

AWK-3121

Quick Installation Guide

Moxa AirWorks

Fifth Edition, March 2012

MOXA[®]

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P/N: 1802031210013

Overview

Moxa's AWK-3121 Access Point/Bridge/AP Client is ideal for applications that are hard to wire, too expensive to wire, or use mobile equipment that connects over a TCP/IP network. The AWK-3121 is rated to operate at temperatures ranging from -25 to 60°C for standard models and -40 to 75°C for extended temperature models, and is rugged enough for any harsh industrial environment. Installation is easy, with either DIN-Rail mounting or distribution boxes. The DIN-Rail mounting ability, wide operating temperature range, and IP30 housing with LED indicators make the AWK-3121 a convenient yet reliable solution for any industrial wireless application.

Package Checklist

Moxa's AWK-3121 is shipped with the following items. If any of these items is missing or damaged, please contact your customer service representative for assistance.

- 1 AWK-3121
- 2 Dual-band Omnidirectional Antennas (2dBi, RP-SMA, 2.4&5GHz)
- 1 Quick Installation Guide
- 1 Software CD
- 1 Moxa Product Warranty Booklet
- 1 Cable Holder with a Screw
- 2 Protective Caps

Installation and Configuration

Before installing the AWK-3121, make sure that all items in the Package Checklist are in the box. In addition, you will need access to a notebook computer or PC equipped with an Ethernet port. The AWK-3121 has a default IP address that you must use when connecting to the device for the first time.

Step 1: Select the power source

The AWK-3121 can be powered by a DC power input or PoE (Power over Ethernet). The AWK-3121 will use whichever power source you choose.

Step 2: Connect the AWK-3121 to a notebook or PC

Since the AWK-3121 supports MDI/MDI-X auto-sensing, you can use either a straight-through cable or crossover cable to connect the AWK-3121 to a computer. If the LED indicator on the AWK-3121's LAN port lights up, it means the connection is established.

Step 3: Set up the computer's IP address

Set an IP address on the same subnet as the AWK-3121. Since the AWK-3121's default IP address is 192.168.127.253, and the subnet mask is 255.255.255.0, you should set the IP address of the computer to 192.168.127.xxx and subnet mask to 255.255.255.0.

Step 4: Use the web-based manager to configure

AWK-3121

Open your computer's web browser and then type **http://192.168.127.253** in the address field to access the homepage of the web-based management. Before the homepage opens, you will need to enter the user name and password. For first-time configuration, enter the default user name and password and then click on the **Login** button:

User name: **admin**

Password: **root**



ATTENTION

For security reasons, we strongly recommend changing the password. To do so, select **Maintenance** → **Password**, and then follow the on-screen instructions.

Step 5: Select the operation mode for the AWK-3121

By default, the AWK-3121's operation mode is set to AP. You can change the setting in **Wireless Settings** → **Basic Wireless Settings** if you would like to use the Client mode.

NOTE To make the change effective, you must click Save Configuration to save the change or Restart (Save and Restart button to apply all changes.

Step 6: Test communications

We will describe two test methods. Use the first method if you are using only one AWK-3121, and use the second method if you are using two or more AWK-3121s.

Testing method for one AWK-3121

If you are only using one AWK-3121, you will need a second notebook computer (B) equipped with a WLAN card. Configure the WLAN card to connect to the AWK-3121 (the default SSID is **MOXA**) and change the IP address of notebook B so that it is on the same subnet as the first notebook (A), which is connected to the AWK-3121.

After configuring the WLAN card, establish a wireless connection with the AWK-3121 and open a DOS window on notebook B. At the prompt, type

ping IP address of notebook A

and then press the **Enter** key. A "Reply from IP address ..." response means the communication was successful. A "Request timed out." response means the communication failed. In this case, recheck the configuration to make sure the connections are correct.

