# QUANTIFIED**AG**®

**Gateway User Manual**

## Support

Thank you for selecting Quantified Ag® products.
For product updates and support, visit http://support.quantifiedag.com.
Phone : (844) 414-2691.

## Trademarks

## Safety and Regulatory Information

Read all of the instructions listed here and/or in the user manual before you operate this device. Give particular attention to all safety precautions. Retain the instructions for future reference.

This device must be installed and used in strict accordance with the manufacturer's instructions, as described in the user documentation that is included with the device.

The device is not to be made available to or marketed to the general public. It is sold through dealers or on a business-to-business basis. The device requires installation by technicians who are licensed and trained by the manufacturer. The device is intended to be used in a commercial environment only, such as a large cattle ranch.

Comply with all warning and caution statements in the instructions. Observe all warning and caution symbols that are affixed to this device.

To prevent fire or shock hazard, do not expose this device to rain or moisture. The device must not be exposed to dripping or splashing. Do not place objects filled with liquids, such as vases or bottles, on the device.

This device was qualified under test conditions that included the use of the supplied cables between system components. To ensure regulatory and safety compliance, use only the provided power and interface cables, and install them properly.

Different types of cord sets may be used for connections to the main supply circuit. Use only a main line cord that complies with all applicable device safety requirements of the country of use.

Installation of this device must be in accordance with national wiring codes and conform to local regulations.

Do not overload outlets or extension cords, as this can lead to risk of fire or electric shock. Overloaded AC outlets, extension cords, frayed power cords, damaged or cracked wire insulation, and broken plugs are dangerous. They may result in a shock or fire hazard.

Route power supply cords so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cords where they are attached to plugs and convenience receptacles, and examine their points of exit from the device.

Place this device in a location that is close enough to an electrical outlet to accommodate the length of the power cord.

Place the device as to allow for easy access when disconnecting the device's power cord from the AC wall outlet. Do not connect the plug into an extension cord, receptacle, or other outlet unless the plug can be fully inserted, with no part of the blades exposed.

There are no user controls located in this device. Do not remove any connections. Do not perform any servicing other than that contained in the installation and troubleshooting instructions. Refer all servicing to qualified service personnel.

## FCC Statements

FCC 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 environment. 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. Potential harmful interference to radio or television reception can be determined by turning the device off and on. If this equipment does cause such interference, the user is encouraged to make attempts to correct the interference by taking one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the device 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

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.

**FCC CAUTION:** Any changes or modifications not expressly approved by Quantified Ag for compliance could void the user's authority to operate the equipment.

**FCC RADIATION EXPOSURE STATEMENT**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. To comply with the FCC RF exposure compliance requirements, the separation distance between the antenna and a person's body (including hands, wrists, feet and ankles) must be at least 75 cm (29.53 inches).

This transmitter must not be co-located, or operating in conjunction with, any other antenna or transmitter.

The availability of specific channels and/or operational frequency bands are country-dependent,and are firmware programmed at the factory to match the intended destinations. The firmware setting is not accessible by the end user.

**RESTRICTIONS ON THE USE OF WIRELESS DEVICES**

In some situations or environments, the use of wireless devices may be restricted by the proprietor of the building or responsible representatives of the organization. For example, using wireless equipment in any environment where the risk of interference with other devices or services is perceived or identified as harmful.

If you are uncertain as to the applicable policy for the use of wireless equipment in a specific organization or environment, you are encouraged to ask for authorization to use the device prior to turning on the equipment.

The manufacturer is not responsible for any radio or television interference caused by unauthorized modification of the devices included with this product, or the substitution or attachment of connecting cables and equipment, other than that specified by the manufacturer. Correction of the interference caused by such unauthorized modification, substitution, or attachment is the responsibility of the user.

The manufacturer and its authorized resellers or distributors are not liable for any damage or violation of government regulations that may arise from failing to comply with these guidelines.

**Table of Contents**

# OVERVIEW

The Quantified Ag Gateway receives data packets from the Quantified Ag ear tags and forwards that data to a server.  The data is then processes and alerts are generated based on that processes data.  The gateway can send an alert back to the ear tag and turn on an LED that can flash at three different rates.  The ear tags and gateway operate in the 902-928 MHz ISM band.  For upstream data (ear tag to gateway) there are 64 channels at 125kHz bandwidth.  Channel 0 starts at 902.3 MHz and incrementing linearly by 200 kHz to channel 63 at 914.9 MHz. The 64 channels are divided into 8 channel blocks.  The gateway will initially be set up to receive in one of these channel blocks.  Within the block the ear tag transmitter will hop pseudo randomly among these 8 concurrent channels.  The minimum time between transmissions will be 60 minutes.

For downstream data (gateway to eartag) there are 8 channels numbered 0 to 7 starting at 923.3 MHz and incrementing linearly by 600 kHz to 927.5 MHz.

Contents
Quantified Ag Gateway
GPS Antenna
Lightning arrestors
Coax cables 3
Network cable

| Category | Description |
|---|---|
| Weight | TBD |
| Dimensions | 15.104" x 11.472" x 5.57" (383.6 mm x 291.4 mm x 141.5mm) |
| Operating Voltage | 115VAC nominal 60Hz |
| Operating and Storage Environment | -25°C to +70°C |
| Relative Humidity | 20% to 90% non-condensing |

# Mounting

It is recommended that the gateway be mounted in an area that has access to 115V power, your network infrastructure and access for mounting the antennas outside.  Mount the gateway before making any of the external connections.  Mount the gateway to a flat, stable surface using the mounting holes provided.  Proper fasteners must be used in all four 0.320" diameter-mounting holes to secure the enclosure.  The external mounting holes are spaced 8.031" horizontally and 12.756" vertically.  It is recommended that the gateway box be secured with a paddle lock.  The lock shackle diameter can be up to 25/64" (9.9 mm) diameter.  Observe all regulatory agency procedures when installing the gateway.

Ensure the Gateway is mount in either an upright position, with the antenna connector facing upwards, or laying flat on its back, with the logo facing upwards.

The Gateway must be professionally installed.  Ensure that the surge suppressor is mounted in a location that is not accessible without the use of a tool, such as a ladder or screwdriver.  This could include mounting on a pole, at least 10 ft high, on top of a residential or storage structure or inside of a locked cabinet.
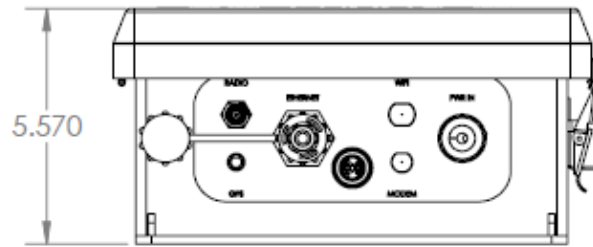
Figure 1.  Front View of Gateway
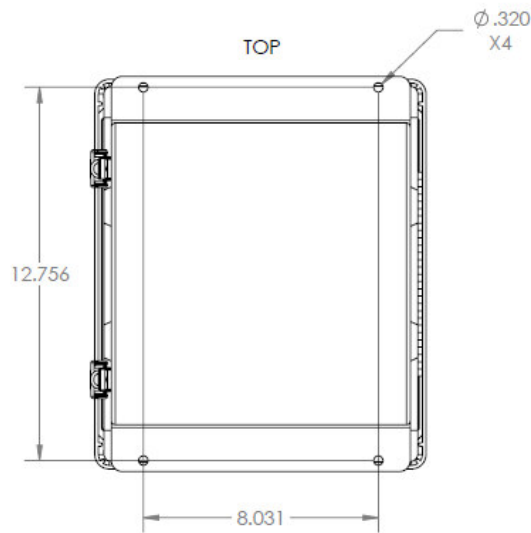
Figure 2.  Bottom View of Gateway.

Figure 3.  Back View of Gateway.

# Connections

A - Data Radio Antenna Connector Reverse Polarity TNC
B - GPS Antenna Connector SMA
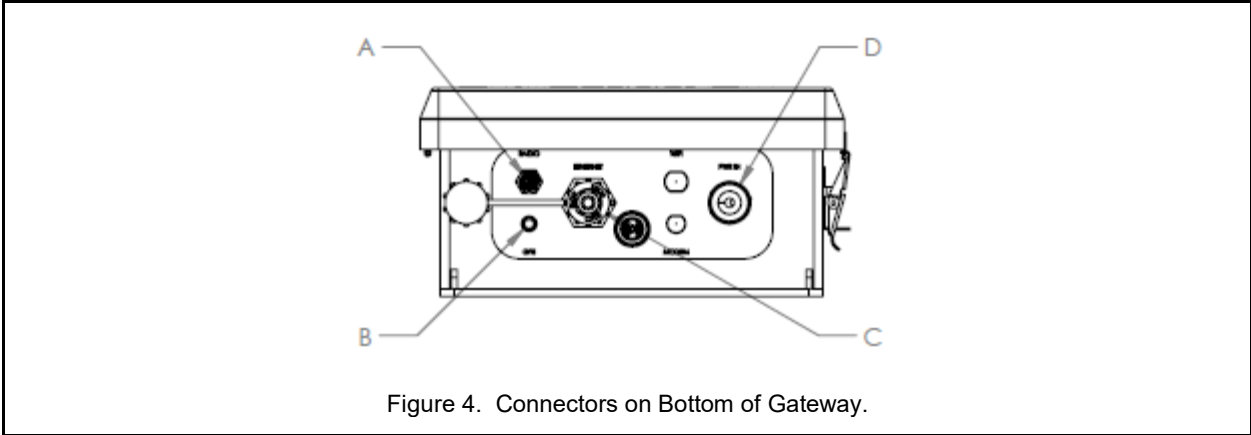C - Ethernet Connector RJ45
D - Power Cord NEMA 5-15-P

Figure 4.  Connectors on Bottom of Gateway.

# Antenna GPS

The GPS antenna can be connected to the gateway using the provided SMA to SMA cable.  Connect one end of the SMA cable to the gateway SMA jack and the other end is connected to the lightning arrestor with the SMA jacks.  The GPS active patch antenna is then connected to the lightning arrestor.  The active patch antenna has a magnetic mount and should be mounted where it can receive the GPS signal from the GPS satellites.  The GPS module is highly sensitive and able to receive the GPS satellite signal from within many structures.  Multi-Story or metal structures may block the GPS signals and the antenna will need to be located where it can receive the signal.  One option is next to a window.  The antenna can also be mounted outside the building.

| Active patch antenna with magnetic base | |
|---|---|
| Size | 1.5" x 1.89" x 0.51" (38.1 mm x 48 mm x 12.9 mm) |
| Weight | 0.1 lb (43 grams) |
| Noise Figure | 1.5 dB |
| VSWR | 2.0 : 1 |
| Voltage | 2.7 - 6.0 V |
| Cable | RG174, 196.8" (5 m), SMA plug |
| Temperature | -40°C to +85°C |

# Antenna Data Radio

The antenna must be professionally installed on a fixed-mounted permanent outdoor structure.  There are three antenna options for the data radio.  The mounting location and the coverage area will determine which antenna will work best for the situation.  The three options are:

| Antenna Type | Manufacturer | Part Number | Description |
|---|---|---|---|
| Omni | Laird | FG9026 | Omni-directional 8 dBi N Jack |
| Sector | L-Com | HG913HSP-120 | H-Pol 13 dBi 120° N Jack |

The lightning arrestor with the Type N jacks should be installed between the data radio and the antenna. The cable with the reverse polarity TNC plug and the Type N plug is used to connect the data radio to the lighting arrestor.  The cable with the Type N to Type N plug is used to connect the lightning arrestor to the antenna.

# Ethernet

Connect the ethernet port on the gateway to a computer.  The computer will be used to set the network configuration.  Once the network configuration is complete, connect the ethernet port to an open port on your network.

# Power

The Quantified Ag gateway can be powered from a standard 120V 60Hz outlet.  Connect the power cord to a standard outlet and the unit will begin to boot up.  You should see the power LED illuminated on the PCB.

# Network Settings

The Quantified Ag gateway requires connection to a local area network (LAN).  By default a static IP address is assigned to the gateway.  This IP address can be used to access the configuration web pages. The default IP address is 192.168.1.20.  To access the configuration pages open a web browser and enter the default IP address.  The computer you use to access the gateway must be on the same subnet.  Once you have accessed the network configuration webpage you can make changes to the to match your network's settings.  See Figure 1.
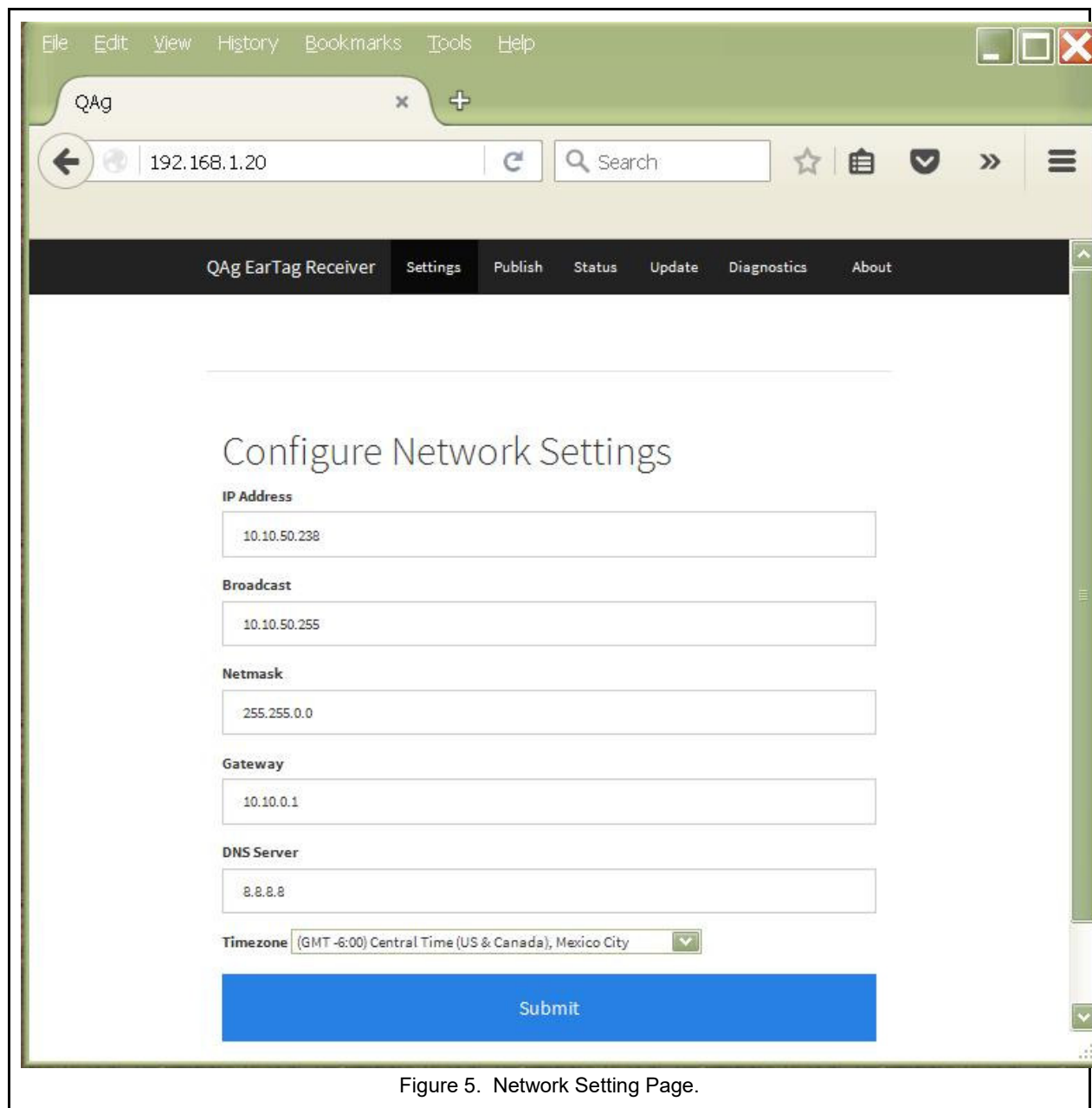
Figure 5.  Network Setting Page.