VTX-WBM-N12

USER MANUAL

REVISION HISTORY

Version No.	Revised Date	Revised by	Description	Notes
1.0	2019-03-15	Sam	Preliminary User Manual released	Proposal

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1 INTRODUCTION

1.1 DESCRIPTION

VTX-WBM-N12 is a complete WiFi/BT and MCU module which is designed for embedded wireless solution and a cost-effective, low power capabilities high performance MCU in IOT applications.

The module integrates ARM Cortex™-M4 MCU with FPU, clock, WiFi/BT and front end. It is based on Cypress IEEE802.11 b/g/n single-stream. Thus, it can be used to enable wireless connectivity to the simplest existing sensor product with minimal engineering effort.

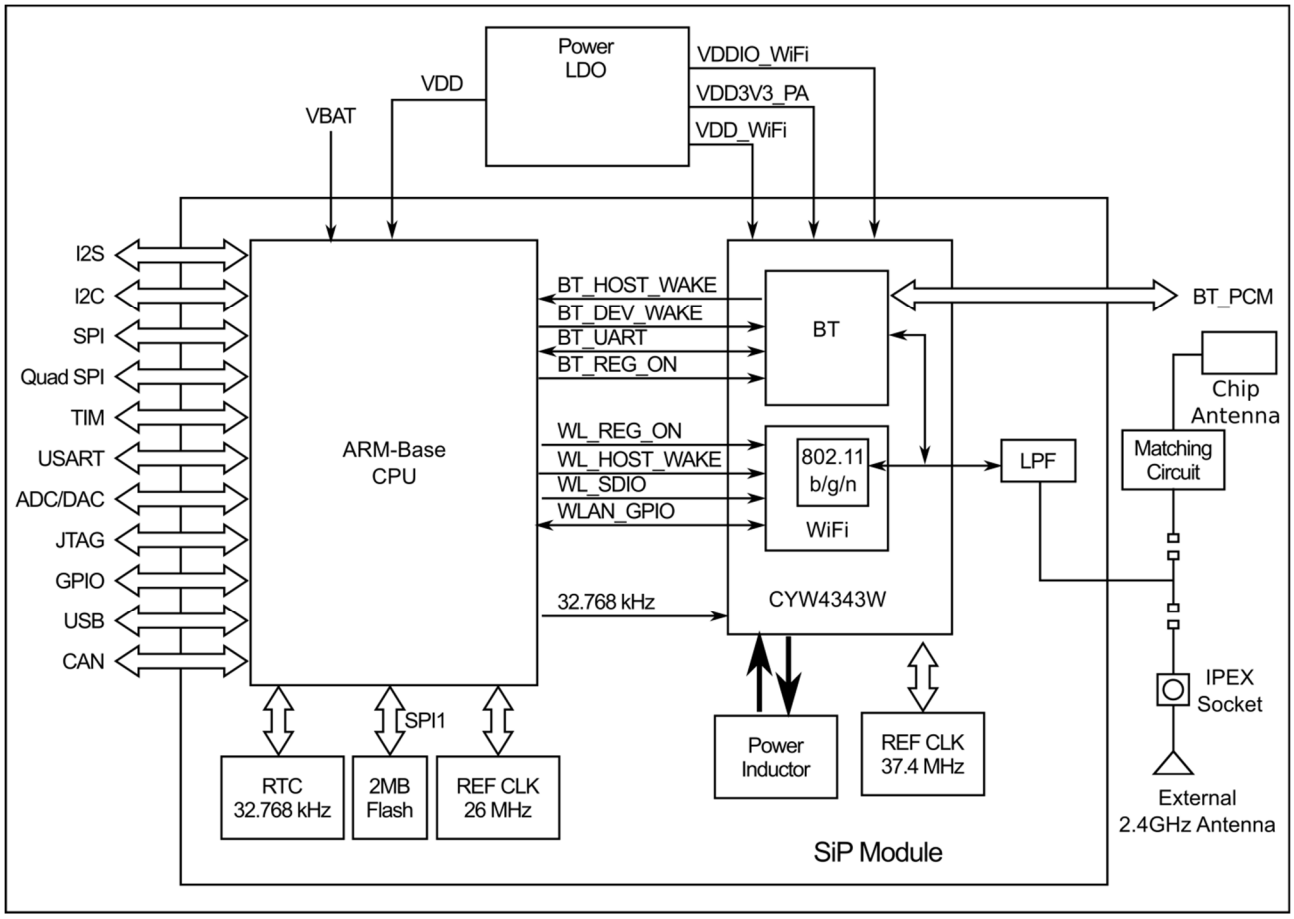
1.2 FEATURES

The module comprises the following functions

■ MCU	STM32 ARM 32-bit Cortex™-M4 Frequency up to 100MHz
■ Memory capacity	1 Mbyte of MCU internal Flash, 256KB of SRAM, 2Mbyte of SPI Flash
■ Diverse serial interface	SPI, Quad SPI (support Dual mode), USART, PCM
■ Sensor applications support	ADC, I2C, I2S, GPIO, Timers
■ Debug interface support	JTAG
■ On-chip functionality Single-chip	MAC/BB/RF
■ Frequency Band	2.4 GHz
■ Network Standard	802.11b, 802.11g, 802.11n (single stream) Bluetooth 2.1 + EDR, Bluetooth 3.0, Bluetooth 4.1 (Bluetooth LowEnergy)
