

## Executive Summary

Com-Net Services, LLC is a comprehensive communications installation company, providing data and telecommunications services to a wide range of clients for over 18 years. Our services include voice, data, fiber optic, networking, networking design, Indoor and outdoor plant cabling, LAN/WAN, CCTV/Video Surveillance, and wireless. Our staff is highly responsive, and whether you are a contractor or end-user, we work hard to ensure a safe, efficient and cost-effective installation. From piece-work to total turnkey solutions—site specific or nationwide—Com-Net has the experience and training to complete each project successfully.

Com-Net Services, Hewlett Packard Enterprise (HPE) and Aruba are dedicated to providing the highest level of customer support in order to meet our client's current needs as well as their future goals. Support for this project is provided via an Aruba HPE technical support contract. This ensures that our clients will receive the very best support available from manufacturer trained professionals.

Com-Net has extensive experience in fulfilling academic project requirements across the Gulf Coast. Our previous projects include multiple e-rate funded projects for over a dozen Louisiana school districts. Additionally, our experience includes school districts in both Florida and Alabama. Our years of experience with projects that are similar in size and scope to the St. Charles Parish Public Schools Network Infrastructure Upgrades project gives us a unique perspective into what our clients expect and need. We have established a proven track record of success in working with academic institutions.

Com-Net Services would be pleased to enter into a contract and perform the services for the project outlined in the St. Charles Parish Public Schools Network Infrastructure Upgrades project, February 4, 2016.

The person authorized to contractually obligate CNS is Vincent R. Thibodaux. As shown on the following Certificate, he is the duly appointed President of the Corporation and he is fully authorized to carry out the responsibilities of that office.

I trust this proposal will meet your requirements. We at CNS look forward to working with you.

Best Regards,



Vincent R. Thibodaux, RCDD/OSP

President

Com-Net Services, L.L.C.

February 7, 2016

## Company Profile

Com-Net Services is a comprehensive communications installation company, providing data and telecommunications services to a wide range of clients. From piece-work to total turn-key solutions, site specific or nationwide, Com-Net has the experience and training to complete each project successfully. Our staff is highly responsive, and whether the client is a contractor or end-user, we ensure safe, efficient and cost effective installation. Our services include voice, data, fiber optic, networking, network design, cabling, LAN/WAN, and wireless networking. Com-Net has three BICSI Registered Communications Distribution Designers (RCDD) on staff, two BICSI Outside Plant Designers (OSP) on staff and is Corning certified.

Aruba / HPE has worked with Com-Net Services for this project in order to ensure the design of the requested turnkey solution is the very best available. The proposed solution includes the reliability of Aruba hardware and support along with Com-Net Services' years of experience in successfully meeting our clients' needs and assisting them to reach their overall I.T. goals.

Com-Net has extensive experience in fulfilling academic project requirements throughout the State of Louisiana. Our previous e-rate funded projects in Louisiana include:

- DeSoto Parish School Board
- Caddo Parish School Board
- Bienville Parish School Board
- St. Mary Parish School Board
- St. Landry Parish School Board
- West Feliciana Parish School Board
- East Baton Rouge Parish School Board;
- Livingston Parish School Board
- Vermillion Parish School Board
- St. Martin Parish School Board
- Ascension Parish School Board
- Houma / Thibodaux Diocese School Board

We have also completed projects in Florida and Alabama for the Orange County School Board and Birmingham School District as well. Our extensive record of success in the above academic projects

enables us to fully understand our clients' needs and anticipate issues before they occur. This enables us to complete our projects in a much more efficient manner – saving both time and costs.

Com-Net Services has been serving our clients for over 18 years. Our management team has a combined total of over 130 years of data / telecommunications experience. Additionally, many of our technicians possess industry certifications and manufacturer direct training. Our staff, takes immense pride in their ability to exceed our clients' expectations. We believe that each member of our staff are ambassadors for our company and that their experience matters. This belief empowers our employees to perform at their very best on every project.

Com-Net Services, LLC serves a broad spectrum of clientele. Our market includes the industrial sector (Dow, Exxon, Honeywell, etc.); public schools (see above); post-secondary facilities (LSU, Delgado Community College, LCTCS, etc.) and state government (Louisiana DHH, DCFS, Louisiana State Department of Administration, etc.). The largest project we have successfully completed consisting of access point installation was Vermillion Parish School Board. This project included 40 access points, in addition to cabling and fiber installation. In the past, our projects have typically been on individual campuses; not entire school districts.

## CERTIFICATE

I, Tami H. Misuraca, Secretary of *COM-NET SERVICES, L.L.C.* ("Corporation"), do hereby certify that Vincent R. Thibodaux is the duly appointed President and Manager of the Corporation. He is thus fully authorized to carry out the responsibilities of that office, including, but not limited to, the execution of construction contracts on behalf of the Corporation. I further certify that the Limited Liability Company Agreement of the Corporation has not been amended, rescinded or annulled and is now in full force and effect.

IN TESTIMONY WHEREOF, I have hereunto affixed my signature on July 11, 2012.



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Tami H. Misuraca, Secretary  
Com-Net Services, L.L.C.

ATTEST:



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Vincent R. Thibodaux, President  
Com-Net Services, L.L.C.



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Bruce A. Beard, President  
The Newtron Group, L.L.C.  
Member (Owner) of Com-Net Services, L.L.C.

# Com-Net Contact Information

		Office#	Cell #
President	Vincent Thibodaux, RCDD/OSP	(225) 928-1231	(225) 936-2136
Manager	Tom Frazier, RCDD/OSP	(225) 928-1231	(225) 235-7313
Manager	Mark Edwards	(225) 928-1231	(225) 315-9772
Project Manager	Charlie Witt	(225) 928-1231	(225) 910-1094
Account Manager	Alex Daniell	(225) 928-1231	(912) 571-2528
Office Manager	Lisa Gill	(225) 928-1231	
Accts. Recv.	John Stallings	(225) 927-8921	
Treasurer	Tami Misuraca	(225) 906-1095	
Safety	Mark Richardson	(225) 906-1024	
QA/QC	Steven Cherco	(225) 906-4057	
Fax		(225) 928-1249	
Toll Free		(800) 676-2137	

## Technical Clarification Contacts

President	Vincent Thibodaux, RCDD/OSP	(225) 928-1231	(225) 936-2136
Manager	Tom Frazier, RCDD/OSP	(225) 928-1231	(225) 235-7313
Manager	Mark Edwards	(225) 928-1231	(225) 315-9772

## Contractual Clarification Contact

President	Vincent Thibodaux, RCDD/OSP	(225) 928-1231	(225) 936-2136
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## E-mail & Fax

Vincent Thibodaux	<a href="mailto:vince@comnetserv.com">vince@comnetserv.com</a>	(225) 928-1249
Tom Frazier	<a href="mailto:tfraz@comnetserv.com">tfraz@comnetserv.com</a>	(225) 928-1249
Mark Edwards	<a href="mailto:mark_edwards@comnetserv.com">mark_edwards@comnetserv.com</a>	(225) 928-1249



1344 CROSSMAN AVE  
SUNNYVALE, CA 94089-1113

T: 1.408.227.4500  
FAX: 1.408.227.4550

WWW.ARUBANETWORKS.COM

January 14, 2016

### Partner Status

This letter is to hereby certify that Com-Net Services, 8232 W Darrly Drive, Baton Rouge LA 70815 is fully authorized to sell, and maintain all of the Aruba a Hewlett Packard Enterprise Company products described in the response. This is to include the wireless and Switching products. Their Partner agreement is in good standing and they meet all requirements requested within the RFP request. We fully support this response.

Sincerely

A handwritten signature in black ink that reads "Kyle Poulsen". The signature is written in a cursive, slightly slanted style.

Kyle Poulsen  
Territory Manager – Louisiana.

# LOUISIANA

DEPARTMENT *of* REVENUE



COM NET SERVICES LLC  
8183 W EL CAJON DR  
BATON ROUGE LA 70815-8035

Date of Notice: September 02, 2015  
Letter ID: L0418754720  
Account ID: 9679291-001-400  
Tax Type: Sales

Re: Louisiana Resale Certificate

Dear Louisiana Taxpayer:

Your Louisiana Resale Certificate is enclosed. You must give copies of the certificate to your vendors to confirm your status as a resale dealer.

Your exemption is effective for the period shown on the enclosed certificate and will be automatically renewed if you continue to report sales activities in the state and do not become delinquent in your sales tax payment or filing responsibilities pursuant to R.S. 47:306.

You are reminded that your resale certificate may only be used to purchase items for resale. Purchases for use or consumption are still taxable and your business must pay the sales tax at the time of purchase or report the purchase on Line 2 of the sales tax return.

Dealers can verify the validity of their customers resale exemption certificates using the LDR online verification system at [www.revenue.louisiana.gov](http://www.revenue.louisiana.gov).

If you have questions about your sales tax account or need additional assistance, please contact the Louisiana Department of Revenue by email at [sales.inquiries@la.gov](mailto:sales.inquiries@la.gov).

Sincerely,  
Louisiana Department of Revenue

Enclosure

Post Office Box 201  
Baton Rouge, LA 70821-0201  
(855) 307-3893 • (225) 231-6236 Fax  
(225) 219-2114 TDD • [www.revenue.louisiana.gov](http://www.revenue.louisiana.gov)

**Tom Schedler**  
**Secretary of State**

**State of Louisiana**  
**Secretary of State**

**COMMERCIAL DIVISION**  
**225.925.4704**



Fax Numbers  
 225.932.5317 (Admin. Services)  
 225.932.5314 (Corporations)  
 225.932.5318 (UCC)

Name	Type	City	Status
COM-NET SERVICES, L.L.C.	Limited Liability Company (Non-Louisiana)	DOVER	Active

**Business:** COM-NET SERVICES, L.L.C.

**Charter Number:** 40467434Q

**Registration Date:** 3/25/2011

**Domicile Address**

32 W. LOOCKERMAN STREET  
 SUITE 201  
 DOVER, DE 19904

**Mailing Address**

8183 W. EL CAJON DRIVE  
 BATON ROUGE, LA 70815

**Principal Business Office**

8183 W. EL CAJON DRIVE  
 BATON ROUGE, LA 70815

**Registered Office in Louisiana**

3867 PLAZA TOWER DR., 1ST FLOOR  
 BATON ROUGE, LA 70816

**Principal Business Establishment in Louisiana**

7786 S. COMMERCE  
 BATON ROUGE, LA 70815

**Status**

**Status:** Active

**Annual Report Status:** In Good Standing

**Qualified:** 3/25/2011

**Last Report Filed:** 3/7/2015

**Type:** Limited Liability Company (Non-Louisiana)

**Registered Agent(s)**

**Agent:** REGISTERED AGENT SOLUTIONS, INC.  
**Address 1:** 3867 PLAZA TOWER DR., 1ST FLOOR

**City, State, Zip:** BATON ROUGE, LA 70816

**Appointment Date:** 3/25/2011

**Amendments on File (2)**

Description	Date
Foreign LLC Statement of Change	4/5/2011
Foreign LLC Statement of Change	4/26/2011



<b>LOUISIANA</b> DEPARTMENT of REVENUE	<b>Louisiana Resale Certificate</b>	
	<b>Purchases of Tangible Personal Property For Resale</b>	
	L.A.RS 47:301(10)	

Note: This certificate may be duplicated as needed. Please retain original certificate for your records.

PLEASE PRINT OR TYPE.

Purchaser Information			
Louisiana Account Number 9679291-001-400	Effective Date (mm/dd/yyyy) 08/25/2015	Expiration Date (mm/dd/yyyy) 08/31/2016	
Purchaser Legal Name COM NET SERVICES LLC		Purchaser Trade Name COM NET SERVICES LLC	
Mailing Address			
Mailing Address 8183 W EL CAJON DR			
City BATON ROUGE		State LA	ZIP 70815-8035
Location Address			
Location Address 7786 COMMERCE AVE			
City BATON ROUGE		State LA	ZIP 70815-8024
Business Information			
U.S. NAICS Code 541512	Purchaser's Type of Business Computer Systems Design Services		

I, the purchaser, certify that all materials, goods, merchandise, and services purchased are for resale as tangible personal property, either in the same form as purchased or to be added as a recognizable, identifiable, and beneficial component of a new product. I also certify that any services purchased with the use of this certificate will be resold as a service as defined under Louisiana R.S. 47:301(14). I further certify that all tax-exempt purchases will be resold as tangible personal property in the normal course of our business.

I understand that if I use any of the items other than for resale, I must pay sales/use tax at the time of use. If this purchase is later found to be subject to tax, I, the purchaser, assume full liability for the tax.

Any purchaser or agent who fraudulently signs this certificate without intent to use the taxable items for resale is subject to all the penalties provided for by Title 47 of the Louisiana Revised Statutes and collection will be pursued against the seller or purchaser for any taxes, penalties and interest due.

Authorization	
Name	Title
Signature X	Date (mm/dd/yyyy)

The validity of this exemption certificate can be verified at [www.revenue.louisiana.gov](http://www.revenue.louisiana.gov).

The State of Louisiana does not certify the correctness of the parish information contained in this document.

Parish Information	
Parish of Principal Place of Business	Parish Tax Account Number



# CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)  
3/25/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

**IMPORTANT:** If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Arthur J. Gallagher Risk Management Services, Inc. 101 S. Main St. Ste 200 P.O. Box 140 Decatur IL 62525	CONTACT NAME: Mary E. Corley	FAX (A/C. No.): 217-233-3305	
	PHONE (A/C. No. Ext): 217-233-3335	E-MAIL ADDRESS: mary_corley@ajg.com	
INSURED Com-Net Services 7786 S Commerce Baton Rouge, LA 70815	INSURER(S) AFFORDING COVERAGE		NAIC #
	INSURER A: Old Republic Insurance Company		24147
	INSURER B: Travelers Property Casualty Co of A		25674
	INSURER C: AGCS MARINE INS CO		22837
	INSURER D: LEXINGTON INS CO		19437
INSURER E:			
INSURER F:			

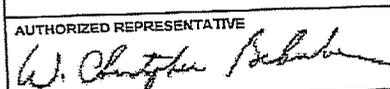
**COVERAGES** CERTIFICATE NUMBER: 1415891583 REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL SUBR INSD   WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> Contractual Liab <input checked="" type="checkbox"/> Time Element Pol GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:	Y	MWZY304162	4/1/2015	4/1/2016	EACH OCCURRENCE \$2,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$150,000 MED EXP (Any one person) \$5,000 PERSONAL & ADV INJURY \$2,000,000 GENERAL AGGREGATE \$4,000,000 PRODUCTS - COMP/OP AGG \$4,000,000 \$
A	<input checked="" type="checkbox"/> AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> NON-OWNED AUTOS	Y	MWWTB304163	4/1/2015	4/1/2016	COMBINED SINGLE LIMIT (Ea accident) \$1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
B	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> DED <input checked="" type="checkbox"/> RETENTION \$10,000		ZUP61M2806215NF	4/1/2015	4/1/2016	EACH OCCURRENCE \$10,000,000 AGGREGATE \$10,000,000 \$
A	<input checked="" type="checkbox"/> WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N N N/A	MWC304161 00	4/1/2015	4/1/2016	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$5,000,000 E.L. DISEASE - EA EMPLOYEE \$5,000,000 E.L. DISEASE - POLICY LIMIT \$5,000,000
C C D	<input type="checkbox"/> Property; Cust. Equip. <input type="checkbox"/> Property; Cust. Equip. <input type="checkbox"/> Cont. Prof. Liability		MXI 93066214 MXI 93066214 044177453	4/1/2015 4/1/2015 4/1/2015	4/1/2016 4/1/2016 4/1/2016	Rent/Leas Equip 1,000,000 Prop; Installation 1,000,000 Ea. Cim/Aggregate 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Forms CG 00 01 (04/13) and CA 00 01 (10/13) apply except where regulations require otherwise. CGL and AL policies are endorsed to provide Additional Insured/Designated Insured status and primary and/or non-contributory coverage as required by contract and permitted by law. CGL, AL and WC policies permit waiver of subrogation when permitted by law prior to loss. Property Insurance provides Additional Insured and/or Loss Payee status, ATIMA. Excess Coverage follows CGL for coverage and additional insured status. Longshore & Harbor Workers and Maritime Coverage is included in WC policy coverage. See attached endorsements for confirmation.

CERTIFICATE HOLDER	CANCELLATION
	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.  AUTHORIZED REPRESENTATIVE 

# CORY, TUCKER & LARROWE, INC.

BONDS • INSURANCE

August 12, 2015

Mr. Vincent Thibodaux  
President  
Com-Net Services, LLC  
7786 S. Commerce Drive  
Baton Rouge, LA 70815

Re: **Bonding Capacity**

Dear Vince:

You asked that we write a letter confirming Com-Net Services, LLC's bonding capabilities.

We have had the privilege of providing bonds for Com-Net Services, LLC and/or its affiliates for over 34 years, currently through Liberty Mutual Insurance Company, 175 Berkeley Street, Boston, MA 02116 (617) 357-9500. Liberty Mutual Insurance Company has an A.M. Best rating of "A (Excellent) XV" with a U.S. Treasury listing of \$1,373,795,000 limit per bond.

We would consider support for Com-Net Services, LLC on single projects in the \$60-80 million range and an aggregate lump sum program exceeding \$160 million. We would not anticipate a problem handling bonds exceeding these parameters subject to our normal review of contract terms and bond documents, evidence of funding, if applicable, and other underwriting conditions available at the time of the request.

Com-Net Services, LLC is a financially strong, well-managed company and it is a pleasure to recommend your firm to owners. Com-Net Services, LLC and its affiliates have built an excellent reputation with owners and vendors over the past (42) years and have earned the reputation as one of the premier contractors in your field in the United States.

This letter is not an assumption of liability and is issued only as a prequalification reference request.

Should you need any additional information, please do not hesitate to call.

Best regards,



Bert Guiberteau, Jr.

cc: Zia Reeves, Liberty Mutual Surety, Dallas, TX



September 16, 2014

Mr. Vince Thibodaux  
Com-Net Services, L. L. C.  
7686 S Commerce Drive  
Baton Rouge, LA 70815

RE: Banking Reference Letter

Dear Vince:

This reference letter is written for the benefit of third parties that you may do business with to give a summary of the banking relationship with Com-Net Services, L. L. C. (subsidiary of Triad E&C Holdings, L. L. C.) and J P Morgan Chase Bank, N. A.

J P Morgan Chase Bank, N. A. and its predecessor banks have had a banking relationship with Com-Net Services, L. L. C. and/or its affiliates in excess of 40 years. Com-Net Services, L. L. C. is an outstanding client of our Bank and we provide to a low eight figure revolving line of credit for both cash and letter of credit needs for Triad E&C Holdings, L. L. C. and it is available to all its subsidiaries.

Com-Net Services, L. L. C. has always handled their business in an excellent manner and should you have any questions, please feel free to call me at (225) 332-4305.

Sincerely,

Jeffrey E. Gould  
Senior Vice President

Jeffrey E. Gould Senior Vice President Commercial Banking Group

JPMorgan Chase Bank, N.A. • 451 Florida Street, Suite B110, Baton Rouge, LA 70801

Telephone: 225 332-3133/Facsimile: 225 332-4410

P. O. Box 3399 (LA2-9685) Baton Rouge, LA 70821-3399

Dee.L.Richard@chase.com

## 1.0 Costs

A detailed response must be provided for each requirement below.

1.1 Supply a narrative of the costs associated with your proposal.

**Please find on the following pages.**

1.2 Eligible and ineligible costs must be identified in the narrative referenced in requirement 1.1.

**Compliant**

1.3 Complete the cost sheet(s) associated with each category in the **2.0 Technical Response** section for which you are responding.

**Please find on the following pages.**

1.4 Installation costs should include all expenses required.

**Compliant**

1.5 During the term of an agreed upon contract, the vendor must make available to SCPPS all similar contracts utilizing like services, equipment, and volumes, and terms and conditions that are made available to other customers in the state of Louisiana.

**Will Comply**

1.6 Vendors must provide SCPPS with lowest corresponding prices for all proposed equipment/services. Lowest corresponding price (LCP) is defined as the lowest price that a service provider charges to nonresidential customers who are similarly situated to a particular applicant (school, library, or consortium) for similar services.

**Compliant**

1.7 Unit costs provided in cost sheet(s) submitted per the **2.0 Technical Response** section must be independent of funding source (E-rate vs. non E-rate funds).

**Compliant**

1.8 Unit costs provided in cost sheet(s) submitted per the **2.0 Technical Response** section must be independent of quantity. Proposed costs cannot change due to changes in quantities needed for project completion.

**Compliant**

1.9 Unit costs must be available to SCPPS for additional purchases for 12 months after completion of work agreed to within contract(s) awarded for this RFP.

**Compliant**

1.10 The awarded vendor(s) must separate invoices for materials/services that will be E-rate eligible based on Category 2 school budgets from all other materials/services.

**Will Comply**

1.11 Any service necessary to implement the proposed solution must be clearly defined. The total cost(s) of these services must also be clearly stated, and specified as eligible or non-eligible for E-rate funding. If the cost is a recurring cost, include the anticipated payment schedule.

**Compliant**

1.12 SCPPS will not be responsible for any costs that were not specified in the vendor's proposal.

**Agreed**

March 7, 2016

## St. Charles Parish Public Schools Network Infrastructure Upgrades 2016 Cost Narrative

The proposed solution for the SCPPS 2016 Network Infrastructure Upgrades Includes:

- Aruba Instant IAP-315 Wireless Access Points
- AirWave Software Device Licenses; and,
- Support for Aruba Instant IAP-315 Wireless Access Points; AirWave; and,
- Layer 3 Switch: HP-5500-48G-PoE+4SFP+ HI Switch W/2SLT; HP X362 720W AC PoE Power Supply; and,
- Layer 2 PoE+ Switch: HP-2530-48G-PoE+2SFP+ Switch; and,
- Non PoE Layer 2 Switch: HP-2530-48G-2SFP+ Switch; and,
- SFP+: HP X132 10G SFP+ LC SR Transceiver; and,
- Installation and initial configuration of all installed components; and,
- Training of STPSB staff in the utilization of installed components

**The Project Grand Total for Section 2.1 Wireless is \$469,660.80.**

This cost includes:

Aruba Instant IAP-315 Wireless Access Points with 1 year support. 3 year and 5 year support options are also available. Support plans are the only recurring costs associated with this proposal. **Unit Cost-\$476.12**

Also included is software licenses and 1 year support for Aruba AirWave network management software. 3 year and 5 year support options are also available. Support plans are the only recurring costs associated with this proposal. All costs associated with AirWave are not E-Rate eligible; AirWave Software Licenses and Support. **Unit Cost-\$25.31**

The install cost per Access Point unit is **\$76.97**.

Non-eligible E-Rate costs total \$20,551.72. E-Rate eligible costs total \$449,109.08.

**The Project Grand Total for Section 2.2 Network Switches is \$496,314.45.**

This cost includes:

Layer 3 Switch: HP-5500-48G-PoE+4SFP+ HI Switch W/2SLT: **Unit Cost-\$3,473.07**

Layer 2 PoE+ Switch: HP-2530-48G-PoE+2SFP+ Switch: **Unit Cost-\$2,144.52**

Non PoE Layer 2 Switch: HP-2530-48G-2SFP+ Switch: **Unit Cost-\$1,524**

SFP+: HP X132 10G SFP+ LC SR Transceiver: **Unit Cost-\$343.20**

HP X362 720W AC PoE Power Supply: **Unit Cost-\$388.46**

Also included is software licenses and 1 year support for Aruba AirWave network management software. 3 year and 5 year support options are also available. Support plans are the only recurring costs associated with this proposal. All costs associated with AirWave are not E-Rate eligible; AirWave Software Licenses and Support.

The install cost per switch unit is \$130.54.

Non-eligible E-Rate costs total \$5,137.93. E-Rate eligible costs total 91,176.52.

**SCPPS 2.1 Wireless Cost Sheet**

**This pricing sheet should reflect ALL costs of equipment and services for wireless access as described in the Network Infrastructure Upgrades RFP.**

Vendor: Com-Net Services, L.L.C.

Vendor E-rate Spin: 143008294

Site	AP Brand/Model	AP Quantity	AP Cost Per Unit	Install Cost Per Unit <sup>1</sup>	Other Costs Per Unit *	Other Non-Unit Costs **	Total Cost
ACM	Aruba IAP-315	48	\$468.42	\$76.97	\$7.70	\$25.31	\$27,763.20
DHS	Aruba IAP-315	123	\$468.42	\$76.97	\$7.70	\$25.31	\$71,143.20
EJL							
ESE	Aruba IAP-315	40	\$468.42	\$76.97	\$7.70	\$25.31	\$23,136.00
HHS	Aruba IAP-315	128	\$468.42	\$76.97	\$7.70	\$25.31	\$74,035.20
HHM	Aruba IAP-315	47	\$468.42	\$76.97	\$7.70	\$25.31	\$27,184.80
JBM	Aruba IAP-315	67	\$468.42	\$76.97	\$7.70	\$25.31	\$38,752.80
LWE	Aruba IAP-315	57	\$468.42	\$76.97	\$7.70	\$25.31	\$32,968.80
LES	Aruba IAP-315	78	\$468.42	\$76.97	\$7.70	\$25.31	\$45,115.20
NES	Aruba IAP-315	68	\$468.42	\$76.97	\$7.70	\$25.31	\$39,331.20
RJV	Aruba IAP-315	35	\$468.42	\$76.97	\$7.70	\$25.31	\$20,244.00
RKS	Aruba IAP-315	41	\$468.42	\$76.97	\$7.70	\$25.31	\$23,714.40
SAT	Aruba IAP-315	14	\$468.42	\$76.97	\$7.70	\$25.31	\$8,097.60
SRE	Aruba IAP-315	66	\$468.42	\$76.97	\$7.70	\$25.31	\$38,174.40

<sup>1</sup> Installation will require unpackaging, assembling, asset tagging, software/firmware upgrades, configuration, mounting, testing, etc.

\* Use this space to explain **Other Per Unit Costs** as listed above.  
IAP-315 Hardware Support (1 Year).

\*\* Use this space to explain **Other Non-Unit Costs** per site as listed above.  
AirWave software license to manage a single device (K-12 license includes Master Console and Failover) and support(1 year).  
(This cost is not E-Rate eligible.)

List any additional costs here. This may include costs for controllers, licensing, management console, external antennas, high density, etc.  
Clearly identify any cost that is not E-Rate eligible.

**Project Grand Total: \$469,660.80**

Vincent R. Thibodaux  
Signature of Authorized Representative

3/7/2016  
Date

Vincent R. Thibodaux  
Printed Name of Authorized Representative

SCPPS 2.2 Network Switches Cost Sheet

This pricing sheet should reflect ALL costs of equipment and services for network switch upgrades as described in the Network Infrastructure Upgrades RFP.

Vendor:		Com-Net Services, L.L.C.										Vendor E-rate Spin:		143008294		
Category	Brand/Model	ACM	DHS	EUL	ESE	HHS	HHM	JBM	LWE	LES	NES	RUV	RKS	SAT	SRE	Totals
Layer 3 Power Over Ethernet+ Network Switch	HP-5500	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14
	Quantity	\$3,473.07	\$3,473.07	\$3,473.07	\$3,473.07	\$3,473.07	\$3,473.07	\$3,473.07	\$3,473.07	\$3,473.07	\$3,473.07	\$3,473.07	\$3,473.07	\$3,473.07	\$3,473.07	\$3,473.07
Layer 2 Power Over Ethernet+ Network Switch	HP-2530	4	16	1	2	19	6	7	7	9	6	1	4	2	5	89
	Quantity	\$2,144.52	\$2,144.52	\$2,144.52	\$2,144.52	\$2,144.52	\$2,144.52	\$2,144.52	\$2,144.52	\$2,144.52	\$2,144.52	\$2,144.52	\$2,144.52	\$2,144.52	\$2,144.52	\$2,144.52
Non Power Over Ethernet Network Switch	HP-2530	5	20	2	4	22	8	8	8	6	8	4	3	1	1	100
	Quantity	\$1,524.86	\$1,524.86	\$1,524.86	\$1,524.86	\$1,524.86	\$1,524.86	\$1,524.86	\$1,524.86	\$1,524.86	\$1,524.86	\$1,524.86	\$1,524.86	\$1,524.86	\$1,524.86	\$1,524.86
Switch Installation Cost <sup>2</sup>	HP-2530	10	37	4	7	42	15	16	16	16	15	6	8	4	7	203
	Quantity	\$130.54	\$130.54	\$130.54	\$130.54	\$130.54	\$130.54	\$130.54	\$130.54	\$130.54	\$130.54	\$130.54	\$130.54	\$130.54	\$130.54	\$130.54
SFP+ (Small Form-Factor Pluggable) <sup>3</sup>	HP X132 10G SFP+ LC SR	9	35	3	5	39	13	15	15	19	15	3	9	5	11	166
	Quantity	\$343.20	\$343.20	\$343.20	\$343.20	\$343.20	\$343.20	\$343.20	\$343.20	\$343.20	\$343.20	\$343.20	\$343.20	\$343.20	\$343.20	\$343.20
SFP+ Installation Cost <sup>2</sup>	Included in Switch Installation Cost															
	Unit Cost															
Other Costs *	HP X362															\$5,438.44
	Unit Cost															\$5,438.44
Total Cost	HP X362	\$24,069.65	\$85,124.57	\$10,219.07	\$16,491.33	\$96,633.35	\$34,958.77	\$37,920.23	\$37,920.23	\$40,532.35	\$35,645.17	\$13,529.87	\$20,788.85	\$11,525.13	\$20,409.51	\$498,314.45
	Unit Cost															

<sup>1</sup> All switches must have 48 ports.  
<sup>2</sup> Installation will require unpacking, assembling, asset tagging, software/firmware upgrades, configuration, mounting, testing, etc.  
<sup>3</sup> SFP+ must be 10 Gb single mode LC.

\* Use this space to explain Other Costs as listed above. This may include costs for licensing, management console, etc.

HP X362 720W AC PoE Power Supply- 14 PoE Power Supplies for the Layer 3 Switches  
AirWave software license to manage a single device (K-12 license includes Master Console and Failover) and support (1 year). (This cost is not E-Rate eligible.)

Central Office  
Core  
Brand/Model:

Central Office  
Core Cost:

Project Grand  
Total:  
\$496,227.16

Signature of Authorized Representative



Printed Name of Authorized Representative  
Vincent R. Thibodeaux

Date  
3/7/2016

## 2.0 Technical Responses

### 2.1 Wireless

**2.1.2** The solution being proposed must satisfy all of the requirements listed below. Vendors must state compliance in their response. If there is an exception to the listed requirements, the vendor must provide a detailed explanation of the proposed alternate. **Appropriate Data Sheets Included.**

**2.1.2.1** Access points must be based on 802.11ac and 802.11ac wave 2 radio technology.

**Compliant**

**2.1.2.2** Access points must be able to provide connectivity for at least 35 devices (35:1 ratio) simultaneously.

**Compliant**

**2.1.2.3** Access points must support multi-user MIMO with three spatial streams and/or SU-MIMO with four spatial streams.

**Compliant**

**2.1.2.4** Access points must support up to 16 BSSIDs per radio.

**Compliant**

**2.1.2.5** Access points must be backwards compatible to support 802.11 a/b/g/n.

**Compliant**

**2.1.2.6** Access points must include radios for both 2.4 GHz and 5 GHz.

**Compliant**

**2.1.2.7** If controller-based solution is proposed it must support high availability allowing a second controller to take over duties with minimal disruption.

**Compliant**

**2.1.2.8** If controller-based solution is proposed it must support client connectivity in the event that a WAN outage disrupts communication between the access point and the controller.

**Compliant**

**2.1.2.9** Solution must offer access points with internal and external antenna options.

**Compliant**

**2.1.2.10** Solution must offer the ability to manage all access points as one wireless network via a single management platform.

**Compliant**

**2.1.2.11** Solution must support QoS capabilities and policy enforcements.

**Compliant**

**2.1.2.12** Solution must support technology to automatically configure RF settings such as channel assignment and transmit power.

**Compliant- Aruba's Adaptive Radio Management (ARM) technology AUTOMATICALLY assigns channel and power settings, provides airtime fairness, and ensures that APs stay clear of all sources of RF interference to deliver reliable, high-performance WLANs.**

**2.1.2.13** Solution must support technology that optimizes overall network capacity in mixed-client environments by helping ensure that 802.11 a/g/n and 802.11 ac clients operate at the best possible rate.

**Compliant- Aruba's Adaptive Radio Management (ARM) technology provides airtime fairness, preventing clients from monopolizing resources at the expense of other clients.**

**2.1.2.14** Solution must support technology to steer dual band capable clients from 2.4 GHz to 5 GHz.

**Compliant- Aruba's ClientMatch Technology utilizes band steering.**

**2.1.2.15** Solution must provide the capability of client moving from one access point to another without noticeable loss of connectivity.

**Compliant- Aruba's ClientMatch Technology encourages roaming, connecting clients to the AP that provides optimal performance.**

**2.1.2.16** Solution must provide a guest portal on a separate Vlan to allow unauthenticated user access to the Internet, yet still utilize the District's web filter.

**Compliant**

**2.1.2.17** Access points must be able to be mounted to drop ceilings or walls without loss of coverage area.

**Compliant**

**2.1.2.18** Solution must minimize interference from 3G/4G cellular network and distributed antenna systems.

**Compliant**

**2.1.2.19** Solution must offer wireless intrusion protection, rogue detection, and containment.

**Compliant**

**2.1.2.20** Vendor must describe warranty included with each brand/model of equipment proposed.

**Please see the included documents for detailed information regarding warranties: "HPE Networking Product Warranty & Support Summary" and "ArubaCare Support Data Sheet".**

**2.1.3** Vendor must describe their installation and testing procedures for the proposed wireless solution, and must include/address all requirements below.

**All Access Points (APs) will be installed to meet manufacturer's recommended specifications and industry standards. Com-Net Services will certify in writing all APs are functioning properly to meet the network design specifications. Testing will be completed using the proposed solution's AirWave Management software.**

**2.1.3.1** Vendor will be responsible for un-boxing, asset tagging, and logging each piece of equipment in an asset tracking spreadsheet provided by SCPPS, in an area designated by SCPPS.

**Will comply**

**2.1.3.2** Any trash resulting from the un-boxing process must be disposed of by the vendor.

**Will Comply**

**2.1.3.3** Vendor will be responsible for installing any necessary software and firmware updates.

**Will Comply**

**2.1.3.4** Vendor will be responsible for configuration of access points.

**Will comply**

**2.1.3.5** Vendor will be responsible for mounting access points in designated areas as specified in agreed upon network design, and connecting access point to the network drop provided for that area.

**Will comply**

**2.1.3.6** Vendor will be responsible for testing every access point installed. Wireless coverage must meet specifications in the network design.

**Will Comply**

**2.1.3.7** The installation of any access point model which will require more than one network drop must be clearly communicated as such to SCPPS in your installation response.

**Will Comply**

## **2.2 Network Switches**

**2.2.1** The solution being proposed must satisfy all of the requirements listed below. Vendors must state compliance in their response. If there is an exception to the listed requirements, the vendor must provide a detailed explanation of the proposed alternate. Anticipated quantities needed are designated in the **SCPPS 2.2 Network Switches Cost Sheet**. Vendor must complete and submit proposed brands and models, along with costs, on the **SCPPS 2.2 Network Switches Cost Sheet**. SCPPS reserves the right to adjust quantities based on needs assessed throughout the project. **Appropriate Data Sheets Included.**

**2.2.1.1** Layer 3 and Layer 2 switches functionally equivalent to, or better than, Avaya ERS 3549GTS-PWR+

**Compliant**

**2.2.1.2** Solution must offer SFP+.

**Compliant**

**2.2.1.3** Must support both 1 Gb/ 10 Gb speeds on each SFP port.

**Compliant**

**2.2.1.4** Must support multiple Vlans.

**Compliant**

**2.2.1.5** Must provide at least 48 ports capable of auto-negotiating 100 Mbs or 1 Gbs.

**Compliant**

**2.2.1.6** Must support Spanning Tree Protocol.

**Compliant**

**2.2.1.7** Must support IPv4 routing protocols (static, RIPv2, OSPF, EIGRP).

**Compliant**

**2.2.1.8** Must support Internet Group Management Protocol (IGMP) Snooping for IPv4 for multicast forwarding.

**Compliant**

**2.2.1.9** Must support IGMP filtering.

**Compliant**

**2.2.1.10** Must support telnet and SSH for remote management.

**Compliant**

2.2.1.11 Must support QoS capabilities.

**Compliant**

2.2.1.12 Must support stacking capabilities.

**Compliant**

2.2.1.13 Must support POE+ and non POE options.

**Compliant**

2.2.1.14 Must offer solution for management of multiple switches.

**Compliant**

2.2.1.15 Vendor must describe warranty included with each brand/model of equipment proposed.

**Please see the included documents for detailed information regarding warranties: "HPE Networking Product Warranty & Support Summary" and "ArubaCare Support Data Sheet".**

2.2.2 Vendor must describe their installation and testing procedures for the proposed network switch solution, and must include/address all requirements below:

**All Switches will be installed to meet manufacturer's recommended specifications and industry standards. Com-Net Services will certify in writing all switches are functioning properly to meet the network design specifications. Testing will be completed using the proposed solution's AirWave Management software.**

2.1.2.1 Vendor will be responsible for un-boxing, asset tagging, and logging each piece of equipment in an asset tracking spreadsheet provided by SCPPS, in an area designated by SCPPS.

**Will comply**

2.1.2.2 Any trash resulting from the un-boxing process must be disposed of by the vendor.

**Will comply**

2.1.2.3 Vendor will be responsible for configuration of network switches.

**Will comply**

2.1.2.4 Vendor will be responsible for placing and securing network switches in the designated racks, and connecting cabling to the network switches. Cable management within rack must be agreed upon with SCPPS prior to installation of network switches.

**Will Comply**

2.1.2.5 Existing network switches being replaced must be removed by vendor and placed in an area designated by SCPPS.

**Will Comply**

2.1.2.6 Vendor will be responsible for testing every network switch installed.

**Will Comply**

### 3.0 Implementation Process & Timelines

Provide a response to this section for each category in the **2.0 Technical Response** section for which you are responding. A detailed response must be provided for each requirement below.

#### 2.1 Wireless

**3.1** Com-Net Services, LLC proposes that the installation will be in place and operational on September 30, 2017.

**3.2** Com-Net Services, LLC agrees that there will be no disruption of service during school hours (7:00am – 3:30pm) without the approval of SCPPS. Any potential outages will be scheduled with SCPPS prior to the outage taking place.

**3.3** Com-Net Services, LLC agrees to coordinate with SCPPS in order to take advantage of school holidays, after school hours, and weekends (if necessary) for project completion. All labor costs quoted for this project include these hours.

**3.4** Com-Net Services, LLC has a staff of over 35 field service technicians. These technicians are managed by a management team with well over 100 years of combined data communication installation experience.

**3.5** Com-Net Services, LLC proposes to complete the access point installation within 12 weeks of project initiation. Each campus will be considered a phase. The table below gives a breakdown of the number of access points installed at each location and the number of days required for completion of the campus.

SCHOOL	# OF ACCESS POINTS	# OF DAYS
ALBERT CAMMON MIDDLE	48	3
DESTREHAN HIGH SCHOOL	123	7
ETHEL SCHOEFFNER ELEM.	40	3
HAHNVILLE HIGH SCHOOL	128	7
HARRY HURST MIDDLE	47	3
JB MARTIN MIDDLE	67	4
LAKWOOD ELEM.	57	3
LULING ELEM.	78	4
NORCO ELEM.	68	4
RJ VIAL ELEM.	35	2
RK SMITH MIDDLE	41	3
SATELLITE CENTER	14	1
ST. ROSE ELEM.	66	3

**3.6** Com-Net Services, LLC will assign a project manager to this project who will be available via email or by phone when not actually on site. Com-Net Services agrees to have the project manager regularly meet with designated SCPPS contact with progress reports, status and timelines.

**3.7** Com-Net Services, LLC will provide weekly updates via email to the designated SCPPS contact.

**3.8** Com-Net Services, LLC is fully insured and agrees to be held liable for damages caused by Com-Net Services, LLC and / or its employees.

**3.9** Com-Net Services, LLC agrees that it shall not make any physical changes to any SCPPS structure without written permission from SCPPS. This includes, cutting drilling, boring, or any other physical alterations.

**3.10** Com-Net Services, LLC agrees to maintain a neat and orderly work area and to dispose of all waste materials produced by Com-Net Services, LLC's work.

**3.11** Com-Net Services, LLC agrees to perform all work in a safe and professional manner in compliance with company and OSHA safety standards.

**3.12** Com-Net Services, LLC agrees to joint inspections by SCPPS and Com-Net Services, LLC representative throughout implementation and before acceptance of the work by SCPPS.

## **2.2 Network Switches**

**3.1** Com-Net Services, LLC proposes that the installation will be in place and operational on September 30, 2017.

**3.2** Com-Net Services, LLC agrees that there will be no disruption of service during school hours (7:00am – 3:30pm) without the approval of SCPPS. Any potential outages will be scheduled with SCPPS prior to the outage taking place.

**3.3** Com-Net Services, LLC agrees to coordinate with SCPPS in order to take advantage of school holidays, after school hours, and weekends (if necessary) for project completion. All labor costs quoted for this project include these hours.

**3.4** Com-Net Services, LLC has a staff of over 35 field service technicians. These technicians are managed by a management team with well over 100 years of combined data communication installation experience.

**3.5** Com-Net Services, LLC proposes to complete the switch installation within 5 weeks of project initiation. Each campus will be considered a phase, with two phases being completed simultaneously. The table below gives a breakdown of the number of switches to be installed at each location and the number of days required for completion of the campus.

<b>SCHOOL</b>	<b># OF SWITCHES</b>	<b># OF DAYS</b>
ALBERT CAMMON MIDDLE	10	2
DESTREHAN HIGH SCHOOL	37	6
E.J. LANDRY ALTERNATIVE CTR.	7	2
ETHEL SCHOEFFNER ELEM.	42	7
HAHNVILLE HIGH SCHOOL	15	3
HARRY HURST MIDDLE	16	3
JB MARTIN MIDDLE	16	3
LAKWOOD ELEM.	16	3
LULING ELEM.	15	3
NORCO ELEM.	6	1
RJ VIAL ELEM.	8	2
RK SMITH MIDDLE	4	1
SATELLITE CENTER	7	2
ST. ROSE ELEM.	4	1

**3.6** Com-Net Services, LLC will assign a project manager to this project who will be available via email or by phone when not actually on site. Com-Net Services agrees to have the project

manager regularly meet with designated SCPPS contact with progress reports, status and timelines.

**3.7** Com-Net Services, LLC will provide weekly updates via email to the designated SCPPS contact.

**3.8** Com-Net Services, LLC is fully insured and agrees to be held liable for damages caused by Com-Net Services, LLC and / or its employees.

**3.9** Com-Net Services, LLC agrees that it shall not make any physical changes to any SCPPS structure without written permission from SCPPS. This includes, cutting drilling, boring, or any other physical alterations.

**3.10** Com-Net Services, LLC agrees to maintain a neat and orderly work area and to dispose of all waste materials produced by Com-Net Services, LLC's work.

**3.11** Com-Net Services, LLC agrees to perform all work in a safe and professional manner in compliance with company and OSHA safety standards.

**3.12** Com-Net Services, LLC agrees to joint inspections by SCPPS and Com-Net Services, LLC representative throughout implementation and before acceptance of the work by SCPPS.

## 4.0 Maintenance & Support

Provide a response to this section addressing each category in the **2.0 Technical Response** section for which you are responding. A detailed response must be provided for each requirement below.

### 2.1 Wireless

**4.1** Indicate the local resources available to provide support to the district, including but not limited to the number of local technicians available for network and equipment installation, troubleshooting, and repair.

**Com-Net Services, LLC has a staff of over 35 field service technicians. These technicians are managed by a management team with well over 100 years of combined data communication installation experience. In addition Com-Net Services has the support of the entire local Aruba HPE team.**

**4.2** Provide information regarding your company's service assurance. Include your service level agreements and response time per service level.

**Please see the included documents for detailed information regarding warranties and service assurance: "HPE Networking Product Warranty & Support Summary", "ArubaCare Support Data Sheet", and "ArubaCare Terms and Conditions".**

**4.3** Describe your repair/replacement process which includes the steps taken for submitting, escalating, and tracking troubles toward resolution.

**Please see the included documents for detailed information regarding warranties: "HPE Networking Product Warranty & Support Summary" and "ArubaCare Support Data Sheet".**

**4.4** Describe the schedule during which real time support will be available to SCPPS.

**Please see the included documents for detailed information regarding warranties: "HPE Networking Product Warranty & Support Summary" and "ArubaCare Support Data Sheet".**

**4.5** Describe the mechanism in which SCPPS will contact the vendor to request support.

**Please see the included documents for detailed information regarding warranties: "HPE Networking Product Warranty & Support Summary" and "ArubaCare Support Data Sheet".**

**In addition to the support provided by Aruba HPE, included in this response is a contact list for Com-Net Services, including e-mail addresses and cell phone numbers.**

**4.6** Vendor must provide knowledge transfer and training on installed equipment/software at the time of project completion.

**Com-Net Services will provide one full day of knowledge transfer and training on the installed equipment/software at the time of project completion (this includes both 2.1 Wireless and 2.2 Network Switches).**

### 2.2 Network Switches

**4.1** Indicate the local resources available to provide support to the district, including but not limited to the number of local technicians available for network and equipment installation, troubleshooting, and repair.

**Com-Net Services, LLC has a staff of over 35 field service technicians. These technicians are managed by a management team with well over 100 years of combined data communication installation experience. In addition Com-Net Services has the support of the entire local Aruba HPE team.**

4.2 Provide information regarding your company's service assurance. Include your service level agreements and response time per service level.

**Please see the included documents for detailed information regarding warranties and service assurance: "HPE Networking Product Warranty & Support Summary" and "ArubaCare Support Data Sheet".**

4.3 Describe your repair/replacement process which includes the steps taken for submitting, escalating, and tracking troubles toward resolution.

**Please see the included documents for detailed information regarding warranties: "HPE Networking Product Warranty & Support Summary" and "ArubaCare Support Data Sheet".**

4.4 Describe the schedule during which real time support will be available to SCPPS.

**Please see the included documents for detailed information regarding warranties: "HPE Networking Product Warranty & Support Summary" and "ArubaCare Support Data Sheet".**

4.5 Describe the mechanism in which SCPPS will contact the vendor to request support.

**Please see the included documents for detailed information regarding warranties: "HPE Networking Product Warranty & Support Summary" and "ArubaCare Support Data Sheet".**

**In addition to the support provided by Aruba HPE, included in this response is a contact list for Com-Net Services, including e-mail addresses and cell phone numbers.**

4.6 Vendor must provide knowledge transfer and training on installed equipment/software at the time of project completion.

**Com-Net Services will provide one full day of knowledge transfer and training on the installed equipment/software at the time of project completion (this includes both 2.1 Wireless and 2.2 Network Switches).**

## 5.0 Qualifications & Prior Experience

Provide a response to this section addressing each category in the **2.0 Technical Response** section for which you are responding. A detailed response must be provided for each requirement below.

### 2.1 Wireless

#### 5.1 Qualifications

**5.1.1** Provide information on the expertise and certifications of your company and employees to design, implement, and maintain the equipment and services proposed.

**Com-Net Services, LLC has successfully completed hundreds of projects in various higher education; state government; and industrial sectors. Com-Net employs three BICSI RCDD's (Registered Communication Distribution Designer) as well as several technicians holding industry certifications from Microsoft, Aruba, and Ruckus Wireless.**

**Com-Net Services, LLC has an established track record of success in the implementation of communication systems as well as any required follow up service to the systems installed. Each project is supervised by an assigned Project Manager to ensure that any and all issues are resolved in the most efficient manner possible.**

**5.1.2** Provide a copy of your Certification to operate as a Telecommunication Service Provider in the State of Louisiana.

**Document included**

**5.1.3** Provide the E-rate SPIN number(s) that your company uses in Louisiana.

**143008294**

**5.1.4** Contractors must meet and affirm compliance with all requirements stated in the document titled "**Contractor Contractual and Insurance Requirements Revised 042910**".

**In compliance. Please see included documents**

**5.1.5** The vendor must include all subcontractors as insurers under its policies or shall insure that all subcontractors satisfy the same insurance requirements affirmed to in requirement 5.1.4.

**No subcontractors**

**5.1.6** Any subcontractor used on this project is bound by all terms and conditions of the contractor to which the contract is awarded. The primary vendor into which SCPPS enters an agreement will assume total responsibility for any actions of subcontractors used to fulfill the agreement.

**No subcontractors**

#### 5.2 Prior Experience

**5.2.1** Provide at least 3 references of projects similar in scope to this project and any other pertinent information on your experience in working with school districts on large scale projects of the same scope.

- 1. Calcasieu Parish Schools, LA – Install 2013 – Contact Michael Franks (337) 217-4357**
- 2. Madison County Schools, MS – Install 2013 – Contact Gavin Guynes (601) 879-3063**
- 3. Pulaski County Schools, AR – Install 2012 – Contact Will Reid (501) 234-2155**

**\*Due to Com-Net Services' new partnership with Aruba HPE, the references listed are Aruba HPE solution references for projects that Com-Net Services was not involved in. Please find below Com-Net Services E-Rate School District references.**

**St. Martin Parish Schools- Angie Thomasee Dore, PE  
Thomasee and Associates, LLC  
204 Winchester Drive, Suite 2B  
Lafayette, Louisiana 70506  
337-981-4665**

**Vermillion Parish Schools – Nick Lege  
Thomasee and Associates, LLC  
204 Winchester Drive, Suite 2B  
Lafayette, Louisiana 70506  
337-981-4665**

**\*These are company references and do not apply exactly to similar projects.**

**5.2.2** Include all Louisiana school districts in your reference list where you have completed similar projects.

**CNS has completed large e-rate projects in Louisiana for the Desoto Parish School Board, Caddo Parish School Board Bienville Parish School Board, St Mary Parish School Board, St. Landry Parish School Board, West Feliciana Parish School Board, East Baton Rouge Parish School Board, Livingston Parish School Board, Vermillion Parish School Board, St. Martin Parish School Board, Ascension Parish School Board, and the Houma/Thibodaux Diocese School Board. In Florida we completed a large e-rate project for the Orange County School Board and in Alabama for the Birmingham School District.**

**5.2.3** State your experience in providing equipment and/or services which were E-rate funded in the telecommunications category in Louisiana.

**Com-Net Services, L.L.C. (CNS) has an extensive background in voice and data services. CNS has done multiple large and small projects for several school boards around the state of Louisiana as well as in the states of Florida and Alabama. Every one of these projects were done with E-Rate money. Because of the above noted projects for numerous school boards, CNS has full knowledge to the understanding and approach that is needed in St. Charles Parish School District project.**

## **2.2 Network Switch**

### **5.1 Qualifications**

**5.1.1** Provide information on the expertise and certifications of your company and employees to design, implement, and maintain the equipment and services proposed.

**Com-Net Services, LLC has successfully completed hundreds of projects in various higher education; state government; and industrial sectors. Com-Net employs three BICSI RCDD's (Registered Communication Distribution Designer) as well as several technicians holding industry certifications from Microsoft, Aruba, and Ruckus Wireless.**

**Com-Net Services, LLC has an established track record of success in the implementation of communication systems as well as any required follow up**

**service to the systems installed. Each project is supervised by an assigned Project Manager to ensure that any and all issues are resolved in the most efficient manner possible.**

**5.1.2** Provide a copy of your Certification to operate as a Telecommunication Service Provider in the State of Louisiana.

**Document included**

**5.1.3** Provide the E-rate SPIN number(s) that your company uses in Louisiana.

**143008294**

**5.1.4** Contractors must meet and affirm compliance with all requirements stated in the document titled "**Contractor Contractual and Insurance Requirements Revised 042910**".

**In compliance. Please see included documents**

**5.1.5** The vendor must include all subcontractors as insurers under its policies or shall insure that all subcontractors satisfy the same insurance requirements affirmed to in requirement 5.1.4.

**No subcontractors**

**5.1.6** Any subcontractor used on this project is bound by all terms and conditions of the contractor to which the contract is awarded. The primary vendor into which SCPPS enters an agreement will assume total responsibility for any actions of subcontractors used to fulfill the agreement.

**No subcontractors**

## **5.2 Prior Experience**

**5.2.1** Provide at least 3 references of projects similar in scope to this project and any other pertinent information on your experience in working with school districts on large scale projects of the same scope.

- 1. Calcasieu Parish Schools, LA – Install 2013 – Contact Michael Franks (337) 217-4357**
- 2. Madison County Schools, MS – Install 2013 – Contact Gavin Guynes (601) 879-3063**
- 3. Pulaski County Schools, AR – Install 2012 – Contact Will Reid (501) 234-2155**

**\*Due to Com-Net Services' new partnership with Aruba HPE, the references listed are Aruba HPE solution references for projects that Com-Net Services was not involved in. Please find below Com-Net Services E-Rate School District references.**

**St. Martin Parish Schools- Angie Thomasee Dore, PE  
Thomasee and Associates, LLC  
204 Winchester Drive, Suite 2B  
Lafayette, Louisiana 70506  
337-981-4665**

**Vermillion Parish Schools – Nick Lege  
Thomasee and Associates, LLC  
204 Winchester Drive, Suite 2B  
Lafayette, Louisiana 70506  
337-981-4665**

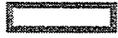
**\*These are company references and do not apply exactly to similar projects.**

**5.2.2** Include all Louisiana school districts in your reference list where you have completed similar projects.

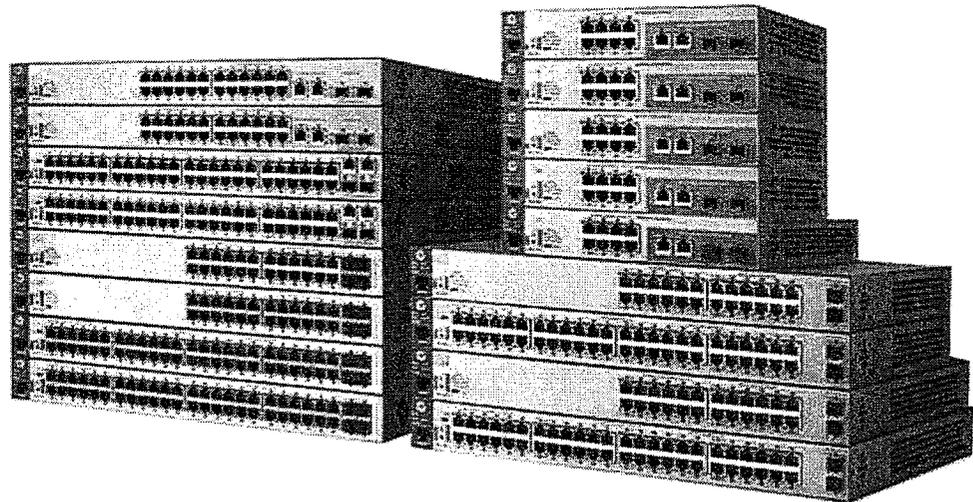
**CNS has completed large e-rate projects in Louisiana for the Desoto Parish School Board, Caddo Parish School Board Bienville Parish School Board, St Mary Parish School Board, St. Landry Parish School Board, West Feliciana Parish School Board, East Baton Rouge Parish School Board, Livingston Parish School Board, Vermillion Parish School Board, St. Martin Parish School Board, Ascension Parish School Board, and the Houma/Thibodaux Diocese School Board. In Florida we completed a large e-rate project for the Orange County School Board and in Alabama for the Birmingham School District.**

**5.2.3** State your experience in providing equipment and/or services which were Erate funded in the telecommunications category in Louisiana.

**Com-Net Services, L.L.C. (CNS) has an extensive background in voice and data services. CNS has done multiple large and small projects for several school boards around the state of Louisiana as well as in the states of Florida and Alabama. Every one of these projects were done with E-Rate money. Because of the above noted projects for numerous school boards, CNS has full knowledge to the understanding and approach that is needed in St. Charles Parish School District project.**



# Aruba 2530 Switch Series



## Key features

- Cost-effective, reliable, and secure Aruba Layer 2 switch series.
- ACLs, EEE, traffic prioritization and models with 10 Gigabit uplinks.
- 8-, 24-, and 48-port Gigabit or Fast Ethernet models.
- PoE+ models for voice, video, and wireless.
- Supports ClearPass Policy Manager and Airwave Network Management.

## Product overview

The Aruba 2530 Switch Series provides security, reliability, and ease of use for enterprises, branch offices, and SMBs. This series of fully managed switches delivers full Layer 2 capabilities with enhanced access security, ACLs, traffic prioritization, sFlow, and IPv6 host support. Right size deployment is simple with choice of 8-, 24-, and 48-port models available with Gigabit or Fast Ethernet ports, optional PoE+, and optional 10GbE uplinks. The 2530 delivers power savings with fanless models, Energy Efficient Ethernet, ability to disable LEDs and enable port low power mode. These switches provide consistent wired/wireless user experience with unified management tools such as ClearPass Policy Manager and Airwave Network Management.

The Aruba 2530 Switch Series offers uplink flexibility with either four Gigabit or two 10 Gigabit Ethernet uplinks on some 24- and 48-port models. The Gigabit 24- and 48-port models have either two small form-factor pluggable plus (SFP+) or four small form-factor pluggable (SFP) slots for fiber connectivity. The Fast Ethernet 24- and 48-port models have two SFPs and two RJ-45 Gigabit uplinks. The compact and fan-less 8-port switches offer additional flexibility with two dual-personality ports that can be used as either RJ-45 Gigabit Ethernet or SFP ports. The PoE+ switch models are IEEE 802.3af- and IEEE 802.3at-compliant with up to 30 W per port, making them suitable for voice, video, or wireless deployments with PoE+.

## Features and benefits

### Unified Wired and Wireless

- **New** ClearPass Policy Manager

Support unified wired and wireless policies using Aruba ClearPass Policy Manager

- HTTP redirect function

Supports HPE Intelligent Management Center (IMC) bring your own device (BYOD) solution

- **New** Switch auto-configuration

Automatically configures switch for rogue AP detection, add VLAN, and set PoE priority when Aruba AP is detected

### Quality of Service (QoS)

- Traffic prioritization (IEEE 802.1p)

Allows real-time traffic classification with support for eight priority levels mapped to either two or four queues, and uses weighted deficit round robin (WDRR) or strict priority

- Simplified quality of service (QoS) configuration

- Port-based

Prioritizes traffic by specifying a port and priority level

- VLAN-based

Prioritizes traffic by specifying a VLAN and priority level

- Class of Service (CoS)

Sets the IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), Layer 3 protocol, TCP/UDP port number, source port, and DiffServ

- Rate limiting

Establishes per-port ingress-enforced maximums for all ingress traffic or for broadcast, multicast, or unknown destination traffic

- Layer 4 prioritization

Enables prioritization based on TCP/UDP port numbers

- Flow control

Helps deliver reliable communication during full-duplex operation

### Management

- **New** Zero-Touch Provisioning (ZTP)

Uses settings in DHCP to enable ZTP with Aruba AirWave Network Management

- Choice of management interfaces

- HTML-based easy-to-use Web GUI

Allows configuration of the switch from any Web browser

- Robust CLI

Provides advanced configuration and diagnostics

- Simple network management protocol (SNMPv1/v2c/v3)

Allows the switch to be managed with a variety of third-party network management applications

- Virtual stacking
  - Provides single IP address management for up to 16 switches
- sFlow® (RFC 3176)
  - Delivers wire-speed traffic accounting and monitoring, configured by SNMP and CLI with three terminal encrypted receivers
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
  - Automates device discovery protocol for easy mapping by network management applications
- Logging
  - Provides local and remote logging of events via SNMP (v2c and v3) and syslog; provides log throttling and log filtering to reduce the number of log events generated
- Port mirroring
  - Provides advanced monitoring and reporting capabilities for statistics, history, alarms, and events
- Find, fix, and inform
  - Finds and fixes common network problems automatically, and then informs the administrator
- Friendly port names
  - Allows assignment of descriptive names to ports
- Dual flash images
  - Provides independent primary and secondary operating system files for backup while upgrading
- Multiple configuration files
  - Are easily stored with a flash image
- Front-panel LEDs
  - Locator LEDs
    - Allows users to set the locator LED on a specific switch to turn on, blink, or turn off; and simplifies troubleshooting by making it easy to locate a particular switch within a rack of similar switches
  - Per-port LEDs
    - Provides an at-a-glance view of the status, activity, speed, and full-duplex operation
  - Power and fault LEDs
    - Display issues, if any
- HPE Comware CLI
  - Comware-compatible CLI
    - Bridges the experience of HPE Comware CLI users who are using the HPE ProVision software CLI
  - Display and fundamental Comware CLI commands
    - Are embedded in the switch CLI as native commands; display output is formatted as on Comware-based switches, and fundamental commands provide a Comware-familiar initial switch setup
  - Configuration Comware CLI commands
    - When Comware commands are entered, CLI helps elicit to formulate the correct ProVision software CLI command

- Download software via DHCP  
Adds the option to specify the location of switch software via DHCP
- TR-069 support  
Enables zero-touch configuration for switches

### Connectivity

- IPv6
  - IPv6 host  
Allows the switch to be deployed and managed at the edge of an IPv6 network
  - Dual stack (IPv4/IPv6)  
Supports connectivity for both protocols; provides a transition mechanism from IPv4 to IPv6
  - MLD snooping  
Forwards IPv6 multicast traffic to appropriate interface; prevents IPv6 multicast traffic from flooding the network
  - IPv6 ACL/QoS  
Supports ACL and QoS for IPv6 network traffic on Gigabit and 48 port 10/100 models
  - Security  
RA Guard, DHCPv6 Protection, Dynamic IPv6 Lockdown (YA only)
- IEEE 802.3af Power over Ethernet (PoE)  
Provides up to 15.4 W per port to IEEE 802.3af-compliant PoE-powered devices such as IP phones, wireless access points, and security cameras
- IEEE 802.3at PoE+  
Provides up to 30 W per port to IEEE 802.3 for PoE/PoE+-powered devices such as video IP phones, IEEE 802.11n wireless access points, and advanced pan/tilt/zoom security cameras (refer to the product specifications for the total PoE power availability)
- Auto-MDIX  
Adjusts automatically for straight-through or crossover cables on all ports
- Pre-standard PoE support  
Detects and provides power to pre-standard PoE devices (refer to the list of supported devices in the product FAQs, which can be accessed at [hpe.com/networking/support](http://hpe.com/networking/support))
- SFP slots  
Provides fiber connectivity such as Gigabit-SX, LX, LH, and BX with four SFP slots on all 24- and 48-port Gigabit Ethernet models. Fast Ethernet 24- and 48-port models have two SFP slots and two RJ-45 Gigabit uplinks; 8-port models have two dual-personality ports supporting either SFP or RJ-45 Gigabit uplinks
- Dual-personality (RJ-45 or USB micro-B) serial console port  
Gives easy access to switch CLI with front-of-switch location and the flexibility of using either an RJ-45 or USB micro-B serial console port

**Layer 2 switching**

## • VLANs

Provides support for 512 VLANs and 4,094 VLAN IDs

## • Jumbo packet support

Supports up to 9,220-byte frame size to improve the performance of large data transfers; 8- and 24-port Fast Ethernet models automatically support up to 2,000-byte frames with no configuration needed

## • 16K MAC address table

Provides access to many Layer 2 devices

## • GARP VLAN Registration Protocol

Allows automatic learning and dynamic assignment of VLANs

## • Rapid Per-VLAN Spanning Tree (RPVST+)

Allows each VLAN to build a separate spanning tree to improve link bandwidth usage; is compatible with PVST+

**Security**

## • ACLs

Accommodates IPv4/IPv6 port and VLAN-based ACLs (IPv6 ACL is supported only on Gigabit Ethernet and 48-port models.)

## • Source-port filtering

Allows only specified ports to communicate with each other

## • RADIUS/TACACS+

Eases switch management security administration by using a password authentication server

## • Secure Sockets Layer (SSL)

Encrypts all HTTP traffic, allowing secure access to the browser-based management GUI in the switch

## • Port security

Allows access only to specified MAC addresses, which can be learned or specified by the administrator

## • MAC address lockout

Prevents particular configured MAC addresses from connecting to the network

- Multiple user authentication methods
  - IEEE 802.1X
    - Uses an IEEE 802.1X supplicant on the client in conjunction with a RADIUS server to authenticate in accordance with industry standards
  - Web-based authentication
    - Provides a browser-based environment, similar to IEEE 802.1X, to authenticate clients that do not support the IEEE 802.1X supplicant
  - MAC-based authentication
    - Authenticates the client with the RADIUS server based on the client's MAC address
- Secure shell (SSH) v2
  - Encrypts all transmitted data for safe remote CLI access over IP networks
- Secure shell
  - Encrypts all transmitted data for safe remote CLI access over IP networks
- STP BPDU port protection
  - Blocks Bridge Protocol Data Units (BPDUs) on ports that do not require BPDUs, preventing forged BPDU attacks
- STP root guard
  - Protects the root bridge from malicious attacks or configuration mistakes
- Secure management access
  - Delivers protected encryption of all access methods (CLI, GUI, or MIB) through SSHv2 and SNMPv3
- Custom banner
  - Displays security policy when users log in to the switch
- Secure FTP
  - Allows safe file transfer to and from the switch; protects against unwanted file downloads or unauthorized copying of a switch configuration file
- Protected ports CLI
  - Offers intuitive CLI to configure the source-port filter feature, by allowing specified ports to be isolated from all other ports on the switch; the protected port or ports can communicate only with the uplink or shared resources

- Authentication flexibility
  - Multiple IEEE 802.1X users per port
    - Provides authentication for up to 32 IEEE 802.1X users per port; prevents a user from “piggybacking” on another user’s IEEE 802.1X authentication
  - Concurrent IEEE 802.1X and Web or MAC authentication schemes per port
    - Allows a switch port to accept any IEEE 802.1X and either Web or MAC authentications
- Switch management logon security
  - Helps secure switch CLI logon by optionally requiring either RADIUS or TACACS+ authentication
- DHCP protection
  - Blocks DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks
- Dynamic ARP protection
  - Blocks ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data
- Dynamic IP lockdown
  - Works with DHCP protection to block traffic from unauthorized hosts, preventing IP source address spoofing

#### **Convergence**

- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
  - Facilitates easy mapping using network management applications with LLDP automated device discovery protocol
- LLDP-MED (Media Endpoint Discovery)
  - Defines a standard extension of LLDP that stores values for parameters such as QoS and VLAN to automatically configure network devices such as IP phones
- IP multicast (data-driven IGMP)
  - Prevents flooding of IP multicast traffic
- PoE and PoE+ allocations
  - Support multiple methods—automatic, IEEE 802.3at dynamic, LLDP-MED fine grain, IEEE 802.3af device class, or user specified—to allocate and manage PoE/PoE+ power for more efficient energy use
- Voice VLAN
  - Uses LLDP-MED to automatically configure a VLAN for IP phones
- IP multicast (data-driven IGMPv3)
  - Prevents flooding of IP multicast traffic
- LLDP-CDP compatibility
  - Receives and recognizes CDP packets from Cisco’s IP phones for seamless interoperation
- Local MAC Authentication
  - Assigns attributes such as VLAN and QoS using locally configured profile that can be a list of MAC prefixes Unified Wired and Wireless
- HTTP redirect function
  - Supports HPE Intelligent Management Center (IMC) bring your own device (BYOD) solution

**Resiliency and high availability**

- Port trunking and link aggregation
  - Trunking

Supports up to eight links per trunk to increase bandwidth and create redundant connections; and supports L2, L3, and L4 trunk load-balancing algorithm (L4 trunk load balancing is supported only on Gigabit Ethernet and 48-port models.)
  - IEEE 802.3ad Link Aggregation Control Protocol (LACP)

Eases configuration of trunks through automatic configuration
- IEEE 802.1s Multiple Spanning Tree

Provides high link availability in multiple VLAN environments by allowing multiple spanning trees; provides legacy support for IEEE 802.1d and IEEE 802.1w
- SmartLink

Provides easy-to-configure link redundancy of active and standby links

**Product architecture**

- Energy-efficient design
  - IEEE 802.3az

Reduces power consumption during periods of low data activity on Gigabit Ethernet switches
  - Port low-power mode

Enables the port to automatically go into low-power mode to conserve energy when no link is detected
  - Fan-less and variable-speed fans

Decreases power consumption in fan-less (all 8-port, 2530-24, and 2530-48 PoE+ switches) as well as variable-speed fan switches
  - Port LEDs

Conserves energy by optionally turning off port link and activity LEDs
- Switch on a chip

Provides a highly integrated, high-performance switch design with a nonblocking architecture

**Flexibility**

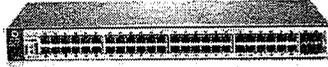
- Flexible mounting
  - Rack mountable  
Allows the switch to be mounted on a standard 19-inch rack, with the hardware included
  - Wall mountable  
Allows the switch to be mounted on a wall, using the hardware included
  - Surface mountable  
Allows the switch to be mounted above or below a surface (such as a desk or table), using the hardware included
- Quiet operation  
Lowers noise, making it suitable for deployments in acoustically sensitive environments such as conference rooms and office spaces
- Compact size  
Reduces space requirements (refer to the product specifications for the exact dimensions)

**Convergence**

- Limited Lifetime Warranty:  
See [hpe.com/networking/warrantysummary](http://hpe.com/networking/warrantysummary) for warranty and support information included with your product purchase.
- Software releases  
To find software for your product, refer to [hpe.com/networking/support](http://hpe.com/networking/support); for details on the software releases available with your product purchase, refer to [hpe.com/networking/warrantysummary](http://hpe.com/networking/warrantysummary)

## Aruba 2530 Switch Series

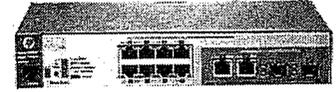
### Specifications



**Aruba 2530-48G-PoE+ Switch (J9772A)**



**Aruba 2530-24G-PoE+ Switch (J9773A)**



**Aruba 2530-8G-PoE+ Switch (J9774A)**

<b>I/O ports and slots</b>	48 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 fixed Gigabit Ethernet SFP ports 1 dual-personality (RJ-45 or USB micro-B) serial console port	24 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 fixed Gigabit Ethernet SFP ports 1 dual-personality (RJ-45 or USB micro-B) serial console port	8 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 2 dual-personality ports; each port can be used as either an RJ-45 10/100/1000 port (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab 1000BASE-T Gigabit Ethernet) or as a SFP slot (for use with SFP transceivers) 1 dual-personality (RJ-45 or USB micro-B) serial console port
<b>Physical characteristics</b>			
Dimensions	17.44(w) x 13.00(d) x 1.75(h) in (44.3 x 32.26 x 4.45 cm) (1U height)	17.44(w) x 13.00(d) x 1.75(h) in (44.3 x 33.02 x 4.45 cm) (1U height)	10(w) x 6.28(d) x 1.75(h) in (25.4 x 15.95 x 4.45 cm) (1U height)
Weight	10.4 lb (4.72 kg)	8.7 lb (3.95 kg)	2.2 lb (1 kg)
<b>Memory and processor</b>			
Processor	ARM9E @ 800 MHz, 128 MB flash, 256 MB DDR3 DIMM; packet buffer size: 3 MB dynamically allocated	ARM9E @ 800 MHz, 128 MB flash, 256 MB DDR3 DIMM; packet buffer size: 1.5 MB dynamically allocated	ARM9E @ 800 MHz, 128 MB flash, 256 MB DDR3 DIMM; packet buffer size: 1.5 MB dynamically allocated
<b>Mounting and enclosure</b>			
Mounting and enclosure	Mounts in an EIA-standard 19-inch telco rack or equipment cabinet (rack-mounting kit available); horizontal surface mounting; wall mounting	Mounts in an EIA-standard 19-inch telco rack or equipment cabinet (rack-mounting kit available); horizontal surface mounting; wall mounting	Mounts in an EIA-standard 19-inch telco rack or equipment cabinet (rack-mounting kit available); horizontal surface mounting; wall mounting
<b>Performance</b>			
100 Mb Latency	IPv6 Ready Certified < 7.4 μs (LIFO 64-byte packets)	IPv6 Ready Certified < 7.4 μs (LIFO 64-byte packets)	IPv6 Ready Certified < 7.4 μs (LIFO 64-byte packets)
1000 Mb Latency	< 2.3 μs (LIFO 64-byte packets)	< 2.3 μs (LIFO 64-byte packets)	< 2.6 μs (LIFO 64-byte packets)
Throughput	up to 77.3 Mpps (64-byte packets)	up to 41.6 Mpps (64-byte packets)	up to 14.8 Mpps (64-byte packets)
Switching capacity	104 Gb/s	56 Gb/s	20 Gb/s
MAC address table size	16000 entries	16000 entries	16000 entries
<b>Environment</b>			
Operating temperature	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)
Operating relative humidity	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	15% to 90% @ 149°F (65°C), noncondensing	15% to 90% @ 149°F (65°C), noncondensing	15% to 90% @ 149°F (65°C), noncondensing
Altitude	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)
Acoustic	Power: 43.6 dB, Pressure: 33.6 dB	Power: 43.9 dB, Pressure: 39.6 dB	Power: 0 dB, Pressure: 0 dB

	Aruba 2530-48G-PoE+ Switch (J9772A)	Aruba 2530-24G-PoE+ Switch (J9773A)	Aruba 2530-8G-PoE+ Switch (J9774A)
<b>Electrical characteristics</b>			
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Maximum heat dissipation	236 BTU/hr (248.98 kJ/hr), (switch only: 236 BTU/hr; combined switch + max. PoE devices: 1624 BTU/hr)	135 BTU/hr (142.42 kJ/hr), (switch only: 135 BTU/hr; combined switch + max. PoE devices: 843 BTU/hr)	65 BTU/hr (68.58 kJ/hr), (switch only: 65 BTU/hr; combined switch + max. PoE devices: 293 BTU/hr)
AC voltage	100–127/200–240 VAC	100–127/200–240 VAC	100–127/200–240 VAC
Current	5.8/2.9 A	3.2/1.6 A	1.4 A
Maximum power rating	476 W	247 W	86 W
Idle power	40.1 W	25.2 W	13.4 W
PoE power	382 W	195 W	67 W
Notes	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated. PoE power is the total power budget available to all PoE ports.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated. PoE power is the total power budget available to all PoE ports.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated. PoE power is the total power budget available to all PoE ports.
<b>Safety</b>	UL 60950-1; CAN/CSA 22.2 No. 60950-1; EN 60825; IEC 60950-1; EN 60950-1	UL 60950-1; CAN/CSA 22.2 No. 60950-1; EN 60825; IEC 60950-1; EN 60950-1	UL 60950-1; CAN/CSA 22.2 No. 60950-1; EN 60825; IEC 60950-1; EN 60950-1
<b>Emissions</b>	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A
<b>Immunity</b>			
Generic	EN 55024, CISPR 24	EN 55024, CISPR 24	EN 55024, CISPR 24
EN	EN 55024, CISPR 24	EN 55024, CISPR 24	EN 55024, CISPR 24
ESD	IEC 61000-4-2	IEC 61000-4-2	IEC 61000-4-2
Radiated	IEC 61000-4-3	IEC 61000-4-3	IEC 61000-4-3
EFT/Burst	IEC 61000-4-4	IEC 61000-4-4	IEC 61000-4-4
Surge	IEC 61000-4-5	IEC 61000-4-5	IEC 61000-4-5
Conducted	IEC 61000-4-6	IEC 61000-4-6	IEC 61000-4-6
Power frequency magnetic field	IEC 61000-4-8	IEC 61000-4-8	IEC 61000-4-8
Voltage dips and interruptions	IEC 61000-4-11	IEC 61000-4-11	IEC 61000-4-11
Harmonics	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2
Flicker	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3
<b>Management</b>	IMC—Intelligent Management Center; command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB; Repeater MIB; Ethernet Interface MIB AirWave Network Management	IMC—Intelligent Management Center; command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB; Repeater MIB; Ethernet Interface MIB AirWave Network Management	IMC—Intelligent Management Center; command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB; Repeater MIB; Ethernet Interface MIB AirWave Network Management
<b>Notes</b>	IEEE 802.3az applies to Gigabit models only; IEEE 802.3at and IEEE 802.3af apply to PoE+ models only. When using SFPs with this product, SFPs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	IEEE 802.3az applies to Gigabit models only; IEEE 802.3at and IEEE 802.3af apply to PoE+ models only. When using SFPs with this product, SFPs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	IEEE 802.3az applies to Gigabit models only; IEEE 802.3at and IEEE 802.3af apply to PoE+ models only. When using SFPs with this product, SFPs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.
<b>Services</b>	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

## Aruba 2530 Switch Series (continued)

### Specifications (continued)



Aruba 2530-48-PoE+ Switch (J9778A)



Aruba 2530-24-PoE+ Switch (J9779A)



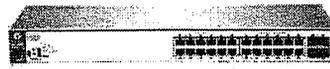
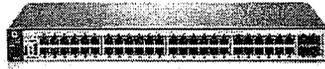
Aruba 2530-8-PoE+ Switch (J9780A)

	Aruba 2530-48-PoE+ Switch (J9778A)	Aruba 2530-24-PoE+ Switch (J9779A)	Aruba 2530-8-PoE+ Switch (J9780A)
<b>I/O ports and slots</b>	<p>48 RJ-45 autosensing 10/100 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: half or full</p> <p>2 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only</p> <p>2 fixed Gigabit Ethernet SFP ports</p> <p>1 dual-personality (RJ-45 or USB micro-B) serial console port</p>	<p>24 RJ-45 autosensing 10/100 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: half or full</p> <p>2 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only</p> <p>2 fixed Gigabit Ethernet SFP ports</p> <p>1 dual-personality (RJ-45 or USB micro-B) serial console port</p>	<p>8 RJ-45 autosensing 10/100 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: half or full</p> <p>2 dual-personality ports; each port can be used as either an RJ-45 10/100/1000 port (IEEE 802.3 Type 10BASE-T; IEEE 802.3u Type 100BASE-TX; IEEE 802.3ab 1000BASE-T Gigabit Ethernet) or as a SFP slot (for use with SFP transceivers) ports</p> <p>1 dual-personality (RJ-45 or USB micro-B) serial console port</p>
<b>Physical characteristics</b>			
Dimensions	17.4(w) x 12.7(d) x 1.75(h) in (44.2 x 32.26 x 4.45 cm) (1U height)	17.4(w) x 12.7(d) x 1.75(h) in (44.2 x 32.26 x 4.45 cm) (1U height)	10(w) x 6.28(d) x 1.75(h) in (25.4 x 15.95 x 4.45 cm) (1U height)
Weight	10.1 lb (4.58 kg)	8.4 lb (3.81 kg)	2.0 lb (0.91 kg)
<b>Memory and processor</b>			
Processor	ARM9E @ 800 MHz, 128 MB flash, 256 MB DDR3 DIMM; packet buffer size: 3 MB dynamically allocated	ARM9E @ 800 MHz, 128 MB flash, 256 MB DDR3 DIMM; packet buffer size: 1.5 MB dynamically allocated	ARM9E @ 800 MHz, 128 MB flash, 256 MB DDR3 DIMM; packet buffer size: 1.5 MB dynamically allocated
<b>Mounting and enclosure</b>	Mounts in an EIA-standard 19-inch telco rack or equipment cabinet (rack-mounting kit available); horizontal surface mounting; wall mounting	Mounts in an EIA-standard 19-inch telco rack or equipment cabinet (rack-mounting kit available); horizontal surface mounting; wall mounting	Mounts in an EIA-standard 19-inch telco rack or equipment cabinet (rack-mounting kit available); horizontal surface mounting; wall mounting
<b>Performance</b>			
100 Mb Latency	IPv6 Ready Certified < 6.6 μs (LIFO 64-byte packets)	IPv6 Ready Certified < 1.7 μs (LIFO 64-byte packets)	IPv6 Ready Certified < 1.3 μs (LIFO 64-byte packets)
1000 Mb Latency	< 2.2 μs (LIFO 64-byte packets)	< 1.1 μs (LIFO 64-byte packets)	< 1.3 μs (LIFO 64-byte packets)
Throughput	up to 13 Mpps (64-byte packets)	up to 9.5 Mpps (64-byte packets)	up to 4.1 Mpps (64-byte packets)
Switching capacity	17.6 Gb/s	12.8 Gb/s	5.6 Gb/s
MAC address table size	16000 entries	16000 entries	16000 entries
<b>Environment</b>			
Operating temperature	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)
Operating relative humidity	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	15% to 90% @ 149°F (65°C), noncondensing	15% to 90% @ 149°F (65°C), noncondensing	15% to 90% @ 149°F (65°C), noncondensing
Altitude	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)
Acoustic	Power: 379 dB, Pressure: 31.8 dB	Power: 40.4 dB, Pressure: 31.7 dB	Power: 0 dB, Pressure: 0 dB

	Aruba 2530-48-PoE+ Switch (J9778A)	Aruba 2530-24-PoE+ Switch (J9779A)	Aruba 2530-8-PoE+ Switch (J9780A)
<b>Electrical characteristics</b>			
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Maximum heat dissipation	170 BTU/hr (179.35 kJ/hr), (switch only); 170 BTU/hr; combined switch + max. PoE devices: 1505 BTU/hr	99 BTU/hr (104.45 kJ/hr), (switch only); 99 BTU/hr; combined switch + max. PoE devices: 809 BTU/hr	29 BTU/hr (30.6 kJ/hr), (switch only); 29 BTU/hr; combined switch + max. PoE devices: 262 BTU/hr
AC voltage	100–127/200–240 VAC	100–127/200–240 VAC	100–127/200–240 VAC
Current	5.2/2.6 A	2.8/1.4 A	1.4 A
Maximum power rating	441 W	237 W	76.7 W
Idle power	37.5 W	21.8 W	5.8 W
PoE power	382 W	195 W	67 W
Notes	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated. PoE power is the total power budget available to all PoE ports.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated. PoE power is the total power budget available to all PoE ports.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated. PoE power is the total power budget available to all PoE ports.
<b>Safety</b>	UL 60950-1; CAN/CSA 22.2 No. 60950-1; EN 60825; IEC 60950-1; EN 60950-1	UL 60950-1; CAN/CSA 22.2 No. 60950-1; EN 60825; IEC 60950-1; EN 60950-1	UL 60950-1; CAN/CSA 22.2 No. 60950-1; EN 60825; IEC 60950-1; EN 60950-1
<b>Emissions</b>	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A
<b>Immunity</b>			
Generic	EN 55024, CISPR 24	EN 55024, CISPR 24	EN 55024, CISPR 24
EN	EN 55024, CISPR 24	EN 55024, CISPR 24	EN 55024, CISPR 24
ESD	IEC 61000-4-2	IEC 61000-4-2	IEC 61000-4-2
Radiated	IEC 61000-4-3	IEC 61000-4-3	IEC 61000-4-3
EFT/Burst	IEC 61000-4-4	IEC 61000-4-4	IEC 61000-4-4
Surge	IEC 61000-4-5	IEC 61000-4-5	IEC 61000-4-5
Conducted	IEC 61000-4-6	IEC 61000-4-6	IEC 61000-4-6
Power frequency magnetic field	IEC 61000-4-8	IEC 61000-4-8	IEC 61000-4-8
Voltage dips and interruptions	IEC 61000-4-11	IEC 61000-4-11	IEC 61000-4-11
Harmonics	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2
Flicker	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3
<b>Management</b>	IMC—Intelligent Management Center; command-line interface; Web browser; configuration menu; out-of-band management (Serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB; Repeater MIB; Ethernet Interface MIB AirWave Network Management	IMC—Intelligent Management Center; command-line interface; Web browser; configuration menu; out-of-band management (Serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB; Repeater MIB; Ethernet Interface MIB AirWave Network Management	IMC—Intelligent Management Center; command-line interface; Web browser; configuration menu; out-of-band management (Serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB; Repeater MIB; Ethernet Interface MIB AirWave Network Management
<b>Notes</b>	IEEE 802.3az applies to Gigabit models only; IEEE 802.3at and IEEE 802.3af apply to PoE+ models only. When using SFPs with this product, SFPs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	IEEE 802.3az applies to Gigabit models only; IEEE 802.3at and IEEE 802.3af apply to PoE+ models only. When using SFPs with this product, SFPs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	IEEE 802.3az applies to Gigabit models only; IEEE 802.3at and IEEE 802.3af apply to PoE+ models only. When using SFPs with this product, SFPs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.
<b>Services</b>	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

## Aruba 2530 Switch Series (continued)

### Specifications (continued)


**Aruba 2530-48G Switch (J9775A)**
**Aruba 2530-24G Switch (J9776A)**
**Aruba 2530-8G Switch (J9777A)**

	Aruba 2530-48G Switch (J9775A)	Aruba 2530-24G Switch (J9776A)	Aruba 2530-8G Switch (J9777A)
<b>I/O ports and slots</b>	48 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 fixed Gigabit Ethernet SFP ports 1 dual-personality (RJ-45 or USB micro-B) serial console port	24 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 fixed Gigabit Ethernet SFP ports 1 dual-personality (RJ-45 or USB micro-B) serial console port	8 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 2 dual-personality ports; each port can be used as either an RJ-45 10/100/1000 port (IEEE 802.3 Type 10BASE-T; IEEE 802.3u Type 100BASE-TX; IEEE 802.3ab 1000BASE-T Gigabit Ethernet) or as a SFP slot (for use with SFP transceivers) ports 1 dual-personality (RJ-45 or USB micro-B) serial console port
<b>Physical characteristics</b>			
Dimensions	17.44(w) x 10.00(d) x 1.75(h) in (44.3 x 25.4 x 4.45 cm) (1U height)	17.44(w) x 10.00(d) x 1.75(h) in (44.3 x 25.4 x 4.45 cm) (1U height)	10(w) x 6.28(d) x 1.75(h) in (25.4 x 15.95 x 4.45 cm) (1U height)
Weight	6.8 lb (3.08 kg)	6.1 lb (2.77 kg)	2.0 lb (0.91 kg)
<b>Memory and processor</b>			
Processor	ARM9E @ 800 MHz, 128 MB flash, 256 MB DDR3 DIMM; packet buffer size: 3 MB dynamically allocated	ARM9E @ 800 MHz, 128 MB flash, 256 MB DDR3 DIMM; packet buffer size: 1.5 MB dynamically allocated	ARM9E @ 800 MHz, 128 MB flash, 256 MB DDR3 DIMM; packet buffer size: 1.5 MB dynamically allocated
<b>Mounting and enclosure</b>			
Mounting and enclosure	Mounts in an EIA-standard 19-inch telco rack or equipment cabinet (rack-mounting kit available); horizontal surface mounting; wall mounting	Mounts in an EIA-standard 19-inch telco rack or equipment cabinet (rack-mounting kit available); horizontal surface mounting; wall mounting	Mounts in an EIA-standard 19-inch telco rack or equipment cabinet (rack-mounting kit available); horizontal surface mounting; wall mounting
<b>Performance</b>			
100 Mb Latency	IPv6 Ready Certified < 7.4 μs (LIFO 64-byte packets)	IPv6 Ready Certified < 7.4 μs (LIFO 64-byte packets)	IPv6 Ready Certified < 7.4 μs (LIFO 64-byte packets)
1000 Mb Latency	< 2.3 μs (LIFO 64-byte packets)	< 2.3 μs (LIFO 64-byte packets)	< 2.6 μs (LIFO 64-byte packets)
Throughput	up to 77.3 Mpps (64-byte packets)	up to 41.6 Mpps (64-byte packets)	up to 14.8 Mpps (64-byte packets)
Switching capacity	104 Gb/s	56 Gb/s	20 Gb/s
MAC address table size	16000 entries	16000 entries	16000 entries
<b>Environment</b>			
Operating temperature	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)
Operating relative humidity	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	15% to 90% @ 149°F (65°C), noncondensing	15% to 90% @ 149°F (65°C), noncondensing	15% to 90% @ 149°F (65°C), noncondensing
Altitude	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)
Acoustic	Power: 34.5 dB, Pressure: 31.0 dB	Power: 34.0 dB, Pressure: 26.4 dB	Power: 0 dB, Pressure: 0 dB

	Aruba 2530-48G Switch (J9775A)	Aruba 2530-24G Switch (J9776A)	Aruba 2530-8G Switch (J9777A)
<b>Electrical characteristics</b>			
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Maximum heat dissipation	Achieved Miercom Certified Green Award 203 BTU/hr (214.17 kJ/hr)	164 BTU/hr (173.02 kJ/hr)	63 BTU/hr (66.46 kJ/hr), (switch only: 63 BTU/hr)
AC voltage	100–127/200–240 VAC	100–127/200–240 VAC	100–127/200–240 VAC
Current	1.2/0.7 A	.6/4 A	0.5 A
Maximum power rating	59.5 W	48.0 W	18.6 W
Idle power	29.5 W	28.8 W	13.6 W
Notes	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.
<b>Safety</b>	UL 60950-1; CAN/CSA 22.2 No. 60950-1; EN 60825; IEC 60950-1; EN 60950-1	UL 60950-1; CAN/CSA 22.2 No. 60950-1; EN 60825; IEC 60950-1; EN 60950-1	UL 60950-1; CAN/CSA 22.2 No. 60950-1; EN 60825; IEC 60950-1; EN 60950-1
<b>Emissions</b>	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A
<b>Immunity</b>			
Generic	EN 55024, CISPR 24	EN 55024, CISPR 24	EN 55024, CISPR 24
EN	EN 55024, CISPR 24	EN 55024, CISPR 24	EN 55024, CISPR 24
ESD	IEC 61000-4-2	IEC 61000-4-2	IEC 61000-4-2
Radiated	IEC 61000-4-3	IEC 61000-4-3	IEC 61000-4-3
EFT/Burst	IEC 61000-4-4	IEC 61000-4-4	IEC 61000-4-4
Surge	IEC 61000-4-5	IEC 61000-4-5	IEC 61000-4-5
Conducted	IEC 61000-4-6	IEC 61000-4-6	IEC 61000-4-6
Power frequency magnetic field	IEC 61000-4-8	IEC 61000-4-8	IEC 61000-4-8
Voltage dips and interruptions	IEC 61000-4-11	IEC 61000-4-11	IEC 61000-4-11
Harmonics	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2
Flicker	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3
<b>Management</b>	IMC—Intelligent Management Center; command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB; Repeater MIB; Ethernet Interface MIB AirWave Network Management	IMC—Intelligent Management Center; command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB; Repeater MIB; Ethernet Interface MIB AirWave Network Management	IMC—Intelligent Management Center; command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB; Repeater MIB; Ethernet Interface MIB AirWave Network Management
<b>Notes</b>	IEEE 802.3az applies to Gigabit models only; IEEE 802.3at and IEEE 802.3af apply to PoE+ models only. When using SFPs with this product, SFPs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	IEEE 802.3az applies to Gigabit models only; IEEE 802.3at and IEEE 802.3af apply to PoE+ models only. When using SFPs with this product, SFPs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	IEEE 802.3az applies to Gigabit models only; IEEE 802.3at and IEEE 802.3af apply to PoE+ models only. When using SFPs with this product, SFPs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.
<b>Services</b>	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

## Aruba 2530 Switch Series (continued)

### Specifications (continued)


**Aruba 2530-48 Switch (J9781A)**
**Aruba 2530-24 Switch (J9782A)**
**Aruba 2530-8 Switch (J9783A)**

	Aruba 2530-48 Switch (J9781A)	Aruba 2530-24 Switch (J9782A)	Aruba 2530-8 Switch (J9783A)
<b>I/O ports and slots</b>	48 RJ-45 autosensing 10/100 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX); Duplex: half or full 2 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 2 fixed Gigabit Ethernet SFP ports 1 dual-personality (RJ-45 or USB micro-B) serial console port	24 RJ-45 autosensing 10/100 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX); Duplex: half or full 2 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 2 fixed Gigabit Ethernet SFP ports 1 dual-personality (RJ-45 or USB micro-B) serial console port	8 RJ-45 autosensing 10/100 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX); Media Type: Auto-MDIX; Duplex: half or full 2 dual-personality ports; each port can be used as either an RJ-45 10/100/1000 port (IEEE 802.3 Type 10BASE-T; IEEE 802.3u Type 100BASE-TX; IEEE 802.3ab 1000BASE-T Gigabit Ethernet) or as a SFP slot (for use with SFP transceivers) ports 1 dual-personality (RJ-45 or USB micro-B) serial console port
<b>Physical characteristics</b>			
Dimensions	17.4(w) x 9.7(d) x 1.75(h) in (44.2 x 24.64 x 4.45 cm) (1U height)	17.4(w) x 9.7(d) x 1.75(h) in (44.2 x 24.64 x 4.45 cm) (1U height)	17.0(w) x 6.28(d) x 1.75(h) in (25.4 x 15.95 x 4.45 cm) (1U height)
Weight	6.3 lb (2.86 kg)	5.7 lb (2.59 kg)	1.8 lb (0.82 kg)
<b>Memory and processor</b>			
Processor	ARM9E @ 800 MHz, 128 MB flash, 256 MB DDR3 DIMM; packet buffer size: 3 MB dynamically allocated	ARM9E @ 800 MHz, 128 MB flash, 256 MB DDR3 DIMM; packet buffer size: 1.5 MB dynamically allocated	ARM9E @ 800 MHz, 128 MB flash, 256 MB DDR3 DIMM; packet buffer size: 1.5 MB dynamically allocated
<b>Mounting and enclosure</b>			
Mounting and enclosure	Mounts in an EIA-standard 19-inch telco rack or equipment cabinet (rack-mounting kit available); horizontal surface mounting; wall mounting	Mounts in an EIA-standard 19-inch telco rack or equipment cabinet (rack-mounting kit available); horizontal surface mounting; wall mounting	Mounts in an EIA-standard 19-inch telco rack or equipment cabinet (rack-mounting kit available); horizontal surface mounting; wall mounting
<b>Performance</b>			
100 Mb Latency	IPv6 Ready Certified < 6.6 μs (LIFO 64-byte packets)	IPv6 Ready Certified < 1.7 μs (LIFO 64-byte packets)	IPv6 Ready Certified < 1.3 μs (LIFO 64-byte packets)
1000 Mb Latency	< 2.2 μs (LIFO 64-byte packets)	< 1.1 μs (LIFO 64-byte packets)	< 1.3 μs (LIFO 64-byte packets)
Throughput	up to 13 Mpps (64-byte packets)	up to 9.5 Mpps (64-byte packets)	up to 4.1 Mpps (64-byte packets)
Switching capacity	17.6 Gb/s	12.8 Gb/s	5.6 Gb/s
MAC address table size	16000 entries	16000 entries	16000 entries
<b>Environment</b>			
Operating temperature	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)
Operating relative humidity	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	15% to 90% @ 149°F (65°C), noncondensing	15% to 90% @ 149°F (65°C), noncondensing	15% to 90% @ 149°F (65°C), noncondensing
Altitude	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)
Acoustic	Power: 0 dB, Pressure: 0 dB	Power: 0 dB, Pressure: 0 dB	Power: 0 dB, Pressure: 0 dB

	Aruba 2530-48 Switch (J9781A)	Aruba 2530-24 Switch (J9782A)	Aruba 2530-8 Switch (J9783A)
<b>Electrical characteristics</b>			
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Maximum heat dissipation	102 BTU/hr (107.61 kJ/hr)	50 BTU/hr (52.75 kJ/hr)	25 BTU/hr (26.38 kJ/hr)
AC voltage	100–127/200–240 VAC	100–127/200–240 VAC	100–127/200–240 VAC
Current	0.7/0.4 A	0.3/0.2 A	0.5 A
Maximum power rating	299 W	14.7 W	7.2 W
Idle power	171 W	8.4 W	4.5 W
Notes	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.
<b>Safety</b>	UL 60950-1; CAN/CSA 22.2 No. 60950-1; EN 60825; IEC 60950-1; EN 60950-1	UL 60950-1; CAN/CSA 22.2 No. 60950-1; EN 60825; IEC 60950-1; EN 60950-1	UL 60950-1; CAN/CSA 22.2 No. 60950-1; EN 60825; IEC 60950-1; EN 60950-1
<b>Emissions</b>	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A
<b>Immunity</b>			
Generic	EN 55024, CISPR 24	EN 55024, CISPR 24	EN 55024, CISPR 24
EN	EN 55024, CISPR 24	EN 55024, CISPR 24	EN 55024, CISPR 24
ESD	IEC 61000-4-2	IEC 61000-4-2	IEC 61000-4-2
Radiated	IEC 61000-4-3	IEC 61000-4-3	IEC 61000-4-3
EFT/Burst	IEC 61000-4-4	IEC 61000-4-4	IEC 61000-4-4
Surge	IEC 61000-4-5	IEC 61000-4-5	IEC 61000-4-5
Conducted	IEC 61000-4-6	IEC 61000-4-6	IEC 61000-4-6
Power frequency magnetic field	IEC 61000-4-8	IEC 61000-4-8	IEC 61000-4-8
Voltage dips and interruptions	IEC 61000-4-11	IEC 61000-4-11	IEC 61000-4-11
Harmonics	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2
Flicker	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3
<b>Management</b>	IMC—Intelligent Management Center; command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB; Repeater MIB; Ethernet Interface MIB AirWave Network Management	IMC—Intelligent Management Center; command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB; Repeater MIB; Ethernet Interface MIB AirWave Network Management	IMC—Intelligent Management Center; command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB; Repeater MIB; Ethernet Interface MIB AirWave Network Management
<b>Notes</b>	IEEE 802.3az applies to Gigabit models only; IEEE 802.3at and IEEE 802.3af apply to PoE+ models only. When using SFPs with this product, SFPs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	IEEE 802.3az applies to Gigabit models only; IEEE 802.3at and IEEE 802.3af apply to PoE+ models only. When using SFPs with this product, SFPs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.	IEEE 802.3az applies to Gigabit models only; IEEE 802.3at and IEEE 802.3af apply to PoE+ models only. When using SFPs with this product, SFPs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.
<b>Services</b>	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

## Aruba 2530 Switch Series (continued)

### Specifications (continued)



**Aruba 2530-48G-PoE+-2SFP+ Switch (J9853A)**

**Aruba 2530-24G-PoE+-2SFP+ Switch (J9854A)**

	Aruba 2530-48G-PoE+-2SFP+ Switch (J9853A)	Aruba 2530-24G-PoE+-2SFP+ Switch (J9854A)
<b>I/O ports and slots</b>	48 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3af PoE+); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 2 SFP+ fixed 1000/10000 SFP+ ports 1 dual-personality (RJ-45 or USB micro-B) serial console port	24 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3af PoE+); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 2 SFP+ fixed 1000/10000 SFP+ ports 1 dual-personality (RJ-45 or USB micro-B) serial console port
<b>Physical characteristics</b>		
Dimensions	17.44(w) x 13.00(d) x 1.75(h) in (44.3 x 32.26 x 4.45 cm) (1U height)	17.44(w) x 13.00(d) x 1.75(h) in (44.3 x 33.02 x 4.45 cm) (1U height)
Weight	10.4 lb (4.72 kg)	8.6 lb (3.9 kg)
<b>Memory and processor</b>		
Processor	ARM9E @ 800 MHz, 128 MB flash, 256 MB DDR3 DIMM; packet buffer size: 3 MB dynamically allocated	ARM9E @ 800 MHz, 128 MB flash, 256 MB DDR3 DIMM; packet buffer size: 1.5 MB dynamically allocated
<b>Mounting and enclosure</b>	Mounts in an EIA-standard 19-inch telco rack or equipment cabinet (rack-mounting kit available); horizontal surface mounting; wall mounting	Mounts in an EIA-standard 19-inch telco rack or equipment cabinet (rack-mounting kit available); horizontal surface mounting; wall mounting
<b>Performance</b>		
100 Mb Latency	IPv6 Ready Certified < 7.3 μs (LIFO 64-byte packets)	IPv6 Ready Certified < 7.3 μs (LIFO 64-byte packets)
1000 Mb Latency	< 2.7 μs (LIFO 64-byte packets)	< 2.7 μs (LIFO 64-byte packets)
10 Gb/s Latency	< 4.0 μs (LIFO 64-byte packets)	< 2.2 μs (LIFO 64-byte packets)
Throughput	101 Mpps (64-byte packets)	65.4 Mpps (64-byte packets)
Switching capacity	136 Gb/s	88 Gb/s
MAC address table size	16000 entries	16000 entries
<b>Environment</b>		
Operating temperature	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)
Operating relative humidity	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	15% to 90% @ 149°F (65°C), noncondensing	15% to 90% @ 149°F (65°C), noncondensing
Altitude	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)
Acoustic	Power: 36.4 dB, Pressure: 30.1 dB	Power: 31.3 dB, Pressure: 24 dB

	Aruba 2530-48G-PoE+-2SFP+ Switch (J9853A)	Aruba 2530-24G-PoE+-2SFP+ Switch (J9854A)
<b>Electrical characteristics</b>		
Frequency	50/60 Hz	50/60 Hz
Maximum heat dissipation	215 BTU/hr (226.83 kJ/hr), (switch only: 215 BTU/hr; combined switch + max. PoE devices: 1499 BTU/hr)	118 BTU/hr (124.49 kJ/hr), (switch only: 118 BTU/hr; combined switch + max. PoE devices: 757 BTU/hr)
AC voltage	100–127/200–240 VAC	100–127/200–240 VAC
Current	5.6/2.8 A	2.9/1.4 A
Maximum power rating	439 W	222.2 W
Idle power	40.2 W	24.7 W
PoE power	382 W	195 W
Notes	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated. PoE power is the total power budget available to all PoE ports.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated. PoE power is the total power budget available to all PoE ports.
<b>Safety</b>	UL 60950-1; CAN/CSA 22.2 No. 60950-1; EN 60825; IEC 60950-1; EN 60950-1	UL 60950-1; CAN/CSA 22.2 No. 60950-1; EN 60825; IEC 60950-1; EN 60950-1
<b>Emissions</b>	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A
<b>Immunity</b>		
Generic	EN 55024, CISPR 24	EN 55024, CISPR 24
EN	EN 55024, CISPR 24	EN 55024, CISPR 24
ESD	IEC 61000-4-2	IEC 61000-4-2
Radiated	IEC 61000-4-3	IEC 61000-4-3
EFT/Burst	IEC 61000-4-4	IEC 61000-4-4
Surge	IEC 61000-4-5	IEC 61000-4-5
Conducted	IEC 61000-4-6	IEC 61000-4-6
Power frequency magnetic field	IEC 61000-4-8	IEC 61000-4-8
Voltage dips and interruptions	IEC 61000-4-11	IEC 61000-4-11
Harmonics	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2
Flicker	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3
<b>Management</b>	IMC—Intelligent Management Center; command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB; Repeater MIB; Ethernet Interface MIB AirWave Network Management	IMC—Intelligent Management Center; command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB; Repeater MIB; Ethernet Interface MIB AirWave Network Management
<b>Notes</b>	IEEE 802.3az applies to Gigabit models only; IEEE 802.3at and IEEE 802.3af apply to PoE+ models only. SFPs with revision "B" or later (e.g., J4858B, J4859C) are required with this product. This product supports only 1 Gigabit SFP & 10 Gigabit SFP+ transceivers, as well as 10 Gigabit Direct Attach Cables.	IEEE 802.3az applies to Gigabit models only; IEEE 802.3at and IEEE 802.3af apply to PoE+ models only. SFPs with revision "B" or later (e.g., J4858B, J4859C) are required with this product. This product supports only 1 Gigabit SFP & 10 Gigabit SFP+ transceivers, as well as 10 Gigabit Direct Attach Cables.
<b>Services</b>	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

## Aruba 2530 Switch Series (continued)

### Specifications (continued)



**Aruba 2530-48G-2SFP+ Switch (J9855A)**



**Aruba 2530-24G-2SFP+ Switch (J9856A)**



**Aruba 2530-8-PoE+ internal PS Switch (JL070A)**

	Aruba 2530-48G-2SFP+ Switch (J9855A)	Aruba 2530-24G-2SFP+ Switch (J9856A)	Aruba 2530-8-PoE+ internal PS Switch (JL070A)
<b>I/O ports and slots</b>	48 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 2 SFP+ fixed 1000/10000 SFP+ ports 1 dual-personality (RJ-45 or USB micro-B) serial console port	24 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 2 SFP+ fixed 1000/10000 SFP+ ports 1 dual-personality (RJ-45 or USB micro-B) serial console port	8 RJ-45 autosensing 10/100 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ar PoE+); Media Type: Auto-MDIX; Duplex: half or full 2 dual-personality ports; each port can be used as either an RJ-45 10/100/1000 port (IEEE 802.3 Type 10BASE-T; IEEE 802.3u Type 100BASE-TX; IEEE 802.3ab 1000BASE-T Gigabit Ethernet) or as a SFP slot (for use with SFP transceivers) ports 1 dual-personality (RJ-45 or USB micro-B) serial console port
<b>Physical characteristics</b>			
Dimensions	17.44(w) x 10.00(d) x 1.75(h) in (44.3 x 25.4 x 4.45 cm) (1U height)	17.44(w) x 10.00(d) x 1.75(h) in (44.3 x 25.4 x 4.45 cm) (1U height)	10(w) x 9.68(d) x 1.75(h) in (25.4 x 24.59 x 4.45 cm) (1U height)
Weight	7.1 lb (3.08 kg)	6.2 lb (2.81 kg)	4.65 lb (2.11 kg)
<b>Memory and processor</b>			
Processor	ARM9E @ 800 MHz, 128 MB flash, 256 MB DDR3 DIMM; packet buffer size: 3 MB dynamically allocated	ARM9E @ 800 MHz, 128 MB flash, 256 MB DDR3 DIMM; packet buffer size: 1.5 MB dynamically allocated	ARM9E @ 800 MHz, 128 MB flash, 256 MB DDR3 DIMM; packet buffer size: 1.5 MB dynamically allocated
<b>Mounting and enclosure</b>	Mounts in an EIA-standard 19-inch telco rack or equipment cabinet (rack-mounting kit available); horizontal surface mounting; wall mounting	Mounts in an EIA-standard 19-inch telco rack or equipment cabinet (rack-mounting kit available); horizontal surface mounting; wall mounting	Mounts in an EIA-standard 19-inch telco rack or equipment cabinet (rack-mounting kit available); Horizontal surface mounting; Wall mounting
<b>Performance</b>			
100 Mb Latency	IPv6 Ready Certified < 7.3 μs (LIFO 64-byte packets)	IPv6 Ready Certified < 7.3 μs (LIFO 64-byte packets)	IPv6 Ready Certified < 1.3 μs (LIFO 64-byte packets)
1000 Mb Latency	< 2.7 μs (LIFO 64-byte packets)	< 2.7 μs (LIFO 64-byte packets)	< 1.3 μs (LIFO 64-byte packets)
10 Gb/s Latency	< 4.0 μs (LIFO 64-byte packets)	< 2.2 μs (LIFO 64-byte packets)	
Throughput	101 Mpps (64-byte packets)	65.4 Mpps (64-byte packets)	up to 4.1 Mpps (64-byte packets)
Switching capacity	136 Gb/s	88 Gb/s	5.6 Gbps
MAC address table size	16000 entries	16000 entries	16000 entries
<b>Environment</b>			
Operating temperature	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)
Operating relative humidity	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	15% to 90% @ 149°F (65°C), noncondensing	15% to 90% @ 149°F (65°C), noncondensing	15% to 90% @ 149°F (65°C), noncondensing
Altitude	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)
Acoustic	Power: 32.2 dB, Pressure: 25.6 dB	Power: 29.4 dB, Pressure: 22.3 dB	Power: 0 dB, Pressure: 0 dB

	Aruba 2530-48G-2SFP+ Switch (J9855A)	Aruba 2530-24G-2SFP+ Switch (J9856A)	Aruba 2530-8-PoE+ Internal PS Switch (JL070A)
<b>Electrical characteristics</b>			
Frequency	50/60 Hz Achieved Miercom Certified Green Award	50/60 Hz	50/60 Hz
Maximum heat dissipation	189 BTU/hr (199.4 kJ/hr)	104 BTU/hr (109.72 kJ/hr)	29 BTU/hr (30.6 kJ/hr), (switch only); 29 BTU/hr; combined switch + max. PoE devices: 239 BTU/hr)
AC voltage	100–127/200–240 VAC	100–127/200–240 VAC	100–127/200–240 VAC
Current	0.9/0.5 A	0.7/0.5 A	0.9/0.5 A
Maximum power rating	55.1 W	31 W	70.2 W
Idle power	33.3 W	20.5 W	5.3 W
PoE power			67 W PoE
Notes	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated. PoE power is the total power budget available to all PoE ports.
<b>Safety</b>	UL 60950-1; CAN/CSA 22.2 No. 60950-1; EN 60825; IEC 60950-1; EN 60950-1	UL 60950-1; CAN/CSA 22.2 No. 60950-1; EN 60825; IEC 60950-1; EN 60950-1	UL 60950-1; CAN/CSA 22.2 No. 60950-1; EN 60825; IEC 60950-1; EN 60950-1
<b>Emissions</b>	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A	FCC Class A; EN 55022/CISPR-22 Class A; VCCI Class A
<b>Immunity</b>			
Generic	EN 55024, CISPR 24	EN 55024, CISPR 24	EN 55024, CISPR 24
EN	EN 55024, CISPR 24	EN 55024, CISPR 24	EN 55024, CISPR 24
ESD	IEC 61000-4-2	IEC 61000-4-2	IEC 61000-4-2
Radiated	IEC 61000-4-3	IEC 61000-4-3	IEC 61000-4-3
EFT/Burst	IEC 61000-4-4	IEC 61000-4-4	IEC 61000-4-4
Surge	IEC 61000-4-5	IEC 61000-4-5	IEC 61000-4-5
Conducted	IEC 61000-4-6	IEC 61000-4-6	IEC 61000-4-6
Power frequency magnetic field	IEC 61000-4-8	IEC 61000-4-8	IEC 61000-4-8
Voltage dips and interruptions	IEC 61000-4-11	IEC 61000-4-11	IEC 61000-4-11
Harmonics	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2
Flicker	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3
<b>Management</b>	IMC—Intelligent Management Center; command-line interface; Web browser; configuration menu; out-of-band management (Serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB; Repeater MIB; Ethernet Interface MIB AirWave Network Management	IMC—Intelligent Management Center; command-line interface; Web browser; configuration menu; out-of-band management (Serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB; Repeater MIB; Ethernet Interface MIB AirWave Network Management	IMC—Intelligent Management Center; command-line interface; Web browser; configuration menu; out-of-band management (Serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB; Repeater MIB; Ethernet Interface MIB AirWave Network Management
<b>Notes</b>	IEEE 802.3az applies to Gigabit models only; IEEE 802.3at and IEEE 802.3af apply to PoE+ models only. SFPs with revision "B" or later (e.g., J4858B, J4859C) are required with this product. This product supports only 1 Gigabit SFP & 10 Gigabit SFP+ transceivers, as well as 10 Gigabit Direct Attach Cables.	IEEE 802.3az applies to Gigabit models only; IEEE 802.3at and IEEE 802.3af apply to PoE+ models only. SFPs with revision "B" or later (e.g., J4858B, J4859C) are required with this product. This product supports only 1 Gigabit SFP & 10 Gigabit SFP+ transceivers, as well as 10 Gigabit Direct Attach Cables.	IEEE 802.3az applies to Gigabit models only; IEEE 802.3at and IEEE 802.3af apply to PoE+ models only. When using SFPs with this product, SFPs with revision "B" or later (product number ends with the letter "B" or later, e.g., J4858B, J4859C) are required.
<b>Services</b>	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

## Standards and protocols

(applies to all products in series)

<b>Denial of service protection</b>		Network DoS Filter	
<b>Device management</b>	RFC 1591 DNS (client)	SSHv1/SSHv2 Secure Shell	
<b>General protocols</b>	IEEE 802.1D MAC Bridges IEEE 802.1p Priority IEEE 802.1Q VLANs IEEE 802.1s Multiple Spanning Trees IEEE 802.1w Rapid Reconfiguration of Spanning Tree IEEE 802.3 Type 10BASE-T IEEE 802.3ab 1000BASE-T IEEE 802.3ad Link Aggregation Control Protocol (LACP) IEEE 802.3af Power over Ethernet IEEE 802.3at Power over Ethernet Plus IEEE 802.3az Energy Efficient Ethernet IEEE 802.3x Flow Control	RFC 768 UDP RFC 783 TFTP Protocol (revision 2) RFC 792 ICMP RFC 793 TCP RFC 826 ARP RFC 854 TELNET RFC 868 Time Protocol RFC 951 BOOTP RFC 1350 TFTP Protocol (revision 2) RFC 1542 BOOTP Extensions RFC 1918 Address Allocation for Private Internet RFC 2030 Simple Network Time Protocol (SNTP) v4 RFC 2131 DHCP	RFC 3411 An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks RFC 3412 Message Processing and Dispatching for the Simple Network Management Protocol (SNMP) RFC 3413 Simple Network Management Protocol (SNMP) Applications RFC 3414 User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3) RFC 3415 View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP) RFC 5905 NTP Client
<b>IP multicast</b>		RFC 3376 IGMPv3	
<b>IPv6</b>	RFC 1981 IPv6 Path MTU Discovery RFC 2460 IPv6 Specification RFC 2464 Transmission of IPv6 over Ethernet Networks RFC 2925 Remote Operations MIB (Ping only) RFC 3315 DHCPv6 (client only) RFC 3484 Default Address Selection for IPv6 RFC 3513 IPv6 Addressing Architecture RFC 3596 DNS Extension for IPv6	RFC 3810 Multicast Listener Discovery Version 2 (MLDv2) for IPv6 RFC 4022 MIB for TCP RFC 4113 MIB for UDP RFC 4251 SSHv6 Architecture RFC 4252 SSHv6 Authentication RFC 4252 SSHv6 Transport Layer RFC 4254 SSHv6 Connection RFC 4291 IP Version 6 Addressing Architecture	RFC 4293 MIB for IP RFC 4419 Key Exchange for SSH RFC 4443 ICMPv6 RFC 4861 IPv6 Neighbor Discovery RFC 4862 IPv6 Stateless Address Autoconfiguration RFC 5095 Deprecation of Type 0 Routing Headers in IPv6
<b>MIBs</b>	RFC 1155 Structure and Identification of Management Information for TCP/IP Internets RFC 1212 Concise MIB Definitions RFC 1213 MIB II RFC 1493 Bridge MIB RFC 2021 RMONv2 MIB	RFC 2578 Structure of Management Information Version 2 (SMIv2) RFC 2579 Textual Conventions for SMIv2 RFC 2613 SMON MIB RFC 2618 RADIUS Client MIB RFC 2620 RADIUS Accounting Client MIB RFC 2665 Ethernet-Like-MIB	RFC 2668 802.3 MAU MIB RFC 2674 802.1p and IEEE 802.1Q Bridge MIB RFC 2737 Entity MIB (Version 2) RFC 2863 The Interfaces Group MIB RFC 4836 Managed Objects for 802.3 Medium Attachment Units (MAU)
<b>Network management</b>	IEEE 802.1AB Link Layer Discovery Protocol (LLDP) RFC 1098 A Simple Network Management Protocol (SNMP)	RFC 1155 Structure of Management Information RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events)	RFC 5424 Syslog Protocol ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED) SNMPv1/v2c/v3
<b>QoS/CoS</b>	RFC 2474 DiffServ precedence, with 4 queues per port	RFC 2475 DiffServ Architecture RFC 2597 DiffServ Assured Forwarding (AF)	RFC 2598 DiffServ Expedited Forwarding (EF)
<b>Security</b>	IEEE 802.1X Port Based Network Access Control	RFC 1492 TACACS+ RFC 2138 RADIUS Authentication	RFC 2866 RADIUS Accounting Secure Sockets Layer (SSL)

## Aruba 2530 Switch Series accessories

<b>Transceivers</b>	<p>HPE X111 100M SFP LC FX Transceiver (J9054C)  HPE X112 100M SFP LC BX-D Transceiver (J9099B)  HPE X112 100M SFP LC BX-U Transceiver (J9100B)  HPE X121 1G SFP LC SX Transceiver (J4858C)  HPE X121 1G SFP LC LX Transceiver (J4859C)  HPE X121 1G SFP LC LH Transceiver (J4860C)  HPE X122 1G SFP LC BX-D Transceiver (J9142B)  HPE X122 1G SFP LC BX-U Transceiver (J9143B)  HPE X121 1G SFP RJ45 T Transceiver (J8177C)</p>
<b>Mounting kit</b>	HPE X410 1U Universal 4-post Rack Mounting Kit (J9583A)
<b>Aruba 2530-8-PoE+ Internal PS Switch (JL070A)</b>	HPE X510 1U Cable Guard (J9700A)
<b>Aruba 2530-8G-PoE+ Switch (J9774A)</b>	<p>Aruba 2530 8-port Switch Power Adapter Shelf (J9820A)  Aruba X510 1U Cable Guard (J9700A)</p>
<b>Aruba 2530-8-PoE+ Switch (J9780A)</b>	<p>Aruba 2530 8-port Switch Power Adapter Shelf (J9820A)  Aruba X510 1U Cable Guard (J9700A)</p>
<b>Aruba 2530-8G Switch (J9777A)</b>	<p>Aruba 2530 8-port Switch Power Adapter Shelf (J9820A)  Aruba X510 1U Cable Guard (J9700A)</p>
<b>Aruba 2530-8 Switch (J9783A)</b>	<p>Aruba 2530 8-port Switch Power Adapter Shelf (J9820A)  HPE X510 1U Cable Guard (J9700A)</p>
<b>Aruba 2530-48G-PoE+-2SFP+ Switch (J9853A)</b>	<p>HPE X132 10G SFP+ LC SR Transceiver (J9150A)  HPE X132 10G SFP+ LC LR Transceiver (J9151A)  HPE X132 10G SFP+ LC LRM Transceiver (J9152A)  HPE X132 10G SFP+ LC ER Transceiver (J9153A)  HPE X242 10G SFP+ to SFP+ 1m Direct Attach Copper Cable (J9281B)  HPE X242 10G SFP+ to SFP+ 3m Direct Attach Copper Cable (J9283B)  HPE X242 10G SFP+ to SFP+ 7m Direct Attach Copper Cable (J9285B)  HPE X244 10G XFP to SFP+ 1m Direct Attach Copper Cable (J9300A)  HPE X244 10G XFP to SFP+ 3m Direct Attach Copper Cable (J9301A)  HPE X244 10G XFP to SFP+ 5m Direct Attach Copper Cable (J9302A)</p>
<b>Aruba 2530-24G-PoE+-2SFP+ Switch (J9854A)</b>	<p>HPE X132 10G SFP+ LC SR Transceiver (J9150A)  HPE X132 10G SFP+ LC LR Transceiver (J9151A)  HPE X132 10G SFP+ LC LRM Transceiver (J9152A)  HPE X132 10G SFP+ LC ER Transceiver (J9153A)  HPE X242 10G SFP+ to SFP+ 1m Direct Attach Copper Cable (J9281B)  HPE X242 10G SFP+ to SFP+ 3m Direct Attach Copper Cable (J9283B)  HPE X242 10G SFP+ to SFP+ 7m Direct Attach Copper Cable (J9285B)  HPE X244 10G XFP to SFP+ 1m Direct Attach Copper Cable (J9300A)  HPE X244 10G XFP to SFP+ 3m Direct Attach Copper Cable (J9301A)  HPE X244 10G XFP to SFP+ 5m Direct Attach Copper Cable (J9302A)</p>

## Aruba 2530 Switch Series accessories (continued)

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**Aruba 2530-48G-2SFP+ Switch (J9855A)** HPE X132 10G SFP+ LC SR Transceiver (J9150A)  
HPE X132 10G SFP+ LC LR Transceiver (J9151A)  
HPE X132 10G SFP+ LC LRM Transceiver (J9152A)  
HPE X132 10G SFP+ LC ER Transceiver (J9153A)  
HPE X242 10G SFP+ to SFP+ 1m Direct Attach Copper Cable (J9281B)  
HPE X242 10G SFP+ to SFP+ 3m Direct Attach Copper Cable (J9283B)  
HPE X242 10G SFP+ to SFP+ 7m Direct Attach Copper Cable (J9285B)  
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HPE X244 10G XFP to SFP+ 3m Direct Attach Copper Cable (J9301A)  
HPE X244 10G XFP to SFP+ 5m Direct Attach Copper Cable (J9302A)

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**Aruba 2530-24G-2SFP+ Switch (J9856A)** HPE X132 10G SFP+ LC SR Transceiver (J9150A)  
HPE X132 10G SFP+ LC LR Transceiver (J9151A)  
HPE X132 10G SFP+ LC LRM Transceiver (J9152A)  
HPE X132 10G SFP+ LC ER Transceiver (J9153A)  
HPE X242 10G SFP+ to SFP+ 1m Direct Attach Copper Cable (J9281B)  
HPE X242 10G SFP+ to SFP+ 3m Direct Attach Copper Cable (J9283B)  
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HPE X244 10G XFP to SFP+ 5m Direct Attach Copper Cable (J9302A)

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Learn more at  
[hpe.com/networking](http://hpe.com/networking)



Products within this series have achieved sufficient scores in each of the rated criteria to achieve the Miercom Certified Green distinction Award. See the Specifications section of this series for more information. Products within this series are IPv6 Ready certified. See the Specifications section of this series for more information.



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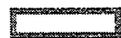
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Enterprise**

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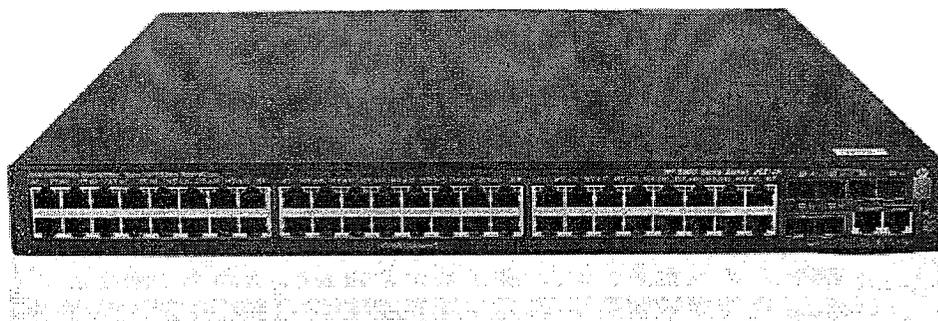
sFlow is a registered trademark of InMon Corp.

4AA4-4245ENW, February 2016, Rev. 7



**Hewlett Packard**  
Enterprise

## HPE 5500 HI Switch Series



### Key features

- High expandability for investment protection
- Premium resiliency and integrated management
- SDN readiness with OpenFlow support
- Fully featured IPv4/IPv6 dual stack
- 1,440 W of PoE+ power using dual power supplies for high resiliency

### Product overview

The HPE 5500 HI Switch Series comprises Gigabit Ethernet switches that deliver outstanding resiliency, security, and multiservice support capabilities at the edge layer of data center, large campus, and metro Ethernet networks. The switches can also be used in the core layer of SMB networks.

With Intelligent Resilient Framework (IRF) support and available dual power supplies, the HPE 5500 HI Switch Series can deliver the highest levels of resiliency and manageability. In addition, the PoE+ models provide up to 1,440 W of PoE+ power with the dual power supply configuration.

Designed with two fixed 10GbE ports and extension module flexibility, these switches can provide up to six 10GbE uplink or 70GbE ports. With complete IPv4/IPv6, OpenFlow, and MPLS/VPLS features, the series provides investment protection with an easy transition from IPv4 to IPv6 networks.

## Features and benefits

### Software-defined networking

- OpenFlow

Supports OpenFlow 1.3 specification to enable SDN by allowing separation of the data (packet forwarding) and control (routing decision) paths

### Quality of Service (QoS)

- Advanced classifier-based QoS

Classifies traffic using multiple match criteria based on Layer 2, 3, and 4 information; applies QoS policies such as setting priority level and rate limit to selected traffic on a per-port or per-VLAN basis

- Traffic policing

Supports Committed Access Rate (CAR) and line rate

- Powerful QoS feature

Creates traffic classes based on access control lists (ACLs), IEEE 802.1p precedence, IP, and DSCP or Type of Service (ToS) precedence; supports filter, redirect, mirror, or remark; supports the following congestion actions: strict priority (SP) queuing, weighted round robin (WRR), weighted fair queuing (WFQ), weighted random early discard (WRED), weighted deficit round robin (WDRR), SP+WDRR, and SP+WFQ

- Storm restraint

Allows limitation of broadcast, multicast, and unknown unicast traffic rate to reduce unwanted broadcast traffic on the network

### Management

- Friendly port names

Allow assignment of descriptive names to ports

- sFlow® (RFC 3176)

Provides scalable ASIC-based wire-speed network monitoring and accounting with no impact on network performance; this allows network operators to gather a variety of sophisticated network statistics and information for capacity planning and real-time network monitoring purposes

- Complete session logging

Provides detailed information for problem identification and resolution

- Remote configuration and management

Enable configuration and management through a Web browser with advanced security features or a CLI located on a remote device

- Manager and operator privilege levels

Provide read-only (operator) and read/write (manager) access on CLI and Web browser management interfaces

- Management VLAN

Segments traffic to and from management interfaces, including CLI/Telnet, a Web browser interface, and SNMP

- Command authorization

Leverages RADIUS to link a custom list of CLI commands to an individual network administrator's login; an audit trail documents activity

- **Secure Web GUI**

Provides an easy-to-use graphical interface with advanced security features for configuring the module via HTTPS
- **SNMPv1, v2c, and v3**

Facilitate centralized discovery, monitoring, and secure management of networking devices
- **Remote monitoring (RMON)**

Uses standard SNMP to monitor essential network functions; supports events, alarm, history, and statistics group plus a private alarm extension group
- **Remote intelligent mirroring**

Mirrors ingress/egress ACL-selected traffic from a switch port or VLAN to a local or remote switch port anywhere on the network
- **In-Service Software Upgrade (ISSU)**

Enables operators to perform upgrades in the shortest possible amount of time with reduced risk to network operations or traffic disruptions

### **Connectivity**

- **Auto-MDIX**

Provides automatic adjustments for straight-through or crossover cables on all 10/100 and 10/100/1000 ports
- **Packet storm protection**

Protects against broadcast, multicast, or unicast storms with user-defined thresholds
- **Ethernet operations, administration, and maintenance (OAM)**

Detects data link layer problems that occurred in the "last mile" using the IEEE 802.3ah OAM standard; monitors the status of the link between two devices
- **Flow Control**

Provides back pressure using standard IEEE 802.3x, reducing congestion in heavy traffic situations
- **Fixed 10GbE ports**

Provide two fixed SFP+ ports for a 20GbE connection to the network without the need for additional extension interface modules
- **Optional 10GbE ports**

Deliver, through the use of optional modules, additional 10GbE connections, which are available for uplinks or high-bandwidth server connections; flexibly support copper, XFP, SFP+, or CX4 local connections
- **Optional eight-port SFP module**

Adds up to eight additional wire-speed Gigabit Ethernet ports for unprecedented Gigabit density in a single 1U enclosure
- **Jumbo packet support**

Supports up to 12,288-byte frame size to improve the performance of large data transfers
- **High-bandwidth CX4 local stacking**

Achieves 12 Gbps per connection when using local CX4 stacking, allowing for up to 96 Gbps total stacking bandwidth (full duplex) in a resilient stacking configuration

- IEEE 802.3af Power over Ethernet (PoE+)

Provides up to 30 W per port that allows support for the latest PoE+-capable devices such as IP phones, wireless access points, and security cameras, as well as any IEEE 802.3af compliant end device; reduces the cost of additional electrical cabling and circuits that would otherwise be necessary in IP phone and WLAN deployments

**Performance**

- Hardware-based wire-speed access control lists (ACLs)

Help provide high levels of security and ease of administration without impacting network performance with a feature-rich TCAM-based ACL implementation

- Nonblocking architecture

Delivers up to 224 Gbps of wire-speed switching with a nonblocking switching fabric and up to 167 million pps throughput

**Resiliency and high availability**

- Separate data and control paths

Separate control from services and keeps service processing isolated; increase security and performance

- Device Link Detection Protocol (DLDP)

Monitors link connectivity and shuts down ports at both ends if unidirectional traffic is detected, preventing loops in STP-based networks

- Intelligent Resilient Framework (IRF)

Creates virtual resilient switching fabrics, where two or more switches perform as a single L2 switch and L3 router; switches do not have to be co-located and can be part of a disaster-recovery system; servers or switches can be attached using standard LACP for automatic load balancing and high availability; can reduce the need for complex protocols like Spanning Tree Protocol, Equal-Cost Multipath (ECMP), or VRRP, thereby simplifying network operation

- Rapid Ring Protection Protocol (RRPP)

Connects multiple switches in a high-performance ring using standard Ethernet technology; traffic can be rerouted around the ring in less than 50 ms, reducing the impact on traffic and applications

- Smart Link

Allows 50 ms failover between links

- Virtual Router Redundancy Protocol (VRRP)

Allows groups of two routers to dynamically back each other up to create highly available routed environments

- IRF capability

Provides single IP address management for a resilient virtual switching fabric of up to nine switches using up to 80 Gb/s links

**Manageability**

- Dual flash images

Provide independent primary and secondary operating system files for backup while upgrading

- Multiple configuration files

Allow multiple configuration files to be stored to a flash image

- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)

Facilitates easy mapping using network management applications with LLDP automated device discovery protocol

- Troubleshooting

Allows ingress and egress port monitoring, enabling network problem solving; virtual cable tests provide visibility into cable problems

- IPv6 management

Future-proofs networking, as the switch is capable of being managed whether the attached network is running IPv4 or IPv6; supports pingv6, tracertv6, Telnetv6, TFTPv6, DNSv6, and ARPv6

### **Layer 2 switching**

- GARP VLAN Registration Protocol

Allows automatic learning and dynamic assignment of VLANs

- IP multicast snooping and data-driven IGMP

Automatically prevents flooding of IP multicast traffic

- Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) protocol snooping

Control and manage the flooding of multicast packets in a Layer 2 network

- 32K MAC addresses

Provide access to many Layer 2 devices

- IEEE 802.1ad QinQ and selective QinQ

Increase the scalability of an Ethernet network by providing a hierarchical structure; connect multiple LANs on a high-speed campus or metro network

- 10GbE port aggregation

Allows grouping of ports to increase overall data throughput to a remote device

- Spanning Tree/MSTP, RSTP, and STP root guard

Prevent network loops

- 32 MSTP instances

Allow multiple configurations of STP per VLAN group

- Isolation at data link layer with private VLANs

Provides, through a two-tier VLAN structure, an additional layer of protection, simplifying network configuration while saving VLAN resources

- VLAN support and tagging

Supports the IEEE 802.1Q (4094 VLAN IDs)

### **Layer 3 services**

- Loopback interface address

Defines an address in Routing Information Protocol (RIP) and Open Standard Path First (OSPF), improving diagnostic capability

- Address Resolution Protocol (ARP)

Determines the MAC address of another IP host in the same subnet; supports static ARPs; gratuitous ARP allows detection of duplicate IP addresses; proxy ARP allows normal ARP operation between subnets or when subnets are separated by a Layer 2 network

- Dynamic Host Configuration Protocol (DHCP)

Simplifies the management of large IP networks and supports client and server; DHCP Relay enables DHCP operation across subnets

- User Datagram Protocol (UDP) helper function

Allows UDP broadcasts to be directed across router interfaces to specific IP unicast or subnet broadcast addresses and prevents server spoofing for UDP services such as DHCP

### **Layer 3 routing**

- IPv4 routing protocols

Support static routes, RIP, OSPF, ISIS, and BGP

- IPv6 routing protocols

Provide routing of IPv6 at wire speed; support static routes, RIPng, OSPFv3, IS-ISv6, and BGP4+ for IPv6

- PIM-SSM, PIM-DM, and PIM-SM (for IPv4 and IPv6)

Support IP multicast address management and inhibition of DoS attacks

- MPLS support

Provides extended support of MPLS, including MPLS VPNs and MPLS Traffic Engineering (MPLS TE)

- Virtual Private LAN Service (VPLS)

Establishes point-to-multipoint Layer 2 VPNs across a provider network

- Bidirectional Forwarding Detection (BFD)

Enables link connectivity monitoring and reduces network convergence time for RIP, OSPF, BGP, IS-IS, VRRP, MPLS, and IRF

- Policy-based routing

Makes routing decisions based on policies set by the network administrator

- Equal-Cost Multipath (ECMP)

Enables multiple equal-cost links in a routing environment to increase link redundancy and scale bandwidth

- IPv6 tunneling

Allows a smooth transition from IPv4 to IPv6 by encapsulating IPv6 traffic over an existing IPv4 infrastructure

### **Security**

- Access control lists (ACLs)

Provide IP Layer 2 to Layer 4 traffic filtering; support global ACL, VLAN ACL, port ACL, and IPv6 ACL; up to 6,144 ingress ACLs and 1,024 egress ACLs are supported

- IEEE 802.1X

Defines an industry-standard method of user authentication using an IEEE 802.1X supplicant on the client in conjunction with a RADIUS server

- MAC-based authentication

Authenticates the client with the RADIUS server based on the client's MAC address

- Identity-driven security and access control

– Per-user ACLs

Permit or deny user access to specific network resources based on user identity and time of day, allowing multiple types of users on the same network to access specific network services without risking network security or providing unauthorized access to sensitive data

– Automatic VLAN assignment

Assigns users automatically to the appropriate VLAN based on their identities

- Port security
  - Allows access only to specified MAC addresses, which can be learned or specified by the administrator
- Secure FTP
  - Allows secure file transfer to and from the switch; protects against unwanted file downloads or unauthorized copying of a switch configuration file
- STP BPDU port protection
  - Blocks Bridge Protocol Data Units (BPDUs) on ports that do not require BPDUs, preventing forged BPDU attacks
- DHCP protection
  - Blocks DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks
- DHCP snooping
  - Helps ensure that DHCP clients receive IP addresses from authorized DHCP servers and maintain a list of DHCP entries for trusted ports; prevents reception of fake IP addresses and reduces ARP attacks, improving security
- DHCPv6 snooping
  - Ensures that DHCPv6 clients obtain IPv6 addresses from authorized DHCPv6 servers and record IP-to-MAC mappings of DHCPv6 clients
- Dynamic ARP protection
  - Blocks ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data
- STP root guard
  - Protects the root bridge from malicious attacks or configuration mistakes
- Guest VLAN
  - Provides a browser-based environment to authenticated clients that is similar to IEEE 802.1X
- Port isolation
  - Protects and adds privacy, and prevents malicious attackers from obtaining user information
- Endpoint Admission Defense (EAD)
  - Provides security policies to users accessing a network
- RADIUS/HWTACACS
  - Eases switch management security administration by using a password authentication server
- Secure management access
  - Delivers secure encryption of all access methods (CLI, GUI, or MIB) through SSHv2 and SNMPv3
- Unicast Reverse Path Forwarding (URPF)
  - Allows normal packets to be forwarded correctly, but discards the attaching packet due to lack of reverse path route or incorrect inbound interface; prevents source spoofing and distributed attacks; supports distributed UFPF
- IP source guard
  - Helps prevent IP spoofing attacks
- IPv6 source guard
  - Help prevent IPv6 spoofing attacks using ND Snooping as well as DHCPv6 Snooping

- ND Snooping

Allows only packets with a legally obtained IPv6 address to pass

**Virtual private network (VPN)**

- Generic Routing Encapsulation (GRE)

Transports Layer 2 connectivity over a Layer 3 path in a secured way; enables the segregation of traffic from site to site

**Convergence**

- LLDP-MED (Media Endpoint Discovery)

Defines a standard extension of LLDP that stores values for parameters such as QoS and VLAN to automatically configure network devices such as IP phones

- Internet Group Management Protocol (IGMP)

Utilizes Any-Source Multicast (ASM) or Source-Specific Multicast (SSM) to manage IPv4 multicast networks; supports IGMPv1, v2, and v3

- Multicast Source Discovery Protocol (MSDP)

Allows multiple PIM-SM domains to interoperate; is used for inter-domain multicast applications

- Multicast Border Gateway Protocol (MBGP)

Allows multicast traffic to be forwarded across BGP networks and kept separate from unicast traffic

- Multicast VLAN

Allows multiple VLANs to receive the same IPv4 or IPv6 multicast traffic, lessening network bandwidth demand by reducing or eliminating multiple streams to each VLAN

- LLDP-CDP compatibility

Receives and recognizes CDP packets from Cisco's IP phones for seamless interoperation

**Additional information**

- Green initiative support

Provides support for RoHS and WEEE regulations

- Green IT and power

Improves energy efficiency through the use of the latest advances in silicon development; shuts off unused ports and utilizes variable-speed fans, reducing energy costs

**Warranty and support**

- Limited lifetime warranty

See [hpe.com/networking/warrantysummary](http://hpe.com/networking/warrantysummary) for warranty and support information included with your product purchase.

- Software releases

To find software for your product, visit [hpe.com/networking/support](http://hpe.com/networking/support); for details on the software releases available with your product purchase, visit [hpe.com/networking/warrantysummary](http://hpe.com/networking/warrantysummary)

## HPE 5500 HI Switch Series



**HPE 5500-24G-4SFP HI Switch with 2 Interface Slots (JG311A)**



**HPE 5500-48G-4SFP HI Switch with 2 Interface Slots (JG312A)**



**HPE 5500-24G-PoE+-4SFP HI Switch with 2 Interface Slots (JG541A)**

**SPECIFICATIONS**

**I/O ports and slots**

24 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only

4 fixed Gigabit Ethernet SFP ports

2 SFP+ 10GbE ports

2 port expansion module slots

Supports a maximum of 38 autosensing 100/1000 ports, with optional module

48 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only

4 fixed Gigabit Ethernet SFP ports

2 SFP+ 10GbE ports

2 port expansion module slots

Supports a maximum of 70 autosensing 100/1000 ports, with optional module

24 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only

4 fixed Gigabit Ethernet SFP ports

2 SFP+ 10GbE ports

2 port expansion module slots

Supports a maximum of 38 autosensing 100/1000 ports, with optional module

**Additional ports and slots**

1 RJ-45 serial console port  
1 RJ-45 out-of-band management port

1 RJ-45 serial console port  
1 RJ-45 out-of-band management port

1 RJ-45 serial console port  
1 RJ-45 out-of-band management port

**Power supplies**

2 power supply slots  
1 minimum power supply required (ordered separately)

2 power supply slots  
1 minimum power supply required (ordered separately)

2 power supply slots  
1 minimum power supply required (ordered separately)

**Physical characteristics**

**Dimensions**  
17.32(w) x 14.17(d) x 1.72(h) in.  
(44.00 x 36.00 x 4.37 cm) (1U height)

**Weight**  
16.53 lb (7.5 kg) shipping weight

17.32(w) x 16.54(d) x 1.72(h) in.  
(44.0 x 42.0 x 4.37 cm) (1U height)

18.74 lb (8.5 kg)

17.32(w) x 18.11(d) x 1.72(h) in.  
(43.99 x 46 x 4.37 cm) (1U height)

22.05 lb (10 kg) shipping weight

**Memory and processor**

1 GB SDRAM, 512 MB flash; packet buffer size: 3 MB

1 GB SDRAM, 512 MB flash; packet buffer size: 6 MB

1 GB SDRAM, 512 MB flash; packet buffer size: 3 MB

**Mounting and enclosure**

Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)

Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)

Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)

**Performance**

1000 Mb Latency < 5 µs  
10 Gbps Latency < 3 µs  
Throughput Up to 130.9 million pps  
Routing/Switching capacity 176 Gbps  
Routing table size 12000 entries (IPv4), 6000 entries (IPv6)  
MAC address table size 32000 entries

< 5 µs  
< 3 µs  
Up to 166.6 million pps  
224 Gbps  
12000 entries (IPv4), 6000 entries (IPv6)  
32000 entries

< 5 µs  
< 3 µs  
Up to 130.9 million pps  
176 Gbps  
12000 entries (IPv4), 6000 entries (IPv6)  
32000 entries

**Environment**

Operating temperature 32°F to 122°F (0°C to 50°C)  
Operating relative humidity 5% to 95%, noncondensing  
Nonoperating/Storage temperature -40°F to 158°F (-40°C to 70°C)  
Nonoperating/Storage relative humidity 5% to 95%, noncondensing  
Acoustic Low-speed fan: 47.9 dB, High-speed fan: 51.1 dB; ISO 7779

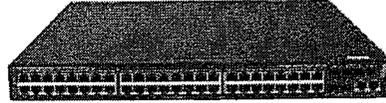
32°F to 122°F (0°C to 50°C)  
5% to 95%, noncondensing  
-40°F to 158°F (-40°C to 70°C)  
5% to 95%, noncondensing  
Low-speed fan: 48.6 dB, High-speed fan: 57.6 dB; ISO 7779

32°F to 113°F (0°C to 45°C)  
5% to 95%, noncondensing  
-40°F to 158°F (-40°C to 70°C)  
5% to 95%, noncondensing  
Low-speed fan: 41.0 dB, High-speed fan: 64.0 dB; ISO 7779

## HPE 5500 HI Switch Series

SPECIFICATIONS (CONTINUED)	HPE 5500-24G-4SFP HI Switch with 2 Interface Slots (JG311A)	HPE 5500-48G-4SFP HI Switch with 2 Interface Slots (JG312A)	HPE 5500-24G-PoE+-4SFP HI Switch with 2 Interface Slots (JG541A)
<b>Electrical characteristics</b>			
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Maximum heat dissipation	481 BTU/hr (507.46 kJ/hr)	651 BTU/hr (686.81 kJ/hr)	460 BTU/hr (485.3 kJ/hr)
AC voltage	141 W	191 W	150 W
Maximum power rating			740 W PoE+
	<b>Notes</b> Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated. PoE power is the maximum power available from the required power supply or supplies. Device supports 1 or 2 internal modular power supplies. JG544A will supply up to 450 watts of PoE+ power per installed unit. JG545A will supply up to 740 watts of PoE+ power per installed unit to the extent needed by the installation.
<b>Safety</b>	UL 60950-1; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; RoHS Compliance; AS/NZS 60950-1; GB 4943	UL 60950-1; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; RoHS Compliance; AS/NZS 60950-1; GB 4943	UL 60950-1; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; RoHS Compliance; AS/NZS 60950-1; GB 4943
<b>Emissions</b>	EN 55022 Class A; CISPR 22 Class A; EN 55024; ICES-003 Class A; CISPR 24; AS/NZS CISPR 22 Class A; EN 61000-3-2; EN 61000-3-3; GB9254; VCCI-3 CLASS A; VCCI-4 CLASS A; ETSI EN 300 386; FCC Part 15 (CFR 47) CLASS A; YD/T993	EN 55022 Class A; CISPR 22 Class A; EN 55024; ICES-003 Class A; CISPR 24; AS/NZS CISPR 22 Class A; EN 61000-3-2; EN 61000-3-3; GB9254; VCCI-3 CLASS A; VCCI-4 CLASS A; ETSI EN 300 386; FCC Part 15 (CFR 47) CLASS A; YD/T993	EN 55022 Class A; CISPR 22 Class A; EN 55024; ICES-003 Class A; CISPR 24; AS/NZS CISPR 22 Class A; EN 61000-3-2; EN 61000-3-3; GB9254; VCCI-3 CLASS A; VCCI-4 CLASS A; ETSI EN 300 386; FCC Part 15 (CFR 47) CLASS A; YD/T993
<b>Notes</b>	8-port Gig-T and SFP modules (JG313A and JG314A) are supported only in slot 1 of this switch.		8-port Gig-T and SFP modules (JG313A and JG314A) are supported only in slot 1 of this switch.
<b>Services</b>	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

## HPE 5500 HI Switch Series



**HPE 5500-48G-PoE+-4SFP HI Switch with 2 Interface Slots (JG542A)**

**HPE 5500-24G-SFP HI Switch with 2 Interface Slots (JG543A)**

**SPECIFICATIONS (CONTINUED)**

<b>I/O ports and slots</b>	<p>48 RJ-45 autosensing 10/100/1000 PoE+ ports; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only</p> <p>4 fixed Gigabit Ethernet SFP ports</p> <p>2 SFP+ 10GbE ports</p> <p>2 port expansion module slots</p> <p>Supports a maximum of 70 autosensing 100/1000 ports, with optional module</p>	<p>24 fixed Gigabit Ethernet SFP ports</p> <p>4 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only</p> <p>2 SFP+ 10GbE ports</p> <p>2 port expansion module slots</p> <p>Supports a maximum of 12 autosensing 10/100/1000 ports, with optional module</p>
<b>Additional ports and slots</b>	<p>1 RJ-45 serial console port</p> <p>1 RJ-45 out-of-band management port</p>	<p>1 RJ-45 serial console port</p> <p>1 RJ-45 out-of-band management port</p>
<b>Power supplies</b>	<p>2 power supply slots</p> <p>1 minimum power supply required (ordered separately)</p>	<p>2 power supply slots</p> <p>1 minimum power supply required (ordered separately)</p>
<b>Physical characteristics</b>		
Dimensions	17.32(w) x 18.11(d) x 1.72(h) in. (43.99 x 46 x 4.37 cm) (1U height)	17.32(w) x 14.17(d) x 1.72(h) in. (43.99 x 35.99 x 4.37 cm) (1U height)
Weight	23.15 lb (10.5 kg)	16.53 lb (7.5 kg)
<b>Memory and processor</b>	1 GB SDRAM, 512 MB flash; packet buffer size: 6 MB	1 GB SDRAM, 512 MB flash; packet buffer size: 3 MB
<b>Mounting and enclosure</b>	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)
<b>Performance</b>		
1000 Mb Latency	< 5 µs	< 5 µs
10 Gbps Latency	< 3 µs	< 3 µs
Throughput	Up to 166.6 million pps	Up to 130.9 million pps
Routing/Switching capacity	224 Gbps	176 Gbps
Routing table size	12000 entries (IPv4), 6000 entries (IPv6)	12000 entries (IPv4), 6000 entries (IPv6)
MAC address table size	32000 entries	32000 entries
<b>Environment</b>		
Operating temperature	32°F to 113°F (0°C to 45°C)	32°F to 122°F (0°C to 50°C)
Operating relative humidity	5% to 95%, noncondensing	5% to 95%, noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	5% to 95%, noncondensing	5% to 95%, noncondensing
Acoustic	Low-speed fan: 48.3 dB, High-speed fan: 54.0 dB; ISO 7779	Low-speed fan: 48.3 dB, High-speed fan: 54.0 dB; ISO 7779

## HPE 5500 HI Switch Series

### SPECIFICATIONS (CONTINUED)

	HPE 5500-48G-PoE+-4SFP HI Switch with 2 Interface Slots (JG542A)	HPE 5500-24G-SFP HI Switch with 2 Interface Slots (JG543A)
<b>Electrical characteristics</b>		
Frequency	50/60 Hz	50/60 Hz
Maximum heat dissipation	666 BTU/hr (702.63 kJ/hr)	460 BTU/hr (485.3 kJ/hr)
Maximum power rating	195 W	135 W
PoE power	1440 W PoE+	
	<p><b>Notes</b></p> <p>Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.</p> <p>PoE power is the power supplied by the internal power supply. It is dependent on the type and quantity of power supplies. Device supports 1 or 2 internal modular power supplies. JG544A will supply 450 watts of PoE+ power per installed unit. JG545A will supply up to 800 watts of PoE+ power per installed unit.</p>	<p>Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.</p>
<b>Safety</b>	UL 60950-1; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; RoHS Compliance; AS/NZS 60950-1; GB 4943	UL 60950-1; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; RoHS Compliance; AS/NZS 60950-1; GB 4943
<b>Emissions</b>	EN 55022 Class A; CISPR 22 Class A; EN 55024; ICES-003 Class A; CISPR 24; AS/NZS CISPR 22 Class A; EN 61000-3-2; EN 61000-3-3; GB9254; VCCI-3 CLASS A; VCCI-4 CLASS A; ETSI EN 300 386; FCC Part 15 (CFR 47) CLASS A; YD/T993	EN 55022 Class A; CISPR 22 Class A; EN 55024; ICES-003 Class A; CISPR 24; AS/NZS CISPR 22 Class A; EN 61000-3-2; EN 61000-3-3; GB9254; VCCI-3 CLASS A; VCCI-4 CLASS A; ETSI EN 300 386; FCC Part 15 (CFR 47) CLASS A; YD/T993
<b>Notes</b>		8-port Gig-T and SFP modules (JG313A and JG314A) are supported only in slot 1 of this switch.
<b>Services</b>	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

## HPE 5500 HI Switch Series

### STANDARDS AND PROTOCOLS

(applies to all products in series)

<b>BGP</b>	RFC 1657 Definitions of Managed Objects for BGPv4	RFC 1771 BGPv4	RFC 2385 BGP Session Protection via TCP MD5 RFC 2858 BGP-4 Multi-Protocol Extensions
<b>Device management</b>	RFC 1157 SNMPv1/v2c RFC 1305 NTPv3 RFC 1901 (Community based SNMPv2) RFC 2452 MIB for TCP6 RFC 2454 MIB for UDP6	RFC 2573 (SNMPv3 Applications) RFC 2576 (Coexistence between SNMPv1, v2, v3) RFC 2819 (RMON groups Alarm, Event, History and Statistics only) RFC 3410 (Management Framework) RFC 3416 (SNMP Protocol Operations v2)	RFC 3417 (SNMP Transport Mappings) HTML and telnet management Multiple Configuration Files SNMP v3 and RMON RFC support SSHv1/SSHv2 Secure Shell
<b>General protocols</b>	IEEE 802.1ad Q-in-Q IEEE 802.1ak Multiple Registration Protocol (MRP) and Multiple VLAN Registration Protocol (MVRP) IEEE 802.1D MAC Bridges IEEE 802.1p Priority IEEE 802.1Q (GVRP) IEEE 802.1v VLAN classification by Protocol and Port IEEE 802.1w Rapid Reconfiguration of Spanning Tree IEEE 802.3ab 1000BASE-T IEEE 802.3ac (VLAN Tagging Extension) IEEE 802.3ad Link Aggregation (LAG) IEEE 802.3ae 10-Gigabit Ethernet IEEE 802.3af Power over Ethernet IEEE 802.3at PoE+ IEEE 802.3az Energy Efficient Ethernet IEEE 802.3i 10BASE-T IEEE 802.3u 100BASE-X IEEE 802.3x Flow Control IEEE 802.3z 1000BASE-X RFC 768 UDP RFC 791 IP RFC 792 ICMP RFC 793 TCP RFC 854 TELNET RFC 925 Multi-LAN Address Resolution RFC 950 Internet Standard Subnetting Procedure RFC 951 BOOTP RFC 1058 RIPv1 RFC 1122 Host Requirements RFC 1141 Incremental updating of the Internet checksum	RFC 1213 Management Information Base for Network Management of TCP/IP-based Internets RFC 1256 ICMP Router Discovery Protocol (IRDP) RFC 1305 NTPv3 RFC 1350 TFTP Protocol (revision 2) RFC 1519 CIDR RFC 1542 BOOTP Extensions RFC 1723 RIP v2 RFC 1812 IPv4 Routing RFC 1887 An Architecture for IPv6 Unicast Address Allocation RFC 2131 DHCP RFC 2236 IGMP Snooping RFC 2338 VRRP RFC 2375 IPv6 Multicast Address Assignments RFC 2616 Hypertext Transfer Protocol—HTTP/1.1 RFC 2644 Directed Broadcast Control RFC 2711 IPv6 Router Alert Option RFC 2784 Generic Routing Encapsulation (GRE) RFC 2865 Remote Authentication Dial In User Service (RADIUS) RFC 2866 RADIUS Accounting RFC 3209 RSVP-TE Extensions to RSVP for LSP Tunnels RFC 3246 Expedited Forwarding PHB RFC 3410 Applicability Statements for SNMP RFC 3414 User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3) RFC 3415 View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)	RFC 3417 Transport Mappings for the Simple Network Management Protocol (SNMP) RFC 3484 Default Address Selection for Internet Protocol version 6 (IPv6) RFC 3493 Basic Socket Interface Extensions for IPv6 RFC 3542 Advanced Sockets Application Program Interface (API) for IPv6 RFC 3587 IPv6 Global Unicast Address Format RFC 3596 DNS Extensions to Support IP Version 6 RFC 3623 Graceful OSPF Restart RFC 3704 Unicast Reverse Path Forwarding (URPF) RFC 3768 Virtual Router Redundancy Protocol (VRRP) RFC 3810 Multicast Listener Discovery Version 2 (MLDv2) for IPv6 RFC 4090 Fast Reroute Extensions to RSVP-TE for LSP Tunnels RFC 4113 Management Information Base for the User Datagram Protocol (UDP) RFC 4213 Basic IPv6 Transition Mechanisms RFC 4443 Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification RFC 4594 Configuration Guidelines for DiffServ Service Classes RFC 4762 Virtual Private LAN Service (VPLS) Using Label Distribution Protocol (LDP) Signaling 802.1r—GARP Proprietary Attribute Registration Protocol (GPRP)
<b>IP multicast</b>	RFC 2236 IGMPv2 RFC 2710 Multicast Listener Discovery (MLD) for IPv6 RFC 2858 Multiprotocol Extensions for BGP-4	RFC 3376 IGMPv3 RFC 3569 An Overview of Source-Specific Multicast (SSM)	RFC 3618 Multicast Source Discovery Protocol (MSDP) RFC 3973 PIM Dense Mode RFC 4601 PIM Sparse Mode

## HPE 5500 HI Switch Series

### STANDARDS AND PROTOCOLS (CONTINUED)

(applies to all products in series)

<b>IPv6</b>	RFC 1881 IPv6 Address Allocation Management RFC 1887 IPv6 Unicast Address Allocation Architecture RFC 1981 IPv6 Path MTU Discovery RFC 2080 RIPng for IPv6 RFC 2373 IPv6 Addressing Architecture RFC 2375 IPv6 Multicast Address Assignments RFC 2460 IPv6 Specification RFC 2461 IPv6 Neighbor Discovery RFC 2462 IPv6 Stateless Address Auto-configuration RFC 2463 ICMPv6 RFC 2464 Transmission of IPv6 over Ethernet Networks	RFC 2473 Generic Packet Tunneling in IPv6 RFC 2475 IPv6 DiffServ Architecture RFC 2710 Multicast Listener Discovery (MLD) for IPv6 RFC 2711 IPv6 Router Alert Option RFC 2740 OSPFv3 for IPv6 RFC 2893 Transition Mechanisms for IPv6 Hosts and Routers RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only) RFC 3162 RADIUS and IPv6 RFC 3306 Unicast-Prefix-based IPv6 Multicast Addresses RFC 3307 IPv6 Multicast Address Allocation	RFC 3315 DHCPv6 (client and relay) RFC 3484 Default Address Selection for IPv6 RFC 3493 Basic Socket Interface Extensions for IPv6 RFC 3513 IPv6 Addressing Architecture RFC 3542 Advanced Sockets API for IPv6 RFC 3587 IPv6 Global Unicast Address Format RFC 3596 DNS Extension for IPv6 RFC 3810 MLDv2 for IPv6 RFC 4113 MIB for UDP RFC 4443 ICMPv6 RFC 4541 IGMP & MLD Snooping Switch RFC 5340 OSPFv3 for IPv6
<b>MIBs</b>	RFC 1212 Concise MIB Definitions RFC 1213 MIB II RFC 1493 Bridge MIB RFC 1657 BGP-4 MIB RFC 1724 RIPv2 MIB RFC 1757 Remote Network Monitoring MIB RFC 1850 OSPFv2 MIB RFC 2011 SNMPv2 MIB for IP RFC 2012 SNMPv2 MIB for TCP RFC 2013 SNMPv2 MIB for UDP RFC 2096 IP Forwarding Table RFC 2233 Interface MIB	RFC 2452 IPv6-TCP-MIB RFC 2454 IPv6-UDP-MIB RFC 2465 IPv6 MIB RFC 2466 ICMPv6 MIB RFC 2571 SNMP Framework MIB RFC 2572 SNMP-MPD MIB RFC 2573 SNMP-Target MIB RFC 2574 SNMP USM MIB RFC 2618 RADIUS Authentication Client MIB RFC 2620 RADIUS Accounting Client MIB RFC 2665 Ethernet-Like-MIB	RFC 2674 Definitions of Managed Objects for Bridges with Traffic Classes, Multicast Filtering, and Virtual Extensions RFC 2737 Entity MIB (Version 2) RFC 2787 VRRP MIB RFC 2819 RMON MIB RFC 2863 The Interfaces Group MIB RFC 2925 Ping MIB RFC 3414 SNMP-User based-SM MIB RFC 3415 SNMP-View based-ACM MIB RFC 3621 Power Ethernet MIB RFC 4113 UDP MIB
<b>MPLS</b>	RFC 2961 RSVP Refresh Overhead Reduction Extensions RFC 3031 Multiprotocol Label Switching Architecture	RFC 3032 MPLS Label Stack Encoding RFC 3036 LDP Specification Distribution Protocol (LDP) Signaling	RFC 4762 Virtual Private LAN Service (VPLS) Using Label
<b>Network management</b>	IEEE 802.1AB Link Layer Discovery Protocol (LLDP) IEEE 802.1D (STP) RFC 1157 SNMPv1 RFC 1212 Concise MIB definitions RFC 1215 Convention for defining traps for use with the SNMP RFC 1757 RMON 4 groups: Stats, History, Alarms and Events RFC 1901 SNMPv2 Introduction RFC 1918 Private Internet Address Allocation RFC 2373 Remote Network Monitoring Management Information Base for High Capacity Networks	RFC 2571 An Architecture for Describing SNMP Management Frameworks RFC 2572 Message Processing and Dispatching for the Simple Network Management Protocol (SNMP) RFC 2573 SNMP Applications RFC 2574 SNMPv3 User-based Security Model (USM) RFC 2575 SNMPv3 View-based Access Control Model (VACM) RFC 2576 Coexistence between SNMP versions RFC 2578 SMIv2 RFC 2581 TCP6 RFC 2819 Remote Network Monitoring Management Information Base	RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations RFC 3176 sFlow RFC 3410 Introduction to Version 3 of the Internet-standard Network Management Framework RFC 3413 Simple Network Management Protocol (SNMP) Applications RFC 3414 SNMPv3 User-based Security Model (USM) RFC 3415 SNMPv3 View-based Access Control Model (VACM) ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED) SNMPv1/v2c/v3
<b>OSPF</b>	RFC 1587 OSPF NSSA	RFC 1850 OSPFv2 Management Information Base (MIB), traps	RFC 2328 OSPFv2 RFC 2370 OSPF Opaque LSA Option
<b>QoS/CoS</b>	IEEE 802.1P (CoS) RFC 2474 DSCP DiffServ RFC 2475 DiffServ Architecture	RFC 2597 DiffServ Assured Forwarding (AF) RFC 2598 DiffServ Expedited Forwarding (EF) RFC 2697 A Single Rate Three Color Marker	RFC 2698 A Two Rate Three Color Marker RFC 4594 Configuration Guidelines for DiffServ Service Classes
<b>Security</b>	IEEE 802.1X Port Based Network Access Control RFC 1492 TACACS+ RFC 1918 Address Allocation for Private Internets	RFC 2865 RADIUS Authentication RFC 2866 RADIUS Accounting Access Control Lists (ACLs) RFC 3579 RADIUS Support For Extensible Authentication Protocol (EAP)	MAC Authentication Port Security SSHv2 Secure Shell

## HPE 5500 HI Switch Series accessories

### Modules

HPE 5500 2-port 10GbE XFP Module (JD359B)  
 HPE 5500 2-port 10GbE Local Connect Module (JD360B)  
 HPE 5500 1-port 10GbE XFP Module (JD361B)  
 HPE 5500/4800 2-port GbE SFP Module (JD367A)  
 HPE 5500/5120 2-port 10GbE SFP+ Module (JD368B)  
 HPE 5500 HI 8-port Gig-T Module (JG313A)  
 HPE 5500 HI 8-port SFP Module (JG314A)  
 HPE 5500/5120 2-port 10GBASE-T Module (JG535A)

### Transceivers

HPE X110 100M SFP LC FX Transceiver (JD102B)  
 HPE X110 100M SFP LC LH40 Transceiver (JD090A)  
 HPE X110 100M SFP LC LH80 Transceiver (JD091A)  
 HPE X110 100M SFP LC LX Transceiver (JD120B)  
 HPE X120 1G SFP LC BX 10-D Transceiver (JD099B)  
 HPE X120 1G SFP LC BX 10-U Transceiver (JD098B)  
 HPE X120 1G SFP LC LH40 1550nm Transceiver (JD062A)  
 HPE X120 1G SFP LC LX Transceiver (JD119B)  
 HPE X120 1G SFP LC SX Transceiver (JD118B)  
 HPE X120 1G SFP RJ45 T Transceiver (JD089B)  
 HPE X125 1G SFP LC LH40 1310nm Transceiver (JD061A)  
 HPE X125 1G SFP LC LH70 Transceiver (JD063B)  
 HPE X130 10G SFP+ LC LR Transceiver (JD094B)  
 HPE X130 10G SFP+ LC LRM Transceiver (JD093B)  
 HPE X130 10G SFP+ LC SR Transceiver (JD092B)  
 HPE X130 10G SFP+ LC LH 80km Transceiver (JG915A)  
 HPE X130 10G XFP LC LR Transceiver (JD108B)  
 HPE X130 10G XFP LC SR Transceiver (JD117B)  
 HPE X130 10G XFP LC ZR 1550nm Transceiver (JD107A)  
 HPE X135 10G XFP LC ER Transceiver (JD121A)  
 HPE X240 10G SFP+ SFP+ 7m Direct Attach Copper Cable (JC784C)  
 HPE X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable (JD095C)  
 HPE X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable (JD096C)  
 HPE X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable (JD097C)  
 HPE X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable (JG081C)

### Cables

HPE 0.5 m Multimode OM3 LC/LC Optical Cable (AJ833A)  
 HPE 1 m Multimode OM3 LC/LC Optical Cable (AJ834A)  
 HPE 2 m Multimode OM3 LC/LC Optical Cable (AJ835A)  
 HPE 5 m Multimode OM3 LC/LC Optical Cable (AJ836A)  
 HPE 15 m Multimode OM3 LC/LC Optical Cable (AJ837A)  
 HPE 30 m Multimode OM3 LC/LC Optical Cable (AJ838A)  
 HPE 50 m Multimode OM3 LC/LC Optical Cable (AJ839A)  
 HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable (QK732A)  
 HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable (QK733A)  
 HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable (QK734A)  
 HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable (QK735A)  
 HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable (QK736A)  
 HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable (QK737A)  
 HPE X230 Local Connect 50cm CX4 Cable (JD363B)  
 HPE X230 Local Connect 100cm CX4 Cable (JD364B)  
 HPE X230 CX4 to CX4 3m Cable (JD365A)

### HPE 5500-24G-4SFP HI Switch with 2 Interface Slots (JG311A)

HPE 5800/5500 150W AC Power Supply (JD362A)  
 HPE 5800/5500 150W DC Power Supply (JD366A)

### HPE 5500-48G-4SFP HI Switch with 2 Interface Slots (JG312A)

HPE 5800/5500 150W AC Power Supply (JD362A)  
 HPE 5800/5500 150W DC Power Supply (JD366A)

## HPE 5500 HI Switch Series accessories (continued)

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<b>HPE 5500-24G-PoE+-4SFP HI Switch with 2 Interface Slots (JG541A)</b>	HPE X362 720W 100-240VAC to 56VDC PoE Power Supply (JG544A) HPE X362 1110W 115-240VAC to 56VDC PoE Power Supply (JG545A)
<b>HPE 5500-48G-PoE+-4SFP HI Switch with 2 Interface Slots (JG542A)</b>	HPE X362 720W 100-240VAC to 56VDC PoE Power Supply (JG544A) HPE X362 1110W 115-240VAC to 56VDC PoE Power Supply (JG545A)
<b>HPE 5500-24G-SFP HI Switch with 2 Interface Slots (JG543A)</b>	HPE 5800/5500 150W AC Power Supply (JD362A) HPE 5800/5500 150W DC Power Supply (JD366A)

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4AA3-8995ENW, November 2015, Rev. 9

## DATA SHEET

ARUBA 320 SERIES  
ACCESS POINTS

Bringing a switch-like experience to 802.11ac

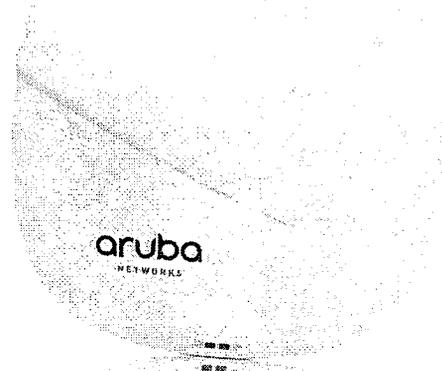
Multifunctional 320 series wireless APs provide the best 802.11ac Wi-Fi connectivity and user experience. Featuring Aruba enhanced ClientMatch and Aruba Beacon technologies, the 320 series enables the highest capacity, performance, and efficiency in extremely high-density environments.

With a maximum concurrent data rate of 1,733 Mbps in the 5 GHz band and 800 Mbps in the 2.4 GHz band (aggregated data rate of 2.5 Gbps), 320 series APs deliver best-in-class next-generation .11ac Wi-Fi infrastructure for the highest density environments.

The high performance and high density 802.11ac 320 series supports multi-user MIMO (MU-MIMO) and 4 spatial streams (4SS). It provides simultaneous multicast data transmission to multiple devices, maximizing data throughput and improving network efficiency.

The 320 series includes the patent-pending enhanced ClientMatch technology that extends the client steering technology with MU-MIMO client awareness. It automatically identifies MU-MIMO capable mobile devices and steers those devices to the closest MU-MIMO capable Aruba access point. By grouping MU-MIMO capable mobile devices together, the network starts taking advantage of the simultaneous transmission to these devices, increasing its overall capacity. These dynamic roaming policies that are based on device types, help customers achieve the best WLAN performance in a mixed device environment during the technology transition period.

The 320 series has an integrated Bluetooth Aruba Beacon that simplifies the remote management of a network of large-scale battery-powered Aruba beacons while also providing advanced location and indoor way finding, and proximity-based push notification capabilities. It enables businesses to leverage mobility context to develop applications that will deliver an enhanced user experience and increase the value of the wireless network for organizations.



## UNIQUE BENEFITS

- Dual radio 4x4 802.11ac access point with multi-user MIMO
  - Supports up to 1,733 Mbps in the 5 GHz band (with 4SS/VHT80 clients) and 800 Mbps in the 2.4 GHz band (with 4SS/VHT40 clients).
- Built-in Bluetooth Low-Energy (BLE) radio
  - Enables location based services with BLE-enabled mobile devices receiving signals from multiple Aruba Beacons at the same time.
  - Simplifies battery-powered Aruba beacon management.
- Advanced Cellular Coexistence (ACC)
  - Minimizes interference from 3G/4G cellular networks, distributed antenna systems, and commercial small cell/femtocell equipment.
- Quality of service for unified communication apps
  - Supports priority handling and policy enforcement for unified communication apps, including Microsoft Skype for Business with encrypted videoconferencing, voice, chat, and desktop sharing.
- RF Management
  - Adaptive Radio Management (ARM) technology automatically assigns channel and power settings, provides airtime fairness, and ensures that APs stay clear of all sources of RF interference to deliver reliable, high-performance WLANs.
  - The Aruba 320 series APs can be configured to provide part-time or dedicated air monitoring for spectrum analysis and wireless intrusion protection, VPN tunnels to extend remote locations to corporate resources, and wireless mesh connections where Ethernet drops are not available.

- Support for additional 5 GHz bands
  - Supports software upgrade to enable additional 5 GHz spectrums when governments expand available frequencies.
- 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.
- Intelligent app visibility and control
  - AppRF technology leverages deep packet inspection to classify and block, prioritize or limit bandwidth for over 1,500 enterprise apps or groups of apps.
- Security
  - Integrated wireless intrusion protection offers threat protection and mitigation, and eliminates the need for separate RF sensors and security appliances.
  - IP reputation and security services identify, classify, and block malicious files, URLs and IPs, providing comprehensive protection against advanced online threats.
  - 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**

Aruba 320 series APs offer a choice of operating modes to meet your unique management and deployment requirements.

- Controller-managed mode – When managed by Aruba Mobility Controllers, Aruba 320 series APs offer centralized configuration, data encryption, policy enforcement, and network services, as well as distributed and centralized traffic forwarding.
- Aruba Instant mode – 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. If WLAN requirements change, a built-in migration path allows 320 series Instant APs to become part of a WLAN that is managed by a Mobility Controller.
- Remote AP (RAP) for branch deployments.
- Air monitor (AM) for wireless IDS, rogue detection, and containment.
- Spectrum analyzer, dedicated or hybrid, for identifying sources of RF interference.
- Secure enterprise mesh.
  - \* Targeted to be available in the first half of 2016 through a software upgrade

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.

#### **AP-320 SERIES SPECIFICATIONS**

- AP-325 and IAP-325
  - 5 GHz (1,733 Mbps max rate) and 2.4 GHz (800 Mbps max rate) radios, each with 4x4 MIMO support and a total of eight integrated omni-directional downtilt antennas.
- AP-324 and IAP-324
  - 5 GHz (1,733 Mbps max rate) and 2.4 GHz (800 Mbps max rate) radios, each with 4x4 MIMO support and a total of four combined, diplexed (dual-band) external RP-SMA antenna connectors.

#### **WI-FI RADIO SPECIFICATIONS**

- AP type: Indoor, dual radio, 5 GHz 802.11ac and 2.4 GHz 802.11n 4x4 MIMO.
- Software-configurable dual radio supports 5 GHz (Radio 0) and 2.4 GHz (Radio 1).
- Four spatial stream SU-MIMO for up to 1,733 Mbps wireless data rate to a single client device.
- Three spatial stream MU-MIMO for up to 1,300 Mbps wireless data rate to up to three MU-MIMO capable client devices simultaneously.
- Support for up to 255 associated client devices per radio, and up to 16 BSSIDs per radio.
- Supported frequency bands (country-specific restrictions apply):
  - 2.400 to 2.4835 GHz
  - 5.150 to 5.250 GHz
  - 5.250 to 5.350 GHz
  - 5.470 to 5.725 GHz
  - 5.725 to 5.850 GHz
- Available channels: Dependent on 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)

- Supported modulation types:
  - 802.11b: BPSK, QPSK, CCK
  - 802.11a/g/n/ac: 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: +24 dBm (18 dBm per chain)
  - 5 GHz band: +24 dBm (18 dBm per chain)
  - Note: conducted transmit power levels exclude antenna gain. For total (EIRP) transmit power, add antenna gain
- Advanced Cellular Coexistence (ACC) minimizes interference from cellular networks.
- Maximum ratio combining (MRC) for improved receiver performance.
- Cyclic delay/shift diversity (CDD/CSD) 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 beamforming (TxBF) for increased signal reliability and range.
- 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 1,733 (MCS0 to MCS9, NSS = 1 to 4)
- 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

#### WI-FI ANTENNAS

- AP-324/IAP-324: Four RP-SMA connectors for external dual band antennas. Internal loss between radio interface and external antenna connectors (due to diplexing circuitry): 2.5 dB in 2.4 GHz and 1.5 dB in 5 GHz.
- AP-325/IAP-325: Eight integrated downtilt omnidirectional antennas for 4x4 MIMO with maximum antenna gain of 3.5 dBi in 2.4 GHz and 5.0 dBi in 5 GHz. Built-in antennas are optimized for horizontal ceiling-mounted orientation of the AP. The downtilt angle for maximum gain is ~ 30 degrees.

#### OTHER INTERFACES

- Two 10/100/1000BASE-T Ethernet network interfaces (RJ-45)
  - Auto-sensing link speed and MDI/MDX
  - Link Aggregation support to achieve platform throughput up to 2 Gbps
  - 802.3az Energy Efficient Ethernet (EEE)
  - PoE-PD: 48 Vdc (nominal) 802.3af or 802.3at PoE
- DC power interface, accepts 2.1/5.5-mm center-positive circular plug with 9.5-mm length
- USB 2.0 host interface (Type A connector)
- Bluetooth Low Energy (BLE) radio
  - Up to 4dBm transmit power (class 2) and -94dBm receive sensitivity
  - Integrated antenna, -5dBi gain (30 degrees downtilt)
  - Can be disabled with configuration
- Visual indicators (tri-color LEDs): For system and radio status
- Reset button: Factory reset (during device power up)
- Serial console interface (RJ-45)
- Kensington security slot

#### POWER

- Maximum (worst-case) power consumption: 20W (802.3at PoE), 13.5W (802.3af PoE) or 18.5W (DC)
  - Excludes power consumed by external USB device (and internal overhead); this could add up to 6W (POE) or 5.5W (DC) for 5W/1A USB device
- Maximum (worst-case) power consumption in idle mode: 8W (PoE) or 7W (DC)
- Direct DC source: 12 Vdc nominal, +/- 5%
- Power over Ethernet (PoE): 48 Vdc (nominal) 802.3af/802.3at compliant source
  - Unrestricted functionality with 802.3at PoE
  - Power-save mode with reduced functionality from 802.3af PoE
    - > USB port disabled
    - > Second Ethernet port disabled
    - > 2.4 GHz radio in 1x1:1 mode
- Power sources sold separately
- When both power sources are available, DC power takes priority

#### MOUNTING

- The AP ships with two (white) mounting clips to attach to a 9/16-inch or 15/16-inch flat T-bar drop-tile ceiling.
- Several optional mount kits are available to attach the AP to a variety of surfaces; see the Ordering Information section for details.

### MECHANICAL

- Dimensions/weight (unit, excluding mount accessories):
  - 203mm (W) x 203mm (D) x 57mm (H)  
8.0" (W) x 8.0" (D) x 2.2" (H)
  - 950g/34 oz
- Dimensions/weight (shipping):
  - 315mm(W) x 265mm(D) x 100mm (H)  
12.4" (W) x 10.4" (D) x 3.9" (H)
  - 1,350g/48 oz

### ENVIRONMENTAL

- Operating:
  - Temperature: 0° C to +50° C (+32° F to +122° F)
  - Humidity: 5% to 95% non-condensing
- Storage and transportation:
  - Temperature: -40° C to +70° C (-40° F to +158° F)

### 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.

### RELIABILITY

MTBF: 739,935 hrs (84.5yrs) at +25C operating temperature (AP-325)

### REGULATORY MODEL NUMBERS

- AP-324 and IAP-324: APIN0324
- AP-325 and IAP-325: APIN0325

### CERTIFICATIONS

- CB Scheme Safety, cTUVus
- UL2043 plenum rating
- Wi-Fi Alliance (WFA) certified 802.11a/b/g/n/ac
- Bluetooth SIG interoperability certification

### WARRANTY

- Aruba limited lifetime warranty

### MINIMUM OPERATING SYSTEM SOFTWARE VERSIONS

- ArubaOS 6.4.4.0
- Aruba InstantOS 4.2.2.0

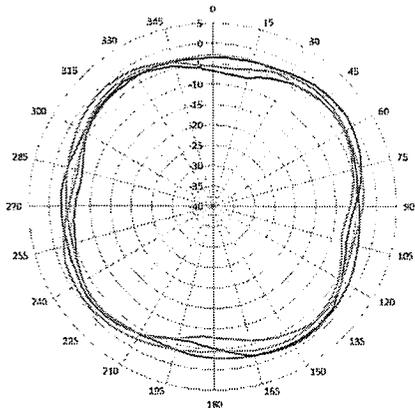
**RF PERFORMANCE TABLE**

	Maximum transmit power (dBm) per transmit chain	Receiver sensitivity (dBm) per receive chain
<b>802.11b 2.4 GHz</b>		
1 Mbps	18.0	-97.0
11 Mbps	18.0	-89.0
<b>802.11g 2.4 GHz</b>		
6 Mbps	18.0	-93.0
54 Mbps	18.0	-75.0
<b>802.11n HT20 2.4 GHz</b>		
MCS0/8/16	18.0	-92.0
MCS7/15/23	16.0	-72.0
<b>802.11n HT40 2.4 GHz</b>		
MCS0/8/16	18.0	-90.0
MCS7/15/23	16.0	-70.0
<b>802.11a 5 GHz</b>		
6 Mbps	18.0	-93.0
54 Mbps	16.5	-75.0
<b>802.11n HT20 5 GHz</b>		
MCS0/8/16	18.0	-92.0
MCS7/15/23	16.0	-72.0
<b>802.11n HT40 5 GHz</b>		
MCS0/8/16	18.0	-89.0
MCS7/15/23	16.0	-69.0
<b>802.11ac VHT20 5 GHz</b>		
MCS0	18.0	-92.0
MCS9	14.0	-65.0
<b>802.11ac VHT40 5 GHz</b>		
MCS0	18.0	-89.0
MCS9	14.0	-62.0
<b>802.11ac VHT80 5 GHz</b>		
MCS0	18.0	-86.0
MCS9	14.0	-59.0

Maximum capability of the hardware provided (excluding antenna gain). Maximum transmit power is limited by local regulatory settings.

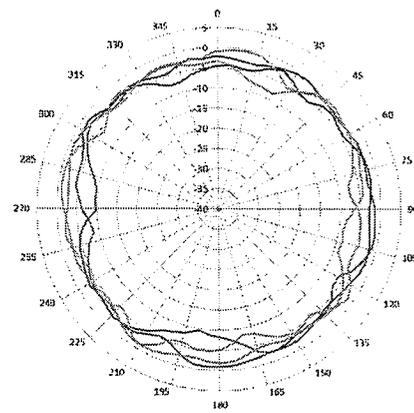
AP-320 ANTENNA PATTERN PLOTS

Horizontal or Azimuth plane (top view), 0 degrees downtilt



2.450 GHz

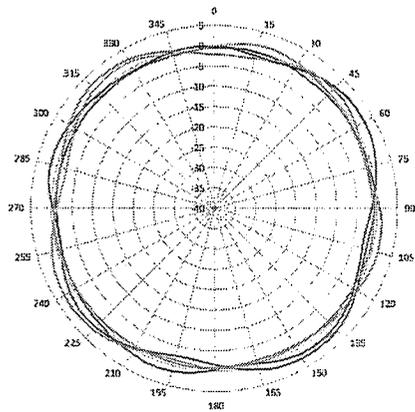
— 2.450.1  
— 2.450.2  
— 2.450.3  
— 2.450.4



5.470 GHz

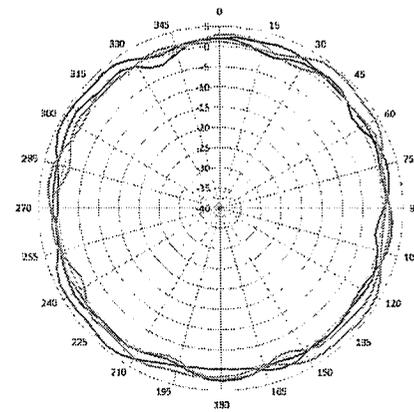
— 5.470.A  
— 5.470.B  
— 5.470.C  
— 5.470.D

Horizontal or Azimuth plane (top view), 30 degrees downtilt



2.450 GHz

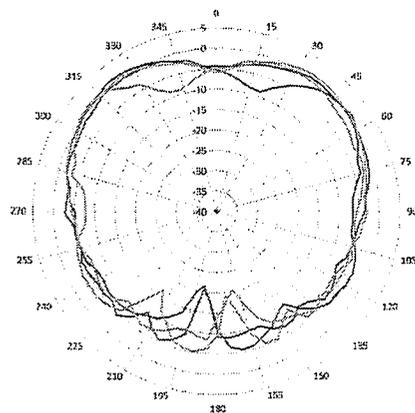
— 2.450.1  
— 2.450.2  
— 2.450.3  
— 2.450.4



5.470 GHz

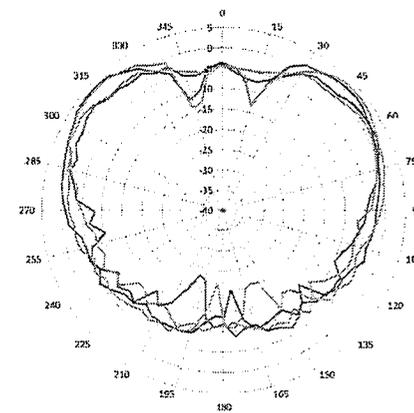
— 5.470.A  
— 5.470.B  
— 5.470.C  
— 5.470.D

Elevation plane (side view), 0 degrees angle



2.450 GHz

— 2.450.1  
— 2.450.2  
— 2.450.3  
— 2.450.4

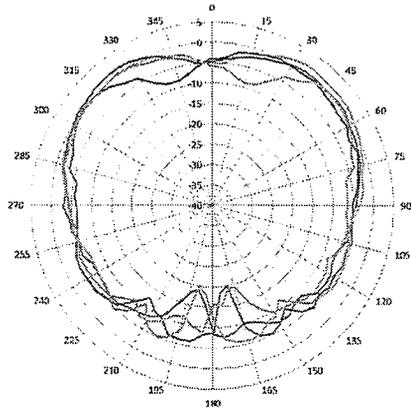


5.470 GHz

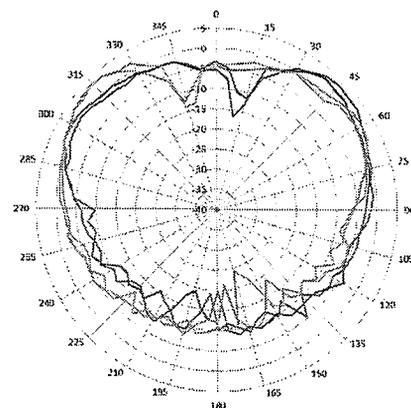
— 5.470.A  
— 5.470.B  
— 5.470.C  
— 5.470.D

AP-320 ANTENNA PATTERN PLOTS

Elevation plane (side view, 90 degrees angle)



2.450 GHz



5.470 GHz

ORDERING INFORMATION

Part Number	Description
<b>AP-320 Series Access Points</b>	
AP-324	Aruba AP-324 Wireless Access Point, 802.11n/ac, 4x4 MU-MIMO, dual radio, antenna connectors
AP-324-F1	Aruba AP-324 Wireless Access Point, 802.11n/ac, 4x4 MU-MIMO, dual radio, antenna connectors. FIPS/TAA compatible version.
IAP-324-RW	Aruba Instant IAP-324 Wireless Access Point, 802.11n/ac, 4x4 MU-MIMO, dual radio, antenna connectors – Restricted regulatory domain: Rest of World
IAP-324-US	Aruba Instant IAP-324 Wireless Access Point, 802.11n/ac, 4x4 MU-MIMO, dual radio, antenna connectors – Restricted regulatory domain: United States
IAP-324-JP	Aruba Instant IAP-324 Wireless Access Point, 802.11n/ac, 4x4 MU-MIMO, dual radio, antenna connectors – Restricted regulatory domain: Japan
IAP-324-IL	Aruba Instant IAP-324 Wireless Access Point, 802.11n/ac, 4x4 MU-MIMO, dual radio, antenna connectors – Restricted regulatory domain: Israel
AP-325	Aruba AP-325 Wireless Access Point, 802.11n/ac, 4x4 MU-MIMO, dual radio, integrated antennas
AP-325-F1	Aruba AP-325 Wireless Access Point, 802.11n/ac, 4x4 MU-MIMO, dual radio, integrated antennas. FIPS/TAA compatible version.
IAP-325-RW	Aruba Instant IAP-325 Wireless Access Point, 802.11n/ac, 4x4 MU-MIMO, dual radio, integrated antennas – Restricted regulatory domain: Rest of World
IAP-325-US	Aruba Instant IAP-325 Wireless Access Point, 802.11n/ac, 4x4 MU-MIMO, dual radio, integrated antennas – Restricted regulatory domain: United States
IAP-325-JP	Aruba Instant IAP-325 Wireless Access Point, 802.11n/ac, 4x4 MU-MIMO, dual radio, integrated antennas – Restricted regulatory domain: Japan
IAP-325-IL	Aruba Instant IAP-325 Wireless Access Point, 802.11n/ac, 4x4 MU-MIMO, dual radio, integrated antennas – Restricted regulatory domain: Israel

**ORDERING INFORMATION**

Part Number	Description
<b>Mounting Accessories</b>	
AP-220-MNT-C1	Spare Aruba Access Point Mount Kit (ceiling grid). Contains 2x ceiling grid rail adapters (for flat rails). Color: black. Spare.
AP-220-MNT-C2	Aruba Access Point Mount Kit (ceiling grid). Contains 2x ceiling grid rail adapters (for Interlude and silhouette style rails). Color: black
AP-220-MNT-W1	Aruba Access Point Mount Kit (basic, flat surface). Contains 1x flat surface wall/ceiling mount bracket. Color: black
AP-220-MNT-W1W	Aruba Access Point Mount Kit (basic, flat surface). Contains 1x flat surface wall/ceiling mount bracket. Color: white
AP-220-MNT-W2	Aruba Access Point Mount Kit (secure, flat surface). Contains 1x flat surface wall/ceiling mount cradle. Color: black
AP-220-MNT-W2W	Aruba Access Point Mount Kit (secure, flat surface). Contains 1x flat surface wall/ceiling mount cradle. Color: white
AP-320-MNT-T	Aruba 320 Series Access Points ceiling tile mount kit
<b>Other Accessories</b>	
AP-325-CVR-20	Kit of 20 snap-on covers for AP-325. Non-glossy, with holes for LED indicators. Color: white
AP-AC-12V30UN	12V/30W Indoor Access Point AC power adapter. Universal, ships with 8 country-specific plug inserts (US, EU, UK, Australia, China, Korea, Argentina, Brazil), covering all Aruba core countries
PD-9001GR-AC	30W 802.3at PoE midspan injector, 10/100/1000BASE-T Ethernet
Antennas	See info on the Aruba website for antenna part numbers



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Enterprise company

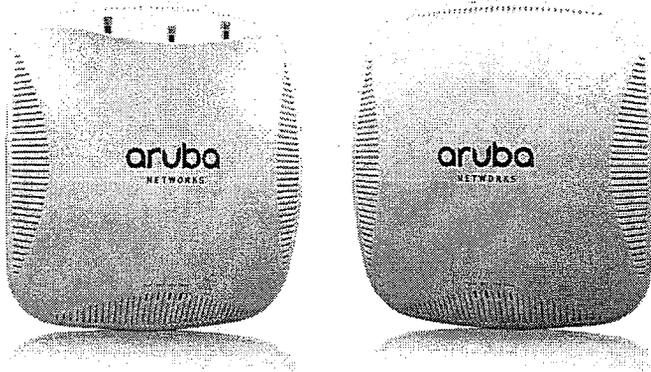
[www.arubanetworks.com](http://www.arubanetworks.com)

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DS\_AP320Series\_121115

## SOLUTION OVERVIEW

# ARUBA INSTANT WI-FI – POWERFUL, SIMPLE, AFFORDABLE.



The undisputable need for users to be productive on their mobile devices is driving organizations everywhere to look for ways to cost-effectively build and support Wi-Fi networks that deliver the best connectivity and user experience.

Controllerless Wi-Fi solutions are simple and affordable. They eliminate the need for additional controller hardware by distributing controller functionality such as authentication and configuration to the access points (AP).

However, not all controllerless solutions are equal. Some solutions may have some serious limitations if speed and reliability associated with business-grade networks are sacrificed in favor of simplicity. The result can be Wi-Fi disruptions, poor performance, and unhappy users.

### BUSINESS-GRADE WI-FI IN AN INSTANT

Aruba Instant is the only controllerless Wi-Fi solution that delivers superior Wi-Fi performance, business-grade security, resiliency and flexibility with the simplicity of zero-touch deployment. Aruba Instant is simple to setup and does not require network expertise to deploy and manage.

One dynamically-elected Instant AP automatically distributes the network configuration to other Instant APs in the network. Simply power-up one Instant AP, configure it over the air or in the cloud, and plug in the other APs – the entire process takes about five minutes.

## SOLUTION BENEFITS

### Fastest network

- Up to 10-times faster than competition at high density.
- Wi-Fi setup in minutes.
- Airtime fairness allows more clients to move faster on the network.
- Always-on scanning avoids performance-slowing interference.
- Aruba Instant APs optimize Wi-Fi channel use and power to speed-up clients.

### Most resilient network

- 100% functional WLAN without a WAN link.
- Integrated spectrum management without compromise to identify and self-heal around Wi-Fi and non-Wi-Fi interference.
- Redundant ISP uplink and 3G/4G uplink option.

### Most flexible architecture

- Single architecture across headquarters, branch and home.
- Local, cloud and on-premises management options.
- AppRF technology performs deep packet inspection and web content filtering.
- Internal RADIUS server on Aruba Instant AP, plus flexible external AAA options.
- 100% investment protection to convert to controller-managed APs.

The free local management interface, unique to Aruba Instant APs, eliminates dependency or required investment in external network management systems. Instant is a turnkey business-grade Wi-Fi solution that works right out of the box.

Even guest access to your network can be secure and uncomplicated for you and all your visitors. Simply create a guest network (SSID) and determine who gets access, how and what they have access to.

Use the simple built-in captive portal or a customizable externally hosted portal for guests to easily login. And secure the network by authenticating users with built-in guest accounts or integrate with external authentication servers.

## **ENHANCE USER EXPERIENCE AND PRODUCTIVITY**

Aruba Instant's business-grade network performance delivers speeds up to 10-times faster than other solutions in environments with high densities of devices.

The Aruba InstantOS comes with integrated Adaptive Radio Management (ARM) technology, which optimizes Wi-Fi behavior and automatically ensures that the Instant APs stay clear of RF interference, resulting in a more reliable, higher-performing wireless network.

It also integrates patented ClientMatch technology, which continuously gathers session performance metrics from mobile devices. These metrics are then used to intelligently steer individual clients to the best AP with the strongest Wi-Fi signal as users move.

The Aruba 802.11ac Wave 2 Instant APs deliver enhanced multi-user MIMO (MU-MIMO) enhanced ClientMatch. By grouping MU-MIMO capable devices on the same stream, the network can take advantage of the simultaneous transmissions to these devices, increasing its overall network capacity and efficiency. These Wave 2 Instant APs also have an integrated BLE Beacon to remotely manage battery-powered Aruba Beacons for advanced location and wayfinding applications.

## **SECURE AND OPTIMIZE YOUR NETWORK WITH SMART APPLICATION HANDLING**

AppRF technology in Aruba Instant intelligently monitors application usage and web traffic to secure and optimize network performance.

Deep packet inspection (DPI) monitors mobile app usage and performance while optimizing bandwidth, priority and network paths in real time – even for apps that are encrypted or appear as web traffic. DPI is vital to understanding usage patterns that may require changes to network design and capacity.

AppRF provides insight into over 1,800 apps, including apps like GoToMeeting, Box, Lync, SharePoint, and Salesforce.com.

AppRF technology also provides web content filtering, enabling IT to control what users can browse on the Internet. AppRF redirects web URL requests to a cloud database that contains always-up-to-date content and reputation information about millions of web pages.

This information can be used to determine what types of web browsing and web apps are allowed on the network for different users or different times of day. You can even combine rules that allow Facebook traffic but block other social media or permit Netflix traffic only after business hours.

The AppRF cloud database is updated in real-time with new information about malicious web addresses. Aruba AppRF will catch new types of web attacks before they cause damage. Clients can be configured to use the AppRF web content filter even when they're not connected to an Aruba Instant network, which keeps clients safe no matter where they are.

Whether users are local or remote, AppRF web content filtering is instrumental in protecting the network against viruses and malware and gives IT precise control over which web sites users can access.

## **AVOID BUSINESS DISRUPTIONS DUE TO WI-FI FAILURE**

Aruba Instant is a resilient network with advanced business-grade features that keep networks up and running, even if an Internet connection fails. Key capabilities include:

- Network survivability to the last AP. The controller function of an individual Instant network transitions seamlessly from one AP to the next to the last AP with no disruption or administrator intervention.
- Dual Ethernet uplinks leverage already-strong uplink resiliency options. Internet connections from two different ISPs can now plug into one Instant AP. This feature gives you the best-possible Internet availability.
- Supports a variety of 3G/4G USB modems that slot into Aruba APs. Now you have the fastest available cellular uplink, either as a primary connection in hard-to-wire areas or as a backup for mission-critical applications.
- Flexible image upgrade features let you download firmware now and reboot later during off hours. This lets you leave the office on time and upgrade when no one is using the network.
- Spectrum load-balancing evens out the client load across channels in a dense deployment. Everyone gets faster access through more efficient use of the available wireless spectrum.

## CHOOSE A NETWORK MANAGEMENT OPTION RIGHT FOR YOUR BUSINESS

Manage your Instant network locally, in the cloud or on premises. Instant access points include a free management interface that provides visibility into the network. All capabilities required to manage a single Instant network are available on the local interface.

Additionally, organizations also have a choice of acquiring the Aruba Central services platform, for network management hosted in the cloud or Aruba AirWave for an on-premises management system.

Aruba Central simplifies network operations by providing zero-touch setup, centralized management of multiple Aruba Instant networks and Mobility Access Switches, historical data reporting, PCI compliance monitoring, and troubleshooting for networks located around town or around the world.

Aruba AirWave is a powerful network management system that not only manages Aruba APs and switches, but also wired and wireless infrastructures from a wide range of third-party manufacturers.

## MAKE A SMART INVESTMENT IN A COST-EFFECTIVE SOLUTION

Aruba Instant is one of the most cost-effective business-grade Wi-Fi solutions available to day.

### Low capex

With Aruba Instant, you get enterprise-grade features and controller functions embedded in the AP. We eliminate the hardware and maintenance expense of a separate controller, but keep all the performance and reliability advantages.

### Low opex

Aruba Instant Wi-Fi integrates everything into the AP – controller functions, security, ARM RF management, ClientMatch performance optimization, and AppRF to improve the use of bandwidth, priority and network paths. It's so easy to setup and manage that you won't need a dedicated wireless expert.

### Investment protection

Only Aruba, a Hewlett Packard Enterprise company offers controllerless and controller-managed Wi-Fi with public cloud, private cloud and on-premises management. You can even mix and match between them. You're not locked into one architecture, so when your needs change, you keep 100% of your investment.

No hardware changes. All Aruba Instant APs can utilize VPNs to access centralized resources like guest access or authentication services from corporate headquarters.

At any time, Aruba Instant APs can easily convert to controller-managed mode, enabling you to mix and match the right solution for the right location – headquarters, branch or home. No matter what you decide, your existing AP investments are fully protected.

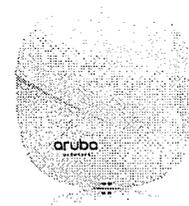
The Aruba Instant product family consists of a wide range of APs with a variety of wireless, wired and WAN connectivity options.

## INDOOR WI-FI

### Instant 324/325

Bringing a switch-like experience to 802.11ac

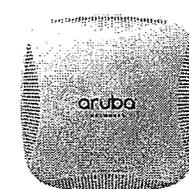
- Top performance and efficiency in high density client environments
- 4x4 MIMO, four spatial streams, up to 1,733 Mbps
- Multi-user MIMO
- 2.4- and 5GHz radios
- Built-in Bluetooth Low Energy (BLE) radio
- Internal and external antenna options
- Mount on ceiling or wall



### Instant 224/225

The ultimate in 802.11ac Wi-Fi performance

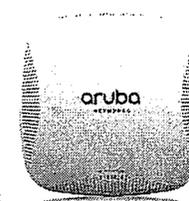
- For extremely high-density client environments
- 3x3 MIMO, three spatial streams, up to 1.3 Gbps
- 2.4- and 5-GHz radios
- Internal and external antenna options
- Mounts on ceiling or wall



### Instant 214/215

Most popular 802.11ac AP

- For medium-density Wi-Fi environments
- 3x3 MIMO, three spatial streams, up to 1.3 Gbps
- 2.4- and 5-GHz radios
- Internal and external antenna options
- Mounts on ceiling or wall



### Instant 204/205

Most affordable 802.11ac AP

- Top performance in medium-density environments
- 2x2 MIMO, two spatial streams, up to 867 Mbps
- 2.4- and 5-GHz radios
- Internal and external antenna options
- Mounts on ceiling or wall



### Instant 155

Fastest performance, highest density wired and wireless

- 2.4- and 5-GHz radios
- 3x3 MIMO, three spatial streams, up to 450 Mbps, 100 Mbps encrypted throughput
- Four ports to connect wired devices (optional power-over-Ethernet on two ports)
- Optional 3G/4G WAN connection
- Sits on your desk



### Instant 228

Ruggedized 802.11ac AP for indoor deployments

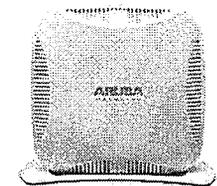
- 3x3 MIMO, three spatial streams, up to 1.3 Mbps
- 2.4- and 5-GHz radios
- Six connectors for external antennas
- Mounts on ceiling or wall



### Instant 108/109

High-performance, high-density wired and wireless

- 2.4- and 5-GHz radios
- 2x2 MIMO, up to 300 Mbps
- One port to connect wired devices
- Optional 3G/4G WAN connection
- Sits on your desk



### Instant 103

Most affordable 802.11n AP

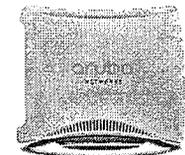
- For low-density Wi-Fi environments
- 2x2 MIMO, two spatial streams, up to 300 Mbps
- 2.4- and 5-GHz radios
- Two internal antennas per radio
- Mounts on ceiling or wall



### Instant 3

Most compact and affordable wired and wireless

- One 2.4-GHz radio
- 2x2 MIMO, up to 300 Mbps
- Two ports to connect wired devices
- Optional 3G/4G WAN connection
- Sits on your desk



## INDOOR WI-FI - DESKTOP

### Instant 205H

High performance 802.11ac AP for hospitality and branch deployments

- 2x2 MIMO, two spatial streams, up to 867 Mbps
- 2.4- and 5-GHz radios
- Four integrated semi-directional antennas
- Three ports to connect wired devices
- Optional 3G/4G WAN connection
- Sits on your desk or mounts on wall-box

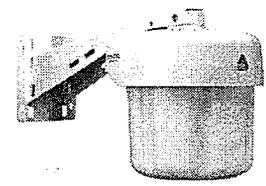


## OUTDOOR WI-FI

### Instant 274/275/277

Ruggedized Gigabit Wi-Fi for outdoor environments

- 2.4- and 5-GHz radios
- 3x3 MIMO, three spatial streams, up to 1.3 Gbps
- Internal and external antenna options
- Mounts on a pole or building



**Aruba has conducted exhaustive performance tests between the Instant APs and other controllerless solutions, with the following results:**

- 10-times faster smartphone connections when measuring TCP downstream aggregate throughput (Mbps) for 20 smartphones (iPhones 1x1:1) in the 2.4-GHz band.
- 69% faster laptop connections when measuring TCP bidirectional aggregate throughput (Mbps) for 20 laptops (3x3:3) in the 5-GHz band.
- Two-times more HD video clients when measuring multicast HD video at scale (5 Mbps video stream to see max laptops on the network before the video becomes unwatchable).



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# AIRWAVE™

Comprehensive management for wireless, wired and remote networks

AirWave is a powerful and easy-to-use network operations system that manages Aruba wireless, wired and remote access networks, as well as wired and wireless infrastructures from a wide range of third-party manufacturers.

Offering unprecedented clarity and centralized control to effectively manage global enterprise infrastructures, AirWave lets service desk personnel triage connectivity issues so that IT engineers can focus on proactively optimizing network performance.

Through a centralized and intuitive user interface, AirWave provides real-time monitoring, proactive alerts, historical reporting, and fast, efficient troubleshooting. It also offers various dashboard views for quickly diagnosing potential problems and to better manage RF coverage, strengthen wireless security and demonstrate regulatory compliance.

AirWave VisualRF™ location and mapping offers network-wide views of the entire RF environment. Maps of Wi-Fi coverage and the underlying wired topology show a clear and accurate picture of who is on the network, their location and how the network is performing. Additionally, AirWave offers overlays on client health to diagnose issues specific to a client, a floor plan or specific location.

The AirWave RAPIDS™ rogue detection works with the RFPProtect™ wireless intrusion protection software module available in ArubaOS™ to collect rogue AP, rogue client and wireless intrusion events as well as mitigate rogue activity across wired and wireless infrastructures.

The wireless data collected by RAPIDS is correlated with wired network data to identify the most significant and relevant threats, while greatly reducing false-positives and strengthening network security.

Available as software or a combined hardware and software appliance, AirWave reduces cost and complexity, improves service quality, and enables IT to make intelligent, well-informed decisions about network design.

## EASY-TO-USE WEB INTERFACE

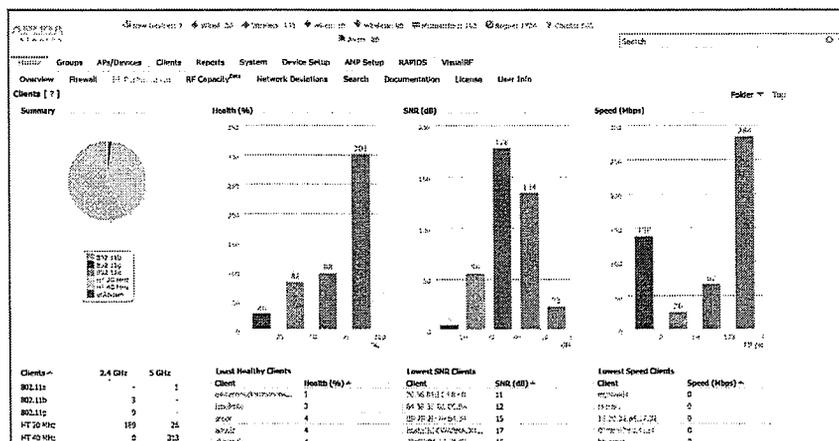
- Role-based access, viewing rights and administrative privileges tailored to job responsibilities.
- Custom graphs of key information allow for pan and zoom for visibility into specific periods of time.
- Identify and search for users by user name.
- Client overview summarizes the types of clients attached to the network and provides visibility into watched or VIP clients.
- Multiple dashboard views provide visibility into every aspect of the wireless network.

## DEVICE DISCOVERY

- Automatically discovers WLAN infrastructure devices.
- Operates in any network environment, including large distributed networks with multiple locations.

## TROUBLESHOOTING AND DIAGNOSTICS

- Collects and displays client device data from ArubaOS, Aruba Instant, Aruba ClearPass Policy Manager, and SOTI MobiControl, including device type, operating system, operating system details, manufacturer and model.
- Searching for clients by user name or MAC address provides a diagnostic view of device and network statistics along with indicators to evaluate overall health and performance.
- Overlay the client health on a floor plan to diagnose issues specific to the client or to an area on a floor plan.
- Advanced RF troubleshooting to easily diagnose RF issues in the network.



AirWave delivers identity-based monitoring and comprehensive management to multivendor wireless, wired and remote enterprise networks.

**ARUBA**  
networks

## REAL-TIME MONITORING AND VISIBILITY

- Automatically tracks every user and device – wireless and remote – on the network.
- Visibility into the wired infrastructure that connects wireless controllers and APs.
- Visibility into clients associated to network including location, SNR, connection speed and more
- Logs and displays radio and RADIUS errors, including noise floor and channel utilization information, frequent causes of connectivity problems.
- Provides rapid drill-down from network-wide to device-level monitoring views.
- Dashboards to track RF performance, capacity and application-level statistics as well as network deviations over a 40-week period.

## ROOT CAUSE ANALYSIS AND EVENT CORRELATION

- Maps upstream relationships between APs, controllers and switches to identify the root cause of downtime and performance problems.
- Correlates performance and downtime issues to send only a single alert in the event of an upstream device failure.

## AUTOMATED CONFIGURATION MANAGEMENT

- Automatically configures APs, controllers, Aruba Instant, and Aruba Mobility Access Switches.
- Configuration policies are defined through a web user interface or by importing a known-good configuration from an existing device.
- Enhanced configuration for the Aruba Instant family to provision large number of branch locations with ease. With tools like adding notes and overrides, support for multi-edit and context sensitive help it makes it very easy to manage configurations on multiple remote locations.
- Efficient remote software distribution eliminates time-consuming and error-prone manual updates.
- Support for advanced image upgrade features like enforcing a certified version of firmware by group, splitting up image download and reboot processes.
- Archives device configurations for auditing and version control.
- Maintains detailed audit logs of changes made by all AirWave operators.

## BETTER NETWORK PLANNING AND PROVISIONING

- VisualRF and the offline VisualRF Plan tool allow quick planning of RF and wired coverage for new sites.

## MANAGE THE LATEST TECHNOLOGIES, ARCHITECTURES AND PRODUCTS

- A single management interface for multiple generations of devices.
- Supports autonomous, controller-managed and mesh APs, including outdoor Aruba AirMesh.
- Monitors Aruba Mobility Access Switches and other edge devices using standard MIB data.
- Generates reports on wired port utilization for capacity planning.
- Supports latest ArubaOS management capabilities.
- Supports WLAN products from leading vendors like Cisco, Motorola and Hewlett-Packard.
- Supports the latest Aruba WLAN products including 7200 series Mobility Controllers and AP-220 series 802.11ac access points.

## OPEN ARCHITECTURE

- XML API enables cost-effective integration of valuable location data with other applications.
- Any data that is visible in AirWave is accessible via the XML API.

## PLATFORM DATA

- Centralized network operations center requires no local agents.
- Runs on standard PC hardware/standard Linux operating system.
- Device communication through SSH, Telnet, SNMP v1/v2c/v3, HTTPS.
- Supports up to 100,000+ managed devices.

## VISUALRF FEATURES

### Real-Time Visualization

- Voice overlay displays coverage for voice handsets, including a radio count heat map.
- Displays Aruba Mobility Access Switches and other wiring closet devices for a comprehensive view of the network edge.
- Simulate failure feature enables analysis of what-if scenarios for proactive RF coverage planning.

### Effective Site Planning for Precise Deployment

- Determines the right quantity and placement of APs, controllers, Aruba Mobility Access Switches and other edge devices based on RF coverage goals.
- Incorporates Aruba Mobility Access Switches, other wiring closet devices and outdoor Aruba AirMesh products into the network design.
- Automatically generates bill of material reports.

### Standalone VisualRF Plan Tool

- Runs on Windows laptops and workstations.
- Uses the same RF planning and visualization algorithms as the integrated VisualRF module.
- Export offline plans to the integrated VisualRF module and export plans from the integrated VisualRF module to the standalone VisualRF tool.

### Integrated Location Tracking and RF Visualization

- Quickly locate users and wireless devices for troubleshooting, planning and asset tracking.
- Playback location history of individual users over the past day to aid in troubleshooting and recovery of lost devices.
- Last known location of each tracked device is stored indefinitely to find lost and stolen devices.

## RAPIDS FEATURES

### Rapids Highlights

- Flexible rules-based determination of what a rogue AP means to the existing environment.
- Correlates data gathered from wired and wireless infrastructures to reduce false positives.
- Central management console for RFPProtect software module monitors intrusion detection and prevention activity, while identifying and neutralizing rogue APs.
- Utilizes location data from VisualRF.
- Compliance reporting, including the payment card industry (PCI) data security standard.

### Rogue Device And Client Visualization

- Integrates with VisualRF to display the location of each rogue device and client on a building floor plan.

### Intrusion Detection System Events

- Aggregates, correlates, alerts and logs wireless attacks that are detected and reported on the network, providing a comprehensive picture of infrastructure security.

### Strong Enterprise-Grade Security

- View locations of rogue APs discovered by AirWave RAPIDS for faster investigation and threat removal.
- Plan the precise locations to deploy dedicated Wi-Fi sensors, such as Aruba air monitors, to ensure complete coverage.
- Compares wired and wireless scanning results to eliminate duplicates and refine threat assessment.

### Rules-Based Threat Classification

- Classify potential threats based on customized rules that define the characteristics of rogue devices.
- Reduce false-positives and enable the network security staff to focus on the most significant threats.

### Automated Alerts and Reports

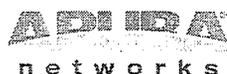
- Predefined, customizable reports address common security, compliance and client needs, such as rogue device tracking, PCI compliance, and client session reporting.
- Supports syslog and SNMP traps from other networked devices, allowing administrators to search for these devices, set triggers to alert on device issues, and use device context for additional troubleshooting.
- Reports exportable in PDF, HTML and CSV formats.

### Automatic and Manual Containment

- Manual and automated rogue AP containment with Aruba and Cisco controllers.
- Customize and define rules-based classification to determine when to automatically contain devices.
- Coordinate with the ArubaOS RFPProtect software to notify administrators which switch ports have rogue APs attached to them.

## ORDERING INFORMATION

Part Number	Description
AW-25	AirWave software to manage up to 25 devices (including controllers, APs, Aruba Mobility Access Switches and third-party switches)
AW-50	AirWave software to manage up to 50 devices
AW-100	AirWave software to manage up to 100 devices
AW-200	AirWave software to manage up to 200 devices
AW-500	AirWave software to manage up to 500 devices
AW-1000	AirWave software to manage up to 1,000 devices
AW-2500	AirWave software to manage up to 2,500 devices
AW-EXP1-50	AirWave expansion license for one additional AP/device for systems with 50 or greater existing device licenses
AW-EXP1-2500	AirWave expansion license for one additional AP/device for systems with 2,500 or greater existing device licenses
AW-MASTER	AirWave software license to manage multiple AirWave servers from a single console
AW-25-FR	AirWave failover software license for 25 devices
AW-50-FR	AirWave failover software license for 50 devices
AW-100-FR	AirWave failover software license for 100 devices
AW-200-FR	AirWave failover software license for 200 devices
AW-500-FR	AirWave failover software license for 500 devices
AW-1000-FR	AirWave failover software license for 1,000 devices
AW-2500-FR	AirWave failover software license for 2,500 devices
AW-EXF1-50	AirWave failover expansion license for one additional AP/device for systems with 50 or greater existing device licenses
AW-EXF1-2500	AirWave failover expansion license for one additional AP/device for systems with 2,500 or greater existing device licenses



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