Moxa 802.11a/b/g/n

WAPN008 User's Manual

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WAPN008 User's Manual

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Introduction

The following topics are covered in this chapter:

- **Overview**
- **Specifications**

Overview

WAPN008 PCI module is designed to provide wireless communication for Moxa industrial wireless products. It communicates via the standard 802.11a/b/g/n protocols on standard 2.4GHz/5GHz and 5GHz DFS channels. The WAPN008 uses the AR9344 SoC Wireless chipset from Atheros.

Specification

Features	WAPN008
Chipset	Atheros AR9344
Baseband Processor (BBP)	- DSSS with DBPSK, DQPSK, CCK - OFDM with BPSK, QPSK, 16QAM, 64QAM - 802.11b: CCK @ 11/5.5 Mbps, DQPSK @ 2 Mbps, DBPSK @ 11 Mbps - 802.11a/g: 64QAM @ 54/48 Mbps, 16QAM @ 36/24 Mbps, QPSK @ 18/12 Mbps, BPSK @ 9/6 Mbps - 802.11n: 64QAM @ 300 Mbps to BPSK @ 6.5 Mbps (multiple rates supported)
security engine	- 64-bit and 128-bit WEP encryption, WPA /WPA2-Personal and Enterprise (IEEE 802.1X/RADIUS, TKIP and AES)
Connectors	Defined BTB connector is using 2x40 pins header, and Support PCI Express standard.
Power requirement	3.3V +/-10%
Dimension	60mm x 60mm x 1.2mm
Operating Temperature	-40 to +80 ℃
Storage Temperature:	-40 to +150℃
Operates in 2.4 and 5 GHz frequency bands.	US: 2.412 to 2.462 GHz (11 channels) 5.180 to 5.240 (4 channels) 5.260 to 5.320 (4 channels) 5.500 to 5.700 GHz (11 channels) 5.745 to 5.825 GHz (5 channels) EU: 2.412 to 2.472 GHz (13 channels) 5.180 to 5.240 (4 channels) 5.260 to 5.320 (4 channels) 5.500 to 5.700 GHz (11 channels) JP: 2.412 to 2.484 GHz (14 channels) 5.180 to 5.240 (4 channels) 5.260 to 5.320 (4 channels) 5.500 to 5.700 GHz (11 channels)
TX Transmit Power:	802.11b: Typ. 26±1.5 dBm @ 1 Mbps, Typ. 26±1.5 dBm @ 2 Mbps, Typ. 26±1.5 dBm @ 5.5 Mbps, Typ. 25±1.5 dBm @ 11 Mbps 802.11g:

	Typ. 24±1.5 dBm @ 6 to 24 Mbps, Typ. 22±1.5 dBm @ 36 Mbps, Typ. 20±1.5 dBm @ 48 Mbps, Typ. 18±1.5 dBm @ 54 Mbps 802.11n (2.4 GHz): Typ. 23±1.5 dBm @ MCS0/8 20 MHz, Typ. 17±1.5 dBm @ MCS7/15 20 MHz Typ. 23±1.5 dBm @ MCS0/8 40 MHz, Typ. 17±1.5 dBm @ MCS7/15 40 MHz 802.11a: Typ. 23±1.5 dBm @ 6 to 24 Mbps, Typ. 21±1.5 dBm @ 36 Mbps, Typ. 20±1.5 dBm @ 48 Mbps,Typ. 18±1.5 dBm @ 54 Mbps 802.11n (5 GHz): Typ. 23±1.5 dBm @ MCS0/8 20 MHz, Typ. 18±1.5 dBm @ MCS7/15 20 MHz Typ. 23±1.5 dBm @ MCS0/8 40 MHz, Typ. 18±1.5 dBm @ MCS7/15 40 MHz
RX Receive Sensitivity:	802.11b: -93 dBm @ 1 Mbps, -93 dBm @ 2 Mbps, -93 dBm @ 5.5 Mbps, -88 dBm @ 11 Mbps 802.11g: -88 dBm @ 6 Mbps, -88 dBm @ 9 Mbps, -85 dBm @ 12 Mbps, -85 dBm @ 18 Mbps, -85 dBm @ 24 Mbps, -82 dBm @ 36 Mbps, -78 dBm @ 48 Mbps, -74 dBm @ 54 Mbps 802.11n (2.4 GHz): -70 dBm @ MCS7 20 MHz, -69 dBm @ MCS15 20 MHz -67 dBm @ MCS7 40MHz, -67 dBm @ MCS15 40 MHz 802.11a: -90 dBm @ 6 Mbps, -88 dBm @ 9 Mbps, -85 dBm @ 12 Mbps, -85 dBm @ 18 Mbps, -81 dBm @ 24 Mbps, -78 dBm @ 36 Mbps, -78 dBm @ 48 Mbps, -72 dBm @ 54 Mbps 802.11n (5 GHz): -69 dBm @ MCS7 20MHz, -71 dBm @ MCS15 20 MHz -66 dBm @ MCS7 40MHz, -68 dBm @ MCS15 40 MHz

