

# QD2040b

Ubiquity Cloud Site Gateway

The QD2040b Ubiquity Cloud Site Gateway connects the site controller network with the Ubiquity Cloud™ server.



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## Introduction

Congratulations on choosing the TCS QD2040b! The QD2040b is a compact, versatile network controller that seamlessly connects with the Ubiquity Cloud™ via TCSbus or Modbus.

This manual includes all the information you will need to properly install and set up your QD2040b. As most units come preconfigured, you will most likely only need to read the Installation section of this manual and you can skip the Configuration section. However, some customers do order their units without being configured beforehand; for those customers, we include the comprehensive Configuration section which contains essential information they will need to set up the unit.

If you have any questions regarding your QD2040b or your network, do not hesitate to contact TCS Technical Support at 800-288-9383, ext. 2.

## Material List

- QD2040b Ubiquity Cloud Site Gateway
- External Power Supply
- Wall Mounting Bracket

## Mounting

The QD2040b is designed to be hung on a wall via the mounting screw holes in each unit. It may also be set on a shelf or table. **Do not allow the mounting screws to touch the circuit board inside the enclosure.**

When selecting a location to mount the QD2040b, be sure to allow space for cable connections. Locate the QD2040b away from excessive dust, heat sources, moisture or direct sunlight. The ideal environment is a server room. The temperature of the room should not exceed 77°F (25°C); good ventilation is mandatory.

## Input Connections

Refer to the "QD2040b Power and Communication Connections Diagram" on page 4 for the following input connections:

**Power:** Attach the included power supply to the back of the QD2040b and insert the power plug into a 120 VAC socket. Upon connection the unit should power up automatically. If it does not, press the Power button once.

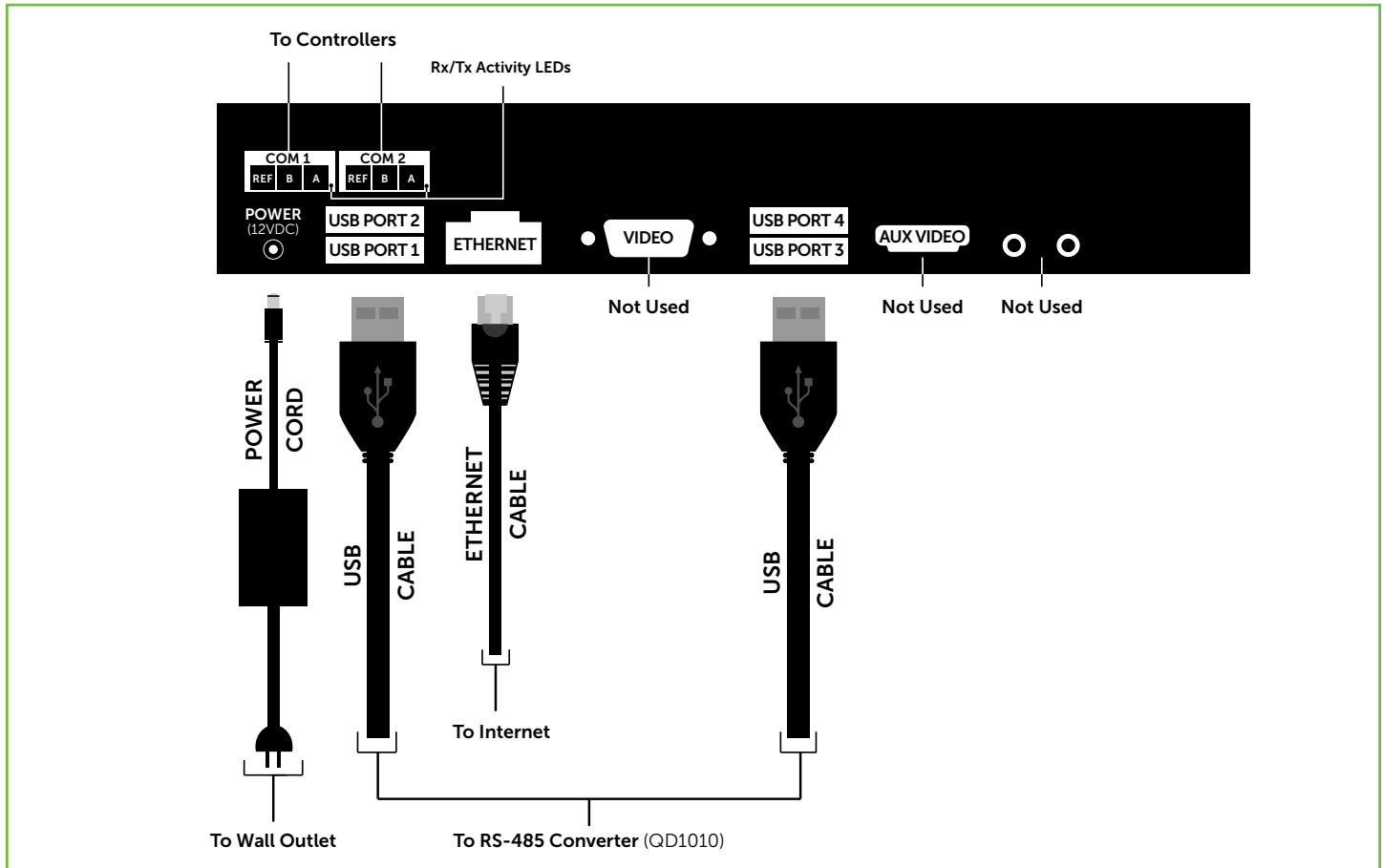
**Ethernet:** Connect an Ethernet cable to the Ethernet LAN outlet. If you are using a cellular modem, connect the Ethernet cable to the Ethernet port on the Cellular Modem.

