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CM01WTA11M

(BLE/WiFi Combo Module)

USER manual



Revision History

Revision	Date	Descriptions
1.0	2022-05-10	Initial release
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1 General Description

CM01WTA01M (BLE/WiFi Combo module) is a communication module with built-in 802.11 Wi-Fi and Bluetooth functions for digital device applications, and integrates an 802.11n wireless LAN network controller on a single chip based on the Realtek RTL8720CM solution, supporting 2.4GHz WLAN IEEE 802.11 b/g/n MAC/Baseband/Radio and Bluetooth wireless communication functions. In order to exchange operation status and control signals between devices of home appliances products in a wireless communication method, a wireless communication module supporting a short-range digital communication method of a wireless communication method is used.

1.1 Application

- Home appliances
Rice cooker, Induction range, IoT sensor etc

1.2 Features

- WiFi 802.11 b/g/n 1X1, 2.4GHz
- Bluetooth Low Energy(BLE) 4.2
- Serial peripheral interface (master and slave modes)
- Compact dimension: 3 5 mm x 20 mm / H max: 4. 8 mm
- Host Interfaces: UART Interface
- RoHS compliant

1.3 Picture



Figure 1-1 Module Picture

2 Dimension, Pin Assignments, Pictures

2.1 Dimension

- L X W X H = 20.0 x 35.0 x 4.8mm

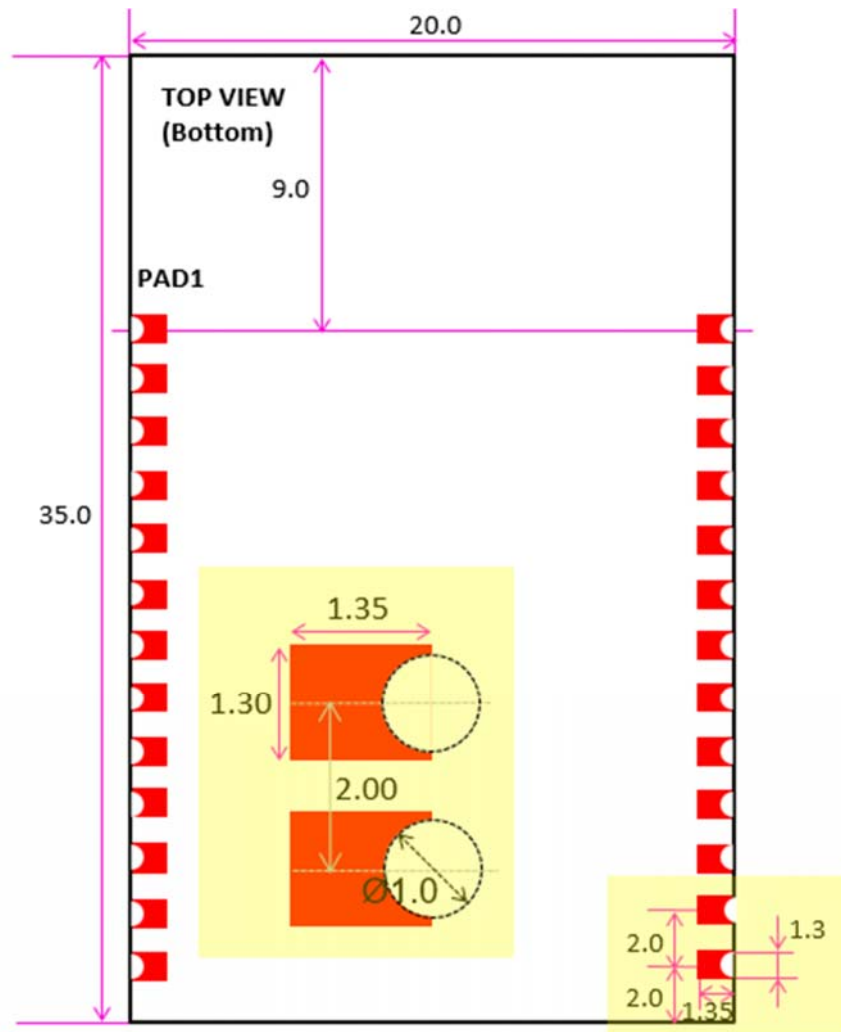


Figure 4-1 Module Dimension

Parameter	Condition s	Min.	Nom.	Max.	Unit
Dimension (Module)					
X	-	19.7	20	20.3	mm
Y	-	29.7	35	35.3	mm
Height	-	-	4.8	-	mm

