IMPORTANT NOTE:
FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This product must be installed by a professional technician/installer.

Q-Bridge4 by connex wireless

USER GUIDE

Getting Started

The system is plug and play so no configuration is necessary to get a working secure wireless network link up and running. Unpack the *Q-Bridge*™ unit and accessories. You should have all the parts shown below. In addition, you will find AC power cords and a pair of short Ethernet jumper cables (patch cords).

POE Power Supplies

75' CAT5e Shielded Outdoor

Q-Bridge™ Bridge Units with Qwik-

STEP 1: Assemble the square tube to the back of the *Q-Bridge*™ unit using 4 nuts. Don't overtighten, just needs to be moderately tight.

STEP 2: Decide which polarity you will be using, *Horizontal* or vertical. We highly recommend using *Horizontal* polarity because there is a lot less interference when using this polarity. When the unit is in *Horizontal* polarity the RJ45 ethernet connector is in the lower **right hand** corner. When the unit is in vertical polarity, the RJ45 ethernet connector is in the lower **left hand** corner. **NOTE:** In order for the antennas to talk to each other, both units must be mounted with the same polarity.

STEP 3: Decide on the mounting location for the units. This is probably the single most important part of the installation. For best performance and longest distances, the units should be mounted outside within sight of each other. If just shooting a short distance, the units can be mounted inside and a link can be established thru a wall or window. The *Q-Bridge*™ comes complete with a *Qwik*Clamp pole mounting system which can be used to mount to an existing pole like a TV antenna or a CB Radio antenna pole. It also includes a wall mount bracket that will allow attachment to the wall of a structure or possibly a tree. We recommend that, if possible, the *Q-Bridge*™ be mounted high on the wall of a house under an eave which will provide added protection from snow and freezing rain and the sun .

TECH NOTE: *Microwaves travel in straight lines and they lose strength quickly when going thru buildings and trees. If there are objects in the microwave path, then useable distance will be reduced. If the target unit is less than 1 mile away then you won't have to worry too much about a couple obstructions but if over 1 mile and there are some obstructions in the microwave path, then the performance will be reduced*.

e. Create an online gaming link with a friend up to 4 miles away. Reduce or eliminate extra fees you might be paying for online access for gaming purposes. And have more bandwidth for the increased complexity of future games including Voice and Video.

f. Create a secure link for remote video and network based security cameras. The *Q-Bridge*™ works with all network based security cameras. Create a streaming video conference link between buildings. Because of the high 4.5Mb/sec bandwidth available with the *Q-Bridge*™, it easily supports streaming video technologies used for remote conferencing, like church meetings, business meetings, etc.

Appendix:

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B 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 radio frequency 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 of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.
- FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is 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 undesired operation.

lar house color. Only non metallic enamel or latex paints should be used. If a paint with metal content is used, it will block the microwaves and cause reduced performance.

7.**TINTED WINDOWS –** Tinted windows are made by applying a metallized film to the window. If a window has tinting, it will usually block the microwaves and cause reduced performance of the *Q-Bridge*™. Concrete walls are also a significant barrier to microwave signals. Aluminum siding in houses is also a barrier to microwave signals. Wood frame houses covered with brick or stucco are pretty transparent to microwave signals and they will reduce the signal strength but the signal will still pass thru the structure. We are bringing this up to you so you can better understand possible causes of performance issues

8.**POE POWER SUPPLY –** The Power Over Ethernet (POE) power supply supplied with the *Q-Bridge*™ is a high quality auto-ranging and highly regulated switching power supply. It meets the IEEE 802.3af standard for Power Over Ethernet adapters. It will work over a wide variety of input voltages. It has built-in surge, overload and short circuit protection. If the power supply light is not lit, then there is most likely something wrong with the power supply or the wall outlet. If the power supply light is blinking then there is probably some short circuit between the power supply and the *Q-Bridge*™ electronics or possibly a damaged *Q-Bridge*™.

9.**VOICE OVER IP (VOIP) –** The *Q-Bridge*™ supports all VOIP standards making it possible to use VOIP phones across any *Q-Bridge*™ link.

10.**TYPICAL APPLICATIONS:**

a. Internet access sharing – share internet access with a friend or family member
b. Link your Home Office to your Main Office - you can access shared files and folders as well as print to the main office printers and use other shared network devices remotely
c. Link multiple building networks together – A company with multiple buildings will find the *Q-Bridge*™ an inexpensive way to link their buildings together. Up to 4 buildings can be linked seamlessly using *Q-Bridge*™ wireless bridges.
d. Add a high speed link between your home network and a PC in your remote studio or office which is located in an outbuilding on your property.

STEP 4: Mount the *Qwik*Clamp pole mount bracket to the tube in the back of the *Q-Bridge*™. Be sure to be mindful of the antenna polarity as discussed above. The bracket can be attached to give up-tilt or down-tilt for the antenna. Down-tilt is used if the sending antenna is higher in elevation than the receiving antenna and up-tilt is used when the sending antenna is lower than the receiving antenna. For down-tilt, the bracket is installed on the square tube with the adjustment screw pointing towards the right and for up-tilt the bracket is installed on the square tube with the adjustment screw pointing towards the left. For both cases, the bracket should be installed with the adjustment screw under the square tube. The bracket can be installed at any length along the square tube depending on how much standoff from the wall or pole is desired. We typically recommend installing the bracket about half way along the square tube.

STEP 5: Attach the wall mount bracket to a wall using screws (not included). Be sure to seal any screw holes in the wall with sealant to avoid any water damage to the wall. Attach the *Qwik*Clamp bracket to the installed wall mount bracket or to an existing pole. The speedbolt clamp has two mounting orientations, one for smaller poles and one for larger poles. Use whichever seems best. Tighten the speed bolt lightly.

STEP 6: Point the antenna towards the receiving antenna. Pointing is achieved by visually sighting the location of the receiving antenna and then moving the antenna to point in that direction. Tighten the speedbolt and the locking nut once rotation is set. Tighten the bracket elevation adjust screw once proper up/down angle is set.

TECH NOTE: *Because of the specially designed wide beamwidth antenna, pointing is not critical and simply pointing in the general direction of the receiving antenna will yield good results.*

STEP 7: Install the cable thru the patent pending field replaceable RJ45 waterproof connector system.

a. Trim about ½ the length of the bayonet tab from the CAT5 cable connector. This trimming is required to prevent interference when the RJ45-ECS cable feedthru is screwed into the RJ45-ECS housing
b. Feed the trimmed CAT5 cable RJ45 connector thru the feedthru assembly as shown. There may be a rubber “skin” on the compression gasket assembly. Just remove this by grasping with the fingers and tearing it away
c. Slide the compression gasket insert into the compression gasket assembly until it is flush with the end of the assembly

d. Install the compression nut and tighten loosely
e. Screw the entire feedthru assembly into the RJ45-ECS housing which is already mounted in the enclosure. There should be a rubber gasket between the two assemblies. Tighten the feedthru assembly to create a seal
f. The final step is to tighten the compression nut until the gaskets are tight around the Cat5 cable

Disassembly

a. Loosen the compression nut to relieve pressure on the Cat5 cable
b. Unscrew the feedthru assembly from the RJ45-ECS housing
c. Using a small screwdriver depress the RJ45 bayonet lock to release the RJ45 connector from the socket

STEP 8: Route the outdoor CAT5 cable from the *Q-Bridge*™ unit into the building. Make sure to seal any holes you make with sealant to prevent water damage. Tie wrap the cable to secure it so it won't flap in the wind. We recommend using black color tie wraps because they perform better in an outdoor environment than the white color ones.

TECH NOTE: *The Q-Bridge™ comes with 75 feet of CAT5e shielded outdoor rated cable. This should be long enough for most installations. If additional length is required, you can purchase an RJ45 shielded coupler at most electronics stores. The coupler won't work very long outside but are fine for inside use. You can add up to a total of 225 additional feet of Cat5e cable without affecting performance.*

STEP 9: Install the POE Power Supply. Be sure to plug in the cable going to the *Q-Bridge*™ before plugging the unit into the wall. This will avoid any damage to the *Q-Bridge*™ which could be caused by plugging in a "hot" connection. There is no problem plugging and unplugging the computer/router cable with power applied, only the POE connection. Once the POE power supply is plugged into the wall and the system is OK, the green light on the power supply will light and stay lit as long as the system is in operation. Because the *Q-Bridge*™ is designed to take such a small amount of power, it is recommended that it be left powered up 24/7.

TECH NOTE: *The Q-Bridge™ POE power supply is specially designed to offer overload and short circuit protection. It also offers surge protection from lightning to protect your equipment like routers, switches, hubs, computers and gaming consoles.*

3.**SUN AND HEAT–** The *Q-Bridge*™ is constructed of all UV protected materials so it will survive for many years in the most extreme of solar environments (ie; an Arizona rooftop during the summer). The unit has been tested and qualified for constant operation at over 165 deg F ambient temperature. Even though the *Q-Bridge*™ is designed for long term survivability in extreme environments, we would still recommend that the unit be mounted in a more protected location, like under a roof eve, if possible. Of course if line of sight is better with the antenna mounted in a non-protected environment then we would recommend the better line of sight mounting location.

4.**LIGHTNING –** Lightning is the single worst enemy of outdoor electronics equipment. No electronics will survive a direct strike but there are close proximity strikes that can cause huge electrical fields to be generated which can damage electronic equipment. We have taken special care in the design of the *Q-Bridge*™ unit to ensure proper grounding of the electronics inside the enclosure to prevent damage from electrical storms. We use only the more expensive shielded CAT5e cable to prevent electrical surges being generated within the cable. Make sure that the POE Power Supply is plugged into a 3 prong grounded outlet. This will prevent damage from surges to equipment inside the house. We highly recommend that the mounting pole or the wall mount bracket be grounded to give additional protection against surges caused by lightning. These can be grounded by attaching a wire to the metal and running the wire to a good earth ground (cold water pipe, copper stake driven in the ground). If there are metal rain gutters on the house, the wire can be run from the wall mount bracket to the metal gutter and then another wire can be run from one of the downspouts to an earth ground. Because of the random nature of lightning, we cannot warrant the *Q-Bridge*™ against damage from lightning**.** We will, however, repair any unit which fails within the warranty period at a greatly reduced service fee.

5.**INTERNET ACCESS SHARING** – The *Q-Bridge*™ is the perfect equipment to share your internet access with a friend or family member up to 4 miles away. Using the *Q-Bridge*™ provides a seamless connection between networks and you can share the internet access available on the main network with the remote network. Please take note that certain internet service providers may not approve of this and in some cases, they may consider this to be illegal. It's best before sharing your internet connection that you check with your internet service provider to make sure you aren't in violation of your service contract.

6.**PAINTING** – The *Q-Bridge*™ unit can be painted to match a particu-

remote units to each of the *Q-Bridges*™ on the WIRELSS | BRIDGE SETTINGS page. So each *Q-Bridge*™ unit in a quad arrangement will have the MAC addresses of the other 3 remote units programmed into its MAC Address table. The MAC address of each unit is shown on the STATUS page.

9. **CLIENT MODE:** In addition to being a bridge device, the *Q-Bridge*™ can also be used as a client device. A client device is one that talks to an access point. You would need to have an available access point in your area in order to use the *Q-Bridge*™ as a client device. To change to client mode: WIRELESS | BASIC SETTINGS | Mode = Client. Settings such as Channel and Security Encryption would need to be set to match the access point.

TECH CORNER

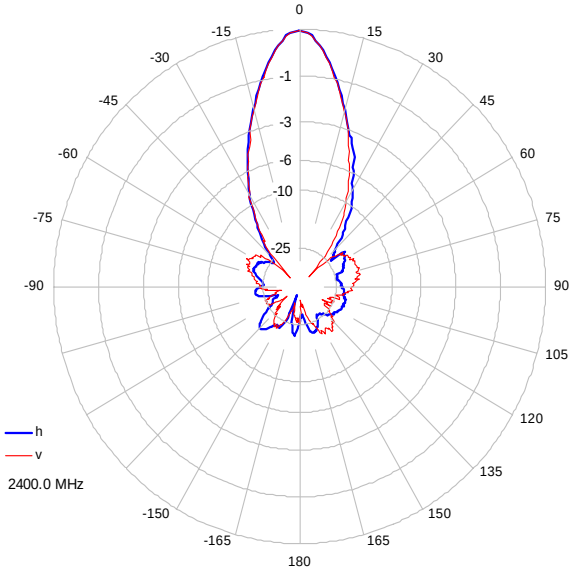
Additional Information you may find useful

1. **DHCP –** DHCP is used to automatically assign IP addresses to computers on the network. The DHCP server that is responsible for assigning the IP addresses is usually the Router that connects your network to the internet but it could be your computer if you are using Microsoft Internet Sharing. Because of the seamless and transparent nature of the *Q-Bridge*™ connection, DHCP requests and responses will be passed across the wireless link. We normally recommend that only 1 DHCP server exists on a given network. It's not a huge issue if two or more are present on the network but it's cleaner if only 1 DHCP server is available on the network to avoid IP confusion. IP confusion would occur if two machines on the same network were given the same IP address. The machines would report an IP conflict error if this were the case. Keep in mind that with the *Q-Bridge*™ link the two connected networks will appear as one network because they are being bridged seamlessly thru *Q-Bridge*™ wireless connection.

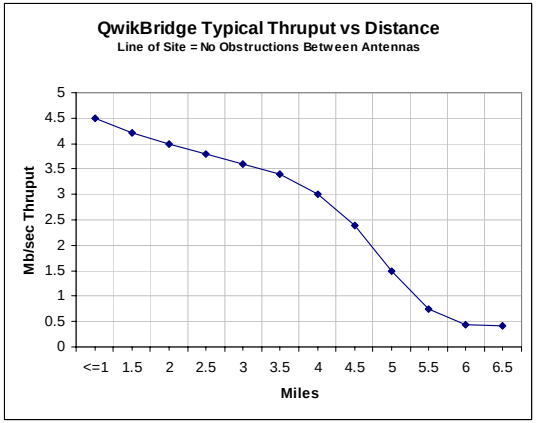
2.**RAIN, SNOW, ICE –** The 2.4GHz frequency being used by the *Q-Bridge*™ will not be affected by heavy rain or falling snow. You should not see any performance degradation due to inclement weather. If snow or ice collects on the front bubble of the antenna, you may see some reduced performance assuming you are shooting a long distance (>3miles) and the ice or snow buildup is greater than 1" thick on the surface of the bubble. For this reason, we suggest mounting under an eave of a house if feasible for your particular situation.

When connecting to routers, switches and hubs you will use a straight thru cable normally called a patch cord. When connecting directly to a computer or gaming console, you will use a crossover cable.

STEP 10: Repeat the procedure for the other side of the link up to 4 miles away. After the installation is completed on both sides of the *Q-Bridge*™ wireless bridge link the networks will be connected and the link will be established. The Wireless Bridge is transparent so that it's just like having a CAT5 cable strung between the two devices or networks.



Antenna Pattern



Why can't I get 11Mb/sec thruput like those other guys advertise? The truth is that all 802.11b devices on the market operate in half duplex mode which cuts the realistic thruput in half so theoretical maximum is 5.5Mb/sec. Because of 128bit encryption and other communication overhead within the devices, typical thruput maximums are 4.0 to 4.5Mb/sec. We believe in only advertising tested and verified **actual** thruput numbers so you get what you expect and not some pie-in-the-sky empty promise. Refer to the chart above for actual thruput vs distance test results.

Specifications

General	
Standards	802.11b (Wlan), 802.3(LAN), 802.3af (POE)
Modulation	DSSS (DPBSK, DQPSK, CCK)
Certifications	FCC / CE
Radio Specifications	
Operating Frequency	2400 to 2497MHz
Channels	USA/Canada 11; Japan 14; France 4; Europe 13
RF Output Power (software selectable)	250mW, 200mW, 150mW, 100mW
Maximum EIRP	+38dBm
Receive Sensitivity @ 11Mbps	-87dBm
Security	64/128bit WEP, WPA or TKIP 802.1x
Remote Config (Web Based)	By IP Address; thru Wireless or Ethernet
Antenna Specifications	
Antenna Gain	14 dBi
Antenna Beamwidth (V & H)	35 deg
Antenna Front to Back	>18dB
Polarization	Horizontal or Vertical
POE Specification	
Power Over Ethernet Injector (CE Approved / 802.3af Compliant)	INPUT: 90 – 264VAC @ 47 – 63Hz OUTPUT: 48VDC @ .35A
Mechanical Specifications	
Color	White or Gray
Dimensions (L x W x H)	10.75" x 10.75" x 2.6" (267 x 267 x 67mm)
Weight	29 oz (800 g)
Ethernet Connector	Field Replaceable Waterproof RJ45
Cable (75' long)	CAT5E Outdoor Rated Shielded Cable
Mount	Wall or Pole Mount
Environmental Specifications	
Operating Temperature	-40 to 167 Deg F (-40 to 75 Deg C)
Humidity	0 to 100% RH
Wind Loading (125MPH survivability)	100MPH / 28lbs; 125MPH / 43lbs

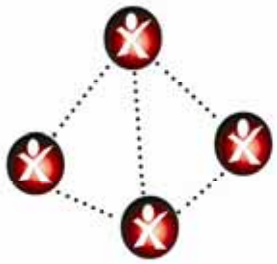
TECH NOTE: *You may want to play around with different settings to see what works best for your particular link. The measurement you would use to compare settings would be to measure the actual thruput by timing the transfer of data across the link. One program that we have found useful for determining thruput is DISKBENCH*

(http://nodesoft.com/DiskBench/).

6. **SITE SURVEY:** The site survey is a very useful tool to determine what wireless devices are within range of your *Q-Bridge*™. Goto WIRELESS | SITE SURVEY and click on REFRESH. The list will show all wireless devices including the remote *Q-Bridge*™ unit (The remote unit will have a blank SSID, for additional security, but can be identified by its MAC address). The table will show channel #, MAC Address and relative signal strength of all the devices within the range of the *Q-Bridge*™. This is useful to see where possible interference could be coming from in case you are experiencing performance problems.

7. **ANTENNA ALIGNMENT:** Because of the special antenna design, antenna alignment is simple using just visual alignment and an electronic alignment isn't necessary. If you'd like to use the antenna alignment tool, make sure that both sides of the link are attached to an active network, then goto WIRELESS | ANTENNA ALIGNMENT | ENTER ANTENNA ALIGNMENT MODE then click on Antenna Alignment Meter. This will bring up a bar graph display showing RSSI (signal strength) and SQ (signal quality). It's normal for these numbers to bounce around a bit but they are useful to get an average reading. You can move the antenna while watching the numbers to get a peak signal. Due to terrain variances and reflections this peak signal might cause the antenna to be tilted away slightly from visual alignment. NOTE: After antenna alignment both sides of the link will need to be rebooted. This can be accomplished by unplugging the POE power supply and replugging it in or if you have computer access to the unit by clicking on the reboot button on the STATUS page.

8. **MESH NETWORK:** You can add an additional 2 *Q-Bridge*™ units to create a mini mesh network. This is useful if you want to connect 4 buildings together. All *Q-Bridge*™ units must have the same settings for Encryption and Channel. Each unit must have a unique IP address. To add another *Q-Bridge*™ you will need to add the MAC addresses of any



SAMPLE MESH NETWORK

Software Settings - We strongly recommend that you create a working plug and play link before making ANY changes to the software settings

1. There is an HTML management system built into every *Q-Bridge*™ unit. This management system can be accessed thru the CAT5 ethernet cable connection or thru the wireless connection, so you can manage both sides of a link from 1 location.

2. To access the *Q-Bridge*™ units, your computer/game console must be on the same subnet as the *Q-Bridge*™ unit. For instance the *Q-Bridge*™ units come configured on subnet 192.168.1.xxx Your computer/game console must be on this subnet to be able to talk to the units. If using Windows goto MY NETWORK PLACES | VIEW NETWORK CONNECTIONS | LOCAL AREA CONNECTION, then click on the SUPPORT tab to see the IP address. If your IP address starts with 192.168.1.xxx then you will be able to communicate with the *Q-Bridge*™. If your address is something else like 192.168.0.xxx you will need to first manually configure your machine's IP address temporarily to be on the 192.168.1.xxx subnet, access the *Q-Bridge*™ units so that you can change their IP address to match your original subnet, then switch your machine back to the original settings. Before changing any settings on your machine write down all the numbers on the SUPPORT tab under DETAILS. This will allow you to reset the machine back to the original settings after making any changes. The *Q-Bridge*™ unit #1 comes pre-configured with IP address **192.168.1.220** and Unit #2 comes pre-configured with IP address **192.168.1.221**

3. **SECURITY:** Security is pre-configured with system passwords, 128Bit encryption, SSID broadcast disabled and Mac Address verification pre-set. This is so that you can setup a plug and play link and have confidence that the link is secure and that your data and network is safe. Once you feel comfortable with the system we would recommend the following security changes:

a.Change the access password on each side of the link by going to PASSWORD. The factory default user name is: *PAW* and the default password is: *pawhero.* Both password and user name are case sensitive.

b.Change the 128bit encryption code by going to WIRELESS | BRIDGE SETTINGS | SET SECURITY . ATTENTION: The SECURITY tab under

WIRELESS is used for setting up client security if the unit is reconfigured as a client device. For bridge security setting you must set security under the BRIDGE SETTINGS.

TECH NOTE: *When setting encryption you must setup both sides of the link to have identical encryption keys. You can setup the remote unit first and then the local unit last in order to be able to configure both units from 1 location across the wireless link. HEX Encryption keys can use the letters A to F, a to f and numbers 0 to9. The more random the key the more secure the code. For 128 bit encryption (most secure) using a HEX code takes 26 characters in the excryption key. You can also set ASCII codes which only take 13 characters and can be any ASCII character but we recommend a HEX code as being the most secure.*

a.SSID Broadcast is set to disabled by default. We recommend that you keep this disabled for additional security. You may also change SSID to a personal word. SSID doesn't need to be the same on both units. It's for information purposes only.

4. **CHANNELS:** The *Q-Bridge*™ default channel is set to channel 2. The only reason you might want to change the channel is if you experience lots of interference from local wireless systems which are operating on the same channel. To change the channel go to WIRELESS | BASIC SETTINGS and change the channel. Both sides of the link must be on the same channel and if setting both units from 1 location, always set the remote unit first and the local unit last.

5. **TRANSMIT POWER (Tx Power):** Normally there wouldn't be any reason to change the power setting. The factory default setting is **200mW** which should be good for most applications. If you are trying to shoot a longer link or you have some objects (trees, buildings) between your *Q-Bridge*™ units, then you may want to turn up the power to 250mW. If you have a shorter link you will actually get better performance if you turn down the Tx Power. This is because at close range there is too much power and it has a tendency to overload the input stage of the units and performance degrades. Use the following general guideline for reference:

Power Level	Recommended Distance
100mW	<1 mile
150mW	1 to 1.5 miles
200mW	1.5 to 2 miles
250mW	2 to 4 miles