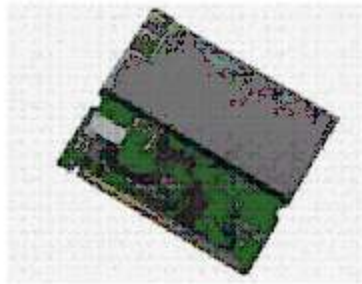


**Super A/G Dual Band  
IEEE 802.11 Wireless Mini-PCI Bus Adapter**

**NL-5354 MP PLUS Aries2**



**User's Manual**

**Rev 1.1**



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## Chapter 1 Introduction

The Dual-Band Wireless A/G Mini PCI bus adapter operates seamlessly and simultaneously in both the 2.4GHz and 5GHz frequency spectrums supporting the 802.11b (2.4GHz, 11Mbps) and the newer, faster 802.11a (5GHz, 54Mbps/108Mbps turbo mode) and 802.11g (2.4GHz, 54Mbps) wireless standards. It's the best way to add wireless capability to your existing wired network, or to add bandwidth to your wireless installation.

To protect your wireless connectivity, the Dual-Band Wireless A/G Mini PCI bus adapter can encrypt all wireless transmissions through 64/128/152-bit WEP data encryption. Dynamic Frequency Selection (DFS) puts your network on the cleanest channel in your location. With the Dual-Band Wireless Mini PCI bus adapter, you will experience the best wireless connectivity nowadays.

## Chapter 2 Hardware Spec

### 2.1 Hardware specification



**Super A/G Dual Band Wireless Mini-PCI Adapter-NL-5354 MP PLUS Aries2**

**\* Product Description :**

- 5GHz/2.4GHz Dual band Mini PCI Adapter
- Super A/G up to 108 Mbps

#### Specifications:

General	
Data Rates (Auto-rate capable)	802.11a: 6, 9, 12, 18, 24, 36, 48, 54, 72, 96 & 108 (Super A) Mbps.  802.11g: 6, 9, 12, 18, 24, 36, 48, 54, 72, 96 & 108 (Super G) Mbps.  802.11b: 1, 2, 5.5, 11Mbps.
Network Standards	WECA (Wi-Fi & Wi-Fi5 compliance), IEEE802.11, IEEE802.11a, IEEE802.11g, IEEE802.11b, draft

	IEEE 802.11e, f, h, and i standards, IEEE802.1x
Compliance	FCC Part 15 Class B / UL, ETSI 300/328/CE
Drivers	Windows 98SE/ME/2000/XP
Operational voltage	3.3 V
Security IP	IEEE802.1x Support for LEAP/PEAP WPA - Wi-Fi Protected Access (AES, 64,128,152- WEP with shared-key Authentication) AES (Advance Encryption Security) Support
<b>RF Information</b>	
Frequency Band	802.11a  - 5.25 - 5.35GHz, - 5.725 - 5.825GHz 802.11b/g - 2.412 - 2.462GHz(US) - 2.412 - 2.484GHz(Japan) - 2.412 - 2.472GHz(Europe ETSI) - 2.457 - 2.462GHz(Spain) - 2.457 - 2.472GHz(France)
Media Access Protocol	CSMA/CA with ACK
Modulation Technology	802.11a/g: OFDM (64-QAM, 16-QAM, QPSK, BPSK) 802.11b : DSSS (DBPSK, DQPSK, CCK)
Receive Sensitivity	802.11a: -89dBm @ 6Mbps, -73dBm @ 48Mbps, -70dBm @ 54Mbps 802.11g: -89dBm @ 6Mbps, -73dBm @ 48Mbps, -70dBm @ 54Mbps 802.11b:



	-93dBm @ 1Mbps, -88dBm @ 11Mbps
Transmit Output Power (Typical)	<p>802.11a:</p> <p>17dBm +/-2 @ 6-24Mbps</p> <p>14dBm +/-2 @ 54Mbps</p> <p>16dBm +/-2 @ 36Mbps</p> <p>15dBm +/-2 @ 48Mbps</p> <p>802.11g:</p> <p>19dBm +/-2dBm @ 6 - 24Mbps</p> <p>17dBm +/-2dBm @ 48 Mbps</p> <p>18dBm +/-2dBm @ 36 Mbps 16dBm +/-2dBm @ 54 Mbps</p> <p>802.11b:</p> <p>19dBm +/-2dBm for all rates</p>
<b>Physical</b>	
Interface	Mini PCI Type III A
Connector	2 x U.FL connectors
Dimensions (HxWxL)	4.8mm x 59.6mm x 50.9mm (0.2in x 2.3in x 2in)
Weight	15 g (0.53 oz.)
<b>Environmental</b>	
Temperature Range	<p>0C to 55C (32F to 131F) - Operating</p> <p>-40C to 70C (-40F to 158F) - Storage</p>
Humidity (non-condensing)	5% - 95% Typical

## Hardware Configuration

### 1. RJ-45 Ethernet connector

Provides 10/100 Mbps connectivity to a wired Ethernet LAN.

