

AUROS Technology WT1000R 2.4GHz Wi-Fi and BT IoT Module



AUROS Technology WT1000R 2.4GHz Wi-Fi and BT IoT Module User Manual

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AUROS

AUROS Technology WT1000R 2.4GHz Wi-Fi and BT IoT Module



Features

CPU and On-Chip Memory

- ESP32-S3 series of SoCs embedded, Xtensa® dual-core 32-bit LX7 microprocessor, up to 240 MHz
- 384 KB ROM
- 512 KB SRAM
- 16 KB SRAM in RTC
- Up to 8 MB PSRAM

Wi-Fi

- 802.11 b/g/n
- Bit rate: 802.11n up to 150 Mbps
- A-MPDU and A-MSDU aggregation
- 0.4 μ s guard interval support
- Center frequency range of operating channel: 2412 ~ 2462 MHz

Bluetooth

- Bluetooth LE: Bluetooth 5, Bluetooth mesh
- 2 Mbps PHY
- Long range mode
- Advertising extensions
- Multiple advertisement sets
- Channel selection algorithm #2

Peripherals

- GPIO, SPI, LCD interface, Camera interface, UART, I2C, I2S, remote control, pulse counter, LED PWM, USB 1.1 OTG, USB Serial/JTAG controller, MCPWM, SDIO host, GDMA, TWAI® controller (compatible with ISO 11898-1), ADC, touch sensor, temperature sensor, timers and watchdogs

Integrated Components on Module

- 40 MHz crystal oscillator
- Up to 16 MB SPI flash

Antenna Options

- External antenna via a connector

Operating Conditions

- Operating voltage/Power supply: 3.0 ~ 3.6 V
- Operating ambient temperature:
 - 65 °C version: -40 ~ 65 °C
 - 85 °C version: -40 ~ 85 °C
 - 105 °C version: -40 ~ 105 °C

Description

WT1000R is a powerful, generic Wi-Fi + Bluetooth LE MCU module. On top of a rich set of peripherals, the acceleration for neural network computing and signal processing workloads provided by the SoC makes the modules an ideal choice for a wide variety of application scenarios related to AI and Artificial Intelligence of Things (AIoT), such as wake word detection, speech commands recognition, face detection and recognition, smart home, smart appliances, smart control panel, smart speaker, etc. powerful, generic Wi-Fi + Bluetooth LE MCU modules. On top of a rich set of peripherals, the acceleration for neural network computing and signal processing workloads provided by the SoC makes the modules an ideal choice for a wide variety of application scenarios related to AI and Artificial Intelligence of Things (AIoT), such as wake word detection, speech commands recognition, face detection and recognition, smart home, smart appliances, smart control panel, smart speaker, etc.

Pin Definitions

Pin Layout

The pin diagram is applicable for WT1000R but has no keep out zone.

