User Manual

Mesh BLE 5.0 Module

Module No.: BT001

Version: V1.0

Change History:

Version	Description	Prepared By	Date
V1.0	1st Edition		2020/6/27

Content



1 Introduction

BT001 intelligent lighting module is a Bluetooth 5.0 low power module based on TLSR825X chip. The Bluetooth module with BLE and Bluetooth mesh networking function, Peer to peer satellite network communication, using Bluetooth broadcast for communication, can ensure timely response in case of multiple devices.

It is mainly used in intelligent light control. It can meet the requirements of low power consumption, low delay and short distance wireless data communication.

2 Features

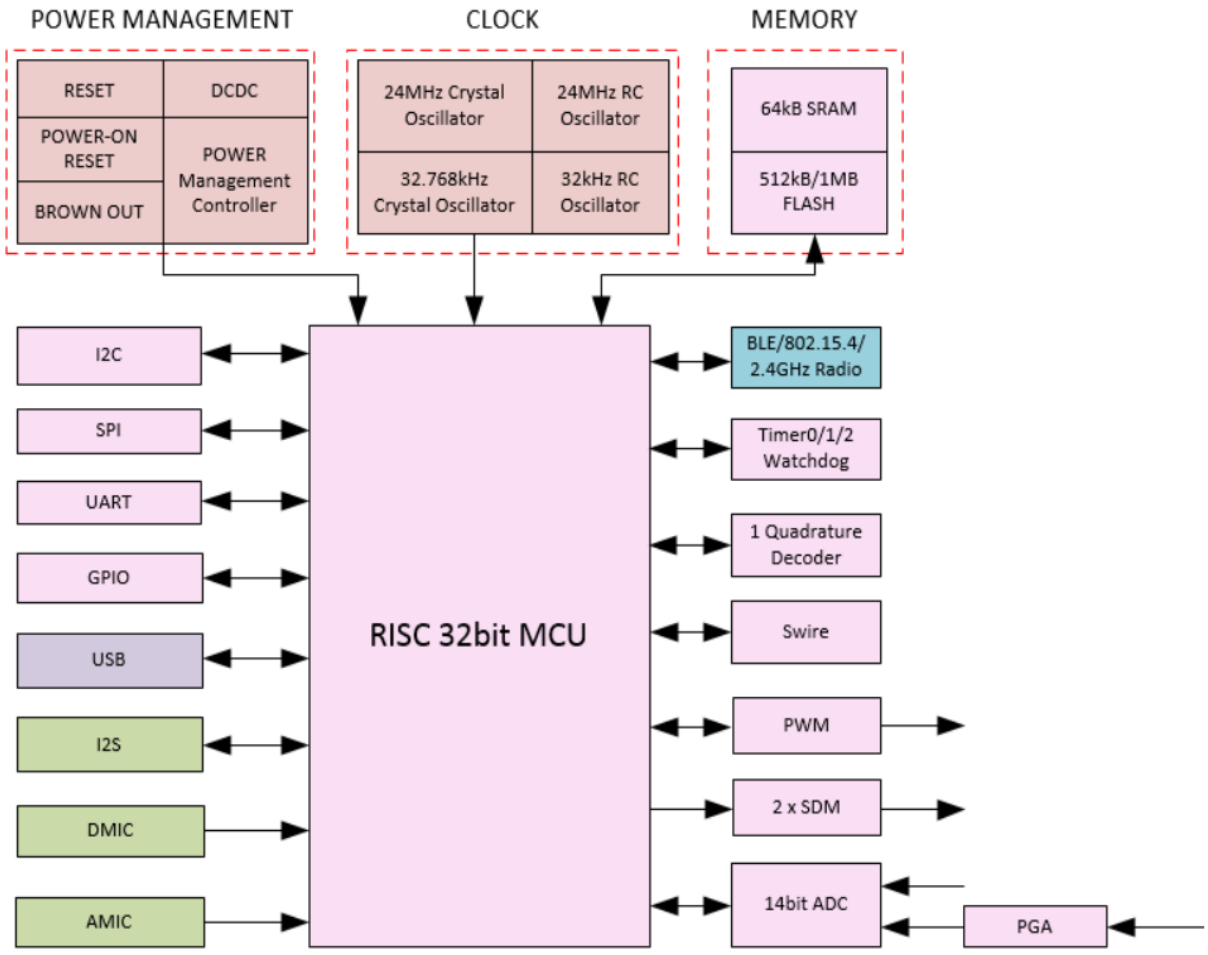
- TLSR825xF512ET system on chip
- Built-in Flash 512KBytes
- Compact size 28 x 12
- Up to 6 channels PWM
- Host Controller Interface (HCI) over UART
- Class 1 supported with 10.0dBm maximum TX power
- BLE 5.0 1Mbps
- Stamp hole patch package, easy to machine paste
- PCB antenna