2.2 Pin Assignments

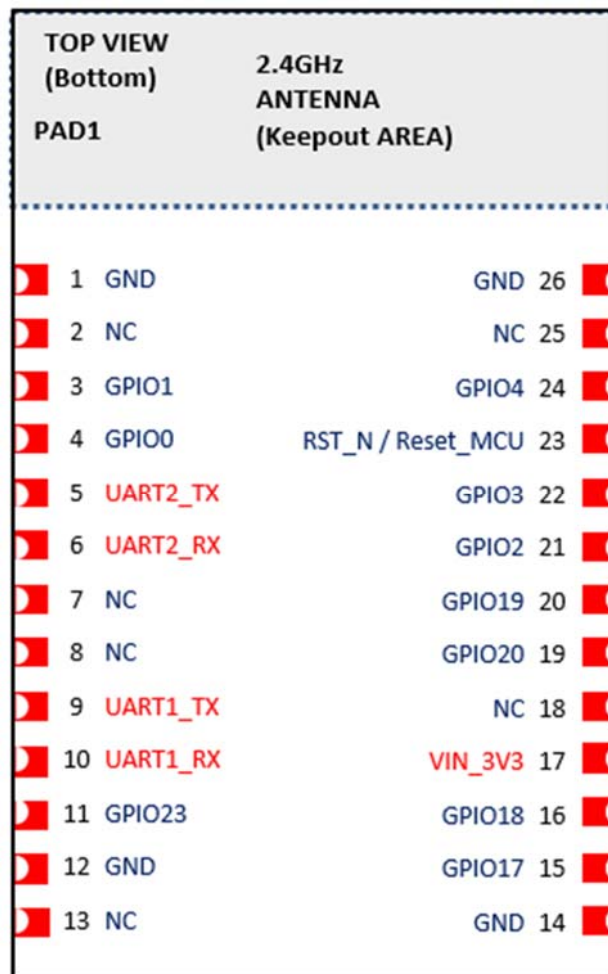
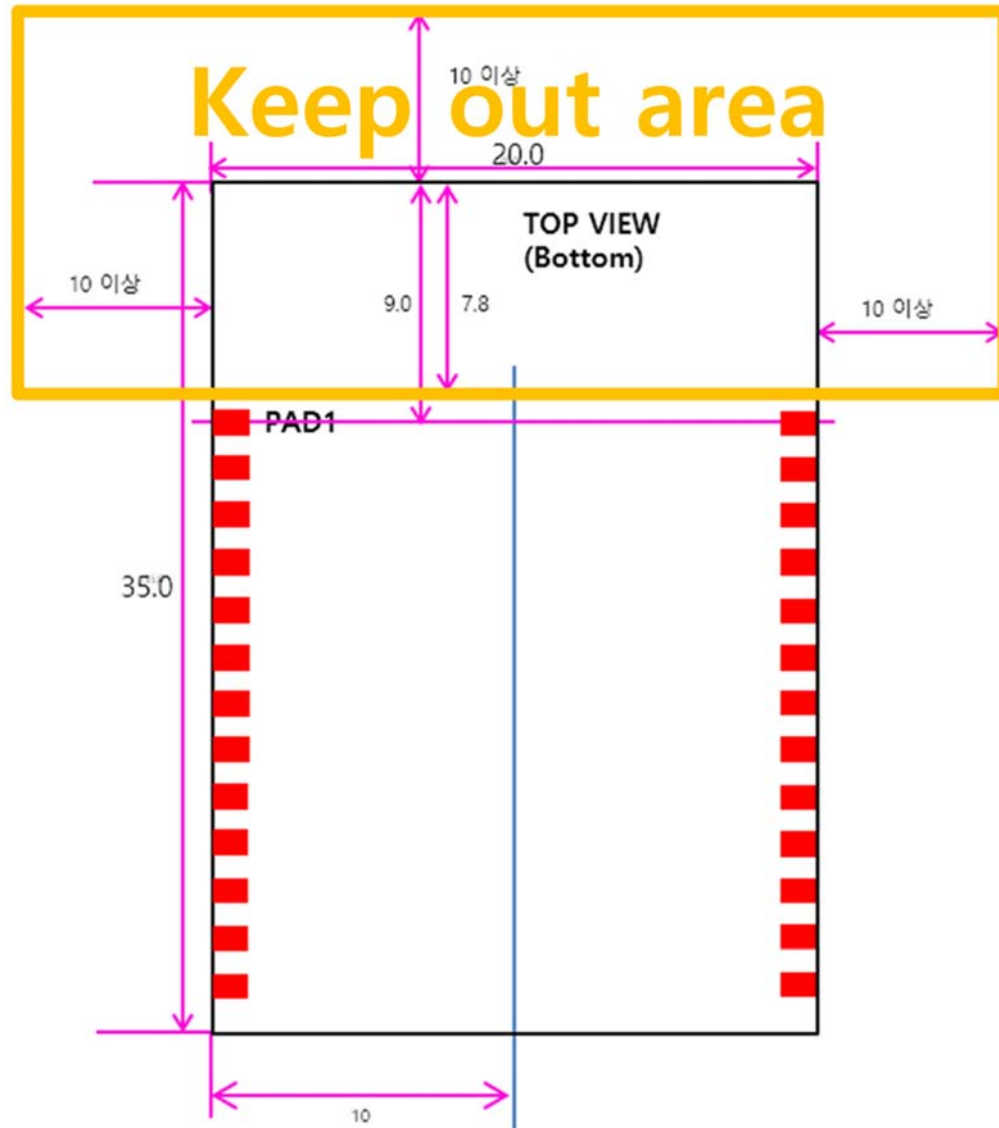


