controlled pixel quantity within each group is the multiples, each group will need 4 DMX addresses, please set DMX address range according to the number of groups you would like to divide the total output length to, which means the required DMX channel quantity equals to the number of groups multiplying by 4.

Under RF mode, if you use multiple receivers, you have two choices:

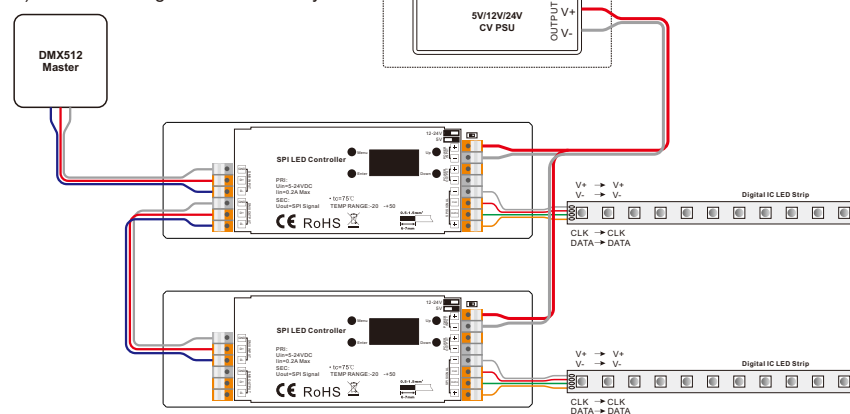Option 1: have all the receivers in the same zone, like zone 1

Zone 1   RF remote

Option 2: have each receiver in a different zone, like zone 1, 2, 3 or 4

Zone 1   Zone 2   Zone 3   RF remote
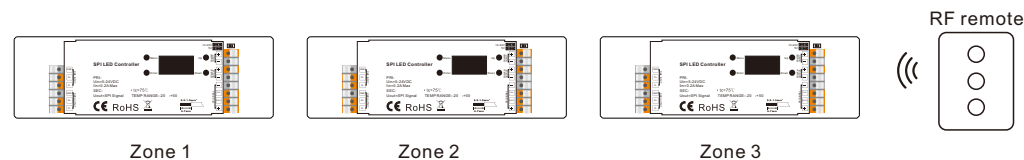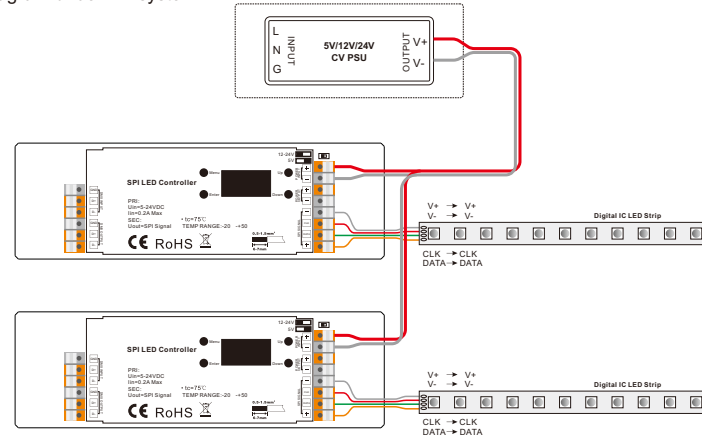
Wiring Diagram

1)Connection diagram under DMX system
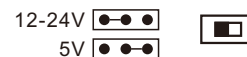

2)Connection diagram under RF system

Operation

1.Power input

5VDC/12-24VDC voltage can be set by a DIP switch

Please set the correct voltage according to the type of LED pixel to be controlled before wiring

2.SPI signal output

+ is Positive voltage output (voltage depends on input)

CLK is the Clock signal (only used with four wire pixels)

Data is the Data signal (used on all pixels)

- is Negative voltage output (voltage depends on input)

RF Mode

After choosing RF mode and configuration of all settings, click "Menu" button to return to Menu select interface, click it again to show the detailed configuration information.

Menu ● | RF mode
TM1812   RGB
           9999 | Up ●

Enter ● | | Down ●
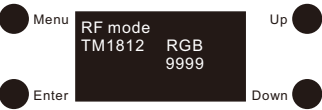
1.Pair to the RF remote

Turn on the RF remote -> Click "Down" button on the SPI controller -> Click any zone button on the remote to select a zone and immediately touch color wheel on the remote -> OLED display of the SPI controller will show "Learning OK" and connected LED lights blink to indicate successful pairing to the zone

2.Delete the pairing

Press and hold down "Down" button on the SPI controller until OLED display shows "Learning Delete" and connected LED lights blink, which means the pairing is deleted successfully

3.Built-in sequences under RF mode

There are 35 built-in sequencing, chasing, changing and static colors under RF mode, and you can play, pause, speed up or down them with a RF remote after successful pairing.