3 Applications

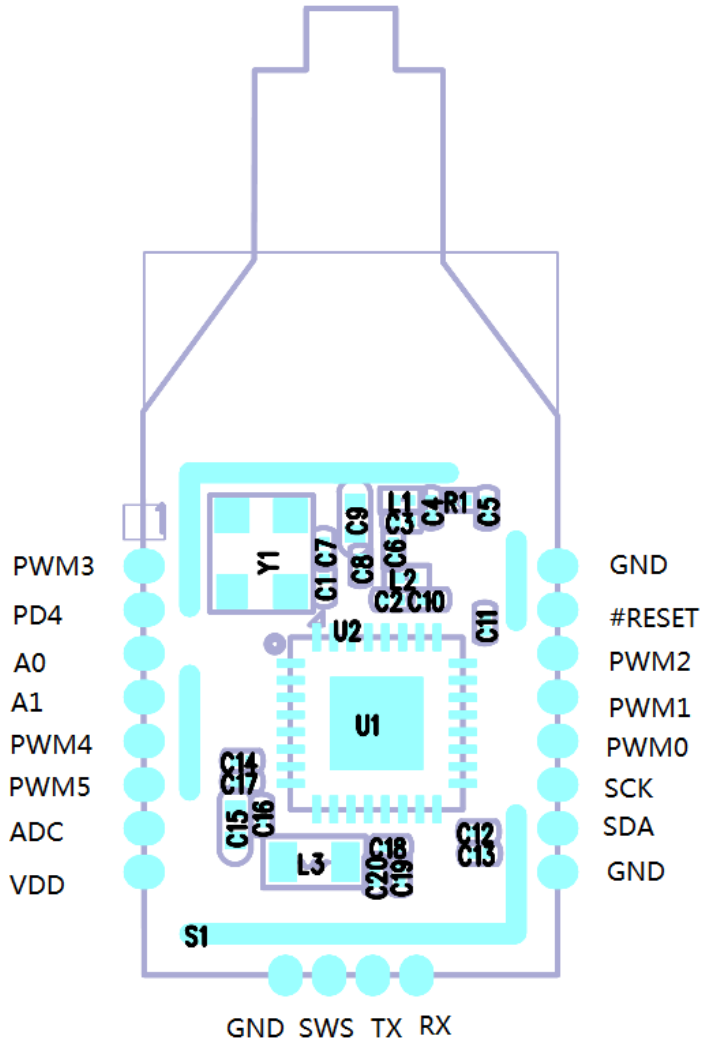
- LED Lighting control
- Smart Devices Switch, Remote Control
- Smart Home

4 Module Diagram

TLS825x SoC diagram



Module Pins Assignments



5 Pins Description

Pin	NAME	I/O	Description	TLSR
1	PWM3	I/O	PWM output	TLSR825x PIN31
2	PD4	I/O	GPIO	TLSR825x PIN1
3	A0	I/O	GPIO	TLSR825x PIN3
4	A1	I/O	GPIO	TLSR825x PIN4
5	PWM4	I/O	PWM output	TLSR825x PIN14

