



AG-5000 SERIES OPERATION MANUAL

Applicable to S/N: 1510300 and higher, for units with lower serial numbers, please refer to revision G Manual

2284 N. Glassell Street, Unit D, Orange, CA 92865

Factory: Ph: (714) 283-1251

Fax: (714) 283-3672

Sales: Ph: (925) 776-1070

Fax: (925) 776-1074

www.premierwirelessinc.com

WARRANTY

Premier Wireless will repair or replace, without charge, any product proved defective in material or workmanship in normal usage for a period of one year after the date of shipment. Premier Wireless will warranty all replacement parts and repairs for 90 days from the date of shipment. All goods for warranty or out of warranty work shall be sent freight prepaid to our California facility. Repairs made necessary by reason of misuse, alteration, normal wear or accident are not covered under this warranty. In no event is Premier Wireless liable for indirect, incidental or consequential damages incurred by the customer for any reason.

THE FOREGOING WARRANTIES ARE IN LIEU OF ALL WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY OTHER OBLIGATION ON THE PART OF PREMIER WIRELESS.

This warranty gives you specific legal rights. You may also have additional rights, which are subject to variation from state to state.

If a warranty repair is required, contact Premier Wireless for a Return Material Authorization number (RMA), and provide the following information.

1. Model and Serial Number
2. Date of Shipment, P.O. number, Premier Sales Order number, or Premier invoice number.
3. Details of the defect or problem

If there is a dispute regarding the warranty of a product which does not fall under the warranty conditions stated above, please include a written explanation with the product when returned.

Ship freight prepaid to:

Premier Wireless, Inc.
2284 N. Glassell Street, Unit D
Orange, CA 92865
Attn: RMA _____
Ph: (714) 283-1251

Returned goods should be clearly identified with the assigned RMA number. Method of return shipment shall be via UPS Ground unless otherwise requested and paid for by customer.

OUT OF WARRANTY & CREDIT RETURNS

The same procedure specified above for warranty returns should be followed for out of warranty repairs and credit returns. Below is an outline of our policy.

1. Any products can be returned for full credit towards future purchases as long as it is in new condition and returned within thirty (30) days of the ship date as provided on the original packing slip from Premier Wireless. A twenty percent (20%) restocking fee will apply for any new product returned after 30 days but less than 90 days. No return will be accepted after 90 days.
2. Any returned product that requires repair and/or refurbishment so that it can be resold will bear additional charges which will be deducted from the credit given.
3. At no time will Premier Wireless accept any product that can not be repaired and/or refurbished for purpose of resale.
4. All freight charges will be the responsibility of the customer.

TABLE OF CONTENTS

1. INTRODUCTION	4
2. OPERATION PARAMETERS	4
2.1 DATA RATE	4
2.2 FREQUENCY OF OPERATION	4
2.3 AP MODE SETTING	4
3. WIRELESS ETHERNET CONFIGURATIONS	4
DIAGRAMS OF AG-5000 SERIES WIRELESS UNITS	5
4. FACTORY DEFAULT SETTINGS	6
4.1 PASSWORD	6
4.2 UNIT NAME & IP ADDRESS	6
4.3 SSID	6
4.4 ENCRYPTION	6
5. PRE-INSTALLATION NOTES	6
5.1 LOCATION	6
5.2 ANTENNA AIMING	6
5.3 ANTENNA POLARITY	6
5.4 PRE-TEST	7
6. INSTALLATION	7
7. TROUBLE SHOOTING	7
EXAMPLE OF ONE WIRELESS GROUP	8
EXAMPLE OF MULTIPLE WIRELESS GROUPS	8
APPENDIX A - AG-5000 UTILITY	9
APPENDIX B - WEB BROWSER METHOD TO ACCESS THE WIRELESS UNIT	10
APPENDIX C - RSSI UTILITY	11
APPENDIX D - COMPLETE DEFAULT PREMIER FACTORY SETTINGS	12
APPENDIX E - ANTENNA HEIGHT CALCULATION	14
APPENDIX F - AH-83 ASSEMBLY DIAGRAM	15
SPECIFICATIONS	16

1. INTRODUCTION

These wireless Ethernet units are designed primarily to replace an Ethernet Cable used in wired network or communication system with more attention towards application in sending streaming video signal. Two units are required to send wireless signal, one at each end of the link; they are the Base station and the Remote station. A single Base station can also be setup to communicate with several Remote stations to collect their signals or send signal out from a central control site. Repeater stations can also be used to extend the range or to avoid obstructions in the signal path. These Ethernet units come in an weather proof fiberglass enclosure suitable for outdoor installation.

2. OPERATING PARAMETERS

2.1 DATA RATE (BANDWIDTH)

MJPEG video uses more bandwidth than MPEG4 format. A MJPEG video at 640X480, 30 frames per second with no compression requires up to about 12 megabit per second bandwidth (mbps) and about 6 mbps at a usable 50% compression, compared to MPEG4 which requires typically less than 2 mbps for CCTV video monitoring at the same resolution and frame rate. The available sustaining maximum data rate of the wireless units is about 20 mbps under good signal condition. When they are used to send streaming video from the remote cameras to the head end and assuming those cameras are operating in unicast mode and the data rate is set at about 1.5 - 2 mbps which is suitable for most CCTV applications using MPEG 4 format, up to about 7 - 8 cameras can be hooked up in one system. But if a repeater is required to relay the signal, the effective flow rate is cut in half for the whole system. To achieve maximum data flow rate, select a configuration that gives at least 3 times the actual working distance, more if the installation environment is not ideal. Reflective environment that results in multipath signals or operating in heavy wireless traffic area can reduce the data flow rate significantly. Some margin should also be allowed for imperfect installation and equipment aging.

2.2 FREQUENCY OF OPERATION

There are a total of eight channels available, four channels in the 5.3 GHz band (channels 52, 56, 60 & 64 from 5.25 to 5.35 GHz) and four channels in the 5.8 GHz band (channels 149, 153, 157 & 161 from 5.725 to 5.825 GHz). There is restriction on which frequency bands are available depending on the model of the units selected for a certain mode of operation or distance. This is due to the limited band coverage of the antenna or FCC regulations. Please see the next section for more detail.

2.3 AP MODE SETTING

These wireless ethernet units are set up to operate in one of three modes that are suitable for wireless digital data or video streaming. These three modes are related to where the unit is located in the network and is identified by the name associated with the enclosure; they are:-

A - Base station (abbreviated BAxx on the enclosure), this is the unit at the head end and is usually setup to operate as a Point-to-Multipoint bridge (although a Point-to-Point bridge can also be used if only one remote unit is present). It is able to communicate with all other units in the same network.

B - Remote station (abbreviated RMxx on the enclosure), this is the unit at the far end or camera end of the link and is setup to operate as a Point-to-Point bridge. It sends the digital signal from any device such as a computer, an IP camera, a video server or a network switch/hub back to the head end.

C - Repeater station (abbreviated RPxx on the enclosure), this is the middle unit between the Remote station and the Base station when they are too far apart or when there is obstruction in between the stations making communication difficult. The unit is setup as Point-to-Multipoint bridge.

3. WIRELESS ETHERNET CONFIGURATIONS

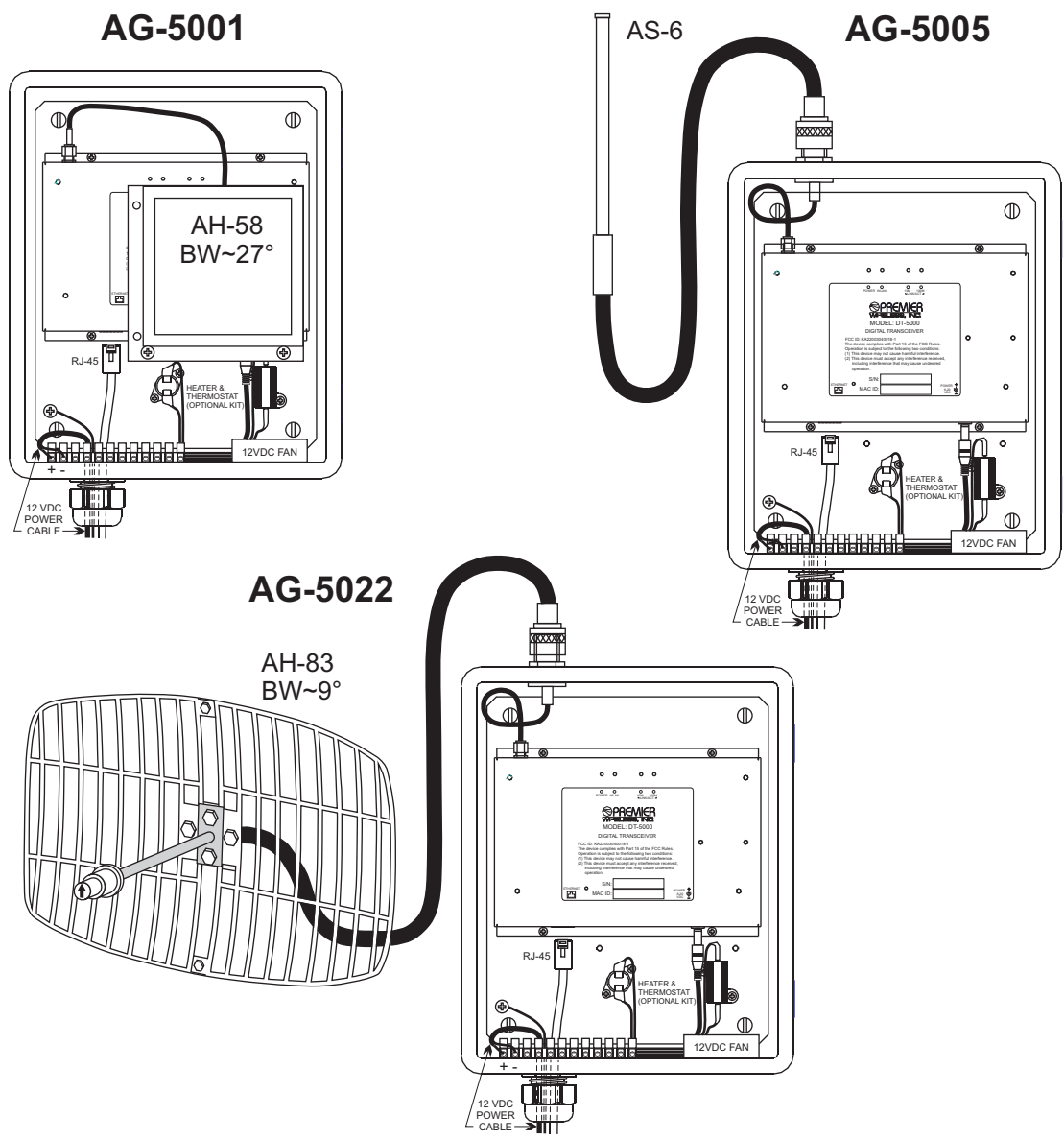
There are three models available depending on the antenna association (see diagrams on next page):-

AG-5001 - 5.3/5.8 GHz unit with internal directional antenna, AH-58 (beamwidth ~27°)

AG-5005 - 5.3/5.8 GHz unit with external omni-directional antenna, AS-6

AG-5022 - 5.8 GHz unit with external high gain directional antenna, AH-83 (beamwidth ~9°)

To configure your system, decide on an operating mode, point to point or point to multipoint based on how many remote camera locations, then check the maximum distance from the table below to select the Base and Remote Units required. All units require 12 VDC to operate. If other input voltages are required, order the optional external power supply kit, one for each unit. Heater kit is also required for area where the temperature will be close to and below freezing.



OPERATING MODE	FREQUENCY	BASE UNIT	REMOTE UNIT	DISTANCE*
Multi-Point to Multi-Point	5.8 GHz	AG-5005	AG-5005	1.4 miles
Point to Multi-Point	5.8 GHz	AG-5005	AG-5001	2 miles
Point to Point	5.8 GHz	AG-5001	AG-5001	3 miles
Point to Multi-Point	5.8 GHz	AG-5005	AG-5022	7 miles
Point to Point	5.8 GHz	AG-5001	AG-5022	10 miles
Point to Point	5.8 GHz	AG-5022	AG-5022	25 miles

Operating Mode is based on antenna type, i.e. Omni-directional (Multi-Point) or Directional antenna (Point) used in the unit.

*The maximum data rate could be maintained up to approximately one third of the maximum distance specified. At maximum distance, the usable data rate could be reduced to approximately one third. Other factors could affect the data rate also.

OPTIONAL ACCESSORIES:

7400070A00 – 110 VAC to 12 VDC, 2A Power Supply Kit in an outdoor enclosure.

7400071A00 – 24 VAC to 12 VDC, 2A Power Supply Kit in an outdoor enclosure.

7000088D00 – New Pole Mount for mounting the enclosure or antennas to 3” or larger diameter pole

5000064000 – Universal Mounting Kit for enclosures or antennas that require tilting or rotation when wall mounted.

4. DEFAULT PREMIER FACTORY SETTINGS

The wireless Ethernet units are set at the factory with certain default values. The user should be able to use these default settings to access the units and change these settings in order to work in their network system. The included AG5000 software utility (or download it from our website www.premierwirelessinc.com) can be used to change the settings. The utility displays a whole picture of all the accessible wireless Ethernet devices present in the network and also provides a mean of storing the whole system configuration in a file that can be retrieved at any time. Please refer to the programming section in the appendix for details. The following paragraphs show some of the basic settings, a complete listing can be found in the appendix section.

4.1 PASSWORD

The default password to access the setup utility is “premier”, all in lower case.

4.2 UNIT NAME & IP ADDRESS

Static IP addressing is used in these wireless Ethernet units. The default values are:

STATION LOCATION	ENCL. NAME	UNIT NAME	IP ADDRESS
Units ordered as one networked system -			
1st Base Station	BA01	Base 01	192.168.0.51
Remote Station 1	RM01	Remote 01	192.168.0.52
Remote Station 2	RM02	Remote 02	192.168.0.53 and so on
Repeater station	RP01	Repeater 01	Next higher IP address and so on ...
2nd Base Station	BA10	Base 10	192.168.0.61
Remote Station 1	RM11	Remote 11	192.168.0.62
Remote Station 2	RM12	Remote 12	192.168.0.63 and so on
Repeater Station	RP11	Repeater 11	Next higher IP address and so on ...
Units ordered separately - (Configured as)			
Remote Stations	RM09	Remote 09	192.168.0.91 and so on

4.3 SSID (Service Set Identifier)

The default setting is “PWI Wireless” and broadcast mode is disabled.

4.4 ENCRYPTION

Encryption is enabled using 128 bit WEP, default entry is “12 34 56 78 90 AB CD EF 12 34 56 78 90”

5. PRE-INSTALLATION NOTES

5.1 LOCATION

The vertical height of the antenna is very important. Clear line of sight is only the **beginning** of a successful installation; the antenna height will need to be adjusted to maximize the received signal. Do not fix the exact location of the antenna before the system is tested for proper operation. Please read the article “ANTENNA HEIGHT CALCULATION” in the appendix section to calculate the required antenna height.

5.2 ANTENNA AIMING

Among the three models of wireless Ethernet units, only the AG-5001 employs internal antenna. AG-5005 employs external omni-directional antenna while the AG-5022 employs an external high gain directional grid antenna to achieve long range transmission. **With internal antenna such as the AG-5001 it is important to aim the front side of the enclosure at the other side of the transmission.** Omni-directional antennas do not require aiming but take precaution to prevent reflections from behind the antenna as these reflections can cancel the forward signal if they are out of phase.

5.3 ANTENNA POLARITY

All the standard antennas in the wireless Ethernet units are linear antennas, with either vertical or horizontal orientation (hence vertical or horizontal polarity). The antennas on both sides have to be oriented to the same polarity in order to receive the signal.

5.4 PRE-TEST

Any devices that will be connected to the remote units should be tested first with cables to verify their operations before replacing the cables with the wireless units.

6. INSTALLATION

!!!WARNING!!!
INSTALLATION OF ANTENNA NEAR POWER LINES IS DANGEROUS AND GETTING IN CONTACT WITH POWER LINES CAN CAUSE SERIOUS INJURY OR EVEN DEATH.

IT IS IMPORTANT TO PERFORM A BENCH TEST FIRST PRIOR TO INSTALLATION IN THE FIELD. THIS IS TO RESOLVE ANY IP ADDRESS CONFLICTS AND SETUP THE WIRELESS UNITS' NETWORK SETTINGS THAT WILL WORK WITH YOUR NETWORK.

(1) It is only after a successful bench testing should the wireless units be installed in the field. This will save the trouble of climbing up pole and using portable computer to change settings in these units.

(2) Use regular Ethernet cable with straight through connection between the computer and the base unit. Use straight through or cross-over connection from the remote unit to the device as required by the device manufacturer.

(2) Mount the enclosures at the planned locations and for **units with internal antennas, the enclosures have to be aimed with the door facing the other side of the transmission.** Do not fix them permanently yet as it might be necessary to move the enclosures to get better reception. Use the U bolts to mount the enclosures to pole less than 2 inches in diameter. For larger diameter pole, use the new pole mount, P/N: 7000088D00.

(3) Mount the external antennas where applicable, use the optional new pole mount for larger diameter pole. Watch out for the polarity of the antennas, they have to match at both ends to achieve good reception. For directional antennas, aim the antennas in the general direction toward the other side. As a rule of thumb for antenna placement, avoid any reflective objects in the immediate vicinity of the antenna and objects close to the transmission path. Examples of these situations are: A large roof area right in front of the antenna which is only a few feet above the roof; railing that is only a couple of feet away from the direct signal path but is in front of the antenna; omni-directional antenna mounted on a wall; signal shooting through a hole in trees or grazing the top of trees only by a few feet. All these situations generate strong multipath reflections that could cancel the direct signal.

(4) Connect the antenna cables to the enclosures.

(5) Hook up the wiring to the enclosures. Use the cord grip to secure the wires and cables, pass the bulky item such as the RJ-45 plug through the cord grip first, then the thinner wires.

(6) Hook-up the 12 VDC power from the power source using the appropriate gauge of wires (see table below). Observe the polarity of the DC voltage and use shielded cable or twisted pair for long run to minimize pickup of strong electro-magnetic field. If the optional power supply kits are used, mount the power supply enclosures at a convenient location and connect the supply power to the enclosures according to your local electrical code.

WIRE SIZE	16AWG	18AWG	20AWG	22AWG	24AWG
No Heater	<500 Ft.	<320 Ft.	<200 Ft.	<125 Ft.	<80 Ft.
With Heater	<175 Ft.	<100 Ft.	<65 Ft.	<40 Ft.	<25 Ft.

(7) Power up the enclosures and check for the running fan or lit LEDs to indicate the presence of power.

(8) Test the installation with some actual transmission before securing all the hardware in place. Seal all external cable connections with electrical tape to prevent water or rain entry into the connections.

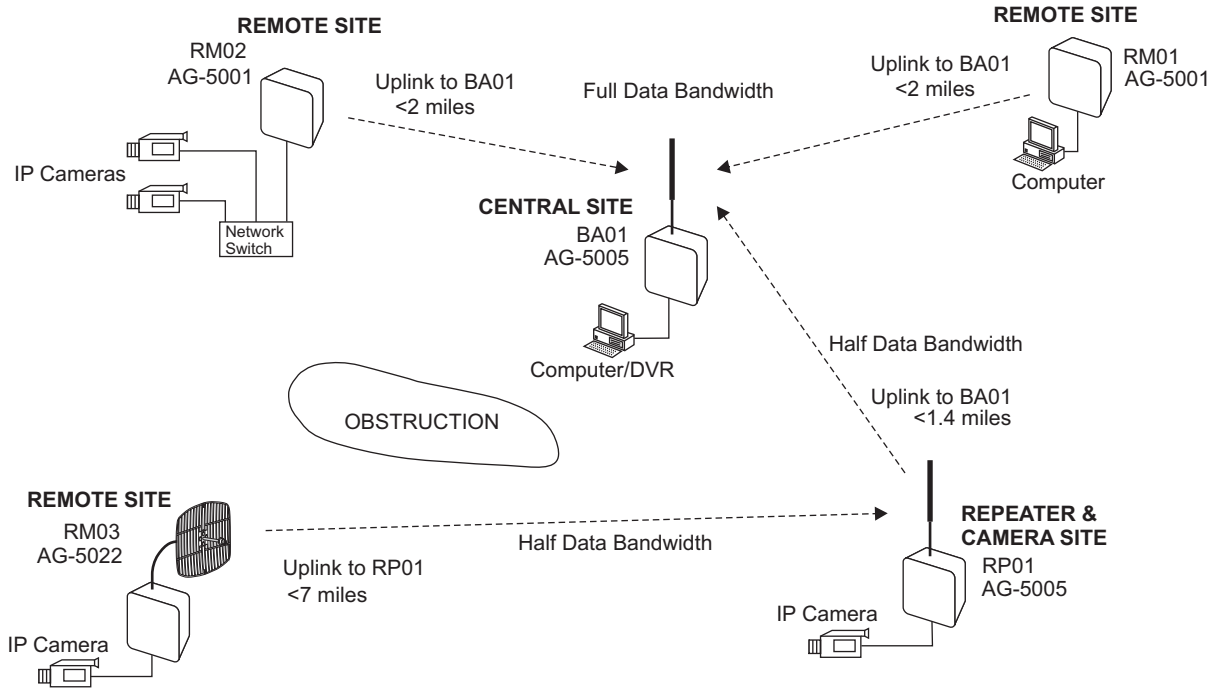
7. TROUBLE SHOOTING

If the system is not working properly after the installation, please re-check your installation with notes in Section 5 PRE-INSTALLATION NOTES, then follow the instructions in Appendix C - RSSI Utility to use this tool to check signal strength and scan the airway for interfering signals.

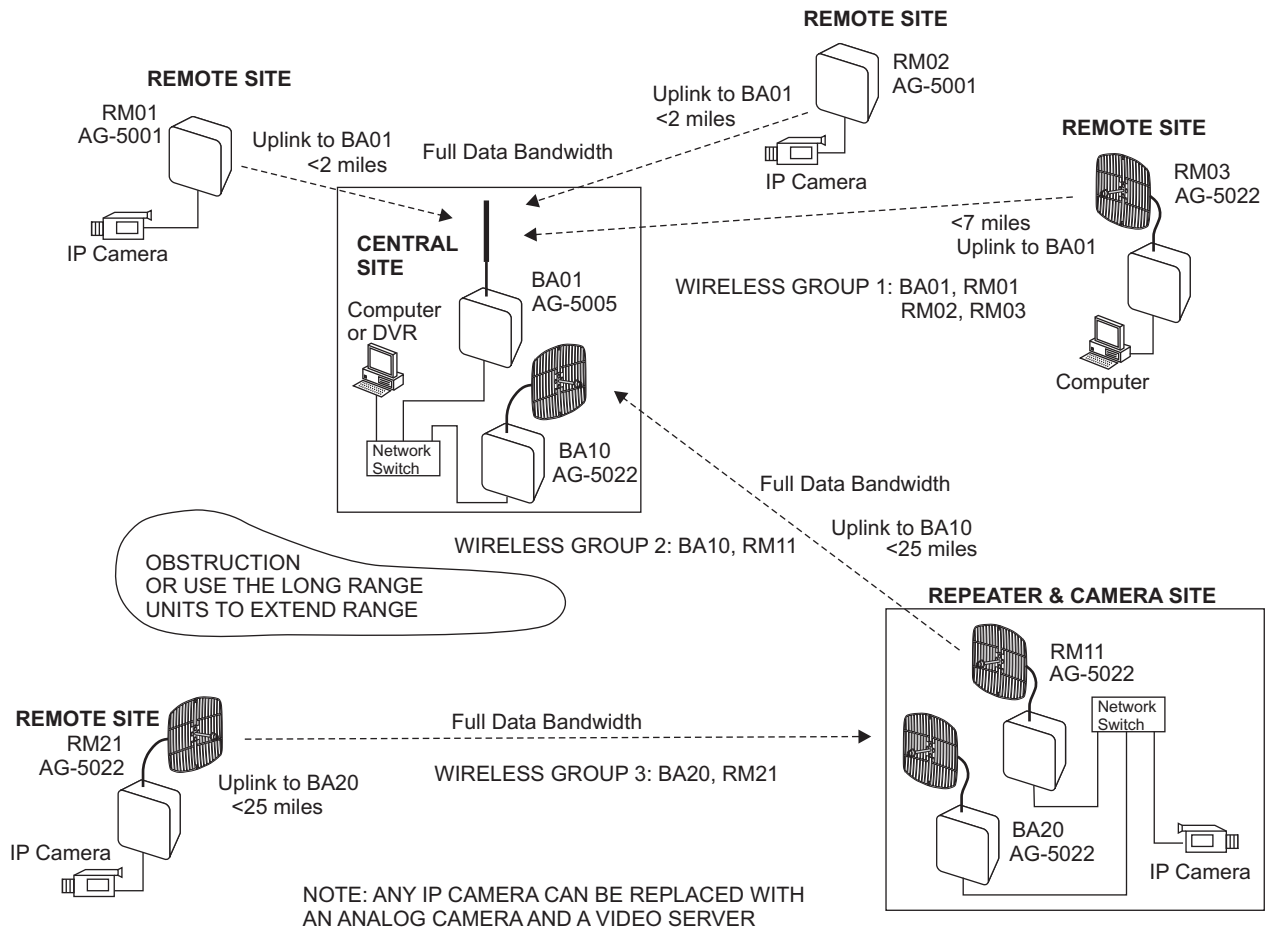
NOTES: There should be only **one wireless unit from the same wireless group** hard-wired to the network.

Any two or more talking wireless units hard-wired to the same network can cause data loop back and eventually traffic jam in the network.

EXAMPLE OF ONE WIRELESS GROUP



EXAMPLE OF MULTIPLE WIRELESS GROUPS



APPENDIX A
WIRELESS ETHERNET AP PROGRAMMING
AG-5000 CONFIGURATION UTILITY V2.5

WARNING!! — The AG-5000 Utility is not compatible with the newer version of the Wireless Ethernet units with serial number higher than 1510300. But it can be used to search for any AG-5000 series wireless units in the network and it will display the IP address, MAC address, etc. with the “Search All” button. It should not be used to change any parameters of the wireless units. Doing so will give unexpected results and you may need to reprogram the unit to make it work again. Use the WEB Browser method on Appendix B to access the unit.

APPENDIX B

WEB BROWSER METHOD TO ACCESS THE WIRELESS UNIT

Most of the parameters can be accessed and changed using this method except the Unit's ID, Name, Uplink, and Model Name which are unique and can be changed only using the AG-5000 Utility that is included on the CD. But these entries are not important as far as the operation is concerned. Do not change any of the parameters if you don't know what the results will be, some of the settings are not suitable for certain operating configurations.

To get access to the wireless unit, the computer's IP address has to be within the IP address subnet range of the unit. If the wireless unit is using the default settings, then check and if necessary manually set the computer's IP address to between 192.168.0.2 to 192.168.0.254 (e.g. 192.168.0.100) but excluding those used by the wireless unit (default IP address range is from 192.168.0.50 to 192.168.0.99) and also set the subnet mask to 255.255.255.0 and gateway address to 192.168.0.1. Make sure to copy down the current computer settings before change so that they can be restored afterward.

To gain access, follow the steps below to login to the wireless unit:

1. Connect the unit to the computer using a straight through network cable or through the network or through another wireless unit if they have wireless connection.
2. Open Windows Internet Explorer on the computer.
3. Type in the IP address of the wireless unit in the address field.
4. The login screen will pop up on the display, enter "admin" in the User Name field and "premier" in the Password field (if the password has not been changed).
5. Select the appropriate page (see below) to change the parameter. Click on the "Apply" button after changes on each page to save the changes.
6. Any wireless units in the network can be accessed in the same way as long as there is wireless connection to the network.
7. If system level parameters such as RF Channel, SSID, encryption, etc. are changed, start with the remote units first and work towards the base unit.

Here are some of the common parameters that may require access:

PARAMETER	LOCATION (Heading/Left Side)	NOTES
IP Address	Home/LAN	192.168.0.XX
MODE	Home/Wireless	WDS
SSID	Home/Wireless	PWI Wireless
RF Channel	Home/Wireless	149, 153, 157, 161 (use only these channels)
MAC Address	Home/Wireless	MAC address of other side
Encryption	Home/Wireless	1234567890abcdef1234567890
Site Survey	Home/Wireless	Select " AP Client" mode temporarily, but do not click "Apply" button, to check incoming signal level
Password	Tools/Admin	premier
Traffic Statistics	Status/Stats	Check transmission success rate

In order for any wireless units to communicate, their system level settings such as SSID, RF channel, encryption, etc., have to match and the MAC addresses have to be entered into opposite sides. The MAC address entry is under the WDS section, "Remote AP MAC Address".

Base Unit - The Base Unit should have all the Repeater and Remote Units' MAC addresses it directly communicates with entered in its memory, up to eight addresses can be entered. Any Remote Unit that requires a Repeater Unit to relay the signal is not communicating to the Base Unit directly and therefore its MAC address should not be entered into the Base Unit.

Remote Unit - The Remote Unit should have the MAC address of the uplink unit, either a base or a repeater, entered here and there should be only one entry.

Repeater Unit - The Repeater Unit should have the MAC addresses of the Remote and the Base Units in its memory.

APPENDIX C RSSI UTILITY

Any wireless unit can be used as a scanner to check the signal received by the unit at the installed location. Only signals that confirm to the 802.11a standard can be picked up and displayed by the unit, other signals such as those analog transmissions from our AG-17XX & AG-19XX and other type of transmissions will not be displayed. To use the unit as a scanner, follow these steps:

1. Stop any video or data communication that the unit is sending or receiving.
2. Login to the unit using the web browser method, please see NOTES below.
3. Go to the Home/Wireless page.
4. We will use the "AP Client" mode temporarily, DO NOT click the "Apply" button to change mode permanently.
5. Select the "AP Client" Mode under the MODE selection and the Site Survey section will appear.
6. Click the "SCAN" button to scan the area for signals.
7. Identify your incoming signal by the MAC address and read its signal strength.
8. Click the "SCAN" button a few more times to check the signal strength consistency.
9. To exit "AP Client" mode, click the "Cancel" button, go to another page or close the WEB Browser.

Some of the installation issues can be resolved by the Site Survey tool:

1. If the signal strength indicated is constantly low e.g. less than 15% and the distance is no way close to the maximum distance specified then the antenna placement may not be optimum. Try to raise the antenna height and look for reflections from structures such as trees, buildings, railings, poles, etc. along the line of sight that may cause reflections to interfere with the direct signal. A clearance of about 15 feet radius is needed for distance of 1 mile; about 10 feet at a distance of half a mile.
2. If the site survey table indicates other signals on the same RF channel but do not belong to your wireless group, it is better to change your RF channel. You have to change all the wireless units in this group to the new channel.
3. It is normal for the signal strength to change by a few to 20~30% from each scan but if it fluctuates up and down a lot, e.g. changing from 70% to 10% randomly and quite often, it is possibly other non 802.11a signal is present in the same area, change to another RF channel to avoid it. Choose from one of the 4 applicable channels, 149, 153, 157 & 161.
4. Another end result from interference is the low success in data transmission. Go to the "Status/Stats" page and select the "WLAN 802.11A Traffic Statistics" heading to view the "Transmission Success Rate". Low success rate means either weak signal or interference.

NOTES: In order to access the wireless unit, your computer's IP address has to be in the subnet range of the wireless unit. The default subnet range is 192.168.0.2 to 192.168.0.254. Avoid the IP addresses used by the wireless units, which are in the range from 192.168.0.50 to 192.168.0.99. Once your computer is set to within the subnet range, you can login to the wireless unit. If you don't know the IP address of the wireless unit, you can use our AG-5000 Configuration Utility to search for the unit then use the WEB Browser to access it. Use the WEB BROWSER METHOD to access the unit: Connect the wireless unit to the computer using a straight through Ethernet cable. Open Internet Explorer, type in the IP address in the address field, enter "admin" in the User name and "premier" in the password field (if the password has not been changed from the factory default).

APPENDIX D COMPLETE DEFAULT PREMIER FACTORY SETTINGS

In order to access the wireless unit, your computer's IP address has to be in the subnet range of the wireless unit. The default subnet range is 192.168.0.2 to 192.168.0.254. Avoid the IP addresses used by the wireless units, which are in the range from 192.168.0.50 to 192.168.0.99. Once your computer is set to within the subnet range, you can login to the wireless unit. If you don't know the IP address of the wireless unit, you can use our AG-5000 Configuration Utility to search for the unit.

Use the WEB BROWSER METHOD to view the setting pages: Connect the wireless unit to the computer using a straight through Ethernet cable. Open Internet Explorer, type in the IP address in the address field, enter "admin" in the User name and "premier" in the password field. The followings are the default settings from Premier Wireless Factory, only the 802.11a section is enabled, the 802.11g section is disabled. If the unit was reset to OEM settings within the configuration menu or by pressing the switch next to the power plug, all the following parameters have to be re-selected or re-entered in order to set up the unit to work better with video streaming and the initial IP address is 192.168.0.50, no password is required to login to the unit after system reset.

PAGE	PARAMETER	DEFAULT PREMIER FACTORY SETTINGS
Home/Wireless	Wireless Band	IEEE802.11a
	Mode	WDS
	SSID	PWI Wireless
	SSID Broadcast	Disable
	*Channel	149 153, 157, 161 (5.8GHz Band)
	Auto Channel Scan	Not selected
	WDS	MAC address(es) of opposite unit(s)
	Authentication	Open System
	Encryption	Enabled
	Key Type	HEX
	Key Size	128 Bits
Valid Key	First (default)	
First Key	1234567890abcdef1234567890	
Home/LAN	Get IP From	Static (Manual) (default)
	*IP address	192.168.0.51 and so on
	Subnet Mask	255.255.255.0
	Default Gateway	192.168.0.1
Advanced/Performance	Wireless Band	IEEE802.11a
	Frequency	Not accessible; display the frequency of the channel selected
	Channel	149 153, 157, 161 (5.8GHz Band)
	Auto Channel Select	Disabled
	Data Rate	Auto (default)
	Beacon Interval	100 (default)
	DTM	1 (default)
	Fragment Length	2346 (default)
	RTS Length	2346 (default)
	Transmit Power	Full
	*Super Mode	Disabled
	Radio Wave	On (default)
	*Wireless Band	IEEE802.11g
*Radio Wave	Off (Other parameters under 802.11g are irrelevant)	

COMPLETE DEFAULT PREMIER FACTORY SETTINGS, PAGE 2

Advanced/Filters	Wireless Access Settings / WLAN Partition	
	Wireless Band	IEEE802.11a
	Access Control	Disabled
	WLAN Partition / Wireless Access Settings	
	Wireless Band	IEEE802.11a
	Internal St. Connection	Checked (Enabled)
	Ethernet to WLAN Acc.	Checked (Enabled)
	Internal Station Connection Between 802.11a & 802.11g Connection –	Unchecked
	All other 802.11g parameters are irrelevant.	
Advanced/Grouping	Load Balance	Disabled
	User Limit	10 (not selectable)
	Link Integrate	Disabled (default)
Advanced/DHCP Server	Dynamic Pool Settings / Static Pool Settings / Current IP Mapping List	
	DHCP Server Control	
	Function Enable/Disable	Disabled (default)
	Other parameters are not accessible.	
Tools/Admin.	User Name	admin (default)
	Old Password	(not shown, "premier"; no password after system reset)

Other parameters are not important for the operation of the unit.

***NOTES:**

1. Static IP addressing is used in these wireless Ethernet units. The default values are:

STATION LOCATION	ENCL. NAME	UNIT NAME	IP ADDRESS
Units ordered as one networked system -			
1st Base Station	BA01	Base 01	192.168.0.51
Remote Station 1	RM01	Remote 01	192.168.0.52
Remote Station 2	RM02	Remote 02	192.168.0.53 and so on
Repeater station	RP01	Repeater 01	Next higher IP address and so on ...
2nd Base Station	BA10	Base 10	192.168.0.61
Remote Station 1	RM11	Remote 11	192.168.0.62
Remote Station 2	RM12	Remote 12	192.168.0.63 and so on
Repeater Station	RP11	Repeater 11	Next higher IP address and so on ...

Units ordered separately without specific instruction -
(Configured as)

Remote Stations	RM09	Remote 09	192.168.0.91 and so on
-----------------	------	-----------	-----------------------------

2. There are more channels in the drop down table but only those 4 channels listed above should be used because of the FCC rules.

3. Do not use Super Mode in the setting and turn off 802.11g Radio Wave.

APPENDIX E ANTENNA HEIGHT CALCULATION

LOCATION.....LOCATION.....LOCATION

When installing a wireless system performance is critically dependent on where it is installed. At these frequencies of operation the maximum range is achieved when there is a clear line of sight between the transmit and receive antenna. Although RF and Microwave signals will penetrate walls and foliage significant reduction in the achievable transmission range will occur, especially when attempting to transmit through foliage.

However, even with a clear line of sight, the presence of reflected signals at the receive antenna (a phenomena called "Multipath") can affect the maximum transmission range. Reflected signals (see illustration) can either increase or decrease the signal strength of the direct signal. If the reflected signal arrives 180 degrees out of phase with the direct signal then almost complete cancellation can occur if the path lengths are substantially the same. If the signals arrive in phase then the strength can increase by up to a factor of two (6.0 dB). The actual amount of increase or decrease is very dependent on the nature of the reflecting surface and its location. The strongest effects are those from reflection points close to either antenna. Also, the farther the reflecting signal has to travel compared to the direct signal the weaker it will be and the less the effect. These reflection minimum and maximum zones (sometimes referred to as "Fresnel Zones") occur whenever the reflected signal path length is longer by a multiple of one-half wavelength. The first zone is a maximum, followed by

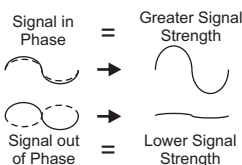
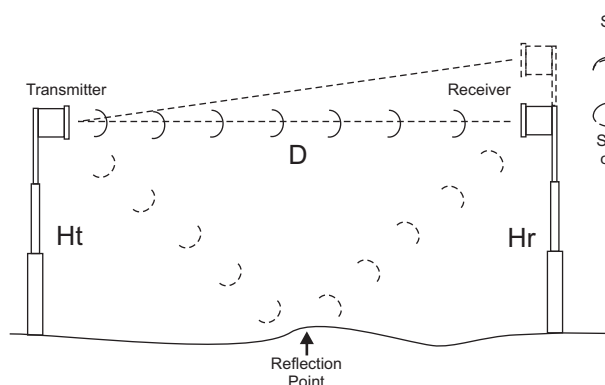
a minimum, maximum, etc.

For example, using the formula below for a path length of 1,000 feet and a transmit antenna height of 25 feet then the first reflection zone (a maximum) for a 2.4 GHz system is at 4 feet, the next minimum is at 8 feet, ...etc. At 16 foot elevation the receive antenna would be at a minimum signal strength. By moving the receive antenna up or down four feet the signal strength would increase to a maximum. Note that the higher the antennas are placed for a given path length the less the separation between each reflection minimum and maximum.

INSTALLATION

The formula can provide a rough idea of what the reflection zone spacing at the receive site will be. Because of the high possibility of multiple reflected signals it is difficult to precisely determine the best position prior to actual installation. When planning installation allow for adequate vertical movement of the receive antenna to maximize signal strength. All of Premier Wireless video transmission systems have a Received Signal Strength Indicator (RSSI) port on the receiver. A digital voltmeter should be used to measure the voltage at this port (from 0 to 3.0 volts) while adjusting the vertical position of the receive antenna. The maximum voltage measured will be determined primarily by the total path length and gain of the receive antenna.

FREQ. BAND	λ	Hr	First Hr Maximum (N=1) for Ht = 25 ft. At distance D				
			D = 300 ft.	D = 1000 ft.	D = 2000 ft.	D = 1 mile	D = 2 miles
900 MHz	1.08 ft.	$N \frac{0.269D}{Ht}$	3.23 ft.	10.8 ft.	21.5 ft.	57 ft.	114 ft.
1.8 GHz	0.55 ft.	$N \frac{0.137D}{Ht}$	1.64 ft.	5.48 ft.	11 ft.	29 ft.	58 ft.
2.4 GHz	0.40 ft.	$N \frac{0.10D}{Ht}$	1.2 ft.	4 ft.	8 ft.	21 ft.	42 ft.
5.3 GHz	0.19 ft.	$N \frac{0.0464D}{Ht}$	0.56 ft.	1.86 ft.	3.7 ft.	10 ft.	20 ft.
5.8 GHz	0.17 ft.	$N \frac{0.0424D}{Ht}$	0.51 ft.	1.70 ft.	3.4 ft.	9 ft.	18 ft.



$$Hr \cong N \frac{\lambda D}{4Ht} ; \text{ where}$$

Hr = Height of reflection zone at receive site
Ht = Transmit antenna height above reflection Point

D = Path length

λ = Wavelength of signal

N = Integer 1 N

Odd numbers give maximum signal strength,
even numbers minimum

Note: Formula most accurate for $D \gg Hr, Ht$

APPENDIX F
AH-81 & AH-83 ASSEMBLY DIAGRAM
(5.8 GHz 30 dB & 23 dB GRID ANTENNAS)

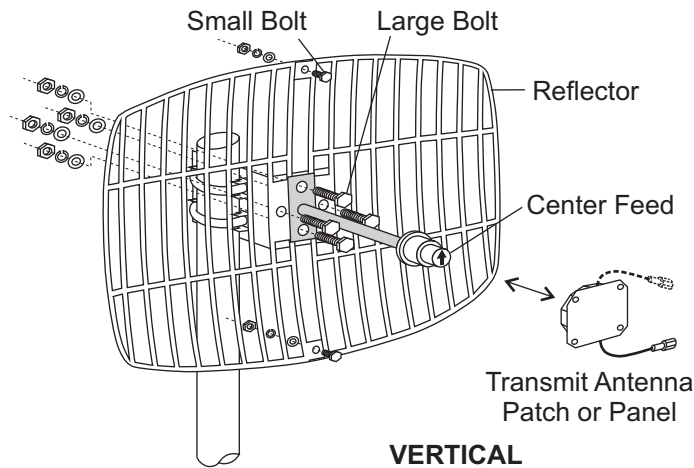


Figure F1

**VERTICAL
POLARITY**

Note: Mounting flange of Center Feed must be parallel to reflector grid in both polarities.

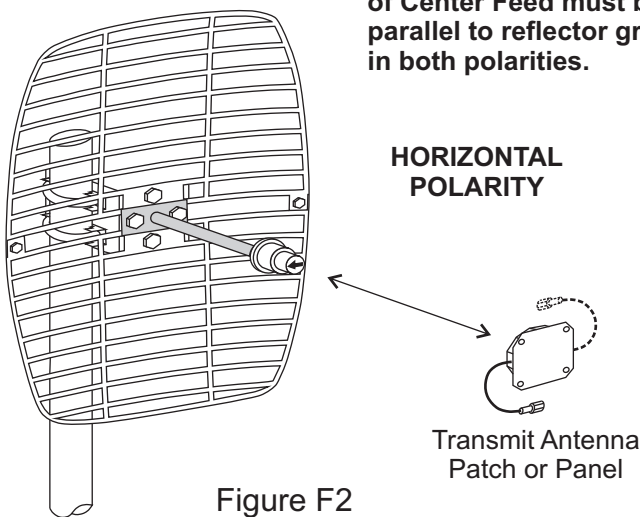


Figure F2

**HORIZONTAL
POLARITY**

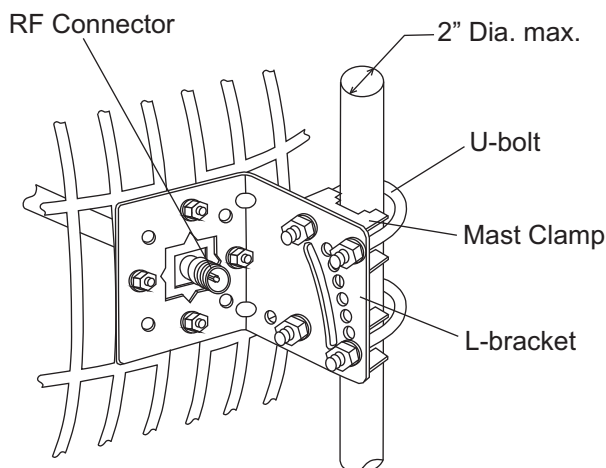


Figure F3

! WARNING !
**INSTALLATION OF ANTENNA NEAR
POWER LINES IS DANGEROUS**

1. Assemble the two reflector halves using the small bolts, flat & lock washers and nuts (2 required for AH-83, 4 for AH-81, Figure F1, AH-83 shown).
2. Determine the polarity of the antenna by referring to Fig. F1 for vertical polarity or Fig. F2 for horizontal polarity. Attach the center feed to the front and the L-bracket to the back of the reflector using the 4 large bolts, flat & lock washers and nuts. Pay attention to the mounting flange of the center feed, which has to be parallel to the grid of the reflector. When changing the polarity of the antenna, remove the 4 large bolts then rotate the center feed and the reflector together 90° around the feed hole on the L-bracket. Reinstall the 4 bolts.
3. Fasten the antenna onto the mast with the 2 U-bolts, mast clamps, flat & lock washers and nuts (Fig. F3).
4. If vertical tilt of the antenna is required, use only one mast clamp and U-bolt with the fixed tilt holes which provide elevation in 10° increments. (Not recommended under high wind conditions.) For continuous tilt adjustment, use the slot to secure the antenna to the desired elevation (Fig. F4).

5. Attach the 6 ft. cable to the connector on the back of the center feed and seal all connector junctions with electrical tape to prevent water entry.

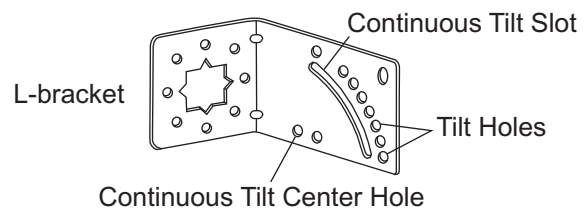


Figure F4

SPECIFICATIONS

RADIO & MODULATION

Frequency Range	5.725 to 5.825 GHz		
Modulation	OFDM DSSS		
Wireless Data Rates	54 Mbps	48 Mbps	36 Mbps
	24 Mbps	18 Mbps	12 Mbps
	11 Mbps	9 Mbps	6 Mbps
	5.5 Mbps	2 Mbps	1 Mbps
Channels	4 independent: 5.725 to 5.825 GHz		

MANAGEMENT

Interface	Ethernet IE or Netscape v6 or Later Telnet AP Manager SNMP v3
-----------	---

SECURITY

WEP	64/128/152 bit
Wi-Fi Protected Access (WPA)	TKIP/AES PSK
802.1x	EAP-MDS/TS/TTLS/PEAP
MAC	Address Access Control List

STANDARDS

Operating Certifications	IEEE 802.11a FCC Part 15 and CSA
--------------------------	-------------------------------------

LEDs

Power
10M
100M
WLAN

MECHANICAL

Dimensions	9.5"W X 11.625"H X 4.25"D
Weight	7 lbs.

ENVIRONMENTAL

Operating Temperature	10°C to +50°C
Storage Temperature	-20°C to +65°C

POWER REQUIREMENTS

Standard	0.6A @ 12 VDC
With Heater Kit	1.6A @ 12 VDC