Testing method for two or more AWK-3121s

If you have two or more AWK-3121s, you will need a second notebook computer (B) equipped with an Ethernet port. Use the default settings for

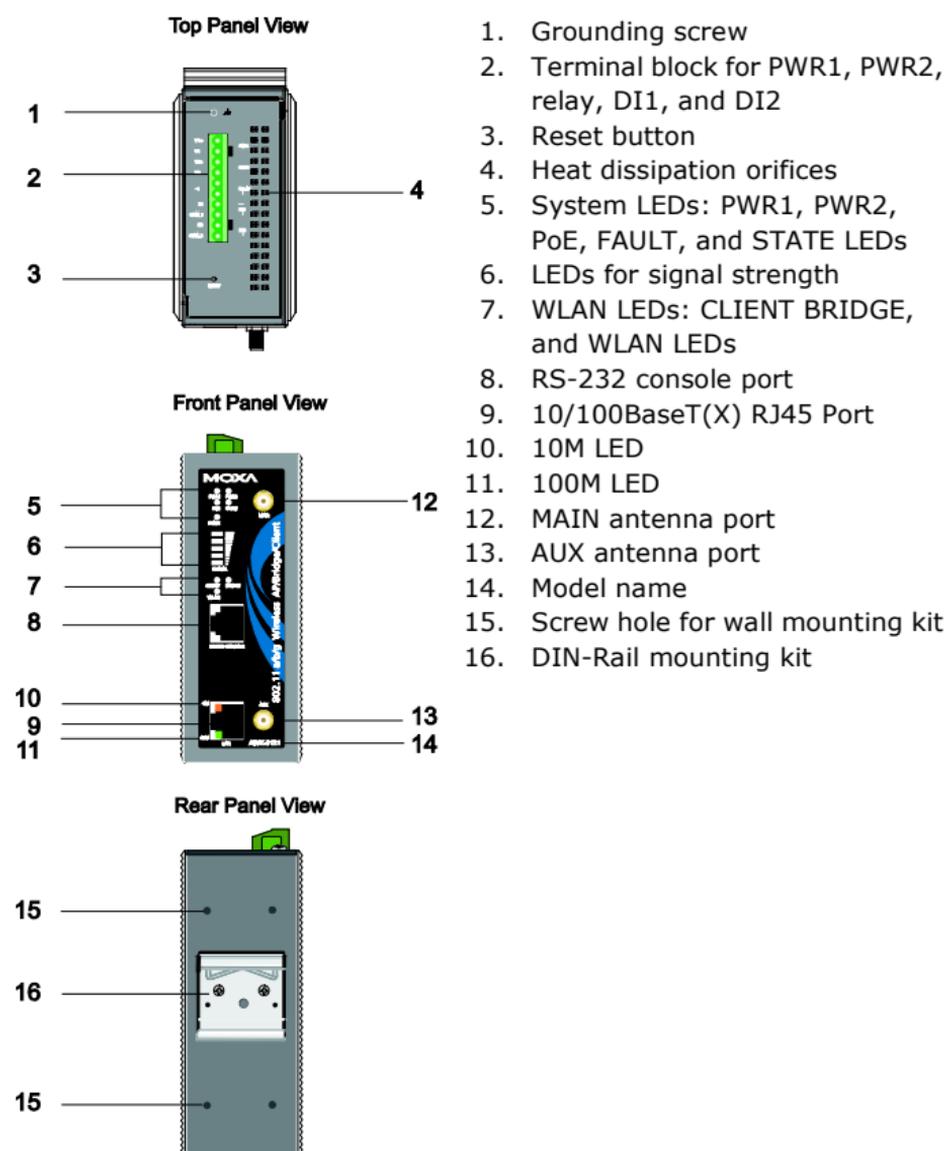
the first AWK-3121 connected to notebook A, and change the second or third AWK-3121 connected to notebook B to Client mode and then configure the notebooks and AWK-3121s properly.