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Getting Started

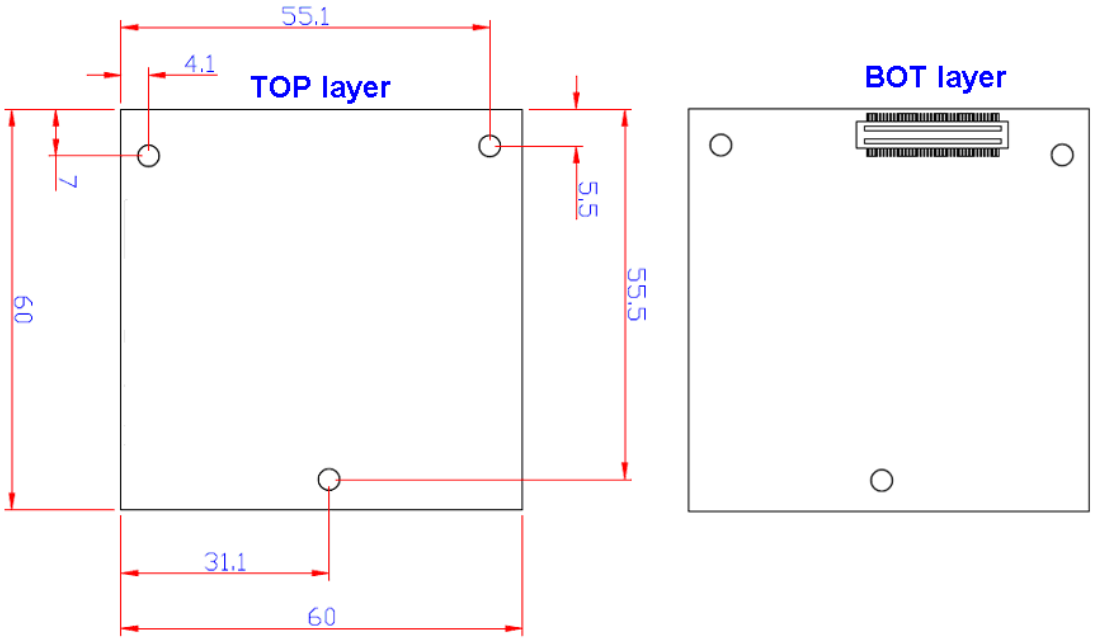
This chapter covers the module layout, and block diagram, hardware installation of the WAPN008. Software installation is covered in the next chapter.

The following topics are covered:

- **Module Layout**
- **Block Diagram**
- **Hardware Installation**
- **Software Installation**

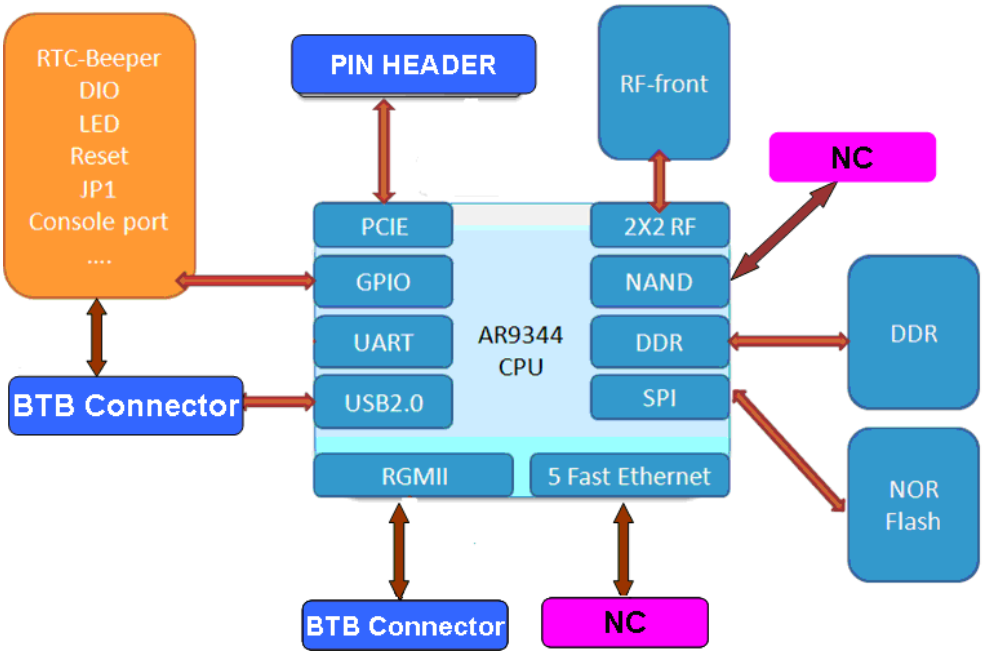
Module Layout

Top and Bottom

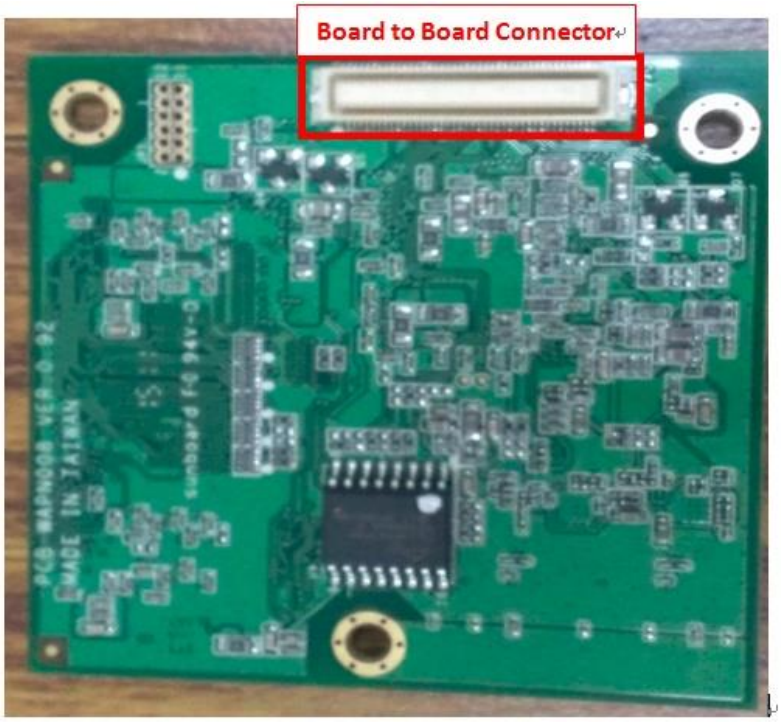


Block Diagram

Below is a block diagram of the WAPN008.



Connector Locations




Antenna 2
Antenna 1

PCI Bus Connector PIN Assignments

Function	Connect to	Pin	Pin	Function	Connect to
3.3v	3.3v	1	2	GND	GND
3.3v	3.3v	3	4	GND	GND
3.3v	3.3v	5	6	ERXD3	PHY RGMII
3.3v	3.3v	7	8	ERXD2	PHY RGMII
3.3v	3.3v	9	10	ERXD1	PHY RGMII
3.3v	3.3v	11	12	ERXD0	PHY RGMII
3.3v	3.3v	13	14	GND	GND
GPIO 16	I2C_SCLK	15	16	GND	GND
GPIO 17	I2C_DATA	17	18	ETX_CLK	ETX_CLK
GND	GND	19	20	GND	GND
GPIO 21	POWER 2	21	22	GND	GND
GPIO 1	JP1 Debug	23	24	ETX_EN	ETX_EN
GND	GND	25	26	GND	GND
GPIO 4	S17_INT	27	28	GND	GND
GND	GND	29	30	ETXD3	PHY RGMII
GPIO 0	I2C_INT0	31	32	ETXD2	PHY RGMII
GND	GND	33	34	ETXD1	PHY RGMII
GPIO 3	UR_DSR	35	36	ETXD0	PHY RGMII
GPIO 9	UR_SIN	37	38	GND	GND
GPIO 10	UR_SOUT	39	40	GND	GND
GPIO 13	MDC	41	42	ERX_CLK	ERX_CLK
GPIO 14	MDIO	43	44	GND	GND
GPIO 20	POWER 1	45	46	GND	GND
GND	GND	47	48	ERX_EN	ERX_EN
GPIO 22	POWER 3	49	50	GND	GND
GND	GND	51	52	GND	GND
GPIO 2	UR_DTR	53	54	EMDC	GIGA PHY
GND	GND	55	56	EMDIO	GIGA PHY
GPIO 11	Reset	57	58	GND	GND
GND	GND	59	60	GND	GND
GPIO 12	LAN 10/100	61	62	TXP0	10/100 LAN
GND	GND	63	64	TXN0	10/100 LAN
GPIO 15	Reserved	65	66	GND	GND
GND	GND	67	68	RXP0	10/100 LAN
SYS_RST_L	GIGA PHY Reset	69	70	RXN0	10/100 LAN
AVDD18	Fast Ethernet bios	71	72	GND	GND
AVDD18	Fast Ethernet bios	73	74	GND	GND
AVDD18	Fast Ethernet bios	75	76	USB_DM	USB port
GND	GND	77	78	USB_DP	USB port
GND	GND	79	80	GND	GND

