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Industrial Ethernet Wireless Solutions

Getting un-Wired with IEEE 802.11

◤ Overview

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 established 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

	802.11b	802.11g	802.11a
Approval Date	Sept. 1999	June 2003	Sept. 1999
Compatibility	IEEE 802.11b compliant	IEEE 802.11b and 802.11g compliant	IEEE 802.11a compliant
Number of Channels	3 non-overlapping	3 non-overlapping	8 non-overlapping (4 in some countries)
Data Rates	11, 5.5, 2, and 1 Mbps	54, 48, 36, 24, 18, 12, 9, and 6 Mbps	54, 48, 36, 24, 18, 12, 8, and 6 Mbps
Wireless Medium	Direct Sequence Spread Spectrum (DSSS), 2.4 GHz	Orthogonal Frequency Division Multiplexing (OFDM), 2.4 GHz	Orthogonal Frequency Division Multiplexing (OFDM), 5 GHz

◤ 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.

Infrastructure Mode

Ad-hoc Mode

MOXA e-mail: info@moxanet.com   www.moxa.com
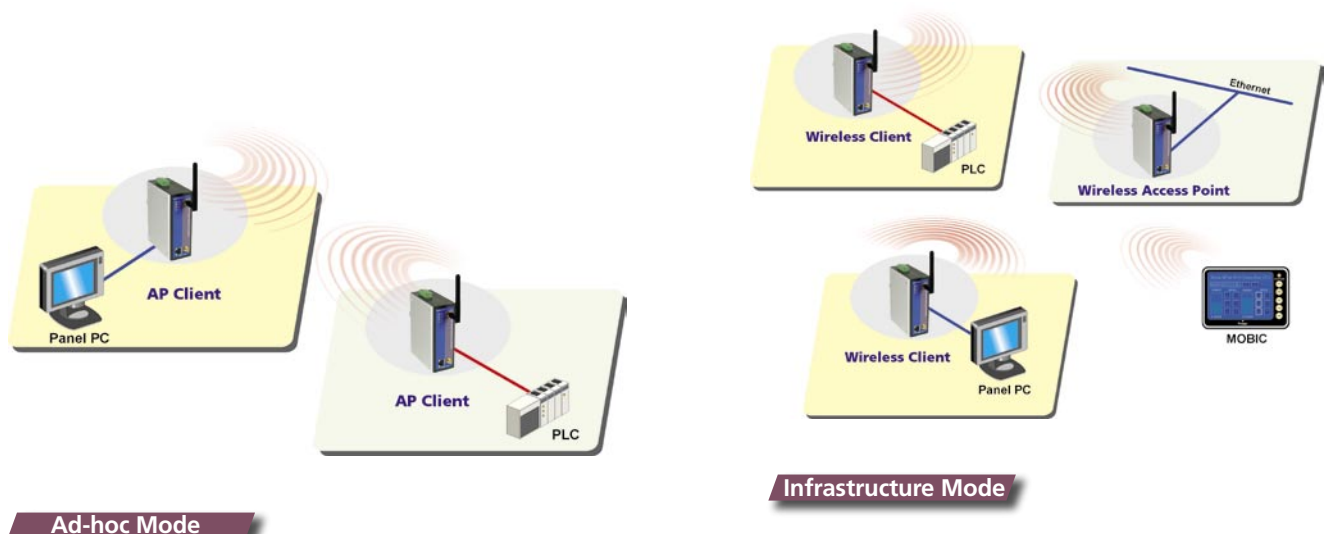
Benefits of using Wireless Technology

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 Solution 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 Wi-Fi Protected Access (WPA) 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 range from 0 to 60°C, and DIN-Rail mounting capability. The enhanced reliability of these products make them a great choice for your wireless industrial applications.

MOXA Wireless Solution

Solution Tutorial

Industrial Wireless Ethernet AWK-1100 Series
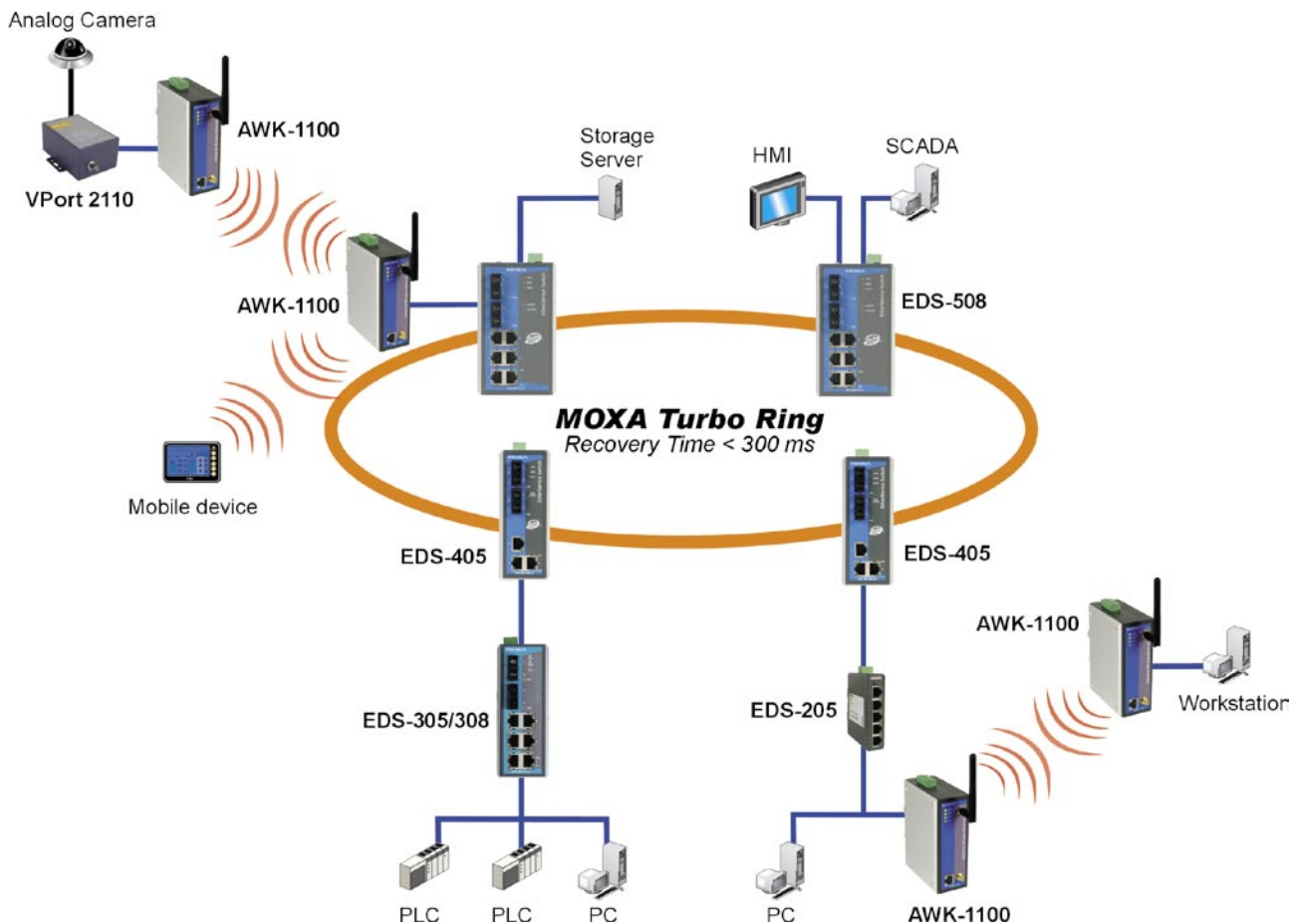
Industrial Wireless Ethernet AirWorks 1100 Series **Preliminary**

AWK-1100 Industrial IEEE 802.11g Wireless AP/Bridge/AP Client

Features

Advanced Security Capability
- **64-bit and 128-bit WEP (Wired Equivalent Privacy)**
- **Enabling/disabling SSID broadcasts**
- **MAC-address-based access control**
- **IEEE 802.1x/RADIUS**
- **WPA (Wi-Fi Protected Access)**

Useful Utilities and Remote Configuration
- **Firmware upgrade from RS-232 or TFTP or HTTP**
- **Configuration backup and reset**
- **Windows-based Wireless Network Manager**
- **Web-based management**
- **Supports SNMP and UPnP**

Industrial Grade Design
- **Operating temperature range from 0 to 60°C**
- **Redundant 24 VDC power inputs or Power-over-Ethernet**
- **DIN-Rail or panel mounting capability**
- **Case design meets IP30 protection standard**

Other
- **AP load balancing**
- **Transmit power control**
- **Link integrity**

- **Association control**
- **DHCP Server/Client**
- **Packet Filtering**
- **Hardware Watchdog Timer**

Recommended Accessories
- **DR Series DIN-Rail 24 VDC Power Supplies**

CE FC

▸ Overview

The AWK-1100 enables wireless users to access network resources wirelessly. AWK-1100 can authenticate and authorize wireless users by IEEE 802.1x and RADIUS, and communicate with a back-end RADIUS (Remote Authentication User Dial-In Service) server to see if a wireless user is allowed to access the wireless network.

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 plug-and-play, yet reliable solution for your Industrial Wireless applications.

▸ IEEE 802.1x/RADIUS

When configured for AP/Bridge mode, AWK-1100 can authenticate wireless users and distribute encryption keys dynamically by 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/PEAP.

WPA (Wi-Fi Protected Access)

AWK-1100 supports the WPA standard 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 is composed of TKIP (Temporal Key Integrity Protocol) and IEEE 802.1x and serves as a successor to WEP for better WLAN security.

Hardware Watchdog Timer

If the firmware gets stuck in an invalid state, the hardware watchdog timer will detect the situation and then restart the AWK-1100 automatically, giving you the assurance that AWK-1100 will provide continuous service.

Redundant Power Inputs

AWK-1100 provides two power inputs that can be connected simultaneously to live DC power sources. If one of the power inputs fails, the other source acts as a backup to provide power automatically.

Dimensions (unit = mm)

Side View   **DIN-Rail Kit** **Front View**   **Rear View**   **Panel Mounting Kit**

Industrial Wireless Ethernet AWK-1100 Series

◤ Specifications

WLAN

Standards:

IEEE802.11g/b for Wireless LAN,

IEEE802.3u 10/100BaseTX 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 (FCC)

Canada: 1-11 (IC)

Europe: 1-13 (ETSI)

France: 10-13

Japan: 1-14

Security:

64-bit and 128-bit WEP encryption, WPA (IEEE 802.1x/RADIUS and TKIP)

Data Rates:

1 Mpbs, 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:

802.11b : ≥17 dBm

802.11g : 6/9 Mbps ≥ 17 dBm, 12/18 Mbps ≥ 15 dBm, 24 Mbps ≥14 dBm, 36 Mbps ≥ 14 dBm, 48 Mbps ≥ 12 dBm, 54 Mbps ≥ 12 dBm

Receiver Sensitivity:

802.11b :

8% FER@1 Mbps ≤ -91 dBm, 8% FER@2 Mbps ≤ -88 dBm

8% FER@5.5 Mbps ≤ -85 dBm, 8% FER@11 Mbps ≤ -83 dBm

802.11g :

10% PER@6 Mbps ≤ -88 dBm, 10% PER@9 Mbps ≤ -87 dBm

10% PER@12 Mbps ≤ -84 dBm, 10% PER@18 Mbps ≤ -82d Bm

10% PER@24 Mbps ≤ -79 dBm, 10% PER@36 Mbps ≤ -75 dBm

10% PER@48 Mbps ≤ -69 dBm, 10% PER@54 Mbps ≤ -68 dBm

Software Features

Protocols:

NAT, PAP/CHAP, PPPoE, PPP, HTTP, DHCP, TCP/IP, RADIUS, DNS, NetBIOS, AppleTalk, and IPX/SPX

Configuration:

Windows-based Wireless Network Manager and Web-based management

Client OS Support:

Windows 95/98/2000/ME/NT/XP, Unix and Macintosh

Interface

Antenna: 2 dBi diversity antenna with an R-SMA connector

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

COM Port: RS-232 × 1

LED Indicators: PWR1, PWR2, LAN (Link/ACT), WLAN (Link/ACT)

Power

Input Voltage:

12 to 45 VDC, redundant dual DC power inputs or Power over Ethernet

Input Current (@24V): 0.3A

Overload Current Protection: 1.6A

Connection: Removable Terminal Block

Reverse Polarity Protection: Present

Mechanical

Casing: IP30 protection, aluminum case

Installation: DIN-Rail, Wall Mounting

Environmental

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: UL/TÜV

Emissions: FCC, CE, SRRC

Warranty: 5 years

* These product specs are subject to change without notice.

◤ Ordering Information

AWK-1100: IEEE 802.11g Wireless AP/Bridge/AP Client with Power over Ethernet supported, 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

*See page 5-6 for more detailed information about these DIN-Rail Power Supplies.

WK-46: Wall Mounting kit