

CyberTAN Technology, Inc.

Model Name	WD114
Description	IEEE 802.11b/g/n 2.4GHz IOE AP/Router Module
Version	Release 0.6
Date	November 12, 2015
Author	Cindy Fan

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WD114 User Manual

Revision History

Date	Release	Author	Description
2015-01-20	0.1	Cindy Fan	First preliminary release.
2015-01-26	0.2	Cindy Fan	Update §3 Specification. §5 Block Diagram.
2015-03-09	0.2a	Cindy Fan	Update §2Features. §5 Block Diagram.
2015-03-11	0.3	Cindy Fan	Update §5 Block Diagram.
2015-06-30	0.4	Cindy Fan	Add §4.2 Pin out Dimensions.
2015-07-09	0.5	Cindy Fan	Refocusing product offer models. Revising temperature range.
2015-11-12	0.6	Cindy Fan	Formatting and clean-up.

Related Documents

Date	Author	Description
		Qualcomm Atheros QCA4531 datasheet
	IEEE.org	IEEE 802.11n 2.4 specifications

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Introduction

The WD114 is a certified WLAN module solution with high performance connectivity capabilities and a versatile user-programmable Linux/OpenWRT software development environment. Qualcomm's leading 2x2 11n technology brings extended range to your feature rich IoE hub, router and or gateway product and is the ideal solution to bridge among multiple protocols and ecosystems, such as ZigBee, Thread, Bluetooth, etc. The module can also discover, connect, communicate and control hundreds of AllJoyn® enabled devices from different manufacturers.

1. Features:

- Full AllJoyn integration client and services implementation
- 802.11n 2x2 improves range and quality of service
- MIPS 24Kc CPU with 650MHz clock
- OpenWRT QSDK and open source ATH9K drivers
- USB2.0 host interface
- DDR2/3 AND SPI flash memory manager
- High speed UART
- Fast Ethernet port
- I²C enables MFI option
- Low cost system BOM
- Integrated LNA and +20 dBm PA
- QFN package and 4 Layer PCB design
- 3.3V external power source
- Advanced power management
- Client-mode optimized power save Wi-Fi™ functionality
- Supports dynamic clocking and CPU off mode
- Commercial and Industrial temperature options
- Customizable GPIOs

2. Typical Applications:

- Smart appliance connectivity modules
- IoE Hubs
- Home automation and energy management “Smart Plug”
- AllJoyn™ always on router nodes
- WiFi™ repeater/range extenders

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3. Specifications

Parameter	Typical Specifications*
Product Type	802.11n hosted IoE module
Memory Sizes	1 x 4Mbit NOR and 1 x 1Gbit NAND SPI flash; 64MB DDR2
Host Interface(s)	UART, GPIO, USB2.0, Ethernet, I2C
Embedded MAC Address	Yes
Main Chip	Qualcomm QCA4531 SOC
Package	14-pin Header Pitch 1.27mm x2
Wireless Standard(s)	IEEE 802.11b/g/n
Spreading	IEEE 802.11b DSSS and 802.11g/n OFDM
Operating Frequency	2412~2483.5MHz ISM band
Antenna	2 - I-PEX RF connectors for external antennas. 1 - optional PCB trace antenna
Number of Channels	11 (US), 13 (EU), 14 (Japan)
Data Rates	2x2 802.11n: up to 300Mbps 802.11g: 54Mbps with fallback to 48, 36, 24, 18, 12, 9 and 6Mbps 802.11b: 11Mbps with fallback to 5.5, 1 and 1Mbps
Modulation Schemes	802.11g/n: 64QAM (up to 300Mbps), 16QAM (39/36/26/24Mbps), QPSK (19.5/18/13/12Mbps), BPSK (9/6.5/6Mbps) 802.11b: CCK (11/5.5Mbps), DQPSK (2Mbps), DBPSK (1Mbps)
Tx Power	20.45 dBm for 802.11b 25.17 dBm for 802.11g 802.11n MCS0 (HT20): 24.88 dBm 802.11n MCS0 (HT40): 18.00 dBm
Rx Sensitivity	-90dBm for 1Mbps @ 8% PER -82dBm for 11Mbps @ 8% PER -74dBm for 54Mbps @ 10% PER -66dBm for HT40, MCS15 @ 10% PER
Media Access Protocol	CSMA/CA with ACK
Supply Power	3.14V to 3.46V
Power	Tx mode: 11Mbps: 400mA 54Mbps: 370mA 65Mbps: 360mA Rx mode: 11Mbps: 220mA 54Mbps: 220mA 65Mbps: 210mA
Dimensions	35 x45 x 6.2 mm (typical)
Regulatory Conformance	EMI: FCC: Part 15b, Part 15c; Europe EN 301 489, EN 300 328 SAFETY: US: UL 60950-1; Europe: EN 60950-1, EN: 50360-1 (SAR); IEC60950-1
RoHS Compliance	Yes
Software Functions	ROM API Support:
MFi support option	MFi footprint

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4.3 Pin Function Descriptions

This section describes signal and function of each pin.

