TAP-323 Series

Rugged trackside 802.11n IP68 wireless AP

- 2 dual-band radios, IEEE 802.11a/b/g/n compliant
- Railway-approved IP68 housing
- Controller-based Turbo Roaming
- 2 fiber SFP slots and 4 PoE ports with M12 LAN connectors
- High transmission power for extended reach
- Complies with EN 50121-4 specifications for trackside applications
- -40 to 75°C operating temperature range

Introduction

The TAP-323 trackside wireless unit is designed for board-to-ground wireless communication. The TAP-323 is a highly compact and rugged wireless unit that integrates two access points, a managed fiber switch, and a wide-range AC/DC power supply into one box. The IP68 housing allows the unit to withstand harsh weather conditions, and M12 connectors make the unit shock and vibration resistant. The TAP-323 supports advanced controller-based Turbo Roaming technology for train-to-ground wireless applications such as communication-based train control (CBTC) and CCTV. The unit can supply power to up to 4 PoE devices while providing reliable LAN communication with Moxa's Turbo Chain technology.

Advanced Mobility and Reliability

- Controller-based L3 Turbo Roaming
- Mobile IP support
- 2 dual-band radios: 2.4 GHz and 5 GHz
- Turbo Chain support (100 ms recovery time)
- WPA/WPA2 and 802.11i supported
- IEEE 802.1X/RADIUS supported

Built for Transportation Applications

- Isolated 110 to 220 VDC/VAC power input
- High transmission power, 400 mW (max)
- Supplies power through 4 PoE ports
- 2 fiber SFP ports for backbone installation
- Wide temperature (-40 to 75°C) range and IP68-rated housing

Specifications

WLAN Interface

Standards:
IEEE 802.11a/b/g/n 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
IEEE 802.3af for Power-over-Ethernet
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1p for Class of Service
IEEE 802.1Q for VLAN

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):
• US:
2.412 to 2.462 GHz (11 channels)
5.180 to 5.240 (4 channels)
5.260 to 5.320 (4 channels)*
5.500 to 5.700 GHz (8 channels - excludes 5.600 to 5.640 GHz)*
5.745 to 5.825 GHz (5 channels)
• EU:
2.412 to 2.472 GHz (13 channels)
5.180 to 5.240 (4 channels)
5.260 to 5.320 (4 channels)*
5.500 to 5.700 GHz (11 channels)*
• JP:
2.412 to 2.484 GHz (14 channels, DSSS)
5.180 to 5.240 (4 channels)
5.260 to 5.320 (4 channels)*
5.500 to 5.700 GHz (11 channels)*
*Special frequency bands (such as 6.0 GHz) are available for customization.

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
802.11n: 6.5 to 300 Mbps (multiple rates supported)

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

802.11n (2.4 GHz):
- Typ. 23±1.5dBm @ MCS0 20 MHz
- Typ. 21±1.5dBm @ MCS1 20 MHz
- Typ. 21±1.5dBm @ MCS2 20 MHz
- Typ. 21±1.5dBm @ MCS3 20 MHz
- Typ. 20±1.5dBm @ MCS4 20 MHz
- Typ. 19±1.5dBm @ MCS5 20 MHz
- Typ. 18±1.5dBm @ MCS6 20 MHz
- Typ. 18±1.5dBm @ MCS7 20 MHz
- Typ. 23±1.5dBm @ MCS8 20 MHz
- Typ. 21±1.5dBm @ MCS9 20 MHz
- Typ. 21±1.5dBm @ MCS10 20 MHz
- Typ. 21±1.5dBm @ MCS11 20 MHz
- Typ. 20±1.5dBm @ MCS12 20 MHz
- Typ. 19±1.5dBm @ MCS13 20 MHz
- Typ. 18±1.5dBm @ MCS14 20 MHz
- Typ. 18±1.5dBm @ MCS15 20 MHz
- Typ. 23±1.5dBm @ MCS0 40 MHz
- Typ. 20±1.5dBm @ MCS1 40 MHz
- Typ. 20±1.5dBm @ MCS2 40 MHz
- Typ. 20±1.5dBm @ MCS3 40 MHz
- Typ. 19±1.5dBm @ MCS4 40 MHz
- Typ. 19±1.5dBm @ MCS5 40 MHz
- Typ. 18±1.5dBm @ MCS6 40 MHz
- Typ. 17±1.5dBm @ MCS7 40 MHz
- Typ. 23±1.5dBm @ MCS8 40 MHz
- Typ. 20±1.5dBm @ MCS9 40 MHz
- Typ. 20±1.5dBm @ MCS10 40 MHz
- Typ. 20±1.5dBm @ MCS11 40 MHz
- Typ. 20±1.5dBm @ MCS12 40 MHz
- Typ. 19±1.5dBm @ MCS13 40 MHz
- Typ. 18±1.5dBm @ MCS14 40 MHz
- Typ. 17±1.5dBm @ MCS15 40 MHz

