AWK-3121B Series
QuickInstallation Guide

Version 1.4, SEP 2022

Technical Support Contact Information
www.moxa.com/support

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Overview

The AWK-3121B wireless AP/client is the ideal rugged wireless solution for railway onboard/wayside and train-to-ground applications such as CCTV and CBTC communications. It can provide speeds of up to 300 Mbps with IEEE 802.11n technology. The AWK-3121B's can operate at temperatures ranging from -40 to 75°C and meet the requirements of the EN 50155/50121 regulations.

Package Checklist

The AWK-3121B is shipped with the following items:

- 1 AWK-3121B
- Quick installation guide (printed)
- Product warranty statement

If any of these items is missing or damaged, contact your customer service representative for assistance.

Installation and Configuration

Before installing the AWK-3121B, make sure that all items in the package checklist are included in the box. In addition, you will need access to a notebook computer or PC equipped with an Ethernet port. The AWK-3121B 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-3121B can be powered by a DC power input.

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

Since the AWK-3121 is provided with the MDI/MDI-X auto-sensing capability of Ethernet connection, you can use either a straight-through cable or crossover cable to connect it to a computer. When the connection between the AWK-3121B and the computer is established, the LED indicator on the AWK-3121B's LAN port lights up.

Step 3: Set up the computer's IP address

Set an IP address for the computer so that it is on the same subnet as that of the AWK-3121B. Since the AWK-3121B's default IP address is 192.168.127.253, and the subnet mask is 255.255.255.0, set the IP address of the computer in the 192.168.127.xxx IP range and subnet mask to 255.255.255.0.

Step 4: Use the web-based manager to configure the AWK-3121B

Open your computer's web browser and type **http://192.168.127.253** in the address field to access the homepage of the web-based manager. Enter the **Username** and **Password** to open the AWK-3121B homepage. If you are configuring the AWK-3121 B for the first time, enter the following default Username and Password and click on the **Login** button:

Username: **admin**
Password: **moxa**

ATTENTION

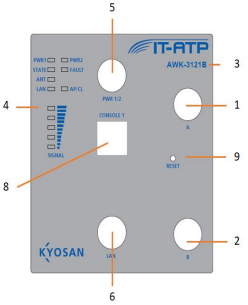
For security reasons, we strongly recommend changing the password after first access. To change the password, select **Maintenance → Password** and follow the on-screen instructions.

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

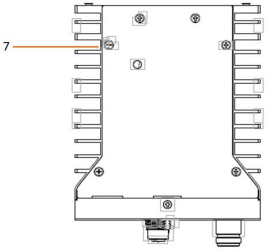
By default, the operation mode of the AWK-3121B is set to **AP**. You can change this setting to Client mode on the **Wireless Settings → Basic Wireless Settings** page.

NOTE You must either click the **Save Configuration** or the **Restart** button for the configuration changes to be effective.

Panel Layout of the AWK-3121B



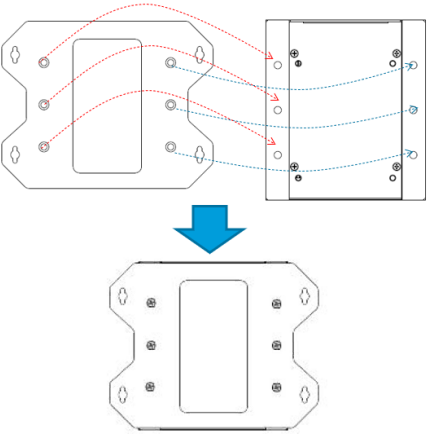
1. 1A N-type antenna port
2. 1B N-type antenna port
3. Model name
4. LEDs
5. 4-pin male M12 A-coded connector for PWR-1 and PWR-2
6. 10/100/1000BaseT(X) 8-pin M12 X-coded female connector for LAN1
7. Grounding screw
8. RJ45 RS-232 console
9. Reset button



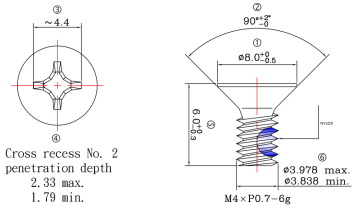
Wall Mounting (optional)

In most applications, wall mounting the AWK-3121Bis the most commonly used method, which makes installation easier as illustrated below:

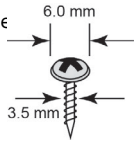
STEP 1:
Attach the wall-mounting plates with the M4 screws in the accessory package.



M4 screws specification for Wall Mounting Kit:



STEP 2:



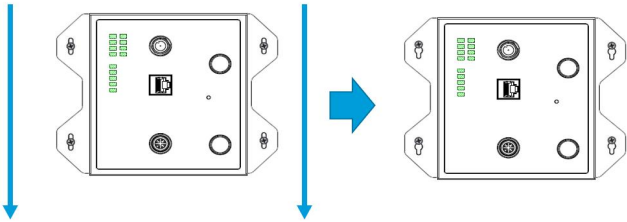
Mounting the AWK-3121B to a wall requires 4 screws. Use the AWK-3121B device, with wall-mounting plates attached, as a guide to mark the correct locations of the 4 screws. The heads of the screws should be 6.0 mm in diameter, and the shafts should be less than 3.5 mm in diameter, as shown in the figure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

Do not drive 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 driving the screws into the wall.

STEP 3:

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

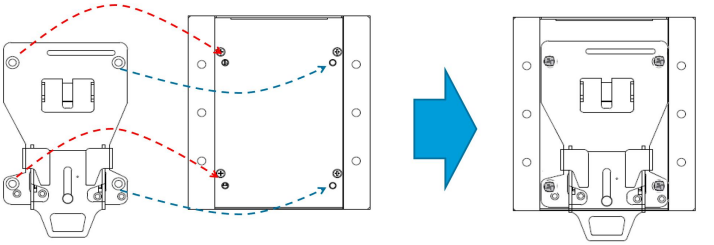


DIN-Rail Mounting (Optional)

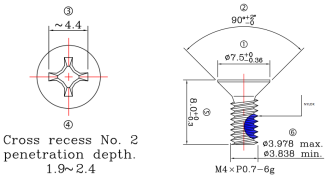
The DIN-rail mounting method is used in industrial or railway application. You will require a DIN-rail attachment plate, which is an optional accessory, to mount the AWK-3121B to a DIN rail. When you attach the DIN-rail attachment plate to the AWK-3121B, make sure that the stiff metal spring is situated towards the top as shown in the following instructions:

STEP 1:

Attached the DIN-rail mounting plates to the AWK-3121 B with the M4 screws in the accessory package.

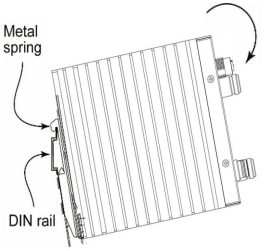


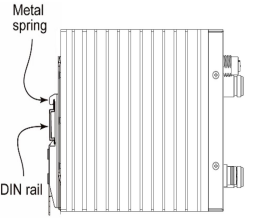
M4 screws specification for DIN-Rail Mounting Kit:



STEP 2:
Insert the top of the DIN rail into the slot just below the stiff metal spring.

STEP 3:
The DIN-rail attachment unit will snap into place as shown in the figure below:





To remove the AWK-3121B from the DIN rail, simply reverse Steps 2 and 3.

WARNING

- This equipment is intended to be used in a Restricted Access Location, such as a dedicated computer room where access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the fact that the metal chassis of the equipment is extremely hot and may cause burns.
- Access to the equipment should be controlled through the use of a lock and key or a security identification system, controlled by the authority responsible for the location. Only authorized, well-trained professionals should be allowed to access the restricted access location.
- Service persons or users must pay special attention and take special precautions before handling this equipment.

External Metal Parts are Hot!

- Use adequate protection before handling this device.

Wiring Requirements

WARNING

Safety First!
Be sure to disconnect the power cord before installing and/or wiring your AWK-3121B.

WARNING

Safety First!
Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes that dictate 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 for easy identification.

ATTENTION

The equipment is intended to be supplied by external power source (UL listed / IEC 60950-1 / IEC 62368-1) which output is complied with ES1 (SELV for IEC 60950-1), PS2/LPS, output rating 24 Vdc, min. 0.789 A, ambient temperature 75 °C minimum.

ATTENTION

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

Grounding the Moxa AWK-3121B

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

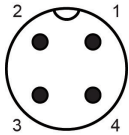
This product is intended to be mounted to a well-grounded mounting surface, such as a metal panel.

Connecting the Power Supplies

The AWK-3121B supports two types of power supplies— PWR1 and PWR2. The 4-pin male M12 A-coded connector on the AWK-3121B front panel is used for the dual power inputs. You can use the metal M12 male 4-pin A-coded screw-type crimp circular connector with pins for power connection included with the product or purchase the M12 power cable (optional) CBL-M12(FF4P)/Open-BK-100-IP68 for lab use/tests.

Pinouts for the power input (4-pin male M12 A-coded) port:

Pin No.	Power Input
1	V1+
2	V2+
3	V1-
4	V2-



ATTENTION

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

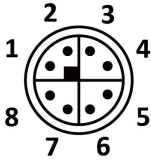
Communication Connections

10/100/1000BaseT(X) Ethernet Port Connection

The AWK-3121B has a 10/100/1000BaseT(X) Ethernet port (LAN1 8-pin shielded M12 X-coded connector). The 10/100/1000TX port located on the front panel is used to connect to Ethernet-enabled devices. Most users configure this port for Auto MDI/MDI-X mode, in which case the port's pinouts are adjusted automatically depending on the type of Ethernet cable used (straight-through or cross-over), and the type of device (NIC-type or HUB/Switch-type) connected to the port.

Pinouts for the 10/100/1000BaseT(X) (M12 8-pin female X-coded) port

Pin No.	GbE Conn.	FE Conn.
1	DA+	TD+
2	DA-	TD-
3	DB+	RD+
4	DB-	RD-
5	DD+	–
6	DD-	–
7	DC-	–
8	DC+	–



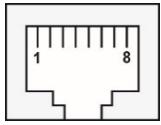
RS-232 Console Connection

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

Console Pinouts for 10-pin or 8-pin RJ45

10-Pin Description 8-Pin

10-Pin Connector	Description	8-Pin Connector
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	–	–



LED Indicators

The front panel of theAWK-3121B contains several LED indicators. The function of each LED is described in the table below:

LED	Color	State	Description
PWR1	Green	On	Power is being supplied (from power input 1)
		Off	Power is **not** being supplied
PWR2	Green	On	Power is being supplied (from power input 2)
		Off	Power is **not** being supplied
FAULT1	Red	On	System is booting up
		Blinking (slow at 1-second intervals)	Cannot get an IP address from the DHCP server
		Blinking (fast at 0.5-second intervals)	IP address conflict
		Off	Normal status, Radio 1 is ready
FAULT2	Reserved		
STATE	Green	On	System startup is complete and the system is in operation.
		Blinking (slow at 1-second intervals)	The Wireless Search Utility has located this ATP-213 device.
	Red	On	System is booting up
ANT	Green	On	The antenna is connected correctly
	Red	On	The antenna is NOT connected correctly

LED	Color	State	Description
WLAN	Green	On	WLAN is functioning in **Client** mode
		Blinking	The WLAN is transmitting data in **Client** mode
		Off	The WLAN is not in use or is not working properly
	Amber	On	WLAN is functioning in **AP** mode
		Blinking	The WLAN is transmitting data in **AP** mode
		Off	The WLAN is not in use or is not working properly
LAN	Green	On	The LAN port's 10/100/1000 Mbps link is active
		Blinking	Data is being transmitted at 10/100/1000 Mbps
		Off	The LAN port's 10/100/1000 Mbps link is inactive
	Amber	On	Reserved
		Blinking	Reserved
		Off	Reserved
SIGNAL (5 LEDs)	Green	On	Signal level (for Client mode only)
		Off	

Specifications

WLAN Interface	
Standards	IEEE 802.11b/g for Wireless LAN IEEE 802.11i for Wireless Security IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X) IEEE 802.3ab for 1000BaseT
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 @ 1 Mbps • 802.11g: 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) • EU: 2.412 to 2.472 GHz (13 channels) • JP: 2.412 to 2.484 GHz (14 channels, DSSS)
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 • 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps

Transmitter 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. 23±1.5 dBm @ 6 to 24 Mbps • Typ. 21±1.5 dBm @ 36 Mbps • Typ. 19±1.5 dBm @ 48 Mbps • Typ. 18±1.5 dBm @ 54 Mbps

Receiver 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 • -86 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

FEDERAL COMMUNICATIONS COMMISSION INTERFERENCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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

The availability of some specific channels and / or operational frequency bands are country dependent and are firmware programmed at factory to match the intended destination. The firmware setting is not accessible by the end user.

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.

RF Exposure warning
This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 23 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

Professional installation
This is a specific product that requires professional installation and configuration, must be performed by trained technical engineers to install the antenna, please contact Moxa for further information.

The availability of some specific channels and / or operational frequency bands are country dependent and are firmware programmed at factory to match the intended destination. The firmware setting is not accessible by the end user.

Protocol Support	
General Protocols	Proxy ARP, DNS, HTTP, HTTPS, IP, ICMP, SNTP, TCP, UDP, RADIUS, SNMP, DHCP
AP-only Protocols	ARP, BOOTP, DHCP
Interface	
Connector for External Antennas	N-type (female)
Fiber Ports	1, 100/1000Base SFP slot
LAN Ports	1, M12-type, 8-pin female X-coded, 10/100/1000BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
Console Port	RJ45 connector for RS-232 serial console
Reset	Present
	PWR, FAULT, STATE, WLAN, LAN 1, LAN 2
Physical Characteristics	
Housing	Metal
Weight	2.0 kg

Installation	Wall mounting (optional), DIN-rail mounting (optional)
Environmental Limits	
Operating Temperature	-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	24VDC, dual DC power input
Input Current	0.789 A (max.) @ 24 VDC
Connector	4-pin male M12 A-coded connector
Reverse Polarity Protection	Present
Standards and Certifications	
Safety	UL 60950-1, IEC 62368-1(CB), LVD EN 62368-1
EMC	EN 61000-6-2/6-4
EMI	CISPR 22, FCC Part 15B Class B
EMS	IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV IEC 61000-4-3 RS: 80 MHz to 1 GHz: 20 V/m IEC 61000-4-4 EFT: Power: 2 kV; Signal: 2 kV IEC 61000-4-5 Surge: Power: 2 kV; Signal: 2 kV IEC 61000-4-6 CS: 10 V IEC 61000-4-8
Radio	EN 300 328, TELEC, FCC
Rail Traffic	EN 50155*, EN 50121-4
Fire and Smoke	EN 45545-2
*This product is suitable for rolling stock railway applications, as defined by the EN 50155 standard. For a more detailed statement, click here: www.moxa.com/doc/specs/EN_50155_Compliance.pdf	
MTBF (mean time between failures)	
Time	xxx,xxx hrs.
Warranty	
Warranty Period	5 years
Details	See www.moxa.com/warranty

ATTENTION

The AWK-3121B is **NOT** a portable mobile device and should be located at least 23 cm away from the human body. The AWK-3121B is **NOT** designed for the general public. To establish a wireless network safely using the AWK-3121B, a well- trained technician should be consulted for installation.

ATTENTION

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