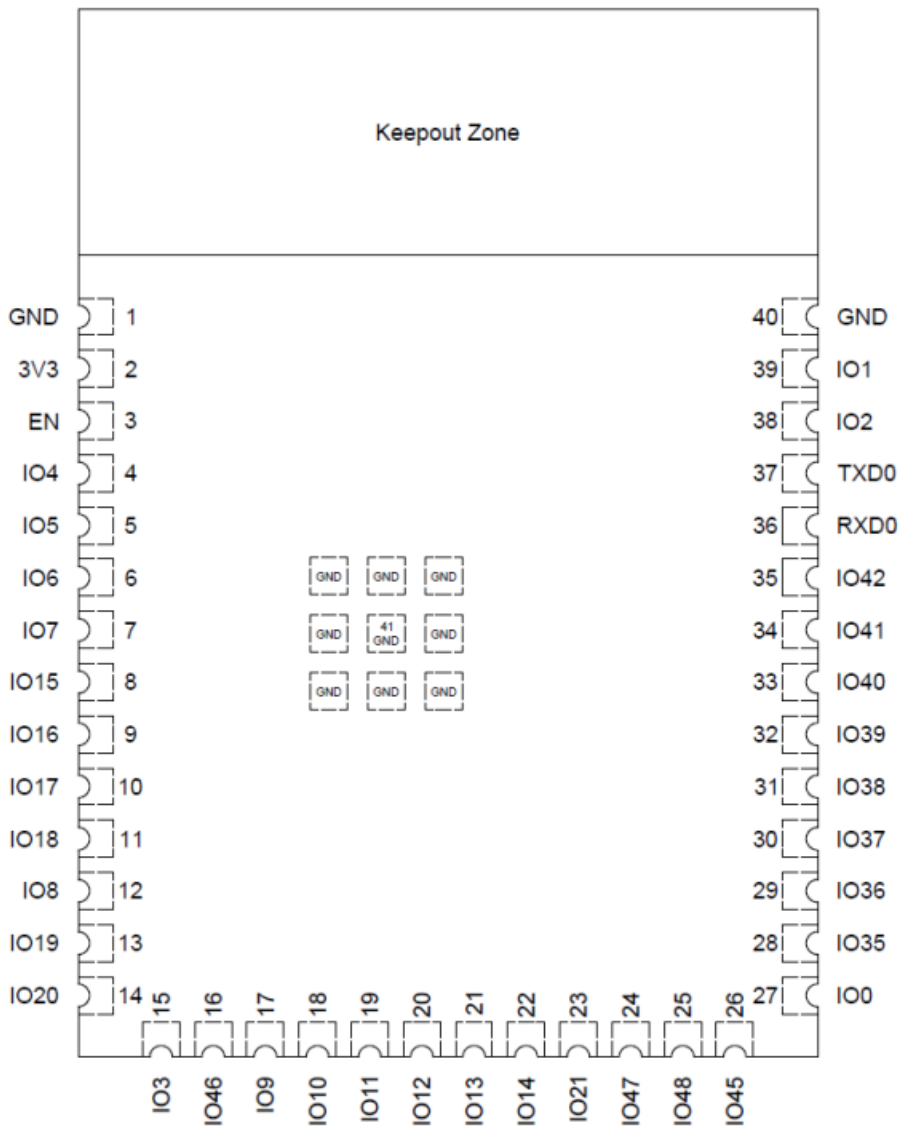


Figure 1: Pin Layout (Top View)

Pin Description

The module has 41 pins. See pin definitions in Table 2.

Table 2: Pin Definitions

Name	No.	Type8	Function
GND	1	p	GND
3V3	2	p	Power supply
EN	3	I	High: on, enables the chip. Low: off, the chip powers off. Note: Do not leave the EN pin floating.
104	4	I/O/T	RTC_GPI04, GPIO4 , TOUCH4, ADC1_CH3
105	5	I/O/T	RTC_GPI05, GPIO5 , TOUCH5, ADC1_CH4
106	6	I/O/T	RTC_GPI06, GPIO6 , TOUCH6, ADC1_CH5
107	7	I/O/T	RTC_GPI07, GPIO7 , TOUCH?, ADC1_CH6
1015	8	I/O/T	RTC_GPI015, GPIO15 , UORTS, ADC2_CH4, XTAL_32K_P
1016	9	I/O/T	RTC_GPI016, GPIO16 , UOCTS, ADC2_CH5, XTAL_32K_N
1017	10	I/O/T	RTC_GPI017, GPIO17 , U1TXD, ADC2_CH6
1018	11	I/O/T	RTC_GPI018, GPIO18 , U1RXD, ADC2_CH7, CLK_OUT3
108	12	I/O/T	RTC_GPI08, GPIO8 , TOUCH8, ADC1_CH7, SUBSPICS1
1019	13	I/O/T	RTC_GPI019, GPI019, U1RTS, ADC2_CH8, CLK_OUT2, USB_D-
1020	14	I/O/T	RTC_GPI020, GPI020, U1CTS, ADC2_CH9, CLK_OUT1, USB_D+
103	15	I/O/T	RTC_GPI03, GPIO3 , TOUCH3, ADC1_CH2
1046	16	I/O/T	GPIO46
109	17	I/O/T	RTC_GPI09, GPIO9 , TOUCH9, ADC1_CH8, FSPIHD, SUBSPIHD
1010	18	I/O/T	RTC_GPI010, GPIO10 , TOUCH10, ADC1_CH9, FSPICSO, FSPII04, SUBSPICSO
1011	19	I/O/T	RTC_GPI011, GPIO11 , TOUCH11, ADC2_CHO, FSPID, FSPII05, SUBSPID
1012	20	I/O/T	RTC_GPI012, GPIO12 , TOUCH12, ADC2_CH1, FSPICLK, FSPII06, SUBSPICLK
1013	21	I/O/T	RTC_GPI013, GPIO13 , TOUCH13, ADC2_CH2, FSPIQ, FSPII07, SUBSPIQ
1014	22	I/O/T	RTC_GPI014, GPIO14 , TOUCH14, ADC2_CH3, FSPIWP, FSPIOQS, SUBSPIWP