802.11a:
- Typ. 23±1.5 dBm @ 6 to 24 Mbps
- Typ. 21±1.5 dBm @ 36 Mbps
- Typ. 20±1.5 dBm @ 48 Mbps
- Typ. 18±1.5 dBm @ 54 Mbps

802.11n (5 GHz):
- Typ. 23±1.5dBm @ MCS0 20 MHz
- Typ. 20±1.5dBm @ MCS1 20 MHz
- Typ. 20±1.5dBm @ MCS2 20 MHz
- Typ. 20±1.5dBm @ MCS3 20 MHz
- Typ. 19±1.5dBm @ MCS4 20 MHz
- Typ. 18±1.5dBm @ MCS5 20 MHz
- Typ. 18±1.5dBm @ MCS6 20 MHz
- Typ. 18±1.5dBm @ MCS7 20 MHz
- Typ. 23±1.5dBm @ MCS8 20 MHz
- Typ. 20±1.5dBm @ MCS9 20 MHz
- Typ. 20±1.5dBm @ MCS10 20 MHz
- Typ. 20±1.5dBm @ MCS11 20 MHz
- Typ. 19±1.5dBm @ MCS12 20 MHz
- Typ. 19±1.5dBm @ MCS13 20 MHz
- Typ. 18±1.5dBm @ MCS14 20 MHz
- Typ. 18±1.5dBm @ MCS15 20 MHz
- Typ. 23±1.5dBm @ MCS0 40 MHz
- Typ. 20±1.5dBm @ MCS1 40 MHz
- Typ. 20±1.5dBm @ MCS2 40 MHz
- Typ. 20±1.5dBm @ MCS3 40 MHz
- Typ. 19±1.5dBm @ MCS4 40 MHz
- Typ. 18±1.5dBm @ MCS5 40 MHz
- Typ. 18±1.5dBm @ MCS6 40 MHz
- Typ. 18±1.5dBm @ MCS7 40 MHz
- Typ. 23±1.5dBm @ MCS8 40 MHz
- Typ. 20±1.5dBm @ MCS9 40 MHz
- Typ. 20±1.5dBm @ MCS10 40 MHz
- Typ. 20±1.5dBm @ MCS11 40 MHz
- Typ. 19±1.5dBm @ MCS12 40 MHz
- Typ. 19±1.5dBm @ MCS13 40 MHz
- Typ. 18±1.5dBm @ MCS14 40 MHz
- Typ. 18±1.5dBm @ MCS15 40 MHz