### 2. Reset Button

By pressing this button for over 3 seconds, the AP will be reset with factory default configuration.

### 3. Power Supply connector

It is for connecting to the power adapter.

## **Hardware Installation**

1. Configure your notebook or PC with Wireless LAN card.
2. For Wired LAN, connect your PCs' Ethernet port to any AP's LAN port by an Ethernet cable.
3. For WLAN, locate the AP to a proper position.
4. Plug the power cord into a power outlet.

## **2.2 NL-5354 MP PLUS Aries2 Technical Description**

The NL-5354 MP PLUS Aries2 card is made by Senao International Co., Ltd ([www.senao.com](http://www.senao.com)) with datasheet link:

[http://www.senao.com/english/product/product\\_wireless01\\_outdoor\\_1.asp?pgtl=Wireless&tplid=02&tp2id=03&proid=000145](http://www.senao.com/english/product/product_wireless01_outdoor_1.asp?pgtl=Wireless&tplid=02&tp2id=03&proid=000145)

It functions as an 802.11a/g Dual Band Wireless Mini-PCI Adapter. It uses the Atheros AR5002 chipset:

<http://www.atheros.com/pt/AR5002XBulletin.htm>

It includes 2 chips: Atheros AR 5212 Mac controller, and Atheros AR5112 Dual band Radio-on-a-Chip (RoC).

The NL-5354 MP PLUS Aries2 card has functions which are described below:

- Support for IEEE 802.11a, 802.11b, 802.11g
- Universal wireless connectivity for seamless roaming between any 802.11-based network
- Uses digital CMOS technology exclusively, minimizing power consumption and cost while maximizing reliability
- Highly integrated 2-chip set
- 2.4/5 GHz dual band Radio-on-a-Chip (RoC)
- Multiprotocol MAC / baseband processor that supports the RoC
- Wireless Multimedia Enhancements Quality of Service support (QoS)
- Super AG™ mode delivers up to 108 Mbps raw data rate with typical end user throughput exceeding 60 Mbps
- Hardware encryption for the Wi-Fi Protected Access (WPA) and IEEE 802.11i security specifications, provides Advanced Encryption Standard (AES), Temporal Key Integrity Protocol (TKIP) and Wired Equivalent Privacy (WEP) without performance degradation
- Dynamic Frequency Selection/Transmit Power Control (DPS/TPC) for international operation
- Support for draft IEEE 802.11e, h, and i standards
- Enhanced third generation performance, transmission range and reliability

The NL-5354 MP PLUS Aries2 card uses the chipset functions as follows:

## AR5112 Dual band Radio-on-a-Chip (RoC)

- All CMOS dual band radio chip
- Dynamic IF Dual Conversion architecture provides super-heterodyne performance at Zero IF prices
- Support for IEEE 802.11a, 802.11b, 802.11g
- Operates from 2.3-2.5 GHz and 5.25-5.850 GHz
- Integrated third-generation power amplifier (PA) and low-noise amplifier (LNA)
- External PA and/or LNA can be used for special applications
- Eliminates all IF filters and most RF filters; no external voltage-controlled oscillators (VCOs) or surface acoustic wave (SAW) filters needed
- Increased sensitivity and multipath tolerance
- Enhanced transmit and receive chains