4.Control with a RF remote

Under RF mode, all configured pixels will be addressed by macro mode and can not be addressed individually.

DMX Mode

After choosing DMX mode and configuration of all settings, click "Menu" button to return to Menu select interface, click it again to show the detailed configuration information.

Menu ● | DMX mode
TM1812   RGB
001-060   3060 | Up ●

Enter ● | | Down ●
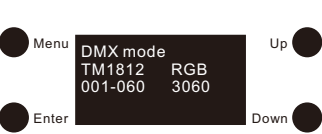
Under DMX mode, the controller is capable of addressing each pixel individually (3 DMX channels for each RGB pixel, 4 DMX channels for each RGBW pixel) or work with macro mode that allows you to address an entire string of RGB/RGBW pixels with just 3/4 DMX channels.

DMX source device (DMX console) and sequencing software (when not used in RF mode with built in sequences.) are required for control under DMX mode.

Set DMX Address & Output Length

Each RGB pixel requires 3 DMX decoding channels, and each RGBW pixel requires 4. Please set the DMX address quantity as a multiple of 3 or 4.

For RGB pixels it's best to set the start address number as 001 or 001 plus a multiple of 3 (004, 007, 010…508) and set the end address as a multiple of 3 and greater than the start address (003, 006, 009…510).

For RGBW pixels it's best to set the start address number as 001 or 001 plus a multiple of 4 (005, 009, 013…509) and set the end address as a multiple of 4 and greater than the start address (004, 008, 012…512).

Each RGB pixel has 3 channels output, and each RGBW pixel has 4. Please set the output length (channels) as a multiple of the previously set DMX address quantity.

When addressing each pixel individually, the DMX channels for output channels of each pixel are as follows:

Addressing Up to 170 RGB Pixels individually

DMX Addresses	Pixel No.	Decoding Channel -> Output Channel
001-003	1st, 171st, 341st,…, 3061st	1 -> R, 2 -> G, 3 -> B
004-006	2nd, 172nd, 342nd,…, 3062nd	4 -> R, 5 -> G, 6 -> B
007-009	3rd, 173rd, 343rd,…, 3063rd	7 -> R, 8 -> G, 9 -> B
010-012	4th, 174th, 344th,…, 3064th	10 -> R, 11 -> G, 12 -> B
…	…	…
508-510	170th, 340th, 510th,…, 3230th	508 -> R, 509 -> G, 510 -> B

Addressing UP to 128 RGBW Pixels individually

DMX Addresses	Pixel No.	Decoding Channel -> Output Channel
001-004	1st, 129th, 257th,…, 2305th	1 -> R, 2 -> G, 3 -> B, 4 -> W
005-008	2nd, 130th, 258th,…, 2306th	5 -> R, 6 -> G, 7 -> B, 8 -> W
009-012	3rd, 131st, 259th,…, 2307th	9 -> R, 10 -> G, 11 -> B, 12 -> W
013-016	4th, 132st, 260th,…, 2308th	13 -> R, 14 -> G, 15 -> B, 16 -> W
…	…	…
509-512	128th, 256st, 384th,…, 2432th	509 -> R, 510 -> G, 511 -> B, 512 -> W

Tables of Changing Modes

NO.	Color	NO.	Color
1	static red	19	7 color I chasing (each color 8 pixels)
2	static green	20	White meteor I (each color 16 pixels fade out, interval 16 pixels of black)
3	static blue	21	RGB meteor (each color 16 pixels fade out, interval 16 pixels of black)
4	static yellow	22	7 color meteor(each color 16 pixels fade out, interval 16 pixels of black)
5	static purple	23	Red and white float
6	static cyan	24	Green and white float
7	static white	25	Blue and white float
8	RGB skipping	26	Red and yellow float
9	7 color skipping	27	Red and purple float
10	RGB strobe	28	Green and yellow float
11	7 color strobe	29	Green and cyan float
12	RGB smooth	30	Blue and purple float
13	7 color smooth	31	Blue and cyan float
14	RGB fade out & fade in	32	Red, yellow and green float
15	7 color fade out & fade in	33	Red, purple and blue float
16	RGB Flow (front color as the background)	34	Green, cyan and blue float
17	7 color Flow (front color as the background)	35	7 color float
18	RGB chasing (each color 8 pixels)		