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

802.11n (2.4 GHz):
- -89 dBm @ MCS0 20 MHz
- -85 dBm @ MCS1 20 MHz
- -85 dBm @ MCS2 20 MHz
- -82 dBm @ MCS3 20 MHz
- -78 dBm @ MCS4 20 MHz
- -74 dBm @ MCS5 20 MHz
- -72 dBm @ MCS6 20 MHz
- -70 dBm @ MCS7 20 MHz
- -95 dBm @ MCS8 20 MHz
- -90 dBm @ MCS9 20 MHz
- -87 dBm @ MCS10 20 MHz
- -83 dBm @ MCS11 20 MHz
- -80 dBm @ MCS12 20 MHz
- -74 dBm @ MCS13 20 MHz
- -71 dBm @ MCS14 20 MHz
- -69 dBm @ MCS15 20 MHz
- -87 dBm @ MCS0 40 MHz
- -83 dBm @ MCS1 40 MHz
- -83 dBm @ MCS2 40 MHz
- -80 dBm @ MCS3 40 MHz
- -76 dBm @ MCS4 40 MHz
- -73 dBm @ MCS5 40 MHz
- -69 dBm @ MCS6 40 MHz
- -67 dBm @ MCS7 40 MHz
- -93 dBm @ MCS8 40 MHz
- -88 dBm @ MCS9 40 MHz
- -85 dBm @ MCS10 40 MHz
- -82 dBm @ MCS11 40 MHz
- -78 dBm @ MCS12 40 MHz
- -73 dBm @ MCS13 40 MHz
- -69 dBm @ MCS14 40 MHz
- -67 dBm @ MCS15 40 MHz

802.11a:
• -90 dBm @ 6 Mbps
• -88 dBm @ 9 Mbps
• -88 dBm @ 12 Mbps
• -85 dBm @ 18 Mbps
• -81 dBm @ 24 Mbps
• -78 dBm @ 36 Mbps
• -74 dBm @ 48 Mbps
• -74 dBm @ 54 Mbps
802.11n (5 GHz):
• -88 dBm @ MCS0 20 MHz
• -85 dBm @ MCS1 20 MHz
• -82 dBm @ MCS2 20 MHz
• -79 dBm @ MCS3 20 MHz
• -76 dBm @ MCS4 20 MHz
• -71 dBm @ MCS5 20 MHz
• -70 dBm @ MCS6 20 MHz
• -69 dBm @ MCS7 20 MHz
• -95 dBm @ MCS8 20 MHz
• -91 dBm @ MCS9 20 MHz
• -87 dBm @ MCS10 20 MHz
• -80 dBm @ MCS11 20 MHz
• -78 dBm @ MCS12 20 MHz
• -74 dBm @ MCS13 20 MHz
• -72 dBm @ MCS14 20 MHz
• -71 dBm @ MCS15 20 MHz
• -84 dBm @ MCS0 40 MHz
• -81 dBm @ MCS1 40 MHz
• -77 dBm @ MCS2 40 MHz
• -75 dBm @ MCS3 40 MHz
• -71 dBm @ MCS4 40 MHz
• -67 dBm @ MCS5 40 MHz
• -64 dBm @ MCS6 40 MHz
• -63 dBm @ MCS7 40 MHz
• -90 dBm @ MCS8 40 MHz
• -85 dBm @ MCS9 40 MHz
• -82 dBm @ MCS10 40 MHz
• -81 dBm @ MCS11 40 MHz
• -77 dBm @ MCS12 40 MHz
• -73 dBm @ MCS13 40 MHz
• -71 dBm @ MCS14 40 MHz
• -68 dBm @ MCS15 40 MHz

Protocol Support

General Protocols: Proxy ARP, DNS, HTTP, HTTPS, IP, ICMP, SNTP, TCP, UDP, RADIUS, SNMPv1/v2/v3, PPPoE, DHCP
AP-only Protocols: ARP, BOOTP, DHCP, STP/RSTP (IEEE 802.1D/w)

Interface

Fiber Ports: 2, 100/1000Base SFP slot
Console Port: M12 B-coded 5-pin female connector for the USB console
USB Port: M12 A-coded 5-pin female connector for connecting the ABC-02 USB storage dongle*
*The ABC-02 can be purchased separately.
LED Indicators: PWR1, PWR2, PoE1-4, FAULT1, FAULT2, STATUS, HEAD, TAIL, LAN1-6, WLAN1, WLAN2
Ethernet Ports: 4, side cabling, M12 D-coded 4-pin female connector, 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection, 802.1af PoE power budget

Connector Conduit	PG Thread Size
Antenna Ports	PG29
Power Port	PG36

Connector for External Antennas: N-type (female)

Physical Characteristics

Housing: Metal, IP68 protection
Weight: 10 kg (22.22 lb)
Dimensions: 324 x 279 x 156 mm (12.76 x 10.98 x 6.142 in)
Installation: Wall mounting