Figure 4-4 Interface UART Pin Assignments (Top View)

No.	Pin Name	Description	Type
9	UART1_TX	UART Interface TX	O
10	UART1_RX	UART Interface RX	I
5	UART2_TX	UART Debug TX	O
6	UART2_RX	UART Debug RX	I
17	VIN_3V3	+3.3V Power supply(2.97V ~3.63V)	P

2.3 Application design guide



Electrical Characteristics

3.1 Absolute Maximum Ratings

Symbol	Parameter	Min.	Norm.	Max.	Unit
VIN	DC supply voltage	2.97	3.3	3.63	V

3.2 Power Consumption

3.2.1 WiFi mode

Parameter	Conditions	Min.	Nom.	Max.	Unit
WiFi Tx mode (Max. current)					
802.11b(2.4GHz)	18dBm Tx Power			250	mA
802.11g(2.4GHz)	15dBm Tx Power			213	
802.11n(2.4GHz)_20MHz	14dBm TX Power			205	
802.11b(2.4GHz)	20dBm Tx Power			288	mA
802.11g(2.4GHz)	17dBm Tx Power			234	
802.11n(2.4GHz)_20MHz	16dBm TX Power			222	

3.2.2 WiFi Rx mode (Max. current)

802.11b(2.4GHz)	-60dBm Input Power			50	mA
802.11n(2.4GHz)_20MHz	-60dBm Input Power			53	

3.2.3 WiFi mode (Max. current)

All Standby	WiFi mode			33	mA
All Off	WiFi mode			23	
Idle	WiFi mode			51	

3.2.4 Bluetooth mode

Parameter	Conditions	Min.	Nom.	Max.	Unit
BT mode (Type. current)					
BT Tx	BT MP, 4.5dBm Tx Power			131	mA
BT Rx	BLE Central mode			60	
BT ADV	BT Peripheral mode			61	
BT Connection	BT Central mode			61	

