Overview

Aruba 228 Series Access Points
802.11ac for harsh, weather-protected areas

Product overview

Rugged Aruba 228 wireless APs deliver gigabit Wi-Fi performance to 802.11ac mobile devices in harsh, weather-protected environments such as warehouses, industrial freezers or enclosures in extreme environments such as stadiums.

With a maximum data rate of 1.3 Gbps in the 5-GHz band and 600 Mbps in the 2.4-GHz band, Aruba 228 APs are three-times faster than 802.11n APs and provide performance similar to a wired   connection.

The 228 APs include ClientMatch technology, which eliminates sticky clients by continuously gathering session performance metrics from mobile devices. This information is then used to steer each mobile device to the best AP and radio on the WLAN.

Proactive and deterministic, ClientMatch dynamically optimizes Wi-Fi client performance as users roam and RF conditions change. If a mobile device moves out of range of an AP or RF interference impedes performance, ClientMatch automatically steers it to a better AP.

With ClientMatch, 228 APs load web pages faster, deliver video streams with improved quality and support high densities of mobile devices. An 802.11ac network without ClientMatch performs no different than an 802.11n WLAN.

The rugged 228 APs additionally support priority handling and policy enforcement for individual Microsoft Lync media on the same device, including encrypted videoconferencing, voice, chat and desktop sharing.

Features and Benefits

Unique Benefits

- Industrial design for harsh, weather-protected environments
    - Extends temperature range for indoor environments that lack heating and cooling
    - Sealed connector interfaces to lock out dust and moisture
    - Connectorized antenna ports support high gain large public venue antennas
    - Designed for enhanced physical security.
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Overview

- Delivers 1.9 Gbps aggregate throughput.
  - EtherChannel link aggregation on two Gigabit Ethernet ports provides 1.9 Gbps throughput.

- Supports aggregate data rates up to 1.9 Gbps
  - 802.11ac transmit beam-forming to enhance signal, throughput and multi stream operation
  - Supports 1.3 Gbps rates in the 5 GHz band for 802.11ac clients
  - Supports up to 600 Mbps for TurboQAM-enabled mobile devices operating in the 2.4 GHz band

- Best-in-class RF management
  - Integrated Adaptive Radio Management technology manages the 2.4-GHz and 5-GHz radio bands and ensures that APs stay clear of RF interference.

- Spectrum analysis
  - Capable of part-time or dedicated air monitoring, the spectrum analyzer remotely scans the 2.4-GHz and

- 5-GHz radio bands to identify sources of RF interference.
- Wireless mesh
  - Wireless mesh connections are convenient where Ethernet drops are not available.

- Security
  - Integrated wireless intrusion protection offers threat protection and mitigation and eliminates the need for separate RF sensors and security appliances.
  - With an **OpenDNS** service subscription, Aruba Instant APs delivers integrated web filtering, malware and botnet protection to every device connected to the WLAN.
  - Encrypted IPsec VPN tunnels securely connect remote users to corporate network resources.
  - Integrated Trusted Platform Module (TPM) for secure storage of credentials and keys.
  - SecureJack-capable for secure tunneling of wired Ethernet traffic

Choose your Operating Mode

The 228 APs offer a choice of operating modes to meet your unique management and deployment requirements.

- Controller-managed AP or Remote AP (RAP) running ArubaOS. When managed by Aruba Mobility Controllers, 228 APs offer centralized configuration, data encryption, policy enforcement and network services, as well as distributed and centralized traffic forwarding.
- Aruba Instant AP running InstantOS. In Aruba Instant mode, a single AP automatically distributes the network configuration to other Instant APs in the WLAN. Simply power-up one Instant AP, configure it over the air, and plug in the other APs – the entire process takes about five minutes.
- Spectrum analysis identifies sources of RF interference
- Air monitor provides wireless intrusion protection
- Hybrid AP serves Wi-Fi clients and provides wireless intrusion protection and spectrum analysis
- Secure enterprise mesh

For large installations across multiple sites, the Aruba Activate service significantly reduces deployment time by automating device provisioning, firmware upgrades, and inventory management. With Aruba Activate, Instant APs are factory-shipped to any site and configure themselves when powered up.

If WLAN and network requirements change, a built-in migration path allows 228 Instant APs to become part of a WLAN that is centrally managed by a Mobility Controller.

AP 228 Series Specifications

- 2.4-GHz (600 Mbps max) and 5-GHz (1.3 Gbps max) radios, each with 3x3 MIMO and three combined, diplexed external antenna connectors.

Wireless Radio Specifications

- AP type: Indoor, dual radio, 5 GHz 802.11ac and 2.4 GHz 802.11n
  - In addition to 802.11n data rates, the 2.4-GHz radio supports 802.11ac data rates using 256-QAM modulation. This gives TurboQAM-enabled clients a 33% boost above the maximum

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supported data rate.

- Software-configurable dual radio supports 5 GHz and 2.4 GHz
- 3x3 MIMO with three spatial streams and up to 1.3 Gbps wireless data rate
- Supported frequency bands (country-specific restrictions apply):
  - 2.4000 GHz to 2.4835 GHz
  - 5.150 GHz to 5.250 GHz
  - 5.250 GHz to 5.350 GHz
  - 5.470 GHz to 5.725 GHz
  - 5.725 GHz to 5.850 GHz

- Available channels: Dependent upon configured regulatory domain
- Dynamic frequency selection (DFS) optimizes the use of available RF spectrum
- Supported radio technologies:
  - 802.11b: Direct-sequence spread-spectrum (DSSS)
  - 802.11a/g/n/ac: Orthogonal frequency-division multiplexing (OFDM)
  - 802.11n/ac: 3x3 MIMO with up to three spatial streams

- Supported modulation types:
  - 802.11b: BPSK, QPSK, CCK
  - 802.11a/g/n: BPSK, QPSK, 16-QAM, 64-QAM
  - 802.11ac: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM

- Transmit power: Configurable in increments of 0.5 dBm
- Maximum (aggregate, conducted total) transmit power (limited by local regulatory requirements):
  - 2.4-GHz band: +28 dBm (23 dBm per chain)
  - 5-GHz bands: +28 dBm (23 dBm per chain)

- Advanced cellular coexistence (ACC) feature to effectively deal with interference from cellular systems
- Maximum ratio combining (MRC) for improved receiver performance
- Cyclic delay diversity (CDD) for improved downlink RF performance
- Short guard interval for 20-MHz, 40-MHz and 80-MHz channels
- Space-time block coding (STBC) for increased range and improved reception
- Low-density parity check (LDPC) for high-efficiency error correction and increased throughput
- Transmit beam-forming (TxBF) for increased reliability in signal delivery
- Supported data rates (Mbps):
  - 802.11b: 1, 2, 5.5, 11
  - 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54
  - 802.11n: 6.5 to 450 (MCS0 to MCS23)
  - 802.11ac: 6.5 to 1,300 (MCS0 to MCS9, NSS = 1 to 3)

- 802.11n high-throughput (HT) support: HT 20/40
- 802.11ac very high throughput (VHT) support: VHT 20/40/80
- 802.11n/ac packet aggregation: A-MPDU, A-MSDU

Power

- Worst-case power consumption from the AP: 23W
- Power sources sold separately
- Power over Ethernet (PoE+): 802.3at-compliant

Antennas

- Six RP-SMA connectors for external antennas

Other Interfaces

- Two 10/100/1000BASE-T Ethernet network interfaces (RJ-45)
  - Auto-sensing link speed and MDI/MDX

Overview

- Load balancing support to achieve platform throughput greater than 1 Gbps
- PoE-PD: 802.3at PoE+

- Serial console interface (Micro USB)

Mounting

- Optional mounting kits:
    - AP-130-MNT or AP-220-MNT-W1 are directly compatible
    - 270 Series outdoor AP mounts (AP-270-MNT-V1, AP-270-MNT-V2, AP-270-MNT-H1, AP-270-MNT-H2) are compatible when the AP-270-MNT-ADP adapter is utilized

Mechanical

- Dimensions/weight (unit, excluding mount accessories):
    - 222 mm (L) x 150 mm (W) x 75 mm (H), 8.5" (L) x 6" (W) x 2.5" (H)
    - 1.225 kg/2.700 lbs

Environmental

- Operating:
    - Temperature: -40° C to +60° C (-40° F to +140° F)
    - Humidity: 5% to 95% non-condensing
    - Storage and transportation:
    - Temperature: -40° C to +70° C (-40° F to +158° F)
    - Operating Altitude: 3,000 m

Regulatory

- FCC/Industry of Canada
- CE Marked
- R&TTE Directive 1995/5/EC
- Low Voltage Directive 72/23/EEC
- EN 300 328
- EN 301 489
- EN 301 893
- UL/IEC/EN 60950
- EN 60601-1-1, EN60601-1-2

For more country-specific regulatory information and approvals, please see your Aruba representative

Regulatory Model Numbers

- AP-228 and IAP-228: APIN0228

Certifications

- CB Scheme Safety, cTUVus
- UL2043 plenum rating
- Wi-Fi Alliance certified 802.11a/b/g/n/ac

Warranty

- **Aruba Limited lifetime warranty**

Minimum software Versions

- ArubaOS 6.4.3.0
- Aruba InstantOS 4.2.0

Configuration

Ordering Guide

Step 1: Select AP Model

Description	Part Number
Controller-managed Access Points	
Aruba AP-228 802.11n/ac Dual 3x3:3 Radio 6xRPSMA Connectors Indoor Hardened AP	JW182A
Aruba AP-228 FIPS/TAA-compliant 802.11ac Dual 3x3:3 Radio 6xRPSMA Connectors Indoor Hardened AP	JW183A
Instant Access Points	
Aruba Instant IAP-228 (RW) 802.11n/ac Dual 3x3:3 Radio 6xRPSMA Cnctr Inst Indoor Hardened AP	JW245A
Aruba Instant IAP-228 (US) 802.11n/ac Dual 3x3:3 Radio 6xRPSMA Cnctr Inst Indoor Hardened AP	JW244A
Aruba Instant IAP-228 (JP) 802.11n/ac Dual 3x3:3 Radio 6xRPSMA Cnctr Inst Indoor Hardened AP	JW246A
Aruba Instant IAP-228 (JP) FIPS/TAA 802.11n/ac Dual 3x3:3 Radio 6xRPSMA Cnctr Indoor Hardened AP	JY762A

Step 2: Add Mounting Bracket

Description	Part Number
AP-220-MNT-W1 Flat Surface Wall/Ceiling Black AP Basic Flat Surface Mount Kit	JW046A
AP-220-MNT-W1W Flat Surface Wall/Ceiling White AP Basic Flat Surface Mount Kit	JW047A
AP-270-MNT-ADP AP-228 to AP-270-MNT-XX Outdoor Mount Adapter	JW056A
AP-270-MNT-V1 AP-270 Series Outdoor Pole/Wall Short Mount Kit	JW052A
AP-270-MNT-V2 AP-270 Series Outdoor Pole/Wall Long Mount Kit	JW053A
AP-270-MNT-H1 AP-270 Series Outdoor AP Hanging or Tilt Install Mount Kit	JW054A
AP-270-MNT-H2 AP-270 Series Access Flush Wall or Ceiling Mount	JW055A

Step 3: Add POE Powering Accessories for Units to be POE Powered

Description	Part Number
Aruba PD-9001GR-AC 30W 802.3at PoE+ 10/100/1000 Ethernet Indoor Rated Midspan Injector	JW629A
Aruba PD-9001GO-DC 30W 802.3at PoE+ 10/100/1000 12-24V DC in Outdoor Surge Prot Midspan Injector	JW630A
Aruba PD-9001GO-NA 30W 802.3at PoE+ 10/100/1000 Otdr Surge Prot NA Power Cord Mdspan Injector	JW700A
Aruba PD-9001GO-INTL 30W 802.3at PoE+ 10/100/1000 Outdoor Surge Prot Intl Power Cord Injector	JW701A

Step 4: Add Mounting Kit for Outdoor POE Midspan Injector (Optional)

Description	Part Number
Aruba PD-MOUNT-OD Outdoor PoE Midspan Injectors Pole/Mast Mount Kit	JW620A

Step 5: Select AC Power Cord for Indoor POE Injector

Configuration

Description	Part Number
PC-AC-ARG Argentina 220V AC 10A 2-meter AC Power Cord	JW113A
PC-AC-AUS Australian AC Power Cord	JW114A
PC-AC-BR Brazil AC Power Cord	JW115A
PC-AC-CHN China AC Power Cord	JW116A
PC-AC-DEN Denmark 220V AC 10A 2-meter AC Power Cord	JW117A
PC-AC-EC Continental European/Schuko AC Power Cord	JW118A
PC-AC-IN India AC Power Cord	JW119A
PC-AC-IL Israel 250V AC 10A 2-meter AC Power Cord	JW120A
PC-AC-IT Italian AC Power Cord	JW121A
PC-AC-JP Japanese AC Power Cord	JW122A
PC-AC-KOR Korea AC Power Cord	JW123A
PC-AC-NA North America AC Power Cord	JW124A
PC-AC-SWI Switzerland 220V AC 10A 2-meter AC Power Cord	JW125A
PC-AC-UK UK AC Power Cord	JW127A
PC-AC-ZA South Africa 250V AC 10A 2-meter AC Power Cord	JW128A

Step 6: Add Antenna for Radio 0 (5 GHZ)

Description	Part Number
AP-ANT-1W 2.4-2.5GHz (4dBi)/4.9-5.875GHz (6dBi) Hi Gain Dual-band Omni-Dir Indoor Antenna	JW009A
AP-ANT-13B 2.4-2.5GHz (2.3dBi)/4.9-5.9GHz (4.0dBi) Downtilt Smallest Omni-Dir Single Ant	JW001A
AP-ANT-16 2.4-2.5Ghz (3.9dBi)/4.9-5.9GHz (4.7dBi) 3 Elmt MIMO Ant w/Downtilt Omni-Dir Antenna	JW003A
AP-ANT-19 2.4/5G Dual Band Omni-Dir 3dBi/6dBi Indr/Otdr RPSMA Cnctr Ant w/36in Intgrtd Cable	JW004A
AP-ANT-20W 2.4-2.5GHz (2dBi)/4.9-5.875GHz (2dBi) Compact Omni-Dir DMt Indr White Antenna	JW011A
AP-ANT-32 Dual Band 2/4dBi Omni RPSMA Low Profile 3-pk Omni Antenna	JW014A
AP-ANT-35A Dual Band 90x90deg 5dBi +/- 45 and V Pol 3 Element MIMO 3xRPSMA Pigtail Antenna	JW015A
AP-ANT-38 Dual Band 60x60deg 8dBi +/- 45 and V Pol 3 Element MIMO 3xRPSMA Pigtail Antenna	JW016A
ANT-3x3-5712 4.9-5.9GHz 12.0dBi 75x25deg +/- 45deg and V Pol 3 MIMO High Gain Dir Antenna	JW033A
ANT-2x2-5314 5.15-5.9 GHz 14dBi 30x30deg Dual Pol MIMO Hi Gain Dir N-Type Outdoor Antenna	JW028A
ANT-4x4-5314 5.15-5.9GHz 14dBi 30x30deg Dual Pol MIMO Hi Gain Dir N-Type Outdoor Antenna	JX988A

Step 7: Add Antenna for Radio 1 (2.4 GHZ)

Description	Part Number
AP-ANT-1W 2.4-2.5GHz (4dBi)/4.9-5.875GHz (6dBi) Hi Gain Dual-band Omni-Dir Indoor Antenna	JW009A
AP-ANT-13B 2.4-2.5GHz (2.3dBi)/4.9-5.9GHz (4.0dBi) Downtilt Smallest Omni-Dir Single Ant	JW001A
AP-ANT-16 2.4-2.5Ghz (3.9dBi)/4.9-5.9GHz (4.7dBi) 3 Elmt MIMO Ant w/Downtilt Omni-Dir Antenna	JW003A

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AP-ANT-19 2.4/5G Dual Band Omni-Dir 3dBi/6dBi Indr/Otdr RPSMA Cnctr Ant w/36in Intgrtd Cable	JW004A
AP-ANT-20W 2.4-2.5GHz (2dBi)/4.9-5.875GHz (2dBi) Compact Omni-Dir DMt Indr White Antenna	JW011A
AP-ANT-32 Dual Band 2/4dBi Omni RPSMA Low Profile 3-pk Omni Antenna	JW014A
AP-ANT-35A Dual Band 90x90deg 5dBi +/- 45 and V Pol 3 Element MIMO 3xRPSMA Pigtail Antenna	JW015A
AP-ANT-38 Dual Band 60x60deg 8dBi +/- 45 and V Pol 3 Element MIMO 3xRPSMA Pigtail Antenna	JW016A
ANT-2x2-2314 2.4 GHz 14dBi 30x30deg Dual Pol MIMO High Gain Dir N-Type Outdoor Antenna	JW024A

Step 8: Add Antenna for Radio 1 (2.4 GHZ)

Description	Part Number
AP-ANT-MNT-3 AP-ANT-25A/28/35A/38 Azimuth and Elevation Adjustable Mount Kit	JW020A

Step 9: Add RF Jumpers for ANT-2X2-2314, ANT-2X2-5314, or ANT-3X3-5712

Description	Part Number
AFC2DL60-00 Indoor AP RPSMAm to Nf 60cm Flexible Indoor Rated RF Cable	JW066A
AFCSJMTM-00 Indoor AP RPSMAm to Nm 60cm Flexible Indoor Rated RF Cable	JW067A

Technical Specifications

RF Performance Table

	Maximum transmit power (dBm) per transmit chain	Receiver sensitivity (dBm) per receive chain
802.11b 2.4 GHz		
1 Mbps	23.0	-95.0
2 Mbps	23.0	-93.0
5.5 Mbps	23.0	-90.0
11 Mbps	23.0	-88.0
802.11g 2.4 GHz and 802.11a 5 GHz		
6 Mbps	23.0	-93.0
54 Mbps	19.0	-75.0
802.11n HT20 2.4 GHz and 5 GHz		
MCS0/8	23.0	-93.0
MCS7/15	18.0	-71.0
802.11n HT40 2.4 GHz and 5 GHz		
MCS0/8	23.0	-90.0
MCS7/15	18.0	-68.0
802.11ac VHT20 5 GHz		
MCS0	23.0	-93.0
MCS9	16.0	-68.0
802.11ac VHT40 5 GHz		
MCS0	23.0	-90.0
MCS9	15.0	-63.0
802.11ac VHT80 5 GHz		
MCS0	23.0	-87.0

Technical Specifications

MCS9	15.0	-61.0

Maximum capability of the hardware provided. Maximum transmit power is limited by local regulatory settings.

Summary of Changes

Date	Version History	Action	Description of Change
11-Nov-2016	From Version 2 to 3	Changed	Minor changes made on Configuration section
07-Nov-2016	From Version 1 to 2	Added	Model added: JY762A
01-Nov-2016	Version 1	Created	Document creation.

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