TAP-M310R Series
Quick Installation Guide

Moxa Tough AP

Version 1.0, March 2025

Technical Support Contact Information
www.moxa.com/support

P/N: 1802003100010

Overview

The TAP-M310R Series wireless APs/clients are ruggedized IEEE 802.11ax wireless solutions for railway train-to-ground (T2G) applications, including CBTC and CCTV communications. Featuring an IP67 dust-tight, waterproof design, the TAP-M310R Series ensures reliable operations in heavy-duty outdoor environments.

The TAP-M310R Series offers four distinct configurations for onboard and wayside applications, featuring AC or DC power modules and Ethernet switch modules, and support for multiple Ethernet/Turbo Chains to enable easy deployment.

The TAP-M310R Series complies with industrial standards and railway approvals, covering operational temperature ranges, power input voltage, surge protection, ESD, and vibration resistance.

NOTE The IP67-rated design provides protection against dust and water. However, if installed in certain specific outdoor environments such as coastal areas with high salinity, or highly polluted regions, it is recommended to use an additional enclosure to further protect the device's exterior housing.

Package Checklist

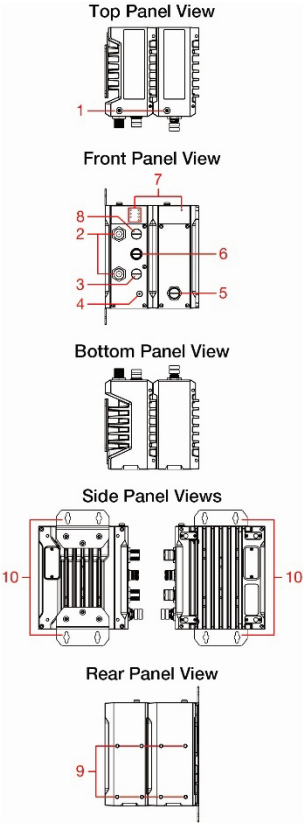
Depending on the purchased configuration, the TAP-M310R Series is shipped with the following items. If any of these items are missing or damaged, please contact your customer service representative for assistance.

- 1 TAP-M310R Series wireless AP/Client
- TAP-M310R-NPS-1R/-NPS-1P1R models only: 1 wall-mounting kit, including 2 x plates and 6 x M3 screws
- Quick installation guide (printed)
- Warranty card

Panel Layout of the TAP-M310R

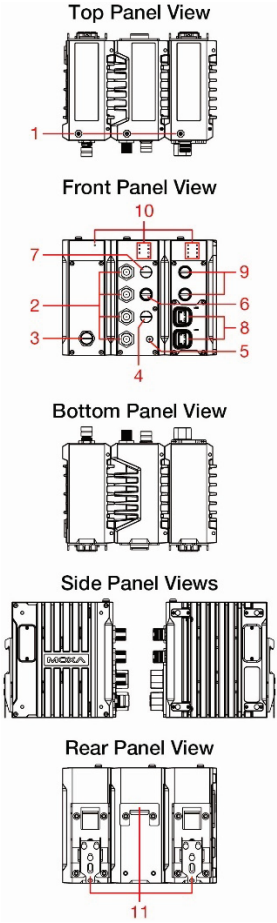
Interface combinations and numbers vary depending on the selected model.

TAP-M310R-NPS-1R/-1P1R Models



1. Grounding screw
2. 1, 2: N-type antenna ports
3. Console: RS-232 console (M12 A-coded 5-pin male connector)
4. Reset button
5. 24 to 110 VDC PWR: M12 K-coded 5-pin male connector
6. LAN 1: 10/100/1000/2500BaseT(X) port (M12 X-coded 8-pin female connector)
7. LEDs: PWR, PWR R, PWR L, SYS, 2.4G, 5G, LAN 1
8. 24 VDC PWR: M12 A-coded 4-pin male connector
9. Mounting holes for DIN-rail kit
10. Wall mounting kit

TAP-M310R-1P1R1S/-1P2R1S Models



1. Grounding screw
2. 1A, 1B, 2A, 2B: N-type antenna ports
3. 110 to 220 VAC PWR: M12 K-coded 5-pin male connector
4. Console: RS-232 console (M12 A-coded 5-pin male connector)
5. Reset button
6. LAN 1: 10/100/1000/2500BaseT(X) port (M12 X-coded 8-pin female connector)
7. 24 VDC PWR: M12 A-coded 4-pin male connector
8. LAN 2, LAN 3: 1000/2500BaseSFP slots
9. LAN 4, LAN 5: 10/100/1000BaseT(X) ports (M12 X-coded 8-pin female connector)
10. LEDs: PWR, PWR R, PWR L, SYS, 2.4G, 5G, LAN 1-5, HEAD, TAIL
11. DIN-rail kit

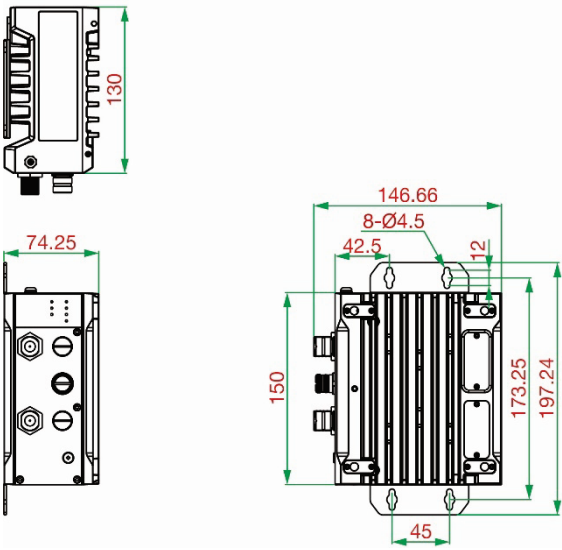
ATTENTION

- DO NOT open or remove the waterproof vent. Removing the seal will void the product warranty.
- Ports that are not being used should be covered tightly with appropriate protective caps.

Dimensions

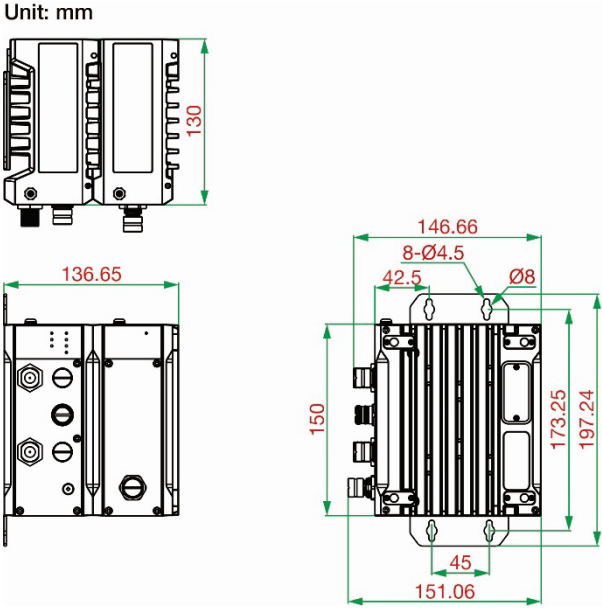
TAP-M310R-NPS-1R Models

Unit: mm



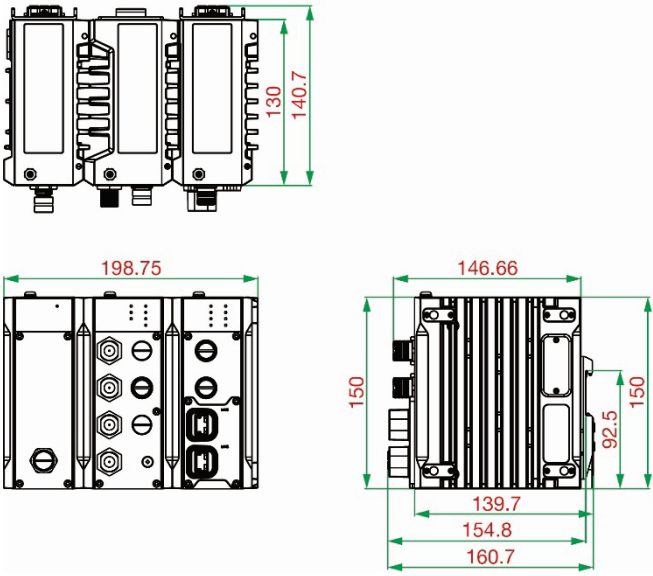
TAP-M310R-NPS-1P1R Models

Unit: mm



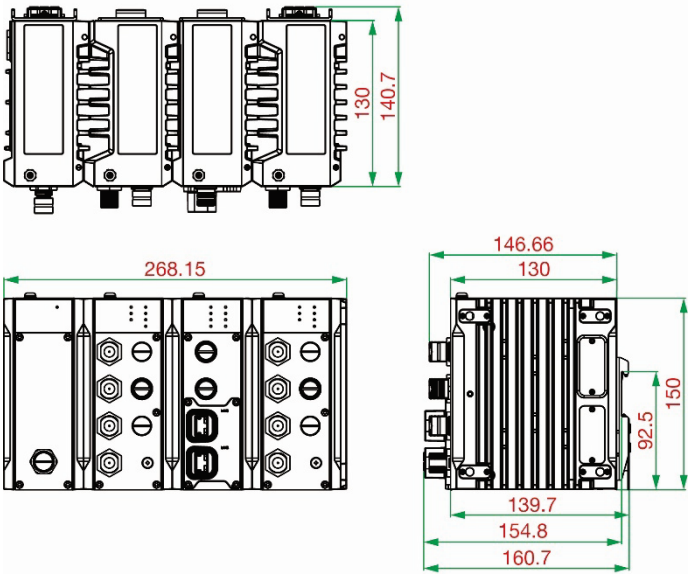
TAP-M310R-1P1R1S Models

Unit: mm



TAP-M310R-1P2R1S Models

Unit: mm

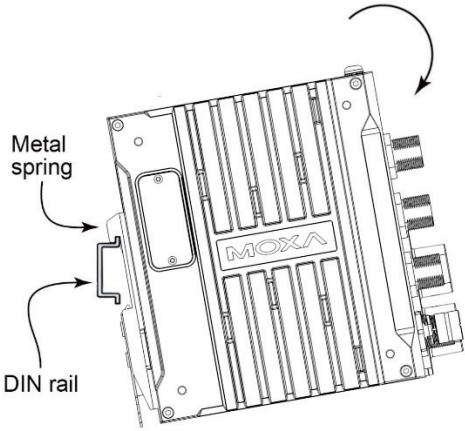


DIN-rail Mounting

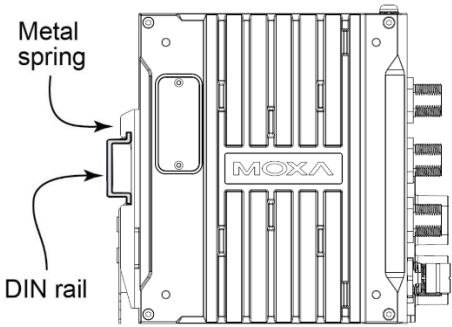
Mount the TAP-M310R Series onto a corrosion-free mounting rail that adheres to the EN 60715 standard by following the steps below.

STEP 1: Attach the DIN-rail kit to the TAP-M310R using M4x7mm screws.

STEP 2: Insert the upper lip of the DIN-rail kit into the mounting rail.



STEP 3: Press the TAP-M310R towards the mounting rail until it snaps into place.

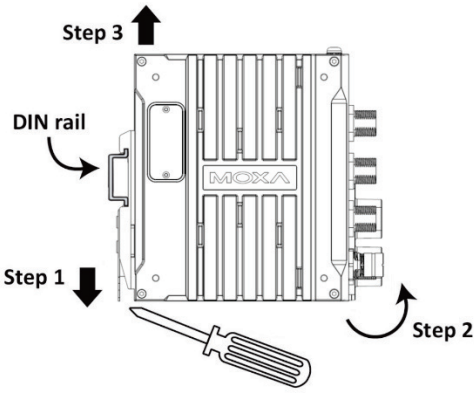


To remove the TAP-M310R Series from a DIN rail, do the following:

STEP 1: Using a screwdriver, pull down the latch on the DIN-rail kit.

STEP 2: Slightly pull the device.

STEP 3: Lift the device up to remove it from the mounting rail.

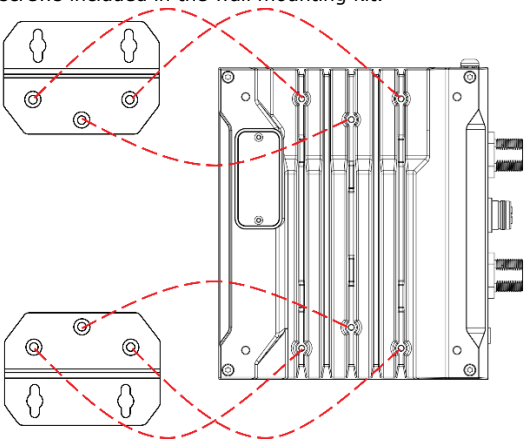


Wall Mounting

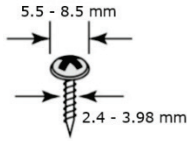
For some applications, it may be more convenient to mount the TAP-M310R Series to a wall.

NOTE Wall mounting is only supported for TAP-M310R-NPS-1R and TAP-M310R-NPS-1P1R models.

STEP 1: If installed, remove the DIN-rail attachment plate from the device first. Attach the wall-mounting plates using the six M3x8mm screws included in the wall mounting kit.



STEP 2: Mounting the TAP-M310R Series to a wall requires 4 screws. Use the device with the wall-mounting plates attached as a guide to mark the location of the 4 screws on the wall. The heads of the screws should be between 5.5 mm and 8.5 mm in diameter. The screw shank should be between 2.4 to 3.98 mm in diameter. The screw length should be at least 15.0 mm, as shown in the figure on the right.

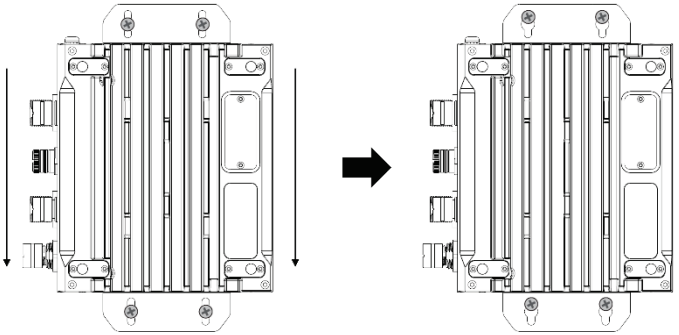


ATTENTION

Test the screw head and shank size by inserting the screws into one of the keyhole shaped apertures of the wall-mounting plates before attaching the plates to the wall.

STEP 3: Drill the holes into the wall on the marked locations, leaving about 2 mm of space between the bottom side of the screw head and the wall to allow room for sliding the wall-mounting kit between the wall and the screws.

STEP 4: Once the screws are fixed into the wall, insert the four screw heads through the large opening of the keyhole-shaped apertures of the mounting kit, and then slide the TAP device downwards. 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 TAP-M310R.

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size. If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

Read and Follow These Guidelines:

- 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 crossing point.
- Do not run signal or communications wiring and power wiring through 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 that shares similar electrical characteristics can be bundled together.

- Keep input wiring and output wiring separated.
- For future reference, you should label the wiring used for all of your devices.

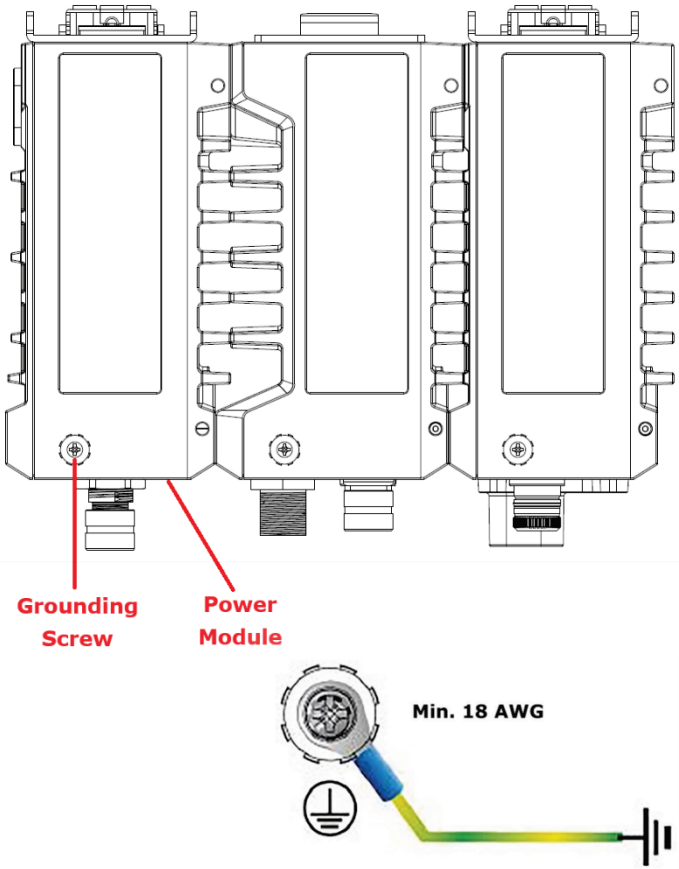
Grounding the Moxa TAP-M310R

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 to the TAP-M310R device.

The TAP-M310R should be well-grounded to ensure safe operation. The grounding screw connection depends on the model configuration.

For models without a power module: Connect the grounding wire to the grounding screw located on the top panel of the radio module.

For models with a power module: Connect the grounding wire to the grounding screw located on the top panel of the power module.



ATTENTION

This product is intended to be mounted to a well-grounded mounting surface, such as a metal panel. The potential difference between the two ground potentials must be zero. If the potential difference is NOT zero, the product could be permanently damaged.

Connecting the Power Inputs

The TAP-M310R Series supports multiple power input options to suit different needs. Connect to the appropriate power input based on your specific configuration.

ATTENTION

Before connecting the TAP-M310R Series to the power input, make sure the power source voltage is stable.

NOTE We recommend installing a power insulation device between the TAP-M310R Series and the power source to avoid damage from power surges.

STEP 1: Connect the power cord connector to the power input port.

STEP 2: Screw the support nuts on the power cord connector to ensure a tight connection.

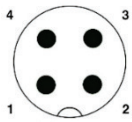
The power input depends on the model used. Refer to the connector type and pinout overview for each model type below.

TAP-M310R-NPS-1R models:

24 VDC power input: M12 A-coded 4-pin male connector on the front panel.

Power input port pinouts:

Pin No.	PWR
1	V+
2	N.C.
3	V-
4	N.C.



ATTENTION

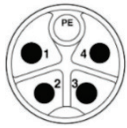
- If using a Class I adapter, the power cord must be connected to a socket-outlet with an earthing connection.
- This product is intended to be supplied by a UL Listed Power Adapter or DC power source marked 'L.P.S' or 'Limited Power Source', rated 24 VDC, 1.35 A (min.), and Tma 75°C (min.). If you require further assistance, please contact your Moxa representative.

TAP-M310R-NPS-1P1R models:

24 to 110 VDC power input: M12 K-coded 5-pin male connector on the power module's front panel for the DC power input.

DC Power input port pinouts:

Pin No.	DC
1	V1+
2	V1-
3	N.C.
4	N.C.
PE	GND



TAP-M310R-1P1R1S and -1P2R1S models:

110 to 220 VAC power input: M12 K-coded 5-pin male connector on the power module's front panel for the AC power input.

AC Power input port pinouts:

Pin No.	AC
1	N.C.
2	N.C.
3	L
4	N
PE	GND

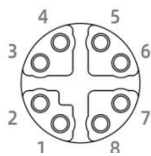
Communication Connections

10/100/1000(/2500)BaseT(X) Ethernet Ports

The TAP-M310R has one 10/100/1000/2500BaseT(X) Ethernet port (LAN1) on the front panel for connecting Ethernet-enabled devices. TAP-M310R-1P1R1S and -1P2R1S models have an additional two 10/100/1000BaseT(X) Ethernet ports (LAN4 and LAN5) on the front panel. The ports use M12 X-coded 8-pin female connectors. Most users configure these ports 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.

10/100/1000(/2500)BaseT(X) Port Pinouts

Pin	10/100 BaseT(X)	1000/2500 BaseT(X)
1	TD+	DA+
2	TD-	DA-
3	RD+	DB+
4	RD-	DB-
5	N.C.	DD+
6	N.C.	DD-
7	N.C.	DC-
8	N.C.	DC+



NOTE 10/100/1000(/2500)BaseT(X) ports that are not in use should be covered with A-CAP-M12F-M protective caps. The caps are included and preinstalled on the TAP-M310R Series device out of the box.

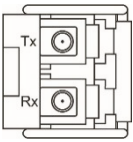
1000/2500BaseSFP Fiber Ports

The TAP-M310R-1P1R1S and -1P2R1S have two 1000/2500BaseSFP ports (LAN2/LAN3) on the front panel for installing SFP modules (the SFP modules must be purchased separately). To operate properly, a fiber transceiver must be used with each SFP module. Unlike electrical signals, optical signals do not require a circuit to transmit data. To transmit full-duplex optical signals between two devices (e.g., device 1 and device 2), you need to run two optical lines between the devices. One optical line is used to transmit data from device 1 to device 2, and the other optical line is used to transmit data from device 2 to device 1. Connect the Tx (transmit) port of device 1 to the Rx (receive) port of device 2, and the Rx port of device 1 to the Tx port of device 2.

ATTENTION

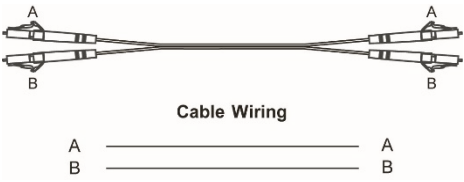
Class 1 Laser optical transceivers must be used with this device.

LC-Port Pinouts



NOTE 1000/2500BaseSFP ports that are not in use should be covered with an IP67-rated plastic cap.

LC-Port to LC-Port Cable Wiring



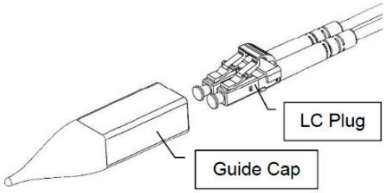
NOTE If you would like to swap out an SFP module, power off the TAP-M310R before removing the old module and inserting the new module.

Shielding Fiber Connections

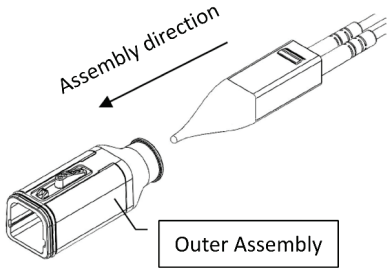
To achieve IP67-rated protection for fiber port connections, use a compatible Moxa cable gland to ensure proper protection.

NOTE The protective cable gland is an optional accessory and must be purchased separately. Refer to the TAP-M310R datasheet on http://www.moxa.com for a list of supported cable glands.

Refer to the following instructions for installing the fiber cable gland.
STEP 1: Use your thumb to press down firmly on the LC latch and insert the LC plug into the guide cap until the latch is securely in place.



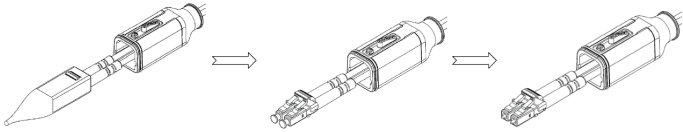
STEP 2: Insert the guide cap with the LC plug through the outer assembly by holding the guide cap and firmly pushing it into the assembly.



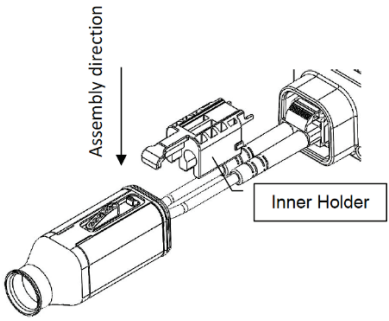
WARNING

Do not push or apply pressure to the fiber cables directly, as this may damage the cables.

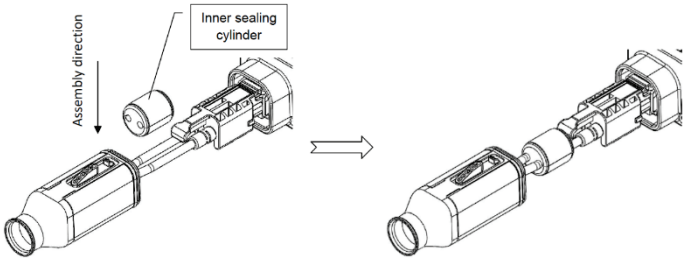
STEP 3: Once inserted, remove the guide cap and the protective cover of the fiber optic connector (if installed).



STEP 4: Insert the LC plug into the SFP transceiver port and install the inner holder onto the cable. Ensure the wires are seated properly in the wire holding spaces, then secure the inner holder to the LC plug.

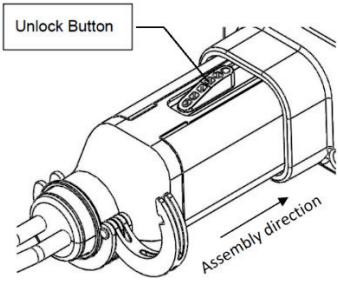


STEP 5: Install the inner sealing cylinder, ensuring that the wires are inserted into the wire gaps. Make sure the inner sealing cylinder touches the inner holder, leaving no gap.



STEP 6: Slide the outer assembly onto the sealing cylinder and inner holder until it snaps into place.

STEP 7: Place the outer snap ring over the rubber flange of the outer assembly and close the ring. Use pliers to tighten the outer snap ring around the assembly.

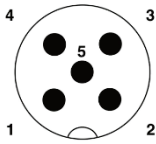


Console Connection

The TAP-M310R Series has one M12 A-coded 5-pin male console port located on the front panel. Use an M12 A-coded 5-pin female cable to connect the TAP-M310R's console port to your PC's COM port. Use a program to access the console configuration on the TAP-M310R.

Console Port Pinouts

Pin No.	Con.
1	TX.
2	RX
3	DSR
4	GND
5	DTR



NOTE When the console port is not in use, cover it with an A-CAP-M12M-M protective cap. The cap is included and preinstalled on the TAP-M310R Series device out of the box.

Antenna Connection

For TAP-M310R-NPS-1R and -1P1R models: There are two N-type RF connectors on the front panel. The connectors on the front panel are labeled **1** and **2**.

For TAP-M310R-1P1R1S models: There are four N-type RF connectors on the front panel. The connectors on the front panel are labeled **1A**, **1B**, **2A**, and **2B**.

For TAP-M310R-1P2R1S models: There are eight N-type RF connectors on the front panel. The connectors on the front panel are labeled **1A**, **1B**, **2A**, and **2B** (two sets).

NOTE Antenna connectors that are not in use should be covered with A-CAP-NM-MIP67 protective caps. The caps are included and preinstalled on the TAP-M310R Series device out of the box.

LED Indicators

The front panel of each module contains several LED indicators. The function of each LED is described in the table below.

Radio Module

LED	Color	State	Description
PWR L	Green	On	Power is being supplied from a power module on the left side (if any).
		Off	Power is not being supplied from a power module on the left side.
PWR R	Green	On	Power is being supplied from a power module on the right side (if any).
		Off	Power is not being supplied from a power module on the right side.
PWR	Green	On	Power is being supplied to the 24 VDC input of the radio module.
		Off	Power is not being supplied via the 24 VDC input of the radio module, or the switch module is present.
SYS	Red	On	Indicates a system initialization failure, configuration error, or system error. This LED will be off during the regular boot up process.

LED	Color	State	Description
	Green	On	System startup is complete, and the system is operating normally.
LAN1	Green	On	The LAN port's 2500 Mbps link is active.
		Blinking	Data is being transmitted at 2500 Mbps.
	Amber	On	The LAN port's 10/100/1000 Mbps link is active.
		Blinking	Data is being transmitted at 10/100/1000 Mbps
	Green/ Amber	Off	The LAN port is inactive.
2.4G	Green	On	The device is in Client(-router) or Slave mode and an active link is established to an AP or master on the 2.4 GHz band.
		Blinking	Traffic is being transmitted in Client(-router) or Slave mode over the 2.4 GHz band.
	Amber	On	The device is in AP, Master, Sniffer mode and the 2.4 GHz band is active.
		Blinking	Traffic is being transmitted in AP or Master mode over the 2.4 GHz band.
	Green/ Amber	Off	The 2.4 GHz band is disabled, not working properly, or the device is in Client(-router) or Slave mode without a connection to an AP or Master.
5G	Green	On	The device is in Client(-router) or Slave mode and an active link is established to an AP or master on the 5 GHz band.
		Blinking	Traffic is being transmitted in Client(-router) or Slave mode over the 5 GHz band.
	Amber	On	The device is in AP, Master, or Sniffer mode and the 5 GHz band is active.
		Blinking	Traffic is being transmitted in AP or Master mode over the 5 GHz band.
	Green/ Amber	Off	The 5 GHz band is disabled, not working properly, or the device is in Client(-router)/Slave mode without a connection to an AP or Master.

Switch Module

LED	Color	State	Description
PWR L	Green	On	Power is being supplied from power input 1 (left side).
		Off	Power is not being supplied from power input 1 (left side).
PWR R	Green	On	Power is being supplied from power input 2 (right side).
		Off	Power is not being supplied from power input 2 (right side).
HEAD	Green	On	Turbo Chain redundancy is enabled, and the Head port is in the Link Up Forward (LUF) state.

LED	Color	State	Description
		Blinking	Turbo Chain redundancy is enabled, and - the switch module is the Head switch, and the Head port is not in the Link Up Forward (LUF) state. - the switch module is the Member switch, and Member port 1 is not in the Link Up Forward (LUF) state. - the switch module is the Tail switch, and the Member port is not in the Link Up Forward (LUF) state.
		Off	The Moxa Turbo Chain or the Moxa Turbo Chain is enabled, and - the switch module is the Member switch and Member port 1 is in the Link Up Forward (LUF) state. - the switch module is the Tail switch, and the Member port is in the Link Up Forward (LUF) state.
TAIL	Green	On	Turbo Chain redundancy is enabled, and the Tail port is in the Link Up Forward (LUF) state.
		Blinking	The Moxa Turbo Chain is enabled, and - the switch module is the Head switch, and the Head Port is not in the Link Up Forward (LUF) state. - the switch module is the Member switch, and Member Port 2 is not in the Link Up Forward (LUF) state. - the switch module is the Tail switch, and the Member Port is not in the Link Up Forward (LUF) state.
		Off	Turbo Chain redundancy is disabled or Turbo Chain redundancy is enabled, and - the switch module is the Head switch, and the Member Port is in the Link Up Forward (LUF) state. - the switch module is the Member switch, and Member Port 2 is in the Link Up Forward (LUF) state.
LAN2/3 (SFP)	Green	On	The LAN port's 2500 Mbps link is active.
		Blinking	Data is being transmitted at 2500 Mbps.
	Amber	On	The LAN port's 10/100/1000 Mbps link is active.
		Blinking	Data is being transmitted at 10/100/1000 Mbps
	Green/ Amber	Off	The LAN port is inactive, the SFP module or SFP cabling is attached properly.
LAN4/5	Green	On	The LAN port's 2500 Mbps link is active.
		Blinking	Data is being transmitted at 2500 Mbps.
	Amber	On	The LAN port's 10/100/1000 Mbps link is active.
		Blinking	Data is being transmitted at 10/100/1000 Mbps

LED	Color	State	Description
	Green/ Amber	Off	The LAN port is inactive.

Power Module

LED	Color	State	Description
PWR	Green	On	The power module is active and supplying power.
		Off	The power module is idle and not supplying power.

Software Setup

This section covers the software setup for the TAP-M310R.

How to Access the TAP

Before installing the TAP device (TAP), make sure that all items in the package checklist are provided in the product box. You will also need access to a notebook computer or PC equipped with an Ethernet port.

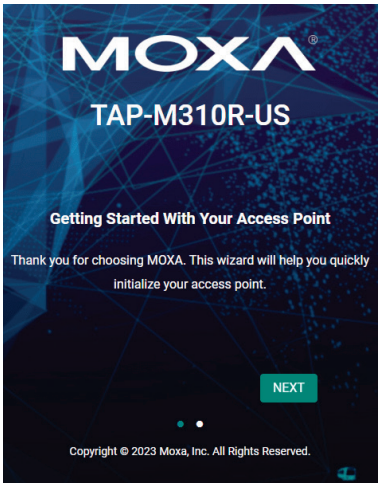
- **Step 1: Select a suitable power source and plug in the TAP**.
- **Step 2: Connect the TAP to the notebook or PC via the TAP's LAN1 port.**
  The LED indicator on the TAP's LAN1 port will light up when a connection is established.

NOTE If you are using an Ethernet-to-USB adapter, follow the instructions in the user's manual provided with the adapter.

- **Step 3: Set up the computer's IP address**

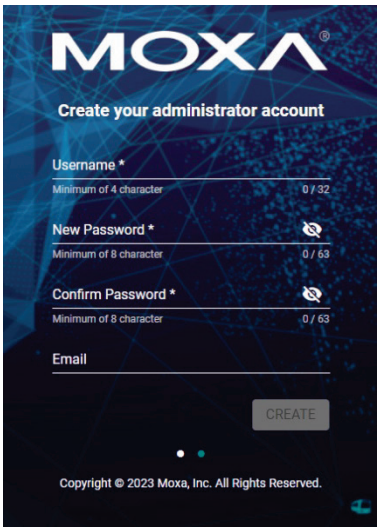
  Choose an IP address for the computer that is on the same subnet as the TAP. Since the TAP's default IP address is 192.168.127.253, and the subnet mask is 255.255.255.0, set the IP address to 192.168.127.xxx, where xxx is a value between 1 and 252.
- **Step 4: Access the homepage of the TAP.**
  Open your computer's web browser and type **http://192.168.127.253** in the address field to access the TAP's homepage. If connected successfully, the TAP's interface homepage

will appear. Click **NEXT**.



- **Step 5: Create a user account and password.**
  Enter a username, password, and your email address, then click **CREATE**.

NOTE The username and password are case-sensitive.



After creating your account, you will be automatically redirected to the login screen.

- **Step 6: Log in to the device.**
  Enter your username and password and click the **LOG IN**.

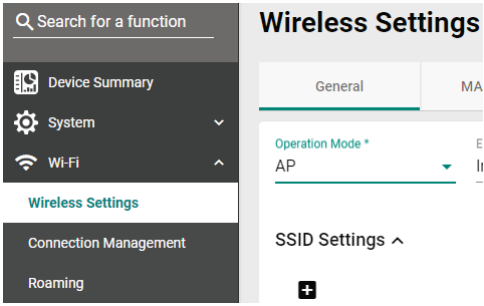
First-time Quick Configuration

After successfully accessing the TAP, refer to the appropriate subsection to quickly set up a wireless network.

NOTE Ensure that there are no IP address conflicts when you configure more than one TAP on the same subnet.

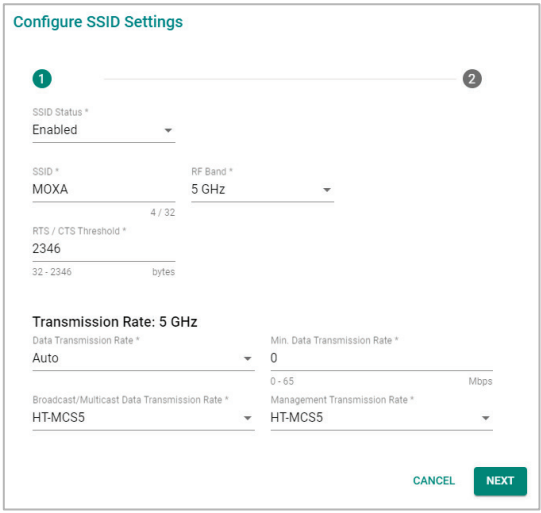
Configuring the TAP as an AP

- **Step 1: Set the operation mode of the TAP to AP mode.**
  Go to **Wi-Fi** → **Wireless Settings** and select **AP** from the **Operation Mode** drop-down list.

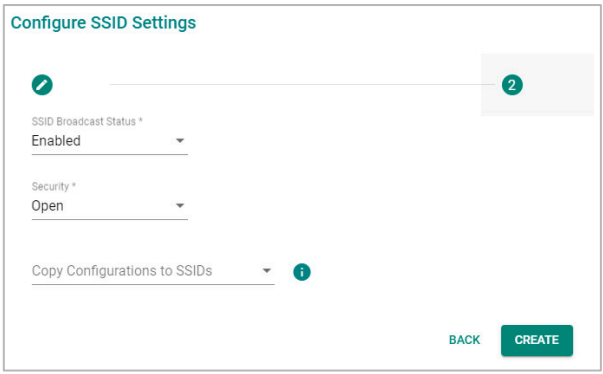


- **Step 2: Set up the TAP as an AP.**
  Click the **ADD** icon ⊞ to create a new SSID.

  On the settings page, configure the **SSID Status, SSID, RF Band, RTS/CTS Threshold,** and **Transmission Rate** for the 5 GHz or 2.4 GHz band. When finished, click **NEXT**.

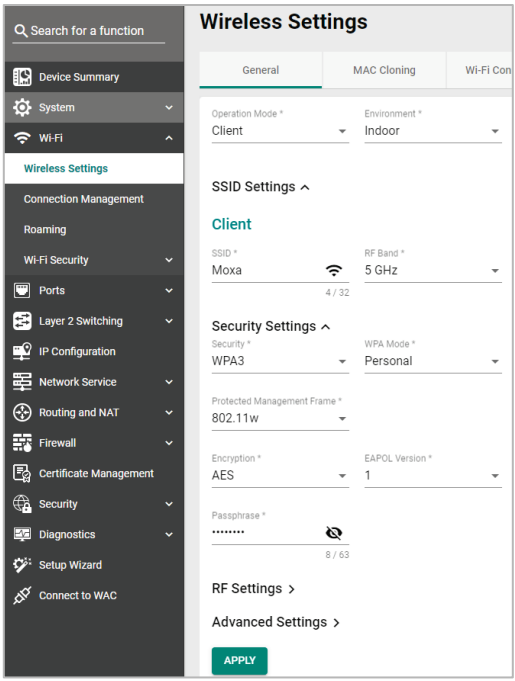


On the second SSID Settings screen, configure the **SSID Broadcast Status** and **Security** type. From here, you can also copy the configuration over to the second SSID. When finished, click **CONFIRM**.



Configuring the TAP as a Client

- **Set the operation mode of the TAP to Client mode.**
  Go to **Wi-Fi > Wireless Settings** and select **Client** from the **Operation Mode** drop-down list, set the SSID, and click **Apply**. For more detailed configurations, refer to the **TAP-M310R User's Manual**.



Certifications

FCC Statement

Federal Communication 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 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 a 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.

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) his device must accept any interference received, including interference that may cause undesired operation.

Caution

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

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 a minimum distance of 20 cm between the radiator and your body.

IMPORTANT NOTE

Antenna Type	Model Number	Antenna Gain (dBi)	
		2.4 GHz	5 GHz
Dipole	ANT-WDB-PNF-1011	11.00	12.04
Dipole	ANT-WSB5-PNF-16	-	16.94

This radio transmitter FCC ID: [SLE-TAP-M310R & SLE-TAP-M310R-NPS] 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.

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 is country-dependent and are firmware-programmed at the factory to match the intended destination. The firmware settings are not accessible to the end user.