**RS-485 Network:** Connect an RS-485 network to one of the COM ports.

**USB PORT 1-4 (Optional):** Connect an RS-485 network via a USB cable to an RS-485 converter (QD1010), or connect a TCS ZigBee network via a wireless gateway (QW1010).

**NOTE:** The remaining connections on the QD2040b are unused and should not be plugged in.

## QD2040b Power and Communication Connections Diagram



Power and Communication Connections

## RS-485 Network Wiring

All controllers connected to the network must be programmed with the same communication baud rate as well as a unique communication address from 0 to 255, excluding 248. On controllers with displays, this can be done from the controller using its keypad and display, by using TCS Insight software, or by calling TCS Technical Support (800-288-9383, ext. 2). TCS Technical Support can access the QD2040b online and change the address of a controller.

Use 22 AWG, twisted shielded two-conductor or three-conductor cable for network wiring. Network wiring should start at one controller and go to the next and then go to the next, until the final controller is reached. Wiring is such that all "A" wires are connected to "A" wires, all "B" wires are connected to "B" wires, and all "REF" wires are connected to "REF" wires.

**NOTE:** "A" refers to the negative (-) RS-485 connection and "B" refers to the positive (+) RS-485 connection.

A 120  $\Omega$  terminating resistor should be placed at each of the two ends of the network directly across the "A" and "B" wires. If the QD2040b will be at one end of the network, hard-wire a 120  $\Omega$  terminating resistor across the "A" and "B" terminals of the QD2040b (See "Three-Wire Network Wiring" on page 5). If the QD2040b will be in the middle of the network, do not wire in the terminating resistor on the QD2040b terminal block.

Connect one end (ideally the furthest end from the QD2040b) of the shield wire of the network wiring to earth ground.

**NOTE:** If you encounter time-out errors, contact TCS Technical Support (800-288-9383, ext. 2).

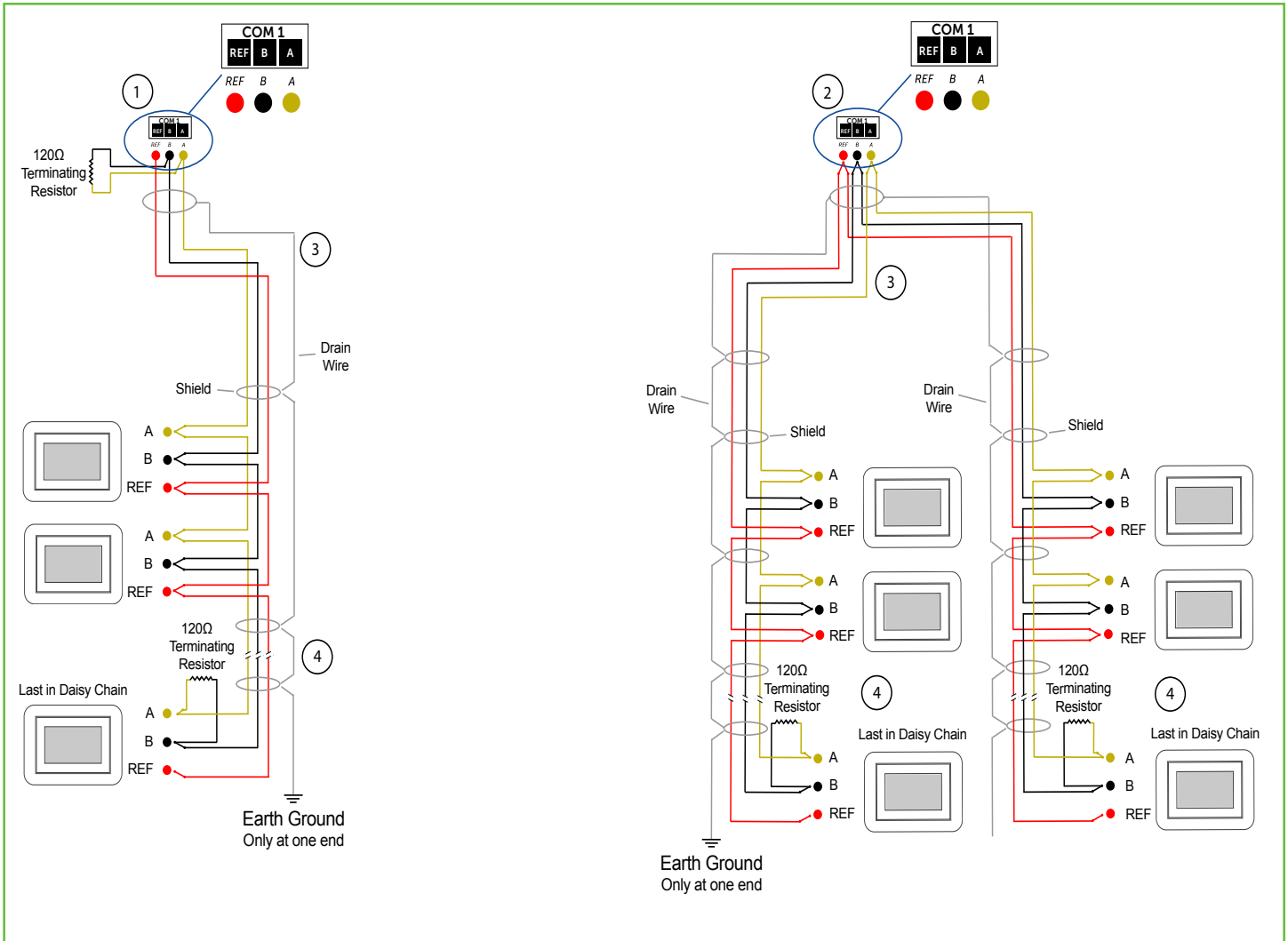
# Installation

## Three-Wire Network Wiring

Follow this wiring diagram for all three-wire systems (this is common).

**NOTES:** In the middle of the network, all network wiring shields should be twisted together and taped off to prevent accidental grounding. More than one ground on the network wiring can result in communication failure.

A maximum of two terminating resistors can be used.



Three-Wire Diagram

- ① QD2040b at end of the network.
- ② QD2040b in the middle of the network.
- ③ Shielded, twisted three-conductor communications wiring with one end earth grounded. (120 Ω balancing resistors provided.)
- ④ Shielded, twisted three-conductor communications wiring with one end earth grounded. (120 Ω balancing resistors provided.)

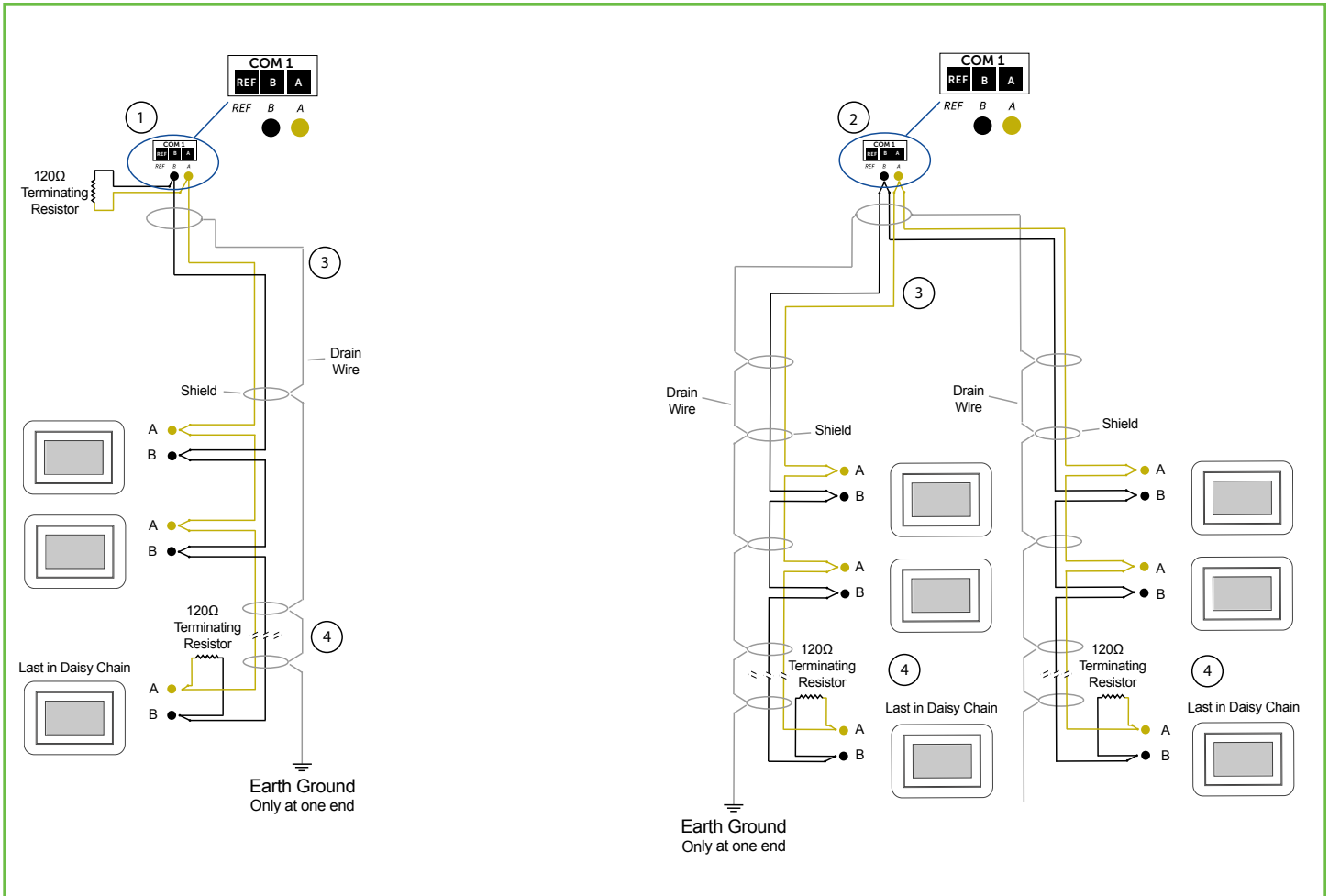
### NOTES:

1. If using more than 64 controllers, use the second RS-485 port or additional QD1010 adapters.
2. Each controller must use the same baud rate and be assigned a unique address.

# Installation

## Two-Wire Network Wiring

Follow this wiring diagram for two-wire (Modbus) wiring systems (this is not common).



Two-wire diagram

- ① QD2040b at end of the network.
- ② QD2040b in the middle of the network.

- ③ Shielded, twisted two-conductor communications wiring with one end earth grounded. (120 Ω balancing resistors provided.)
- ④ Shielded, twisted two-conductor communications wiring with one end earth grounded. (120 Ω balancing resistors provided.)

### NOTES:

1. If using more than 64 controllers, use the second RS-485 port or additional QD1010 adapters.
2. Each controller must use the same baud rate and be assigned a unique address.

## Startup

1. Verify all RS-485 connections from the controller network to the QD2040b are complete.
2. Verify that all 24V power wiring to the controller network has been completed; all controllers are powered on and each controller has been programmed with a unique RS-485 address.
3. Connect one end of the Ethernet cable to the Ethernet port on the QD2040b, and the other end to the network port provided by the customer, or to a cell modem (if utilized).
4. Connect the power source to the QD2040b and apply power.
5. If your QD2040b was preconfigured by the TCS factory or another user, it will automatically go online and contact the Ubiquity Cloud. However, you must call TCS Technical Support (800-288-9383 ext. 2) to verify connection and activate the unit.
6. If your QD2040b was not ordered preconfigured, you can configure it at this time. See the Configuration Section on page 9.

The unit is now ready for operation.

## Troubleshooting

### Power LED Does Not Light Up

Be sure that the 12V, 5A tip positive power supply module included with the QD2040b is plugged in to a 120VAC outlet that has power.

### No Communications with Controllers on the Network

Make sure the baud rate selection for the QD2040b is set to match the baud rate of all the controllers on each port network (the default communication speed of the serial bus is 9600). All controllers on the network must have a unique address, excluding the reserved address '248'. All controllers on any given port must be of the same type, whether Modbus or TCSbus. Also, each port must be configured for the appropriate type of communication.

Check the network wiring, making sure to follow polarity; the wire that goes to A must go to A in all devices, as well as the wire that goes to B and REF.

### No LAN Link to the Internet

Verify the network cable is connected correctly and make sure the LEDs next to the Ethernet jack are properly illuminated. For example, a solid green LED at the RJ-45 LAN connector usually indicates that the QD2040b is either connected or receiving a signal. If the green light is flashing, this is an indication of data being sent or received.

If there are no lights, the QD2040b may not be connected properly, or may not be receiving a signal from the network. If, after checking the connections, the LED indicators are still off, the network adapter, port, or cable may be defective.

If there are lights but there is still no communication, this could be because the network communication is not set properly or there is a bad firewall proxy setting. Contact your IT department for support, or contact TCS Technical Support (800-288-9383, ext. 2) for assistance.

## No Communication with RS-485 Ports (COM 1 and 2), Ubiquity Time-out, or No Data

Each port on the QD2040b has the proper biasing resistors as specified by TCSbus and Modbus standards. Each port is also optically isolated, which cleans up the signal and also protects the unit from taking stray voltage off the RS-485 lines.

A set of LEDs on each of the RS-485 ports on the QD2040b allow the building occupant to view operational status of the serial communication integrated board:

- GREEN – blinking indicates transmitting (Tx)
- YELLOW – blinking indicates receiving (Rx)

If neither of these lights are functioning, there could be a bad connection, a bad cable, a bad ground, or a bad component. Contact TCS Technical Support (800-288-9383, ext. 2) for assistance.



**IMPORTANT:** If you ordered your QD2040b preconfigured by TCS, which is typical, you can skip this section! The Configuration section is for customers who did not order their QD2040b preconfigured by TCS, or who need to reconfigure their unit.

## Gateway Configuration

The unit is preconfigured with a default login and password. It is the customer's responsibility to configure a custom login and password. Contact TCS Technical Support (800-288-9383, ext. 2) for more information on how to set up credentials.

Once you have made a connection and have logged in (see "Appendix: Monitor and Keyboard" on page 18) you are able to configure the operation of the unit by selecting the proper parameters for your application.

**If you are unable to access the configuration page, contact TCS Technical Support (800-288-9383, ext. 2) for assistance.**

All Ubiquity Cloud services are accessed by logging into the Ubiquity Cloud Server ([www.ubiquitysystems.net](http://www.ubiquitysystems.net)), not by using this configuration page. This page is only used for setting up local network communications.

## Installation Information

The Hardware Identity section contains unit-related information used to uniquely identify the unit when it is being serviced in the field. The Software Status section contains software/application-related information that identifies the level of patching of the unit. The Site Time is used by the local network and the QD2040b until the Ubiquity Cloud Server performs a time synchronization with the site.

**NOTE:** Be sure to set the correct time zone so that the site will correctly adjust the time during future time synchronizations with Ubiquity Cloud.

Once you are finished entering information in this section, click the Update Installation Info button.

Installation Information			
Hardware Identity			
Product UUID:	4ac98e31-4b80-e311-af30-4437e6cc981b		
MAC:	00224DAEF196	Serial Number:	0496003610000000
Hardware Version:	10	Hardware Revision:	695
Model:	QD2040	Submodel:	QD2040B
Software Status			
System Checksum:	7744aab1d8bc128e2f1ec8b58718f1552e6fbf5cfe3a019e731267f6af88deaf		
OS:	qdos7		
Application Version:	07.06.01	Application Revision:	070601_rc9
Application Build Date:	2021/03/12 17:56:26 GMT+0000		
Site Time			
Wait up to two minutes for the values to change.			
Current Time:	10:41	<input checked="" type="radio"/> AM <input type="radio"/> PM	March 16, 2021 <input type="button" value="Sync to PC Time"/>
Timezone:	Alaska		
<input type="button" value="Update Installation Info"/>			

Installation Information

## Application Information

### Application Information – Overview

This section contains settings which define how the QD2040b interacts with the controller network, and how it communicates the data to the Ubiquity Cloud Server.

### Application Options

You must select a Network Polling Cycle Time for the QD2040b. This is the time interval that the unit will poll the entire network of controllers on all ports. You must select whether to allow caching the host name via DNS. Typically, this is left unchecked. You must select how often the QD2040b connects to the Ubiquity Cloud Server. Typically, this is set to “Always On.”

- **Network Polling Cycle Time:** (Default 1 minute) How often the RS-485 network is polled
- **Connection Times:** (Default Always On) The interval when the unit posts data to the Ubiquity Cloud

### Application Information

#### Application Options

Controller Network Polling Cycle: 1 Minute

Connection Times:  Always On  Never On  Specify Times

#### RS485 Network -- Port Configuration

Autodetection of Controllers on All Ports:  Enabled

All Ports are Automatically Detected Once Hardware is Installed

Device <b>C-PORT1-0</b>	Port 1 (addr 0 to 255)		
Protocol Support	TCS	Baud Rate	9600
Time-Out Period	200 milliseconds	Autodetection Range	0 to 255
Device <b>C-PORT2-0</b>	Port 2 (addr 256 to 511)		
Protocol Support	TCS	Baud Rate	9600
Time-Out Period	200 milliseconds	Autodetection Range	0 to 255
Device <b>U-PORT4-0</b>	Disabled		
Protocol Support	TCS	Baud Rate	9600
Time-Out Period	200 milliseconds	Autodetection Range	0 to 255

[Update Application Info](#)

## Application Information

### RS-485 Network - Port Configuration

Both RS-485 communication (COM) ports are configured using this interface. While the COM ports are automatically detected once the QD2040b is powered on, each active port will need to be configured to ensure proper functioning of the network. Ports can be enabled or disabled from the drop-down menu as well.

**NOTE:** Secure Sockets Layer (SSL) requires port 443 to be open.

**Protocol:** Select the communications protocol being used on each port. TCSbus is selected by default.

**Baud Rate:** This is the data transmission speed on the network. The Baud Rate must be the same selection for the port configuration as it is on every device communicating to that port.

**Time-out Period:** This is the number of milliseconds the port on the QD2040b will wait for a response from the network devices before determining that a device is not communicating, or has "timed out." Select the time-out period for each port. TCS recommends TCSbus and Modbus set at 200 ms for wired networks.

**Auto-detection Range:** (Default 0, 255) This is the lowest address to start polling and the highest address to stop polling during the auto-detected sequence.

## Communication Information

This section contains settings which control how the QD2040b connects through the Internet. All of these settings are determined by your local network administrator or IT department.

**Communication Information**

**Communication Options**

IP Address Allocation:  DHCP  Static IP

Central Server Location:  **Set Ubiquity Domain Name**

Special Options:  Disable TCP Window Scaling  Disable IPV6  Enable SSL

HostName:

**Proxy**

Enable Proxy Server Usage:  ▼

**Update Communication Info**

*Communication Options*

### Communication Options

The QD2040b supports both static IP and Dynamic Host Configuration Protocol (DHCP) IP address allocations. Enter the Ubiquity Cloud Server location (www.ubiquitysystems.net) by clicking the “Set Ubiquity Domain Name” button. Select whether to enable or disable special options. Enter host name if needed (typically left blank).

### Network

Select the desired IP allocation (DHCP addressing or static IP addressing). When using static IP addressing, it is necessary to enter the IP Address, Gateway, Subnet, DNS1 and DNS2 settings; these settings are established by the LAN/ WAN network administrator prior to installation. When utilizing DHCP addressing, the IP address settings are automatically assigned when communication is established.

### MTU Adjustments

Adjusting the MTU down may allow gateways to communicate with smaller TCP packet sizes. This may be useful if you are using cell modems not capable of passing a TCP packet with a size of 1500.

### Proxy

If a proxy is required, select Static Proxy from the drop-down menu and enter all the related details in the fields that appear. When you are finished entering information in this section, click the Update Communication Info button.

### Security Information

This section contains settings which control the security of the device within the QD2040b and whether it can be accessed through the web interface.

**If Secure Mode has been enabled and you need access, call TCS Technical Support (800-288-9383, ext. 2) for assistance.**

Here is where you change the default login credentials used to access the Configuration Page. TCS recommends changing these credentials. Once you are finished entering information in this section, click the Update Security Info button.

- **Lockdown Mode:** (Default Unchecked) When the option is checked it will disable all remote interfaces.
- **Secure Mode:** (Default Unchecked) When the option is checked it will disable the Web UI.
- **Password:** (Default NA) Password Change for admin account.

Security Information					
Application Security					
Lockdown Mode	<input type="checkbox"/>	Enable	Secure Mode	<input type="checkbox"/>	Enable
User	admin		Strong Password Example	Qv33n#!tt	
Password	<input type="text"/>		Retype Password	<input type="text"/>	

Update Security Info

Commissioning Tools

Security Information

## Commissioning Tools

You can access a separate page containing various commissioning tools by clicking the “Commissioning Tools” button at the bottom of the Security Information page. These tools provide you with access to managing the communication status of the QD2040b and the controller network connected to it.

### Commissioning Tools

#### Ubiquity Connection Status C

Status: **ESTABLISHED**      Timestamp: 1620157597

#### Controller View C

Port	State	Address	Controller Model	Communication Status	<input type="checkbox"/>
4	Confirmed	5	Dent 3037	COMMLOSS	<input type="checkbox"/>
4	Confirmed	6	Unknown	OK	<input type="checkbox"/>
3	Confirmed	1	Disconnect #2	OK	<input type="checkbox"/>
3	Confirmed	2	Unknown	OK	<input type="checkbox"/>
3	Confirmed	3	Unknown	OK	<input type="checkbox"/>
3	Confirmed	4	Unknown	OK	<input type="checkbox"/>
3	Confirmed	5	Unknown	OK	<input type="checkbox"/>
3	Confirmed	6	Unknown	OK	<input type="checkbox"/>
3	Confirmed	7	Unknown	OK	<input type="checkbox"/>
3	Confirmed	8	Unknown	OK	<input type="checkbox"/>
3	Confirmed	9	Unknown	OK	<input type="checkbox"/>
3	Confirmed	21	Unknown	OK	<input type="checkbox"/>
3	Confirmed	22	Unknown	OK	<input type="checkbox"/>
3	Confirmed	23	Unknown	OK	<input type="checkbox"/>
2	Confirmed	9	Network Room (Transfer Fan)	OK	<input type="checkbox"/>
2	Confirmed	108	2108	OK	<input type="checkbox"/>
2	Confirmed	252	133	OK	<input type="checkbox"/>
1	Confirmed	102	DTS 310	OK	<input type="checkbox"/>
1	Confirmed	218	218Q	OK	<input type="checkbox"/>

Remove Selected

#### System Commands

Reboot Unit      Check For Update

Gateway Configuration

## Commissioning Tools

### Ubiquity Cloud Connection Status

This section displays the status of the connection between the QD2040b and the Ubiquity Cloud Server. You have three options for the message that will appear here:

- 1. Error - No Route to Host:** The unit does not currently have an Ethernet connection.
- 2. Connected:** The unit is able to communicate to the Ubiquity Cloud Server BUT is not being matched up with a specific site. Typically this indicates that the site is not initialized on the Ubiquity Cloud Server side yet. Contact TCS Technical Support (800-288-9383, ext. 2) to assign or initialize the QD2040b to a site.
- 3. Established:** The unit is communicating with the Ubiquity Cloud Server AND is ready to go. All Ubiquity functions (monitoring, programming, alarming, etc.) should be available through the user interface at this point.

Clicking the green button with the arrow on it on the right side of the Ubiquity Connection Status title bar will refresh the connection status.

## Controller View

This section allows you to see what controllers have been found by the QD2040b and view each controller's address, model, and communication status. The state field will show AUTO-DETECTED initially when found by the unit and CONFIRMED once the controller has been recognized by the Ubiquity Cloud Server. This information allows the installer to verify that each controller has been found by the QD2040b and is communicating with the local network. Clicking the green Refresh button on the right side of the Controller View title bar will refresh each controller's status.

## System Commands

This section describes how to set up system flags for the QD2040b. "Reboot Unit" sets a flag which will shut off and restart the QD2040b within a five-minute cycle. "Check for Update" contacts the Ubiquity Cloud Server for any updates relevant to its particular model number and software version. Once the update has been downloaded, it is automatically applied, and the unit will reboot if necessary.

**NOTE:** The "Check for Update" command requires that the QD2040b have Internet access to retrieve the update patch.

## Command Line Interface

### Gateway Configuration

When you have connected to the gateway using a keyboard and monitor (See "Appendix: Monitor and Keyboard" on page 18), you will be able to configure the Gateway parameters for your site as needed. This is the only function that can be performed directly on the Gateway. All programming, scheduling, and other functionality must be performed via the Ubiquity Cloud application by logging into the Ubiquity Cloud ([www.ubiquitysystems.net](http://www.ubiquitysystems.net)) and entering your assigned username and password.

1. Once connected to the Gateway, you will be prompted to enter a username and password. If you do not have the default username and password for this unit, contact TCS Technical Support (800-288-9383 ext. 2) for assistance.
2. Once logged in with username and password, type in "tcssetup."
3. This will open the Command Line Interface (below).
4. Scroll to each field that you want to change by pressing the "Enter" button.
5. Type in new values on any field as needed.
6. Pressing "Enter" will save new value, or keep current value, and advance to the next field.
7. Once the final "Secure Mode" section is finalized, the unit will automatically apply the new configuration and update the unit within five minutes.

# Configuration

```
-----main: IP Address Allocation selection-----
IP Source (2):

  1. Static IP
  2. Dynamic IP (DHCP)

>1
-----main: get Static IP-----
Static IP (0.0.0.0):

>172.16.10.201
-----main: get Subnet Mask-----
Subnet Mask (0.0.0.0):

>255.255.255.0
-----main: get Gateway IP-----
Gateway IP (0.0.0.0):

>172.16.10.1
-----main: get Primary DNS Server IP-----
DNS Server IP 1 (0.0.0.0):

>172.16.10.1
-----main: get Secondary DNS Server IP-----
DNS Server IP 2 (0.0.0.0):

>8.8.8.8
-----main: Set MTU-----
MTU for eth0 (1500):

  1. 1500 - Ethernet/PPP
  2. 1420 - Typical Cell Modem with CHAP/PAP
  3. 1006 - Serial-Line IP (SLIP)
  4. 576 - ISDN
  5. 500-1500 - Custom

>1500
```

## Gateway Configuration

```
-----main: get Virtual IP Enable-----
Virtual Config IP Enable (1):

  1. Disable Virtual IP
  2. Enable Virtual IP

>
ERROR: unknown selection, no change
unknown selection, no change
-----main: get Ubiquity URL-----
Ubiquity URL (www.ubiquitysystems.net):

>www.ubiquitysystems.net
-----main: get SSL Communications Status-
QD2040 to Ubiquity SSL Enable (1):

  0. Disable SSL
  1. Enable SSL

>1
```

## Application Options



# Configuration

```
-----main: get proxy Usage-----
Proxy Usage (0):

  0. Disable Proxy
  1. Static Proxy
>1
-----main: get Proxy Server IP or Hostname-
Proxy Server ():

>proxy.tcsbasys.com
-----main: get Proxy Server Port Number----
Proxy Port (80):

>3128
-----main: get Proxy Authentication Type----
Proxy Authentication (0):

  0. No Authentication
  1. Normal Authentication
  2. NTLM Authentication
>0
```

## Proxy Options

```
-----main: get HostName-----
--note: If no hostname, type (disabled):
Host Name (test1):

>
nothing entered, no change
-----main: get IPV6 Status-----
Enabled IPV6 (0):

  0. Disable IPV6
  1. Enable IPV6
>
nothing entered, no change
-----main: get TCP Window Scaling Status-----
Window Scaling (0):

  0. Disable TCPWS
  1. Enable TCPWS
>
nothing entered, no change
-----main: get SecureMode and LockdownMode Status-----
Secure Mode Enabled (0) and Lockdown Mode (0) :

  0. Enable Normal Mode
  1. Disable Secure Mode
  2. Disable Lockdown Mode
  3. Enable Secure Mode
  4. Enable Lockdown Mode
>█
```

## Extended Application Options

## Appendix: Monitor and Keyboard

The QD2040b may require IP configuration management locally at the device, using a keyboard and monitor. If so, you will need:

1. Monitor with HDMI or VGA input connection (depending on your monitor, you may need a VGA-to-HDMI adapter).
2. HDMI-to-HDMI cable or VGA-to-VGA cable.
3. USB Keyboard.

### Connection Setup

#### Monitor and Cable

Connect the cable to the monitor to the QD2040b, matching up the corresponding ends (HDMI, VGA). Power on the monitor and switch to the proper input, based on the cable used.

#### Keyboard

Plug the USB cable into a free USB port on the QD2040b (see the "QD2040b Power and Communication Connections Diagram" on page 4). Test keyboard connectivity by pressing Caps Lock to see if the LED on the keyboard illuminates.

#### Reboot the Unit

Press and hold the Power button until the unit turns off. Release the Power button and press it again to power the unit back on. This will cause the unit to recognize the monitor and keyboard.