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: 110/220 VDC/VAC (88 to 300 VDC, 85 to 264 VAC)
Input Current:
AC input: 110 to 220 VAC, 50 to 60 Hz, 1.1 A (max.)
DC input: 110 to 220 VDC, 1.1 A (max.)
Connector: M23
Power Consumption: Maximum 85 watts (with PSE ports fully loaded)

PSE/Voltage	110 VDC	110 VAC	220 VDC	220 VAC
0 PSE ports in use	17.4 W	16.2 W	17.6 W	17.5 W
1 PSE port in use	34.15 W	32.6 W	33.8 W	33.55 W
2 PSE ports in use	50.9 W	49 W	49.9 W	49.6 W
3 PSE ports in use	67.65 W	65.4 W	66 W	65.65 W
4 PSE ports in use	84.4 W	81.8 W	82.1 W	81.7 W

Reverse Polarity Protection: Present
Overload Current Protection: Present

Standards and Certifications

Safety: UL 60950-1, IEC 60950-1(CB), LVD EN 60950-1
EMC: EN 61000-6-2/6-4, EN 55032/55024
EMI: CISPR 22, FCC Part 15B Class A
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 301 489-1/17, EN 300 328, EN 301 893, TELEC, DFS, FCC, IC, WPC
Rail Traffic: EN 50155*, EN 50121-4
*Complies with a portion of EN 50155 specifications.
Fire and Smoke: EN 45545-2
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (mean time between failures)

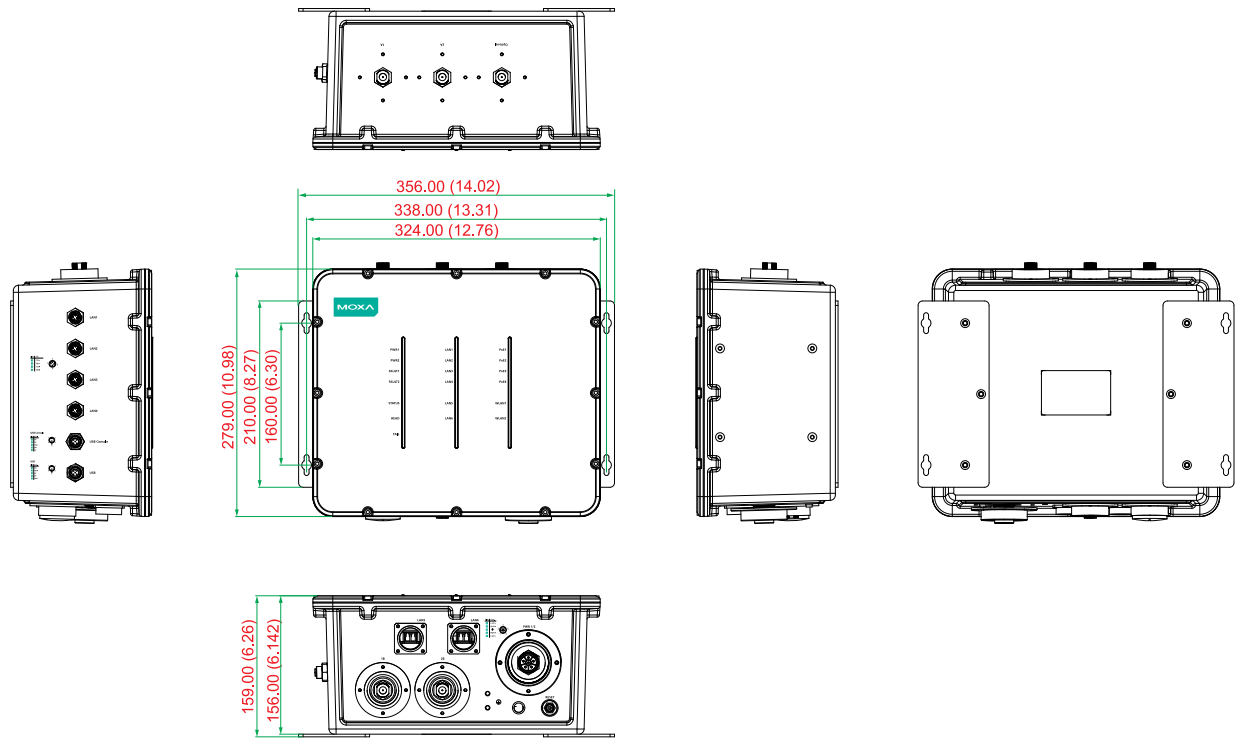
Time: 290,937 hrs
Standard: Telcordia SR332