■ Modulation Modes	WiFi: CCK and OFDM with BPSK, QPSK, 16QAM, 64QAM, 256QAM BT: Dual-mode classic Bluetooth and Classic Low Energy operation
■ Hardware Encyption	WEP, WPA/WPA2
■ Supported Data Rates	IEEE 802.11b 1 – 11 Mbps IEEE 802.11g 6 – 54 Mbps IEEE802.11n (2.4 GHz) 7.2 – 150 Mbps

- Advanced 1x1 802.11n features
  - Full/Half Guard Interval
  - Fram Aggregation
  - Space Time Block coding (STBC)
  - Low Density Parity Check (LDPC) Encoding
- Support BT COEX
- BRCM WICED Fully compatible
- Operating Temperature -40℃ to 85℃

2 BLOCK DIAGRAM



ADC	Analog to Digital Converter
DAC	Digital to Analog Converter
I2C	Intelligent Interface Controller
SPI	Serial Peripheral Interface
Quad SPI	Quad Serial Peripheral Interface
USART	Universal synchronous/asynchronous receiver transmitters
TIM	Timers
I2S	Inter-integrated sound
CAN	Controller area network

3 MODULE DESCRIPTION

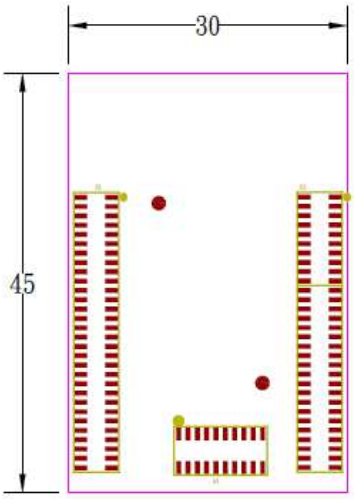
3.1 MODULE APPEARANCE

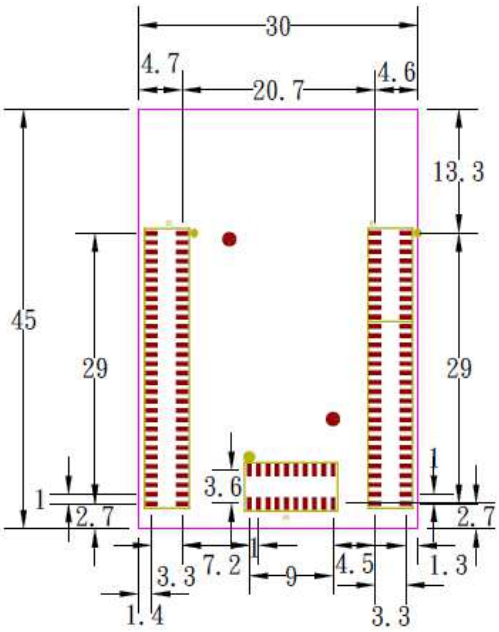
		
Top	Top (with RF shielding)	Bottom

3.2 COMPONENT DESCRIPTION

- J1 External antenna socket
- ANT1 On board chip antenna
- R3 Jump for external antenna using
- R4 Jump for chip antenna using