After setting up the testing environment, open a DOS window on notebook B. At the prompt, type

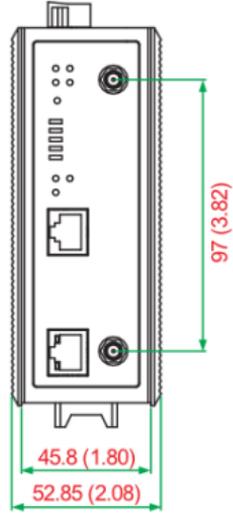
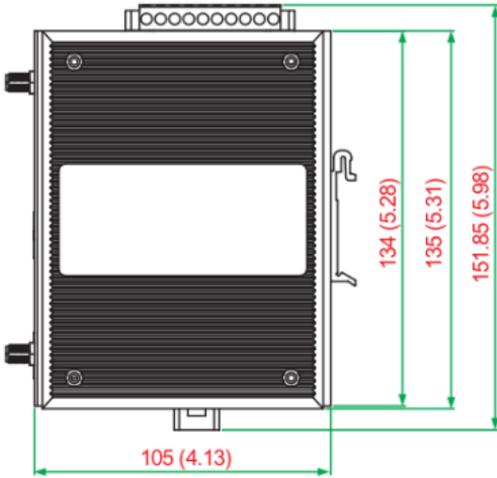
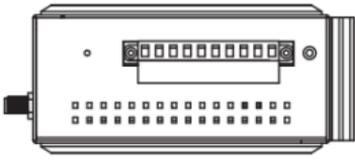
ping IP address of notebook A

and then press **Enter** key. A "Reply from IP address ..." response means the communication was successful. A "Request timed out." response means the communication failed. In this case, recheck the configuration to make sure the connections are correct.

Panel Layout of the AWK-3121



Mounting Dimensions (unit = mm)



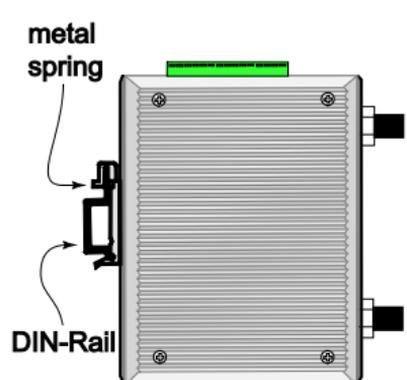
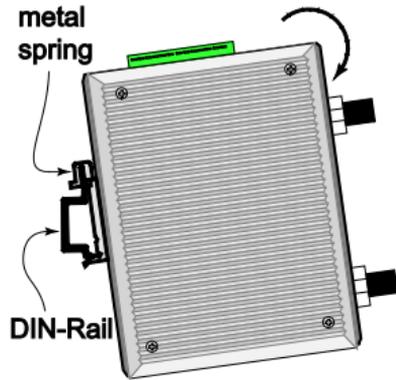
DIN-Rail Mounting

The aluminum DIN-Rail attachment plate should be fixed to the back panel of the AWK-3121 when you take it out of the box. If you need to reattach the DIN-Rail attachment plate to the AWK-3121, make sure the stiff metal spring is situated towards the top, as shown in the figures below.

STEP 1:

Insert the top of the DIN-Rail into the slot just below the stiff metal spring. snap into place as shown below.

STEP 2:



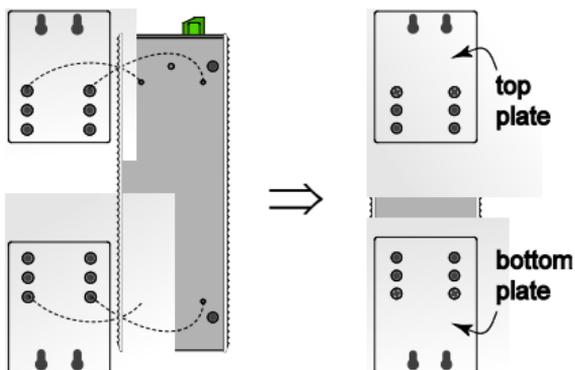
To remove the AWK-3121 from the DIN-Rail, simply reverse Steps 1 and 2.

Wall Mounting (optional)

For some applications, it may be more convenient to mount the AWK-3121 to a wall, as illustrated below.

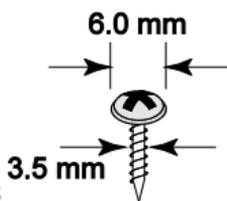
STEP 1:

Remove the aluminum DIN-Rail attachment plate from the AWK-3121, and then attach the wall mount plates with M3 screws, as shown in the adjacent diagrams.



STEP 2:

Mounting the AWK-3121 to a wall requires 4 screws. Use the AWK-3121 device, with wall mount plates attached, as a guide to mark the correct locations of the 4 screws. The heads of the screws should be less than 6.0 mm in diameter, and the shafts should be less than 3.5 mm in diameter, as shown in the figure at the right.

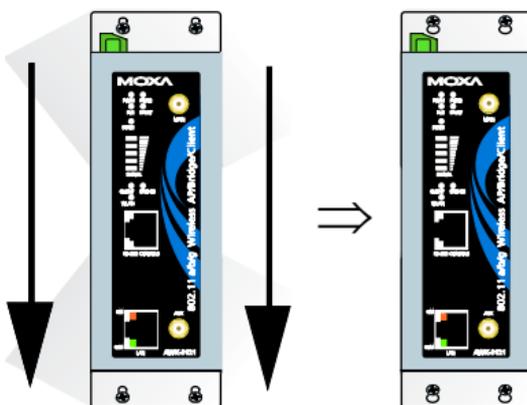


Do not screw the screws in all the way—leave a space of about 2 mm to allow room for sliding the wall mount panel between the wall and the screws.

NOTE Test the screw head and shank size by inserting the screw into one of the keyhole shaped apertures of the Wall Mounting Plates before it is screwed into the wall.

STEP 3:

Once the screws are fixed into the wall, insert the four screw heads through the large opening of the keyhole-shaped apertures, and then slide the AWK-3121 downwards, as indicated to the right. Tighten the four screws for added stability.



Wiring Requirements



WARNING

Safety First!

Be sure to disconnect the power cord before installing and/or wiring your Moxa AWK-3121.



WARNING

Safety First!

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowed for each wire size.

If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

You should also pay attention to the following items:

- Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.
NOTE: Do not run signal or communications wiring and power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.
- You can use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring with similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separate.
- It is strongly advised that you label wiring to all devices in the system when necessary.



ATTENTION

This product is intended to be supplied by a Listed Power Unit marked "Class 2" or "LPS" and rated O/P: 12 to 48 VDC, minimum 6 W (12 V/0.494 A to 48V/0.121 A), 25°C.



ATTENTION

Make sure the external power adaptor (includes power cords and plug assemblies) provided with the unit is certified and suitable for use in your country.

Grounding the Moxa AWK-3121

Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the ground screw to the grounding surface prior to connecting devices.

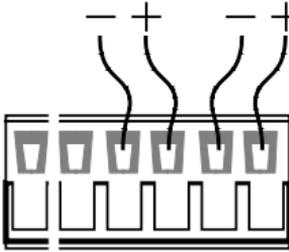


ATTENTION

This product is intended to be mounted to a well-grounded mounting surface, such as a metal panel.

Wiring the Redundant Power Inputs

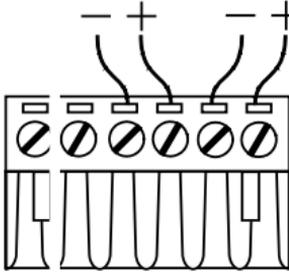
The top two pairs of contacts of the 10-contact terminal block connector on the AWK-3121's top panel are used for the AWK-3121's two DC inputs. Top and front views of the terminal block connector is shown here.



Top View

STEP 1: Insert the negative/positive DC wires into the V-/V+ terminals.

STEP 2: To keep the DC wires from pulling loose, use a small flat-blade screwdriver to tighten the wire-clamp screws on the front of the terminal block connector.



Front View

STEP 3: Insert the plastic terminal block connector prongs into the terminal block receptor, which is located on the AWK-3121's top panel.



ATTENTION

Before connecting the AWK-3121 to the DC power inputs, make sure the DC power source voltage is stable.

Wiring the Relay Contact

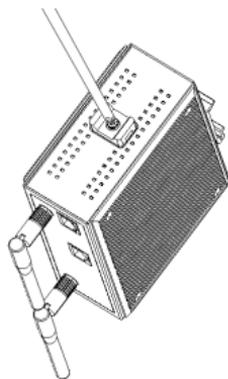
The AWK-3121 has one relay output, which consists of the two contacts of the terminal block on the AWK-3121's top panel. Refer to the previous section for detailed instructions on how to connect the wires to the terminal block connector, and how to attach the terminal block connector to the terminal block receptor. These relay contacts are used to indicate user-configured events. The two wires attached to the Relay contacts form an open circuit when a user-configured event is triggered. If a user-configured event does not occur, the Relay circuit will be closed.

Wiring the Digital Inputs

The AWK-3121 has two sets of digital input—DI1 and DI2. Each DI comprises two contacts of the 10-pin terminal block connector on the AWK-3121's top panel. You can refer to the "Wiring the Redundant Power Inputs" section for detailed instructions on how to connect the wires to the terminal block connector, and how to attach the terminal block connector to the terminal block receptor.

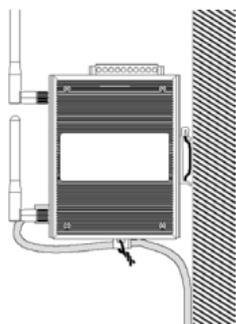
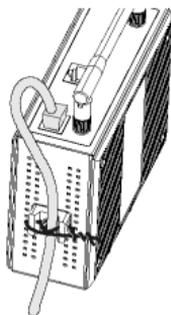
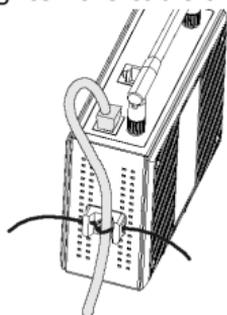
Cable Holder Installation (Optional)

You can attach the cable holder to the bottom of the AWK-3121. This helps to keep cabling neat and avoid accidents that result from untidy cables.



STEP 1: Screw the cable holder onto the bottom of the AWK-3121.

STEP 2: After mounting the AWK-3121 and plugging in the LAN cable, tighten the cable along the device and wall.



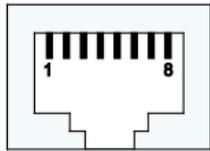
Communication Connections

10/100BaseT(X) Ethernet Port Connection

The 10/100BaseT(X) ports located on the AWK-3121's front panel are used to connect to Ethernet-enabled devices.

Below we show pinouts for both MDI (NIC-type) ports and MDI-X (HUB/Switch-type) ports.

MDI Port Pinouts		MDI-X Port Pinouts		8-pin RJ45
Pin	Signal	Pin	Signal	
1	Tx+	1	Rx+	
2	Tx-	2	Rx-	
3	Rx+	3	Tx+	
6	Rx-	6	Tx-	

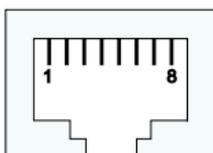


RS-232 Connection

The AWK-3121 has one RS-232 (8-pin RJ45) console port located on the front panel. Use either an RJ45-to-DB9 or RJ45-to-DB25 cable to connect the Moxa AWK-3121's console port to your PC's COM port. You may then use a console terminal program to access the AWK-3121 for console configuration.

Console Pinouts for 10-pin or 8-pin RJ45

10-Pin	Description	8-Pin
1	-----	
2	DSR	1
3	RTS	2
4	GND	3
5	TxD	4
6	RxD	5
7	DCD	6
8	CTS	7
9	DTR	8
10	-----	



- NOTE**
1. The pin numbers for male DB9 and DB25 connectors, and hole numbers for female DB9 and DB25 connectors are labeled on the connector. However, the numbers are typically quite small, so you may need to use a magnifying glass to see the numbers clearly.
 2. The pin numbers for both 8-pin and 10-pin RJ45 connectors (and ports) are typically not labeled on the connector (or port). Refer to the Pinout diagram above to see how RJ45 pins are numbered.

ATEX Information



1. DEMKO certification number: 10 ATEX 0902666X
2. Ambient range ($-40^{\circ}\text{C} \leq T_{\text{amb}} \leq 75^{\circ}\text{C}$)
3. Certification string: Ex nA nL IIC T4
4. Standards covered (EN60079-0:2006, EN60079-15:2005)
5. The conditions of safe usage:
 - a. The Ethernet Communication Devices are intended for mounting in an IP54 enclosure and used in an area of not more than pollution degree 2 as defined by IEC60664-1.
 - b. Conductors suitable for use in an ambient temperature greater than 93°C must be used for the Power Supply Terminal.
 - c. A 4 mm² conductor must be used when connection to the external grounding screw is utilized.
 - d. Cables must be suitable for use in an ambient temperature greater than 93°C .



ATTENTION

For railway rolling stock applications, AWK-3121 devices must use a galvanically isolated power supply that is compliant with the EN 50155 standard.

LED Indicators

The front panel of the Moxa AWK-3121 contains several LED indicators. The function of each LED is described in the table below.

LED	Color	State	Description
Front Panel LED Indicators (System)			
PWR1	Green	On	Power is being supplied from power input 1.
		Off	Power is not being supplied from power input 1.
PWR2	Green	On	Power is being supplied from power input 2.
		Off	Power is not being supplied from power input 2.
PoE	Amber	On	Power is being supplied via PoE.
		Off	Power is not being supplied via PoE.
FAULT	Red	Blink (slow)	Cannot get an IP address from the DHCP server (interval: 1 sec)
		Blink (fast)	IP address conflict (interval: 0.5 sec)
		Off	Error condition does not exist.
STATE	Green/Red	Green	Software Ready
		Green Blink	The AWK has been located by AWK Search Utility. (interval: 1sec)
		Red	Bootling error condition
SIGNAL (5 LEDs)	Green	On	Signal level
		Off	(for Client mode only)
BRIDGE MODE	Green	On	AWK functions in Bridge Mode.
		Off	AWK is not in Bridge Mode.
CLIENT MODE	Green	On	AWK functions in Client Mode.
		Off	AWK is not in Client Mode.
WLAN	Amber	On	WLAN is in used
		Off	WLAN is not in use

TP Port LED Indicators (Port Interface)

100M	Green	On	TP port's 100Mbps link is active .
		Blink	Data is being transmitted at 100 Mbps
		Off	TP port's 100Mbps link is inactive .
10M	Yellow	On	TP port's 10Mbps link is active .
		Blink	Data is being transmitted at 10 Mbps
		Off	TP port's 10Mbps link is inactive .

Specifications

WLAN Interface

Standards:

IEEE 802.11a/b/g for Wireless LAN
IEEE 802.11i for Wireless Security
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseTX
IEEE 802.3af for Power-over-Ethernet
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP

Spread Spectrum and Modulation (typical):

- 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

Operating Channels (central frequency):

US:

2.412 to 2.462 GHz (11 channels)

5.18 to 5.24 GHz (4 channels)

EU:

2.412 to 2.472 GHz (13 channels)

5.18 to 5.24 GHz (4 channels)

JP:

2.412 to 2.472 GHz (13 channels, OFDM)

2.412 to 2.484 GHz (14 channels, DSSS)

5.18 to 5.24 GHz (4 channels for W52)

Security:

- SSID broadcast enable/disable
- Firewall for MAC/IP/Protocol/Port-based filtering
- 64-bit and 128-bit WEP encryption, WPA /WPA2-Personal and Enterprise (IEEE 802.1X/RADIUS, TKIP and AES)

Transmission Rates:

802.11b: 1, 2, 5.5, 11 Mbps

802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps

TX Transmit Power:

802.11b:

Typ. 23±1.5 dBm @ 1 to 11 Mbps

802.11g:

Typ. 20±1.5 dBm @ 6 to 24 Mbps, Typ. 19±1.5 dBm @ 36 Mbps, Typ.

18±1.5 dBm @ 48 Mbps, Typ. 17±1.5 dBm @ 54 Mbps

802.11a:

Typ. 18±1.5 dBm @ 6 to 24 Mbps, Typ. 16±1.5 dBm @ 36 to 48 Mbps,

Typ. 15±1.5 dBm @ 54 Mbps

RX Sensitivity:

802.11b:

-97 dBm @ 1 Mbps, -94 dBm @ 2 Mbps, -92 dBm @ 5.5 Mbps, -90 dBm @ 11 Mbps

802.11g:

-93 dBm @ 6 Mbps, -91 dBm @ 9 Mbps, -90 dBm @ 12 Mbps, -88 dBm @ 18 Mbps, -84 dBm @ 24 Mbps, -80 dBm @ 36 Mbps, -76 dBm @ 48 Mbps, -74 dBm @ 54 Mbps

802.11a:

-90 dBm @ 6 Mbps, -89 dBm @ 9 Mbps, -89 dBm @ 12 Mbps, -85 dBm @ 18 Mbps, -83 dBm @ 24 Mbps, -79 dBm @ 36 Mbps, -75 dBm @ 48 Mbps, -74 dBm @ 54 Mbps

Protocol Support

General Protocols: Proxy ARP, DNS, HTTP, HTTPS, IP, ICMP, SNTP, TCP, UDP, RADIUS, SNMP, PPPoE, DHCP

Interface

Default Antennas*: 2 dual-band omni-directional antennas, 2 dBi, RP-SMA (male)

***Only available with the AWK-3121 and AWK-3121-SSC models.**

Connector for External Antennas:

AWK-3121 and AWK-3121-SSC: RP-SMA (female)

AWK-3121-M12: QMA (female)

RJ45 Ports: 1, 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection (AWK-3121 only)

Fiber Ports: 1, 100BaseFX port (SC connector, AWK-3121 only)

M12 Ports: 1, 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection (AWK-3121-M12 only)

Console Port: RS-232 (RJ45-type)

LED Indicators: PWR1, PWR2, PoE*, FAULT, STATE, signal strength, CLIENT MODE, BRIDGE MODE, WLAN, 10/100 (TP port), 100M (fiber port), LAN (M12 port)

***PoE is only available for the AWK-3121 and AWK-3121-M12**

Alarm Contact: 1 relay output with current carrying capacity of 1 A @ 24 VDC

Digital Inputs: 2 electrically isolated inputs

- +13 to +30 V for state "1"
- +3 to -30 V for state "0"
- Max. input current: 8 mA

Physical Characteristics

Housing: Metal, providing IP30 protection

Weight: 850 g

Dimensions: 53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)

Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits

Operating Temperature:

Standard Models: -25 to 60°C (-13 to 140°F)

Wide Temp. Models: -40 to 75°C (-40 to 167°F)

Storage Temperature: -40 to 85°C (-40 to 185°F)

Ambient Relative Humidity: 5% to 95% (non-condensing)

Power Requirements

Input Voltage: 12 to 48 VDC, redundant dual DC power inputs or 48 VDC Power-over-Ethernet (IEEE 802.3af compliant)*

***Compliant with EN 50155 on 24 VDC**

***PoE is only available for the AWK-3121 and AWK-3121-M12**

Connector: 10-pin removable terminal block

Power Consumption: 12 to 48 VDC, 0.121 to 0.494 A

Reverse Polarity Protection: Present

Standards and Certifications

Safety: UL 60950-1, EN 60950-1

Hazardous Location: UL/cUL Class I Division 2, ATEX Zone 2 (for AWK-3121 only)

EMC: EN 301 489-1/17; FCC Part 15, Subpart B; EN 55022/55024

Radio: EN 300 328, EN 301 893, DSPR (Japan)

Rail Traffic: EN 50155, EN 50121-1/4

Note: Please check Moxa's website for the most up-to-date certification status.

Reliability

MTBF (mean time between failures):

AWK-3121: 392,209 hrs

AWK-3121-M12: 480,831 hrs

AWK-3121-SSC: 445,913 hrs

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/support/warranty.aspx



ATTENTION

The AWK-3121 is **NOT** a portable mobile device and should be located at least 20 cm away from the human body. The AWK-3121 is **NOT** designed for the general public. To deploy AWK-3121s and establish a wireless network safely, a well-trained technician is required for installation.



ATTENTION

Use the antennas correctly: The 2.4 GHz antennas are needed when the AWK-3121 operates in IEEE 802.11b/g. The 5 GHz antennas are needed for IEEE802.11a. Make sure your antenna installation is within a safety area, which is covered by a lightning protection or surge arrest system.

Technical Support Contact Information
www.moxa.com/support

Moxa Americas:

Toll-free: 1-888-669-2872

Tel: 1-714-528-6777

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Fax: +86-21-5258-5505

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