Hardware Installation

The WAPN008 can be installed into all Moxa wireless system board series.

Step for Installation

1. Install the WAPN008 PCI card on the system board. Apply pressure to both bus connectors and gently press the board onto the stack. The board should slide into the matching bus connectors. Do not attempt to force the board, as this can lead to bent/broken pins.
2. Screw on the WAPN008 PCI card.
3. Screw on the all the necessary chassis.

Software Installation

After physically installing the WAPN008, your operating system must be configured to recognize the new system board.

Step for Installation

1. Apply power to the system board.
2. Connect system board and PC with Ethernet cable.
3. Open a browser and type: 192.168.127.253 to open the system login webpage.
4. Login the webpage with default password: root in order to verify that all of the hardware is install properly.

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.

FCC Caution:

To assure continued compliance, (example - use only shielded interface cables when connecting to computer or peripheral devices) any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
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.

IMPORTANT NOTE:

This module is restricted to mobile configuration. 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 33 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. This transmitter module must not be co-located or operating in conjunction with any other antenna or transmitter

CAUTION:

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

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: SLE-WAPN008 ”

Information for the OEMs and Integrators

The following statement must be included with all versions of this document supplied to an OEM or integrator, but should not be distributed to the end user.
1) This device is intended for OEM integrators only.
2) Please see the full Grant of Equipment document for other restrictions.

This radio transmitter FCCID: SLE-WAPN008 has been approved by FCC 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.

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	MOXA	ANT-WDB-O-2 BK	Dipole	2.9dBi for 2.4 GHz 2.34dBi for 5GHz
2	MOXA	ANT-WDB-ANM-0502	Dipole	4.62dBi for 2.4 GHz 1.41dBi for 5GHz
3	MOXA	ANT-WDB-PNF-1518	Directional Panel	15dBi for 2.4 GHz
4	MOXA	ANT-WDB-ANM-0306	Omni-directional	3.5dBi For 2.4GHz 6.0dBi For 5GHz
5	MOXA	MAT-WDB-CA-RM-2-0205	Omni-directional	2.0dBi For 2.4GHz 5.0dBi for 5 GHz
6	MOXA	MAT-WDB-DA-RM-2-0203-1m	Omni-directional	2.0dBi For 2.4GHz 3.0 Bi for 5 GHz
7	MOXA	ANT-WDB-ARM-0202	Omni-directional	1.8dBi For 2.4GHz 1.8dBi for 5 GHz
8	MOXA	ANT-WSB-AHRM-05-1.5m BK	Omni-directional	5.0dBi For 2.4GHz
9	MOXA	ANT-WDB-ARM-02	Omni-directional	2.0dBi For 2.4GHz 2.0dBi for 5 GHz
10	MOXA	ANT-WDB-ANM-0502	Omni-directional	5.0dBi For 2.4GHz 2.0dBi for 5GHz
11	MOXA	ANT-WSB-ANF-09	Omni-directional	9.0dBi For 2.4GHz
12	MOXA	ANT-WDB-ANF-0407	Omni-directional	4.0dBi For 2.4GHz 7.0dBi for 5 GHz
13	MOXA	ANT-WDB-ANM-0407	Omni-directional	4.0dBi For 2.4GHz 7.0dBi for 5 GHz
14	MOXA	ANT-WDB-ANF-0609	Omni-directional	6.0dBi For 2.4GHz 9.0dBi for 5 GHz
15	MOXA	ANT-WDB-ANM-0609	Omni-directional	6.0dBi For 2.4GHz 9.0dBi for 5 GHz
16	MOXA	ANT-WSB5-ANF-12	Omni-directional	12dBi for 5 GHz

NCC 警語:

經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。

前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

本模組於取得認證後將依規定於模組本體標示審驗合格標籤，並要求最終產品平台廠商(OEM Integrator)於最終產品平台(End Product)上標示" 本產品內含射頻模組，其 NCC 型式認證號碼為:

CCXXxxYYyyyZzW