3.3 Recommended Operating Conditions

Symbol	Parameter	Conditions	Min.	Nom	Max.	Unit
VIN	DC supply voltage from HOST	-	+2.97	+3.3	+3.63	V
Top	Operating temperature(Ambient)	-	-20	-	+85	°C

3.4 Environmental Characteristics

Symbol	Parameter	Conditions	Min.	Max.	Unit
ESD	Electro-static discharge voltage	HBM	-4K	+4K	V
Top	Operating temperature	-	-20	+85	°C
Tstg	Storage temperature	-	-30	+85	°C

3 RF Specifications

All measurements are made under nominal supply voltage, room temperature, and conducted conditions at each antenna port except antenna.

3.1 WLAN Receiver RF Specifications

Parameter	Conditions	Min.	Nom.	Max.	Unit	
Receive input frequency (based on center frequency of channel)						
802.11b/g/n	2.4GHz	2412	-	2472	MHz	
WLAN 2.4GHz Receiver sensitivity						
802.11b	1Mbps DSSS	PER<8%, Packet size= 1,024bytes	-	-99.0	-	dBm
	2Mbps DSSS		-	-95.5	-	dBm
	5.5Mbps DSSS		-	-93.5	-	dBm
	11Mbps DSSS		-	-90.0	-	dBm
802.11g	6Mbps OFDM	PER<10%, Packet size= 1,024bytes	-	-94.0	-	dBm
	9Mbps OFDM		-	-93.0	-	dBm
	12Mbps OFDM		-	-91.5	-	dBm
	18Mbps OFDM		-	-89.0	-	dBm
	24Mbps OFDM		-	-86.0	-	dBm
	36Mbps OFDM		-	-82.5	-	dBm
	48Mbps OFDM		-	-78.0	-	dBm
	54Mbps OFDM		-	-76.5	-	dBm
802.11n (HT20)	MCS0	PER<10%, Packet size= 1,024bytes	-	-93.5	-	dBm
	MCS1		-	-91.0	-	dBm
	MCS2		-	-88.5	-	dBm
	MCS3		-	-85.5	-	dBm
	MCS4		-	-82.5	-	dBm
	MCS5		-	-77.0	-	dBm
	MCS6		-	-75.5	-	dBm
	MCS7		-	-74.0	-	dBm

Maximum input level					
802.11b	PER<8%	-	-	0	dBm
802.11g/n(2.4GHz)	PER<10%	-	-	0	dBm

3.2 WLAN Transmitter RF Specifications

Parameter	Conditions	Min	Nom	Max	Unit
Transmit output frequency (Center frequency of channel)					
802.11b/g/n	2.4GHz	2412	-	2472	MHz
WLAN 2.4GHz Transmit Channel Power*					
802.11b (2.4GHz)	1~11Mbps DSSS	-	16	-	dBm
802.11g (2.4GHz)	6Mbps OFDM	-	14	-	dBm
	54Mbps OFDM	-	14	-	dBm
802.11n (2.4GHz) (HT20)	MCS0	-	13	-	dBm
	MCS7	-	13	-	dBm
EVM(Error Vector Magnitude)					
802.11b (2.4GHz)	1~11Mbps DSSS	-	8	-	%
802.11g (2.4GHz)	6Mbps OFDM	-	-5	-	dB
	54Mbps OFDM	-	-25	-	dB
802.11n (2.4GHz) (HT20)	MCS0	-	-5	-	dB
	MCS7	-	-28	-	dB
Center Frequency tolerance					
802.11b	2.4GHz	-25 (-60)	-	+25	ppm
802.11g	2.4GHz		-	(+60)	(kHz)
802.11n	2.4GHz				
Remarks					
* Transmit Channel Power : Transmit channel power is limited within EIRP limit based on country Regulation in operational mode.					
** EVM :<Test condition>					
. Method: composite EVM method.					
. Number of symbols: 17.					
. Phase correction: Symbol-by-symbol correction.					
. Channel estimation: Raw channel estimate full packet.					
. Symbol timing correction: on.					
. Amplitude tracking: off.					
. Frequency Sync: Long training symbol.					

