Your Industrial Ethernet Solutions for Control and Automation

MTL Instruments
MOXA
Industrial Wireless Ethernet
## Industrial Wireless Ethernet

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Getting un-Wired with IEEE 802.11

Introduction

Are you ready for the convenience that comes from sending your Ethernet packets over the air instead of through a wire? Wireless is not for everyone, but if your application uses mobile equipment that is controlled over a TCP/IP network, or the cost of installing wire conduits at your work site is prohibitive, then consider setting up a wireless local area network (WLAN). The IEEE 802.11 standard specifies a way to use radio frequency (RF) technology to send Ethernet packets over the air. Applications that include TCP/IP will run on 802.11-compliant WLANs the same as they do over Ethernet. By common agreement between regulatory agencies around the world (FCC, ETSI, etc.), a WLAN transmits over unlicensed spectrums, with only minor variations from country to country.

802.11 Specifications

<table>
<thead>
<tr>
<th></th>
<th>802.11a</th>
<th>802.11b</th>
<th>802.11g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approval Date</td>
<td>September 1999</td>
<td>September 1999</td>
<td>June 2003</td>
</tr>
<tr>
<td>Compatibility</td>
<td>IEEE 802.11a compliant</td>
<td>IEEE 802.11b compliant</td>
<td>IEEE 802.11b/g compliant</td>
</tr>
<tr>
<td>Number of Channels</td>
<td>8 non-overlapping (4 in some countries)</td>
<td>3 non-overlapping</td>
<td>3 non-overlapping</td>
</tr>
<tr>
<td>Data Rates</td>
<td>54, 48, 36, 24, 18, 12, 9, 6 Mbps</td>
<td>54, 48, 36, 24, 18, 12, 9, 6 Mbps</td>
<td>54, 48, 36, 24, 18, 12, 9, 6 Mbps</td>
</tr>
<tr>
<td>Wireless Medium</td>
<td>Orthogonal Frequency Division Multiplexing (OFDM), 5 GHz</td>
<td>Direct Sequence Spread Spectrum (DSSS), 2.4 GHz</td>
<td>Orthogonal Frequency Division Multiplexing (OFDM), 2.4 GHz</td>
</tr>
</tbody>
</table>

Typical Wireless Network Configurations

A wireless LAN is configured for either Ad-hoc mode or Infrastructure mode. In Ad-hoc mode, stations use peer-to-peer transmission to send information from station to station, without requiring an AP (Access Point) to connect to a wired network. This is the easiest and least expensive way to set up a wireless network. Alternatively, Infrastructure mode requires using an AP. The AP can be used by itself to set up a WLAN, or can be used to connect the WLAN to a wired network. In either case, all wireless communication goes through the AP.
Benefits of Using Wireless Technology

What makes wireless networking a natural choice for many networking requirements?

- **Flexibility:** Wireless networks work anywhere, anytime.
- **Easy Deployment:** Wireless networks are ideal for those hard to wire areas.
- **High Performance:** Wireless networks have the bandwidth and safeguards needed to keep essential applications running continuously.
- **Cost Effective:** Wireless networks can be installed quickly, and help reduce the cost of cabling and maintenance.

Moxa’s Wireless Solutions for Industrial Markets

One of the biggest concerns raised by potential users of WLAN technology is safety. Since data is transmitted by radio waves, how can users guarantee the confidentiality of their information? To provide secure transmission over wireless networks, Moxa provides WPA (Wi-Fi Protected Access) and WPA2 security specifications to overcome weaknesses in Wired Equivalent Privacy (WEP). In addition, Moxa’s wireless products incorporate several important features to meet the stringent demands of industrial applications, including redundant power inputs, operating temperature ranges of either 0 to 60°C or -40 to 75°C (T models) and DIN-Rail mounting capability. The enhanced reliability of these products makes them a great choice for your wireless industrial applications.

WPA (Wi-Fi Protected Access)

Moxa’s wireless products support the WPA/WPA2 standards proposed by the Wi-Fi Alliance (http://www.wi-fi.org). Both WPA-PSK (Pre-Shared Key) mode and full WPA mode are supported. WPA includes TKIP (Temporal Key Integrity Protocol) and IEEE 802.1X, and replaces WEP by providing better WLAN security.

WLAN Security

<table>
<thead>
<tr>
<th>Security Protocols</th>
<th>Features</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEP (Wired Equivalent Privacy)</td>
<td>• Data encryption with RC4</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td>• User-name/password authentication not provided</td>
<td></td>
</tr>
<tr>
<td>TKIP (Temporary Key Integration Protocol)</td>
<td>• Enhanced WEP with extended WEP IV length</td>
<td>Available</td>
</tr>
<tr>
<td></td>
<td>• Packet Integration Check</td>
<td></td>
</tr>
<tr>
<td>802.1X</td>
<td>• Uses EAP (Extensible Authentication Protocol) for port-based authentication</td>
<td>Available</td>
</tr>
<tr>
<td></td>
<td>• Supports RADIUS, Kerberos, and other authentication services</td>
<td></td>
</tr>
<tr>
<td>WPA (Wi-Fi Protected Access)</td>
<td>• TKIP, 802.1X, MIC (Message Integration Check)</td>
<td>Available</td>
</tr>
<tr>
<td></td>
<td>• Supports RADIUS for authentication</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Backward upgradeable to all systems</td>
<td></td>
</tr>
<tr>
<td>802.11i (WPA2)</td>
<td>• WPA+AES cipher</td>
<td>Available in AWK-3121, AWK-1200-AP</td>
</tr>
</tbody>
</table>

IEEE 802.1X/RADIUS

When configured for AP/Bridge mode, Moxa’s wireless products authenticate wireless users and distribute encryption keys dynamically with IEEE 802.1X Port-based Network Access Control and RADIUS (Remote Authentication Dial-In User Service). The following authentication methods are supported: EAP-MD5, EAP-TLS, EAP-TTLS, and PEAP.

Redundant Power Inputs

The AWK-3121/1100 provides two power inputs that can be connected simultaneously to live DC power sources. If one of the power inputs fails, the other live source acts as a backup to provide the AWK-3121 and AWK-1100’s power needs automatically.
Industrial Ethernet Solutions for Control and Automation

: Typical Industrial Application of Wireless Ethernet

- **AWK-1200-AP**
  - Outdoor Wireless AP
  - IP68
  - 802.11b/g
  - -20 to 70°C

- **AWK-1200-AC**
  - IP67
  - 802.11b/g
  - -20 to 70°C

- **AWK-3121**
  - IP30
  - 802.11b/g
  - 0 to 60°C, -40 to 75°C (T model)

- **AWK-1100**
  - IP30
  - 802.11b/g
  - 0 to 60°C

: Comparison Chart for Wireless Ethernet Products

<table>
<thead>
<tr>
<th>Model</th>
<th>64-bit and 128-bit WEP Encryption</th>
<th>WPA</th>
<th>WPA2</th>
<th>IEEE 802.1X</th>
<th>Hide SSID</th>
<th>IP Rating</th>
<th>Standard</th>
<th>Operating Temperature</th>
<th>Power Redundancy</th>
<th>DIN-Rail Mounting</th>
<th>Wall Mounting</th>
<th>Mast Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWK-3121</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>IP30</td>
<td>802.11a/b/g</td>
<td>0 to 60°C, -40 to 75°C (T model)</td>
<td>√</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AWK-1200-AP</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>IP68</td>
<td>802.11b/g</td>
<td>-20 to 70°C</td>
<td></td>
<td>√</td>
<td></td>
<td></td>
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<tr>
<td>AWK-1200-AC</td>
<td>√</td>
<td>√</td>
<td>√</td>
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<td>√</td>
<td>IP68</td>
<td>802.11b/g</td>
<td>-20 to 70°C</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>AWK-1100</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>IP30</td>
<td>802.11b/g</td>
<td>0 to 60°C</td>
<td>√</td>
<td>√</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
AWK-3121 Series

Industrial IEEE 802.11a/b/g wireless Access Point/Bridge/Client

Overview
- Wireless Ethernet
- Active Ethernet I/O
- Peer-to-Peer I/O
- Modular Remote I/O
- Media Converters
- Accessories
- Order Information

Introduction
Are your industrial applications hard to wire, or are your wiring costs out of control? Are you already using mobile equipment that connects over a TCP/IP network? If so, then what you need is the AWK-3121 Access Point/Bridge/Client. The AWK-3121 is rated to operate at temperatures ranging from 0 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 case with LED indicators make the AWK-3121 a convenient yet reliable solution for any industrial wireless application.

Advanced security
- 64-bit and 128-bit WEP (Wired Equivalent Privacy)
- Enable/disable SSID broadcasts
- MAC-address-based access control
- IEEE 802.1X/RADIUS
- WPA (Wi-Fi Protected Access)/WPA2

Useful utilities and remote configuration
- Firmware upgrade from TFTP or HTTP
- Console/Web-based management
- SNMP and UPnP supported
- Configuration backup and reset

Specifications

WLAN
 Standards: IEEE 802.11a/b/g for Wireless LAN, IEEE 802.3u for 10/100BaseTX, IEEE 802.3af for Power-over-Ethernet, IEEE 802.1D for Spanning Tree Protocol, IEEE 802.1w for Rapid STP
 Modulation:
  802.11b: DBPSK, DQPSK, CCK
  802.11g: OFDM with BPSK, QPSK, 16QAM, 64QAM
  802.11a: OFDM with BPSK, QPSK, 16QAM, 64QAM
 Data Rate and Modulation:
  OFDM @ 54 Mbps, CCK @ 11/5.5 Mbps, DQPSK @ 2 Mbps, DBSK @ 1 Mbps
 Operating Channels:
  US:
    2.412 to 2.462 GHz; 11 channels
    5.15 to 5.35; 5.725 to 5.825 GHz; 12 channels
  EU:
    2.412 to 2.472 GHz; 13 channels
    5.15 to 5.35 GHz; 8 channels
    5.47 to 5.725 GHz; 11 channels
  JP:
    2.412 to 2.472 GHz; 13 channels, OFDM

IEEE 802.11a/b/g compliant
- Power input by redundant 24 VDC power inputs or Power-over-Ethernet
- Powerful security with WPA/WPA2/802.1X/MAC address filtering
- DIN-Rail or wall mounting ability
- IP30 protected high-strength metal case

<table>
<thead>
<tr>
<th>Modulation</th>
<th>802.11a/g Support Rates</th>
<th>802.11b/g Support Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 to 24 Mbps</td>
<td>6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps</td>
<td></td>
</tr>
<tr>
<td>36 to 48 Mbps</td>
<td>16 Mbps (+/- 1.5 dBm)</td>
<td></td>
</tr>
<tr>
<td>54 Mbps</td>
<td>15 dBm (+/- 1.5 dBm)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TX Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>802.11b: -92 dBm @ 1 Mbps; -80 dBm @ 2 Mbps; -85 dBm @ 12 Mbps; -90 dBm @ 24 Mbps; -76 dBm @ 36 Mbps; -72 dBm @ 48 Mbps; -70 dBm @ 54 Mbps</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RX Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>802.11g: -97 dBm @ 6 Mbps; -86 dBm @ 9 Mbps; -85 dBm @ 12 Mbps; -82 dBm @ 18 Mbps; -80 dBm @ 24 Mbps; -76 dBm @ 36 Mbps; -72 dBm @ 48 Mbps; -70 dBm @ 54 Mbps</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>802.11b: 1 to 11 Mbps: 18 dBm (+/- 1.5 dBm)</td>
</tr>
<tr>
<td>802.11g: 6 to 24 Mbps: 16 dBm (+/- 1.5 dBm)</td>
</tr>
<tr>
<td>36 to 48 Mbps: 14 dBm (+/- 1.5 dBm)</td>
</tr>
<tr>
<td>54 Mbps: 13 dBm (+/- 1.5 dBm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transmit Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>802.11a/g</td>
</tr>
<tr>
<td>802.11b: 1 to 11 Mbps: 18 dBm (+/- 1.5 dBm)</td>
</tr>
<tr>
<td>802.11g: 6 to 24 Mbps: 16 dBm (+/- 1.5 dBm)</td>
</tr>
<tr>
<td>36 to 48 Mbps: 14 dBm (+/- 1.5 dBm)</td>
</tr>
<tr>
<td>54 Mbps: 13 dBm (+/- 1.5 dBm)</td>
</tr>
</tbody>
</table>

2.412 to 2.484 GHz; 14 channels, CCK
5.15 to 5.35 GHz; 8 channels (W52, W53)
5.47 to 5.725 GHz; 11 channels (W56)
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; -72 dBm @ 48 Mbps

**Interface**

**Antenna:** 2 dBi dual-band, omni-directional antenna

**Connector:** RP-SMA (female)

**RJ45 Port:** 10/100BaseT(X) auto negotiation speed

**LED Indicators:** PWR1, PWR2, PoE, FAULT, STATE, CLIENT MODE, BRIDGE MODE, WLAN

**Console:** RS-232 (RJ45)

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

**Digital Inputs:** 2 inputs, electrically isolated from the electronics
- +13 to +30V for state “1”
- -30 to -3V for state “0”
- Max. input current: 8 mA

**Power Requirements**

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

**Connection:** 10-pin removable terminal block

**Reverse Polarity Protection:** Present

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**Physical Characteristics**

**Casing:** IP30 protection, metal case

**Dimensions (W x H x D):** 53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in.)

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

**Environmental Limits**

**Operating Temperature:** 0 to 60°C (32 to 140°F), -40 to 75°C (-40 to 167°F) for T models

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

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

**Regulatory Approvals**

**Safety:** EN60950, UL60950-1, UL508, UL2043 (Pending)

**Hazardous Location:** UL/cUL Class I, Division 2, Groups A, B, C and D (Pending); ATEX Class I, Zone 2, Ex nC IIC (Pending)

**Radio:** EN300 328, ARIB STD-33/66 (Japan)

**EMC:** EN301 489-1/-17

**EMI:** FCC Part 15

*Please check Moxa’s website for the most up-to-date certification status.

**Warranty**

5 years (see www.moxa.com/warranty for details)

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**Ordering Information**

- **AWK-3121-US:** IEEE 802.11a/b/g wireless AP/Bridge/Client, US band, 0 to 60°C
- **AWK-3121-EU:** IEEE 802.11a/b/g wireless AP/Bridge/Client, EU band, 0 to 60°C
- **AWK-3121-JP:** IEEE 802.11a/b/g wireless AP/Bridge/Client, JP band, 0 to 60°C
- **AWK-3121-US-T:** IEEE 802.11a/b/g wireless AP/Bridge/Client, US band, -40 to 75°C
- **AWK-3121-EU-T:** IEEE 802.11a/b/g wireless AP/Bridge/Client, EU band, -40 to 75°C
- **AWK-3121-JP-T:** IEEE 802.11a/b/g wireless AP/Bridge/Client, JP band, -40 to 75°C

**Optional Accessories**

- **ABC-01:** Industrial RS-232 RJ45-based automatic backup configurator
- **DR-4524:** 45W/2A DIN-Rail 24 VDC power supply with universal 85 to 264 VAC input
- **DR-75-24:** 75W/3.2A DIN-Rail 24 VDC power supply with universal 85 to 264 VAC input
- **DR-120-24:** 120W/5A DIN-Rail 24 VDC power supply with 88 to 132 VAC/176 to 264 VAC input by switch
- **WK-46:** Wall mounting kit
- **RK-4U:** 4U-high 19” rack mounting kit
AWK-1200 Series

IEEE 802.11g/b wireless Access Point/Bridge and AP Client for outdoors

> IP68 rated wireless Access Point/Bridge and IP67 rated wireless AP Client
> Point-to-point, point-to-multipoint wireless connectivity
> WEP/WPA/WPA2/IEEE 802.1X authenticator supported
> -20 to 70°C operating temperature range

: Introduction

The AWK-1200 Access Point/Bridge or AP Client is ideal for applications that are hard to wire, too expensive to wire, or use mobile equipment that connects to a TCP/IP network. The AWK-1200 series is rated to operate at temperatures ranging from -20 to 70°C, and its weatherproof design allows you to set up a WLAN, or extend existing wired networks to outdoor locations. In addition, the AWK-1200 series has a detachable antenna design, which gives you the flexibility of choosing your own special-purpose antennas instead of using the standard models. You also don’t need to worry about finding a power supply in outdoor environments, since the AWK-1200’s PoE (Power-over-Ethernet) design makes it easy to deploy.

Advanced security capability
- 64-bit and 128-bit WEP (Wired Equivalent Privacy)
- Enable/disable SSID broadcasts
- MAC-address-based access control
- IEEE 802.1X/RADIUS
- WPA/WPA2

Useful utilities and remote configuration
- Firmware upgrade from HTTP
- Web-based management
- SNMP supported
- Configuration backup and reset to factory default

: Specifications

WLAN

Standards:
IEEE 802.11g/b for Wireless LAN,
IEEE 802.3u for 10/100BaseT(X)

Frequency Range:
2.4-2.4835 GHz, Direct Sequence Spread Spectrum (DSSS)

Data Rate & Modulation:
OFDM @ 54 Mbps, CCK @ 11/5.5 Mbps, DQPSK @ 2 Mbps, and DBSK @ 1 Mbps

Operating Channels:
USA: 1-11 (US)
Europe: 1-13 (EU)
Japan: 1-14 (JP)

Security:
For AWK-1200-AP:
WEP, WPA, WPA2, IEEE 802.1X, MAC address filtering, Hide SSID, Layer 2 isolation
For AWK-1200-AC:
64-bit and 128-bit WEP encryption, WPA

Data Rates:
1 Mbps, 2 Mbps, 5.5 Mbps, 6 Mbps, 9 Mbps, 11 Mbps, 12 Mbps, 18 Mbps, 24 Mbps, 36 Mbps, 48 Mbps, 54 Mbps

Transmit Power:
Typ. 17 dBm @ 1, 2, 5.5 and 11 Mbps, 17 dBm @ 6 Mbps, 14 dBm @ 54 Mbps

RX Sensitivity:
802.11b:
-89 dBm @ 11 Mbps
802.11g:
-65 dBm @ 54 Mbps, -66 dBm @ 48 Mbps,
-70 dBm @ 36 Mbps, -74 dBm @ 24 Mbps,
-77 dBm @ 18 Mbps, -79 dBm @ 12 Mbps,
-81 dBm @ 9 Mbps, -82 dBm @ 6 Mbps

Software Features
Protocols: HTTP, DHCP, TCP/IP, RADIUS, DNS, NetBIOS, AppleTalk, and IPX/SPX
Configuration: Web-based management
Client OS Support: Windows 95/98/2000/ME/NT/XP, Unix, and Macintosh
**Interface**

Antenna: 5dBi External (AWK-1200-AP), 9dBi Internal (AWK-1200-AC)
Connector: N-type female connector (AWK-1200-AP only)
RJ45 Port: 10/100BaseT(X) auto negotiation speed

**Power Requirements**

Input Voltage: Active Ethernet, 48 VDC
Input Current (@ 48 VDC, PoE): AWK-1200-AP: 0.38A, AWK-1200-AC: 0.375A

**Physical Characteristics**

Casing: IP68 (AWK-1200-AP), IP67 (AWK-1200-AC)
Dimensions (W x H x D):
AWK-1200-AP: 284.4 x 254.3 x 77.5 mm (11.20 x 10.01 x 3.05 in.)
AWK-1200-AC: 165.8 x 195.8 x 60.3 mm (6.53 x 7.71 x 2.37 in.)
Weight:
AWK-1200-AP: 3100 g
AWK-1200-AC: 600 g

**Dimensions (unit = mm)**

- **AWK-1200-AP**
  - Front View
  - Side View
  - Rear View
  - Mounting Kit

- **AWK-1200-AC**
  - Front View
  - Side View
  - Rear View
  - Mounting Kit

**Installation:** Wall mounting, mast mounting

**Environmental Limits**

Operating Temperature: -20 to 70°C (-4 to 158°F)
Storage Temperature: -40 to 80°C (-40 to 176°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

**Regulatory Approvals**

Safety: EN60950-1: 2001, UL60950-1
Radio: EN300 328
EMC: EN301 489-1/-17
EMI: FCC Part 15C
MTBF: over 200,000 hrs
  Database: GB, GC (Ground Benign, Controlled) 25°C

**Warranty**

5 years (see www.moxa.com/warranty for details)

**Ordering Information**

- AWK-1200-AP-US: IEEE 802.11g/b IP68 wireless AP/Bridge, US band, -20 to 70°C
- AWK-1200-AP-EU: IEEE 802.11g/b IP68 wireless AP/Bridge, Euro band, -20 to 70°C
- AWK-1200-AP-JP: IEEE 802.11g/b IP68 wireless AP/Bridge, Japan band, -20 to 70°C
- AWK-1200-AC-US: IEEE 802.11g/b IP67 wireless AP Client, US band, -20 to 70°C
- AWK-1200-AC-EU: IEEE 802.11g/b IP67 wireless AP Client, Euro band, -20 to 70°C
- AWK-1200-AC-JP: IEEE 802.11g/b IP67 wireless AP Client, Japan band, -20 to 70°C

mba.com  email: info@moxa.com
**AWK-1100 Series**

*Industrial IEEE 802.11g/b wireless Access Point/Bridge/AP Client*

> IEEE 802.11g/b compliant  
> Power input by redundant 24 VDC power inputs or Power-over-Ethernet  
> Powerful security with WPA/802.1X/MAC address filtering  
> DIN-Rail or panel mounting ability  
> IP30 protected high-strength metal case

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**Introduction**

Are your industrial applications hard to wire, or are your wiring costs out of control? Are you already using mobile equipment that connects over a TCP/IP network? If so, then the AWK-1100 Access Point/Bridge/AP Client could be what you’re looking for. The AWK-1100 is rated to operate at temperatures ranging from 0 to 60°C, 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 case with LED indicators make AWK-1100 a convenient yet reliable solution for any industrial wireless application.

**Advanced security capability**

- 64-bit and 128-bit WEP (Wired Equivalent Privacy)  
- Enable/disable SSID broadcasts  
- MAC-address-based access control  
- IEEE 802.1X/RADIUS  
- WPA (Wi-Fi Protected Access)

**Useful utilities and remote configuration**

- Firmware upgrade from TFTP or HTTP  
- Web-based management  
- SNMP and UPnP supported  
- Configuration backup and reset

---

**WLAN**

**Standards:**  
IEEE 802.11g/b for Wireless LAN,  
IEEE 802.3u 10/100BaseT(X) for Ethernet LAN,  
IEEE 802.3af for Power-over-Ethernet

**Frequency Range:**  
2.4-2.4835 GHz, Direct Sequence Spread Spectrum (DSSS)

**Data Rate & Modulation:**  
OFDM @ 54 Mbps, CCK @ 11/5.5 Mbps, DQPSK @ 2 Mbps, and DBSK @ 1 Mbps

**Operating Channels:**  
USA: 1-11 (US)  
Europe: 1-13 (EU)  
Japan: 1-14 (JP)

**Security:**  
64-bit and 128-bit WEP encryption, WPA (IEEE 802.1X/RADIUS and TKIP)

**Data Rates:**  
1 Mbps, 2 Mbps, 5.5 Mbps, 6 Mbps, 9 Mbps, 11 Mbps, 12 Mbps, 18 Mbps, 24 Mbps, 36 Mbps, 48 Mbps, 54 Mbps

**Transmit Power:**  
Typ. +18 dBm (+/- 1.5 dBm) @ 11Mbps, +14 dBm (+/- 1.5 dBm) @ 54Mbps

**RX Sensitivity:**

- 802.11b:  
  -81 dBm @ 11 Mbps, -85 dBm @ 5.5 Mbps,  
  -86 dBm @ 2 Mbps, -87 dBm @ 1 Mbps

- 802.11g:  
  -68 dBm @ 54 Mbps, -70 dBm @ 48 Mbps,  
  -74 dBm @ 36 Mbps, -78 dBm @ 24 Mbps,  
  -81 dBm @ 18 Mbps, -84 dBm @ 12 Mbps,  
  -85 dBm @ 9 Mbps, -86 dBm @ 6 Mbps
Industrial Ethernet Solutions for Control and Automation

5

Industrial Wireless Ethernet

AWK-1100

Software Features
Protocols: HTTP, DHCP, TCP/IP, RADIUS
Configuration: Web-based management
Client OS Support: Windows 95/98/2000/ME/NT/XP, Unix, and Macintosh

Interface
Antenna: 2 dBi omni-directional antenna
Connector: RP-SMA connector
RJ45 Port: 10/100BaseT(X) auto negotiation speed
LED Indicators: PWR1, PWR2, WLAN, LAN (Link/ACT)

Power Requirements
Input Voltage: 12 to 45 VDC, redundant dual DC power inputs or 48 VDC Power-over-Ethernet (IEEE 802.3af)
Input Current (@ 24 V): 0.3 A
Overload Current Protection: 1.6 A
Connection: Removable terminal block
Reverse Polarity Protection: Present

Physical Characteristics
Casing: IP30 protection, metal case
Dimensions (W x H x D): 53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in.)
Weight: 800 g
Installation: DIN-Rail mounting, wall mounting (optional kit)

Dimensions (unit = mm)

Environmental Limits
Operating Temperature: 0 to 60°C (32 to 140°F)
Storage Temperature: -20 to 70°C (-4 to 158°F)
Ambient Relative Humidity: 5% to 95% (non-condensing)

Regulatory Approvals
Safety: EN60950-1, UL60950-1
Hazardous Location:
UL/cUL Class I, Division 2, Groups A, B, C, and D (Pending);
ATEX Class I, Zone 2, Ex nC IIC (Pending)
Radio: EN300 328
EMC: EN301 489-1/-17
EMI: FCC Part 15C
MTBF: 200,000 hrs
Database: MIL-HDBK-217F, GB 25°C

Warranty
5 years (see www.moxa.com/warranty for details)

Ordering Information
- AWK-1100-US: IEEE 802.11g/b wireless AP/Bridge/AP Client, US band, 0 to 60°C
- AWK-1100-EU: IEEE 802.11g/b wireless AP/Bridge/AP Client, Euro band, 0 to 60°C
- AWK-1100-JP: IEEE 802.11g/b wireless AP/Bridge/AP Client, Japan band, 0 to 60°C

Optional Accessories
- DR-4524: 45W/2A DIN-Rail 24 VDC power supply with universal 85 to 264 VAC input
- DR-75-24: 75W/3.2A DIN-Rail 24 VDC power supply with universal 85 to 264 VAC input
- DR-120-24: 120W/5A DIN-Rail 24 VDC power supply with 88 to 132 VAC/176 to 264 VAC input by switch
- WK-46: Wall mounting kit
- RK-4U: 4U-high 19” rack mounting kit
## Antennas and Accessories

### IEEE 802.11a/b/g 2.4 & 5 GHz Dual-band Antenna

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency Range</th>
<th>Antenna Type</th>
<th>Antenna Gain</th>
<th>Impedance</th>
<th>Polarization</th>
<th>V.S.W.R.</th>
<th>Connector</th>
<th>Dimensions (H)</th>
<th>Weight</th>
<th>Installation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANT-WDB-O-2</td>
<td>2.4-2.5 GHz &amp; 4.9-5.8 GHz</td>
<td>1/4 Dipole Sleeve</td>
<td>2 dBi (typical)</td>
<td>50 ohms nominal</td>
<td>Linear, Vertical</td>
<td>&lt; 2</td>
<td>RP-SMA (male)</td>
<td>108 mm length</td>
<td>370 g</td>
<td>U-bolt installation kit</td>
</tr>
<tr>
<td>ANT-WSB-O-02</td>
<td>2.4-2.5 GHz</td>
<td>1/4 Dipole Sleeve</td>
<td>2 dBi (typical)</td>
<td>50 ohms nominal</td>
<td>Linear</td>
<td>&lt; 2</td>
<td>RP-SMA (male)</td>
<td>150 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANT-WSB-O-5-150</td>
<td>2.4-2.5 GHz</td>
<td>5 dBi (typical)</td>
<td>50 ohms nominal</td>
<td>Vertical</td>
<td></td>
<td>&lt; 2</td>
<td>RP-SMA (male)</td>
<td>150 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANT-1-O-09</td>
<td>2.4-2.5 GHz</td>
<td>Omni-directional</td>
<td>9 dBi</td>
<td>50 ohms</td>
<td>Vertical</td>
<td></td>
<td></td>
<td>390 mm (15.35 in.)</td>
<td>370 g</td>
<td>U-bolt installation kit</td>
</tr>
<tr>
<td>ANT-1-D-12</td>
<td>2.4-2.5 GHz</td>
<td>Directional, Flat Panel</td>
<td>12 dBi</td>
<td>50 ohms</td>
<td>Vertical</td>
<td></td>
<td></td>
<td>90 x 275 x 30 mm (3.54 x 10.83 x 1.18 in.)</td>
<td>500 g</td>
<td>Wall mounting, swivel mounting kit (optional kit)</td>
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### IEEE 802.11b/g 2.4 GHz Antennas

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<td>50 ohms nominal</td>
<td>Linear</td>
<td>&lt; 2</td>
<td>RP-SMA (male)</td>
<td>360° horizontal, 12° vertical</td>
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### IEEE 802.11a/b/g 2.4 & 5 GHz Dual-band Antenna

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### IEEE 802.11a/b/g 2.4 GHz Antennas

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## Ordering Information

- **ANT-WDB-O-2**: IEEE 802.11a/b/g 2.4 & 5 GHz dual-band antenna, RP-SMA (female) connector
- **ANT-WSB-O-02**: IEEE 802.11b/g 2.4 GHz, omni-directional antenna, RP-SMA (female) connector
- **ANT-WSB-O-5-150**: IEEE 802.11b/g 2.4 GHz, omni-directional antenna, RP-SMA (female) connector, with 150mm cable
- **ANT-1-O-09**: 2.4 GHz, omni-directional, 9 dBi antenna, N-Female connector
- **ANT-1-D-12**: 2.4 GHz, directional, 12 dBi antenna, N-Female connector
- **CRF-N0117SA-3M**: CFD200 cable, N-Male to RP SMA Male connector, 3 meters (for AWK-3121 and AWK-1100 only)
  *This cable is necessary for the devices, which have RP-SMA connector, to connect with optional antenna.*
- **CRF-N0429N-3M**: CFD400 cable, N-Male to N-Male connector, 3 meters (for AWK-1200-AP only)
  *This cable is necessary for AWK-1200-AP to connect with optional antenna.*

## Optional Accessories

- **HA-1002SU**: Swivel mounting kit, swivel angle 90° horizontal, 40° vertical
  *Supports ANT-1-D-12 by adjusting the angle for use with different wireless applications.*