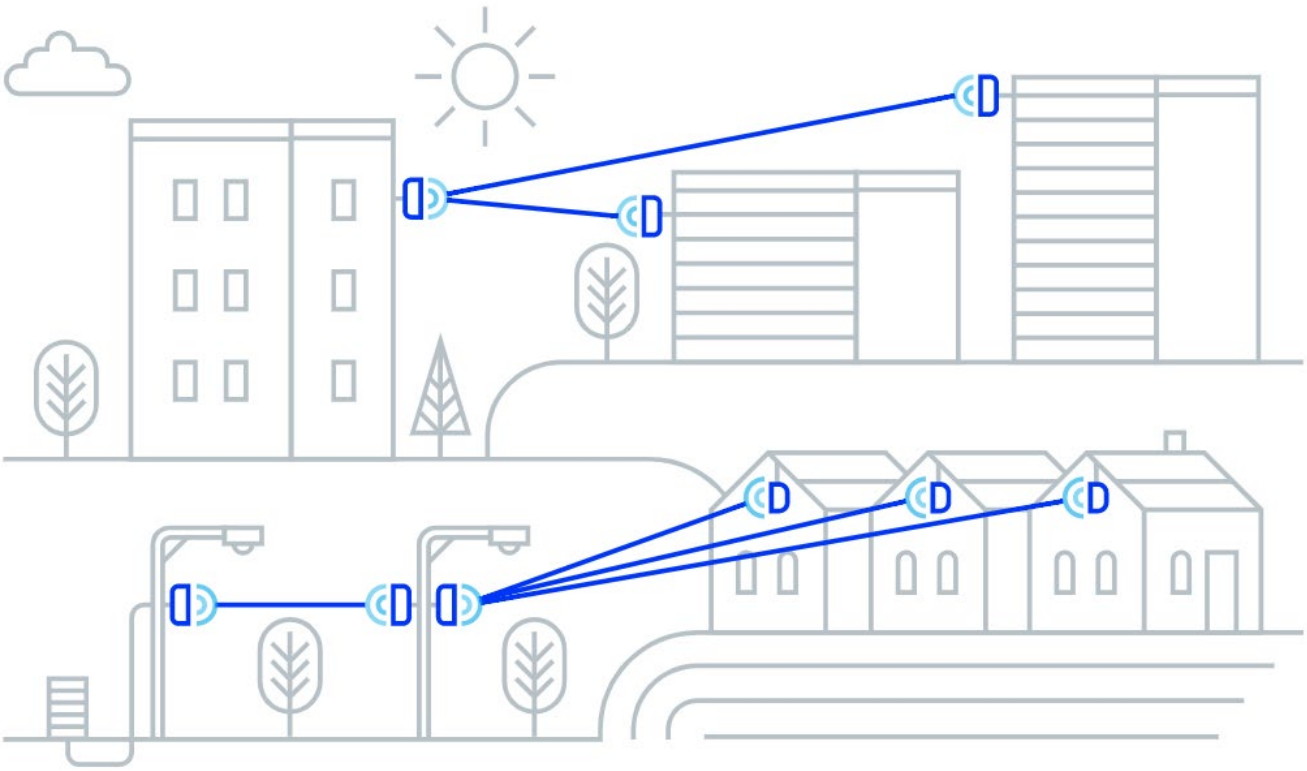

K60 Wireless Communication System

User Guide

March 21, 2025

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.

You can determine whether your equipment is causing interference by turning it on and off. If the interference stops, it was probably caused by the equipment. If the equipment causes interference to radio or television equipment, try to correct the interference by using one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician.

Any modifications to this product which are not authorized by Altowav Inc. could void your authority to operate this equipment.

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Altowav would like to thank all of our staff for their efforts and expertise in development and implementation of the K60.

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Table of Contents

1 Guide Overview

Thank you for choosing the K60 wireless communications system from Altowav.

This guide is intended for network and system administrators who will install, configure, and manage K60 distribution networks. This guide provides an overview of the system. This guide does not provide detailed information on any specific network configuration. This guide provides instruction for K60 configuration and management, using Altowav's WebUI. Other methods such as Command Line Interface (CLI) and Edge Controller, are briefly described, but detailed instruction is not provided.

It is assumed readers of this guide are familiar with:

- Basic networking concepts
- Routing and switching in networks
- Specific network practices and operations at the installation.

This guide includes:

1.1 Additional documentation

Further information about installing, configuring and managing Altowav 60 GHz network devices can be found in:

K60 Quick Start Guide	Altowav Edge Controller Guide
	K60 Getting Started Videos

1.2 Additional help

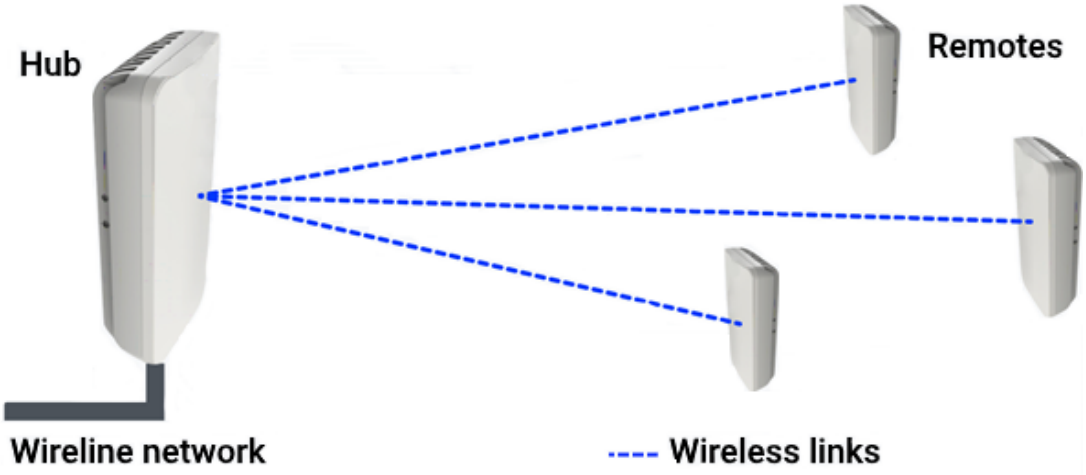
Altowav is committed to providing our customers with high quality technical support.

Web	support.altowav.com
E-mail	support@altowav.com

1.3 What's New?

Version & Date	Revisions to K60 User Guide
3-21-25	Clarification for LED Indicator Codes.
5-31-24	Legal name change to Altowav Inc. Legacy event fields in Admin tab.
4-4-24	Added description of Assess Wireless button and tool operation for the WebUI Admin tab. Rebranding from Kwikbit Networks to Altowav.
3.16.x 3-28-22	See the Firmware 3.16x Release Notes for a more detailed list of changes. Default configuration changes • Wireless SSID and passcode defaults: **KBAccess**. • VLAN mode default: **Port-based**. • Management VLAN ID: **100**. • PVID: **100**. (For all Ethernet ports.) Transmit power setting added to the Wireless tab of the WebUI.

2 K60 System Overview



K60 units in a Point-to-Multipoint (PtMP) wireless network

Altowav wireless networks take advantage of the high capacity of the 60 GHz frequency band to provide scalable gigabit connectivity. The K60 unit is designed for outdoor use and works well for multiple applications, including gigabit access, optical fiber extension, IoT backhaul (sensors, security, cameras, etc.), as well as corporate and enterprise data communications.

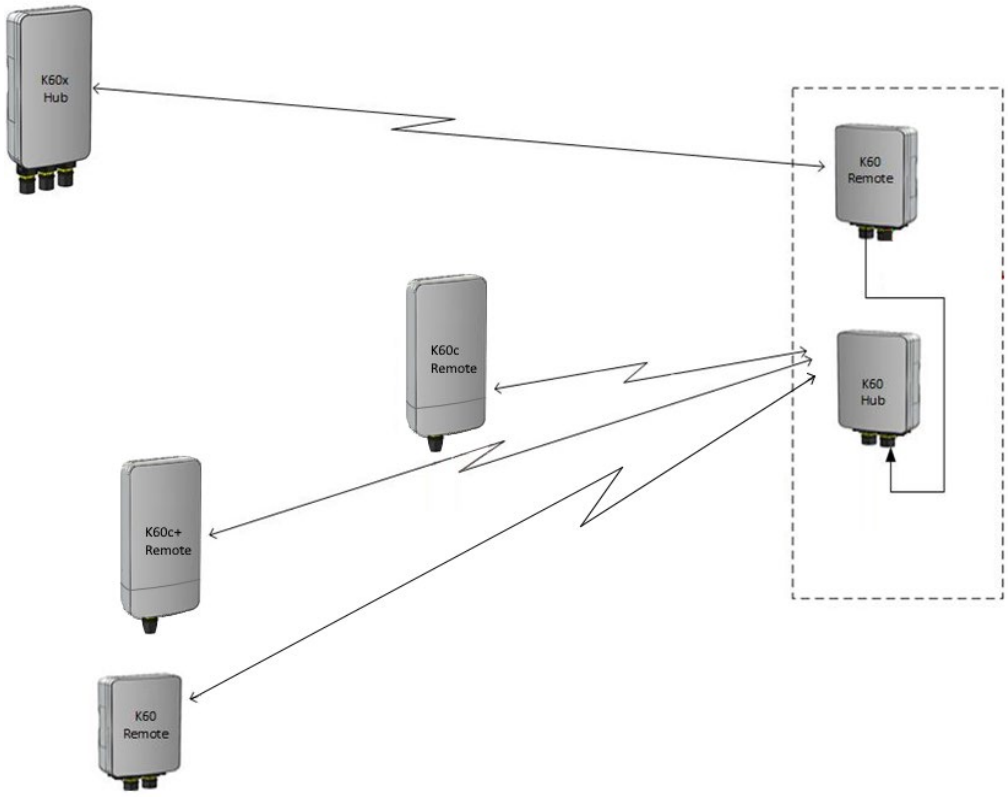
Adaptive beamforming with an integrated antenna array, as well as flexible mounting options and scan angles (90˚ horizontal / 30˚ vertical) help to ensure reliable connectivity and simplify installation of the units for non-technical staff.

Generally, a K60 network consists of the following components:

- **Hub(s):** One or more K60 units assigned a hub (distribution) role. Hubs control wireless communication to one or more remote units.
- **Remote(s):** One or more K60 units assigned a remote (client) role. Remotes scan for available hubs and connect. Remotes may be configured to connect only to a preferred hub, to align with specific network plans and policies.
- **Edge Controller (optional):** Provides tools for network planning, provisioning, configuration, management, monitoring and fault isolation. The Edge Controller is recommended for networks of medium and large scale.

Each K60 unit can be configured to operate in either a hub or remote role.

Altowav's K60, K60x, K60c, K60c+ and K60i units are designed to be interoperable in order to provide further flexibility in network configurations.



Example of K60x, K60c, K60c+ and K60 units used together

2.1 Ethernet Switching Function

Designed to seamlessly integrate into existing Ethernet networks, the K60 system is built for Ethernet connectivity services and provides network functionality as a standard Layer 2 (L2) Ethernet Switch (IEEE 802.1d). Each K60 cluster (one hub with its group of up to eight remotes) acts as a distributed switch, with the Ethernet ports on the hub and linked remotes acting as switch ports.

The embedded switch functionality performs Media Access Control (MAC) address learning (up to 4096 MAC addresses). This function allows a hub to optimize radio resources by sending traffic to the remote associated with the traffic's destination.

The K60 system allows network management traffic to be encapsulated in a dedicated management VLAN and can transport standard Ethernet frames, including oversize frames (up to 1596 bytes including the FCS).

2.2 System Specifications

The following table describes the K60 System specifications.

K60 System Specifications	
Aggregate wireless capacity	Up to 1.8 Gbit/sec (Layer 2/ Ethernet)
Ethernet frame type	Transparent bridging of all Ethernet types including VLAN and VLAN stacking
Latency	250 µs typical
L2 switching	Complete Layer 2 switching with VLAN support
Security	AES 128 with automatic secure key distribution
Network attributes	Ethernet switch, 802.1Q, DSCP/ToS/802.1p (IPv4/v6) and 802.1ad/ QinQ tagging
Network interfaces	Two GbE RJ-45 ports: Port 1 with PoE in and Port 2 with up to 30W PoE output
Other interfaces	LED indicator for power, link condition, signal strength, and unit location
Provisioning	Zero-touch deployment and provisioning available with optional Edge Controller
Management	WebUI, CLI, REST API and Edge Controller (optional)
Wireless standard	802.11ad

2.3 System Throughput

The K60 system is based on the IEEE 802.11ad standard. It uses time division duplexing (TDD) access mode, employing a single frequency for both transmit and receive paths. The throughput for the downlink and uplink depends on a downlink-to-uplink frame bandwidth ratio. The ratio is automatically adjusted based on the offered load in each direction, taking into account all remotes connected to a hub in PtMP.

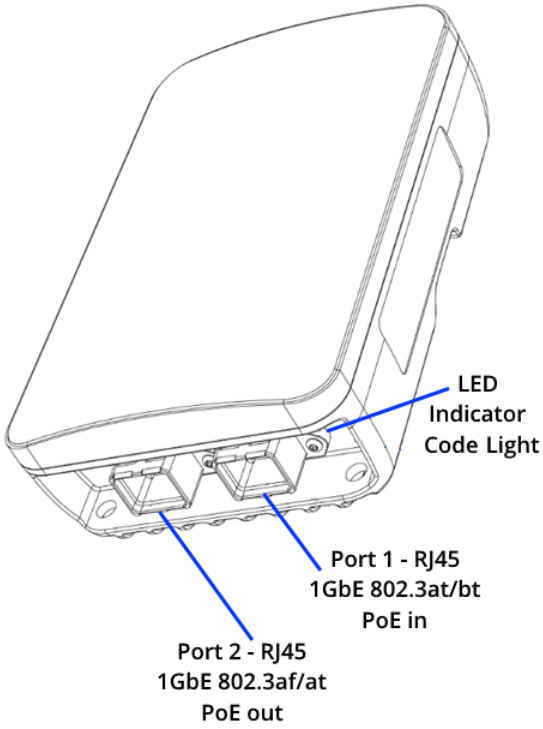
The system's throughput depends on the Modulation and Coding Rate (MCS) which varies according to link and signal conditions. The following table details Ethernet uplink and downlink combined throughput for a K60 link.

Throughput Performance for Cyclic Prefix of 1/8					
MCS Index	**Modulation**	**NCBPS**	**Repetitions**	**Code Rate**	**Data Rate (Mbit/s)**
1	π/2 BPSK	1	2	1/2	310
2	π/2 BPSK	1	1	1/2	620
3	π/2 BPSK	1	1	5/8	775
4	π/2 BPSK	1	1	3/4	930
5	π/2 BPSK	1	1	13/16	1007
6	π/2 QPSK	2	1	1/2	1240
7	π/2 QPSK	2	1	5/8	1550
8	π/2 QPSK	2	1	3/4	1860

The system will run at MCS Index 8 under good conditions and within the units' specified ranges. Co-channel interference, obstructions to the line of sight, and attenuative weather such as rain, snow, and fog will cause the MCS Index to drop. This adaptive feature enables the system units to maintain communications at a slower data rate in adverse conditions.

At higher elevations, the 60 GHz frequency provides some enhanced performance due to lower oxygen density.

3 K60 Unit Description and Specifications



The K60 has a durable exterior casing and is supplied with a combination pole or wall mount bracket. The mounting bracket allows for a range of installation angles to enable mounting in challenging locations. Units installed at the same location can be interconnected for medium and large network deployments.

The K60 has two RJ45 connector ports.

- Port 1 is used for Gigabit Ethernet network connectivity and PoE power input (802.3at, 802.3at+, or 802.3bt).
- Port 2 is used for Gigabit Ethernet network connectivity and provides PoE power output (up to 30W/802.3at).

A total of 38W PoE input power is required on Port 1 to satisfy the maximum 8W power consumption of the K60 and support the maximum delivered PoE output power (802.3at/30W) delivered on Port 2.

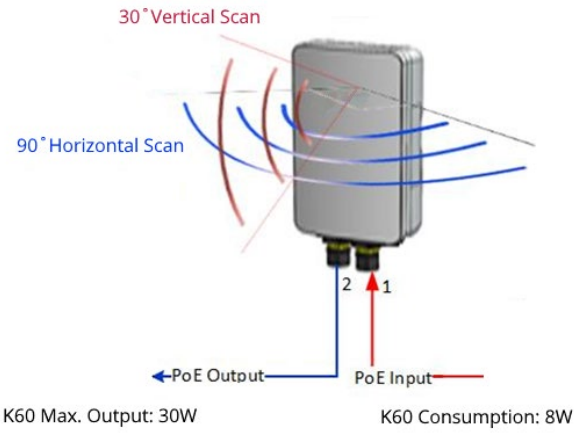
The LED shows operational status with green/red light patterns. See LED Indicator Codes for a description of the patterns and their meaning.

3.1 K60 Unit Specifications

The K60 has a small form factor that can be easily and unobtrusively deployed in many different outdoor environments. The following table lists physical, power, environmental, radio and networking specifications for the K60.

Physical Characteristics	
General	Single-piece outdoor unit with integrated antenna
Dimensions – H x W x D	157 x 99 x 48 mm (6.2 x 3.9 x 1.9 inches)
Weight	400 g / 14 ounces
Network interface	2 x 1 gigabit Ethernet ports
Networking Specifications	
Operation configuration	PtP and PtMP
Aggregate wireless capacity	1.8 Gbps
Symmetry	Dynamic downlink (DL) and uplink (UL) based on offered load

Power Specifications	
Power input	802.3at, 802.3at+, or 802.3bt PoE
Power consumption	K60 only: 8 watts maximum K60 with a fully loaded PoE output: 38 watts maximum
Power output	PoE available on Port 2: 802.3at (30 watts) (30W output requires 38W PoE input)
Environmental Specifications	
Operating temperature	-30˚C to +55˚C
Ingress Protection rating	IP67
ESD	IEC EN 61000-4-2
EMC	IEC EN 61000-4-3
Radio Specifications	
Access technology	Single carrier beamforming physical layer (802.11ad)
Duplex	Time Division Multiplexing (TDD)
Modulation	BPSK, QPSK; 8 levels of adaptive modulation and coding schemes
Frequencies	57.05 - 64.00 GHz
Channel bandwidth	2.16 GHz
Antenna system	128 patch beamforming antenna with 90˚ horizontal and 30˚ vertical scan range
Output power (maximum)	40 dBm EIRP
Typical range	400 meters



4 LED Indicator Codes

The K60 is equipped with a single LED showing both red and green light. The light sequences indicate the state of the K60 unit during each time slot. The following table shows the meaning of the light sequences.

LED	Indicates
Solid red	Unit is booting up.
Solid green	Operating normally as hub or root hub.
Flashing green	The radio does not have an RF connection to another radio. Applies to both hubs/root hubs and remotes. Example: repeating.
Flashing green in groups of 1 - 5	Remote is connected to hub. Number of flashes shows signal strength: 1 (weakest) to 5 (strongest). Example: shows a signal strength of 3.
Flashing green and red	Unit is in locate mode or performing a factory reset. Examples: Identify mode: ... Resetting to factory defaults: repeating.
Flashing red	Error condition. Example:
Other patterns	At startup other patterns may occur during the first minute.

5 Installation

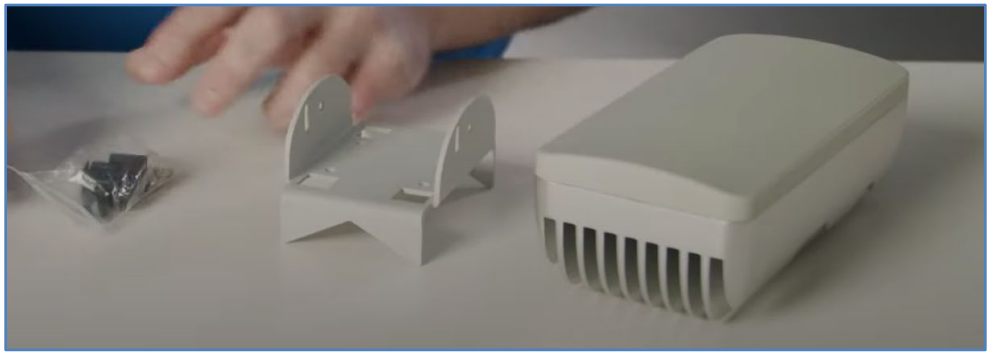
This section provides steps for installation, including preparation and configuration of the K60. It assumes that a site survey and network plan have been completed and any issues regarding coverage, capacity, interference areas and installation requirements have been addressed.

- Prepare for installation – unpacking the unit, recording specific information.
- Pre-installation setup and IP configuration (for systems not using Edge Controller)
    - Setting device roles.
    - Optional reset of SSID and airlink passcode.
    - Setting communication channel frequency for hubs.
    - Setting preferred hubs for remotes.
    - Changing IP address assignments, as needed.
    - Setting location and description.
    - Changing the password.
- Mounting and connecting the K60 – attaching bracket, mounting, adjusting angles and connecting to LAN.

If you require assistance for site survey, planning, configuration, installation, or deployment, Altowav offers services. Contact us for more information.

5.1 Prepare for Installation

The K60 is shipped in a box with mounting hardware and port caps, and is labeled with specific device information.



The K60 box includes:

- A mounting bracket designed for pipe mount or wall mount and screws.
- Port caps for unused ports.
- A label listing the IP and MAC address.

Record the following information before permanently installing equipment at the site.

- Record the IP and MAC address information found on the temporary peelable label on the K60 box. The IP address will be used for direct configuration of the K60.
- Locate the permanent label on the unit casing and record the information for SN: (serial number) and HN: (unit name) for future reference.

Optionally, you may purchase a field termination kit for the Harting IP67 connectors. See the field termination kit video for assembly instructions. Pipe clamps in several sizes may be purchased as part of the unit kit. Cables may be purchased pre-assembled in several lengths. Contact us for more information.

5.2 Pre-installation Setup and IP Configurations

K60 units have a default configuration loaded at the factory. If you are not using the Edge Controller to set up your network, you must configure each unit before installation using its factory-set IP address to access one of the other Management Interface options: WebUI or CLI.

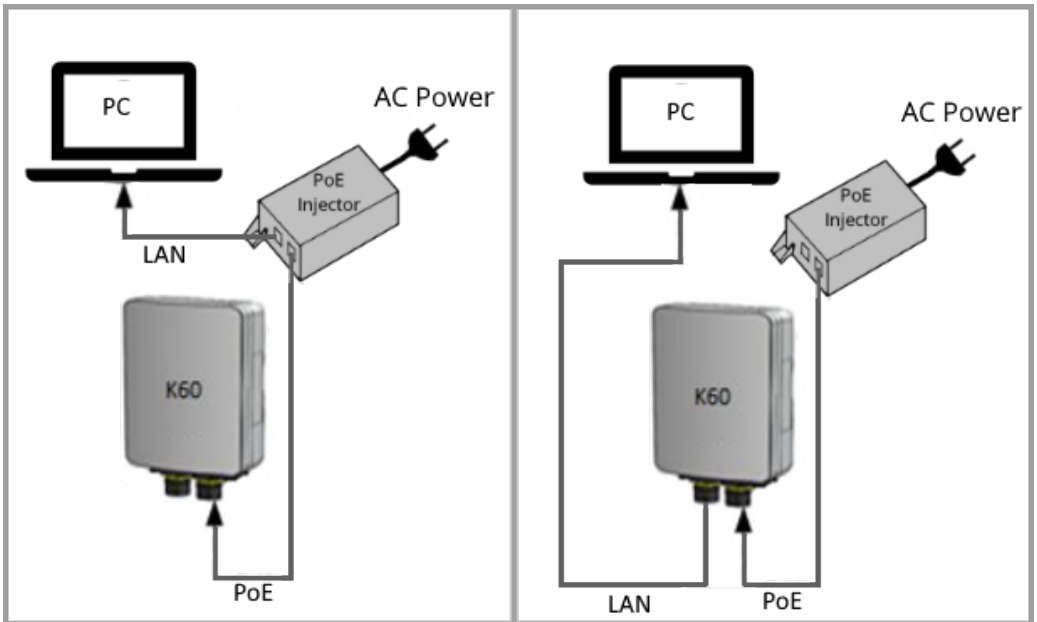
This section shows how to perform common pre-installation configuration tasks, using the WebUI.

Typical settings for initial configuration of the K60		
WebUI Tab	**Setting**	**Comments**
Wireless	Device Role	Required.
	SSID	Defaults to **KBAccess**. Reset optional.
	Airlink encryption passcode	Defaults to **KBAccess**. Reset optional.
	Center frequency	Recommended for hub units.
Admin	Change Password	Optional, but highly recommended.
	Location	Optional, but highly recommended.
	Description	Optional, but highly recommended.
Network	IP assignment method	Setting may be required by your organization's network policy. Optional for operation.
	IP address	Required when IP address method is set to Static.
	Network mask	Required when IP address method is set to Static.
	Network gateway	Required when IP address method is set to Static.

See Management Functions for additional settings and status information.

Follow these steps for initial setup, using the K60 WebUI.

1. Supply power to the K60 and directly connect it to your computer. Typically, this is done in one of the following ways.

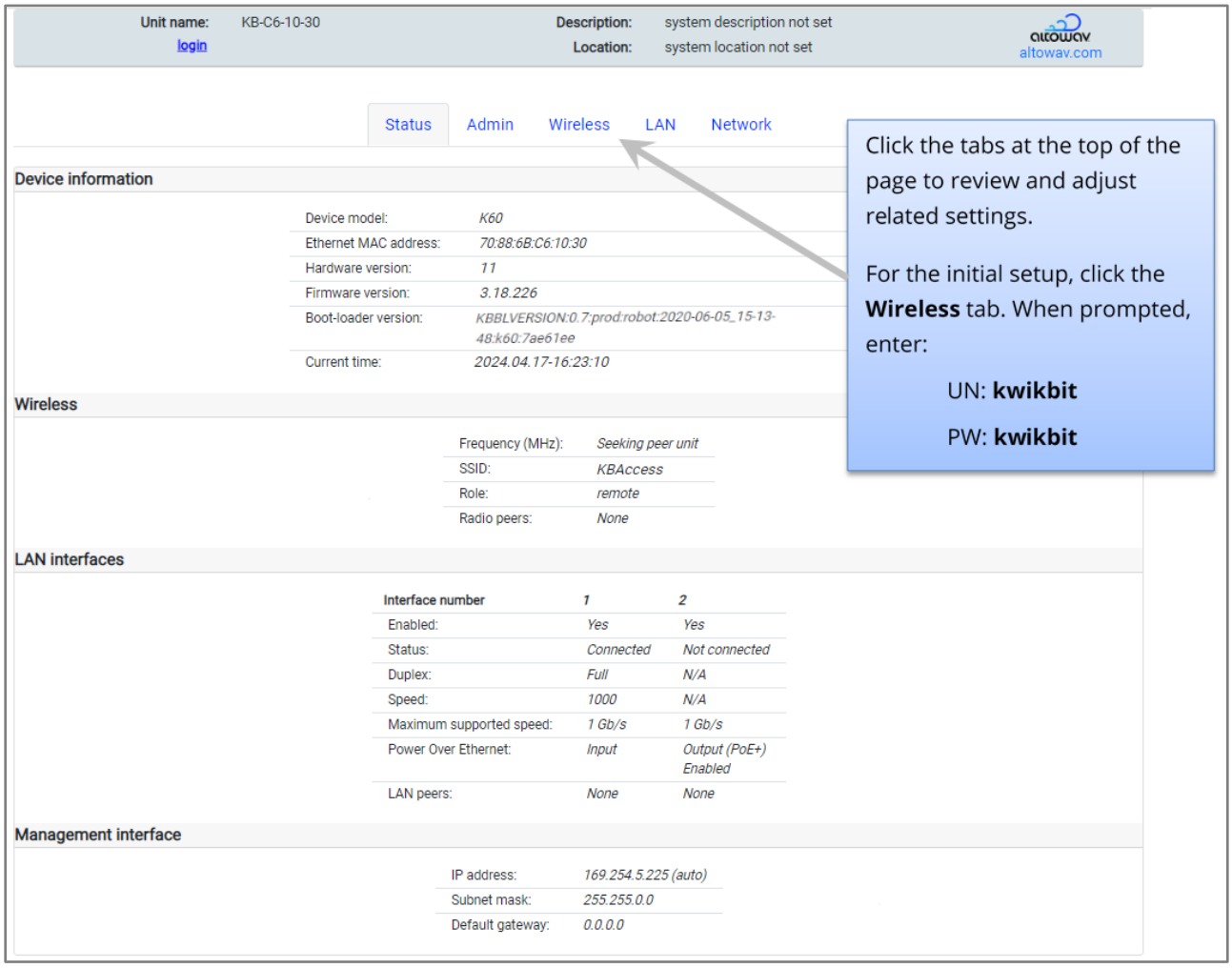


Method 1: Connect a PoE injector to Port 1 (PoE in) on the K60 and connect the LAN port on the injector to your computer with a Cat 5e or higher Ethernet cable.	**Method 2:** Connect a PoE injector to Port 1 (PoE in) on the K60 and connect your computer to Port 2 with a Cat 5e or higher Ethernet cable.

> **Tip:** Since the ports on the unit are weatherproof, a standard RJ45 Ethernet plug will lock into place and be difficult to remove. One option is to remove the locking tab from a standard RJ45 plug. Or, use an Ethernet cable equipped with the weatherproof Harting push-pull plug (IP67 rating) to be used for outdoor installation.

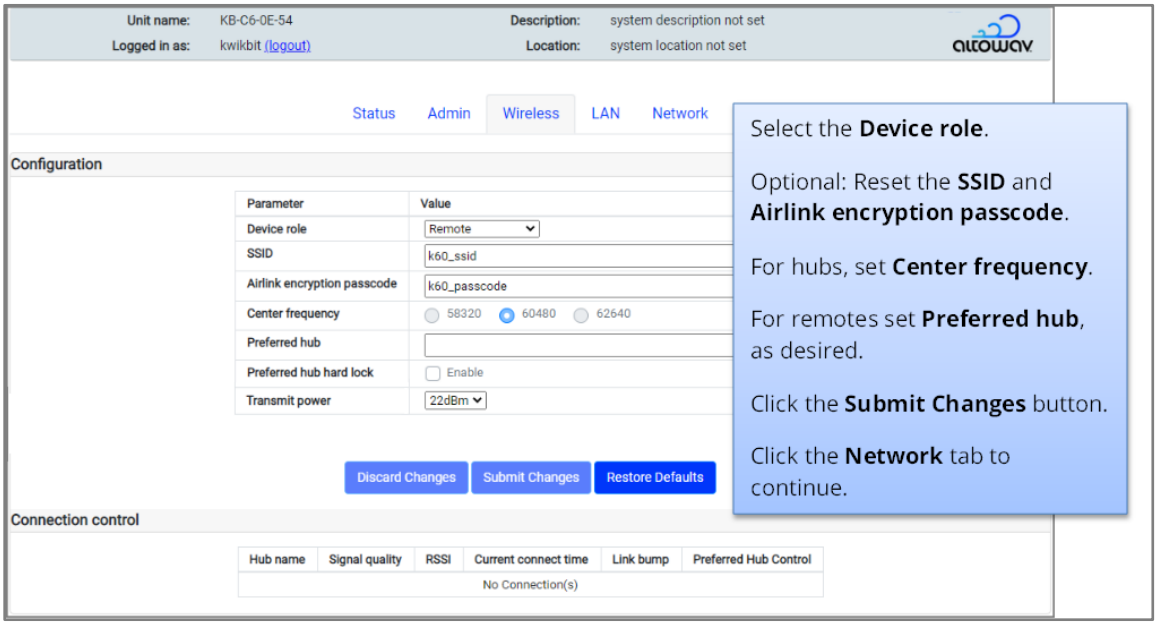
2. Open a browser on the computer and browse to the IP address. For example, **https://169.254.5.225**. (The IP address is listed on a temporary label on the unit as shipped from the factory. See Installation Planning.) (Your unit's specific IP address will be different from the example, but will follow the pattern: 169.254.#.#. See how to find the original IP address.) You may have to temporarily set your computer to obtain IP addresses automatically for direct access to the unit.

   If issued a security warning, click the **Advanced** button and **Proceed** to the site. The WebUI window opens, showing the status information for the device.



Note: You can view the information on the Status tab without logging in. Clicking on any other tab or the blue **login** button, prompts you to login.

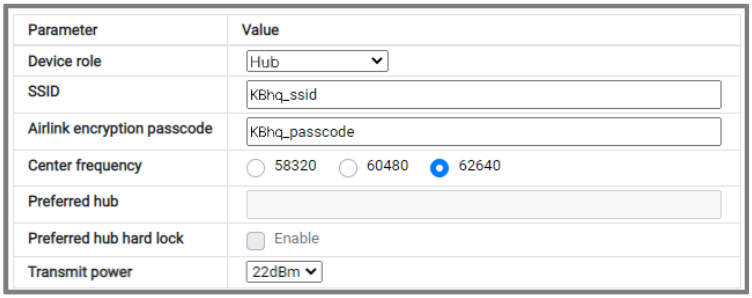
3. On the **Wireless** tab set the **Device role**. The default for **SSID** and **Airlink encryption passcode** is **KBAccess**. (In order to establish wireless communication, the distribution hub and remote client devices must have the same SSID and Airlink encryption passcode.) The default is useful for quick deployment, but the values can be reset for additional security. Your organization's process will determine how and when to reset the SSID and passcode.



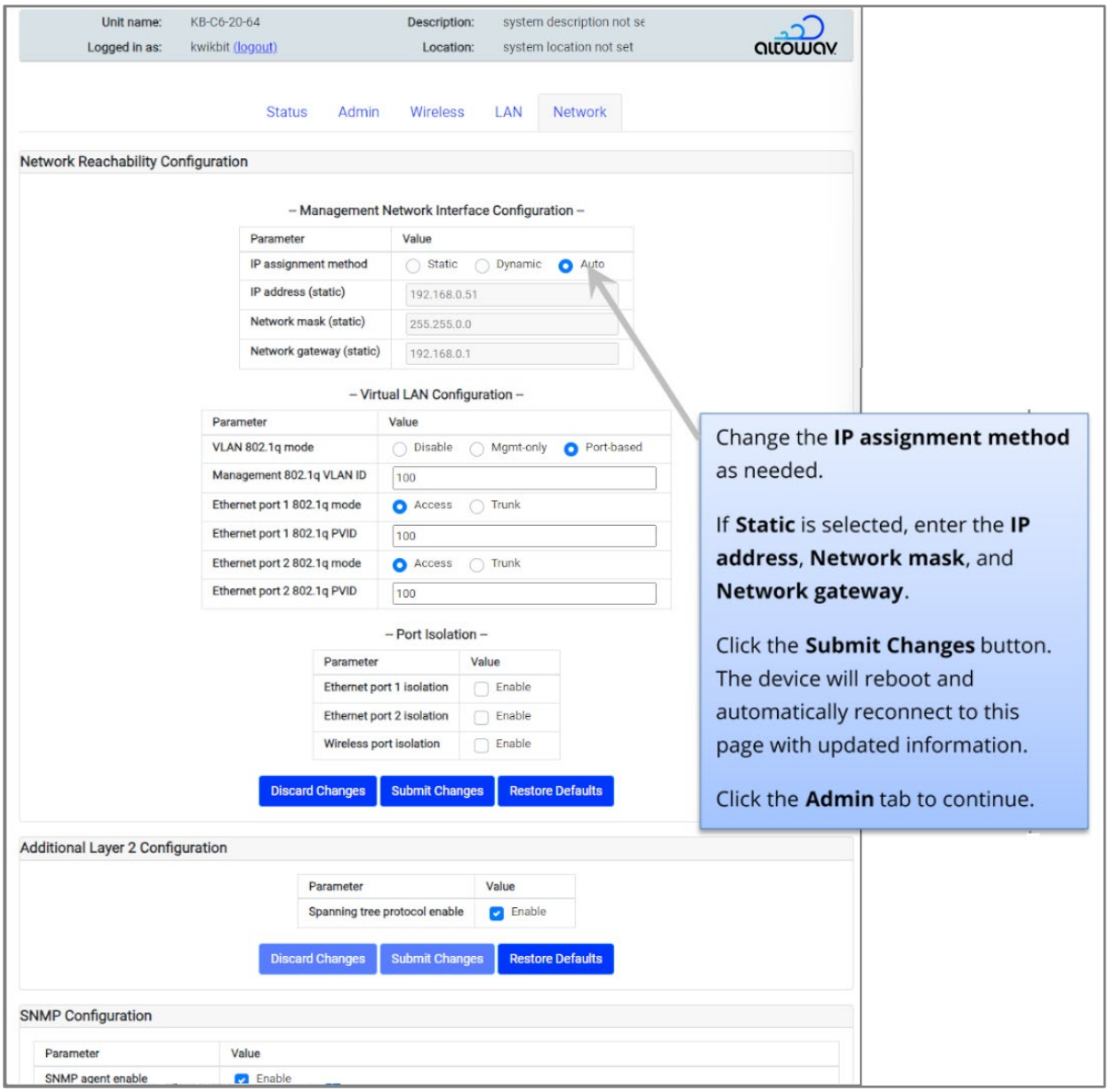
When selecting the **Device roles** for wireless PtP or PtMP communication, keep in mind that each hub device may form a wireless link with to up to eight remote devices. Remote units form wireless links to only one hub at a time.

If a remote has more than one hub device within range, the **Preferred hub** setting ensures that it links with the desired hub. Remotes without a preferred hub will periodically scan for a connection. **Preferred hub hard lock** can be enabled to prevent the remote from scanning for an alternate hub. If you are unsure of the preferred hub name, refer to your network plan, or you can adjust this setting after the actual installation.

For hubs, set **Center frequency**, as needed.



4. On the **Network** tab, change the IP assignment method, as required by your organization's network policy.

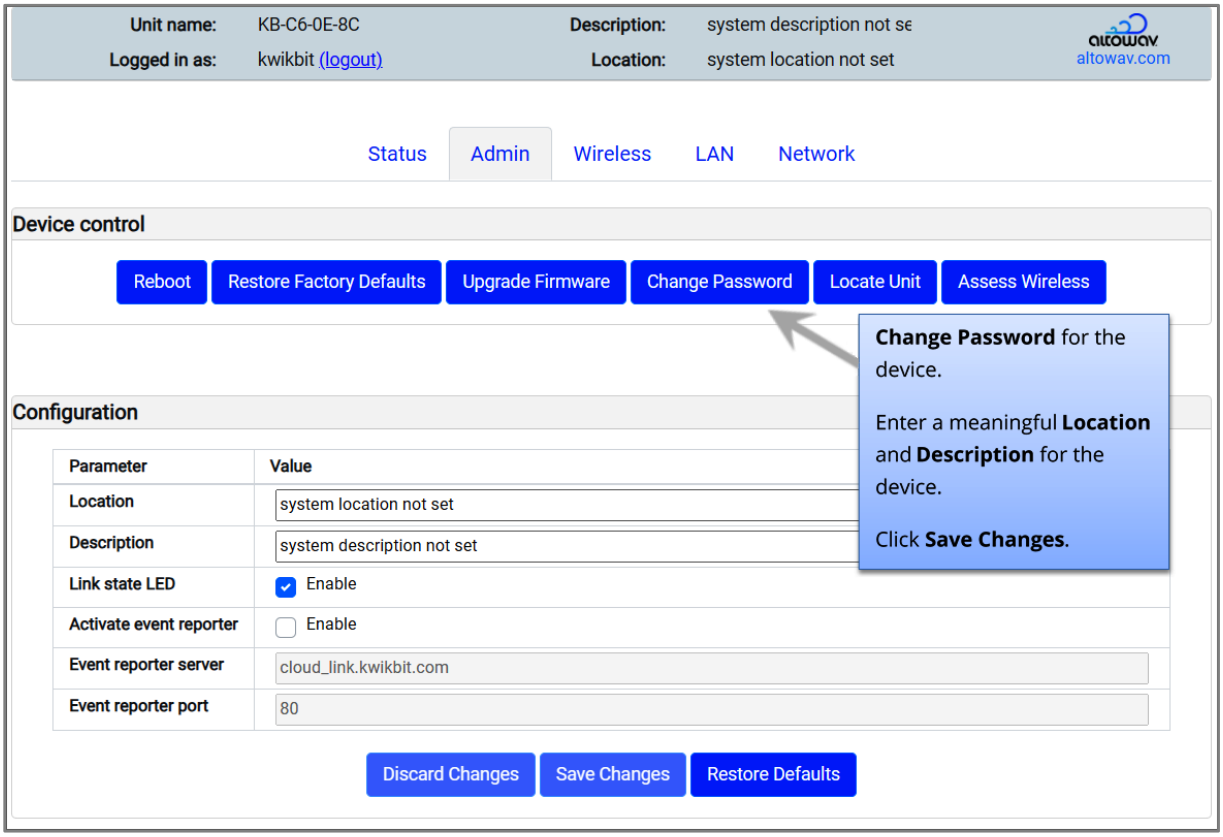


Note: When the IP address is changed, be sure to record it for future access, monitoring and configuration of this unit.

The VLAN network settings default to the values shown above, in order to streamline deployments. However, to optimize data-plane performance after deployment, set Management VLAN ID and Ethernet PVIDs to different VLANS or set VLAN mode to something other than port-based.

See Management Functions, Network for a complete picture of the Network tab settings.

5. On the **Admin** tab, set the location and description of the device.



All devices are shipped from the factory with the same password: **kwikbit**. Click the **Change Password** button to set a new password, in accordance with your organization's network policy.

Location – typically indicates the physical location where the device will be installed.

Description – may include orientation, function, role or other information about the device.

Location and description information is useful when installing, managing and monitoring devices in your network.

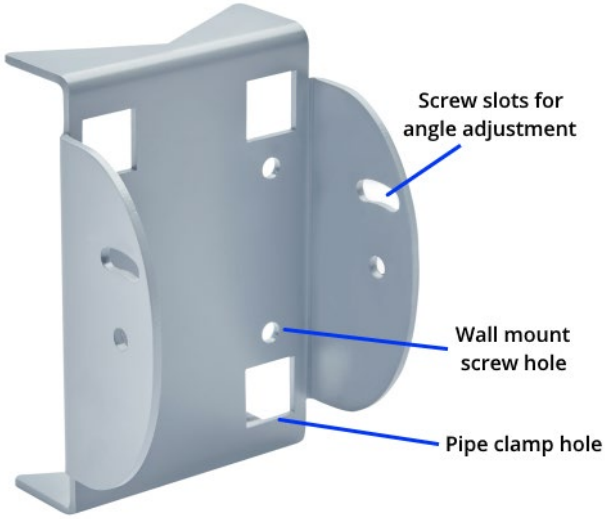
Note: For networks that do not use the Edge Controller, location information should be recorded with the unit name and IP address on your site plan. The Edge Controller tracks this information automatically in the device list.

The unit is now configured and ready to be installed.

5.3 Mounting and Connecting the K60

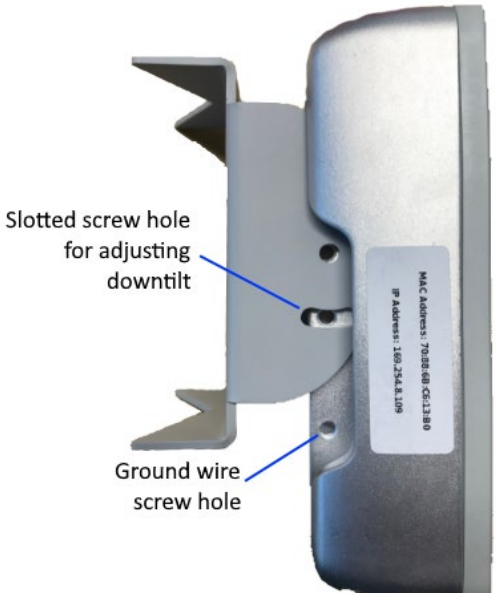
The K60 includes a mounting bracket and screws for installation and grounding. See the Mounting K60x and K60 60 GHz Radios video for quick installation instructions, or follow these steps for basic mounting of the units:

1. Determine the installation location for each K60 unit and whether it will be on a pole, pipe or wall.



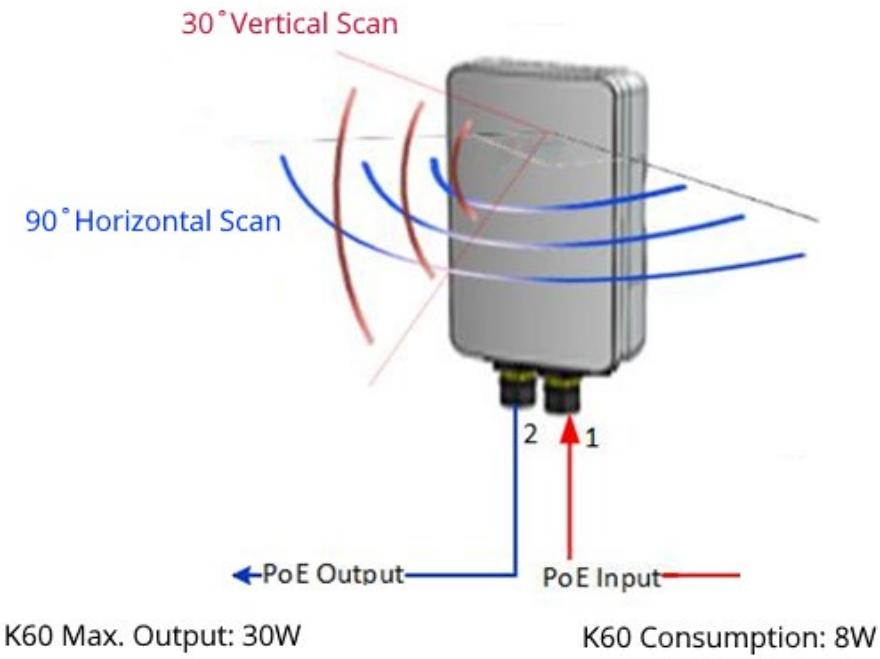
2. For pipe or pole mounted units, insert pipe clamps (not supplied) into the square holes in the back of the bracket. (Pipe clamp holes are 5/8” x 5/8”, designed for typical use of 1/2” or 9/16” wide pipe clamps in varying lengths.) For wall mounted units, screw the bracket to the wall.

3. Attach the bracket to the K60 unit using four of the screws provided. The bracket’s slotted screw holes are used to adjust the angle, as needed. If you plan to attach an optional ground wire, attach the bracket with the screw slots toward the bottom of the unit.



4. For pole or pipe mount units, slide the pipe clamps onto the pole. Adjust the horizontal angle by rotating the unit around the pole. Adjust the vertical tilt of the unit using the slotted screw hole. When aligned as desired, tighten clamps and screws.

> **Tip:** When adjusting angles, keep in mind that the antenna is located at the top of the unit and the beam is directed out the radome with a with a scanning range of 90˚ horizontal and 30˚ vertical.



5. Connect PoE input by snapping the weatherproof Harting push-pull plug into Port 1, as shown in the image below. Twist the yellow ring on the plug to lock it in place. (Harting IP67 field termination kits and pre-assembled Ethernet cables may be purchased. Contact us for more information.) Repeat the process to connect cable to Port 2, as needed. Use the Altowav-supplied port caps to cover any unused ports.

6. **Optional:** Install a ground wire, if required. Use the fifth screw provided with the unit to attach the wire to the predrilled hole on the lower part of a heat fin. (See the graphic for attaching the mounting bracket, in the steps above for the location.)

Continue mounting all prepared units, until the installation is complete.

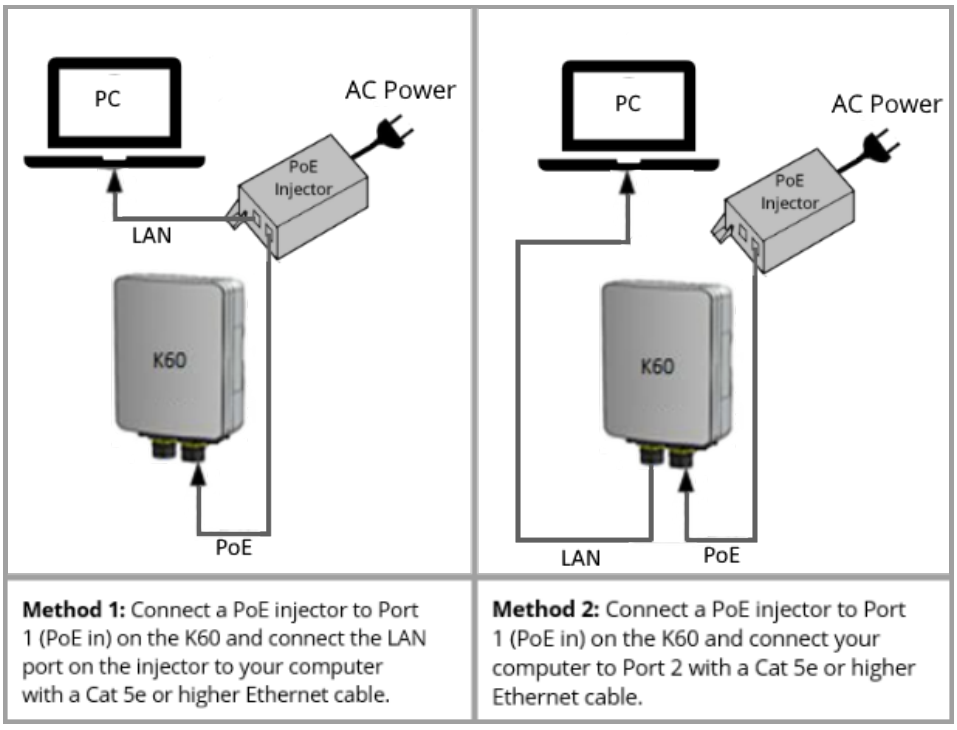
6 Management Interface Options

The Altowav system offers several options to manage units, configure settings, and view information about connections, peers, performance or faults for each unit. Access these settings and information through the following management interfaces.

- **WebUI:** Provides an interactive display of status information and settings options.
- **Command Line Interface (CLI):** Provides a set of commands enabling the operator to manage, maintain and troubleshoot the system via the command line.
- **Edge Controller (optional):** Provides the same interactive display and settings as the WebUI, for each unit in the network. It also enforces user permissions and authentication for the network.

The WebUI and the CLI management interfaces require the following.

- The IP address of the K60 unit. (You may have to temporarily set your computer to obtain IP addresses automatically for direct access to the unit.)
- Supply power to the K60 and connect it to your computer. Typically, this is done using one of the methods shown in the following graphic.



Method 1: Connect a PoE injector to Port 1 (PoE in) on the K60 and connect the LAN port on the injector to your computer with a Cat 5e or higher Ethernet cable.

Method 2: Connect a PoE injector to Port 1 (PoE in) on the K60 and connect your computer to Port 2 with a Cat 5e or higher Ethernet cable.

- Log in with the unit's password to change settings or access sensitive information.

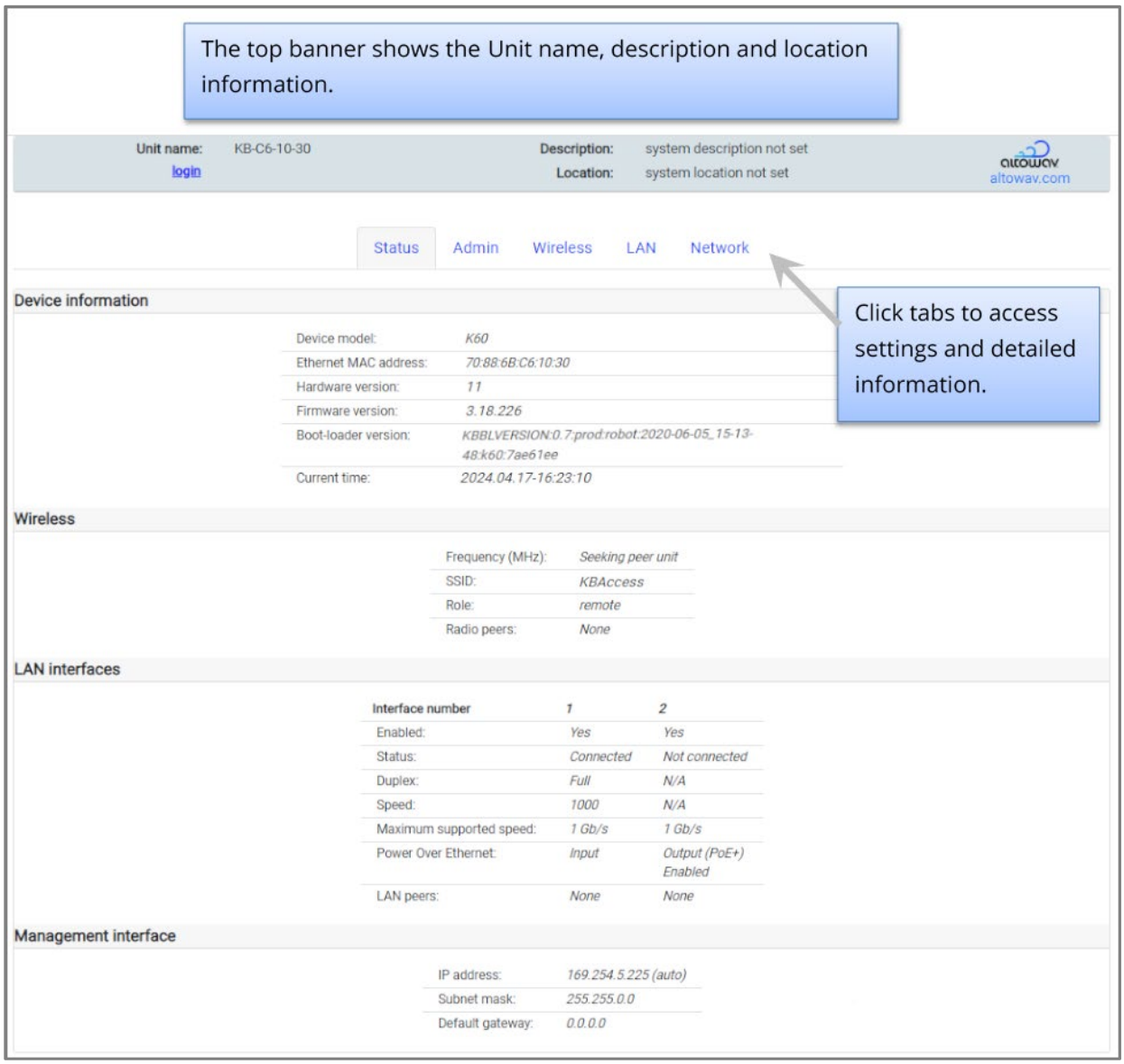
6.1 Open the K60 WebUI and log in

The K60 WebUI is a single page with status information and settings on multiple tabs. To directly access the K60 WebUI:

1. Supply power to the K60 and connect it to your Internet-enabled computer with a Cat5 or higher Ethernet cable, as described in the previous section.
2. Open a browser on your computer and browse to the unit's IPv4 IP address via https. For example, **https://169.254.5.225**. (Your unit's specific IP address will be different from the example, but will follow the pattern: 169.254.#.#. See how to find the original IP address.) If issued a security warning, click the **Advanced** button and **Proceed** to the site.

   Note: For some browsers, you can use the unit name, (KB-XX-XX-XX) instead of the IP address. For example, **https://KB-C6-10-30**.

The WebUI window opens, showing status information for the K60. You can view the Status tab, without logging in.



3. Clicking any tab or the **login** button will prompt for a login. The first time you log in, use the default user name and password:

   User Name: kwikbit
   Password: kwikbit

   Changing the password can be done on the Admin tab. The unit's password is the same for both the WebUI and CLI. See Management Functions for a description of more settings by tab.

6.2 Command Line Interface (CLI)

The K60 CLI provides device status as well as configuration options through information and control commands using Secure Shell (ssh). To directly access the K60 CLI:

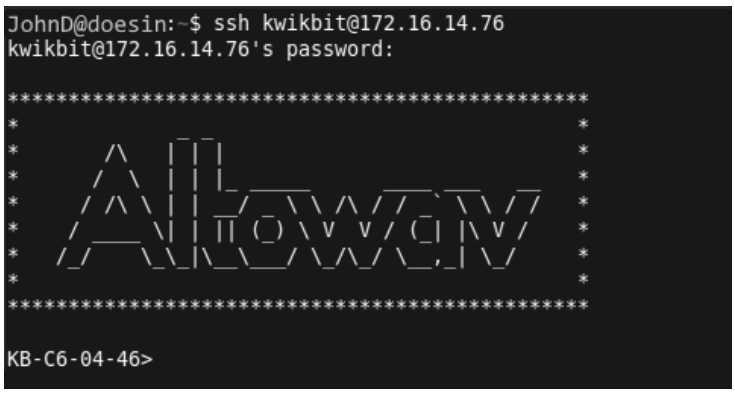
1. Supply power to the K60 and connect it to your computer with a Cat5 or higher Ethernet cable, as described in Management Interface Options.

2. Open a terminal or command window on your computer.

3. To access the CLI, enter the secure shell command, **ssh**, followed by **kwikbit@**, followed by the unit's IPv4 IP address. For example: **ssh kwikbit@169.254.2.225**. (Your unit's specific IP address will be different from this example, but will follow the pattern: 169.254.#.#. See how to find the original IP address.)

   Note: You can also open the CLI using the unit name, (KB-XX-XX-XX) instead of the IP address. For example, **ssh kwikbit@KB-C6-03-06**.

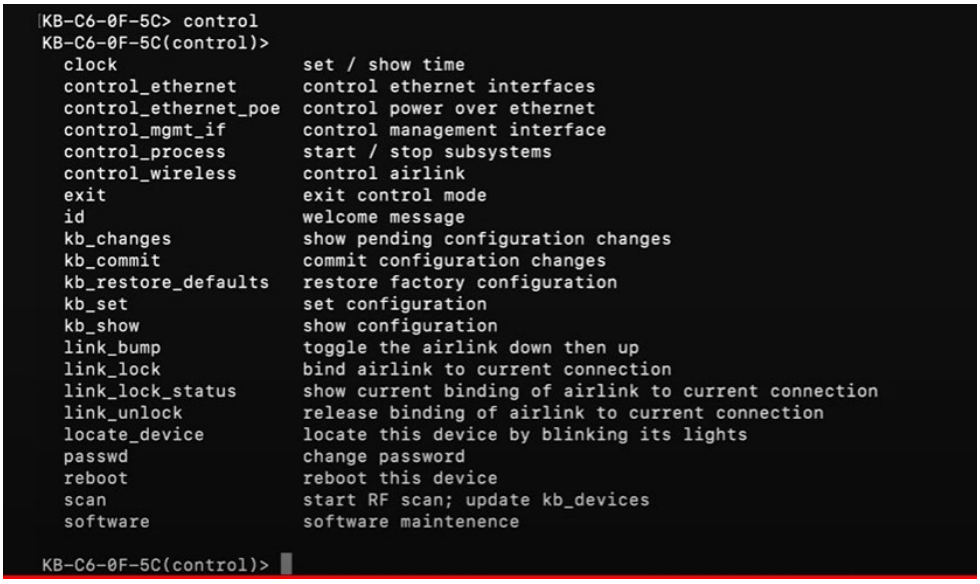
   The CLI displays your unit's IP address with a password request.



4. Enter the default password: **kwikbit**. The CLI is ready and lists the unit name in the command prompt. The unit's password is the same for both the WebUI, CLI.
   Use the following methods to list available information and run control commands to adjust settings.

To list available information commands: Enter **?** at the prompt.

To enter control mode to adjust settings: Enter **control** at the prompt. Then enter **?** to list all control commands.



To end the CLI session: Enter **Exit** on the command line or close the terminal or command window.

6.3 Altowav Edge Controller

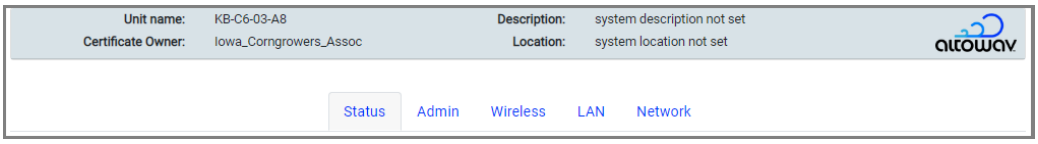
The optional Altowav Edge Controller enables remote monitoring and managing of Altowav networks. The Edge Controller helps the site administrator quickly identify issues affecting performance such as poor RSSI, MCS, links or devices down, and firmware version compliance. It also assists the administrator with optimization tasks using detailed analytic data and secure access to network devices.

K60 devices can be added to Altowav Edge Controller networks to centralize diverse network operations. For more information about what you can do for your network with the Edge Controller, please refer to the Altowav Edge Controller User Guide.

7 Management Functions

This section shows the management functions available on each tab of the WebUI. The same functions can be accessed through commands available using the CLI.

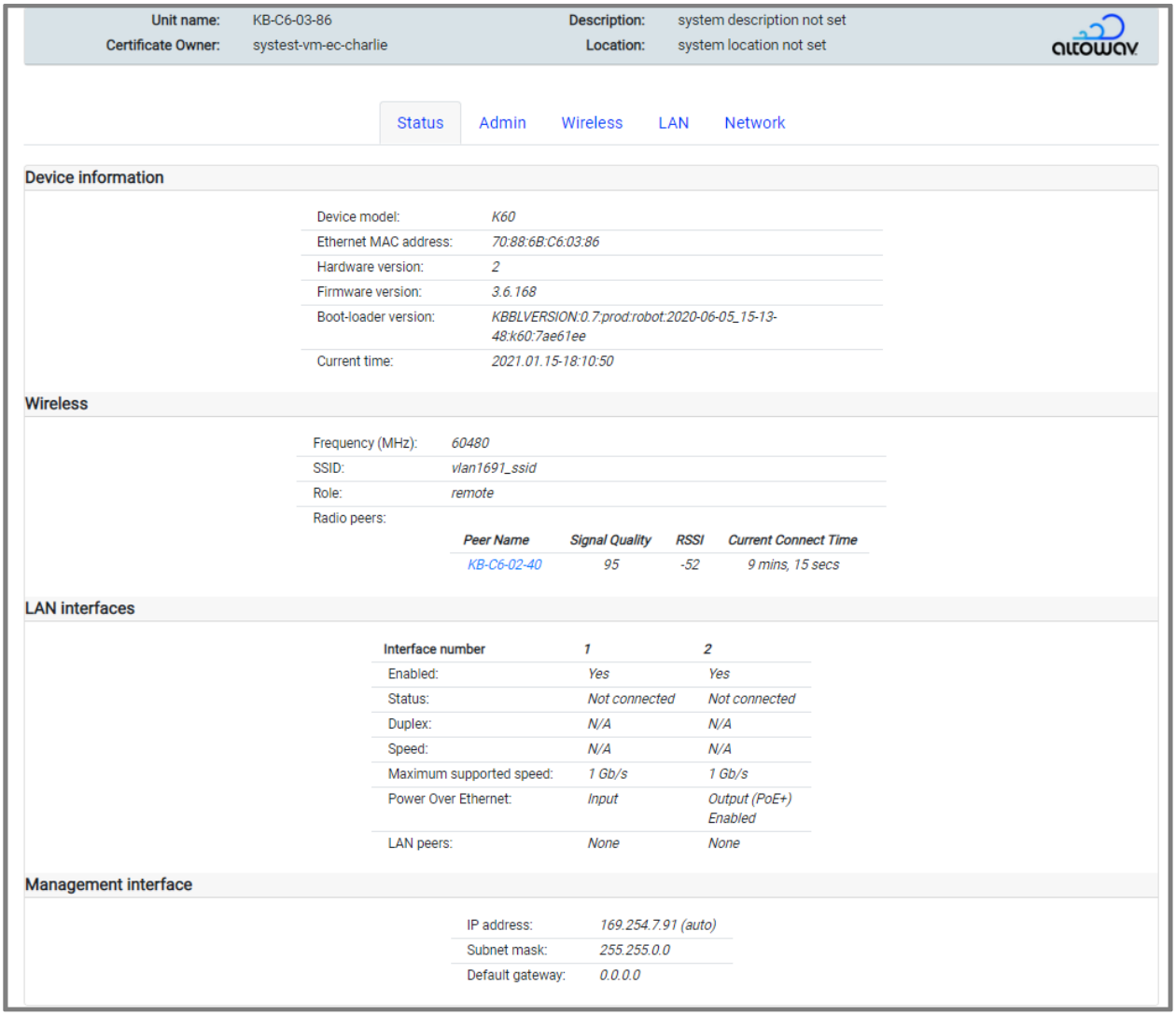
The header of the WebUI shows the Unit name, (also called the KB MAC), Description and Location, as well as Certificate Owner. Login is not required to view the status tab, but is required to view or set configurations on any other tab of the WebUI.



Tip: The header background changes from gray to yellow when a unit is unreachable.

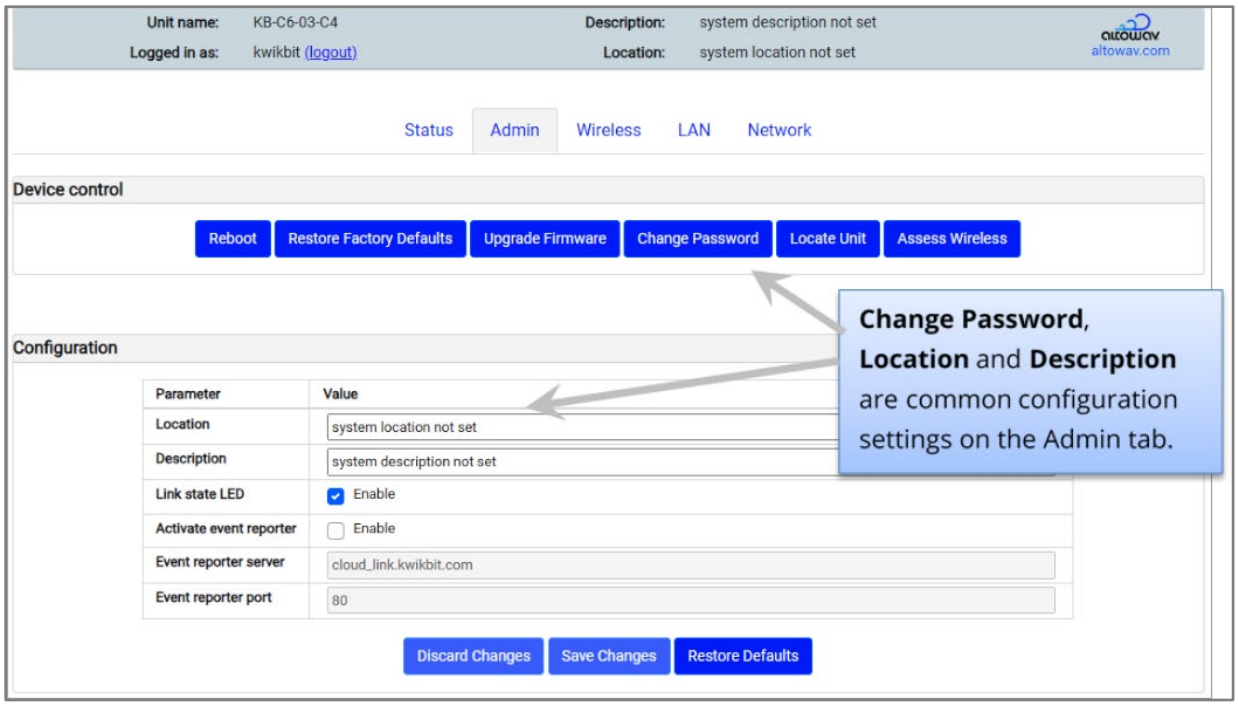
7.1 Status Information

The Status tab shows a summary of information about the unit, its wireless and LAN connections, and interface information. Logging in is not required to view Status information, but clicking any tab, or viewing a connected peer triggers a log in prompt.



7.2 Admin Functions

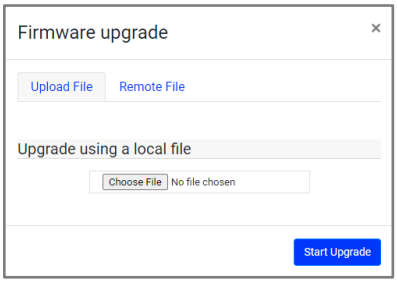
The Admin tab has options for administrative tasks such as rebooting, upgrading, locating, changing the password, as well as setting the unit's location and description.



Reboot – restarts the unit remotely.

Restore Factory Defaults – restores all device configuration to factory defaults. If the unit is unreachable, it may require a factory reset using a reset cable.

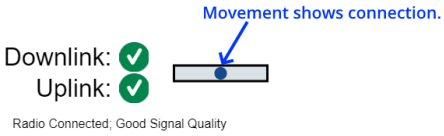
Upgrade Firmware – updates the device firmware with the upgrade version you select.



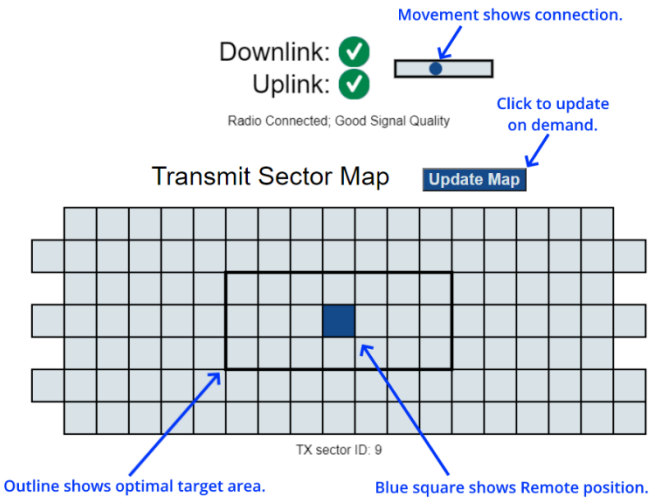
Change Password – Use this button to change the password, according to your organization's network policy.

Locate Unit – Click this button to put the unit into locate mode, where it flashes an LED signal for field personnel to identify the unit. In this case, the LED sequence is:  repeating.

Assess Wireless – Use this button during installation or repositioning of a Remote, to show link quality. An icon shows downlink and uplink quality, using red (x), amber (-) and green (✓) icons. A gray (?) appears while the unit is connecting or reconnecting. A message describes the connection and signal strength.



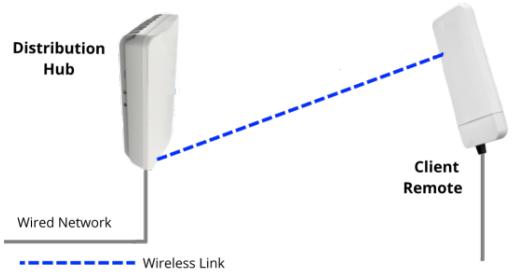
For the K60, a Transmit Sector Map displays the current status of the remote unit as a blue square in the outline target area. Refine the position of the square in the outline to optimize the link quality.



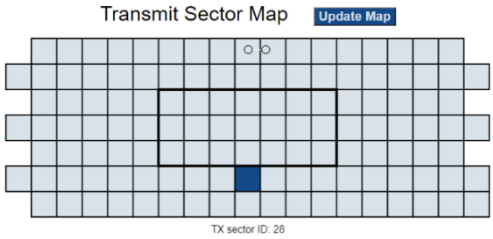
As adjustments are made, the tool captures signals and relative positions to display an accurate representation. An **Update Map** button run updates on demand. This drops and re-establishes the link so there may be a short time (10 sec or less) before the link assessment and map update is complete.

The tool is simple to use with line-of-sight. For example, if the remote unit is aimed below the hub (elevation), the blue square appears below the target area.

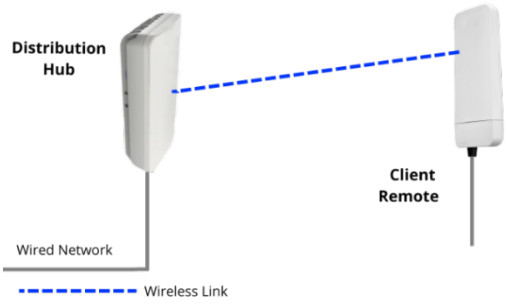
Remote aimed too far down!



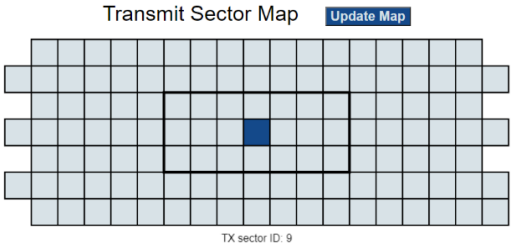
Field Installation Tool results



Adjust by tilting remote up.



Field Installation Tool results



Make adjustments for left to right (azimuth), in a similar way. Another way to think of adjustments: If the square is up and to the right of the target area on the map, stand behind the unit and adjust it down and to the left to put it into the target area.

Location – indicates the physical location where the device will be installed.

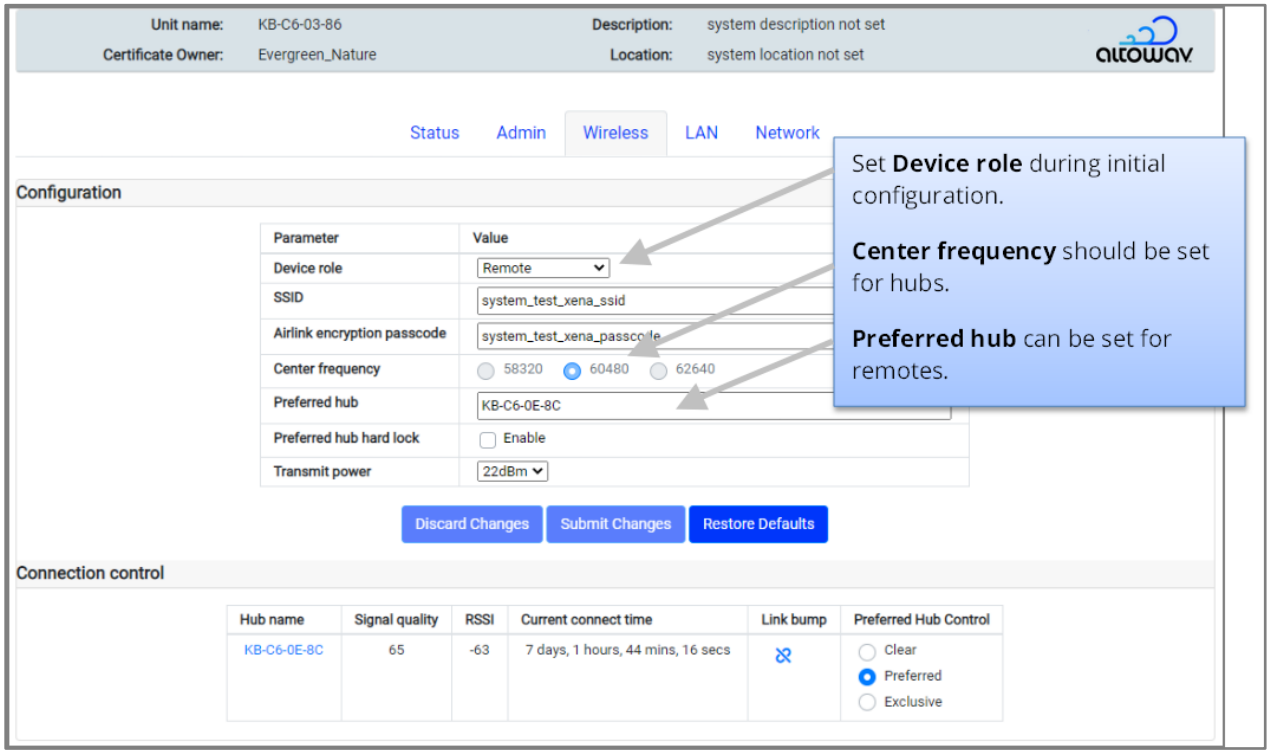
Description – may include orientation, function, role or other information about the device.

Link State LED - enables/disables the device's LED.

Activate event, **Event reporter server** and **Event reporter port** are legacy items, exposed in v3.18.x and later. Use SNMP messaging on Network tab instead.

7.3 Wireless

The Wireless tab includes settings which enable the K60 to communicate wirelessly and shows connection information and control tools.



Device roles include Remote, Hub, Root hub, and Remote seekroot.

SSID and **Airlink encryption passcode** default to **KBAccess**. The default is useful for quick deployment, but the values can be reset for additional security. Your organization's process will determine how and when to reset the SSID and passcode.

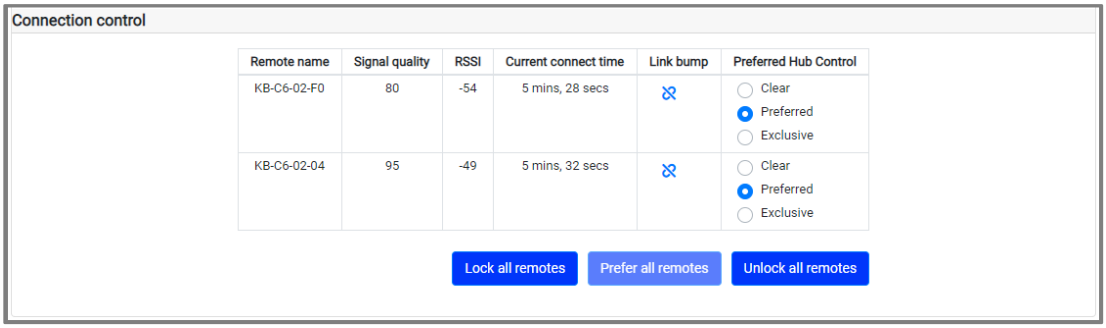
Transmit power defaults to the maximum power level, 40dBm. Use this setting to select lower power levels for one or both units on a link if full power is not required to maintain the best link quality. When transmit power level is set to less than maximum, a monitor ensures that the link is re-established. If not, the level automatically resets.

Preferred Hub can be set for remote units, to prevent them from connecting with any other hubs that may be in range. However, if the preferred hub becomes unavailable

the remote scans for an alternate hub and connects to it, to avoid a disruption in connectivity. **Preferred hub hard lock** can be enabled to prevent the remote from scanning for an alternate hub.

7.3.1 Connection Control

In the Connection control area of the Wireless tab, information about the connected hub is listed for remotes. For hubs, as shown below, the area lists information about the connected remotes and includes buttons to control preferred hub settings: **Clear, Preferred** or **Exclusive**. Exclusive means that the preferred hub hard lock has been enabled.



7.3.2 Using the Remote Seekroot Role

Configuring a unit with the remote seekroot role is done to prevent a remote from connecting to an island in the network, (a hub unit or cluster of hub and remote units with no connection to the root).

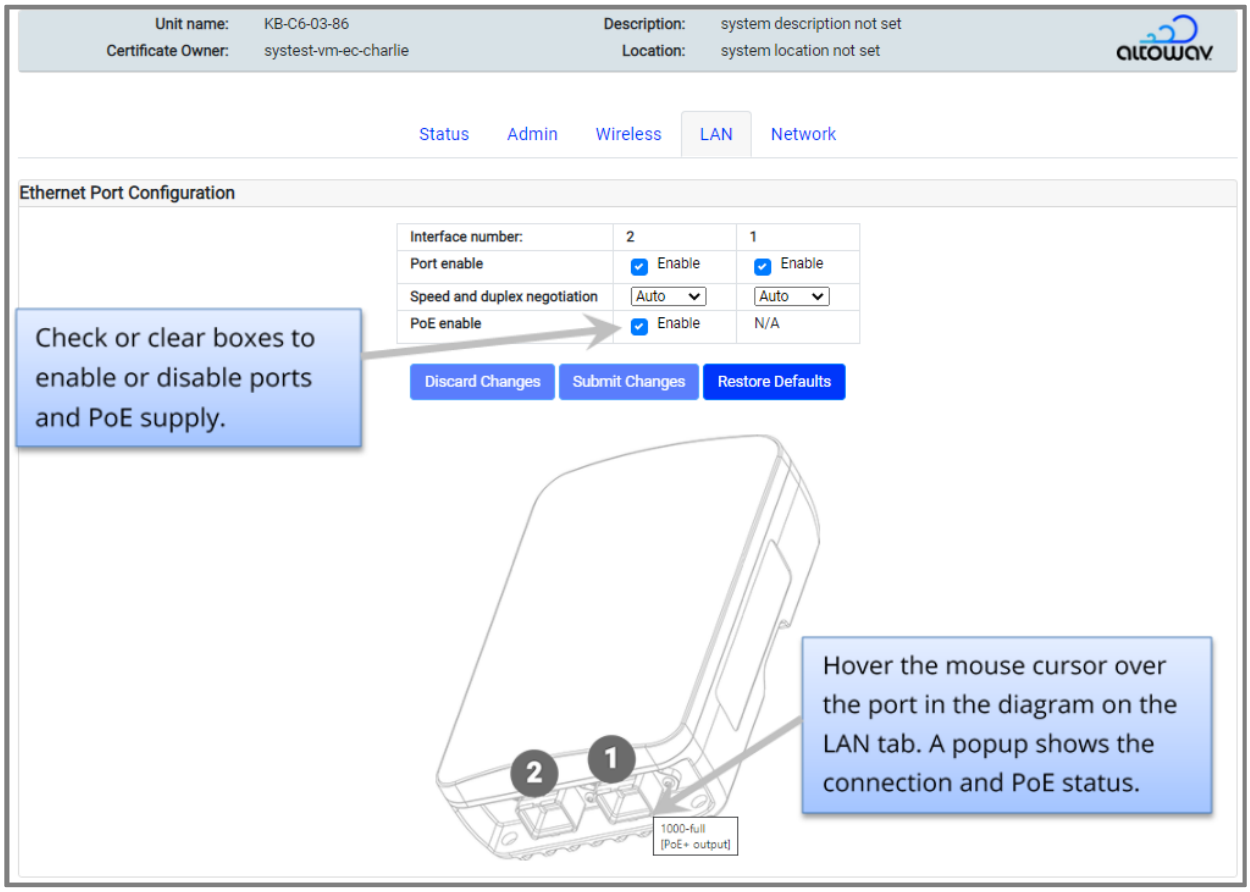
Note: The remote seekroot role must only be assigned when a root hub is defined on the network. Assigning a remote_seekroot role on a network without a root hub will cause the remote to periodically disconnect, scan and reconnect, causing an intermittent disruption that is difficult to troubleshoot.

A unit assigned the remote seekroot role will scan for a hub within range, connect and then search for a path to the root. If a path to the root is not found, the remote seekroot unit will connect to a different hub and attempt to find a path to the root again. After a path to the root is found, the units remain connected. This root seeking behavior ensures that the remote does not connect to an island.

A remote will always connect to its configured preferred hub, regardless of the seekroot status. However, if the preferred hub is unavailable the remote will attempt to connect to an alternate hub, following the seekroot behavior again.

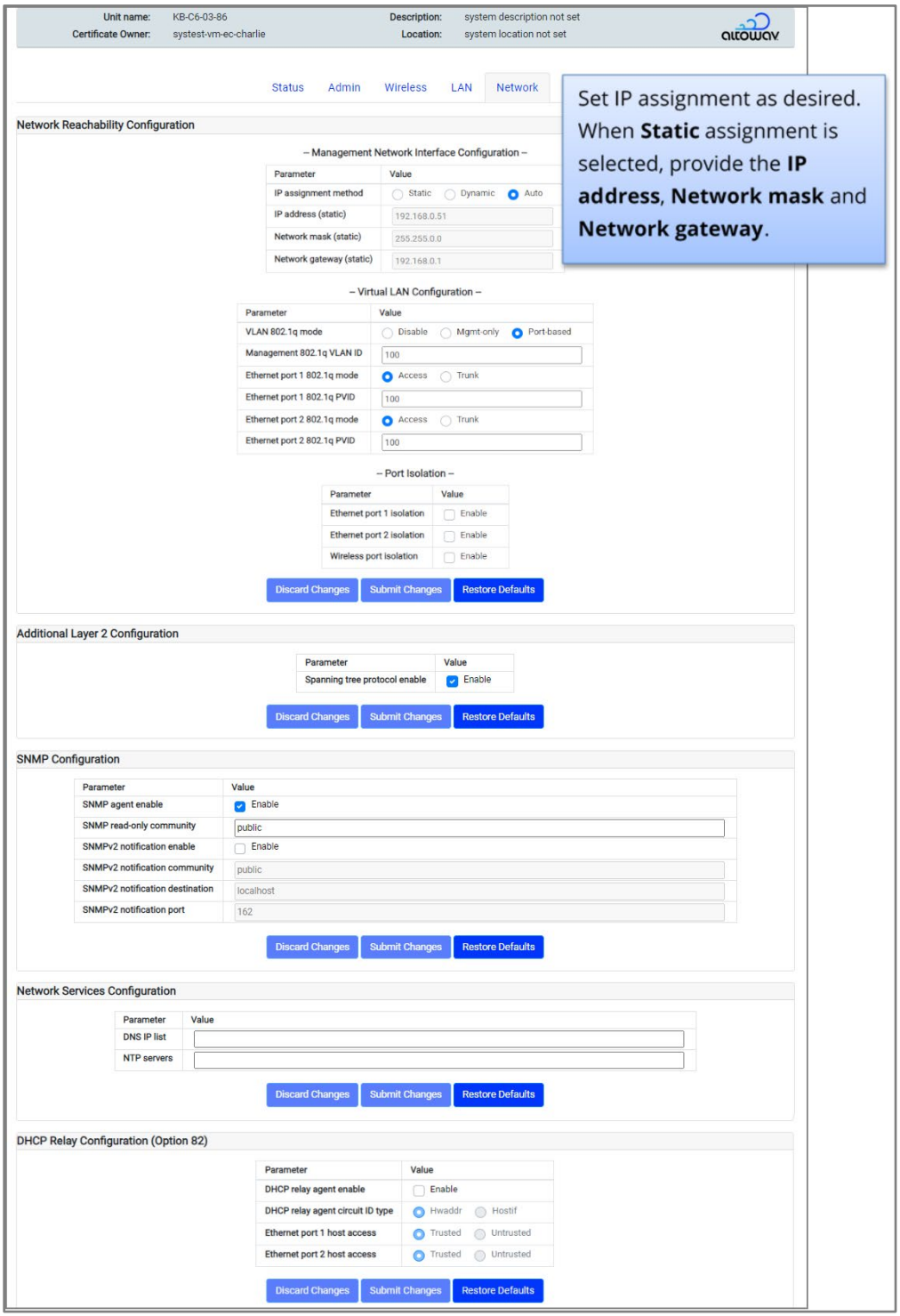
7.4 LAN

The LAN tab displays information about the current LAN connections to the unit.



7.5 Network

The Network tab offers settings for Network Interfaces, VLAN configuration and Port Isolation, as well as additional Layer 2, SNMP, and Network Services Configuration.



The following network settings default to the values shown, in order to streamline deployments. However, to optimize data-plane performance after deployment, set Management VLAN ID and Ethernet PVIDs to different VLANS or set VLAN mode to something other than port-based. Initial default VLAN settings:

- VLAN 802.1q mode: **Port-based**.
- Management VLAN ID: **100**.
- Ethernet port 802.1q mode: **Access** (all Ethernet ports).
- PVID: **100** (all Ethernet ports) .

8 Troubleshooting

8.1 How to Find the Original IP Address of the Unit

When direct access to a unit is needed after a factory reset or for direct configuration of a new unit, the IP address is required.

All units are shipped with an original IP address which follows the IPv4 pattern of 169.254.#.#, where the last two octets are randomized. The units have a temporary label listing the units' IP and MAC address. Keep this information in your records.

If the IP address is unavailable, go to support.altowav.com for help obtaining the original IP address, using the Serial Number on the unit's permanent label.

8.2 Factory Reset Instructions

The easiest way to reset to factory defaults is using the **Restore Factory Defaults** button on the Admin tab of the WebUI or the equivalent CLI command.

If you cannot access the WebUI or CLI because of a lost password, incorrect VLAN configuration or the IP address has been changed to an unknown value, you can use a reset cable as shown in the instructions below. Instructions for making a reset cable follow the reset instructions.

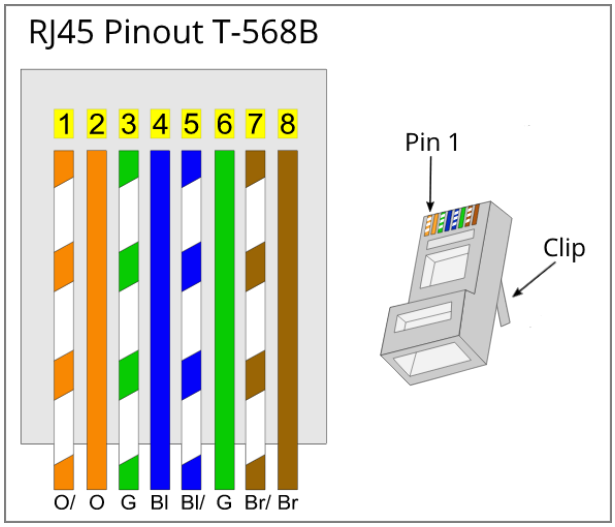
Note: Factory reset returns the unit's login to the default: "kwikbit". Factory reset also returns the IP address of the unit back to the original IP address. How to find the original IP address.

To reset the device to factory defaults:

1. Disconnect power by removing the connector in Port 1.
2. Insert the reset cable into Ethernet Port 2.
3. Reconnect power to Port 1. During power-up, observe the LED.
4. The red and green repeating sequence indicates the K60 is resetting:
    repeating.
5. Once the repeating LED sequence completes, remove the reset cable.
6. The device is now operating at factory default settings.

To make a reset cable from an unused Ethernet cable:

1. Cut an easy to manage length, typically 12” or less, from an Ethernet cable, leaving the RJ45 plug on one end.
2. Remove the outer insulation from the cut end of the cable and separate the wires for pin 1 and 2. (In most cases for straight-through T568B pinout wiring this is typically the orange/white and orange pair.)



3. Short out the pin 1 and pin 2 pair of wires by peeling the insulation and twisting them together. Leave the rest of the wires open.
4. Remove the locking tab from the plug, but leave the plug intact. This will make it easier to insert and remove the plug from the unit. The reset cable is ready to use.

9 Appendices

9.1 Acronyms

BPSK	Biphase Shift Keying
DHCP	Dynamic Host Configuration Protocol
EIRP	Equivalent isotropically radiated power
EMC	Electromagnetic Compatibility
ESD	Electrostatic Discharge
FCC	Federal Communications Commission
Gbps	Gigabits per second
GHz	Gigahertz
IEEE	Institute of Electrical and Electronics Engineers
ISED	Innovation, Science and Economic Development, Canada
L2	Layer 2
LAN	Local Area Network
LED	Light Emitting Diode
LOS	Line-of-Sight
MAC	Media Access Control
MCS	Modulation and Coding Scheme
MHz	Megahertz
PtMP	Point-to-Multipoint
PtP	Point-to-Point
QPSK	Quadrature Phase Shift Keying
RF	Radio Frequency
RSTP	Rapid Spanning Tree Protocol
SNMP	Simple Network Management Protocol
SSID	Service Set Identifier
TDD	Time Division Duplexing
VLAN	Virtual Local Area Network
WebUI	Web User Interface

9.2 Terms

Cat 5, Cat 5e network connection – Ethernet cable. A standardized twisted pair cable for up to 100 MHz over 100 m (328 ft).

Cat 6 network connection – Ethernet cable. A standardized twisted pair cable for up to 250 MHz. Cat 6 is backward compatible with Cat 5/5e cable standards.

Hub – A device role in an Altowav network. In this role, the device is wired to the network at its site, and connects wirelessly to one or more remote devices. In the tree topology, hubs are used at branching sites in the network and at the root.

Island – A hub unit or cluster of hub and remote units with no connection to the root.

Remote – A device role in the Altowav network. Must be connected to a hub. In the tree topology: a remote may be on a leaf in the tree, or may be where the tree branches out (a site with a remote and one or more hubs).

Remote seekroot – A device role in the Altowav network. Note: only used where a root hub has been defined. The remote seekroot functions as a remote, but operates with a root seeking behavior when scanning for and connecting to hubs. After connecting to a hub, this type of remote will search for a path to the root hub. If none is found, it disconnects and scans for another hub. This behavior prevents the unit from retaining a connection to an island in the network that cannot reach the root.

Roles – Specifies how the selected device will be used. Altowav device roles are remote, hub, root hub and remote seekroot.

Root hub – A device role in the Altowav network. The root hub has a wired connection to the LAN.

Site – The location of a Radio Frequency device (unit) or devices in a Altowav network. Each site typically has up to 4 units. Each site must have one unit assigned a Remote role. Additional units take on Hub roles. See also 60 GHz System.

9.3 Regulatory Statements

9.3.1 FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. A minimum of 30 centimeters (12 inches) of separation between the K60 and all persons shall be maintained.

9.3.2 FCC Regulatory Statement

Any changes or modifications not expressly approved by Altowav Inc. 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: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device is not to be operated on aircraft except for the conditions listed in 47 CFR §15.255 (b).

9.3.3 ISED Industry Canada Radiation Exposure Statement

NOTE: IC Radiation Exposure Statement: This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. A minimum of 30 centimeters of separation between the K60 and all persons shall be maintained.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Un minimum de 30 centimètres de séparation entre le K60 et toutes les personnes doit être maintenu.

9.3.4 ISED Industry Canada Regulatory Statement

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

This device is not to be operated on aircraft except for the conditions listed in ISED RSS-210 Annex J.1.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'encompromettre le fonctionnement.

Cet appareil ne doit pas être utilisé à bord d'un avion, sauf dans les conditions énumérées dans ISDE RSS-210, annexe J.1.