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Unit: mm (inch)



Ordering Information

Available Models

TAP-323-EU-CT-T: Railway trackside 802.11n IP68 wireless access point, EU band, -40 to 75°C operating temperature, conformal coating

TAP-323-US-CT-T: Railway trackside 802.11n IP68 wireless access point, US band, -40 to 75°C operating temperature, conformal coating

TAP-323-JP-CT-T: Railway trackside 802.11n IP68 wireless access point, JP band, -40 to 75°C operating temperature, conformal coating

Note: Please visit Moxa's website for a complete list of optional wireless accessories and antennas available for Moxa's wireless products.

Recommended SFP Modules (can be purchased separately)

SFP-1FELLC-T: SFP module with 1 100Base port with LC connector for 80 km transmission, single-mode, -40 to 85°C operating temperature range

SFP-1FESLC-T: SFP module with 1 100Base port with LC connector for 40 km transmission, single-mode, -40 to 85°C operating temperature range

SFP-1GLXLC-T: SFP module with 1 1000Base port with LC connector for 10 km transmission, single-mode, -40 to 85°C operating temperature range

SFP-1GLHLC-T: SFP module with 1 1000Base port with LC connector for 30 km transmission , single-mode, -40 to 85°C operating temperature range

SFP-1GLHXLC-T: SFP module with 1 1000Base port with LC connector for 40 km transmission, single-mode, -40 to 85°C operating temperature range

SFP-1GSXLC-T: SFP module with 1 1000Base port with LC connector for 300/550 m transmission, multi-mode, -40 to 85°C operating temperature range

SFP-1GLSXLC-T: SFP module with 1 1000Base port with LC connector for 1/2 km transmission, multi-mode, and -40 to 85°C operating temperature range

Optional Accessories (can be purchased separately)

ABC-02-USB: USB-based auto backup configurator, configuration backup/restoration, firmware upgrade and log file storage tool for managed Ethernet switches and routers, 0 to 60°C operating temperature

ABC-02-USB-T: USB-based auto backup configurator, configuration backup/restoration, firmware upgrade and log file storage tool for managed Ethernet switches and routers, -40 to 75°C operating temperature

Package Checklist

- 1 TAP-323
- 1 wall-mounting kit, including 2 plates
- 1 fiber panel mounting kit
- 6 metal protective caps for LAN-1 to LAN-4 Ethernet ports, USB console port, and ABC-02* USB storage port
- 5 metal protective caps for 4 antenna ports and 1 optional antenna port
- 3 antenna glands for top side antenna
- 1 metal M23 male 6-pin crimp connector for power
- 1 plastic M23 dust cover for power
- Quick installation guide (printed)
- Warranty card

*ABC-02 and SFP modules can be purchased separately; they are not included in the package.

Railway Access Point Accessories

M12/M23 Cords

CBL-M12D(MM4P)/RJ45-100 IP67

1-meter M12-to-RJ45 Cat-5C UTP Ethernet cable with IP67-rated 4-pin male D-coded M12 connector

CBL-M23(FF6P)/Open-BK-100 IP67

1-meter M23-to-6-pin power cable with IP67-rated 6-pin female M23 connector

M12/M23 Connectors

M12D-4P-IP68

Field-installable M12 D-coded screw-in sensor connector, 4-pin male, IP68-rated

A-PLG-WPM23-01

Field-installable M23 cable connector, 6-pin female, crimp type

M12 IP67 Protective Caps

A-CAP-N-M

Metal cap to cover N-type connector

A-CAP-M12F-M

Metal cap for M12 female connector