3.3 DIMENSION





Unit: mm

Top View

4 ADDITION INFORMATION

4.1 I²C INTERFACE

Characteristics

Symbol	Parameter	Standard mode(1)		Fast mode(1)(2)		Unit
		Min	Max	Min	Max	
$t_{w(SCLL)}$	SCL clock low time	4.7	-	1.3	-	µs
$t_{w(SCLH)}$	SCL clock high time	4.0	-	0.6	-	
$t_{su(SDA)}$	SDA setup time	250	-	100	-	ns
$t_{h(SDA)}$	SDA data hold time	0	3450(3)	0	900(4)	
$t_{r(SDA)}$ $t_{r(SDL)}$	SDA and SCL rise time	-	1000	-	300	
$t_{f(SDA)}$ $t_{f(SDL)}$	SDA and SCL fall time	-	300	-	300	
$t_{h(STA)}$	Start condition hold time	4.0	-	0.6	-	µs
$t_{su(STA)}$	Repeated Start condition setup time	4.7	-	0.6	-	
$t_{su(STO)}$	Stop condition setup time	4.0	-	0.6	-	µs
$t_{w(STO:STA)}$	Stop to Start condition time (bus free)	4.7	-	1.3	-	µs
t_{SP}	Pulse width of the spikes that are suppressed by the analog filter for standard fast mode	0	50(5)	0	50(5)	µs
C_b	Capacitive load for each bus line	-	400	-	400	pF

1. Guaranteed by design, not tested in production.
2. f_{PCLK1} must be at least 2MHz to achieve standard mode I²C frequencies. It must be at least 4MHz to achieve fast mode I²C frequencies, and a multiple of 10MHz to reach the 400kHz maximum I²C fast mode clock.
3. The device must internally provide a hold time of at least 300ns for the SDA signal in order to bridge the undefined region of the falling edge of SCL
4. The maximum data hold time has only to be met if the interface does not stretch the low period of SCL signal.

5 WARNING

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.

1. To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.
   (Pour se conformer aux exigences de conformité d'exposition RF de la FCC, une distance de séparation d'au moins 20 cm doit être maintenue entre l'antenne de cet appareil et toutes les personnes.)
2. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
   (Cet émetteur ne doit pas être colocalisé ou fonctionner en conjonction avec une autre antenne ou émetteur.)

This device is intended only for OEM integrators under the following conditions:

1) The antenna must be installed such that 20 cm is maintained between the antenna and users. For laptop installations, the antenna must be installed to ensure that the proper spacing is maintained in the event the users places the device in their lap during use (i.e. positioning of antennas must be placed in the upper portion of the LCD panel only to ensure 20 cm will be maintained if the user places the device in their lap for use) and
2) The transmitter module may not be co-located with any other transmitter or antenna. As long as the 2 conditions above are met, further transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in devices where the antenna may be installed such that 20 cm may be maintained between the antenna and users (for example access points, routers, wireless ASDL modems, certain laptop configurations, and similar equipment). The final end product must be labeled in a visible area with the following: "Contains TX FCC ID: YA3-CPEWIFI01, IC:10186A-CPEWIFI01".

RF Exposure Manual Information That Must be Included

The users manual for end users must include the following information in a prominent location "IMPORTANT NOTE: To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter."

Additional Information That Must be Provided to OEM Integrators

The end user should NOT be provided any instructions on how to remove or install the device.