Quick Start Guide

WES3

Introduction

Welcome to KBC Networks' Quick Start Guide for the WES3, 3rd generation unlicensed 5GHz Wireless Ethernet System. This guide has been designed to provide a step-by-step guide to setting up a WES3 wireless link.

Each WES3 RF module includes user-selectable firmware that allows any WES3 model to be configured as an AP/Host or a Client providing a simpler approach to creating and expanding point-to-point and point to multipoint wireless networks.

Downloads

Full specifications, features and additional information can be found on the relevant product page on the KBC website here as well as in the downloads section: http://www.kbcnetworks.com/resources/downloads.

General

Check the product upon receipt for any visible damage which may have been caused during shipping. Claims and discrepancies must be reported within 1 week of original product shipment from KBC. See below for model numbers and system contents.

Part Numbers – Individual Units

Model Number	For use in:	Antenna	Power Requirement	Field of View
WES3-AX-CA	**Americas**	**17dbi directional**	**24Vdc passive PoE** ***Unit is supplied with power supply/injector with appropriate power plug per regional usage.***	**30°**
WES3-AX-CB	UK, Hong Kong			
WES3-AX-CC	Europe			
WES3-AX-CE	Australia			
WES3-AX-BA	**Americas**	**9dbi directional**	**24Vdc passive PoE**	**65°**
WES3-AX-BB	UK, Hong Kong			
WES3-AX-BC	Europe			
WES3-AX-BE	Australia			
WES3-AX-AA	**Americas**	**5dbi omni-directional**	**24Vdc passive PoE**	**360°**
WES3-AX-AB	UK, Hong Kong			
WES3-AX-AC	Europe			
WES3-AX-AE	Australia			
WES3-AX-CF	**Americas**	**17dbi directional**	**PoE - IEEE 802.3af**	**30°**
WES3-AX-CG	All other regions			
WES3-AX-BF	**Americas**	**9dbi directional**	**PoE - IEEE 802.3af**	**65°**
WES3-AX-BG	All other regions			
WES3-AX-AF	**Americas**	**5dbi omni-directional**	**PoE - IEEE 802.3af**	**360°**
WES3-AX-AG	All other regions			

Part Numbers – Factory Configured Host/Client Point to Point Kits (Americas Only)

Model Number	Consists of:	Host/AP IP Address:	Client IP Address:	Additional Equipment Included:
WES3-KT	(2) WES3-AX-CA	192.168.1.200	192.168.1.201	--
WES3-KT-9	(2) WES3-AX-BA	192.168.1.200	192.168.1.201	--
WES3-KT-P5	(2) WES3-AX-CA	192.168.1.200	192.168.1.201	ESULS4-L1-B & DR12048 / SDR12048
WES3-KT-P5T	(2) WES3-AX-CA	192.168.1.200	192.168.1.201	

WES3-KT-POE	(2) WES3-AX-CF	192.168.1.200	192.168.1.201	--
WES3-EDG-KT	(2) WES3-AX-CA	192.168.1.200	192.168.1.201	(2) ED-G

System Contents - WES3-AX-CA /-CB, -CC, -CE & WES3-AX-BA /-BB, -BC, -BE Versions

Qty	Description	
1	WES3 RF module with integrated directional antenna	
1	24Vdc power supply with integrated PoE injector – non PoE version only, please see table below	
1	Strain-relief external RJ45 LAN port seal	
1	Quick Start Guide	
1	WES3 Pole/Wall Mounting Kit which includes:	
	Qty	Description
	1	Pole clamp bracket
	1	Bracket body (L/R swivel piece)
	2	Connecting pieces (up/down alignment)
	2	50mm, 1.98" long 1/4" hex bolt
	2	¼" hex nuts
	1	27mm, 1.06" long ¼" hex bolt
	2	Flat washers 15mm, 0.59"
	2	Locking washers 10mm, 0.39" long
	1	U-bolt
	2	¼" lock washers

Note: all versions of WES3 units contain the above list of pole/wall mounting assembly kits.

System Contents - WES3-AX-AA /-AB, -AC, -AE Omni-Directional Versions

Qty	Description
1	WES3 RF module with (2) external N-connector antenna ports
1	24Vdc power supply with integrated PoE injector – non PoE version only, please see table below
1	Strain-relief external RJ45 LAN port seal
2	5 dBi Omni-directional Antennas
1	Quick Start Guide
1	WES3 Pole/Wall Mounting Kit

System Contents - WES3-AX-CF /-CG & WES3-AX-BF /-BG Versions

Qty	Description
1	WES3 PoE powered RF module with integrated directional antenna
1	Strain-relief external RJ45 LAN port seal
1	Quick Start Guide
1	WES3 Pole/Wall Mounting Kit

Note: This version assumes that an IEEE802.3af PSE device is available to power the WES3 radio. No injectors or power supplies are provided.

System Contents - WES3-AX-AF /-AG Omni-Directional Versions

Qty	Description
1	WES3 PoE powered RF module with (2) external N-connector antenna ports
1	Strain-relief external RJ45 LAN port seal
2	5 dBi Omni-directional Antennas
1	Quick Start Guide
1	WES3 Pole/Wall Mounting Kit

Note: This version assumes that an IEEE802.3af PSE device is available to power the WES3 radio. No injectors or power supplies are provided.

Physical Deployment

This equipment must be installed and operated in accordance with instructions found in this document. Failure to comply with these instructions will invalidate warranty.

All wireless units should be programmed and bench tested install installation. KBC recommends creating a master network diagram to record all IP addresses and key network information.

WES3 Factory Default Settings (unless ordered in WES3-KT or similar kits or pre-configured systems when "KBC-PRE-CONF" service was ordered)

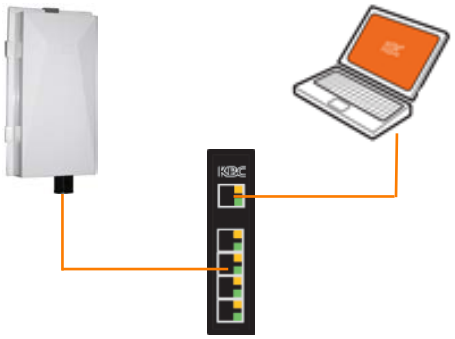
Parameter	Setting
LAN IP Address	192.168.1.202
GUI User Name	admin
GUI Password	password
Mode	Access Point (WDS)
Channel/Frequency	161 (5.805 GHz)
Channel Spectrum Width	20/40
SSID	KBC_WES3
Pre-shared Key	11111111
MAC-Filter	Disabled
TX Power Output	Max
Antenna Gain	17

Connecting to a WES3 RF Module

KBC Networks recommends shielded, outdoor-rated, straight-through Ethernet cables when connecting near power outlets and when exposed to the elements.

24V PASSIVE POE INPUT	**48V 802.3af POE INPUT**
WES3-AX-CA /-CB, -CC & -CE	**WES3-AX-CF** /-CG
WES3-AX-BA /-BB, -BC & -BE	**WES3-AX-BF** /-BG
WES3-AX-AA /-AB, -AC & -AE	**WES3-AX-AF** /-AG

WES3-PIM-WP: 24Vdc power supply with integrated PoE injector
POE Port → WES3 RF Module

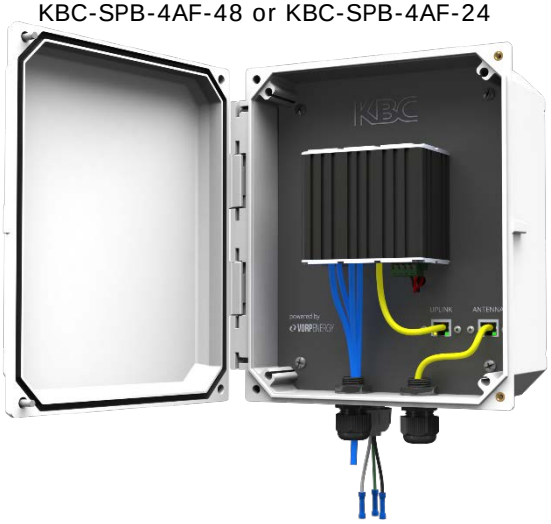


IEEE802.3af standard PoE switch

(Americas Only) Remote Power Solutions Available

You may also be using a KBC “Power Box” for the Client unit at the pole. In that case you would not power via the supplied injector but rather from the pass through injector built-into the “SPB” power enclosure. The following are optional power solutions which are available (Americas only) and support the WES3 series:

KBC-SPB-4AF-48 or KBC-SPB-4AF-24



KBC-SPB-1AF-24 or KBC-SPB-1AT-24 /-48

Model	Powers/Connects
KBC-SPB-1AF-24	One <15W draw IP camera and one 24V POE input WES3 series node (eg WES3-AX-CA)
KBC-SPB-1AT-24	One <30W draw IP camera and one 24V POE input WES3 series node (eg WES3-AX-CA)
KBC-SPB-1AT-48	One <30W draw IP camera and one 48V POE input WES3 series node (eg WES3-AX-CF)
KBC-SPB-4AF-24	Up to 4 <15W draw IP cameras and (1) 24V POE input WES3 series node (WES3-AX-CA)
KBC-SPB-4AF-48	Up to 4 <15W draw IP cameras and (1) 48V POE input WES3 series node (WES3-AX-CF)
KBC-SPB-24-24	(2) 24V POE WES3 series nodes (ie WES3-AX-CA) in a relay format in a location where are no cameras to connect at that specific location.
KBC-SPB-48-48	(2) 48V POE WES3 series nodes (ie WES3-AX-CF) in a relay format in a location where are no cameras to connect at that specific location.
KBC-SPB-4AF-48	Up to 3 <15W draw cameras (or one 30W camera) and (2) 48V POE WES3 series nodes in a wireless relay format in a location where are cameras to connect as well.
KBC-SPB-HPoE-24	One <70W draw IP PTZ and one 24V POE WES3 series node (ie WES3-AX-CA)
KBC-SPB-HPoE-48	One <70W draw IP PTZ and one 48V POE WES3 series node (ie WES3-AX-CF)
KBC-SPB-4AF-48-70W	One <70W draw IP PTZ and either two (2) 48V POE WES3 series nodes or one additional low wattage draw camera and a single 48V POE WES3 series node

Remote power and connection to the wireless transceiver can also be made via KBC’s line of industrial battery backup UPS or solar power kits to maintain 24/7 power when onsite power is either inconsistent or unavailable. For more info see the power section of our website here. Contact KBC for info on what is needed for the correct power input.

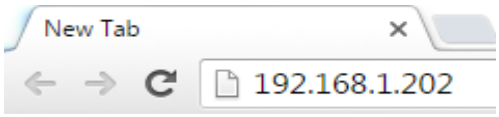
Configuring WES3 for Point-to-Point and Point to Multipoint

PTP = Point-to-Point / PTMP = Point to Multipoint

Configuring the AP/Host Antenna

1. Set laptop to static IP on 192.168.1.xxx network
2. Connect to WES3 RF module as shown in previous section.
3. Once WES3 RF module is connected to power source, the power LED light on the back of the unit will turn on. After 30-60 seconds you may hear the WES3 “beep”, which is normal, alerting you that it is booted up.
4. Once WES3 is connected to laptop or switch the network LED on the back of the unit will turn and flash to indicate link activity

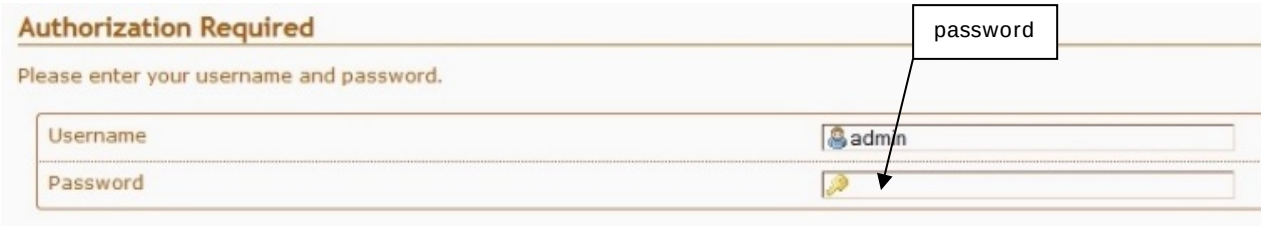
Open a web browser and type in the factory default IP address 192.168.1.202. If no response: you may be using a kit (see note in orange below) or a pre-configured system.



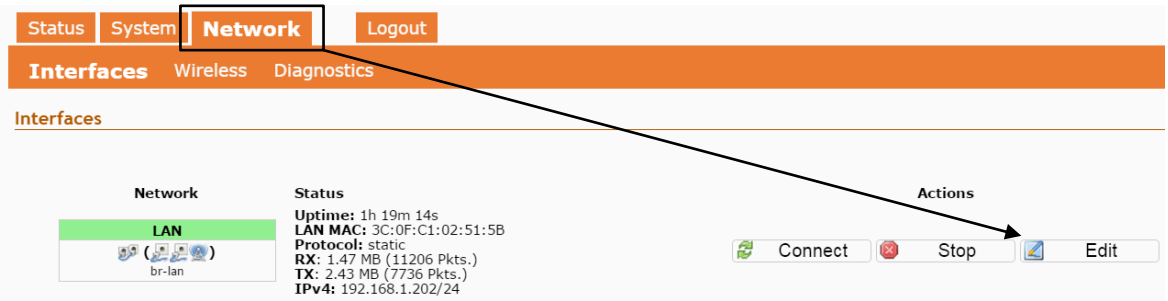
Note: factory pre-configured "kitted" WES3 units (ie WES3-KT and WES3-KT-POE) are set to 192.168.1.200 for the Host unit and 192.168.1.201 for the Client device.

If using a WES3-KT, WES3-KT-P5, WES3-KT-P5T, WES3-EDG-KT or a pre-configured system using "KBC-PRE-CONF" service code, skip the following configuration steps and go to the "Instructions for Physical Deployment" at the bottom of this guide.

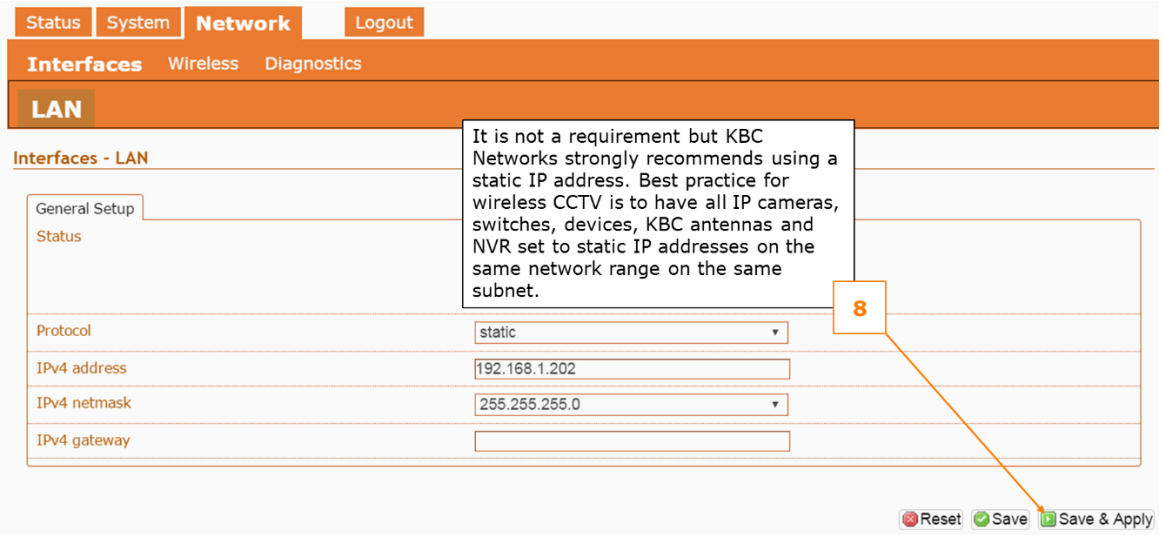
5. Enter 'password' to access the **Status** page



6. The first step is to change the LAN IP Address. Click the Network tab then click 'Edit'

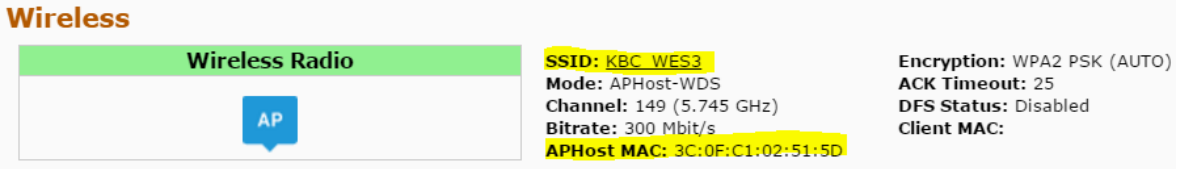


7. Change the IP Address then click 'Save & Apply'

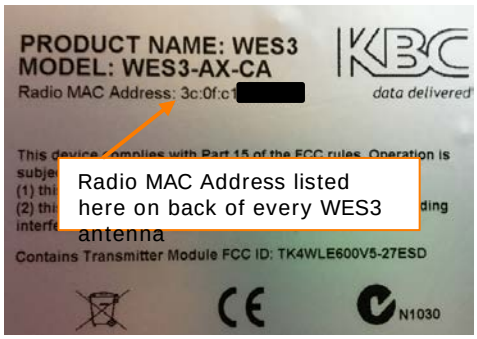


8. After the IP address is updated – it will take you back to the Login page and your browser will now be at the new IP address. If you don't get to the Login page make sure you don't have an IP address conflict and ensure your laptop is set to the same network range (subnet) as the WES3.

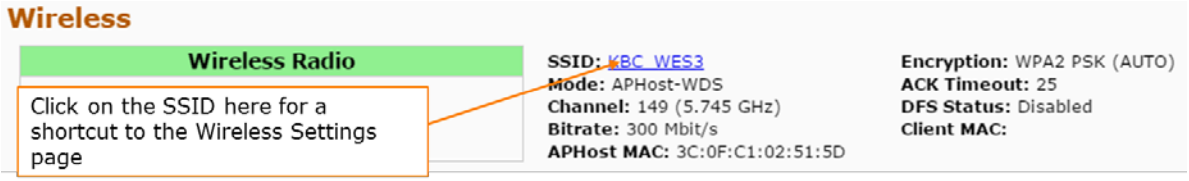
9. Now that you have logged back in – notice you are on the **Status** page



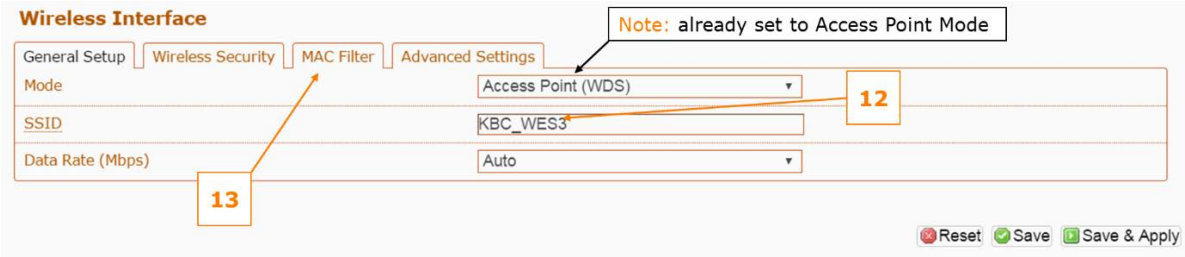
- Highlighted are the SSID & Radio MAC Address (shown as 'APHost MAC')
- For each PTP and PTMP wireless system to connect, the APHost and client(s) need to be networked together using the SSID and Radio MAC Address fields
- KBC recommends the APHost and Client(s) share a unique SSID.
- KBC also recommends the APHost be MAC locked to each client and each client should be MAC locked to its APHost
- The radio MAC address can be found on the Status page (as shown above) as well as on the back of each WES3 RF module (as follows)



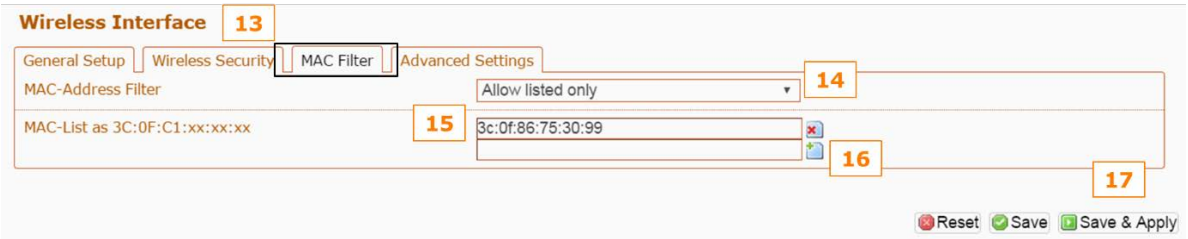
10. Click on the SSID as shown or click 'Network → Wireless → Edit'



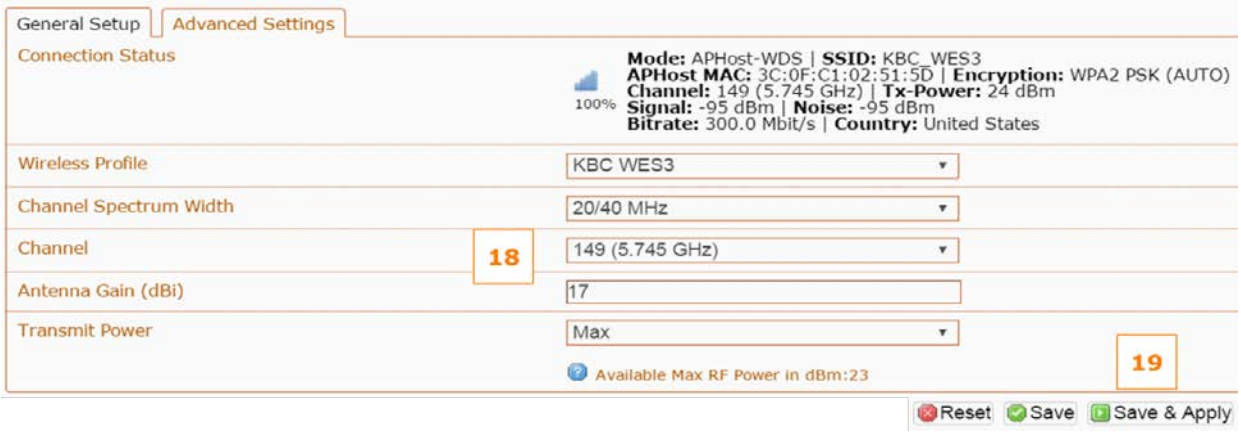
11. Now in the Wireless Settings – Confirm that the SSID matches each client antenna. If you change the SSID click 'Save & Apply'



12. Click on the MAC Filter tab if this feature is desired. It is recommended for enhanced security, however not required for the radios to link.

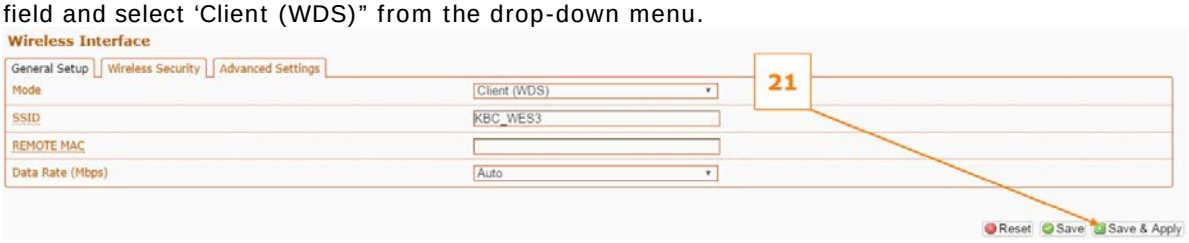


13. Enable the MAC-Address filter by clicking on the drop down menu to select 'Allow listed only'
14. Enter the radio MAC Address of each client antenna in the box
15. To enter more than one radio MAC address, click the green + icon to add another field
16. When complete click 'Save & Apply'
17. If there is more than one PTP or PTMP system at one location, each APHost needs to be set to a different unique channel or frequency. Select the channel.
18. Click 'Save & Apply'



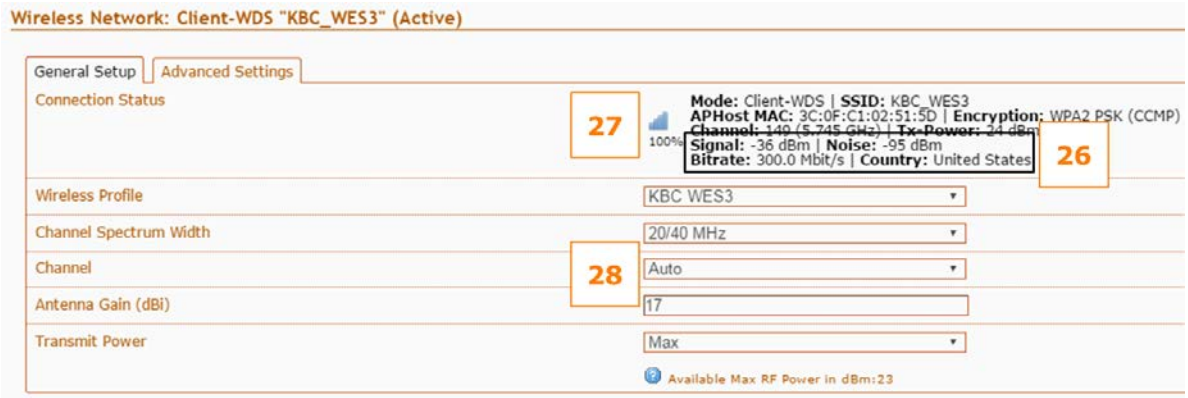
Configuring the Client Antenna

19. Leave WES3 APHost antenna plugged in and powered up. Connect directly to the client antenna and repeat steps 1-11
20. Look at the bottom of the page under 'Wireless Interface' on the 'General Setup' tab. Look at the 'Mode' field and select 'Client (WDS)" from the drop-down menu.



21. Verify that the SSID matches the SSID of the APHost antenna.
22. Enter the radio MAC address of the AP host antenna into the "Remote MAC" field. For help see step 10.

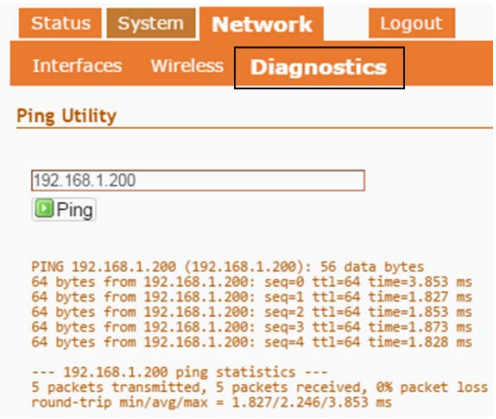
23. Click "Save & Apply"
24. Now the Client and APHost are wirelessly connected. Verify wireless connection by looking at the 'Connection Status' information.



25. KBC recommends that the wireless signal strength is greater than 40 but less than 70.
    - Wireless Signal Strength = difference between noise & signal
        - ✓ Signal = - 36dbm
        - ✓ Noise = - 95dbm
        - ✓ Wireless Signal Strength = 59dbm (ie, in the 40-65 range)

26. You can also confirm that the wireless status bar is close to 100%
27. While there is a frequency selection on the Client interface, the frequency is always driven by the APHost so no matter what channel for which the Client is selected, it will connect to its Host frequency provided that the SSID, PSK and radio MAC-filter security feature (if enabled) are all entered correctly to link wirelessly.
28. The same information can be found on the **Status** page

29. The final confirmation step is to click on the Network tab → Diagnostics. Enter the IP address of the APHost in the field provided. Click on the Ping start button and confirm that you get 5 packets transmitted and received with 0% packet loss. The average ping time should be under 10ms for most applications. Please contact KBC Networks technical support if this test fails.



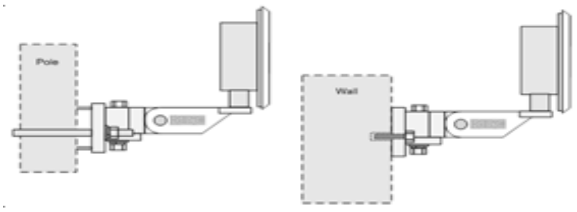
Connecting multiple standard WES3 Clients to a High Throughput Host/AP (ie WES3HTG series)

Some systems require the use of a high throughput series 'receiver'. The WES3 series can link to the WES3HTG provided several parameters match up.

Parameter	WES3 Default Setting	WES3HTG Default Setting	Field reconfiguration to:
LAN IP	192.168.1.202	192.168.1.152	Ensure that all WES3 / WES3HTG units have independent IP Addresses to avoid IP Conflicts. Record all IP changes!
GUI User Name	admin	admin	N/A
GUI Password	password	password	N/A
Host/Client Mode	Host (Access Point WDS)	Host (Access Point WDS)	All WES3 units change to Client WDS; keep WES3HTG in Access Point WDS Mode.
Channel/Freq	161 (5.805 GHz)	161 (5.805 GHz)	N/A (unless a more appropriate frequency is needed in the environment)
Spectrum Width	20/40	20/40/80	N/A (unless a more appropriate spectrum width is needed in the environment)
SSID	KBC_WES3	WES3HTG	All Clients must match Host setting; change to your desire. Record changes.
Pre-shared Key	11111111	11111111	No required changes, however, KBC recommends changing from default for security purposes.
Remote MAC	N/A	N/A	Only applicable to Client Mode: enter radio MAC of WES3HTG Host if this setting is desired (recommended).
MAC-Filter	Disabled	Disabled	Only applicable to Access Point Mode: enter radio MAC of each remote wireless Client unit to be connected to the Host if this setting is desired (recommended).
TX Power Output	Max	Max	N/A
Antenna Gain	17	17	Change WES3HTG Host to appropriate setting depending on the model number: WES3HTG-AX-AA → 5 WES3HTG-AX-BA → 9 WES3HTG-AX-CA (keep at 17)

Instructions for Physical Deployment

This equipment must be installed and operated in accordance with instructions found in the KBC Networks' manual. Damage due to misuse is not covered by warranty.



1. Feed the Ethernet cable through the black weather coupler protection piece prior to crimping on the RJ45 connector.
2. Hand-tighten the Ethernet cable connection protecting piece, do not tighten further. Damage due to over-tightening the black weather coupler into its RJ45 housing is not covered under warranty.
3. The Ethernet cable should have wiggle room to allow condensation to release. Leave a gap small enough to keep out bugs and such but open to allow moisture to release and drip down the cable away from the port.
4. Do not mount the antennas horizontally or upside down. The black external LAN port should point downwards.
5. Once the cable is inserted into the external LAN port RJ45, a small flat head screwdriver, or similar tool, is needed to release the tab of the RJ45 connector on your cable. If you pull the cable without releasing the tab, it will damage the port.

Trouble-shooting

Contact KBC for technical assistance. Here are some ideas to try.

Problem	Suggestion
No signal strength LEDs	Ensure Host in Access Point WDS mode and Client(s) in Client WDS mode. Ensure that all Clients are set to matching parameters as Host. Many times when the MAC filter is enabled there is an incorrect character. Verify all characters match exactly or try disabling and erasing the "Remote MAC" from the Client side (and MAC-Filter on the Host). If they link after disabling that feature then it is likely that an incorrect MAC or character was used.
Not all signal strength LEDs light up	Ensure clear wide-open line of sight. If you have even just one signal strength LED then the configurations are likely correct. Try improving the alignment of the antennas and/or another frequency in case the problem is related to RF interference in the environment.
Unit reboots itself continuously after a couple of minutes	The "Ping Watchdog" feature may be turned on and is configured improperly. Check the feature (system/tools) and disable to see if the constant auto-reboot stops.
Unit stops connecting to mate antenna until a power reset is performed	This is symptomatic of 3rd party RF interference. Attempt the following suggestions: ➢ Run a scan from the Host (Network/Wireless/Spectrum) to determine the least noisy frequency and set the Host to that channel. ➢ Reduce channel spectrum width ➢ Lower power output or try another antenna gain option ➢ Enable one of the self-healing tools such as aout-reboot by hours or ping watchdog.
No Network LED	Check all Ethernet cabling and LAN ports on all devices connected to WES3HTG unit.
No access to GUI; cannot ping IP ****NOTE: your system may have been pre-configured. Check provided documentation for unit IP address per serial number.***	If working with one of the kits, the default IP is either 192.168.1.200 or 192.168.1.201. The IP would only be 192.168.1.202 after performing a hard reset (see warning for this process below; reset as final option). It is important to record all changes. If the IP address is changed from default there is no way to recover it if forgotten other than a restore to defaults. Having to hard reset will be a time consuming effort.

WES3 LED Status Indicators

★ Flashing LED ● Solid LED ○ LED off
WSS Wireless Signal Strength (see #26)

1.	RSSI4/STATUS	★	In power-up / boot-up process
		●	40+ RSSI
		○	WSS less than 40 or no wireless link
2.	RSSI3	●	30-39 RSSI
		○	WSS less than 30 or no wireless link
3.	RSSI2	●	20-29 RSSI
		○	WSS less than 20 or no wireless link
4.	RSS1	●	10-19 RSSI
		○	WSS less than 10 or no wireless link
5.	NETWORK – Ethernet link activity - LAN	●	Link activity established
		★	Link activity from wireless unit to connected Ethernet device or across wireless link
		○	No link to Ethernet cable connected device *(not indicative of wireless link/strength)*
6.	Power	●	Power applied
		○	No power to unit.

Note: The LEDs do not change color.

Factory Reset to Default via GUI

1. Click on **'System'** then **'Firmware'**
2. Click on **'Perform Reset'**

Factory Reset to Default via Hard Reset Button

WARNING: A hard reset to defaults will erase all saved info including the system requirements for a wireless connection. When possible, save a copy of the config file to a known and accessible location and record all changes made to the WES3 device.

RESET AT USER RISK: Incorrect reset procedure can result in damage to the internal board and require a return to KBC Networks or need for replacement at user cost. If the button is pushed but not held for the duration of the reset process it MUST be powered down and retry. Do not press the button without powering down and restarting.

1. Power up the WES3 RF module and allow it to go through its power up process.
2. Remove the Phillips head screw near the port on the bottom of the WES3 RF module.
3. Insert a small screwdriver or paperclip into screw hole in order to push the reset button.
4. Hold the button for 12-15 seconds and release.
5. RF module will reset to the WES3 factory default settings found on page 1 of this guide.

Warranty Information

See our website at: https://www.kbcnetworks.com/policies-procedures/general-content/about-us/policies-procedures for warranty information covering all of KBC Networks products.

Compliance

FCC

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired 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 when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operations of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Industry Canada

This Class A digital apparatus complies with Canadian ICES-003. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (E.I.R.P.) is not more than that permitted for successful communication. This device complies with Industry Canada license-exempt RSS standard(s).

Operation is subject to the following two conditions:

- This device may not cause interference, and
- This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil numérique de la classe A est confrome à la norme NMB-003 Canada. Pour réduire le risque d'interférence aux autres utilisateurs, le type d'antenne et son gain doivent être choisies de façon que la puissance isotrope rayonnée équivalente (PIRE) ne dépasse pas ce qui est nécessaire
pour une communication réussie. Cet appareil est conforme à la norme RSS Industrie Canada exempts de licence norme(s). Son fonctionnement est soumis aux deux conditions suivantes:

17 Compliance

- Cet appareil ne peut pas provoquer d'interférences et
- Cet appareil doit accepter toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement du dispositif.

CE Marking

CE marking on this product represents the product is in compliance with all directives that are applicable to it.

This equipment may be operated in the following countries:
Great Britain and Northern Ireland, Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Portugal, Romania, Switzerland, Sweden.

Installer Compliance Responsibility

Devices must be professionally installed and it is the professional installer's responsibility to make sure the device is operated within local country regulatory requirements.

RoHS / WEEE Compliance Statement

European Directive 2002/96/EC requires that the equipment bearing this symbol on the product and/or its packaging must not be disposed of with unsorted municipal waste. The symbol indicates that this product should be disposed of separately from regular household waste streams. It is your responsibility to dispose of this and other electric and electronic equipment via designated collection facilities appointed by the government

or local authorities. Correct disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about the disposal of your old equipment, please contact your local authorities, waste disposal service, or the shop where you purchased the product.

Need Help?

Please visit our website http://www.kbcnetworks.com or contact your nearest KBC office or dealer.

KBC Networks Office Contact Information

North & Latin America, USA

Phone: +1 949 297 4930
Toll-free: +1 888 366 4276
Email: techsupport@kbcnetworks.com

EMEA, UK
Phone: +44(0)1622 618787

Email: emeatechsupport@kbcnetworks.com

APAC
China
Phone (1): +86 25 8688 3321
Phone (2): +86 25 8688 4058
Email: techsupport@kbcnetworks.com

Singapore

Phone: +65 98463323
Email: apactechsupport@kbcnetworks.com