1021	23	I/O/T	RTC_GPIO21, GPIO21
1047	24	I/O/T	SPICLK_P_DIFF,GPI047, SUBSPICLK_P_DIFF
1048	25	I/O/T	SPICLK_N_DIFF,GPI048, SUBSPICLK_N_OIFF
1045	26	I/O/T	GPIO45
100	27	I/O/T	RTC_GPIO0, GPIO0
I035b	28	I/O/T	SPII06, GPIO35 , FSPID, SUBSPID
I036b	29	I/O/T	SPII07, GPIO36 , FSPICLK, SUBSPICLK
I037b	30	I/O/T	SPIDQS, GPIO37 , FSPIQ, SUBSPIQ
1038	31	I/O/T	GPIO38 , FSPIWP,SUBSPIWP
1039	32	I/O/T	MTCK , GPI039, CLK_OUT3, SUBSPICS1
1040	33	I/O/T	MTDO , GPI040, CLK_OUT2
1041	34	I/O/T	MTDI, GPI041, CLK_OUT1

Name	No.	Type ^a	Function
IO42	35	I/O/T	MTMS , GPIO42
RXD0	36	I/O/T	U0RXD , GPIO44, CLK_OUT2
TXD0	37	I/O/T	U0TXD , GPIO43, CLK_OUT1
IO2	38	I/O/T	RTC_GPIO2, GPIO2 , TOUCH2, ADC1_CH1
IO1	39	I/O/T	RTC_GPIO1, GPIO1 , TOUCH1, ADC1_CH0
GND	40	P	GND
EPAD	41	P	GND

Engineering Mode

What You Need

To develop applications for the module you need:

- 1 x WT1000R
- 1 x Espressif RF testing board
- 1x USB-to-Serial board
- 1 x Micro-USB cable
- 1 x PC running Linux

In this user guide, we take the Linux operating system as an example.

Hardware Connection

- Solder the WT1000R module to the RF testing board as shown in Figure 2.