Table 1: Header Pin Function Descriptions

J3 PIN	NAME	Description	Type	J4 PIN	NAME	Description	Type
1	GND	Ground	Ground	1	3.3V	3.3V supply	Power
2	GPIO15	Software configurable	I/O	2	3.3V	3.3V supply	Power
3	NC	NC	NC	3	GND	Ground	Ground
4	I2C_SCL	GPIO16/I2C_SCL	I/O	4	RST_B	Reset B	I
5	I2C_SDA	GPIO17/I2C_SDA	I/O	5	UART_OUT	UART output (uses GPIO10)	O
6	GPIO4	Software configurable	I/O	6	UART_IN	UART input (uses GPIO9)	I
7	GND	Ground	Ground	7	USB_DP	USB D+ Signal; carries USB data to and from the USB 2.0 PHY	I/O
8	GND	Ground	Ground	8	USB_DM	USB D- Signal ; carries USB data to and from the USB 2.0 PHY	I/O
9	TMS	GPIO3/JTAG test mode	I	9	GND	Ground	Ground
10	TDO	GPIO2/JTAG data output	O	10	AVDD20	Ethernet supply voltage	I/O
11	TDI	GPIO1/JTAG data input	I	11	P4_TX-	Ethernet Port TX-	I/O
12	TCK	GPIO0/JTAG Clock	I	12	P4_TX+	Ethernet Port TX+	I/O
13	NC	NC	NC	13	P4_RX-	Ethernet Port RX-	I/O
14	GPIO13	Software configurable	I/O	14	P4_RX+	Ethernet Port RX+	I/O

5. Using the M03H008C.03 Carrier/Test Board

The Carrier/Test Board enables the module user to quickly simulate the module's hardware and software behaviors and prototype the user's final product. A user's manual describing steps to bring up the WD114 board with the carrier/test board is provided separately.

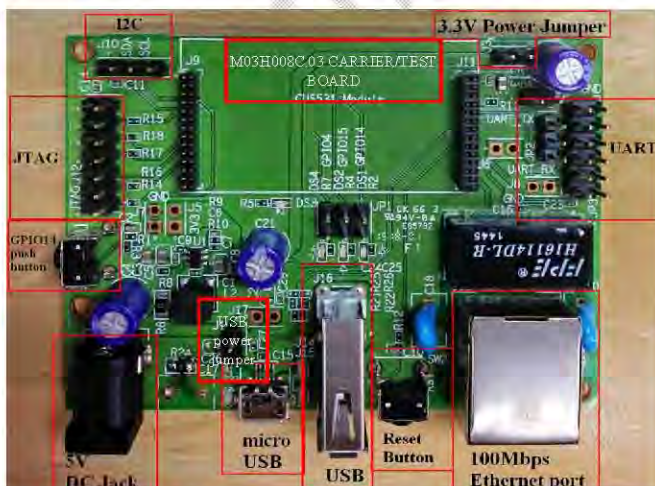


Figure 4: The Carrier/Test Board

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FCC Statement:

Federal Communication Commission Interference Statement

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.

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.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device and its antenna(s) must not be co-located with any other transmitters except in accordance with FCC multi-transmitter product procedures.

Referring to the multi-transmitter policy, multiple-transmitter(s) and module(s) can be operated simultaneously without C2P.

IMPORTANT NOTE:

This module is intended for OEM integrator. The OEM integrator is responsible for the compliance to all the rules that apply to the product into which this certified RF module is integrated.

Additional testing and certification may be necessary when multiple modules are used.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for an population/uncontrolled environment can be satisfied.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: This device complies with Part 15 of 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.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: N89-WD114 ". If the size of the end product is larger than 8x10cm, then the following FCC part 15.19 statement has to also be available on the label: This device complies with Part 15 of 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.

IC Statement:

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

Pour les produits disponibles aux États-Unis / Canada du marché, seul le canal 1 à 11 peuvent être exploités. Sélection d'autres canaux n'est pas possible.

This device and its antenna(s) must not be co-located with any other transmitters except in accordance with IC multi-transmitter product procedures.

Referring to the multi-transmitter policy, multiple-transmitter(s) and module(s) can be operated simultaneously without reassessment permissive change.

Cet appareil et son antenne (s) ne doit pas être co-localisés ou fonctionner en association avec une autre antenne ou transmetteur.

IMPORTANT NOTE:

IC Radiation Exposure Statement:

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé.

Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

This radio transmitter (IC: 5005A-WD114) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (IC: 5005A-WD114) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne.

Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Table for Filed Antenna

Ant.	Brand	Part No.	Antenna Type	Connector	Gain (dBi)	Loss of Cable (dB)	True Gain (dBi)
1	TONGDA	T-543-2020003-2	Dipole	Reversed SMA	5.00	0.70	4.30
2	TONGDA	T-543-2020003-2	Dipole	Reversed SMA	5.00	0.70	4.30
	-	-	Printed	N/A	4.32	-	4.32

Note: The EUT has three antennas (2TX, 2RX).

This module is intended for OEM integrator. The OEM integrator is still responsible for the IC compliance requirement of the end product, which integrates this module.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the IC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. 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.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains IC: 5005A-WD114 "

The Host Model Number (HMN) must be indicated at any location on the exterior of the end product or product packaging or product literature which shall be available with the end product or online.