3.3 Bluetooth RF Specifications

Parameter	Conditions	Min	Typ.	Max	Unit
Frequency Range	2402+K*2MHz (K=0~39)	2402	-	2480	MHz
Receiver					
Sensitivity (PER)	PER ≤30.8%	-	-100	-	dBm
Max received signal	PER ≤30.8%	0	-	-	dBm
Transmitter					
Output Power	Average Power	-	4.5	-	dBm
ICFT		-	-15	-	kHz
Frequency offset	Drift rate	-	2	-	kHz/50us
	Initial drift rate	-	-2	-	kHz

4 Manual

4.1 Interface (UART)

Serial port setup	value
Baud Rate	115,200
Data bits	8bit
Parity bits	-
Stop bits	1bit
Flow control	-

4.2 Module Control (Host → module)

■ Command format: AT<+CMD> [<=parameter>][CR][LF]

■ AT Command list

command	description	response
AT+SEND=XXXXXXX	Data send to server	OK[CR][LF]
AT+RESET	Reset	OK[CR][LF] ATSC=0 ATSC=1
AT+BROADCAST=XXXXXXX	Broadcast BLE advertisement by device name XXXXXXX	
AT+CONNECT	Connect to the server	
AT+OTA_PROD=XXXXXXX	Update Product FW(URL: XXXXXXXX)	
AT+OTA_MOD=XXXXXXX	Update module FW(URL: XXXXXXXX)	
AT+OTA_READY_OK	Host is ready for OTA	
AT+OTA_DONE	OTA completion confirmed	

AT+PRODINFO=XXXX	Set product information XXXX	
AT+LCDSEND=XXXXXXX	Set LCD type to XXXXXXXX	
AT+NMAC=?	Get WLAN MAC	OK_XXXX[CR][LF]
AT+RSSI=?	Get RSSI	
AT+MODULEVER=?	Get MODULE version	
AT+LCDVER=?	Get LCD version	
AT+SSID=?	Get SSID	
AT+PWD=?	SET WLAN PASSWORD	

4.3 Commend response (module → Host)

Command response	description	response
OK	success	-
ERROR	Commend fail	
READ=XXXXXX	Rx data from server	OK[CR][LF]
EVENT=TCP_SERVER_CONNECT	Successful sever connection	OK[CR][LF]
EVENT=TCP_SERVER_FAIL	Sever connection fail	
EVENT=TCP_SERVER_DISCONNECT	Sever disconnected	
EVENT=OTA_READY	OTA ready	
EVENT=OTA_START	OTA started	
EVENT=OTA_END	OTA completed	
EVENT=OTA_FAIL	OTA failed	

5 Antenna list

5.1 Antenna selection guide

- 1) Impedance: 50Ω
- 2) Frequency range: 2.4GHz~2.5GHz
- 3) Peak gain: 3.999dBi
- 4) Example antenna
 - KDT-TE-2450TO-03D-RP (Wi-Fi Dual and 2.4GHz /5GHz) for External Tilt



6 FCC Information to User

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution THE GRANTEE IS NOT RESPONSIBLE FOR ANY CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

IMPORTANT NOTE: FCC RF Radiation Exposure Statement This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

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 of the device.

A label must be affixed to the outside of the host product with the following statements:

Product Name: Wi-Fi CAT (Connected Appliance Transceiver) Module

Contains FCC ID: 2AFWN-CM01WTA11M

Module is limited to OEM installation ONLY.

That OEM integrators is responsible for ensuring that the end-user has no manual instructions to remove or install module.

That module is limited to installation in mobile or fixed applications, according to Part 2.1091(b).

That separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations.