WDR-3124A
Quick Installation Guide

Second Edition, April 2015

Overview

Moxa's WDR-3124A industrial wireless device router combines both IEEE 802.11n and cellular technologies to enable flexible wireless communications.

The WDR-3124A is compliant with industrial standards and approvals, covering operating temperature, power input voltage, surge, ESD and vibration. The two DC power inputs offer power redundancy. The dual SIM support and the patented antenna and power isolation design allow the WDR-3124A to operate reliably in any harsh environment.

With support for DIN-rail mounting and wide operating temperature, and IP30 housing with LED indicators, the WDR-3124A is an ideal solution for any industrial wireless applications.

Package Checklist

Moxa's WDR-3124A is shipped with the following items. If any of these items is missing or damaged, please contact your customer service representative for assistance.

- WDR-3124A
- 1 GPS connector terminator
- 2 dual-band omni-directional antennas, 2 dBi, RP-SMA (male)
- 1 2G/3G omni-directional antennas, 2 dBi, SMA (male)
- 5 plastic RJ45 protective caps for serial console and Ethernet ports
- Quick installation guide (printed)
- Warranty card

Installation and Configuration

Before installing the WDR-3124A, 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 WDR-3124A has a default IP address that you must use when connecting to the device for the first time.

Step 1: Insert a SIM card and turn on the WDR-3124A

Insert one or two 2G/3G SIM cards into the SIM slots located on the bottom of the WDR-3124A. Then, turn on the WDR-3124A by connecting a power terminal block to a DC power source (12 to 48 VDC).

Step 2: Connect the WDR-3124A to a notebook or PC

Since the WDR-3124A supports MDI/MDI-X auto-sensing, you can use either a straight-through cable or crossover cable to connect the WDR-3124A to a computer. If the LED indicator on the WDR-3124A's LAN port lights up, it means a connection has been established.

Step 3: Set up the computer's IP address

Set an IP address on the same subnet as the WDR-3124A. Since the WDR-3124A's default IP address is 192.168.127.254, 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 the WDR-3124A

Open your computer's web browser and type **http://192.168.127.254** in the address field to access the homepage of the web-based management system. 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 **Login**.

> User name: admin
> Password: root

⚠️ **ATTENTION**

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

NOTE For the change to take effect, you must click **Save Configuration** to save the changes, and restart (clicking the **Save and Restart** buttons will save all changes).

Hardware Overview

Top Panel View
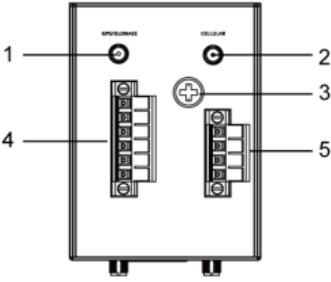
Front Panel View
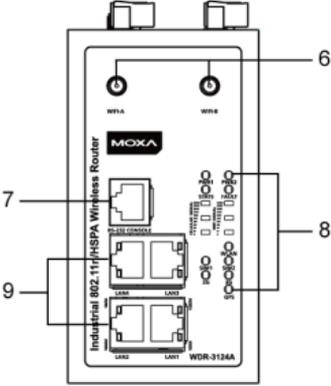

Rear Panel View
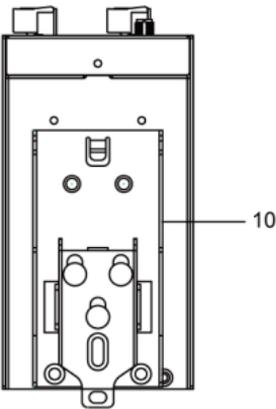
Bottom Panel View
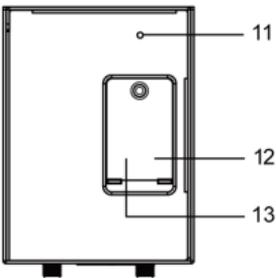
1. GPS antenna connector (female SMA)
2. Cellular antenna connector (female SMA)
3. Grounding screw (M5)
4. Terminal block (two digital input and one digital relay)
5. Terminal block (PWR1 and PWR2)
6. WIFI antenna ports (female RP-SMA)
7. RS-232 serial console (RJ45)
8. LED display
9. 10/100/1000 BaseT(X) Ethernet ports (RJ45)
10. DIN-rail mounting kit
11. Reset button
12. Dual SIM – SIM2
13. Dual SIM – SIM1

Device Dimensions

Unit = mm (inch)
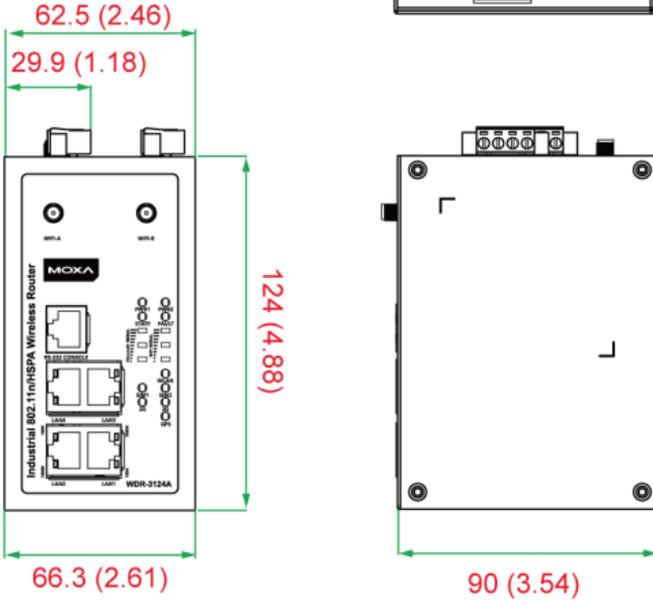
## DIN-Rail Mounting

DIN-Rail Kit Dimensions:
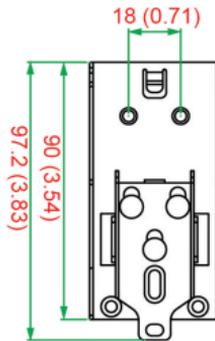
Unit = mm (inch)

The DIN-rail kit is attached to the back panel of the WDR-3124A. Mount the WDR-3124A on corrosion-free mounting rails that meet the EN 60715 standard.

Installation

STEP 1: Insert the upper lip of the DIN rail into the DIN-rail mounting kit.

STEP 2: Press the WDR-3124A towards the DIN rail until it snaps into place.

Step 1
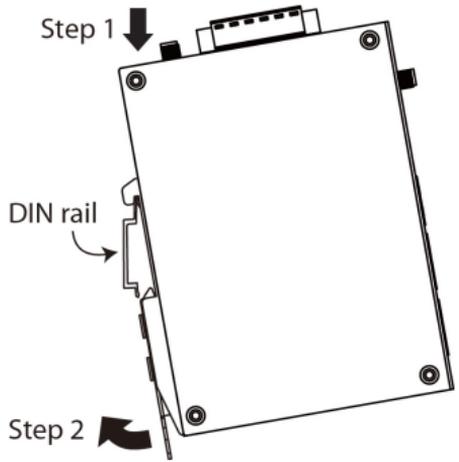
DIN rail

Step 2

Removal

STEP 1: Pull down the latch on the mounting kit using a screwdriver.

STEP 2: Slightly pull the WDR-3124A forward.

STEP 3: Lift up to remove the WDR-3124A from the DIN rail

Step 3

DIN rail

Step 2
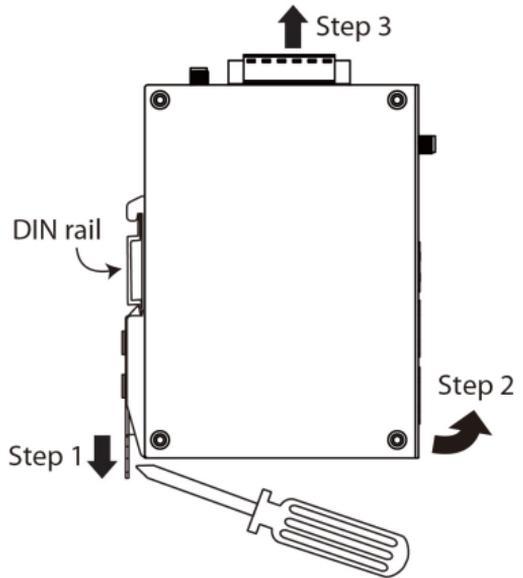
Step 1

Wall Mounting (optional)

For some applications, it may be more convenient to mount the WDR-3124A to a wall.

Wall-mount Kit Dimensions:

51.6 (2.03)

34 (1.34)

3.5 (0.14)

Ø7 (0.28)

67 (2.64)

15.3 (0.6)

30.5 (1.2)
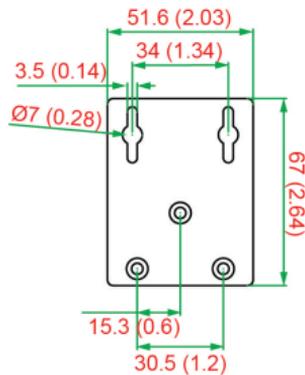
Unit = mm (inch)

STEP 1:

Remove the aluminum DIN-rail attachment plate from the WDR-3124A, and then attach the wall mount plates with M3 screws, as shown in the adjacent diagram.

top plate

bottom plate
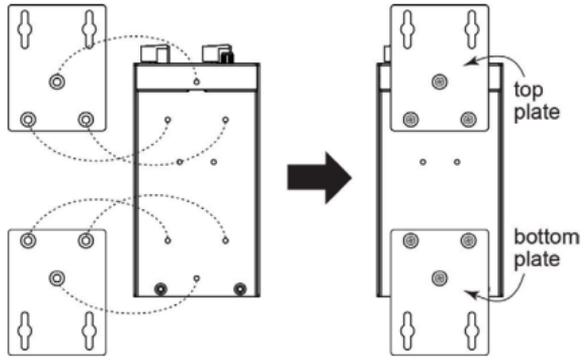
STEP 2:

Mounting the WDR-3124A to a wall requires 4 screws. Use the WDR-3124A 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.

6.0 mm

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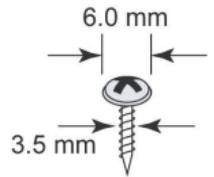
NOTE Test the screw head and shank size by inserting the screw into one of the keyhole shaped apertures of the Wall Mounting Plates before it is screwed into the wall.

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 WDR-3124A downwards, as indicated in the accompanying diagram. Tighten the four screws for added stability.
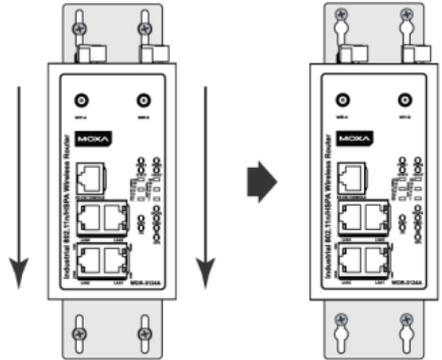
⚠ WARNING

- This equipment is intended to be used in a Restricted Access Location, such as a dedicated computer room. 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.
- Service persons or users should pay special attention and take special precautions before handling the equipment.
- Access should be controlled with lock and key, or a security identity system controlled by the authority responsible for the location. Only authorized, well-trained professionals should be allowed to access the restricted access location.
- External metal parts are hot!! Pay special attention or use special protection before handling.

Wiring Requirements

⚠️ **WARNING**

Safety First!

Be sure to disconnect the power cord before installing and/or wiring your WDR-3124A.

⚠️ **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: 9.6 W (12V/0.7A to 48V/0.2A).

⚠️ **ATTENTION**

Make sure that 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 WDR-3124A

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 WDR-3124A's top panel are used for the WDR-3124A's two DC inputs. Top and front views of the terminal block connector are shown here.
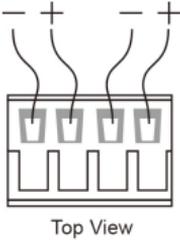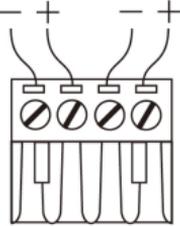
Top View

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 WDR-3124A's top panel.

⚠️ **ATTENTION**

Before connecting the WDR-3124A to the DC power inputs, make sure that the DC power source voltage is stable.

Wiring the Relay Contact

The WDR-3124A has one relay output, which consists of the two contacts of the terminal block on the WDR-3124A's top panel. Refer to the Specification section for detailed electrical requirement. The 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 WDR-3124A has two sets of digital inputs—DI1 and DI2. Each DI comprises two contacts of the 6-pin terminal block connector on the WDR-3124A's top panel. Refer to the Specification section for detailed information on isolated digital input definition.

Communication Connections

10/100BaseT(X) Ethernet Port Connection

The 10/100BaseT(X) ports located on the WDR-3124A'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-	
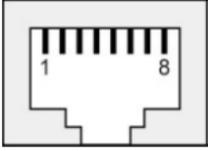
1000BaseT Ethernet Port Connection

1000BaseT data is transmitted on differential TRD+/- signal pairs over copper wires.

MDI/MDI-X Port Pinouts

Pin	Signal
1	TRD(0)+
2	TRD(0)-
3	TRD(1)+
4	TRD(2)+
5	TRD(2)-
6	TRD(1)-
7	TRD(3)+
8	TRD(3)-
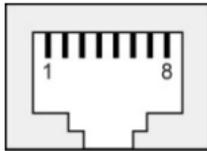
RS-232 Connection

The WDR-3124A 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 WDR-3124A's console port to your PC's COM port. You may then use a console terminal program to access the WDR-3124A 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	–	
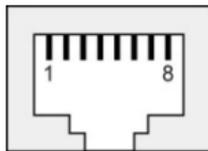
NOTE The pin numbers for both 8-pin and 10-pin RJ45 connectors (and ports) are typically not labeled on the connector (or port). Refer to the Pinout diagram above to see how RJ45 pins are numbered.

LED Indicators

The front panel of the WDR-3124A 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.
STATE	Green	On	System startup is complete and the system is operating
		Blinking	Device has been located by the Wireless Search Utility
		Off	Power is off, or the system is booting up
FAULT	Red	On	System configuration error or a relay event has occurred
		Blinking (fast)	(Blinking interval: 0.5 sec) IP address conflict.
		Blinking (slow)	(Blinking interval: 1 sec) Cannot get an IP address from a DHCP server.
		Off	Power is off, or there is no error condition.
CELLULAR SIGNAL (3 LEDs)	Green	On	Number of LEDs to indicate cellular signal level when connected to a cellular network with an IP address. Signal LED 1: 0 < RSSI <= 12 Signal LED 2: 12 < RSSI <= 20 Signal LED 3: 20 < RSSI <= 31
WIFI SIGNAL (3 LEDs)	Green	On/Off	WiFi signal level (**Client-Router** mode only) Signal LED 1: 0 < SNR <= 23 Signal LED 2: 23 < SNR <= 47 Signal LED 3: 47 < SNR
SIM1	Amber	On/Off	SIM 1 is active or inactive
		Blinking	SIM 1 is not inserted or PIN code is incorrect
SIM2	Amber	On/Off	SIM 2 is active or inactive
		Blinking	SIM 2 is not inserted or PIN code is incorrect
2G	Amber	On	Registered to a base station with cellular connection in GPRS or EDGE mode
3G	Amber	On	Registered to a base station with cellular connection in UMTS or HSPA mode
GPS	Green	On	GPS has been located
		Blinking	Locating GPS or less than four satellites have been located.
		Off	GPS has not been located
LAN Port LED Indicators (Port Interface)			
1000M	Green	On	1000Mbps link is active
		Blinking	Data is being transmitted at 1000Mbps
		Off	1000Mbps link is inactive
10/100M	Amber	On	10/100Mbps link is active
		Blinking	Data is being transmitted at 10/100Mbps
		Off	10/100Mbps link is inactive

Specifications

Cellular Interface	
Standards	GSM/GPRS/EDGE/UMTS/HSPA
Band Options	WDR-3124A-EU/US: Five band UMTS/HSPA 800/850/900/1900/2100 MHz WDR-3124A-EU/US: Quad-band GSM/GPRS/EDGE 850/900/1800/1900 MHz
HSPA Data Rate	Downlink: Up to 14.4 Mbps Uplink: Up to 5.76 Mbps (category 6, 7)
GPRS Data Rate	Downlink/Uplink: 236 kbps (class 12)
SMS	Point-to-point MT and MO PDU mode
Interface	
Cellular Antenna Connectors	1 SMA (female) for WCDMA
Wireless Antenna Connectors	2 RP-SMA (female)
GNSS (GPS+GLONASS)	1 SMA (female), GPS: 1575.42 MHz GLONASS: 1602 MHz
SIM Slots	Dual SIM card support
Ethernet	4, 10/100/1000Mbps auto negotiation speed, F/H duplex mode and auto MDI/MDI-X connection (RJ45-type)
Serial Console Port	1, RS-232 (RJ45-type)
LED Indicators	PWR1, PWR2, STATE, FAULT, CELLULAR SIGNAL, WIFI SIGNAL, WLAN, SIM1, SIM2, 2G, 3G, GPS
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"
Ground Screw	M5
Reset Button	Power Reset/Factory Default Reset
WLAN Interface	
Standards	IEEE 802.11a/b/g/n for Wireless LAN IEEE 802.11i for Wireless Security
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 802.11a/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)

Operating Channels (central frequency)	WDR-3124A-EU: - 2.412 to 2.472 GHz (13 channels) - 5.180 to 5.240 (4 channels) WDR-3124A-US: - 2.412 to 2.462 GHz (11 channels) - 5.180 to 5.240 (4 channels) - 5.745 to 5.825 GHz (5 channels)
Security	SSID broadcast enable/disable 64-bit and 128-bit WEP encryption, WPA/WPA2-Personal and Enterprise (IEEE 802.1X/RADIUS and AES)
Transmission Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: 6.5 to 300 Mbps (multiple rates supported)
TX Transmit Power	2.4GHz 802.11b: - Typ. 23±1.5 dBm @ 1 Mbps - Typ. 20±1.5 dBm @ 5 Mbps - Typ. 19±1.5 dBm @ 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 802.11n: - MCS0, 8@20 MHz: Typ. 20 dBm (± 1.5 dBm) - MCS7, 15@20 MHz: Typ. 16 dBm (± 1.5 dBm) - MCS0, 8@40 MHz: Typ. 20 dBm (± 1.5 dBm) - MCS7, 15@40 MHz: Typ. 16 dBm (± 1.5 dBm) 5GHz 802.11a: - Typ. 20±1.5 dBm @ 6 to 24 Mbps - Typ. 19±1.5 dBm @ 36 Mbps - Typ. 16±1.5 dBm @ 48 Mbps - Typ. 15±1.5 dBm @ 54 Mbps 802.11n: - MCS0, 8@20 MHz: Typ. 19 dBm (± 1.5 dBm) - MCS7, 15@20 MHz: Typ. 14 dBm (± 1.5 dBm) - MCS0, 8@40 MHz: Typ. 18 dBm (± 1.5 dBm) - MCS7, 15@40 MHz: Typ. 14 dBm (± 1.5 dBm)

RX Sensitivity	2.4GHz
	802.11b:
	- -92 dBm @ 1 Mbps
	- -90 dBm @ 2 Mbps
	- -88 dBm @ 5.5 Mbps
	- -84 dBm @ 11 Mbps
	802.11g:
	- -87 dBm @ 6 Mbps
	- -86 dBm @ 9 Mbps
	- -85 dBm @ 12 Mbps
	- -82 dBm @ 18 Mbps
	- -80 dBm @ 24 Mbps
	- -76 dBm @ 36 Mbps
	- -74 dBm @ 48 Mbps
	- -72 dBm @ 54 Mbps
	802.11n:
	- -69 dBm @ MCS15 20MHz
	- -71 dBm @ MCS7 20MHz
	5GHz
	802.11a:
	- -87 dBm @ 6 Mbps
	- -86 dBm @ 9 Mbps
	- -85 dBm @ 12 Mbps
	- -82 dBm @ 18 Mbps
	- -80 dBm @ 24 Mbps
	- -76 dBm @ 36 Mbps
	- -74 dBm @ 48 Mbps
	- -72 dBm @ 54 Mbps
	802.11n:
	- -68 dBm @ MCS15 40MHz
	- -69 dBm @ MCS15 20MHz
	- -70 dBm @ MCS7 40MHz
	- -71 dBm @ MCS7 20MHz
LAN Interface	
Standards	IEEE 802.3 for 10BaseT
	IEEE 802.3u for 100BaseTX
	IEEE 802.3ab for 1000BaseT
Speed	10/100/1000Mbps auto negotiation speed
Software	
Network Protocol	ICMP, TCP/IP, UDP, DHCP, Telnet, DNS, SNMP, HTTP, HTTPS, SMTP, SNTP, ARP, Radius
Routing/Firewall	NAT, Port Forwarding, IP/MAC/Port Filtering
VPN	Max. Tunnel Number: 5 (Responder/Initiator) IPSec (DES, 3DES, AES, MD5, SHA-1, DH2, DH5), PSK/X.509/RSA
Management Options	Remote SMS Control, SNMPv1/v2c/v3, Web/Telnet/Serial Console
GPS	NMEA
Others	DDNS
Software (Moxa Proprietary)	
GuaranLink	3-tier heart-beat for reliable and persistent cellular connectivity
Wireless Central Management	Large scale centralized device management over private cellular IPs
Search Utility	Simple device configuration and management

Physical Characteristics	
Housing	Metal casing for high EMC-level, providing IP30 protection
Mounting	DIN-rail (default) or wall-mount (optional)
Weight	1280 g
Dimension	67 x 90.5 x 124 mm (2.6 x 3.52 x 4.83 inch)
Installation	DIN-rail mounting, wall mounting (with optional kit)
Environmental Limits	
Operating Temperature	Standard models: 0 to 55°C (32 to 131°F) Wide temperature models: -30 to 70°C (-22 to 158°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Ambient Relative Humidity	5 to 95% (30°C, non-condensing)
Power Requirements	
Input Voltage	12 to 48 VDC, redundant dual DC power inputs
Connector	4-pin removable terminal block
Power Consumption	9.6W (12V/0.7A to 48V/0.2A)
Reverse Polarity Protection	Present
Standards and Certifications	
Safety	UL 60950-1, EN 60950-1
EMC	EN 301 489-1, EN 301 489-7 EN 301 489-17, EN 301 489-24 FCC Part 15 Subpart B EN 61000-6-2/-4
Radio	EN 301 511, EN 301 908 EN 300 328, EN 301 893
Reliability	
MTBF	382,851 hours
Warranty	
Warranty Period	5 years
Details	See www.moxa.com/support/warranty.aspx

⚠ ATTENTION

The WDR-3124A is **NOT** a portable mobile device and should be located at least 20 cm away from the human body.

The WDR-3124A is **NOT** designed for the general public. To deploy WDR-3124A units and establish a wireless network safely, a well-trained technician should do the installation.

⚠ ATTENTION

Use the antennas correctly: Wide-band (2G/3G) antennas are needed for the WDR-3124A to operate in a cellular network. The 2.4 GHz antennas are needed when the WDR-3124A operates in IEEE 802.11b/g/n. The 5 GHz antennas are needed for IEEE802.11a/n. Make sure that your antenna installation is within a safety area, which is covered by a **lightning protection or surge arrest** system.

⚠ ATTENTION

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.

⚠ ATTENTION

Do not locate the antenna near overhead power lines or other electric light or power circuits, or where it can come into contact with such circuits. When installing the antenna, take extreme care not to come into contact with such circuits, because they may cause serious injury or death. For proper installation and grounding of the antenna, refer to national and local codes (for example, U.S.:NFPA 70, National Electrical Code, Artical810, Canada: Canadian Electrical Code, Section 54).