6	PWM5	I/O	PWM output	TLSR825x PIN15
7	ADC	I	A/D input	TLSR825x PIN16
8	VDD	P	Power supply，3.3V/5.4mA	TLSR825x PIN9,18,19
9	GND	P	Ground	TLSR825x PIN7
10	SWS	/	For Software upload	TLSR825x PIN5
11	UART-TX	O	UART TX	TLSR825x PIN6
12	UART-RX	I	UART RX	TLSR825x PIN17
13	GND	P	Ground	TLSR825x PIN7
14	SDA	I/O	I2C SDA/GPIO	TLSR825x PIN20
15	SCK	I/O	I2C SCK/GPIO	TLSR825x PIN21
16	PWM0	I/O	PWM output	TLSR825x PIN22
17	PWM1	I/O	PWM output	TLSR825x PIN23
18	PWM2	I/O	PWM output	TLSR825x PIN24
19	#RESET	I	RESET, low active	TLSR825x PIN25
20	GND	P	Ground	TLSR825x PIN7

6 Electronic Specification

Item	Min	TYP	Max	Unit
RF Specifications				
RF Transmitting Power Level	6.0	8.0	10.0	dBm
RF Receiver Sensitivity	-92	-94	-96	dBm

@FER<30.8%, 1Mbps				
RF TX Frequency tolerance		+/-10	+/-15	KHz
RF TX Frequency range	2402		2480	MHz
RF Channel	CH0		CH39	/
RF Channel Space		2		MHz
AC /DC Characteristics				
Operation Voltage	3.0	3.3	3.6	V
Supply voltage rise time （from 1.6V to 2.8V）			10	ms
Input High Voltage	0.7VDD		VDD	V
Input Low Voltage	VSS		0.3VDD	V
Output High Voltage	0.9VDD		VDD	V
Output Low Voltage	VSS		0.1VDD	V

7 Power Consumption

Operation Mode	**Consumption**
TX current	4.8mA Whole chip with 0dBm
RX current	5.3mA Whole chip
Standby (Deep Sleep) depend on firmware	0.4uA (optional by firmware)

8 Antenna Specification

ITEM	UNIT	MIN	TYP	MAX
Frequency	MHz	2400		2500
V.S.W.R				2.0
Gain(AVG)	dBi		1.0	
Maximum input power	W			1
Antenna type	PCB antenna			
Radiated Pattern	Omni-direc tional			
Impendence	50Ω			

FCC Certification Requirements.

According to the definition of mobile and fixed device is described in Part 2.1091(b), this device is a mobile device.

And the following conditions must be met:

1. This Modular Approval is limited to OEM installation for mobile and fixed applications only. The antenna installation and operating configurations of this transmitter, including any applicable source-based time- averaging duty factor, antenna gain and cable loss must satisfy MPE categorical Exclusion Requirements of 2.1091.

2. The EUT is a mobile device; maintain at least a 20 cm separation between the EUT and the user's body and must not transmit simultaneously with any other antenna or transmitter.

3. A label with the following statements must be attached to the host end product: This device contains FCC ID: 2AGN8-BT001.

5. This module must not transmit simultaneously with any other antenna or transmitter

6. The host end product must include a user manual that clearly defines operating requirements and conditions that must be observed to ensure compliance with current FCC RF exposure guidelines.

For portable devices, in addition to the conditions 3 through 6 described above, a separate approval is required to satisfy the SAR requirements of FCC Part 2.1093

If the device is used for other equipment that separate approval is required for all other operating configurations, including portable configurations with respect to 2.1093 and different antenna configurations.

For this device, OEM integrators must be provided with labeling instructions of finished products. Please refer to KDB784748 D01 v07, section 8. Page 6/7 last two paragraphs:

A certified modular has the option to use a permanently affixed label, or an electronic label. For a permanently affixed label, the module must be labeled with an FCC ID - Section 2.926 (see 2.2 Certification (labeling requirements) above). The OEM manual must provide clear instructions explaining to the OEM the labeling requirements, options and OEM user manual instructions that are required (see next paragraph).

For a host using a certified modular with a standard fixed label, if (1) the module's FCC ID is not visible when installed in the host, or (2) if the host is marketed so that end users do not have straightforward commonly used methods for access to remove the module so that the FCC ID of the module is visible; then an additional permanent label referring to the enclosed module:"Contains Transmitter Module FCC ID: 2AGN8-BT001" or "Contains FCC ID: 2AGN8-BT001" must be used. The host OEM user manual must also contain clear instructions on how end users can find and/or access the module and the FCC ID.

The final host / module combination may also need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device.

The user’s manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the manufacturer could void the user’s authority to operate the equipment.

To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements.