

User's Guide

XS

**Wireless
LAN Array**

3900

3700

3500

March 17th, 2006

XIRRUS

Wireless LAN Array

XS-3900, XS-3700, XS-3500

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Part Number: 800-0006-001
(Revision E)



Trademarks

XIRRUS is a trademark of Xirrus, Inc. All other trademarks and brand names are marks of their respective holders.

Notices

FCC Notice

This device complies with Part 15 of the FCC Rules, with operation subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause unwanted operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate RF energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following safety measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Consult the dealer or an experienced wireless technician for help.

Use of a shielded twisted pair (STP) cable must be used for all Ethernet connections in order to comply with EMC requirements.

RF Radiation Hazard Warning

To ensure compliance with FCC RF exposure requirements, this device must be installed in a location where the antennas of the device will have a minimum distance of at least 25 cm (9.84 inches) from all persons. Using higher gain antennas and types of antennas not certified for use with this product is not allowed. The device shall not be co-located with another transmitter.

Non-Modification Statement

Unauthorized changes or modifications to the device are not permitted. Use only the supplied internal antenna, or external antennas supplied by the manufacturer. Modifications to the device will void the warranty and may violate FCC regulations. Please go to the Xirrus Web site for a list of all approved antennas.

Indoor Use

This product has been designed for indoor use. Operation of channels in the 5150MHz to 5250MHz band is permitted indoors only to reduce the potential for harmful interference to co-channel mobile satellite systems.

Maximum Antenna Gain

Currently, the maximum antenna gain for external antennas is limited to 5.2dBi for operation in the 2400MHz to 2483.5MHz, 5150MHz to 5250MHz and 5725MHz to 5825MHz bands. The antenna gains must not exceed maximum EIRP limits set by the FCC / Industry Canada.

High Power Radars

High power radars are allocated as primary users (meaning they have priority) in the 5150MHz to 5250MHz and 5650MHz to 5850MHz bands. These radars could cause interference and/or damage to LELAN devices used in Canada.

Industry Canada Notice and Marking

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

The term "IC:" before the radio certification number only signifies that Industry Canada technical specifications were met.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

EU Directive 1999/5/EC Compliance Information

This section contains compliance information for the Xirrus Wireless LAN Array family of products, which includes the XS-3900, XS-3700 and XS-3500. The compliance information contained in this section is relevant to the European Union and other countries that have implemented the EU Directive 1999/5/EC.

Declaration of Conformity

- Cesky [Czech]** Toto zařízení je v souladu se základními požadavky a ostatními odpovídajícími ustanoveními směrnice 1999/5/EC.
- Dansk [Danish]** Dette udstyr er i overensstemmelse med de væsentlige krav og andre relevante bestemmelser i Direktiv 1999/5/EF.
- Deutsch [German]** Dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprechenden Vorgaben der Richtlinie 1999/5/EU.
- Eesti [Estonian]** See seande vastab direktiivi 1999/5/EU olulistele nõuetele ja teistele asjakohastele sätetele.
- English** This equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
- Español [Spain]** Este equipo cumple con los requisitos esenciales así como con otras disposiciones de la Directiva 1999/5/CE.
- Ελληνική [Greek]** Αυτός ο εξοπλισμός είναι σε συμμόρφωση με τις ουσιώδεις απαιτήσεις και άλλες σχετικές διατάξεις της Οδηγίας 1999/5/EC.
- Français [French]** Cet appareil est conforme aux exigences essentielles et aux autres dispositions pertinentes de la Directive 1999/5/EC.
- Íslenska [Icelandic]** Þetta tæki er samkvæmt grunnkröfum og öðrum viðeigandi ákvæðum Tilskipunar 1999/5/EC.

- Italiano [Italian]** Questo apparato é conforme ai requisiti essenziali ed agli altri principi sanciti dalla Direttiva 1999/5/CE.
- Latviski [Latvian]** Šī iekārta atbilst Direktīvas 1999/5/EK būtiskajā prasībām un citiem ar to saistītajiem noteikumiem.
- Lietuvių [Lithuanian]** Šis įrenginys tenkina 1995/5/EB Direktyvos esminius reikalavimus ir kitas šios direktyvos nuostatas.
- Nederlands [Dutch]** Dit apparant voldoet aan de essentiële eisen en andere van toepassing zijnde bepalingen van de Richtlijn 1995/5/EC.
- Malti [Maltese]** Dan l-apparant huwa konformi mal-htigiet essenzjali u l-provedimenti l-oħra rilevanti tad-Direttiva 1999/5/EC.
- Margyar [Hungarian]** Ez a készülék teljesíti az alapvető követelményeket és más 1999/5/EK irányelvben meghatározott vonatkozó rendelkezéseket.
- Norsk [Norwegian]** Dette utstyret er i samsvar med de grunnleggende krav og andre relevante bestemmelser i EU-direktiv 1999/5/EF.
- Polski [Polish]** Urządzenie jest zgodne z ogólnymi wymaganiami oraz szczególnymi mi warunkami określony mi Dyrektywą. UE:1999/5/EC.
- Português [Portuguese]** Este equipamento está em conformidade com os requisitos essenciais e outras provisões relevantes da Directiva 1999/5/EC.
- Slovensko [Slovenian]** Ta naprava je skladna z bistvenimi zahtevami in ostalimi relevantnimi popoji Direktive 1999/5/EC.
- Slovensky [Slovak]** Toto zariadenie je v zhode so základnými požiadavkami a inými príslušnými nariadeniami direktiv: 1999/5/EC.

Suomi [Finnish] Tämä laite täyttää direktiivin 1999/5/ EY olennaiset vaatimukset ja on siinä asetettujen muiden laitetta koskevien määräysten mukainen.

Svenska [Swedish] Denna utrustning är i överensstämmelse med de väsentliga kraven och andra relevanta bestämmelser i Direktiv 1999/5/EC.

Assessment Criteria

The following standards were applied during the assessment of the product against the requirements of the Directive 1999/5/EC:

- Radio: EN 301 893 and EN 300 328 (if applicable)
- EMC: EN 301 489-1 AND en 301 489-17
- Safety: EN 50371 to EN 50385

CE Marking

For the Xirrus Wireless LAN Array (XS-3900, XS-3700 and XS-3500), the CE mark and Class-2 identifier opposite are affixed to the equipment and its packaging:



WEEE Compliance



- Natural resources were used in the production of this equipment.
- This equipment may contain hazardous substances that could impact the health of the environment.
- In order to avoid harm to the environment and consumption of natural resources, we encourage you to use appropriate take-back systems when disposing of this equipment.
- The appropriate take-back systems will reuse or recycle most of the materials of this equipment in a way that will not harm the environment.
- The crossed-out wheeled bin symbol (in accordance with European Standard EN 50419) invites you to use those take-back systems and advises you not to combine the material with refuse destined for a land fill.
- If you need more information on collection, re-use and recycling systems, please contact your local or regional waste administration.
- Please contact Xirrus for specific information on the environmental performance of our products.

National Restrictions

In the majority of the EU and other European countries, the 2.4 GHz and 5 GHz bands have been made available for the use of Wireless LANs. The following table provides an overview of the regulatory requirements in general that are applicable for the 2.4 GHz and 5 GHz bands.

Frequency Band (MHz)	Max Power Level (EIRP) (mW)	Indoor ONLY	Outdoor ONLY
2400–2483.5	100	X	X**
5150–5350*	200	X	N/A
5470–5725*	1000	X	X

**Dynamic frequency selection and Transmit Power Control is required in these frequency bands.*

***France is indoor use only in the upper end of the band.*

The requirements for any country may change at any time. Xirrus recommends that you check with local authorities for the current status of their national regulations for both 2.4 GHz and 5 GHz wireless LANs.

The following countries have additional requirements or restrictions than those listed in the above table:

Belgium

The Belgian Institute for Postal Services and Telecommunications (BIPT) must be notified of any outdoor wireless link having a range exceeding 300 meters. Xirrus recommends checking at www.bipt.be for more details.

Draadloze verbindingen voor buitengebruik en met een reikwijdte van meer dan 300 meter dienen aangemeld te worden bij het Belgisch Instituut voor postdiensten en telecommunicatie (BIPT). Zie www.bipt.be voor meer gegevens.

Les liaisons sans fil pour une utilisation en extérieur d'une distance supérieure à 300 mètres doivent être notifiées à l'Institut Belge des services Postaux et des Télécommunications (IBPT). Visitez www.bipt.be pour de plus amples détails.

France

The use of the band from 5470 MHz to 5725 MHz is **not allowed** in France. The band from 5150 MHz to 5350 MHz can only be used **indoors**. If the product is used outdoors, the use of any 5 GHz frequency is **not allowed**, and power output is restricted in some portions of the 2.4 GHz band. Refer to the following table or go to www.art-telecom.fr for more details.

L'utilisation de la bande 5470 MHz à 5725 MHz n'est pas autorisée en France. La bande de 5150 MHz à 5350 MHz ne peut être utilisée qu'à l'intérieur d'un bâtiment. Dans le cas d'une utilisation en extérieur aucune fréquence dans les bandes des 5 GHz n'est permise, tandis que la puissance est limitée dans certaines parties de la bande des 2.4 GHz. Reportez-vous à la suivre table ou visitez www.art-telecom.fr pour de plus amples détails.

The following table shows the applicable power levels for 2.4 GHz and 5 GHz in France (*Puissances utilisables dans les bandes 2.4 GHz et 5 GHz en France*).

Location	Frequency Range (MHz)	Power (EIRP)
Indoor (Intérieur)	2400–2483.5	100 mW (20 dBm)
	5150–5350	200 mW (23 dBm)
	5470–5725	Not allowed (<i>Interdit</i>)
Outdoor (Extérieur)	2400–2454	100 mW (20 dBm)
	2454–2483.5	10 mW (10 dBm)
	5150–5350	Not allowed (<i>Interdit</i>)
	5470–5725	Not allowed (<i>Interdit</i>)

Greece

A license from EETT is required for the outdoor operation in the 5470 MHz to 5725 MHz band. Xirrus recommends checking www.eett.gr for more details.

Ç äç éĩõñãßáéêô úíâîùôãñéêî ñĩõóôç æ íçóõ ñô ôùí 5470–5725 ÌÇz â éôñ âôáéùîĩ âôÛá üÛââéá ôçð ÅÅÔÔ, ïõ ññçãâßôáé óôãñá á ü ó öùíç áí ç ôĩõ ÃÃÃÈÁ. ãñéóóüôãñâð ëâ ôù ñâéáùóôî www.eett.gr

Italy

This product meets the National Radio Interface and the requirements specified in the National Frequency Allocation Table for Italy. Unless this wireless LAN product is operating within the boundaries of the owner's property, its use requires a "general authorization." please check with www.comunicazioni.it/it/ for more details.

Questo prodotto é conforme alla specifiche di Interfaccia Radio Nazionali e rispetta il Piano Nazionale di ripartizione delle frequenze in Italia. Se non viene installato all'interno del proprio fondo, l'utilizzo di prodotti wireless LAN richiede una "autorizzazione Generale." Consultare www.comunicazioni.it/it/ per maggiori dettagli.

Noway, Switzerland and Liechtenstein

Although Norway, Switzerland and Liechtenstein are not EU member states, the EU Directive 1999/5/EC has also been implemented in those countries.

Calculating the Maximum Output Power

The regulatory limits for maximum output power are specified in EIRP (radiated power). The EIRP level of a device can be calculated by adding the gain of the antenna used (specified in dBi) to the output power available at the connector (specified in dBm).

Antennas

The Xirrus Wireless LAN Array family of products employs integrated antennas that cannot be removed and which are not user accessible. Nevertheless, as regulatory limits are not the same throughout the EU, users may need to adjust the conducted power setting for the radio to meet the EIRP limits applicable in their country or region. Adjustments can be made from the product's management interface—either Web Management Interface (WMI) or Command Line Interface (CLI).

Operating Frequency

The operating frequency in a wireless LAN is determined by the access point. As such, it is important that the access point is correctly configured to meet the local regulations. See [National Restrictions](#) in this section for more information.

If you still have questions regarding the compliance of Xirrus products or you cannot find the information you are looking for, please contact us at:

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Westlake Village, CA 91362
USA

Tel: 1.805.497.0955
Fax: 1.805.449.1180

www.xirrus.com

Safety Warnings



Safety Warnings

Read all user documentation before powering this device. All Xirrus interconnected equipment should be contained indoors. This product is not suitable for outdoor operation. Please verify the integrity of the system ground prior to installing Xirrus equipment. Additionally, verify that the ambient operating temperature does not exceed 50°C.



Explosive Device Proximity Warning

Do not operate the XS-3900/XS-3700/XS-3500 unit near unshielded blasting caps or in an explosive environment unless the device has been modified to be especially qualified for such use.



Lightning Activity Warning

Do not work on the XS-3900/XS-3700/XS-3500 or connect or disconnect cables during periods of lightning activity.



Circuit Breaker Warning

The XS-3900/XS-3700/XS-3500 relies on the building's installation for over current protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A (U.S.) or 240 VAC, 10A (International) is used on all current-carrying conductors.

Translated safety warnings appear on the following page.

Translated Safety Warnings

Avertissements de Sécurité



Sécurité

Lisez l'ensemble de la documentation utilisateur avant de mettre cet appareil sous tension. Tous les équipements Xirrus interconnectés doivent être installés en intérieur. Ce produit n'est pas conçu pour être utilisé en extérieur. Veuillez vérifier l'intégrité de la terre du système avant d'installer des équipements Xirrus. Vérifiez également que la température de fonctionnement ambiante n'excède pas 50°C.



Proximité d'appareils explosifs

N'utilisez pas l'unité XS-3900/XS-3700/XS-3500 à proximité d'amorces non blindées ou dans un environnement explosif, à moins que l'appareil n'ait été spécifiquement modifié pour un tel usage.



Foudre

N'utilisez pas l'unité XS-3900/XS-3700/XS-3500 et ne branchez pas ou ne débranchez pas de câbles en cas de foudre.



Disjoncteur

L'unité XS-3900/XS-3700/XS-3500 dépend de l'installation du bâtiment pour ce qui est de la protection contre les surintensités. Assurez-vous qu'un fusible ou qu'un disjoncteur de 120 Vca, 15 A (États-Unis) ou de 240 Vca, 10 A (International) maximum est utilisé sur tous les conducteurs de courant.

Software Warranty and License Agreement

THIS SOFTWARE LICENSE AGREEMENT (THE "AGREEMENT") IS A LEGAL AGREEMENT BETWEEN YOU ("CUSTOMER") AND LICENSOR (AS DEFINED BELOW) AND GOVERNS THE USE OF THE SOFTWARE INSTALLED ON THE PRODUCT (AS DEFINED BELOW). IF YOU ARE AN EMPLOYEE OR AGENT OF CUSTOMER, YOU HEREBY REPRESENT AND WARRANT TO LICENSOR THAT YOU HAVE THE POWER AND AUTHORITY TO ACCEPT AND TO BIND CUSTOMER TO THE TERMS AND CONDITIONS OF THIS AGREEMENT (INCLUDING ANY THIRD PARTY TERMS SET FORTH HEREIN). IF YOU DO NOT AGREE TO ALL OF THE TERMS OF THIS AGREEMENT RETURN THE PRODUCT AND ALL ACCOMPANYING MATERIALS (INCLUDING ALL DOCUMENTATION) TO THE RELEVANT VENDOR FOR A FULL REFUND OF THE PURCHASE PRICE THEREFOR.

CUSTOMER UNDERSTANDS AND AGREES THAT USE OF THE SOFTWARE SHALL BE DEEMED AN AGREEMENT TO THE TERMS AND CONDITIONS GOVERNING SUCH SOFTWARE AND THAT CUSTOMER IS BOUND BY AND BECOMES A PARTY TO THIS AGREEMENT.

1. Definitions

- 1.1 "Documentation" means the user manuals and all other all documentation, instructions or other similar materials accompanying the Software covering the installation, application, and use thereof.
- 1.2 "Licensor" means XIRRUS and its suppliers.
- 1.3 "Product" means a multi-radio access point containing four or more distinct radios capable of simultaneous operation on four or more non-overlapping channels.
- 1.4 "Software" means, collectively, each of the application and embedded software programs delivered to Customer in connection with this Agreement. For purposes of this Agreement, the term Software shall be deemed to include any and all Documentation and Updates provided with or for the Software.
- 1.5 "Updates" means any bug-fix, maintenance or version release to the Software that may be provided to Customer from Licensor pursuant to this Agreement or pursuant to any separate maintenance and support agreement entered into by and between Licensor and Customer.

2. Grant of Rights

- 2.1 **Software.** Subject to the terms and conditions of this Agreement, Licensor hereby grants to Customer a perpetual, non-exclusive, non-sublicenseable, non-transferable right and license to use the Software solely as installed on the Product in accordance with the accompanying Documentation and for no other purpose.
- 2.2 **Ownership.** The license granted under Sections 2.1 above with respect to the Software does not constitute a transfer or sale of Licensor's or its suppliers' ownership interest in or to the Software, which is solely licensed to Customer. The Software is protected by both national and international intellectual property laws and treaties. Except for the express licenses granted to the Software, Licensor and its suppliers retain all rights, title and interest in and to the Software, including (i) any and all trade secrets, copyrights, patents and other proprietary rights therein or thereto or (ii) any Marks (as defined in Section 2.3 below) used in connection therewith. In no event shall Customer remove, efface or otherwise obscure any Marks contained on or in the Software. All rights not expressly granted herein are reserved by Licensor.
- 2.3 **Copies.** Customer shall not make any copies of the Software but shall be permitted to make a reasonable number of copies of the related Documentation. Whenever Customer copies or reproduces all or any part of the Documentation, Customer shall reproduce all and not efface any titles, trademark symbols, copyright symbols and legends, and other proprietary markings or similar indicia of origin ("Marks") on or in the Documentation.

2.4 **Restrictions.** Customer shall not itself, or through any parent, subsidiary, affiliate, agent or other third party (i) sell, rent, lease, license or sublicense, assign or otherwise transfer the Software, or any of Customer's rights and obligations under this Agreement except as expressly permitted herein; (ii) decompile, disassemble, or reverse engineer the Software, in whole or in part, provided that in those jurisdictions in which a total prohibition on any reverse engineering is prohibited as a matter of law and such prohibition is not cured by the fact that this Agreement is subject to the laws of the State of California, Licensor agrees to grant Customer, upon Customer's written request to Licensor, a limited reverse engineering license to permit interoperability of the Software with other software or code used by Customer; (iii) allow access to the Software by any user other than by Customer's employees and contractors who are bound in writing to confidentiality and non-use restrictions at least as protective as those set forth herein; (iv) except as expressly set forth herein, write or develop any derivative software or any other software program based upon the Software; or (v) use any computer software or hardware which is designated to defeat any copy protection or other use limiting device, including any device intended to limit the number of users or devices accessing the Product.

3. **Limited Warranty and Limitation of Liability**

3.1 **Limited Warranty & Exclusions.** Licensor warrants that the Software will perform in substantial accordance with the specifications therefor set forth in the Documentation for a period of ninety [90] days after Customer's acceptance of the terms of this Agreement with respect to the Software ("Warranty Period"). If during the Warranty Period the Software does not perform as warranted, Licensor shall, at its option, correct the relevant Software giving rise to such breach of performance or replace such Software free of charge. THE FOREGOING ARE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES FOR BREACH OF THE FOREGOING WARRANTY. THE WARRANTY SET FORTH ABOVE IS MADE TO AND FOR THE BENEFIT OF CUSTOMER ONLY. The warranty will apply only if (i) the Software has been used at all times and in accordance with the instructions for use set forth in the Documentation and this Agreement; (ii) no modification, alteration or addition has been made to the Software by persons other than Licensor or Licensor's authorized representative; and (iii) the Software or Product on which the Software is installed has not been subject to any unusual electrical charge.

3.2 **DISCLAIMER.** EXCEPT AS EXPRESSLY STATED IN THIS SECTION 3, ALL ADDITIONAL CONDITIONS, REPRESENTATIONS, AND WARRANTIES, WHETHER IMPLIED, STATUTORY OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, SATISFACTORY QUALITY, ACCURACY, AGAINST INFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE, ARE HEREBY DISCLAIMED BY LICENSOR AND ITS SUPPLIERS. THIS DISCLAIMER SHALL APPLY EVEN IF ANY EXPRESS WARRANTY AND LIMITED REMEDY OFFERED BY LICENSOR FAILS OF ITS ESSENTIAL PURPOSE. ALL WARRANTIES PROVIDED BY LICENSOR ARE SUBJECT TO THE LIMITATIONS OF LIABILITY SET FORTH IN THIS AGREEMENT.

3.3 **HAZARDOUS APPLICATIONS.** THE SOFTWARE IS NOT DESIGNED OR INTENDED FOR USE IN HAZARDOUS ENVIRONMENTS REQUIRING FAIL SAFE PERFORMANCE, SUCH AS IN THE OPERATION OF A NUCLEAR FACILITY, AIRCRAFT NAVIGATION OR COMMUNICATIONS SYSTEMS, AIR TRAFFIC CONTROLS OR OTHER DEVICES OR SYSTEMS IN WHICH A MALFUNCTION OF THE SOFTWARE WOULD RESULT IN FORSEEABLE RISK OF INJURY OR DEATH TO THE OPERATOR OF THE DEVICE OR SYSTEM OR TO OTHERS ("HAZARDOUS APPLICATIONS"). CUSTOMER ASSUMES ANY AND ALL RISKS, INJURIES, LOSSES, CLAIMS AND ANY OTHER LIABILITIES ARISING OUT OF THE USE OF THE SOFTWARE IN ANY HAZARDOUS APPLICATIONS.

3.4 **Limitation of Liability.**

(a) **TOTAL LIABILITY.** NOTWITHSTANDING ANYTHING ELSE HEREIN, ALL LIABILITY OF LICENSOR AND ITS SUPPLIERS UNDER THIS AGREEMENT SHALL BE LIMITED TO THE AMOUNT PAID BY CUSTOMER FOR THE RELEVANT SOFTWARE, OR PORTION THEREOF, THAT GAVE RISE TO SUCH LIABILITY OR ONE HUNDRED UNITED STATES DOLLARS (US\$100), WHICHEVER IS GREATER. THE LIABILITY OF LICENSOR AND ITS SUPPLIERS UNDER THIS SECTION SHALL BE CUMULATIVE AND NOT PER INCIDENT.

(b) **DAMAGES.** IN NO EVENT SHALL LICENSOR, ITS SUPPLIERS OR THEIR RELEVANT SUBCONTRACTORS BE LIABLE FOR (A) ANY INCIDENTAL, SPECIAL, PUNITIVE OR CONSEQUENTIAL DAMAGES, LOST PROFITS OR LOST OR DAMAGED DATA, OR ANY INDIRECT DAMAGES, WHETHER ARISING IN CONTRACT, TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR OTHERWISE OR (B) ANY COSTS OR EXPENSES FOR THE PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES IN EACH CASE, EVEN IF LICENSOR OR ITS SUPPLIERS HAVE BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES.

3.5 **Exclusions.** SOME JURISDICTIONS DO NOT PERMIT THE LIMITATIONS OF LIABILITY AND LIMITED WARRANTIES SET FORTH UNDER THIS AGREEMENT. IN THE EVENT YOU ARE LOCATED IN ANY SUCH JURISDICTION, THE FOREGOING LIMITATIONS SHALL APPLY ONLY TO THE MAXIMUM EXTENT PERMITTED IN SUCH JURISDICTIONS. IN NO EVENT SHALL THE FOREGOING EXCLUSIONS AND LIMITATIONS ON DAMAGES BE DEEMED TO APPLY TO ANY LIABILITY BASED ON FRAUD, WILLFUL MISCONDUCT, GROSS NEGLIGENCE OR PERSONAL INJURY OR DEATH.

4. Confidential Information

4.1 **Generally.** The Software (and its accompanying Documentation) constitutes Licensor's and its suppliers' proprietary and confidential information and contains valuable trade secrets of Licensor and its suppliers ("Confidential Information"). Customer shall protect the secrecy of the Confidential Information to the same extent it protects its other valuable, proprietary and confidential information of a similar nature but in no event shall Customer use less than reasonable care to maintain the secrecy of the Confidential Information. Customer shall not use the Confidential Information except to exercise its rights or perform its obligations as set forth under this Agreement. Customer shall not disclose such Confidential Information to any third party other than subject to non-use and non-disclosure obligations at least as protective of a party's right in such Confidential Information as those set forth herein.

4.2 **Return of Materials.** Customer agrees to (i) destroy all Confidential Information (including deleting any and all copies contained on any of Customer's Designated Hardware or the Product) within fifteen (15) days of the date of termination of this Agreement or (ii) if requested by Licensor, return, any Confidential Information to Licensor within thirty (30) days of Licensor's written request.

5. Term and Termination

5.1 **Term.** Subject to Section 5.2 below, this Agreement will take effect on the Effective Date and will remain in force until terminated in accordance with this Agreement.

5.2 **Termination Events.** This Agreement may be terminated immediately upon written notice by either party under any of the following conditions:

- (a) If the other party has failed to cure a breach of any material term or condition under the Agreement within thirty (30) days after receipt of notice from the other party; or
- (b) Either party ceases to carry on business as a going concern, either party becomes the object of the institution of voluntary or involuntary proceedings in bankruptcy or liquidation, which proceeding is not dismissed within ninety (90) days, or a receiver is appointed with respect to a substantial part of its assets.

5.3 Effect of Termination.

- (a) Upon termination of this Agreement, in whole or in part, Customer shall pay Licensor for all amounts owed up to the effective date of termination. Termination of this Agreement shall not constitute a waiver for any amounts due.
- (b) The following Sections shall survive the termination of this Agreement for any reason: Sections 1, 2.2, 2.4, 3, 4, 5.3, and 6.
- (c) No later than thirty (30) days after the date of termination of this Agreement by Licensor, Customer shall upon Licensor's instructions either return the Software and all copies thereof; all Documentation relating thereto in its possession that is in tangible form or destroy the same (including any copies thereof contained on Customer's Designated Hardware). Customer shall furnish Licensor with a certificate signed by an executive officer of Customer verifying that the same has been done.

6. Miscellaneous

If Customer is a corporation, partnership or similar entity, then the license to the Software and Documentation that is granted under this Agreement is expressly conditioned upon and Customer represents and warrants to Licensor that the person accepting the terms of this Agreement is authorized to bind such entity to the terms and conditions herein. If any provision of this Agreement is held to be invalid or unenforceable, it will be enforced to the extent permissible and the remainder of this Agreement will remain in full force and effect. During the course of use of the Software, Licensor may collect information on your use thereof; you hereby authorize Licensor to use such information to improve its products and services, and to disclose the same to third parties provided it does not contain any personally identifiable information. The express waiver by either party of any provision, condition or requirement of this Agreement does not constitute a waiver of any future obligation to comply with such provision, condition or requirement. Customer and Licensor are independent parties. Customer may not export or re-export the Software or Documentation (or other materials) without appropriate United States, European Union and foreign government licenses or in violation of the United State's Export Administration Act or foreign equivalents and Customer shall comply with all national and international laws governing the Software. This Agreement will be governed by and construed under the laws of the State of California and the United States as applied to agreements entered into and to be performed entirely within California, without regard to conflicts of laws provisions thereof and the parties expressly exclude the application of the United Nations Convention on Contracts for the International Sales of Goods and the Uniform Computer Information Transactions Act (as promulgated by any State) to this Agreement. Suits or enforcement actions must be brought within, and each party irrevocably commits to the exclusive jurisdiction of, the state and federal courts located in Ventura County, California. Customer may not assign this Agreement by operation of law or otherwise, without the prior written consent of Licensor and any attempted assignment in violation of the foregoing shall be null and void. This Agreement cancels and supersedes all prior agreements between the parties. This Agreement may not be varied except through a document agreed to and signed by both parties. Any printed terms and conditions contained in any Customer purchase order or in any Licensor acknowledgment, invoice or other documentation relating to the Software shall be deemed deleted and of no force or effect and any additional typed and/or written terms and conditions contained shall be for administrative purposes only, i.e. to identify the types and quantities of Software to be supplied, line item prices and total price, delivery schedule, and other similar ordering data, all in accordance with the provisions of this Agreement.

Hardware Warranty Agreement

PLEASE READ THIS AGREEMENT CAREFULLY BEFORE USING THIS PRODUCT

BY USING THIS PRODUCT, YOU ACKNOWLEDGE THAT YOU HAVE READ AND UNDERSTOOD ALL THE TERMS AND CONDITIONS OF THIS AGREEMENT AND THAT YOU ARE CONSENTING TO BE BOUND BY THIS AGREEMENT. IF YOU DO NOT AGREE TO ALL OF THE TERMS OF THIS AGREEMENT, RETURN THE UNUSED PRODUCT TO THE PLACE OF PURCHASE FOR A FULL REFUND.

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The above warranty DOES NOT apply to any evaluation Equipment made available for testing or demonstration purposes. All such Equipment is provided AS IS without any warranty whatsoever.

Customer agrees the Equipment and related documentation shall not be used in life support systems, human implantation, nuclear facilities or systems or any other application where failure could lead to a loss of life or catastrophic property damage, or cause or permit any third party to do any of the foregoing.

All information or feedback provided by Customer to Xirrus with respect to the Product shall be Xirrus' property and deemed confidential information of Xirrus.

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This Agreement shall be governed by and construed in accordance with the laws of the State of California, United States of America, as if performed wholly within the state and without giving effect to the principles of conflict of law. If any portion hereof is found to be void or unenforceable, the remaining provisions of this Warranty shall remain in full force and effect. This Warranty constitutes the entire agreement between the parties with respect to the use of the Equipment.

Manufacturer is Xirrus, Inc. 370 North Westlake Blvd #200 Westlake Village, CA 91362.

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- Trademarks
- Notices
- EU Directive 1999/5/EC Compliance Information
- Safety Warnings
- Translated Safety Warnings
- Software Warranty and License Agreement
- Hardware Warranty Agreement

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Introduction

This chapter introduces the Wireless LAN Array, including an overview of its key features and benefits, and a detailed listing of the product's physical, environmental, technology and regulatory specifications. Section headings for this chapter include:

- "The Xirrus Family of Products" on page 1
- "About this User's Guide" on page 2
- "Why Choose the Xirrus Wireless LAN Array?" on page 5
- "Product Overview" on page 6
- "Key Features and Benefits" on page 10
- "Product Specifications (XS-3900 and XS-3700)" on page 13
- "Product Specifications (XS-3500)" on page 17

The Xirrus Family of Products

The Xirrus family of products includes the following items:

- **Xirrus Wireless LAN Array (XS-3900 / XS-3700 / XS-3500)**
The Wireless WLAN Array is specifically designed for the Enterprise market. There are three versions of this product, each with a different wireless capacity—16 IAPs (Integrated Access Points—radios) with the XS-3900, 8 IAPs with the XS-3700, and 4 IAPs with the XS-3500.
- **Xirrus Wireless Management System (XM-3300)**
The XM-3300 is used for managing large Wireless WLAN Array deployments from a centralized Web-based interface. If you need detailed information about this product, refer to the XM-3300 User's Guide, part number 800-0007-001.
- **Xirrus Remote DC Power System (XP-3100)**
The XP-3100 provides distributed DC power to multiple Wireless WLAN Arrays, eliminating the need to run dedicated AC power to each unit and facilitating backup power when connected via a UPS.

Nomenclature

Throughout this User's Guide, the Wireless LAN Array is also referred to as the **Xirrus Array**, or simply the **Array**. In some instances, the terms **product** and **unit** are also used. When discussing specific products from the Xirrus family, the product name is used (for example, XS-3900, XS-3700 or XS-3500).

The Xirrus Wireless Management System (XM-3300) and the Xirrus Remote DC Power System (XP-3100) are referred to as the **XM-3300** and **XP-3100**, or **XM** and **XP** respectively.

About this User's Guide

This User's Guide provides detailed information and procedures that will enable wireless network administrators to install, configure and manage the Xirrus Array so that end users can take full advantage of the product's features and functionality without technical assistance.

Organization

Topics and procedures are organized by function under the following chapter headings:

- **Introduction**
Provides a brief introduction to wireless technology, an overview of the product, including its key features and benefits, and presents the product specifications.
- **Installing the Xirrus Array**
Defines the prerequisites for deploying and installing the Array and provides instructions to help you plan and complete a successful installation.
- **The Web Management Interface**
Offers an overview of the product's embedded Web Management Interface, including its content and structure. It also emphasizes what you need to do to ensure that any configuration changes you make are applied, and provides a list of restricted characters.

- **Configuring the Xirrus Array**
Contains procedures for configuring the Array using its embedded Web Management Interface. It also includes instructions for logging in to the Array with your Web browser, and procedures for upgrading the system firmware and resetting the Array to its factory defaults.
- **The Command Line Interface**
Provides instructions for configuring the Array using keywords and commands via its embedded Command Line Interface—with examples and syntax conventions—and includes a procedure for establishing a Secure Shell (SSH) connection to the product.
- **Appendix A: Servicing the Xirrus Array**
Contains procedures for servicing the Array, including the removal and reinstallation of major hardware components.
- **Appendix B: Quick Reference Guide**
Contains product reference information, including a review of the Web Management Interface pages and their content, an alphabetical listing of keywords available with the Command Line Interface, the product's factory default settings, a sample event log, and some useful keyboard shortcuts.
- **Appendix C: Technical Support**
Offers guidance to resolve technical issues, including some general hints and tips to enhance your product experience, and a procedure for isolating problems within an Array-enabled wireless network. Also includes Frequently Asked Questions (FAQs), a table of error messages generated by the product, and Xirrus contact information.
- **Glossary of Terms**
Provides an explanation of terms directly related to Xirrus product technology, organized alphabetically.
- **Index**
The index is a valuable information search tool. Use the index to locate specific topics discussed in this User's Guide. Simply click on any page number in the index to jump to the referenced topic.



Notes and Cautions

The following symbols are used throughout this User's Guide:



This symbol is used for general notes that provide useful supplemental information.



This symbol is used for cautions. Cautions provide critical information that may adversely affect the performance of the product.

Screen Images

Some screen images of the Web Management Interface have been modified for clarity. For example, an image may have been cropped to highlight a specific area of the screen, and/or sample data may be included in some fields.

Your User's Guide as a PDF Document

This User's Guide is also made available as a secure PDF (Portable Document Format) file and can be viewed using the Adobe® Acrobat Reader® product. It cannot be edited or modified. If you don't have Acrobat Reader, you can download it free-of-charge from: <http://www.adobe.com>.

Hyperlinks

If you click on body text that appears in the color **TEAL** (with the exception of headings or notes) the embedded hyperlink within the text will immediately take you to the referenced destination. All internal and external cross-references, including page numbers within the **List of Figures** and the **Index**, have associated hyperlinks. After "jumping" to a referenced topic, if you want to return to the previous page (reference source), simply click on Acrobat's **previous page** button.



Previous page button

Figure 1. Adobe Acrobat (Version 6 and above)

Why Choose the Xirrus Wireless LAN Array?

In 2003 there were approximately 30,000 Wireless Local Area Networks (WLANs) operating in the public domain. Research suggests that the number will more than quadruple by 2006. Enterprise WLANs in the private sector are also becoming increasingly common as businesses strive for greater flexibility in the workplace and the need for employee mobility rises. The only requirements for an effective wireless deployment are a power source, a couple of screws, and an imagination.

Wireless LAN is also fully compatible with standard Ethernet protocols, so connectivity with existing wired infrastructures is transparent to users—they can still access and use the same applications and network services that they use when plugged into the company's wired LAN infrastructure (it's only the plug that no longer exists).

Wireless LAN has come a long way in the past few years and now offers the performance, reliability and security that Enterprise customers have come to expect from their networks. The technology is being driven by three major IEEE standards:

- **802.11a**
Operates in the 5 GHz range with a maximum speed of 54 Mbps.
- **802.11b**
Operates in the 2.4 GHz range with a maximum speed of 11 Mbps. It has a range of about 100 meters indoors and 300 meters outdoors.
- **802.11g**
Supports a higher transmission speed of 54 Mbps in the 2.4 GHz range and is backwards compatible with 802.11b.

Whether you're a small company with just a handful of employees, or a large corporation with thousands, wireless has the scalability and flexibility to serve your needs.

Product Overview

Part of the family of Xirrus products, the Wireless LAN Array is a high capacity, multi-mode device designed for the Enterprise market, with twice the range and up to sixteen times the capacity of competitive wireless products.



Figure 2. Wireless LAN Array (XS-3900)

The Xirrus Array (regardless of the product model) is Wi-Fi® compliant and simultaneously supports 802.11a, 802.11b and 802.11g clients. Enterprise class features such as [VLAN](#) support and multiple [SSID](#) capability enable robust network compatibility and a high level of scalability and system control. The optional Xirrus Wireless Management System (XM-3300) allows global management of hundreds of Arrays from a central location.

The XS-3700 and XS-3500 versions of the Wireless LAN Array deliver a correspondingly lower capacity than the XS-3900.

Enterprise Class Security

The latest and most effective wireless encryption security standards, including WPA (Wi-Fi Protected Access) with 802.11i AES (Advanced Encryption Standard) are provided with the Xirrus Array. In addition, the use of an embedded RADIUS server (or 802.1x with an external RADIUS server) ensures user authentication—multiple Arrays can authenticate to the optional XM-3300 ensuring only authorized Xirrus Wireless LAN Arrays become part of the wireless network. Rogue AP detection and site monitoring is performed in the background by the Array automatically.

Deployment Flexibility

Xirrus' unique multi-radio architecture generates 360 degrees of sectored high-gain 802.11a/b/g coverage that provides extended range and the highest possible data rates for a large volume of clients. Each sector can be controlled automatically or manually, creating a pattern of wireless coverage perfectly tailored to individual customer needs. For example:

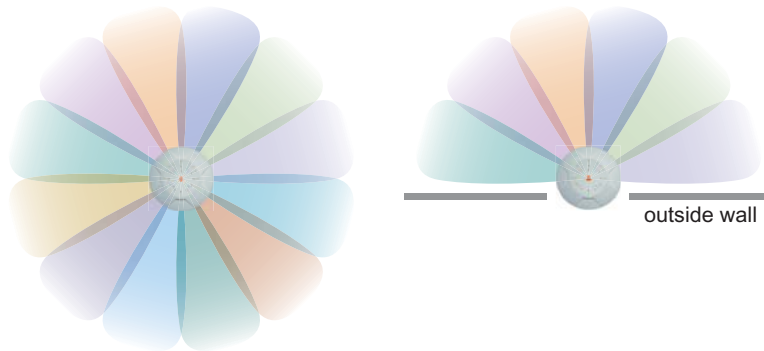


Figure 3. Wireless Coverage Patterns

Figure 2 depicts the following two scenarios:

- **Full pattern coverage**
All radios are activated with coverage spanning 360 degrees. If within range, clients will always receive coverage regardless of their geographic position relative to the Array.
- **Partial pattern coverage**
If desired, the Xirrus Array can be deployed close to an exterior wall. In this case, half of all available radios have been deactivated to prevent redundant signals from “bleeding” beyond the site’s perimeter wall. This configuration may also be used in those cases where you want to restrict wireless coverage to selected areas of the building’s interior.

Remote DC Power System (Optional)

The Xirrus Remote DC Power System (XP-3100) provides distributed DC power to your Array (DC version) deployments, eliminating the need to provide an AC power outlet in close proximity to the unit(s).

In the following example, DC power is supplied to four Xirrus Arrays while utilizing only one AC power outlet.

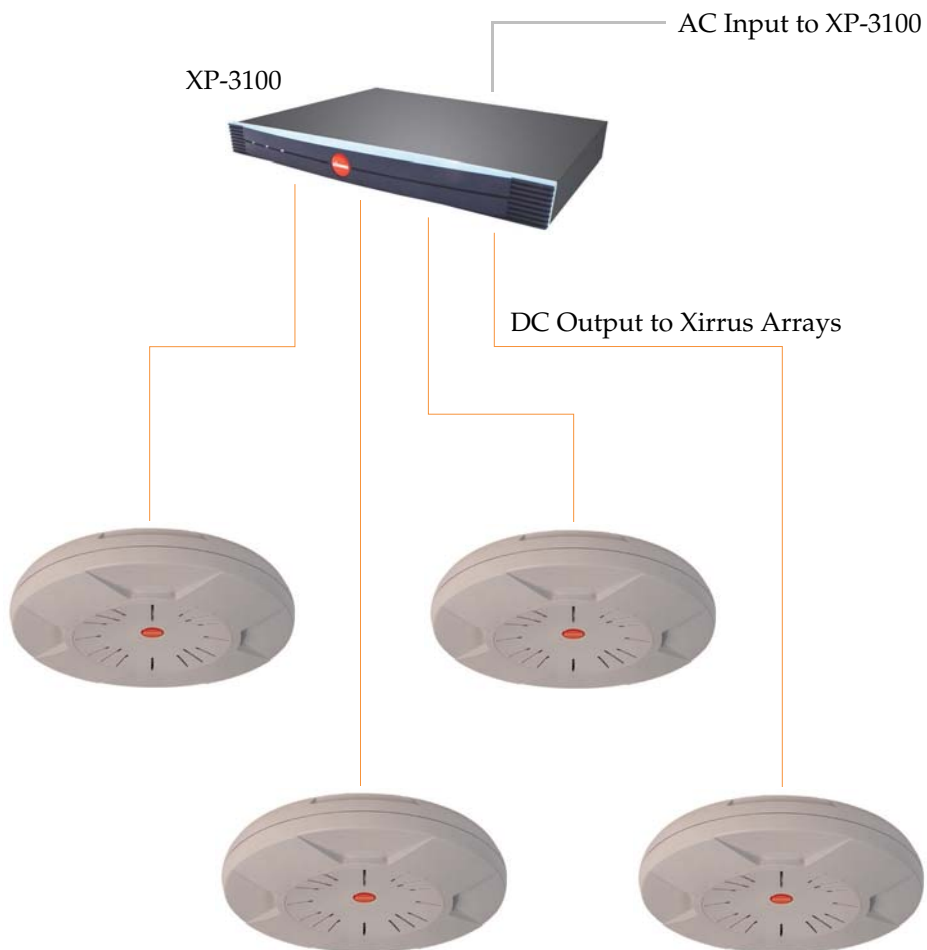


Figure 4. Remote DC Power Distribution

Enterprise Class Management

The Xirrus Array can be configured with its default RF settings, or the RF settings can be customized using the Array's embedded Web Management Interface (WMI). The WMI enables easy configuration and control from a graphical console, along with a full compliment of troubleshooting tools, reports and statistics.

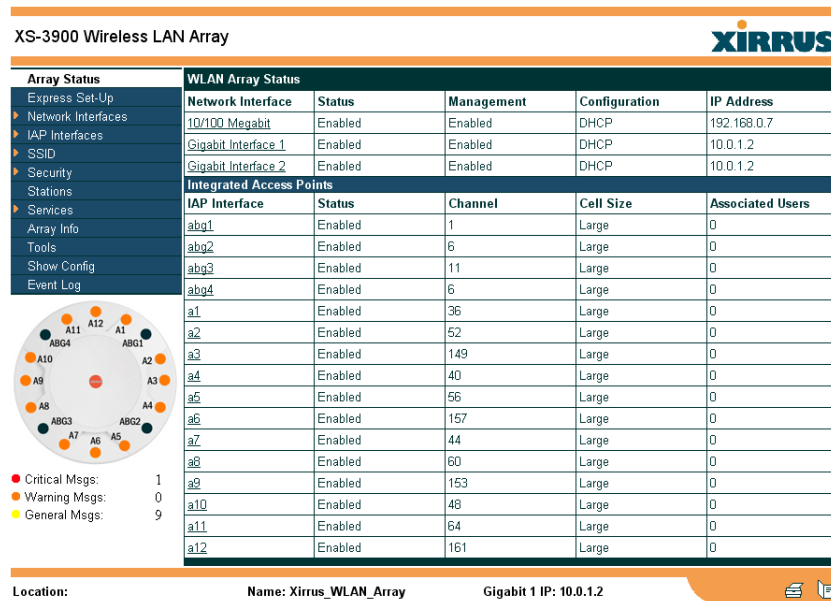


Figure 5. WMI: Array Status Page

In addition, a fully featured Command Line Interface (CLI) offers IT professionals a familiar management and control environment. [SNMP](#) (Simple Network Management Protocol) is also supported to allow management from an SNMP compliant management tool, such as the optional Xirrus Wireless Management System.



For deployments of more than two Arrays, we recommend that you use the Xirrus Wireless Management System (XM-3300). The XM-3300 offers a rich set of features for fine control over large deployments.

Key Features and Benefits

This section describes some of the key product features and the benefits you can expect when deploying the Xirrus Array (the XS-3900 product is highlighted in this section).

High Capacity and High Performance

The XS-3900 easily handles time-sensitive traffic, such as voice, and can enable wireless connectivity for 1,024 users. The unit includes two Gigabit uplink ports for connection to the wired network. A total of sixteen IAPs provides a maximum wireless capacity of 864 Mbps, which offers ample reserves for the high demands of current and future applications. Of the sixteen IAPs, twelve operate in the 802.11a mode and four operate in any combination of 802.11a, 802.11b and 802.11g.

If desired, IAP (radio) **abg2** can also be configured in RF monitoring and rogue AP detection mode.

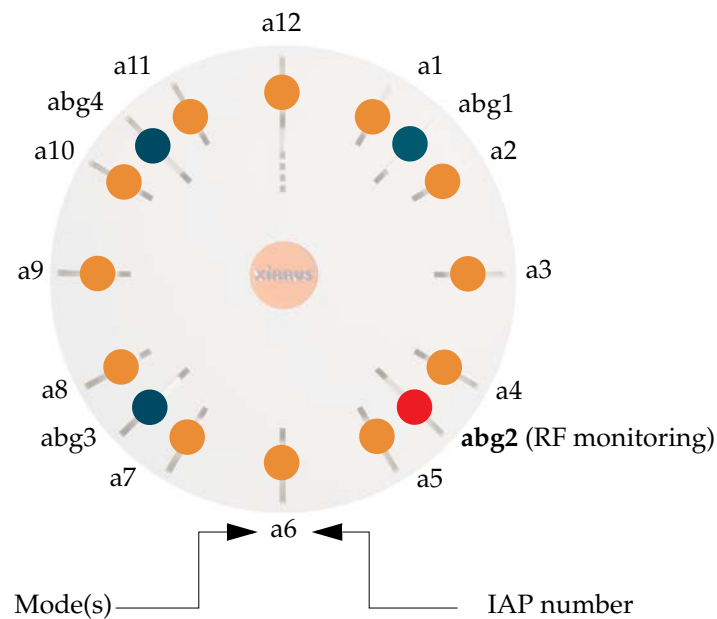


Figure 6. Layout of IAPs (XS-3900)

Extended Coverage

One XS-3900 solution enables you to replace up to sixteen access points (includes one omnidirectional IAP for monitoring the network). Fifteen IAP radios with integrated directional antennas provide increased wireless range and enhanced data rates in all directions. With a Xirrus Array deployed, far fewer access points are needed for your wireless network. Radio **abg2** (see [Figure 6](#)) can be switched to use an integrated omnidirectional antenna—for listening only—and can be dedicated to the tasks of site monitoring and rogue AP detection.

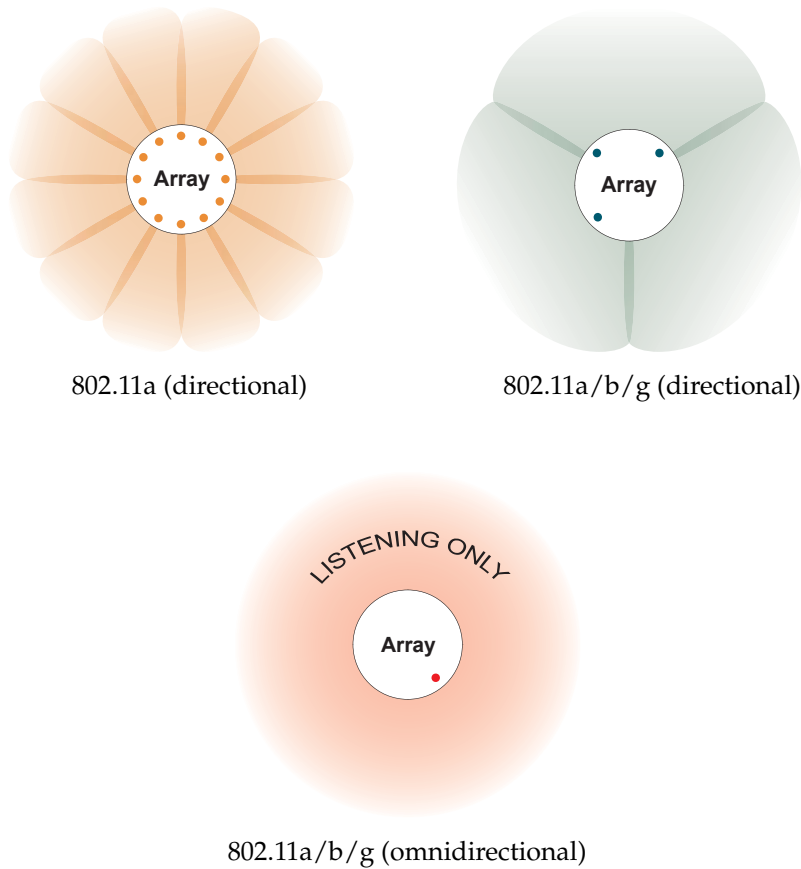


Figure 7. Antenna Patterns

An orange semi-circle graphic is positioned to the left of the "Non-Overlapping Channels" section header.

Non-Overlapping Channels

Complete use of non-overlapping channels limits interference and delivers maximum capacity. On the XS-3900, all 16 non-overlapping channels are fully utilized across the 5GHz and 2.4GHz spectrums (up to 12 across the 5GHz spectrum and up to 3 across the 2.4GHz spectrum—typically, one radio is used as a dedicated RF monitor).

Secure Wireless Access

Multiple layers of authentication and encryption ensure secure data transmissions. The Xirrus Array is 802.11i compliant with encryption support for 64 bit and 128 bit WEP, and WPA with TKIP and AES encryption.

Authentication support is provided via 802.1x, including PEAP, EAP-TLS, and EAP-TTLS.

Applications Enablement

QoS (Quality of Service) functionality combined with true switch capabilities enable high density Voice over Wireless LAN deployments. Compliant with 802.1p and 802.1q standards.

SDMA Optimization

SDMA (Spatial Division Multiple Access) technology provides full 360° coverage while allowing independent channel and power output customization. Also supports fast inter-zone handoffs for time-sensitive applications and roaming support.

Easy Deployment

The Xirrus Wireless Management System (XM-3300) offers real time monitoring and management capabilities of the wireless network—ideal for the Enterprise market. It also allows you to import floor plans to help you plan your deployment. The Xirrus Wireless LAN Array chassis has a plenum rated, lockable and tamper resistant case.

Product Specifications (XS-3900 and XS-3700)

Element	Specifications
Number of Users	Maximum of 64 associated users per radio 1024 users per Array (XS-3900) 512 users per Array (XS-3700)
Physical	Diameter: 18.65 inches (47.37 cm) Height: 3.87 inches (9.83 cm) Weight: 8lbs (3.63 kg)
Environmental	Operating Temperature: -10°C to 50°C 0% to 90% relative humidity (non-condensing) Storage Temperature: -20°C to 60°C 5% to 95% relative humidity (non-condensing) Maximum Operating Altitude: 2000 meters (6561 feet)
System	825 MHz CPU 128MB RAM, expandable 512MB system flash, expandable Expansion slot for future options
Electrical	Input Power (AC version): 90VAC to 265VAC at 47Hz to 63Hz Input Power (DC version): 48VDC
Interfaces	Serial: 1 x RS232 – RJ45 connector Ethernet Interfaces: 2 x Gigabit 10/100/1000 Mbps w/failover 1 x Fast Ethernet 10/100 Mbps Status LEDs: System status, Ethernet, Radio

Element	Specifications
Management	Web-based HTTPS SNMP v3 CLI via SSHv2 or Telnet FTP TFTP Serial Proprietary Xirrus Wireless Management System Syslog reporting for alerts/alarms
Networking	DHCP client, DHCP server, NTP client RFC
VLAN Support	802.1Q, P VLAN Supports up to 16 VLANs
Multiple SSID Support	Allows up to 16 separate SSIDs to be defined with map security, VLAN and QoS settings for each SSID
Performance	Client Load Balancing Automatic load balancing between system radios Quality of Service: 802.1P wired traffic prioritization Wireless packet prioritization MAP CoS to TCID Fair queuing of downstream traffic

A large orange semi-circle is positioned on the right side of the page, partially overlapping the table.

Element	Specifications
Security	Wireless Security: - WEP 40bit/128bit encryption - WPA with TKIP and AES encryption - Misappropriated APs automatically reset to factory defaults (requires the Xirrus Wireless Management System) - Rogue AP detection, with alerts and classification User and System Authentication: - WPA Pre-Shared Key authentication - Embedded RADIUS Server 802.1x EAP-TLS 802.1x EAP-TTLS 802.1x PEAP - External RADIUS servers - Authentication of Xirrus Arrays to the Xirrus Management System (XM-3300)

Element	Specifications
Wireless	Number of Radios: XS-3900: 12 x 802.11a radios 4 x 802.11a/b/g radios XS-3700: 4 x 802.11a radios 4 x 802.11a/b/g radios Wireless Standards: 802.11a/b/g and g-only mode 802.11e (draft), 802.11i Channel Selection: Manual Automatic Frequency Bands: 11a: 5.15-5.25 GHz (UNII 1) 11a: 5.15-5.25 GHz (TELEC) 11a: 5.25-5.35 GHz (UNII 2) 11a: 5.470-5.725 (ETSI) 11a: 5.725-5.825 GHz (UNII 3) 11b/g: 2.412-2.462 GHz (FCC) 11b/g: 2.412-2.472 GHz (ETSI) 11b/g: 2.412-2.484 GHz (TELEC) Antenna: Internal 6 dBi sectorized antenna External RP-TNC connector Radio Approvals: FCC (United States) EN 301.893 (Europe)
Compliance	UL / cUL 60950 and EN 60950 FCC Part 15.107 and 15109, Class A EN 301.489 (Europe)
Warranty	One year (hardware), 90 day (software)

Product Specifications (XS-3500)

Element	Specifications
Number of Users	Maximum of 64 associated users per radio (256 users per Array). Recommended number of typical users per Array is 20.
Physical	Diameter: 12.58 inches (31.95 cm) Height: 2.58 inches (6.55 cm) Weight: 4lbs (1.81 kg)
Environmental	Operating Temperature: -10°C to 50°C 0% to 90% relative humidity (non-condensing) Storage Temperature: -20°C to 60°C 5% to 95% relative humidity (non-condensing) Maximum Operating Altitude: 2000 meters (6561 feet)
System	825 MHz CPU 128MB RAM, expandable 512MB system flash, expandable Expansion slot for future options
Electrical	Input Power (AC version): 90VAC to 265VAC at 47Hz to 63Hz Input Power (DC version): 48VDC
Interfaces	Serial: 1 x RS232 – RJ45 connector Ethernet Interfaces: 1 x Gigabit 10/100/1000 Mbps w/failover Status LEDs: System status, Ethernet, Radio

Element	Specifications
Management	Web-based HTTPS SNMP v3 CLI via SSHv2 or Telnet FTP TFTP Serial Proprietary Xirrus Wireless Management System Syslog reporting for alerts/alarms
Networking	DHCP client, DHCP server, NTP client RFC
VLAN Support	802.1Q, P VLAN Supports up to 16 VLANs
Multiple SSID Support	Allows up to 16 separate SSIDs to be defined with map security, VLAN and QoS settings for each SSID
Performance	Client Load Balancing Automatic load balancing between system radios Quality of Service: 802.1P wired traffic prioritization Wireless packet prioritization MAP CoS to TCID Fair queuing of downstream traffic

A large orange semi-circle is positioned on the right side of the page, partially overlapping the table.

Element	Specifications
Security	Wireless Security: - WEP 40bit/128bit encryption - WPA with TKIP and AES encryption - Misappropriated APs automatically reset to factory defaults (requires the Xirrus Wireless Management System) - Rogue AP detection, with alerts and classification User and System Authentication: - WPA Pre-Shared Key authentication - Embedded RADIUS Server 802.1x EAP-TLS 802.1x EAP-TTLS 802.1x PEAP - External RADIUS servers - Authentication of Xirrus Arrays to the Xirrus Management System (XM-3300)

Element	Specifications
Wireless	Number of Radios: 4 x 802.11a/b/g radios Wireless Standards: 802.11a/b/g and g-only mode 802.11e (draft), 802.11i Channel Selection: Manual Automatic Frequency Bands: 11a: 5.15-5.25 GHz (UNII 1) 11a: 5.15-5.25 GHz (TELEC) 11a: 5.25-5.35 GHz (UNII 2) 11a: 5.470-5.725 (ETSI) 11a: 5.725-5.825 GHz (UNII 3) 11b/g: 2.412-2.462 GHz (FCC) 11b/g: 2.412-2.472 GHz (ETSI) 11b/g: 2.412-2.484 GHz (TELEC) Antenna: 4 internal 3 dBi 180° 802.11b/g sectorized antennas 1 internal 2 dBi 360° omni-directional antenna External RP-TNC connector Radio Approvals: FCC (United States) EN 301.893 (Europe)
Compliance	UL / cUL 60950 and EN 60950 FCC Part 15.107 and 15109, Class A EN 301.489 (Europe)
Warranty	One year (hardware), 90 day (software)

Installing the Xirrus Array

This chapter defines the prerequisites for installing the Xirrus Array and provides instructions to help you complete a successful installation. Section headings for this chapter include:

- “Installation Prerequisites” on page 21
- “Planning Your Installation” on page 24
- “Installation Workflow” on page 39
- “Unpacking the Xirrus Array” on page 40
- “Installing Your Xirrus Wireless LAN Array” on page 41
- “Powering Up the Xirrus Wireless LAN Array” on page 51
- “Establishing Communication with the Array” on page 53
- “Performing the Express Setup Procedure” on page 54

Installation Prerequisites

Your Xirrus Array deployment requires the presence of hardware and services in the host wired/wireless network, including:

- **Dedicated AC power outlet**
Unless you are using the Xirrus Remote DC Power System (XP-3100) with the DC version of the Xirrus Array, you need a dedicated power outlet to supply AC power to each unit deployed at the site. If you are using the optional XP-3100, then DC power is supplied to all units and only one AC outlet is required for the XP-3100.
- **Ethernet port** (read notes)
You need at least one 10/100/1000 BaseT port to establish wired Gigabit Ethernet connectivity (via the product’s [Gigabit 1](#) or [Gigabit 2](#) port) and one 10/100 BaseT port (if desired) for product management.
 *The Array’s Ethernet ports should be plugged into an Ethernet switch, not an Ethernet hub—if a hub is used, we recommend that you connect only one Ethernet port.*



The Gigabit1 Ethernet interface is the primary port for both data and management traffic. If a single Ethernet connection is used, it must be connected to the Gigabit1 Ethernet interface.

The 10/100 Ethernet Port can be used for managing the Array, and will only bridge management traffic. See also, "Port Failover Protection" on page 33.

- **Secure Shell (SSH) utility**

To establish secure remote command line access to the Array, you need a Secure Shell (SSH) utility, such as PuTTY.

- **Secure Web browser**

Either Internet Explorer (version 6.0 or higher), Netscape Navigator (version 7.0 or higher), or Mozilla Firefox (version 1.01 or higher) and it must be available on the same subnet as the Array. A secure Web browser is required for Web-based management of the Array.

- **Serial connection capability**

To connect directly to the console port on the Array, your computer must be equipped with a male 9-pin serial port and terminal emulation software (for example, HyperTerminal).

Use the following settings when establishing a serial connection:

Bits per second	115,200
Data bits	8
Parity	None
Stop bits	1
Flow control	None

Optional Network Components

The following network components are optional.

- **DHCP server**
To distribute IP addresses and ancillary information to your Xirrus Array.
- **Xirrus Wireless Management System (XM-3300)**
The optional XM-3300 offers powerful management features for small or large Xirrus Array deployments.
- **Xirrus Remote DC Power System (XP-3100)**
The optional XP-3100 provides distributed DC power to multiple Arrays, eliminating the need to run dedicated AC power to each unit and facilitating backup power when connected via a UPS.
- **External RADIUS server**
Although your Array comes with an embedded [RADIUS](#) server, for 802.1x authentication in large deployments you may want to add an external RADIUS server.

Client Requirements

The Xirrus Array should only be used with Wi-Fi certified client devices.

Planning Your Installation

This section provides guidelines and examples to help you plan your Xirrus Array deployment to achieve the best overall coverage and performance. We recommend you conduct a site survey to determine the best location and settings for each Array you install.

General Deployment Considerations

The Xirrus Array's unique multi-radio architecture generates 360 degrees of sectorized high-gain 802.11a/b/g coverage that provides extended range. However, the number, thickness and location of walls, ceilings or other objects that the wireless signals must pass through may affect the range. Typical ranges vary depending on the types of materials and background RF (radio frequency) noise at your location. To maximize wireless range, follow these basic guidelines:

1. Keep the number of walls and ceilings between the Array and your receiving devices to a minimum—each wall or ceiling can reduce the wireless range from between 3 and 90 feet (1 to 30 meters). Position your devices so that the number of walls or ceilings is minimized.
2. Be aware of the direct line between each device. For example, a wall that is 1.5 feet thick (half a meter) at 90° is actually almost 3 feet thick (or 1 meter) when viewed at a 45° angle. At an acute 2° degree angle the same wall is over 42 feet (or 14 meters) thick! For best reception, try to ensure that your wireless devices are positioned so that signals will travel straight through a wall or ceiling.

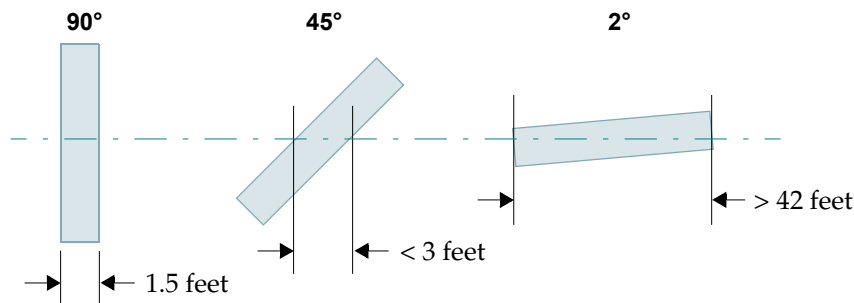


Figure 8. Wall Thickness Considerations

3. Building materials can make all the difference. For example, solid metal doors or aluminum wall studs may adversely effect wireless signals. Try to position wireless client devices so that the signal passes through drywall (between studs) or open doorways and not other materials.

Coverage and Capacity Planning

This section considers coverage and capacity for your deployment(s), including placement options, RF patterns and cell sizes, area calculations, roaming considerations, and channel allocations.

Placement

Use the following guidelines when considering placement options:

1. The best placement option for the Array is ceiling-mounted within an open plan environment (cubicles rather than fixed walls).
2. Keep the Array away from electrical devices or appliances that generate RF noise. Because the Array is generally mounted on ceilings, be aware of its position relative to lighting (especially fluorescent lighting)—we recommend maintaining a distance of at least 3 to 6 feet (or 1 to 2 meters).
3. If using multiple Arrays at the same location, we recommend maintaining a distance of at least 100 feet between units.

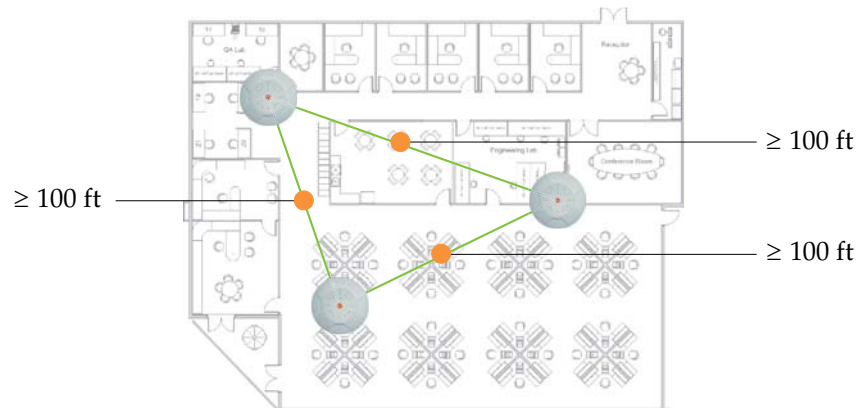


Figure 9. Unit Placement

RF Patterns

The Xirrus Array allows you to control—automatically or manually—the pattern of wireless coverage that best suits your deployment needs. You can choose to operate with full coverage, half coverage, or custom coverage (by enabling or disabling individual sectors).

Full (Normal) Coverage

In normal operation, the Array provides a full 360 degrees of coverage.

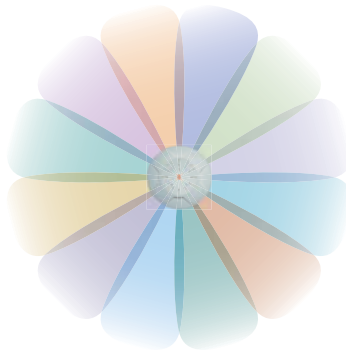


Figure 10. Full (Normal) Coverage

Half Coverage

If installing a unit close to an exterior wall, you can deactivate half of the radios to prevent redundant signals from “bleeding” beyond the wall and extending service into public areas. The same principle applies if you want to restrict service to an adjacent room within the site.

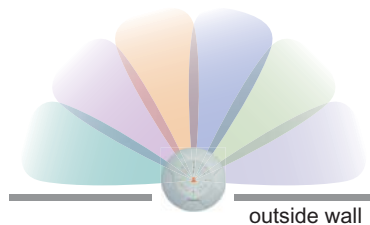


Figure 11. Adjusting RF Patterns

Custom Coverage

Where there are highly reflective objects in close proximity to the Array, you can turn off specific radios to avoid interference and feedback.

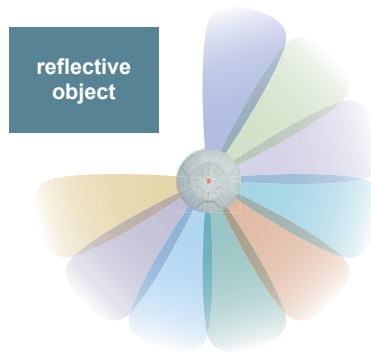


Figure 12. Custom Coverage

Calculating Areas

Before we discuss cell sizes, it is useful to know how to calculate the area of a circle (because the Array radiates a full 360 degrees). The area of a circle is equal to pi (π) times the square of the radius, where pi is equal to 3.14. The following graphic calculates the area of a circle with a radius of 20 feet.

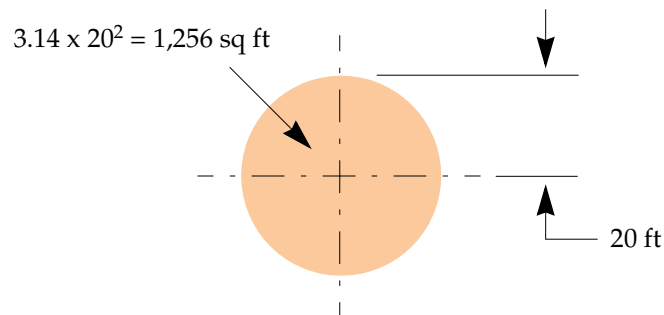


Figure 13. Calculating the Area of a Circle

Capacity and Cell Sizes

Cell sizes should be calculated based on the number of users, the applications being used (for example, data/video/voice), and the number of Arrays available at the location. The capacity of a cell is defined as the minimum data rate desired for each sector multiplied by the total number of sectors being used.

The following chart shows the **maximum** recommended cell sizes for each data rate.

Desired Data Rate (Mbps)	11a Cell Size		11b/g Cell Size	
	Radius (feet)	Area (sq. feet)	Radius (feet)	Area (sq. feet)
54	100	31,400	104	33,962
48	185	107,466	183	105,155
36	247	191,568	260	212,264
24	278	242,672	283	251,479
18	309	299,810	338	358,726
12	339	360,852	364	416,037
9	371	432,193	374	439,211
6	402	507,437	390	477,594
11	0	0	416	543,396
5.5	0	0	437	649,295
2	0	0	458	658,659
1	0	0	468	687,735

Sample 802.11a Cells

The following 802.11a sample cells illustrate the coverage area and minimum throughput you can expect (per sector) based on the size of each cell. Notice how the throughput increases as the cell size decreases, and vice versa.

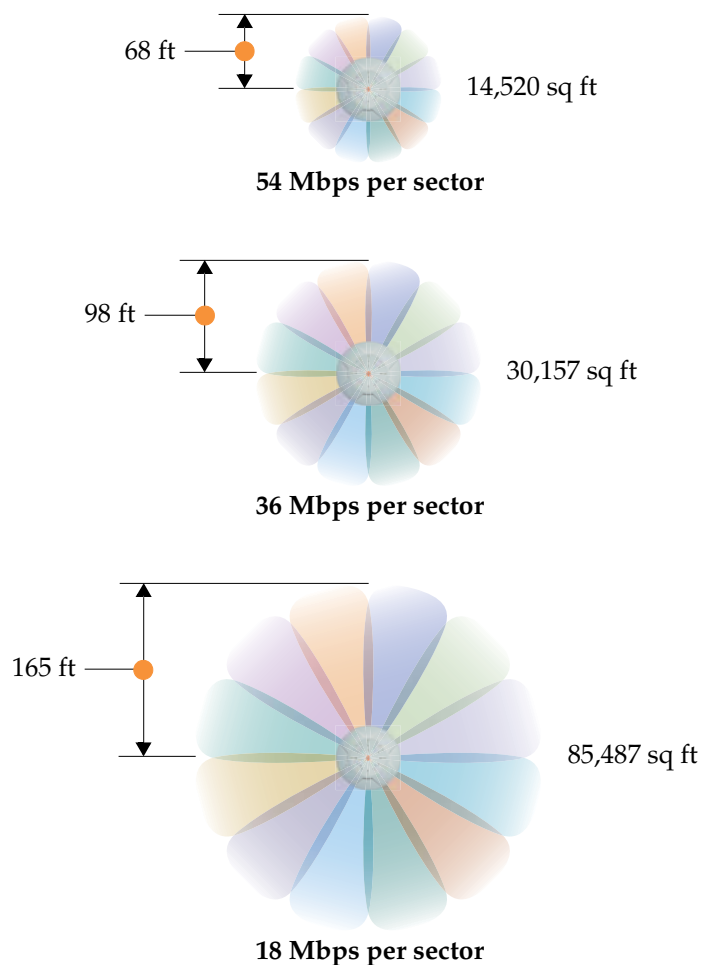


Figure 14. Sample 802.11a Cells

Fine Tuning Cell Sizes

Adjusting the [transmit power](#) allows you to fine tune cell sizes. There are three settings—Large, Medium, or Small (the default is Large). If you are installing many units in close proximity to each other, reduce the transmit power to avoid excessive interference with other Arrays or installed APs. See also, “[IAP Settings](#)” on page 90.

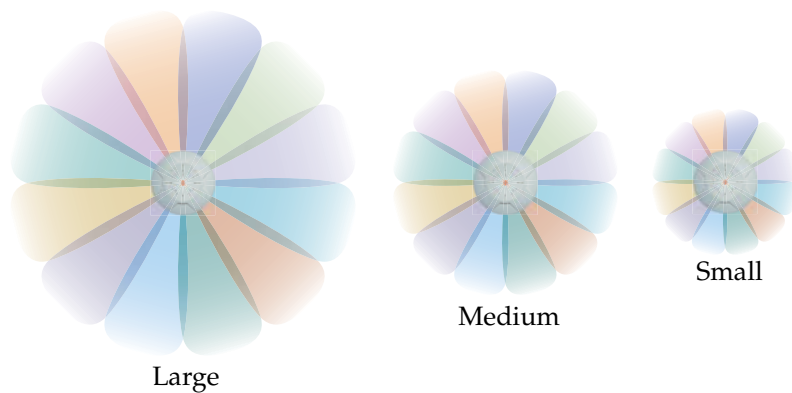


Figure 15. Transmit Power

Roaming Considerations

Cells should overlap approximately 10 - 15% to accommodate client roaming.

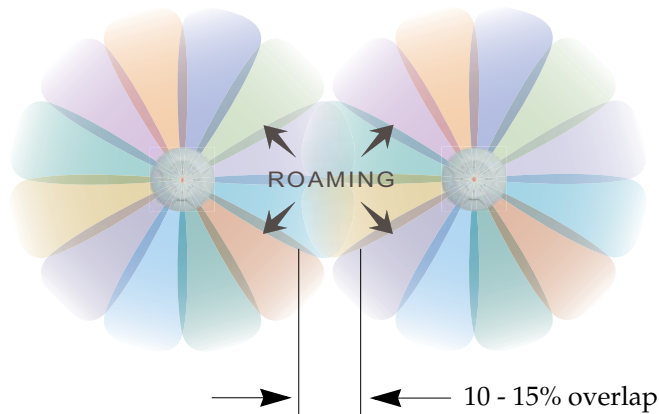


Figure 16. Overlapping Cells

Allocating Channels

Because the Xirrus Array is a multi-channel device, allocating the best channels to radios is important if peak performance is to be maintained.

Automatic Channel Selection

We recommend that you allow the Array to make intelligent channel allocation decisions automatically. In the automatic mode, channels are allocated dynamically, driven by changes in the environment.

Manual Channel Selection

You can manually assign channels on a per radio basis, though manual selection is not recommended (and not necessary).



To avoid co-channel interference, do not select adjacent channels for radios that are physically next to each other.

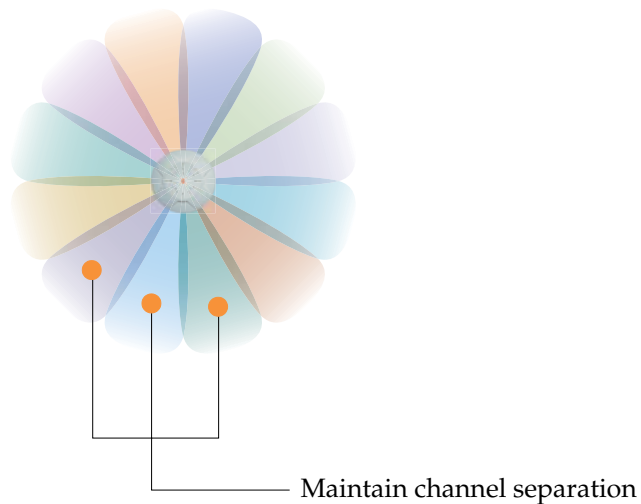


Figure 17. Allocating Channels Manually

Deployment Examples

The following examples employ 802.11a cells, each offering minimum throughputs of 54 Mbps, 36 Mbps, and 18 Mbps per sector respectively, and assume a floor plan covering a total area of about 60,000 square feet.

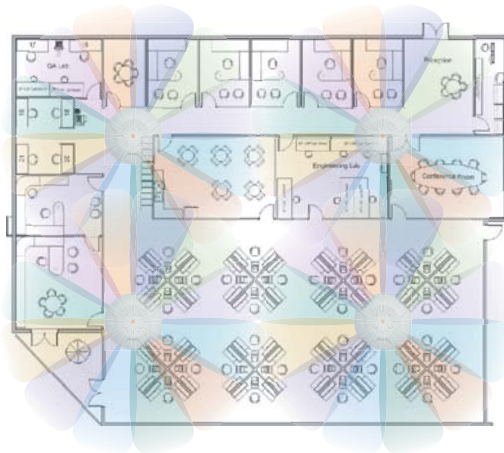


Figure 18. Deployment Scenario (54 Mbps)—Per Sector



Figure 19. Deployment Scenario (36 Mbps)—Per Sector



Figure 20. Deployment Scenario (18 Mbps)—Per Sector

Failover Planning

This section discusses failover protection at the unit and port levels.

Port Failover Protection

To ensure that service is continued in the event of a port failure, you can utilize the Gigabit 1 and Gigabit 2 ports simultaneously.

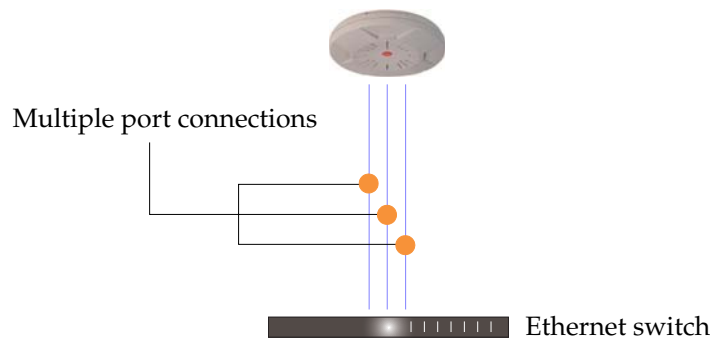


Figure 21. Port Failover Protection

In addition, the Array has full failover protection between the Gigabit 1 and Gigabit 2 Ethernet ports (see following table).

Interface	Bridges Data?	Bridges Management Traffic?	Fails Over To:	IP address
Fast Ethernet	No	Yes	None	DHCP or static
Gigabit 1	Yes	Yes	Gigabit 2	DHCP or static
Gigabit 2	Yes	Yes	Gigabit 1	Assumes the IP address of Gigabit 1

Switch Failover Protection

To ensure that service is continued in the event of a switch failure, you can connect Arrays to more than one Ethernet switch (not a hub).

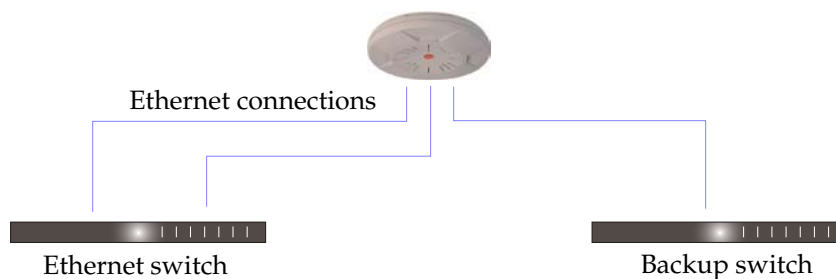


Figure 22. Switch Failover Protection



Gigabit Ethernet connections must be on the same subnet.

Power Planning

This section discusses the AC and DC power options.

AC Power

The AC power option requires a direct connection between the Array and a dedicated AC power outlet. The power cord is provided with the unit.

Remote Distributed DC Power

To deliver DC power to the Array, you must have the optional Xirrus Remote DC Power System (XP-3100) and a Xirrus Array that supports DC power—see [Figure 4 on page 8](#). The XP-3100 provides DC power to multiple Arrays from a single source, and requires only one AC power outlet.

Depending on the type of cable used, Arrays can be located up to 1,000 feet from the XP-3100. In addition, the XP-3100 can be plugged into a UPS to prevent power failure to all Arrays in the network.



When using CAT5 cable, DC power can be provided up to a distance of 300 feet.

Security Planning

This section offers some useful guidelines for defining your preferred encryption and authentication method. For additional information, go to the [Security](#) section of “Frequently Asked Questions” on page 222.

Wireless Encryption

Encryption ensures that no user can decipher another user’s data transmitted over the airwaves. There are three encryption options available to you, including:

- **WEP-40bit or WEP-128bit**
Because WEP is vulnerable to cracks, we recommend that you only use this for legacy devices that cannot support a stronger encryption type.
- **Wi-Fi Protected Access**
This is much more secure than WEP and uses TKIP for encryption.

- **Wi-Fi Protected Access with AES**

This is government-grade encryption—available on most new client adapters—and uses the AES-CCM encryption mode (Advanced Encryption Standard–Counter Mode).

Authentication

Authentication ensures users are who they say they are, and occurs when users attempt to join the wireless network and periodically thereafter. The following authentication methods are available with the XS-3900:

- **RADIUS 802.1x**

802.1x uses a remote RADIUS server to authenticate large numbers of clients, and can handle different authentication methods (EAP-TLS, EAP-TTLS, EAP-PEAP).

- **Xirrus internal RADIUS server**

Includes all the core functionality of a full RADIUS server built into the Xirrus Array. Recommended for smaller numbers of users (about 100 or less).

- **Pre-Shared Key**

Uses a pass-phrase or key that is manually distributed to all authorized users. The same passphrase is given to client devices and entered into each Array.

- **MAC Access Control Lists (ACLs)**

MAC access control lists provide a list of client adapter MAC addresses that are allowed or denied access to the wireless network, and can be used in addition to any of the above authentication methods. ACLs are good for embedded devices, like printers and bar-code scanners (though MAC addresses can be spoofed). The Xirrus Array supports 512 ACL entries.

Network Management Planning

Network management can be performed using any of the following methods:

- Command Line Interface, using an SSH (Secure Shell) utility, like PuTTY.
- Web-based management, using the Array's embedded Web Management Interface (WMI). This method provides configuration and basic monitoring tools, and is good for small deployments (one or two units).
- Web-based management, using the optional Xirrus Wireless Management System (XM-3300). The XM-3300 is used for managing large Array deployments from a centralized Web-based interface and offers the following features:
 - ◆ Layer 3 appliance
 - ◆ Globally manage large numbers of Arrays
 - ◆ Seamless view of the entire wireless network
 - ◆ Easily configure large numbers of Arrays
 - ◆ Rogue AP monitoring
 - ◆ Easily manage system-wide firmware updates
 - ◆ Monitor performance and trends
 - ◆ Aggregation of alerts and alarms



Deployment Summary

The following table summarizes your deployment options for small and large deployments.

Function	Number of Xirrus Arrays	
	One or Two	Three or More
Power	AC DC (with XP-3100)	AC DC (with XP-3100) UPS backup (recommended)
Failover	Recommended	Highly recommended
VLANs	Optional	Optional use, Can be used to put all APs on one VLAN or map to existing VLAN scheme
Encryption	WPA with TKIP (recommended) PSK or 802.1x	WPA with AES (recommended) 802.1x keying
Authentication	Internal RADIUS server Pre-Shared Key	External RADIUS server
Management	Internal WMI Internal CLI XM-3300	XM-3300

Installation Workflow

This workflow illustrates the steps that are required to install and configure your Xirrus Array successfully. Review this flowchart before attempting to install the unit on a customer's network.

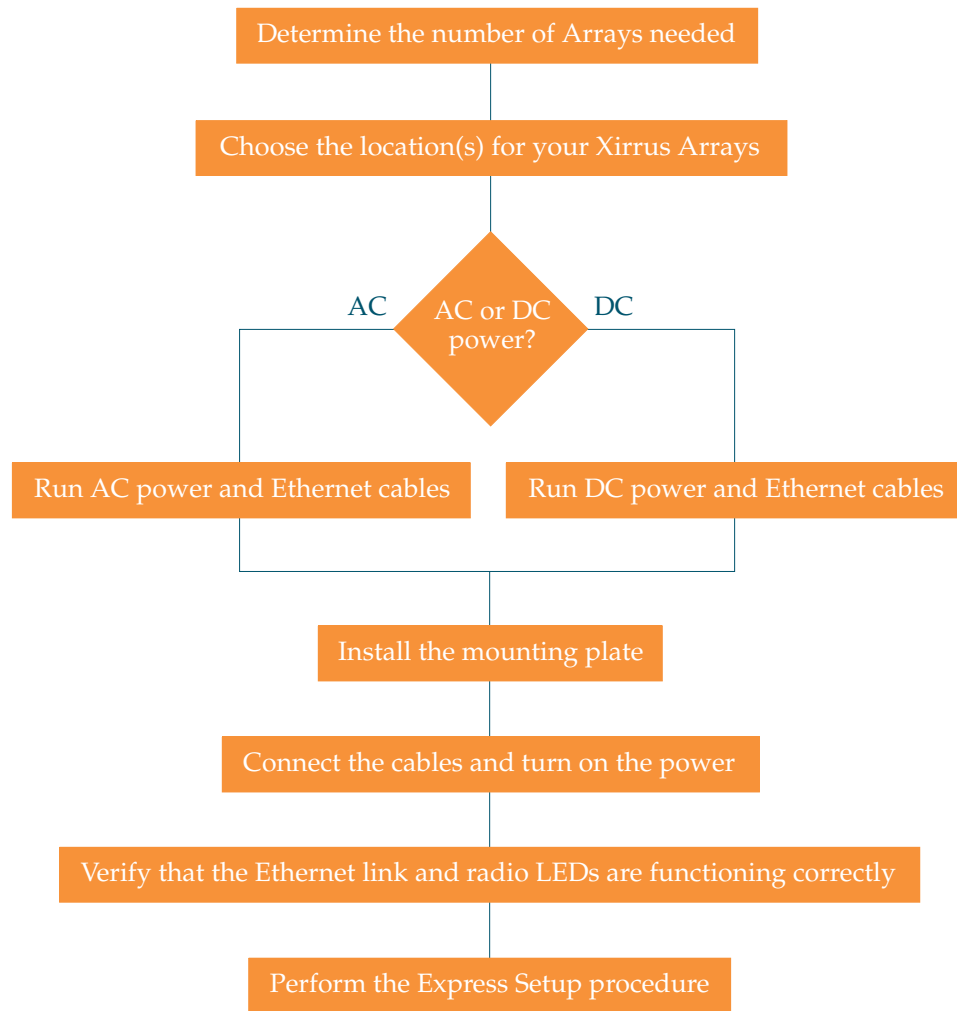


Figure 23. Installation Workflow

Unpacking the Xirrus Array

When you unpack your Xirrus Array, you will find the following items in the carton:

An orange semi-circle graphic is located to the left of the table.

Item	Quantity
Xirrus Wireless LAN Array	1
AC power cord	1
Console cable	1
Mounting plate	1
Mounting screws	4
Tile grid mounting clamps	4
Clamp nuts	4
Mounting template	1
CD-ROM containing: This User's Guide in PDF format End User License Agreement (EULA) README file	1
Quick Install Guide	1
Registration Card	1

Installing Your Xirrus Wireless LAN Array

This section provides instructions for installing your Xirrus Wireless LAN Array.

Choosing a Location

Based on coverage, capacity and deployment examples discussed earlier in this chapter, choose a location for the Array that will provide the best results for your needs. The Xirrus Array was designed to be mounted on a ceiling where the unit is unobtrusive and wireless transmissions can travel unimpeded throughout open plan areas. Choose a location that is central to your users (see the following diagram for correct placement).

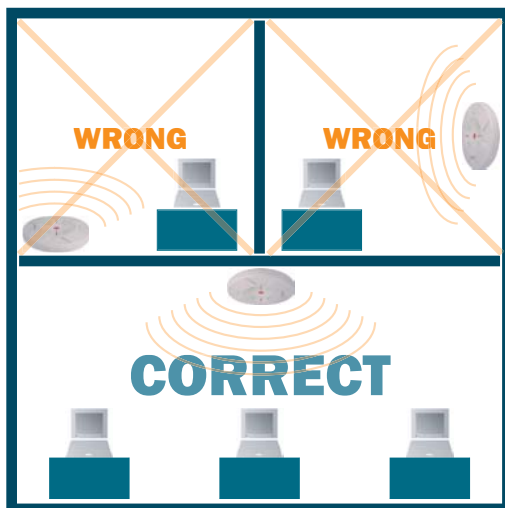


Figure 24. Array Placement

Wiring Considerations

Unless you are using the Xirrus Remote DC Power System (XP-3100) with the DC version of the Array, an AC power outlet must be available to the Array (an AC power cord is provided with each unit). If you are using the XP-3100 to distribute DC power to multiple Arrays, go to [“Remote DC Power System \(Optional\)”](#) on [page 8](#).

Once you have determined the best location for your Xirrus Array, you must run cables to the location for the following services:

Power

- Dedicated AC power
- DC power (if using the XP-3100)

Network

- Gigabit 1
- Gigabit 2 (optional, not available on the XS-3500)
- Fast Ethernet (optional, not available on the XS-3500)
- Serial cable

Important Notes About Network Connections

Read the following notes before making any network connections.

 *The Array's Ethernet ports should be plugged into an Ethernet switch, not an Ethernet hub—if a hub is used, we recommend that you connect only one Ethernet port.*

 *The Gigabit1 Ethernet interface is the primary port for both data and management traffic. If a single Ethernet connection is used, it must be connected to the Gigabit1 Ethernet interface.*

The 10/100 Ethernet Port can be used for managing the Array, and will only bridge management traffic. See also, "Port Failover Protection" on page 33.



When the unit's IP address is unknown or a network connection has not been established, the serial cable is used for connecting directly with the Command Line Interface (CLI) via HyperTerminal. When a network connection is established, the Array can be managed from any of the available network connections, either Fast Ethernet, Gigabit 1 or Gigabit 2.

Mounting the Unit

Most offices have drop-down acoustical ceiling tiles set into a standard grid. The Xirrus Array has been designed to enable mounting to a tiled ceiling via a mounting plate and clamps that attach to the grid. Once the mounting plate is attached, the Array simply rotates onto the plate (similar to a smoke detector). Once the unit is mounted it can be removed and re-attached easily, without the need for tools or modifications to the original installation.

This section assumes that you are mounting the Array to a tiled ceiling. If your ceiling is not tiled, the mounting plate can be attached directly to the ceiling with the screws and anchors provided (without using the tile grid mounting clamps).

Attaching the T-Bar Clips

The T-bar clips are used to create four mounting points on the ceiling tile grid for the Array mounting plate. Use the mounting template (provided) to find the correct location for all four clamps. To attach the clamps, simply twist the clamps onto the grid and tighten the screw post with a screwdriver.

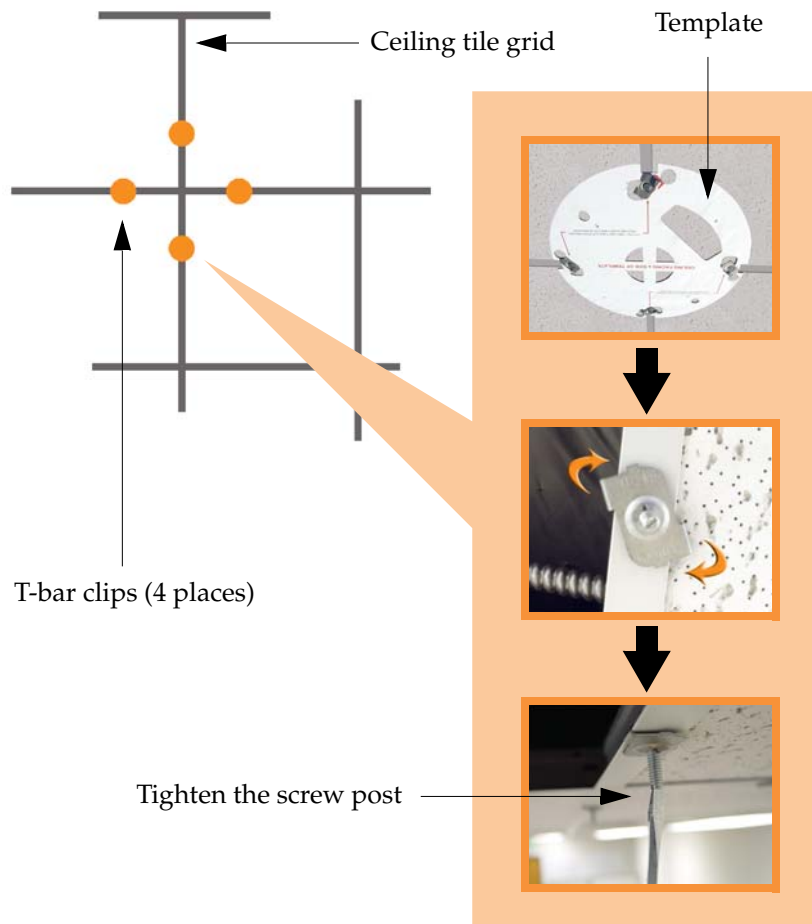


Figure 25. Attaching the T-Bar Clips

Installing the Mounting Plate

If necessary, orient the mounting plate (see “Attaching the T-Bar Clips” on [page 44](#)) and locate the plate on the four screw posts. Secure the mounting plate to the four clamps using the nuts provided. Once the mounting plate is secured, cut an access hole in the ceiling tile for the cables.

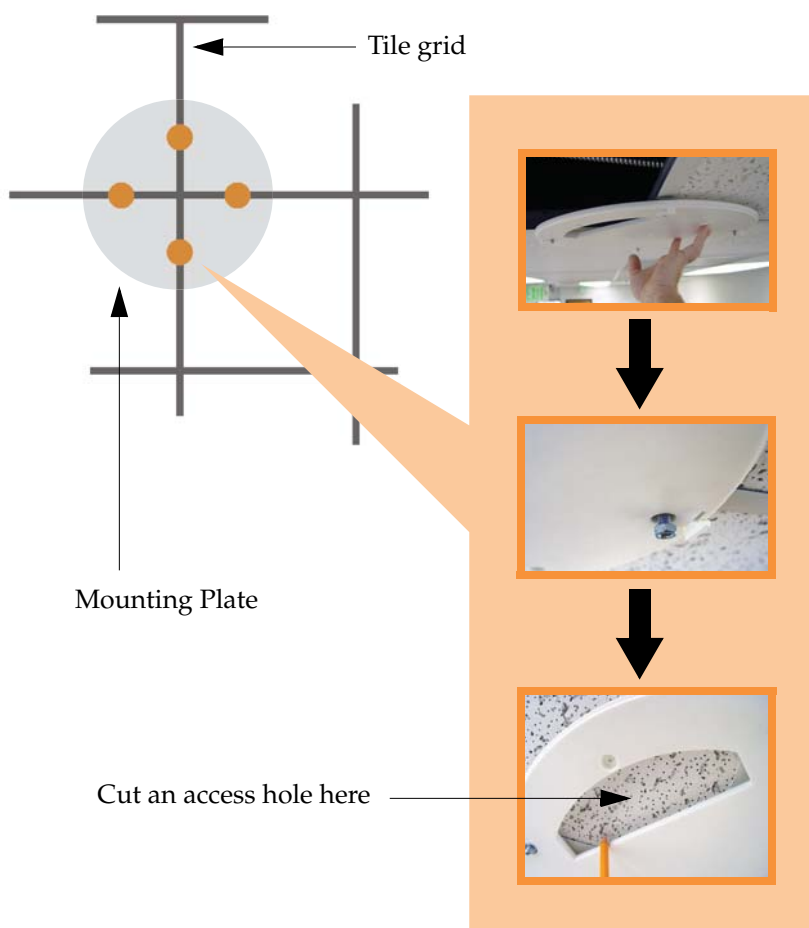


Figure 26. Installing the Mounting Plate (XS-3900 shown)

Connecting the Cables

Feed the power and Ethernet cables through the access hole in the tile and the mounting plate (XS-3900), then connect the cables to the unit. See also, “[Wiring Considerations](#)” on page 42.

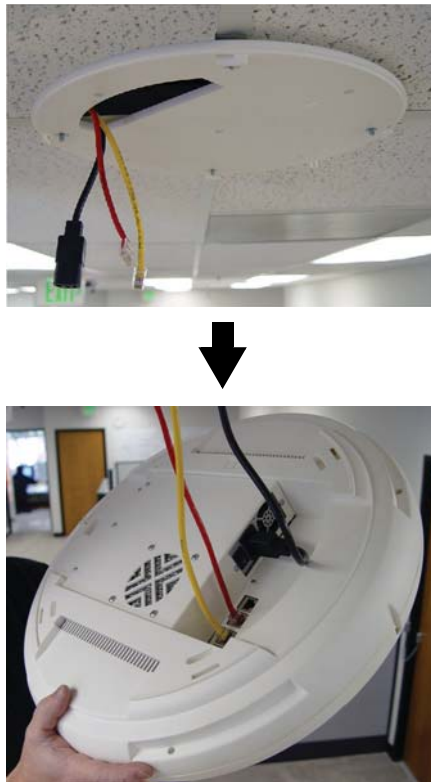


Figure 27. Connecting the Cables

When the cables are connected, turn on the power switch—before attaching the unit to the mounting plate (next step). Verify that the Ethernet link LED lights and the LED boot sequence begins. The radio LEDs on the front of the unit will illuminate in rotation, indicating that the Xirrus Array software is loading and the unit is functioning correctly.

Attaching the Array to the Mounting Plate (XS-3900)

Align the port recess on the Array with the access hole in the mounting plate, then connect the Array with the lugs on the mounting plate (4 places) and turn the Array clockwise to lock the unit into place (similar to a smoke detector).



Figure 28. Attaching the Unit (XS-3900)

Attaching the Array to the Mounting Plate (XS-3500)

Align the XS-3500 Wireless LAN Array with the key post on the mounting plate, then turn the Array to the right to lock the unit into place at the 4 lugs—similar to a smoke detector.

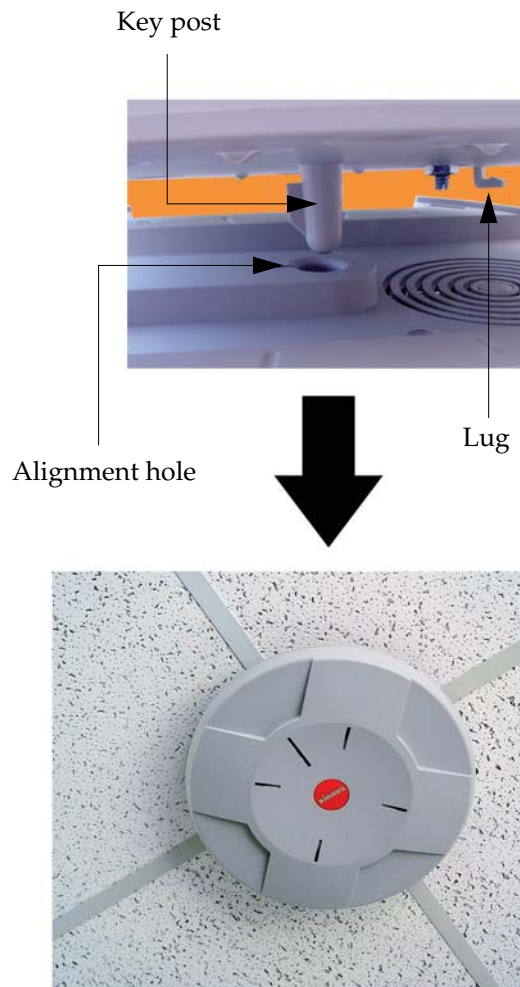
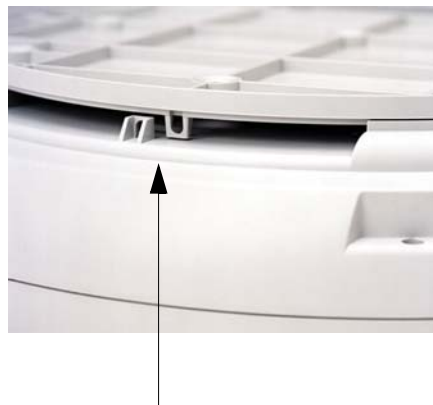


Figure 29. Attaching the Unit (XS-3500)

Securing the Array

For added security, there is a locking bracket incorporated into the mounting plate, which will accept a small luggage-style padlock (if desired). There is also a Kensington lock slot located near the Ethernet ports. In addition, the mounting plate incorporates a positive locking tab that prevents the unit from being inadvertently released.



Locking bracket

Figure 30. Securing the Array

Now that the Array is physically installed, you must run the Express Setup procedure from the unit's Web Management Interface to enable the radios and establish initial system configuration settings. Go to [“Powering Up the Xirrus Wireless LAN Array” on page 51](#).

Dismounting the Array

To dismount the Array, place your fingers so as to increase the space between the Array and the mounting plate at the positions indicated by the decals on the mounting plate—these are aligned with IAPs (radios) abg1 and abg3, as indicated on the clock-face of the Array.

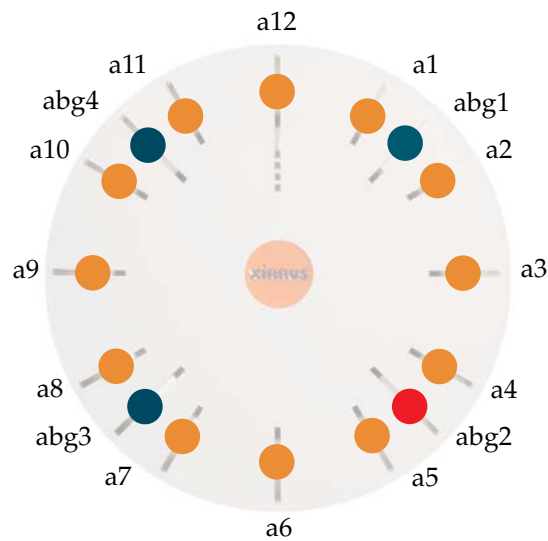


Figure 31. IAP Positions (XS-3900)

Powering Up the Xirrus Wireless LAN Array

When powering up, the Array follows a specific sequence of LED patterns showing the boot progress, and following a successful boot will provide extensive status information. The normal boot sequence is as follows:

1. The green status LED will light first, showing a steady flashing while the unit boots. In the event of a boot failure, this LED will change to flashing red.
2. The Ethernet Link/Activity LEDs on the underside of the Array will light for those ports connected to the network.
3. All IAP radio LEDs will light simultaneously.
4. While the Array is booting, a sequential LED pattern will cycle through all the radio LEDs.
5. When the Array completes boot, the status LED will show a steady green, and all radio lights will show the current state of those radios.

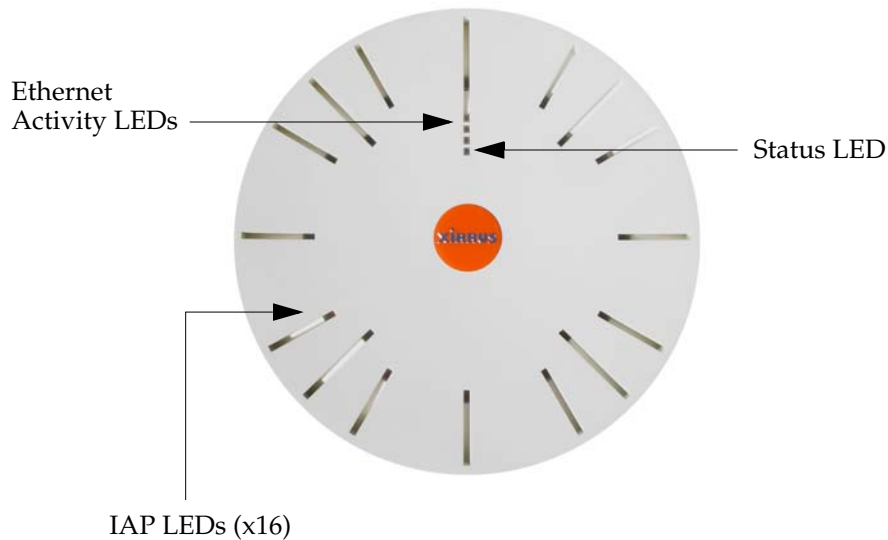


Figure 32. LED Locations (XS-3900)

Once the unit is fully booted the default IAP LED display will be as follows:

- IAP radio LEDs that are enabled will show a steady orange for 802.11a radios, or green for 802.11b/g radios.
- Once a client associates with an individual IAP, that LED will show a slow flash (heartbeat) pattern.
- When data is transmitted or received by an IAP, that IAP's LED will flash. The rate of flashing changes with the number of packets sent or received per second—the LED will flash more quickly with a greater number of packets per second and more slowly with lower numbers of packets per second.

These settings may be altered or disabled entirely for diagnostic purposes or for personal preference. Changes are made via the Array's Command Line Interface or the Web Management Interface—refer to “IAP LED Settings” on page 103.

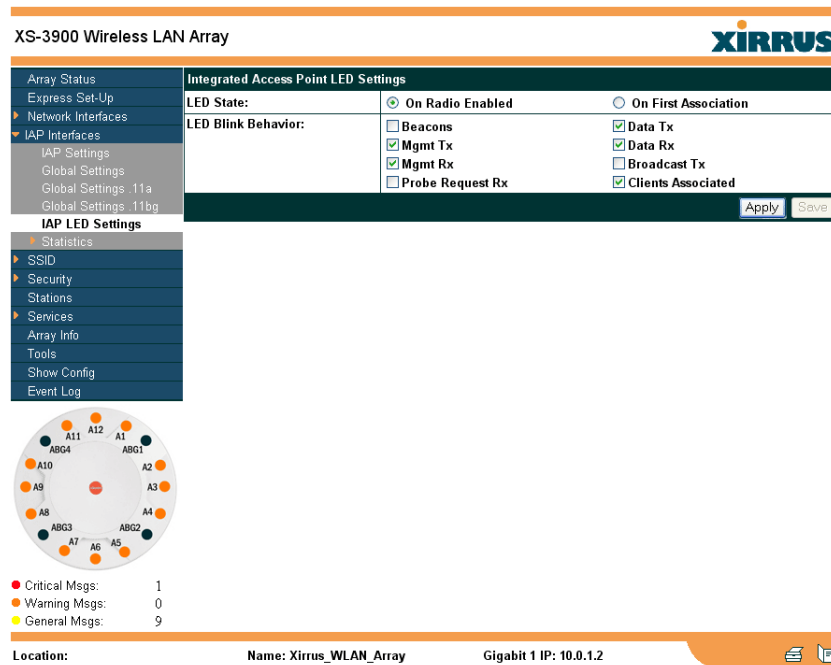


Figure 33. WMI: IAP LED Settings Page

Establishing Communication with the Array

The Array can be configured through the Command Line Interface (CLI) or the graphical Web Management Interface (WMI). You can use the CLI via the serial management port, the Fast Ethernet port, or either of the Gigabit Ethernet ports. You can use the WMI via any of the Array's Ethernet ports.

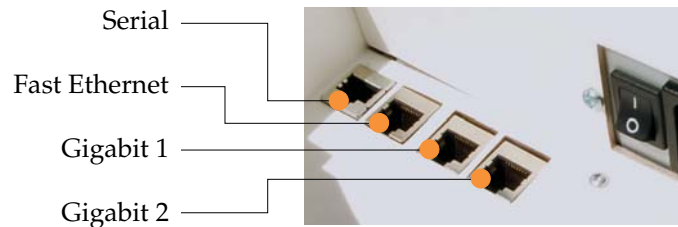


Figure 34. Network Interface Ports

Using the Serial Port

If using the serial port to make your connection, use serial settings of 8 bits, no parity, 1 stop bit (8N1) and a speed setting of 115200 baud. Use the communication package of your choice.

Using the Ethernet Ports

If the Array is booted and does not receive DHCP addresses on either the Fast Ethernet or Gigabit Ethernet ports, the Fast Ethernet port will default to an IP address of 10.0.0.1 and both Gigabit Ethernet ports will default to 10.0.1.1 and 10.0.2.1 respectively. If the Array is connected to a network that provides DHCP addresses, the IP address can be determined by the following two methods:

1. Examine the DHCP tables on the server and find the addresses assigned to the Array (Xirrus MAC addresses begin with 000F7D).
2. Query the Array using the CLI via the serial port. Use the **show ethernet** command to view the IP addresses assigned to each port.

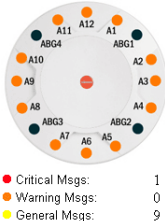
Logging In

When logging in to the Array, use the default user name and password—the default user name is **admin**, and the default password is **admin**.

Performing the Express Setup Procedure

The Express Setup procedure allows you to establish global configuration settings that will enable basic Array functionality. Any changes you make on this page will affect all radios. When finished, click on the **Apply** button to apply the new settings to this session, then click on the **Save** button to save your changes.

XS-3900 Wireless LAN Array



Express Set-Up

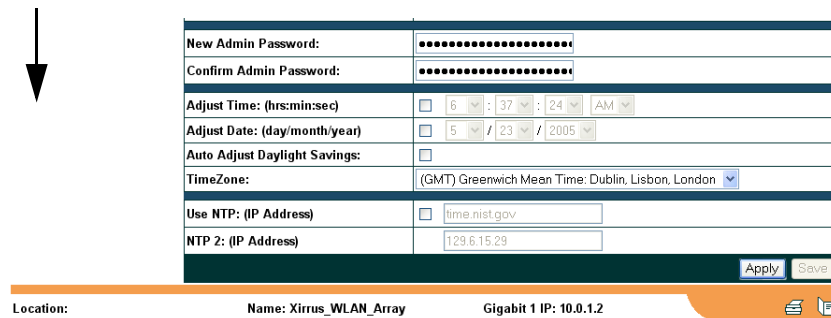
XIRRUS

Express Set-Up	Host Name: Xirus_WLAN_Array
Network Interfaces	Location Information:
IAP Interfaces	Admin Contact:
SSID	Admin Email:
Security	Admin Phone:
Stations	Enable/Configure All IAP's: Execute
Services	10/100 Megabit Settings
Array Info	Enable Interface: ☒ Yes ☐ No
Tools	Allow Management On Interface: ☒ Yes ☐ No
Show Config	Configuration Server Protocol: ☒ DHCP ☐ Static
Event Log	IP Address: 192.168.0.7
	IP Subnet Mask: 255.255.255.0
	Default Gateway: 192.168.0.1
	Gigabit Interface 1 Settings
	Enable Interface: ☒ Yes ☐ No
	Allow Management On Interface: ☒ Yes ☐ No
	Configuration Server Protocol: ☒ DHCP ☐ Static
	IP Address: 10.0.1.2
	IP Subnet Mask: 255.0.0.0
	Default Gateway:
	Gigabit Interface 2 Settings
	Enable Interface: ☒ Yes ☐ No
	Allow Management On Interface: ☒ Yes ☐ No
	Configuration Server Protocol: ☒ DHCP ☐ Static
	IP Address: 10.0.1.2
	IP Subnet Mask: 255.0.0.0
	Default Gateway:
	SSID: (Wireless Network Name) xirus
	Wireless Security: Open
	Wireless Key/Passphrase:
	Confirm Key/Passphrase:

↓
more ...

Figure 35. WMI: Express Setup Page (Part 1)

... continued



The screenshot shows a web-based configuration interface for a Wireless LAN Array. It includes fields for setting a new admin password and confirming it. Below these are time and date adjustment options, including a time zone dropdown menu. There are also checkboxes for using NTP (Network Time Protocol) and a field for NTP 2 IP address. At the bottom, there are 'Apply' and 'Save' buttons. A status bar at the very bottom displays the location, name, and IP address of the device.

New Admin Password:	
Confirm Admin Password:	
Adjust Time: (hrs:min:sec)	☐ 6 : 37 : 24 AM
Adjust Date: (day/month/year)	☐ 5 / 23 / 2005
Auto Adjust Daylight Savings:	☐
TimeZone:	(GMT) Greenwich Mean Time: Dublin, Lisbon, London
Use NTP: (IP Address)	☐ time.nist.gov
NTP 2: (IP Address)	129.6.15.29

Location: Name: Xirrus_WLAN_Array Gigabit 1 IP: 10.0.1.2

Figure 36. WMI: Express Setup Page (Part 2)

Procedure for Performing an Express Setup

1. **Host Name:** Specify a unique **host name** for this Array. The host name is used to identify the Array on the network. Use a name that will be meaningful within your network environment, up to 64 alphanumeric characters.
2. **Location Information:** Enter a brief but meaningful description that accurately defines the physical location of the Array. In an environment where multiple units are installed, clear definitions for their locations are important if you want to identify a specific unit.
3. **Admin Contact:** Enter the name and contact information of the person who is responsible for administering the Array at the designated location.
4. **Admin Email:** Enter the email address of the admin contact you entered in Step 3.
5. **Admin Phone:** Enter the telephone number of the admin contact you entered in Step 3.
6. **Enable/Configure All IAPs:** Click on the **Execute** button to enable and auto configure all IAPs (a message displays the countdown time—in seconds—to complete the auto-configuration task).

7. Configure the **Fast Ethernet** (10/100 Megabit), **Gigabit 1** and **Gigabit 2** network interfaces. The fields for each of these interfaces are the same, and include:
 - a. **Enable Interface:** Choose **Yes** to enable this network interface, or choose **No** to disable the interface.
 - b. **Allow Management on Interface:** Choose **Yes** to allow management of the Array via this network interface, or choose **No** to deny all management privileges for this interface.
 - c. **Configuration Server Protocol:** Choose **DHCP** to instruct the Array to use **DHCP** to assign IP addresses to the Array's Ethernet interfaces, or choose **Static IP** if you intend to enter IP addresses manually. If you choose the Static IP option, you must enter the following information:
 - **IP Address:** Enter a valid IP address for this Array. To use any of the remote connections (Web, **SNMP**, or **SSH**), a valid IP address must be used.
 - **IP Subnet Mask:** Enter a valid IP address for the **subnet mask** (the default is 255.255.255.0). The subnet mask defines the number of IP addresses that are available on the routed subnet where the Array is located.
 - **Default Gateway:** Enter a valid IP address for the **default gateway**. This is the IP address of the router that the Array uses to forward data to other networks.
 8. **SSID (Wireless Network Name):** The SSID (Service Set Identifier) is a unique name that identifies a wireless network. All devices attempting to connect to a specific WLAN must use the same SSID. The default for this field is "xirrus."
- For additional information about SSIDs, go to the **Multiple SSIDs** section of "Frequently Asked Questions" on page 222.
9. **Wireless Security:** Select the desired wireless security scheme (Open, **WEP** or **WPA**). Make your selection from the choices available in the pull-down list.

Open

This option offers no data encryption and is **not recommended**, though you might choose this option if clients are required to use a VPN connection through a secure SSH utility, like PuTTY.

WEP (Wired Equivalent Privacy)

An optional IEEE 802.11 function that offers frame transmission privacy similar to a wired network. WEP generates secret shared encryption keys that both source and destination stations can use to alter frame bits to avoid disclosure to eavesdroppers.

WPA (Wi-Fi Protected Access)

A Wi-Fi Alliance standard that contains a subset of the IEEE 802.11i standard, using TKIP or AES as an encryption method and 802.1X for authentication. WPA is the stronger of the two wireless security schemes.

For more information about security, including a full review of all security options and settings, go to “[Security Management](#)” on page 113.



Security settings will only take effect if they are assigned to a specific SSID. Refer to “[SSID](#)” on page 107.

10. **Wireless Key/Passphrase:** Depending on the wireless security scheme you selected, enter a unique WEP key or WPA passphrase.
 - a. **Confirm Key/Passphrase:** If you entered a WEP key or WPA passphrase, confirm it here.
11. **New Admin Password:** If desired, enter a new administration password for managing this Array. Choose a password that is not obvious, and one that you can remember. If you forget your password, you must reset the Array to its factory defaults so that the password is reset to **admin** (its default setting).
 - a. **Confirm Admin Password:** If you entered a new administration password, confirm the new password here.

12. **Adjust Time (hrs:min:sec):** Check this box if you want to adjust the current system time. When the box is checked, the time fields become active. Enter the revised time (hours, minutes, seconds, am/pm) in the corresponding fields. If you don't want to adjust the current time, this box should be left unchecked (default).
13. **Adjust Date (day/month/year):** Check this box if you want to adjust the current system date. When the box is checked, the date fields become active. Enter the revised date (day, month, year) in the corresponding fields. If you don't want to adjust the current date, this box should be left unchecked (default).
14. **Auto Adjust Daylight Savings:** Check this box if you want the system to adjust for daylight savings automatically, otherwise leave this box unchecked (default).
15. **Time Zone:** Select a time zone from the choices available in the pull-down list.

(GMT - 12:00) Eniwetok, Kwajalein

(GMT - 11:00) Midway Island, Samoa<option>

(GMT - 10:00) Hawaii

(GMT - 09:00) Alaska

(GMT - 08:00) Pacific Time (US & Canada); Tijuana

(GMT - 07:00) Mountain Time (US & Canada)

(GMT - 06:00) Central Time (US & Canada)

(GMT - 05:00) Eastern Time (US & Canada)

(GMT - 04:00) Atlantic Time (Canada)

(GMT - 03:30) Newfoundland

(GMT - 03:00) Buenos Aires, Georgetown

(GMT - 02:00) Mid-Atlantic

(GMT - 01:00) Azores, Cape Verde Is.

(GMT) Greenwich Mean Time: Dublin, Lisbon, London

(GMT + 01:00) Amsterdam, Copenhagen, Madrid, Paris

(GMT + 02:00) Israel

(GMT + 03:00) Moscow, St. Petersburg, Volgograd

(GMT + 03:30) Tehran

(GMT + 04:00) Abu Dhabi, Muscat

(GMT + 04:30) Kabul

(GMT + 05:00) Islamabad, Karachi, Tashkent

(GMT + 05:30) Bombay, Calcutta, Madras, New Delhi

(GMT + 06:00) Almaty, Dhaka

(GMT + 07:00) Bangkok, Hanoi, Jakarta

(GMT + 08:00) Beijing, Chongqing, Hong Kong

(GMT + 09:00) Osaka, Sapporo, Tokyo

(GMT + 09:30) Adelaide

(GMT + 10:00) Guam, Port Moresby

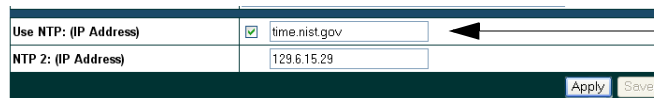
(GMT + 11:00) Magadan, Solomon Is., New Caledonia

(GMT + 12:00) Auckland, Wellington

(GMT) Greenwich Mean Time: Dublin, Lisbon, London

Figure 37. WMI: Time Zones

- 16. Use NTP (IP Address):** Check this box if you want to use an NTP (Network Time Protocol) server to synchronize the Array's clock. This ensures that syslog time-stamping is maintained across all units. Without an NTP server assigned (no universal clock), each Array will use its own internal clock and stamp times accordingly, which may result in discrepancies. When this box is checked, the NTP and NTP 2 IP address fields become active. If you don't want to use an NTP server, leave this box unchecked (default), otherwise enter the IP address or DNS name of the NTP server.



Use NTP: (IP Address)	☒ time.nist.gov
NTP 2: (IP Address)	☐ 129.6.15.29

Apply Save

NTP enabled

Figure 38. Enabling the NTP Feature

- a. NTP 2 (IP Address):** If you enabled the NTP option and the site is using a secondary NTP server, enter the IP address or DNS name of the secondary NTP server.
- 17.** Click on the **Apply** button to apply the new settings to this session
- 18.** Click on the **Save** button to save your changes (otherwise your new settings will not take effect).

This ends the Express Setup procedure.

Installing the XS-3900 Wall Mount Assembly

The wall mounting assembly is used to mount the XS-3900 Wireless LAN Array on a wall, instead of the traditional ceiling mount—where mounting the Array on the ceiling may be impractical at your location.

Kit Contents

The Wall Mounting Assembly kit includes the following items:

- 8 x SNAPTOGGLE™ toggle bolts (for attaching the wall bracket to the wall)
- 4 x 1/4 inch bolt assemblies (for attaching the mounting plate to the wall bracket)
- Wall Mounting Bracket

Tools Required

- Power drill
- 1/2 inch (13mm) drill bit
- Cross head screwdriver
- 1/4 inch nut wrench
- Pencil
- Level

Mark the Wall Position

1. Use the Wall Mounting Bracket as a template and mark the locations on the wall for the mounting holes.

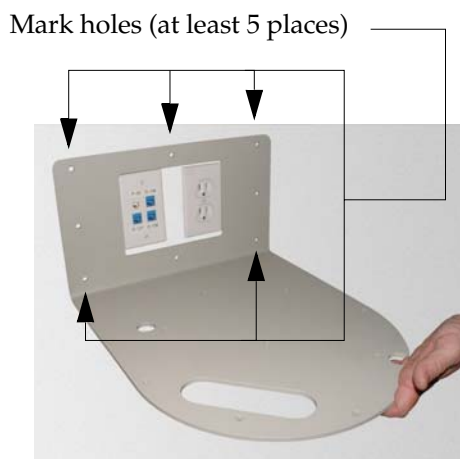


Figure 39. Wall Mount—Marking the Holes

When marking the holes, ensure that the mounting plate is level—you may need assistance.



The bracket must be secured to the wall in at least 5 places, using a minimum of the top 3 holes and the 2 outside holes at the bottom. For maximum strength, use all 8 mounting points (8 toggle bolts are provided).

Install the SNAPTOGGLE™ Toggle Bolts

2. At the locations you marked in Step 1, drill a 1/2 inch (13mm) hole (there must be a minimum clearance behind the wall of 1 7/8 inches (48mm)).
3. (Refer to graphic **A**) Hold the metal channel flat alongside the plastic straps and slide the channel through the hole.

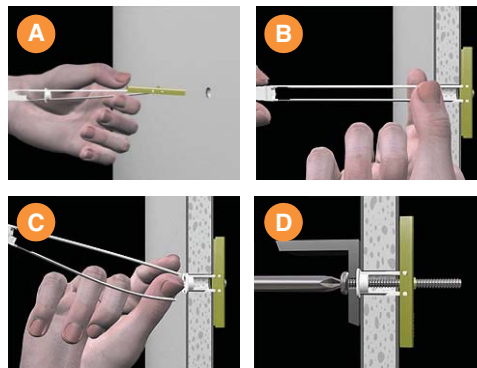


Figure 40. Installing the Toggle Bolts

4. (Refer to graphic **B**) Hold the strap handle between your thumb and forefinger and pull towards you until the metal channel rests flush behind the wall.

To achieve the maximum shear holding capability for the toggle bolt, orient the metal channel so that the channel is vertical to the floor.

Using your other hand, now slide the plastic cap along the straps until the flange of the cap is flush with wall.

The straps provide a one-way ratcheting mechanism (similar to a cable tie). Ensure that the toggle bolt assembly is oriented correctly (vertical to the floor) before sliding the plastic cap along the straps.

5. (Refer to graphic **C**) Break the straps at the wall, flush with the flange of the cap. The straps can be broken by pushing them from side-to-side and simply snapping them off.

Graphic **D** shows a cutaway example of how the toggle bolt is used to secure an item to the wall (in our case, the item is the Wall Mounting Bracket—secured to the wall with a minimum of 5 toggle bolts.

Do not attach the Wall Mounting Bracket to the wall at this time.

Attach the Mounting Plate to the Wall Mounting Bracket

Secure the Wireless LAN Array's mounting plate to the Wall Mounting Bracket (4 places)—tighten the 4 bolt assemblies to a torque of 10–12 lbf.ft (1.38–1.66 kgf.m). *Do not overtighten the bolts.*

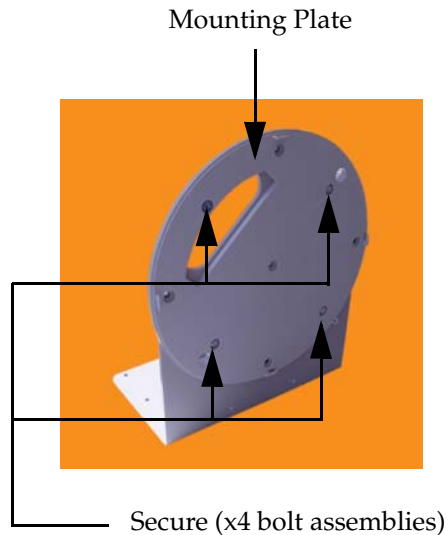


Figure 41. Attaching the Wall Mounting Plate

Attach the Wall Mounting Bracket/Plate Assembly to the Wall

6. Secure the Wall Mounting Bracket (with attached Mounting Plate) to the wall at the toggle bolt anchors you created in Steps 2 through 5—a minimum of 5 places.

Mount the Array

The image opposite shows the orientation of the Wireless LAN Array when mounted on a wall. It is not intended to show a fully installed Array.

7. Mount the Wireless LAN Array to the Wall Mounting Bracket in the same way that you would mount the Array to a ceiling mount (the procedure is identical).



Figure 42. Mounting the Array on a Wall

The Web Management Interface

This chapter provides an overview of the XS-3900's embedded Web Management Interface (WMI), used for establishing your network's configuration settings and wireless operating parameters.

An Overview

The WMI is an easy-to-use graphical interface to your Xirrus Array. It allows you to configure the product to suit your individual requirements and ensure that the unit functions efficiently and effectively.

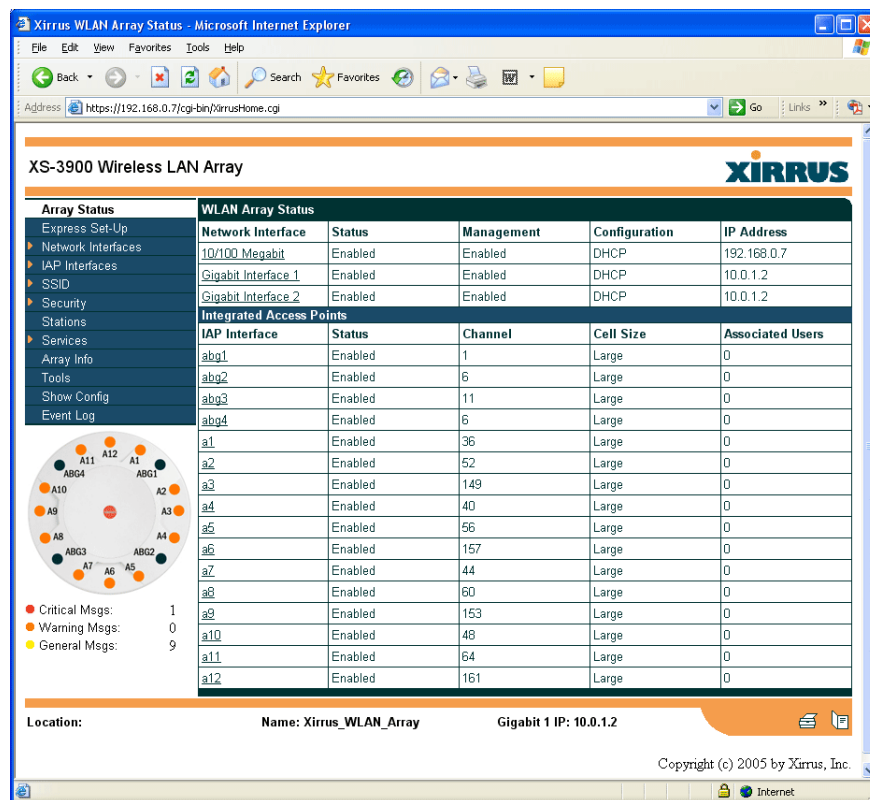


Figure 43. Web Management Interface

Content

The content of the WMI has been organized by function and hierarchy, shown here in list form. You can click on any item in the list to jump to the referenced destination.



- Array Status
- Express Setup
- Network Interfaces
 - Network Settings
 - Network Statistics
 - DHCP Settings
 - DNS Settings
- IAP Interfaces
 - IAP Settings
 - Global Settings
 - Global Settings .11a
 - Global Settings .11bg
 - IAP LED Settings
 - Statistics
 - (Individual IAP Statistics)
- SSID
 - SSID Management
- Security
 - Security Management
 - Radius Server
 - Radius User
 - MAC Access List
 - Admin Management
 - Management Control
 - Rogue AP List
 - Rogue Control List
- Stations
 - RSSI
- Services
 - Time Settings
 - System Log
 - SNMP
- Array Info
- Tools
- Show Config
- Event Log
- Logout

Structure

The WMI has been designed with simplicity in mind, making navigation quick and easy. In the following example, you'll see that pages are divided into left and right frames. The left frame contains configuration elements organized by function (for example, radio interfaces, security, etc.), and where these functions are sub-divided there is an associated pull-down menu. Also included in the left frame are three counters that provide a running total of messages generated by the syslog subsystem during your session—organized into **Critical**, **Warning** and **General** messages.

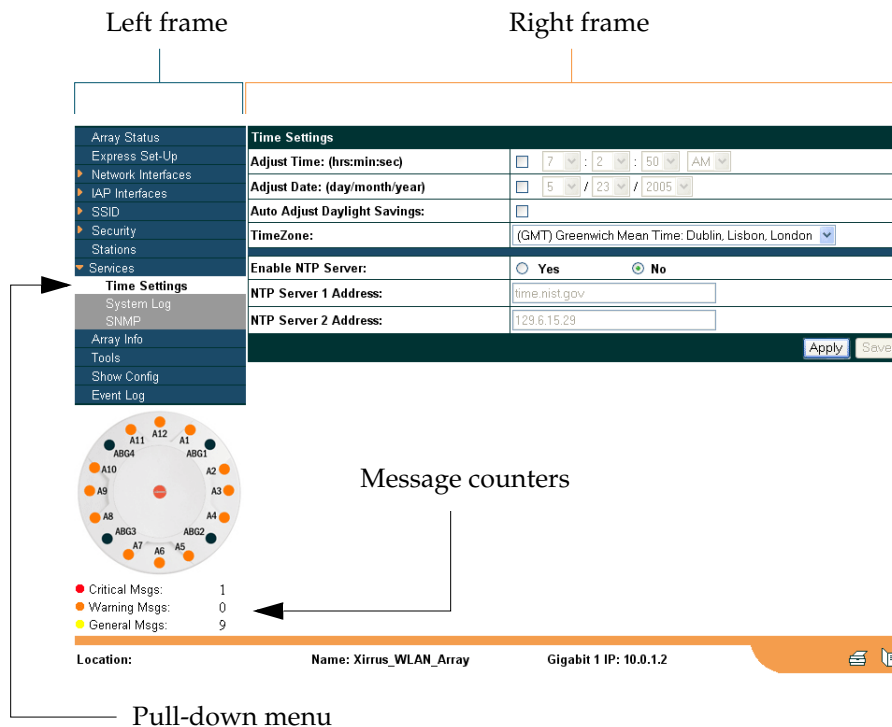


Figure 44. WMI: Frames

The right frame contains the configuration parameters for the Array. This is where you input data (if you want to make changes) or review the Array's current status and activity.

Status Bar

Below the configuration frames you will find a status bar containing information about this Array, including:

- Location—displays the location information assigned to the unit.
- Host name—the [host name](#) assigned to this unit.
- Network interface IP address—the IP address of the network interface that is currently being used.

Also included in the status bar is a **Print** button and a **Help** button. Click on the Print button to send a print file of the active page to your local printer, or click on the Help button to go to the Array's online help system.

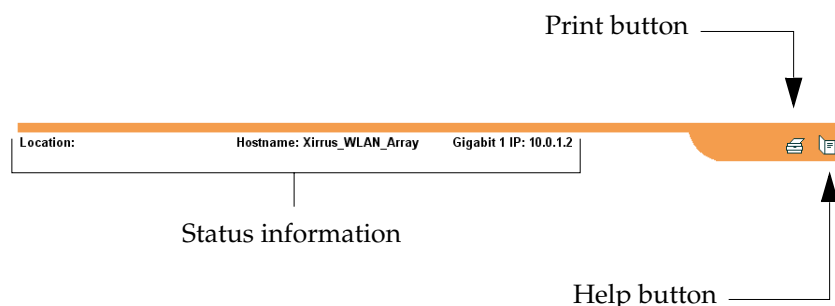


Figure 45. WMI: Status Bar

Applying Configuration Changes

When you have defined all your settings on any WMI configuration page, you must click on the **Apply** button for the changes to take effect in the current session. Click on the **Save** button to write your changes (for future sessions).

Character Restrictions

When inputting strings in the WMI (for example, assigning SSIDs, host name, password, etc.), use only common alphanumeric characters. Do not use any of the following characters:

& < > ' " / \

Configuring the Xirrus Array

This chapter covers configuration and management tasks using the product's embedded Web Management Interface (WMI). It also includes a procedure for logging in to the XS-3900/XS-3700/XS-3500 with your Web browser.

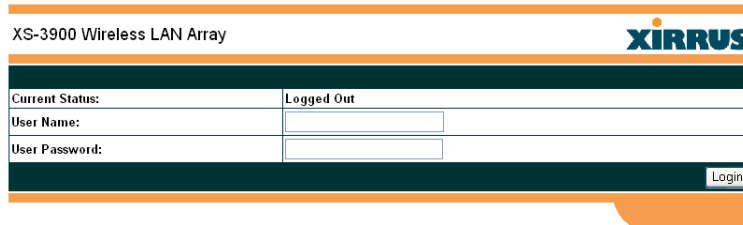
Section headings for this chapter include:

- "Logging In" on page 69
- "Making Configuration Changes to the Array" on page 70

Logging In

Use this procedure to log in to the WMI via your Web browser.

1. Establish a network connection and open your Web browser.
2. Connect to the Wireless LAN Array via its default IP address (10.0.1.1) or via a DHCP assigned IP address.
3. To log in to the Array's Web Management Interface, enter **admin** when prompted for a user name and password.



XS-3900 Wireless LAN Array	
XIRRUS	
Current Status:	Logged Out
User Name:	
User Password:	
Login	

Figure 46. WMI: Logging In to the Wireless LAN Array

Making Configuration Changes to the Array

This section has been organized into functional areas that reflect the flow and content of the WMI. Configuration instructions to the Wireless LAN Array require you to input data in one or more of the following formats:

- Specifying data (for example, IP addresses, descriptions, etc.).
- Making selections from pull-down lists.
- Choosing an option by clicking on a radio button (for example, on/off).
- Clicking on a check box to activate/deactivate a feature.
- Clicking on a button to confirm a command or apply your changes.

Array Status

This is a status only page that provides a snapshot of the global configuration settings for all XS-3900/XS-3700/XS-3500 network interfaces and radios. You must go to the appropriate configuration page to make changes to any of the settings displayed here (configuration changes cannot be made from this page).

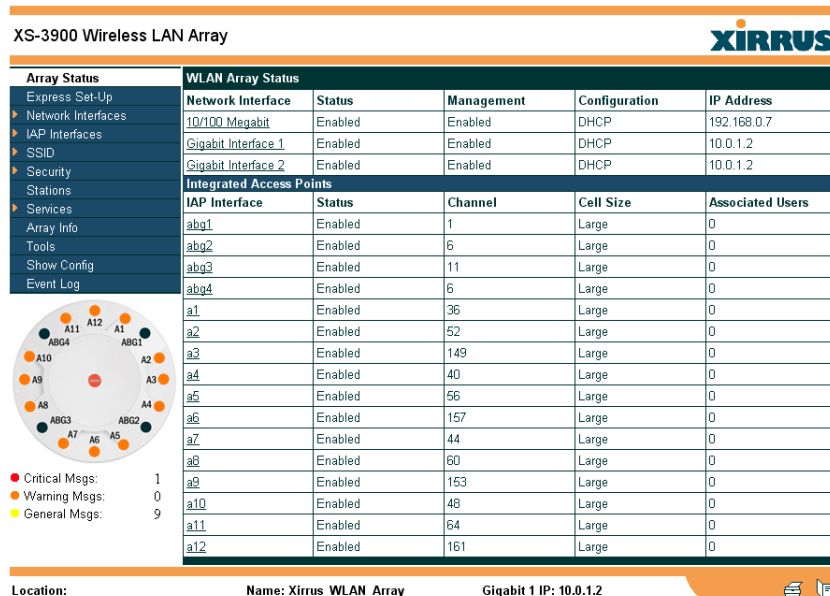
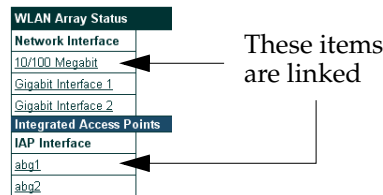


Figure 47. WMI: Array Status Page

The Array Status page is sub-divided into the **Network Interface** and **IAP Interface** (radio) sections and provides you with the following information:

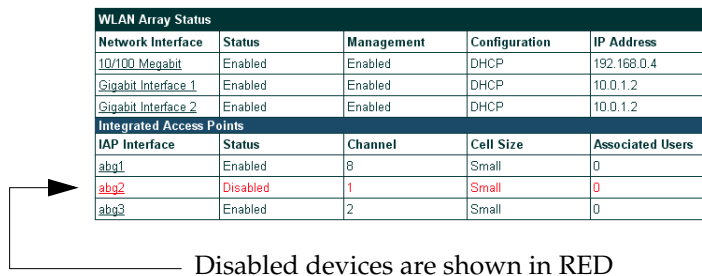
- **All devices:** A listing of the available Network Interfaces and IAPs with each item containing a link to the associated configuration page. Linked items are shown UNDERLINED. For example:



WLAN Array Status	
Network Interface	
<u>10/100 Megabit</u>	
<u>Gigabit Interface 1</u>	
<u>Gigabit Interface 2</u>	
Integrated Access Points	
IAP Interface	
<u>abg1</u>	
<u>abg2</u>	

Figure 48. Linked Items

- **All devices:** The current status of each device, whether enabled or disabled. Devices that are disabled are shown in RED. For example:



WLAN Array Status				
Network Interface	Status	Management	Configuration	IP Address
<u>10/100 Megabit</u>	Enabled	Enabled	DHCP	192.168.0.4
<u>Gigabit Interface 1</u>	Enabled	Enabled	DHCP	10.0.1.2
<u>Gigabit Interface 2</u>	Enabled	Enabled	DHCP	10.0.1.2
Integrated Access Points				
IAP Interface	Status	Channel	Cell Size	Associated Users
<u>abg1</u>	Enabled	8	Small	0
<u>abg2</u>	Disabled	1	Small	0
<u>abg3</u>	Enabled	2	Small	0

Figure 49. WMI: Disabled Device (Partial View)

- **Network Interface devices:**
 - The **Management** column indicates whether the network interface device is enabled or disabled. Network interfaces are enabled or disabled on the [Network Settings](#) page.
 - The **Configuration** column shows how each network interface obtains its IP address—either dynamically via DHCP or entered manually by you (static configuration) on the [Network Settings](#) page.

- The **IP Address** column shows the current IP address being used by each network interface device.
- **IAP Interface devices:**
 - The **Channel** column shows on which channel each IAP (radio) is operating. Channel selections are made on the [IAP Settings](#) page from a pull-menu. To avoid co-channel interference, adjacent radios should not be using adjacent channels.
 - The **Cell Size** column indicates which cell size setting is currently active for each radio—either small, medium, large or manually defined by you. The cell size of a radio is a function of its transmit power and determines the radio’s overall coverage. Cell sizes are defined on the [IAP Settings](#) page. For additional information about cell sizes and the importance of planning for and defining the optimum sizes for your Array, go to “[Coverage and Capacity Planning](#)” on page 25.

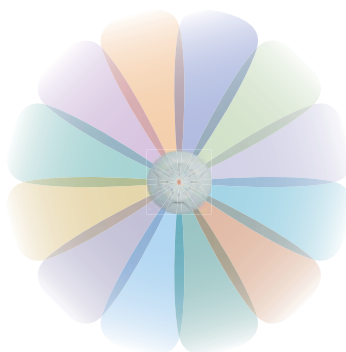


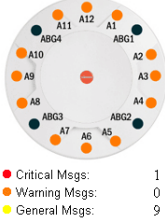
Figure 50. IAP Cells

- The **Associated Users** column informs you how many users are currently associated with each radio. The high-capacity XS-3900 can handle up to 64 concurrent users per individual IAP radio (1024 or 960 users per Array when the monitor is enabled).

Express Setup

This page allows you to establish global configuration settings that will enable basic Array functionality. Any changes you make on this page will affect all radios. When finished, click on the **Apply** button to apply the new settings to this session, then click on the **Save** button to save your changes.

XS-3900 Wireless LAN Array



● Critical Msgs: 1
● Warning Msgs: 0
● General Msgs: 9

Express Set-Up

- Network Interfaces
- IAP Interfaces
- SSID
- Security
- Stations
- Services
- Array Info
- Tools
- Show Config
- Event Log

Express Set-Up	
Host Name:	Xirrus_WLAN_Array
Location Information:	
Admin Contact:	
Admin Email:	
Admin Phone:	
Enable/Configure All IAP's:	Execute
10/100 Megabit Settings	
Enable Interface:	☒ Yes ☐ No
Allow Management On Interface:	☒ Yes ☐ No
Configuration Server Protocol:	☒ DHCP ☐ Static
IP Address:	192.168.0.7
IP Subnet Mask:	255.255.255.0
Default Gateway:	192.168.0.1
Gigabit Interface 1 Settings	
Enable Interface:	☒ Yes ☐ No
Allow Management On Interface:	☒ Yes ☐ No
Configuration Server Protocol:	☒ DHCP ☐ Static
IP Address:	10.0.1.2
IP Subnet Mask:	255.0.0.0
Default Gateway:	
Gigabit Interface 2 Settings	
Enable Interface:	☒ Yes ☐ No
Allow Management On Interface:	☒ Yes ☐ No
Configuration Server Protocol:	☒ DHCP ☐ Static
IP Address:	10.0.1.2
IP Subnet Mask:	255.0.0.0
Default Gateway:	
SSID: (Wireless Network Name)	xirrus
Wireless Security:	Open
Wireless Key/Passphrase:	
Confirm Key/Passphrase:	



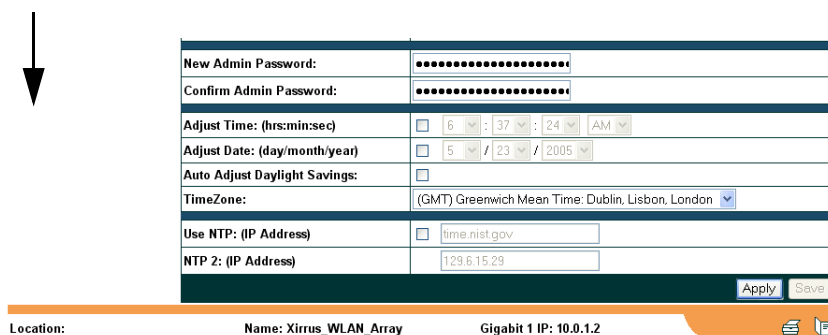
more ...

Figure 51. WMI: Express Setup Page (Part 1)

Configuring the Xirrus Array

73

... continued



The screenshot shows a web-based configuration interface for a Xirrus WLAN Array. It includes fields for 'New Admin Password' and 'Confirm Admin Password', both masked with dots. Below these are time configuration options: 'Adjust Time (hrs:min:sec)' with a time picker set to 6:37:24 AM, 'Adjust Date (day/month/year)' with a date picker set to 5/23/2005, and 'Auto Adjust Daylight Savings' with an unchecked checkbox. The 'TimeZone' is set to '(GMT) Greenwich Mean Time: Dublin, Lisbon, London'. There are also fields for 'Use NTP: (IP Address)' with a checkbox and a text input, and 'NTP 2: (IP Address)' with a text input containing '129.6.15.29'. At the bottom right are 'Apply' and 'Save' buttons. A status bar at the very bottom shows 'Location:', 'Name: Xirrus_WLAN_Array', and 'Gigabit 1 IP: 10.0.1.2'.

Figure 52. WMI: Express Setup Page (Part 2)

Procedure for Performing an Express Setup

1. **Host Name:** Specify a unique **host name** for this Array. The host name is used to identify the Array on the network. Use a name that will be meaningful within your network environment, up to 64 alphanumeric characters.
2. **Location Information:** Enter a brief but meaningful description that accurately defines the physical location of the Array. In an environment where multiple units are installed, clear definitions for their locations are important if you want to identify a specific unit.
3. **Admin Contact:** Enter the name and contact information of the person who is responsible for administering the Array at the designated location.
4. **Admin Email:** Enter the email address of the admin contact you entered in Step 3.
5. **Admin Phone:** Enter the telephone number of the admin contact you entered in Step 3.
6. **Enable/Configure All IAPs:** Click on the **Execute** button to enable and auto configure all IAPs (a message displays the countdown time—in seconds—to complete the auto-configuration task).

7. Configure the **Fast Ethernet** (10/100 Megabit), **Gigabit 1** and **Gigabit 2** network interfaces. The fields for each of these interfaces are the same, and include:
 - a. **Enable Interface:** Choose **Yes** to enable this network interface, or choose **No** to disable the interface.
 - b. **Allow Management on Interface:** Choose **Yes** to allow management of the Array via this network interface, or choose **No** to deny all management privileges for this interface.
 - c. **Configuration Server Protocol:** Choose **DHCP** to instruct the Array to use **DHCP** to assign IP addresses to the Array's Ethernet interfaces, or choose **Static IP** if you intend to enter IP addresses manually. If you choose the **Static IP** option, you must enter the following information:
 - **IP Address:** Enter a valid IP address for this Array. To use any of the remote connections (**Web**, **SNMP**, or **SSH**), a valid IP address must be used.
 - **IP Subnet Mask:** Enter a valid IP address for the **subnet mask** (the default is 255.255.255.0). The subnet mask defines the number of IP addresses that are available on the routed subnet where the Array is located.
 - **Default Gateway:** Enter a valid IP address for the **default gateway**. This is the IP address of the router that the Array uses to forward data to other networks.
8. **SSID (Wireless Network Name):** The SSID (Service Set Identifier) is a unique name that identifies a wireless network. All devices attempting to connect to a specific WLAN must use the same SSID. The default for this field is "**xirrus**."

For additional information about SSIDs, go to the [Multiple SSIDs](#) section of "[Frequently Asked Questions](#)" on page 222.

9. **Wireless Security:** Select the desired wireless security scheme (Open, WEP or WPA). Make your selection from the choices available in the pull-down list.

Open

This option offers no data encryption and is **not recommended**, though you might choose this option if clients are required to use a VPN connection through a secure SSH utility, like PuTTY.

WEP (Wired Equivalent Privacy)

An optional IEEE 802.11 function that offers frame transmission privacy similar to a wired network. WEP generates secret shared encryption keys that both source and destination stations can use to alter frame bits to avoid disclosure to eavesdroppers.

WPA (Wi-Fi Protected Access)

A Wi-Fi Alliance standard that contains a subset of the IEEE 802.11i standard, using TKIP or AES as an encryption method and 802.1X for authentication. WPA is the stronger of the two wireless security schemes.

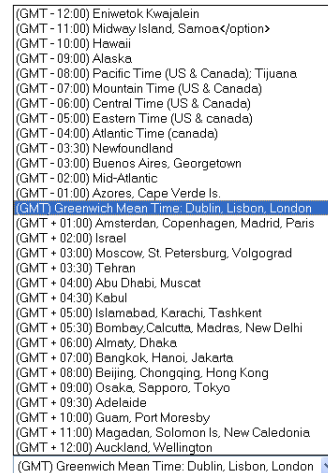
For more information about security, including a full review of all security options and settings, go to “[Security Management](#)” on page 113.



Security settings will only take effect if they are assigned to a specific SSID. Refer to “[SSID](#)” on page 107.

10. **Wireless Key/Passphrase:** Depending on the wireless security scheme you selected, enter a unique WEP key or WPA passphrase.
 - a. **Confirm Key/Passphrase:** If you entered a WEP key or WPA passphrase, confirm it here.
11. **New Admin Password:** If desired, enter a new administration password for managing this Array. Choose a password that is not obvious, and one that you can remember. If you forget your password, you must reset the Array to its factory defaults so that the password is reset to **admin** (its default setting).

- a. **Confirm Admin Password:** If you entered a new administration password, confirm the new password here.
12. **Adjust Time (hrs:min:sec):** Check this box if you want to adjust the current system time. When the box is checked, the time fields become active. Enter the revised time (hours, minutes, seconds, am/pm) in the corresponding fields. If you don't want to adjust the current time, this box should be left unchecked (default).
13. **Adjust Date (day/month/year):** Check this box if you want to adjust the current system date. When the box is checked, the date fields become active. Enter the revised date (day, month, year) in the corresponding fields. If you don't want to adjust the current date, this box should be left unchecked (default).
14. **Auto Adjust Daylight Savings:** Check this box if you want the system to adjust for daylight savings automatically, otherwise leave this box unchecked (default).
15. **Time Zone:** Select a time zone from the choices available in the pull-down list.



```

(GMT -12:00) Eniwetok, Kwajalein
(GMT -11:00) Midway Island, Samoa</option>
(GMT -10:00) Hawaii
(GMT -09:00) Alaska
(GMT -08:00) Pacific Time (US & Canada); Tijuana
(GMT -07:00) Mountain Time (US & Canada)
(GMT -06:00) Central Time (US & Canada)
(GMT -05:00) Eastern Time (US & Canada)
(GMT -04:00) Atlantic Time (Canada)
(GMT -03:30) Newfoundland
(GMT -03:00) Buenos Aires, Georgetown
(GMT -02:00) Mid-Atlantic
(GMT -01:00) Azores, Cape Verde Is.
(GMT Greenwich Mean Time: Dublin, Lisbon, London)
(GMT +01:00) Amsterdam, Copenhagen, Madrid, Paris
(GMT +02:00) Israel
(GMT +03:00) Moscow, St. Petersburg, Volgograd
(GMT +03:30) Tehran
(GMT +04:00) Abu Dhabi, Muscat
(GMT +04:30) Kabul
(GMT +05:00) Islamabad, Karachi, Tashkent
(GMT +05:30) Bombay, Calcutta, Madras, New Delhi
(GMT +06:00) Almaty, Dhaka
(GMT +07:00) Bangkok, Hanoi, Jakarta
(GMT +08:00) Beijing, Chongqing, Hong Kong
(GMT +09:00) Osaka, Sapporo, Tokyo
(GMT +09:30) Adelaide
(GMT +10:00) Guam, Port Moresby
(GMT +11:00) Magadan, Solomon Is., New Caledonia
(GMT +12:00) Auckland, Wellington
(GMT) Greenwich Mean Time: Dublin, Lisbon, London
  
```

Figure 53. WMI: Time Zones

16. **Use NTP (IP Address):** Check this box if you want to use an NTP (Network Time Protocol) server to synchronize the Array's clock. This ensures that syslog time-stamping is maintained across all units. Without an NTP server assigned (no universal clock), each Array will use its own internal clock and stamp times accordingly, which may result in discrepancies. When this box is checked, the NTP and NTP 2 IP address fields become active. If you don't want to use an NTP server, leave this box unchecked (default), otherwise enter the IP address or DNS name of the NTP server.

Use NTP: (IP Address)	☒	time.nist.gov
NTP 2: (IP Address)		129.6.15.29
		Apply Save

NTP enabled

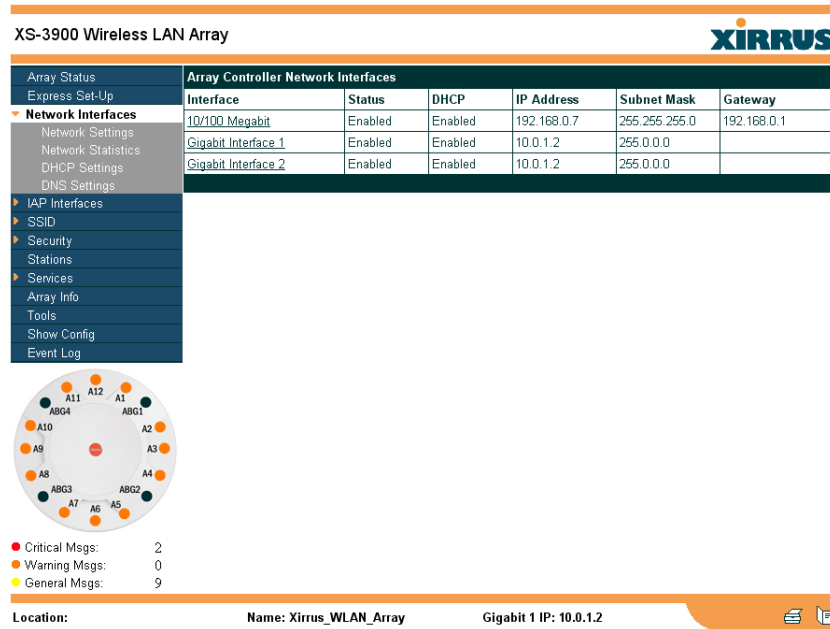
Figure 54. Enabling the NTP Feature

- a. **NTP 2 (IP Address):** If you enabled the NTP option and the site is using a secondary NTP server, enter the IP address or DNS name of the secondary NTP server.
17. Click on the **Apply** button to apply the new settings to this session
18. Click on the **Save** button to save your changes (otherwise your new settings will not take effect).

This ends the Express Setup procedure.

Network Interfaces

This is a status only page that provides a snapshot of the configuration settings currently established for the 10/100 [Fast Ethernet](#) interface and the 10/100/1000 [Gigabit 1](#) and [Gigabit 2](#) interfaces. You must go to the appropriate configuration page to make changes to any of the settings displayed here (configuration changes cannot be made from this page). You can click on any item (underlined) in the **Interface** column to “jump” to the associated configuration page.



XS-3900 Wireless LAN Array

Interface	Status	DHCP	IP Address	Subnet Mask	Gateway
10/100 Megabit	Enabled	Enabled	192.168.0.7	255.255.255.0	192.168.0.1
Gigabit Interface 1	Enabled	Enabled	10.0.1.2	255.0.0.0	
Gigabit Interface 2	Enabled	Enabled	10.0.1.2	255.0.0.0	

Critical Msgs: 2
 Warning Msgs: 0
 General Msgs: 9

Location: Name: Xirrus_WLAN_Array Gigabit 1 IP: 10.0.1.2

Figure 55. WMI: Network Interfaces Page

WMI pages that allow you to change or view configuration settings associated with the network interfaces include:

- “Network Settings” on page 80.
- “Network Statistics” on page 84.
- “DHCP Settings” on page 85.
- “DNS Settings” on page 87.

Network Settings

This page allows you to establish configuration settings for the 10/100 Fast Ethernet interface and the 10/100/1000 Gigabit 1 and Gigabit 2 interfaces.



Gigabit 2 settings will “mirror” Gigabit 1 settings (except for MAC addresses) and cannot be configured separately.

When finished, click on the **Apply** button to apply the new settings to this session, then click on the **Save** button to save your changes.



XS-3900 Wireless LAN Array



Network Interface Settings	
10/100 Megabit Settings	
Enable Interface:	☒ Yes ☐ No
Allow Management On Interface:	☒ Yes ☐ No
Auto Negotiate:	☒ Yes ☐ No
Duplex:	☒ Full ☐ Half
Speed:	100 Megabit
MTU Size:	1500
Configuration Server Protocol:	☒ DHCP ☐ Static
IP Address:	192.168.0.7
IP Subnet Mask:	255.255.255.0
Default Gateway:	192.168.0.1
Gigabit Interface 1 Settings	
Enable Interface:	☒ Yes ☐ No
Allow Management On Interface:	☒ Yes ☐ No
Auto Negotiate:	☒ Yes ☐ No
Duplex:	☒ Full ☐ Half
Speed:	Gigabit
MTU Size:	1504
Configuration Server Protocol:	☒ DHCP ☐ Static
IP Address:	10.0.1.2
IP Subnet Mask:	255.0.0.0
Default Gateway:	
Gigabit Interface 2 Settings	
Enable Interface:	☒ Yes ☐ No
Allow Management On Interface:	☒ Yes ☐ No
Auto Negotiate:	☒ Yes ☐ No



● Critical Msgs: 2

● Warning Msgs: 0

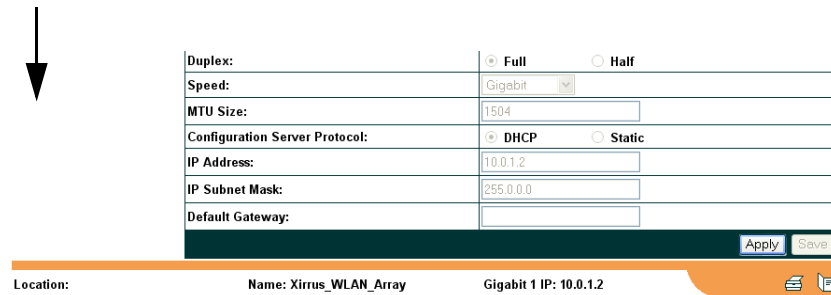
● General Msgs: 9



more ...

Figure 56. WMI: Network Settings Page (Part 1)

... continued



Duplex:	☒ Full ☐ Half
Speed:	Gigabit
MTU Size:	1504
Configuration Server Protocol:	☒ DHCP ☐ Static
IP Address:	10.0.1.2
IP Subnet Mask:	255.0.0.0
Default Gateway:	

Location: Name: Xirrus_WLAN_Array Gigabit 1 IP: 10.0.1.2

Apply Save

Figure 57. WMI: Network Settings Page (Part 2)

Network Interface Ports

The following diagram shows the location of each network interface port on the underside of the Array.

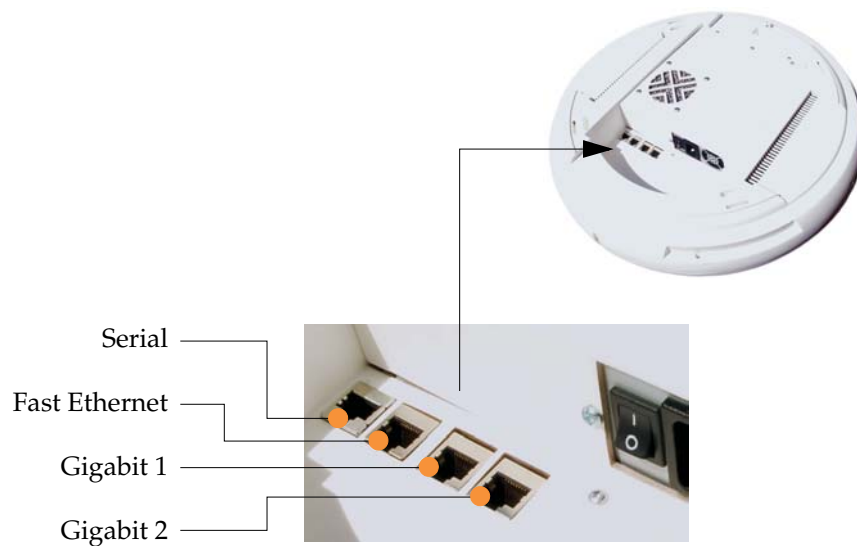


Figure 58. Network Interface Ports

Procedure for Configuring the Network Interfaces

1. Configure the **Fast Ethernet**, **Gigabit 1** and **Gigabit 2** network interfaces. The fields for each of these interfaces are the same, and include:
 - a. **Enable Interface:** Choose **Yes** to enable this network interface (Fast Ethernet, Gigabit 1 or Gigabit 2), or choose **No** to disable the interface.
 - b. **Allow Management on Interface:** Choose **Yes** to allow management of this Array via the selected network interface, or choose **No** to deny all management privileges for this interface.
 - c. **Auto Negotiate:** This feature allows the Array to negotiate the best transmission rates automatically. Choose **Yes** to enable this feature, or choose **No** to disable this feature—the default is enabled. If you disable the Auto Negotiate feature, you must define the Duplex and Speed options manually (otherwise these options are not available).
 - **Duplex:** Full-duplex refers to the transmission of data in two directions simultaneously (for example, a telephone is a full-duplex device because both parties can talk and be heard at the same time). In contrast, half-duplex allows data transmission in one direction at a time only (for example, a walkie-talkie is a half-duplex device because it allows only one party to talk at any one time). If the Auto-Negotiate feature is disabled, you can manually choose **Half** or **Full** duplex for your data transmission preference.
 - **Speed:** If the Auto-Negotiate feature is disabled, you can manually choose the desired data transmission speed from the pull-down list, either **Fast Ethernet** or **Gigabit**.
 - d. **MTU Size:** Specify the **MTU** (Maximum Transmission Unit) size. When you specify the MTU, you are defining—in bytes—the largest physical packet size that the network can transmit. Any messages larger than the MTU that you specify here are divided into smaller packets before being sent. The default is 1504 bytes.

- e. **Configuration Server Protocol:** Choose **DHCP** to instruct the Array to use **DHCP** when assigning IP addresses to the Array, or choose **Static IP** if you intend to enter IP addresses manually.
 - **IP Address:** If you selected the Static IP option, enter a valid IP address for the Array. To use any of the remote connections (Web, **SNMP**, or SSH), a valid IP address must be established.
 - **IP Subnet Mask:** If you selected the Static IP option, enter a valid IP address for the **subnet mask** (the default for Class C is 255.255.255.0). The subnet mask defines the number of IP addresses that are available on the routed subnet where the Array is located.
 - **Default Gateway:** If you selected the Static IP option, enter a valid IP address for the **default gateway**. This is the IP address of the router that the Array uses to transmit data to other networks.
2. Click on the **Apply** button to apply the new settings to this session.
3. Click on the **Save** button to save your changes (otherwise your new settings will not take effect).



Network Statistics

This is a status only page that allows you to review statistical data associated with each network interface and its activity. You can **Refresh** the data (update the page with the latest information) or **Clear** the data (reset all content to zero and begin counting again) at any time by clicking on the appropriate button. If you are experiencing problems, you may also want to print this page for your records.

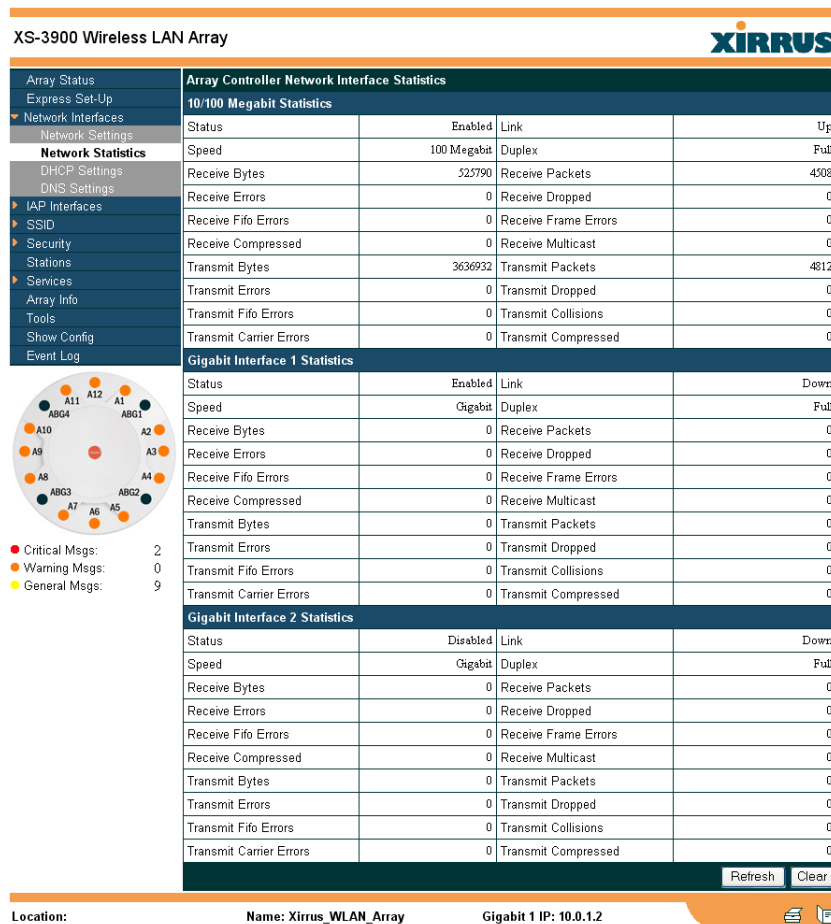
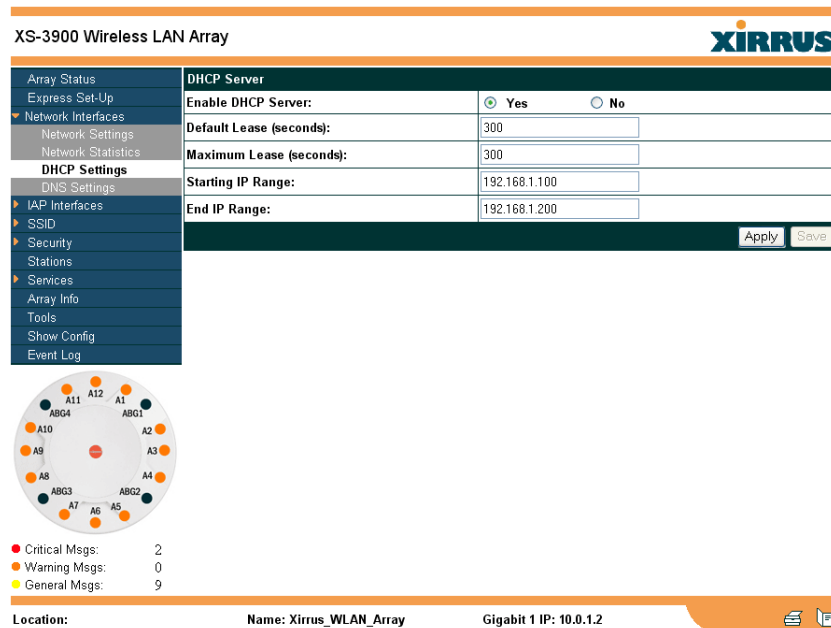


Figure 59. WMI: Network Statistics Page

DHCP Settings

This page allows you to enable/disable **DHCP** (Dynamic Host Configuration Protocol) server functionality. DHCP allows the Array to provide wireless clients with IP addresses and other networking information. The DHCP server will not provide DHCP services to the wired side of the network.

If you enable the DHCP server, you need to define the **DHCP lease** time (default and maximum) and establish the IP address range that the DHCP server can use. When finished, click on the **Apply** button to apply the new settings to this session, then click on the **Save** button to save your changes.



XS-3900 Wireless LAN Array

DHCP Server

Enable DHCP Server: ☒ Yes ☐ No

Default Lease (seconds): 300

Maximum Lease (seconds): 300

Starting IP Range: 192.168.1.100

End IP Range: 192.168.1.200

Apply Save

Critical Msgs: 2
 Warning Msgs: 0
 General Msgs: 9

Location: Name: Xirrus_WLAN_Array Gigabit 1 IP: 10.0.1.2

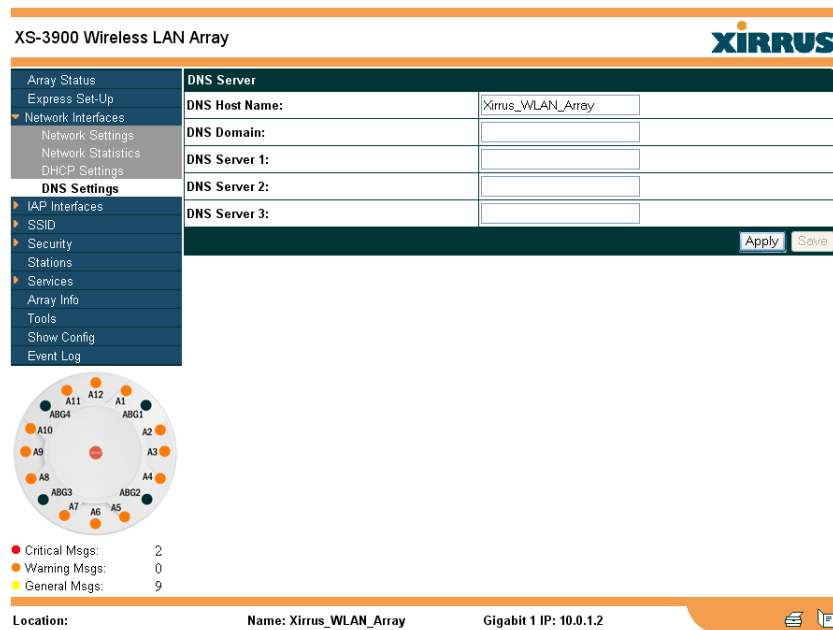
Figure 60. WMI: DHCP Settings Page

Procedure for Configuring the DHCP Server

1. **Enable DHCP Server:** Choose **Yes** to enable DHCP services, or choose **No** to disable DHCP services.
2. **Default Lease (seconds):** This field defines the default **DHCP lease** time (in seconds). The factory default is 300 seconds, but you can change the default at any time.
3. **Maximum Lease (seconds):** Enter a value (in seconds) to define the maximum allowable DHCP lease time. The default is 300 seconds.
4. **Starting IP Range:** Enter an IP address to define the start of the IP range that will be used by the DHCP server. The default is 192.168.1.100.
5. **End IP Range:** Enter an IP address to define the end of the IP range that will be used by the DHCP server. The DHCP server will only use IP addresses that fall between the start and end range that you define on this page. The default is 192.168.1.200.
6. Click on the **Apply** button to apply the new settings to this session.
7. Click on the **Save** button to save your changes (otherwise your new settings will not take effect).

DNS Settings

This page allows you to establish your [DNS](#) (Domain Name System) settings. At least one DNS server must be set up if you want to offer clients associating with the Array the ability to use meaningful host names instead of numerical IP addresses. When finished, click on the **Apply** button to apply the new settings to this session, then click on the **Save** button to save your changes.



XS-3900 Wireless LAN Array

DNS Server

DNS Host Name:	Xirrus_WLAN_Array
DNS Domain:	
DNS Server 1:	
DNS Server 2:	
DNS Server 3:	

Apply Save

Location: Name: Xirrus_WLAN_Array Gigabit 1 IP: 10.0.1.2

Figure 61. WMI: DNS Settings Page

Procedure for Configuring DNS Servers

1. **DNS Host Name:** Enter a valid DNS [host name](#).
2. **DNS Domain:** Enter the DNS domain name.
3. **DNS Server 1:** Enter the IP address of the primary DNS server.
4. **DNS Server 2:** Enter the IP address of the secondary DNS server.
5. **DNS Server 3:** Enter the IP address of the tertiary DNS server.
6. Click on the **Apply** button to apply the new settings to this session.
7. Click on the **Save** button to save your changes (otherwise your new settings will not take effect).



IAP Interfaces

This is a status only page that allows you to review configuration data associated with each Integrated Access Point (radio). It includes a list of which IAP radios are enabled, the channel that each radio is currently using, cell sizes, and how many users are currently associated with each radio. There are no configuration options available on this page, but if you are experiencing problems or simply reviewing the radio assignments, you may want to print this page for your records.

You can click on any item in the **IAP** column to “jump” to the associated configuration page.

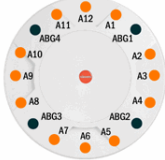
XS-3900 Wireless LAN Array



- Array Status
- Express Set-Up
- Network Interfaces
- IAP Interfaces**
 - IAP Settings
 - Global Settings
 - Global Settings 11a
 - Global Settings 11bg
 - IAP LED Settings
- Statistics
- SSID
- Security
- Stations
- Services
- Array Info
- Tools
- Show Config
- Event Log
- Logout

Uptime - 2 days 5 hours 23 minutes

IAP	Status	Channel	Cell Size	Associated Stations	Description
abg1	Disabled	1	Large	0	
abg2	Enabled	Monitor	Manual	0	
abg3	Disabled	11	Large	0	
abg4	Disabled	6	Large	0	
a1	Disabled	36	Large	0	
a2	Disabled	52	Large	0	
a3	Disabled	149	Large	0	
a4	Disabled	40	Small	0	
a5	Disabled	56	Large	0	
a6	Disabled	157	Large	0	
a7	Disabled	44	Large	0	
a8	Disabled	60	Large	0	
a9	Disabled	153	Large	0	
a10	Disabled	48	Large	0	
a11	Disabled	64	Large	0	
a12	Enabled	161	Small	2	Marketing- small cell size



Critical Msgs: 0
 Warning Msgs: 0
 General Msgs: 142

Location:

Name: Xirrus_WLAN_Array

Gigabit 1 IP: 192.168.39.138




Figure 62. WMI: IAP Interfaces Page

IAP Settings

This page allows you to enable/disable Integrated Access Points (radios), define the wireless mode for each radio, specify the channel to be used and the cell size for each radio, establish transmit/receive parameters, and select antennas. When finished, click on the **Apply** button to apply the new settings to this session, then click on the **Save** button to save your changes. To see a diagram of the layout and naming of radios, go to [Figure 6 on page 10](#).

XS-3900 Wireless LAN Array

Uptime - 2 days 5 hours 23 minutes

Array Status

Express Set-Up

Network Interfaces

IAP Settings

Global Settings .11a

Global Settings .11b

IAP LED Settings

Statistics

SSID

Security

Stations

Services

Array Info

Tools

Show Config

Event Log

Logout

ABG4

A11

A12

A10

A9

A8

ABG3

A7

A6

A5

ABG2

A3

A4

Critical Msgs: 0

Warning Msgs: 0

General Msgs: 142

IAP	Enabled	Mode	Channel	Cell Size	Tx Power dBm	Rx dBi	Antenna Select	Description
abg1	☐	.11b/g	1	Large	20	-90	Internal-Dir	
abg2	☒	.11abg	Monitor	Manual	20	-95	Internal-Omni	
abg3	☐	.11b/g	11	Large	20	-90	Internal-Dir	
abg4	☐	.11b/g	6	Large	20	-90	Internal-Dir	
a1	☐	.11a	36	Large	20	-90	Internal_5Ghz	
a2	☐	.11a	52	Large	20	-90	Internal_5Ghz	
a3	☐	.11a	149	Large	20	-90	Internal_5Ghz	
a4	☐	.11a	40	Small	5	-65	Internal_5Ghz	
a5	☐	.11a	56	Large	20	-90	Internal_5Ghz	
a6	☐	.11a	157	Large	20	-90	Internal_5Ghz	
a7	☐	.11a	44	Large	20	-90	Internal_5Ghz	
a8	☐	.11a	60	Large	20	-90	Internal_5Ghz	
a9	☐	.11a	153	Large	20	-90	Internal_5Ghz	
a10	☐	.11a	48	Large	20	-90	Internal_5Ghz	
a11	☐	.11a	64	Large	20	-90	Internal_5Ghz	
a12	☒	.11a	161	Small	5	-65	Internal_5Ghz	Marketing-sma

Apply

Save

Location:

Name: Xirrus_WLAN_Array

Gigabit 1 IP: 192.168.39.138

Figure 63. WMI: IAP Settings Page

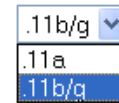
Procedure for Auto Configuring IAPs (Radios)

You can auto-configure radios by clicking on the **Auto Configure** button on the relevant WMI page (auto configuration only applies to enabled radios):

- For all radios, go to the “Global Settings” on page 93.
- For all 802.11a radios, go to the “Global Settings .11a” on page 96.
- For all 802.11b/g radios, go to the “Global Settings .11bg” on page 99.

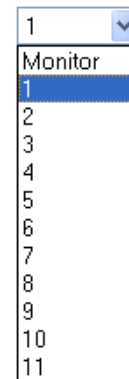
Procedure for Manually Configuring IAPs (Radios)

1. In the **Enabled** column, check the box of a corresponding radio to enable the radio, or uncheck the box if you want to disable the radio.
2. In the **Mode** column, select the wireless mode for this radio from the choices available in the pull-down menu (either .11a or .11b/g).



3. In the **Channel** column, select the **channel** you want this radio to use from the channels available in the pull-down list.

The sample pull-down list shown here is for the **abg2** radio with its mode set to .11b/g. Any channels appearing in this pull-down list that are shown in RED are not recommended.



4. In the **Cell Size** column, choose either **Small**, **Medium**, or **Large** to define the desired pre-configured **cell** size, or choose **Manual** to define the wireless cell size manually. If you choose Manual, you must specify the transmit and receive power—in dB—in the **Tx Power dB** (transmit) and **Rx dB** (receive) fields.

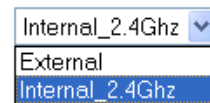
The number of users and their applications are major drivers of bandwidth requirements. The network architect must account for the number of users within the Array’s cell diameter.

In a large office, or if multiple Arrays are in use, you should choose **Small** cells to achieve a higher data rate, since walls and other objects will not define the cells naturally.

For additional information about cell sizes, go to “[Coverage and Capacity Planning](#)” on page 25.

5. In the **Antenna Select** column, choose the antenna you want this radio to use from the pull-down list. The list of available antennas will be different (or no choices will be available), depending on the wireless mode you selected for the radio.

The sample pull-down list shown here is for an 11a radio. In cases where the configuration of the Array limits the antenna choice (for example, if no external antenna is available), the Antenna Select column is greyed out.



6. An optional Description field is provided for each IAP to record specific notes. To enter a description, double click in the field and enter your text in the pop-up requestor.

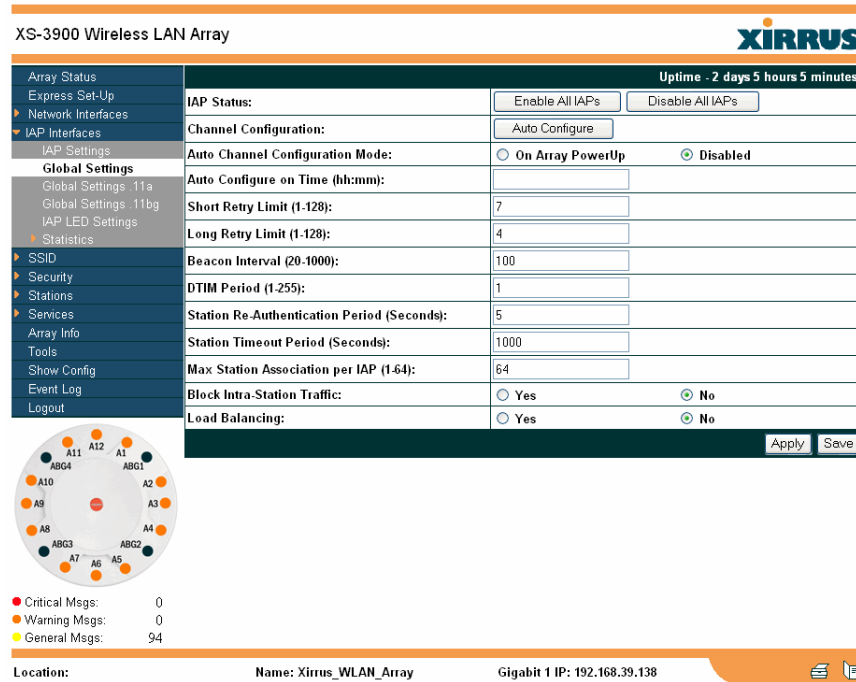


Figure 64. Entering a Description

7. Click on the **Apply** button to apply the new settings to this session.
8. Click on the **Save** button to save your changes (otherwise your new settings will not take effect at the next reboot).

Global Settings

This page allows you to establish global IAP (radio) settings. Global IAP settings include enabling or disabling all radios (regardless of their operating mode), auto-configuring channel allocations, enabling or disabling the Beacon World Mode and EDCF, specifying the short and long retry limits, and defining the beacon interval and DTIM period. Changes you make on this page are applied to all IAPs (radios), without exception.



XS-3900 Wireless LAN Array

Uptime - 2 days 5 hours 5 minutes

Array Status:

Channel Configuration:

Auto Channel Configuration Mode: ☐ On Array PowerUp ☒ Disabled

Auto Configure on Time (hh:mm):

Short Retry Limit (1-128):

Long Retry Limit (1-128):

Beacon Interval (20-1000):

DTIM Period (1-255):

Station Re-Authentication Period (Seconds):

Station Timeout Period (Seconds):

Max Station Association per IAP (1-64):

Block Intra-Station Traffic: ☐ Yes ☒ No

Load Balancing: ☐ Yes ☒ No

Location: Name: Xirrus_WLAN_Array Gigabit 1 IP: 192.168.39.138

● Critical Msgs: 0
● Warning Msgs: 0
● General Msgs: 94

Figure 65. WMI: Global Settings Page

Procedure for Configuring Global IAP Settings

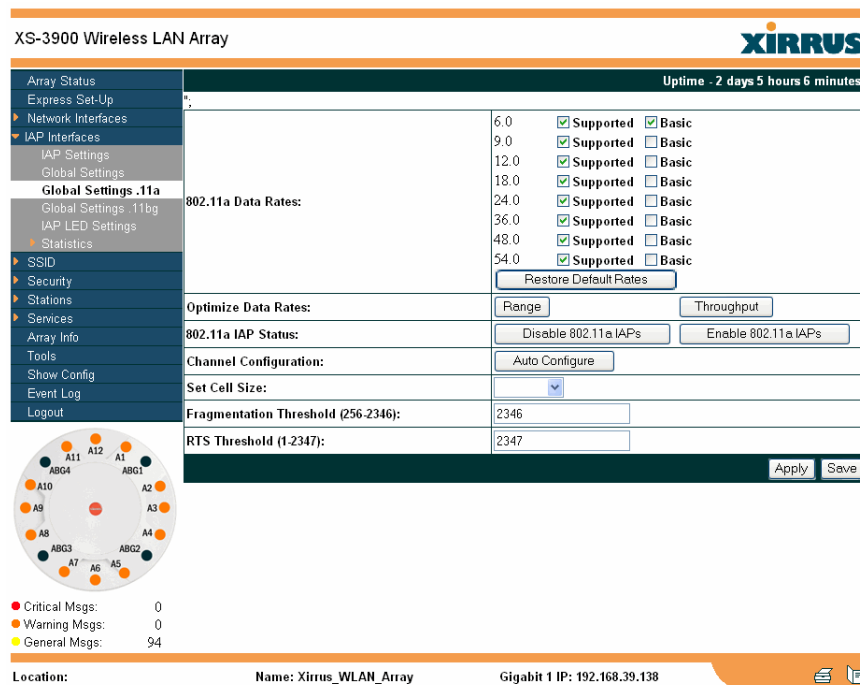
1. **IAP Status:** Click on the **Enable All IAPs** button to enable all radios for this Array, or click on the **Disable All IAPs** button to disable all radios.
2. **Channel Configuration:** Click on the **Auto Configure** button to instruct the Array to determine the best channel allocation settings for each radio and select the channel automatically, based on changes in the environment. This is the recommended method for channel allocations.
3. **Auto Channel Configuration Mode:** This option allows you to instruct the Array to auto-configure channel selection for each enabled IAP when the Array is powered up. Choose **On Array PowerUp** to enable this feature, or choose **Disabled** to disable this feature.
4. **Auto Configure on Time:** This option allows you to instruct the Array to auto-configure channel selection for each enabled IAP at a time you specify here (in hours and minutes, using the format: hh:mm). Leave this field blank unless you want to specify a time at which the auto-configuration utility is initiated.
5. **Short Retry Limit:** This attribute indicates the maximum number of transmission attempts for a [frame](#), the length of which is less than or equal to the RTS Threshold, before a failure condition is indicated. The default value is 7. Enter a new value (1 to 128) in the **Short Retry Limit** field if you want to increase or decrease this attribute.
6. **Long Retry Limit:** This attribute indicates the maximum number of transmission attempts for a [frame](#), the length of which is greater than the RTS Threshold, before a failure condition is indicated. The default value is 4. Enter a new value (1 to 128) in the **Long Retry Limit** field if you want to increase or decrease this attribute.
7. **Beacon Interval:** When the XS-3900 sends a beacon, it includes with it a beacon interval, which specifies the period of time before it will send the beacon again. Enter the desired value in the **Beacon Interval** field, between 20 and 1000. The value you enter here is applied to all radios.

8. **DTIM Period:** A DTIM (Delivery Traffic Indication Message) is a signal sent as part of a beacon by the Array to a client device in sleep mode, alerting the device to a [packet](#) awaiting delivery. Enter the desired value in the **DTIM Period** field, between 1 and 255. The value you enter here is applied to all radios.
9. **Station Re-Authentication Period:** This option allows you to specify a time (in seconds) for the duration of station reauthentications.
10. **Station Timeout Period:** Specify a time (in seconds) in this field to define the timeout period for station associations.
11. **Max Station Association per IAP:** This option allows you to define how many station associations are allowed per IAP (up to 64 stations per IAP).
12. **Block Intra-Station Traffic:** This option allows you to block or allow traffic between wireless clients that are associated to the Array.
13. **Load Balancing:** This option enables or disables active load balancing between the Array IAPs.
14. Click on the **Apply** button to apply the new settings to this session.
15. Click on the **Save** button to save your changes (otherwise your new settings will not take effect).



Global Settings .11a

This page allows you to establish global 802.11a IAP (radio) settings. These settings include defining which 802.11a data rates are supported, enabling or disabling all 802.11a radios, auto-configuration of channel allocations for all 802.11a radios, and specifying the fragmentation and RTS thresholds for all 802.11a radios.



XS-3900 Wireless LAN Array

Uptime - 2 days 5 hours 6 minutes

Array Status

Express Set-Up

Network Interfaces

IAP Interfaces

IAP Settings

Global Settings

Global Settings .11a

Global Settings .11b/g

IAP LED Settings

Statistics

SSID

Security

Stations

Services

Array Info

Tools

Show Config

Event Log

Logout

802.11a Data Rates:

6.0	☒ Supported	☒ Basic
9.0	☒ Supported	☐ Basic
12.0	☒ Supported	☐ Basic
18.0	☒ Supported	☐ Basic
24.0	☒ Supported	☐ Basic
36.0	☒ Supported	☐ Basic
48.0	☒ Supported	☐ Basic
54.0	☒ Supported	☐ Basic

Restore Default Rates

Optimize Data Rates:

Range Throughput

802.11a IAP Status:

Disable 802.11a IAPs Enable 802.11a IAPs

Channel Configuration:

Auto Configure

Set Cell Size:

Fragmentation Threshold (256-2346):

2346

RTS Threshold (1-2347):

2347

Apply Save

● Critical Msgs: 0

● Warning Msgs: 0

● General Msgs: 94

Location: Name: Xirrus_WLAN_Array Gigabit 1 IP: 192.168.39.138

Figure 66. WMI: Global Settings .11a Page

Procedure for Configuring Global 802.11a IAP Settings

1. **802.11a Data Rates:** The Array allows you to define which data rates are supported for all 802.11a radios.

6.0	☒ Supported	☒ Basic
9.0	☒ Supported	☐ Basic
12.0	☒ Supported	☒ Basic
18.0	☒ Supported	☐ Basic
24.0	☒ Supported	☒ Basic
36.0	☒ Supported	☐ Basic
48.0	☒ Supported	☐ Basic
54.0	☒ Supported	☐ Basic

Figure 67. Specifying 802.11a Data Rates

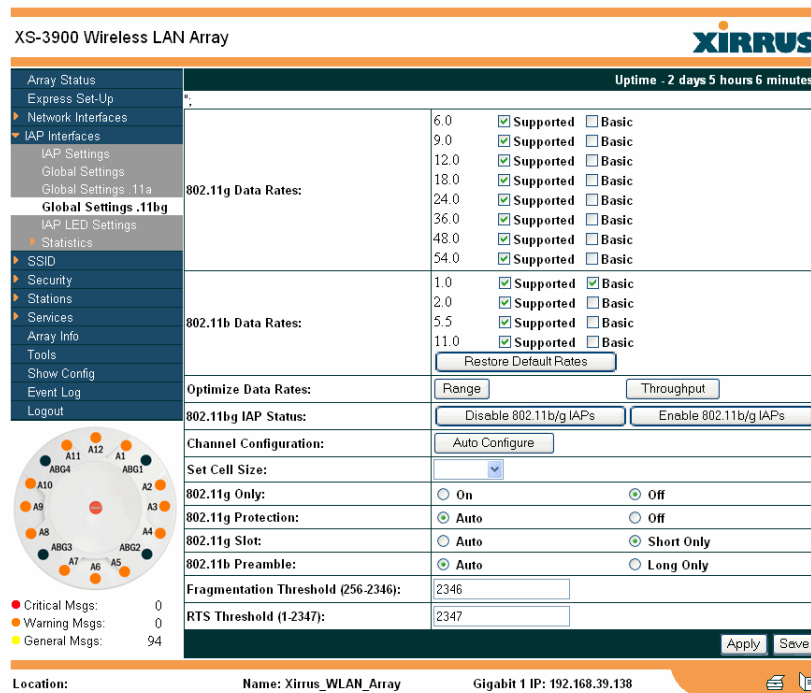
Select (or deselect) data rates by clicking in the corresponding **Supported** and **Basic** data rate check boxes.

- **Basic Rate**—a wireless station (client) must support this rate in order to associate.
 - **Supported Rate**—the Array will use this data rate for transmissions to clients.
2. **Optimize Data Rates:** The Xirrus Wireless LAN Array can optimize your 802.11a data rates automatically, based on range or throughput. Click on the **Range** button to optimize data rates based on range, or click on the **Throughput** button to optimize data rates based on throughput. The **Restore Default Rates** button will take you back to the factory default rate settings.
 3. **802.11a IAP Status:** Click on the **Enable 802.11a IAPs** button to enable all 802.11a radios for this Array, or click on the **Disable 802.11a IAPs** button to disable all 802.11a radios.

- 
4. **Channel Configuration:** Click on the **Auto Configure** button to instruct the Array to determine the best channel allocation settings for each 802.11a radio and select the channel automatically, based on changes in the environment. This is the recommended method for 802.11a channel allocations.
 5. **Set Cell Size:** The Cell Size may be set globally for all 802.11a IAPs to Large, Medium, or Small using a drop down menu.
 6. **Fragmentation Threshold:** This is the maximum size for directed data packets transmitted over the 802.11a radio. Larger frames fragment into several packets, their maximum size defined by the value you enter here. Smaller fragmentation numbers can help to “squeeze” packets through in noisy environments. Enter the desired **Fragmentation Threshold** value in this field, between 256 and 2346).
 7. **RTS Threshold:** The RTS (Request To Send) Threshold specifies the packet size. Packets larger than the RTS threshold will use CTS/RTS prior to transmitting the packet—useful for larger packets to help ensure the success of their transmission. Enter a value between 1 and 2347.
 8. Click on the **Apply** button to apply the new settings to this session.
 9. Click on the **Save** button to save your changes (otherwise your new settings will not take effect).

Global Settings .11bg

This page allows you to establish global 802.11b/g IAP (radio) settings. These settings include defining which 802.11b and 802.11g data rates are supported, enabling or disabling all 802.11b/g radios, auto-configuration of channel allocations for all 802.11b/g radios, and specifying the fragmentation and RTS thresholds for all 802.11b/g radios.



XS-3900 Wireless LAN Array **XIRRUS**

Uptime - 2 days 5 hours 6 minutes

802.11g Data Rates:	6.0	☒ Supported	☐ Basic
	9.0	☒ Supported	☐ Basic
	12.0	☒ Supported	☐ Basic
	18.0	☒ Supported	☐ Basic
	24.0	☒ Supported	☐ Basic
	36.0	☒ Supported	☐ Basic
	48.0	☒ Supported	☐ Basic
	54.0	☒ Supported	☐ Basic
	802.11b Data Rates:		
	1.0	☒ Supported	☒ Basic
2.0	☒ Supported	☐ Basic	
5.5	☒ Supported	☐ Basic	
11.0	☒ Supported	☐ Basic	
Restore Default Rates			
Optimize Data Rates:	Range Throughput		
802.11bg IAP Status:	Disable 802.11b/g IAPs Enable 802.11b/g IAPs		
Channel Configuration:	Auto Configure		
Set Cell Size:	v		
802.11g Only:	☐ On ☒ Off		
802.11g Protection:	☒ Auto ☐ Off		
802.11g Slot:	☐ Auto ☒ Short Only		
802.11b Preamble:	☒ Auto ☐ Long Only		
Fragmentation Threshold (256-2346):	2346		
RTS Threshold (1-2347):	2347		
Apply Save			

Location: Name: Xirrus_WLAN_Array Gigabit 1 IP: 192.168.39.138

Figure 68. WMI: Global Settings .11bg Page

Procedure for Configuring Global 802.11b/g IAP Settings

1. **802.11g Data Rates:** The Array allows you to define which data rates are supported for all 802.11g radios.

6.0	☒ Supported	☐ Basic
9.0	☒ Supported	☐ Basic
12.0	☒ Supported	☐ Basic
18.0	☒ Supported	☐ Basic
24.0	☒ Supported	☐ Basic
36.0	☒ Supported	☐ Basic
48.0	☒ Supported	☐ Basic
54.0	☒ Supported	☐ Basic

Figure 69. Specifying 802.11g Data Rates

Select (or deselect) data rates by clicking in the corresponding **Supported** and **Basic** data rate check boxes.

- **Basic Rate**—a wireless station (client) must support this rate in order to associate.
 - **Supported Rate**—the Array will use this data rate for transmissions to clients.
2. **802.11b Data Rates:** This task is similar to Step 1, but these data rates apply only to 802.11b radios.

1.0	☒ Supported	☒ Basic
2.0	☒ Supported	☒ Basic
5.5	☒ Supported	☒ Basic
11.0	☒ Supported	☒ Basic

Figure 70. Specifying 802.11b Data Rates

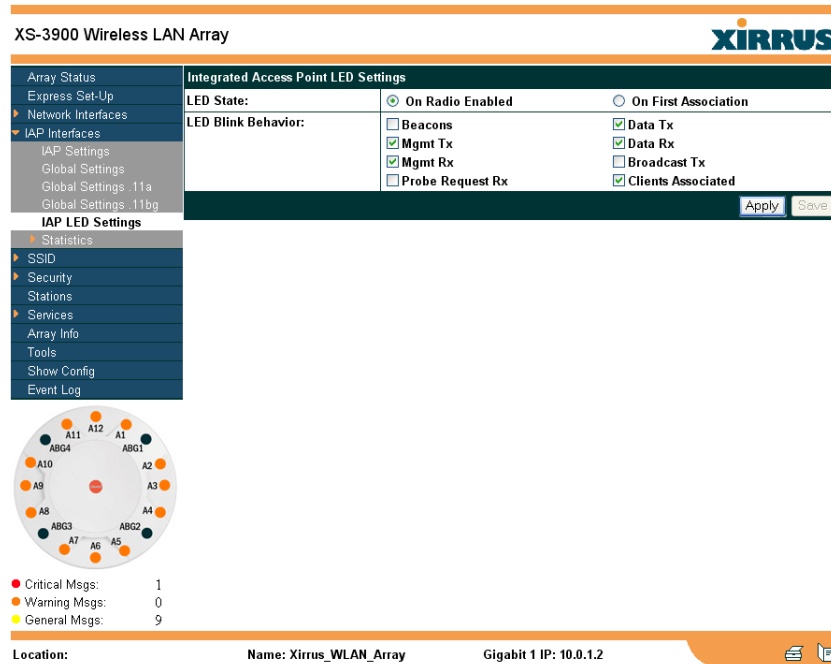
3. **Optimize Data Rates:** The Xirrus Wireless LAN Array can optimize your 802.11b/g data rates automatically, based on range or throughput. Click on the **Range** button to optimize data rates based on range, or click on the **Throughput** button to optimize data rates based on throughput. The **Restore Default Rates** button will take you back to the factory default rate settings.
4. **802.11bg IAP Status:** Click on the **Enable 802.11b/g IAPs** button to enable all 802.11b/g radios for this Array, or click on the **Disable 802.11b/g IAPs** button to disable all 802.11b/g radios.
5. **Channel Configuration:** Click on the **Auto Configure** button to instruct the Array to determine the best channel allocation settings for each 802.11b/g radio and select the channel automatically, based on changes in the environment. This is the recommended method for 802.11b/g channel allocations.
6. **Set Cell Size:** The Cell Size may be set globally for all 802.11a IAPs to Large, Medium, or Small via a drop down menu.
7. **802.11g Only:** Select **On** if you want to restrict use to 802.11g mode only. In this mode, no 802.11b rates are transmitted. Also, stations that only support 802.11b will not be able to associate.
8. **802.11g Protection:** Select **Auto** to provide automatic protection for all 802.11g radios.
9. **802.11g Slot:** Select **Auto** to instruct the Array to manage the 802.11g slot times automatically, or choose **Short Only**. Xirrus recommends using **Auto** for this settings, especially if 802.11b devices are present.
10. **802.11b Preamble:** The **preamble** contains information that the Array and client devices need when sending and receiving packets. All compliant 802.11b systems have to support the long preamble (a short preamble improves the efficiency of a network's throughput when transmitting special data, such as voice, VoIP (Voice-over IP) and streaming video).
Select **Auto** to instruct the Array to manage the preamble (long and short) automatically, or choose **Long Only**.

11. **Fragmentation Threshold:** This is the maximum size for directed data [packets](#) transmitted over the 802.11b/g radio. Larger frames fragment into several packets, their maximum size defined by the value you enter here. Enter the desired **Fragmentation Threshold** value in this field, between 256 and 2346).
12. **RTS Threshold:** The RTS (Request To Send) Threshold specifies the [packet](#) size. Packets larger than the RTS threshold will use CTS/RTS prior to transmitting the packet—useful for larger packets to help ensure the success of their transmission. Enter a value between 1 and 2347.
13. Click on the **Apply** button to apply the new settings to this session.
14. Click on the **Save** button to save your changes (otherwise your new settings will not take effect).



IAP LED Settings

This page allows you to set up the Array's IAP LEDs, including the assignment of behavior preferences.



XS-3900 Wireless LAN Array

Integrated Access Point LED Settings

LED State: ☒ On Radio Enabled ☐ On First Association

LED Blink Behavior:

☐ Beacons	☒ Data Tx
☒ Mgmt Tx	☒ Data Rx
☒ Mgmt Rx	☐ Broadcast Tx
☐ Probe Request Rx	☒ Clients Associated

Apply Save

IAP LED Settings

Statistics

SSID

Security

Stations

Services

Array Info

Tools

Show Config

Event Log

● Critical Msgs: 1

● Warning Msgs: 0

● General Msgs: 9

Location: Name: Xirrus_WLAN_Array Gigabit 1 IP: 10.0.1.2

Figure 71. WMI: IAP LED Settings Page

Procedure for Configuring the IAP LEDs

1. **LED State:** This option determines which event triggers the LEDs, either when a radio is enabled or when a radio first associates with the network. Choose **On Radio Enabled** or **On First Association**, as desired.
2. **LED Blink Behavior:** This option allows you to select when the IAP LEDs blink, based on the activities you check here. From the choices available, select one or more activities to trigger when the LEDs blink.
3. Click on the **Apply** button to apply the new settings to this session, then click on the **Save** button to save your changes.

Statistics

This is a status only page that provides an overview of the statistical data associated with individual radios. For more detailed information about a specific radio, simply click on any radio in the left column, or go to the statistics page for the desired radio (for example, Statistics IAP abg4). You can **Refresh** or **Clear** the data on this page at any time by clicking on the appropriate button.

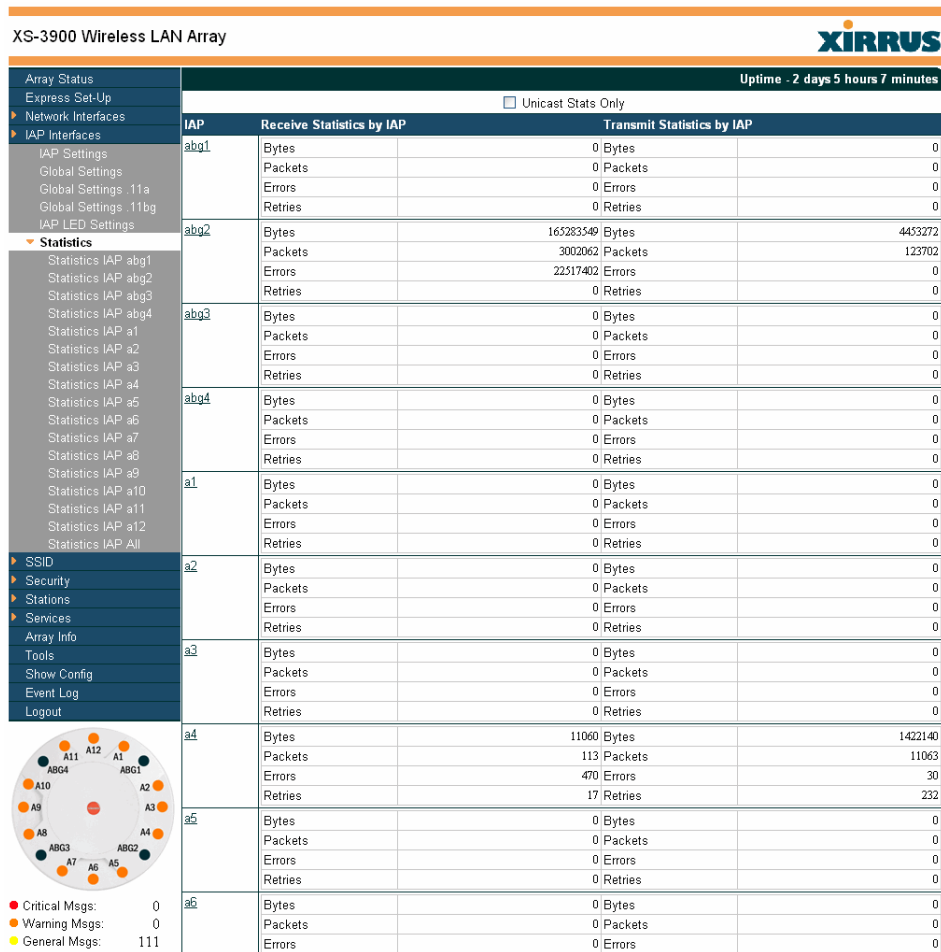


Figure 72. WMI: Statistics Page

Statistics (for specific radios)

These pages provide a detailed statistical summary of each radio's performance, displayed either numerically or by percentage (your choice). The following image shows an example from the XS-3700 product of the **Statistics IAP a4** page (for the a4 radio).

The default Statistics Type is NUMERIC, but you can change this to PERCENTAGE from the pull-down menu at the top of the page. In addition, you can **Refresh** or **Clear** the data on this page at any time by clicking on the appropriate button.

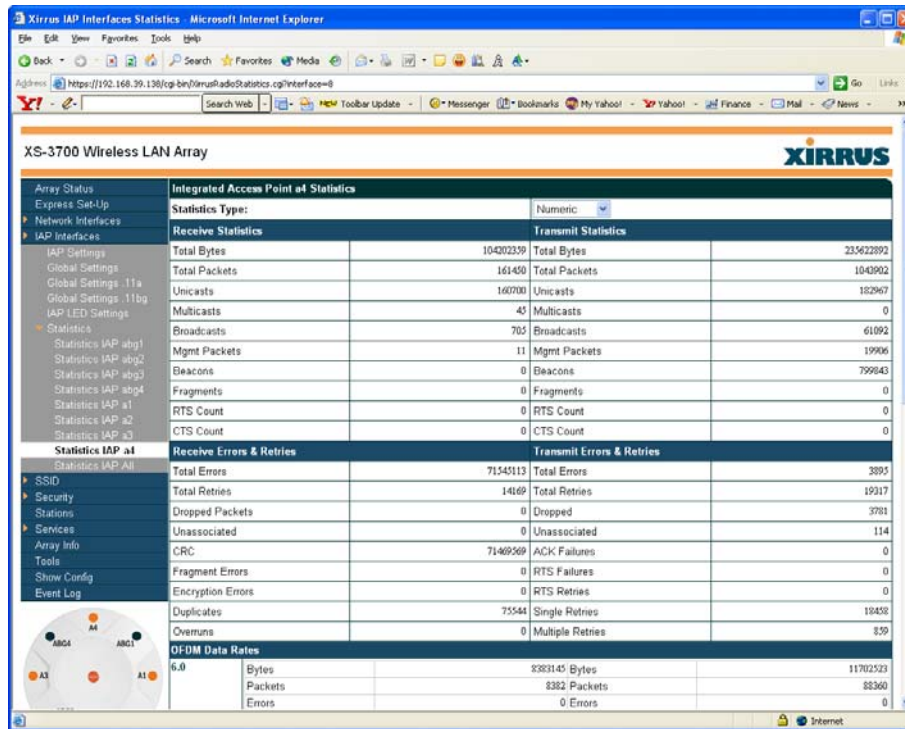


Figure 73. WMI: Statistics for IAP a4 Page (XS-3700)