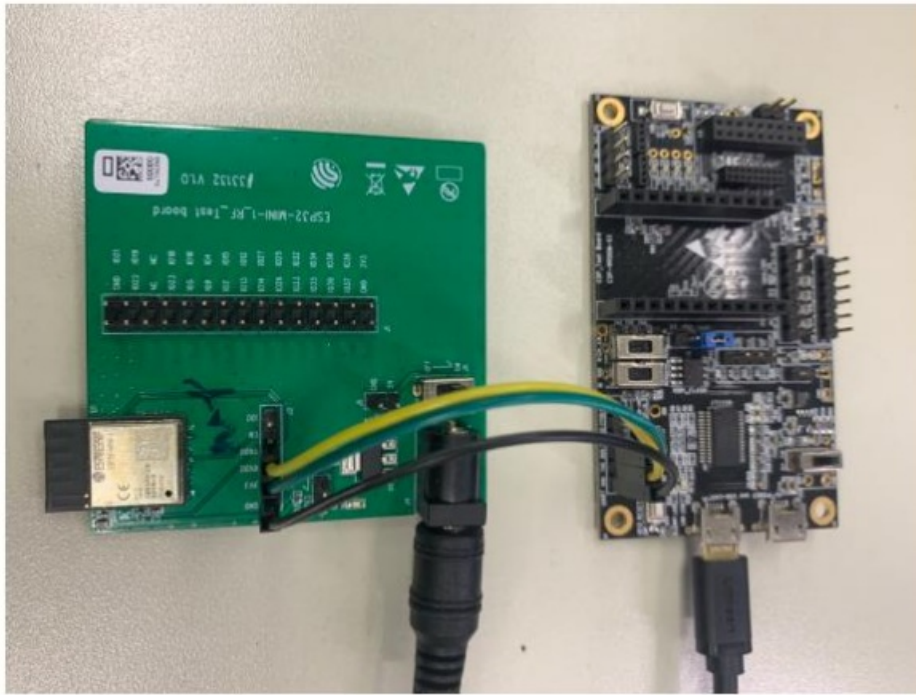


Figure 2: Hardware Connection

- Connect the RF testing board to the USB-to-Serial board via TXD, RXD, and GND.
- Connect the USB-to-Serial board to the PC.
- Connect the RF testing board to the PC or a power adapter to enable 5 V power supply, via the Micro-USB cable.
- During download, connect IO0 to GND via a jumper. Then, turn “ON” the testing board.
- Download firmware into Flash. For details, see the sections below.
- After downloading, remove the jumper on IO0 and GND.
- Power up the RF testing board again. The module will switch to working mode. The chip will read programs from flash upon initialization.

U.S. FCC Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference; and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part15 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 the receiver.

- Connect the equipment to an outlet on a circuit different from that to which the receiver is disconnected.
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter. The antennas 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.

OEM Integration Instructions

This device is intended only for OEM integrators under the following conditions. The module can be used for installation in another host. The antenna must be installed such that 20 cm is maintained between the antenna and users, and the transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the integral antenna(s) that has been originally tested and certified with this module. As long as 3 conditions above are met, further transmitter tests will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirement with this module installed (for example, digital device emission, PC peripheral requirements, etc.) Notice: In the event that these conditions cannot be met (for example certain laptop configuration or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot 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. The final end product must be labelled in a visible area with the following: "Contains FCC ID: 2BC6K-WT1000R".

IC Statement

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

- This device may not cause interference
- This device must accept any interference, including interference that may cause undesired operation of the device

Radiation Exposure

This equipment complies with IC radiation exposure limits set forth for uncontrolled environments. Equipment should be installed and operated with a minimum distance of 20 cm between the radiator & your body.

RSS-247 Section 6.4(5)

The device could automatically discontinue transmission in case of absence of information to transmit, or operational failure. Note that this is not intended to prohibit the transmission of control or signalling information or the use of repetitive codes where required by the technology.

This device is intended only for OEM integrators under the following conditions: (For module device use)

- The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- The transmitter module may not be co-located with any other transmitter or antenna

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or colocation with another transmitter), then the Canada authorization is no longer considered valid and the IC 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 Canada authorization

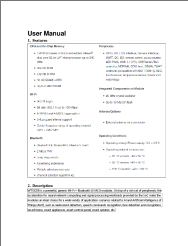
End Product Labeling

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. The final end product must be labeled in a visible area with the following: “Contains IC: 31431-WT1000R”.

Manual Information

To the End User The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warnings as shown in this manual

Documents / Resources



[AUROS Technology WT1000R 2.4GHz Wi-Fi and BT IoT Module \[pdf\] User Manual](#)
 WT1000R, WT1000R 2.4GHz Wi-Fi and BT IoT Module, 2.4GHz Wi-Fi and BT IoT Module, Wi-Fi and BT IoT Module, BT IoT Module, Module

References

- [User Manual](#)

[Manuals+.](#) [Privacy Policy](#)

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