## AR5212 Multiprotocol MAC/baseband processor

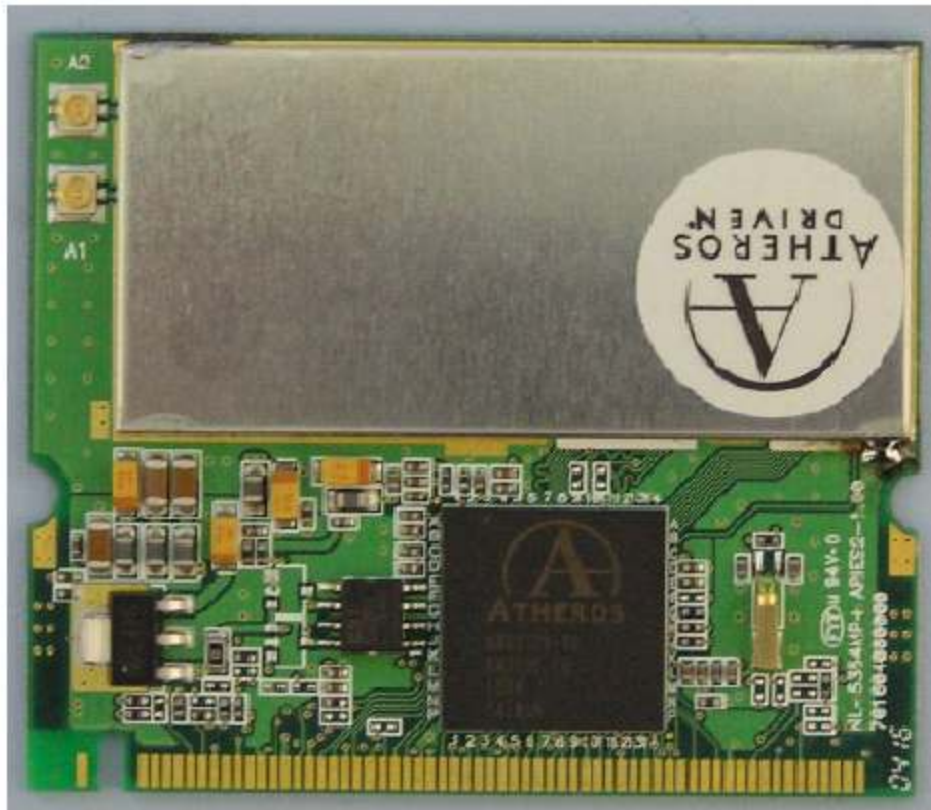
- Supports both 2.4 GHz and 5 GHz RoCs
- Super A/G™ mode includes dynamic 108 Mbps capability, real-time hardware data compression, dynamic transmit optimization and standards-compliant bursting
- No external FLASH or RAM memory needed
- PCI 2.3 and PC Card 7.1 host interfaces with DMA support
- Integrated analog-to-digital and digital-to-analog converters
- Serial EEPROM, LEDs, GPIOs peripheral interfaces
- Low power operational and sleep modes.

## 2.3 Installation Information

The card has 2 U.FL RF connectors for antenna diversity.

The A2 is for both transmission and receiving, but the A1 is for receiving only. The A1 and A2 support 802.11a, b, g in auto-switch inside the chipset.





## Chapter 3 Driver Information:

The software driver can be downloaded from the link below:

[http://www.senao.com/english/product/product\\_load\\_w.asp?http=1&proid=000145](http://www.senao.com/english/product/product_load_w.asp?http=1&proid=000145)

## Chapter 4 FCC and Regulatory Control Information

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.

### Radio Frequency Interference Requirements:

This device complies with Part 15 of FCC Rules and Canada RSS-210. Operation is subject to the following conditions:

1. This device may not cause harmful interference.



2. This device must accept any interference received, including interference that may cause undesired operation.
3. This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

### **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:

We declare that **NL-5354 MP Plus Aries2** (Atheros 11a/g Mini PCI Bus Adapter) is limited in CH1~CH11 by specified firmware controlled in the USA.

### **IMPORTANT NOTE:**

#### **FCC Radiation Exposure Statement:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This device complies with FCC RF Exposure limits set forth for an uncontrolled environment, under 47 CFR 2.1093 paragraph (d)(2).

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.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This module is restricted to the described / contained herein 3eTI application(s). The module is for OEM installation only and cannot be sold to end user directly.

### **Antenna Information:**

*Only the antenna types listed below can be used:*

Antenna 1: 8dbi omni directional antennas for 802.11a

Antenna 2: 5dbi omni directional antennas for 802.11g/b  
Antenna 3: 14dbi directional antennas for 802.11g/b

**This module must be labeled with FCC ID.**

If the FCC ID is not visible when the module is installed inside another device, then the outside of device must also display a label referring to the enclosed module. The exterior label can be “ **Contains Transmitter Module FCC ID:QVT-WLAN-MP1** ” or similar wording.

## Appendix A Regulatory Compliance Information

### 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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

### IMPORTANT NOTE:

#### FCC Radiation Exposure Statement:

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

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

The antenna must be installed such that 20 cm is maintained between the antenna and users. As long as condition above is met, further transmitter test 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 device where the antenna may be installed such that 20 cm may be maintained between the antenna and users (for example: Access Point, Router). The final end product must be labeled in a visible area with the following: "Contains TX FCC ID: **QVT-WLAN-MP1**".

#### **Manual Information That Must be Included**

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 users manual of the end product which integrate this module. The users manual for OEM integrators 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".