



## QD2010a

Embedded Site Communication  
Center



## Description

---

The QD2010a Series Embedded Site Communication Center is designed to act as an Internet gateway appliance working in conjunction with the centrally hosted Ubiquity web application. Users can network the QD2010a utilizing the onboard Ethernet port. Loop Control and energy metering of demand and consumption is standard to the unit as well.

## Features

---

- Integrated Web Server with 512 MB of Flash memory and 512MB of DDR2 memory
- Integrated 10/100 Ethernet controller with firewall capabilities
- Interface into Ubiquity
- Interface for configurations
- Remotely upgradable firmware
- User definable communication cycles
- SSL (Secure Socket Layer) enabled web pages
- Integrated controller addressing
- Supports up to 3 TCS Basys Controls devices

## Contents

---

Description .....	1
Features .....	1
Material List .....	1
Programming .....	2
Prior Connection to Network .....	2
Initial Configuration .....	2
Mounting .....	3
Connections .....	3
RS485 Network Wiring and Setup .....	3
Setup Page .....	4
Commissioning Tools .....	6
Ubiquity Systems Software .....	7
Checkout and Troubleshooting .....	8

## Material List

---

- QD2010a Site Communication Center
- Power cord
- 10 ft CAT 5 Crossover Cable (used for connecting directly from PC to QD2010a only)
- 10 ft CAT 5 Patch Cable
- QD1010-USB USB to RS485 Converter

## Programming

The gateway within the QD2010a operates by directly communicating to the centrally hosted Ubiquity server (Ethernet to Central Server mode) using a direct broadband connection (Cable or DSL), through a LAN or WAN. The QD2010a may also be accessed via direct connection from a laptop or desktop PC using the included CAT 5 crossover patch cable (setup mode) to view the configuration page using a web browser.

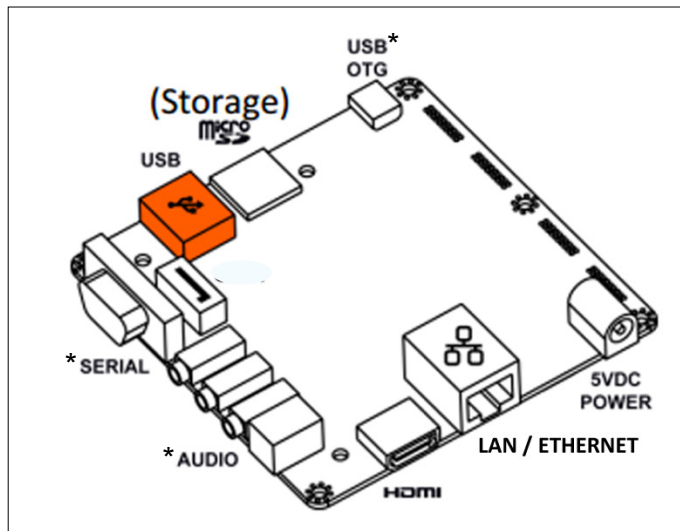
**NOTE: The crossover cable is a unique cable designed especially for direct connections between two computers. Other Ethernet cables will not work.**

After its initial configuration (see Setup page section), the QD2010a is ready to be connected to the local network and access the Internet. By connecting to the centrally hosted server, the advantages of multi-site enterprise functionality are available. Enterprise features include: multi-site global programming, global scheduling, global alarming and enterprise data aggregation. In addition, some local control functions are still performed by the QD2010a (i.e. subsystem, energy curtailment, outdoor air sharing, etc.)

## Prior to Connection to Network

The QD2010a comes from the factory with a default Setup Mode enabled (Communication Type: Setup). In this mode, the QD2010a acts as a DHCP server to allow configuration of the QD2010a by simply connecting it to a laptop or desktop PC.

**Caution: The QD2010a comes programmed with a default setup mode and functions as a DHCP server. When setting up the unit, be sure it is not connected to another DHCP enabled network.**



Components diagram (casing removed)

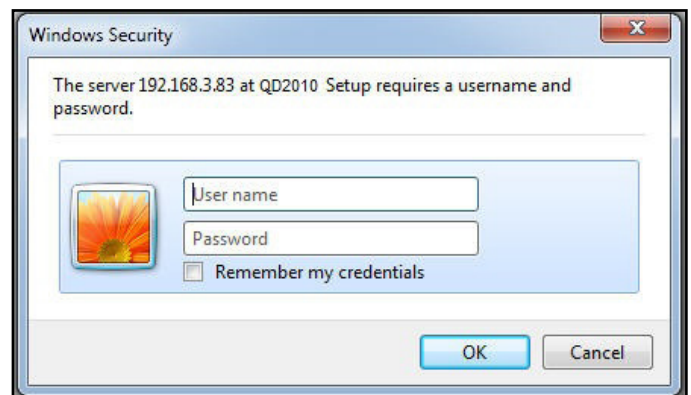
\* Not used

## Initial Configuration

Before connecting the QD2010a to a LAN or WAN, you must first configure the unit for operation. This process will require a laptop or desktop PC (not connected to any other network - wired or wireless) and a web browser (Internet Explorer 5.0 or higher).

1. Power up the QD2010a unit and give it 5 minutes to fully boot up. The QD2010a should not be connected to any other networks at this point.
2. Connect the laptop or desktop PC to the QD2010a panel by plugging the crossover cable into the Ethernet port of the QD2010a and Ethernet port of the PC.
3. Power up (or reboot) the PC to establish the local network with the QD2010a. The QD2010a will assign an IP address to the PC.
4. Open the web browser and type the following in the address field/location bar: <http://192.168.1.1>
5. When prompted, enter the following login credentials: username: admin  
password: password
6. The setup page will open in your web browser

From this page you can configure the operation parameters of the QD2010a (see Setup Page section) or link to the control addressing page to address controllers, that do not have displays, prior to installation (see Control Addressing section). After configuration is complete, disconnect the PC from the QD2010a. It is now ready for installation.



**QD2010**

### Installation Information

**Contractor Contact**  
 Installer Name:  Installer Contact Phone Number:

**Identity**  
 Model: **QD2040** Application Version: **07.00.00**  
 Submodel: **QD2010AV0100** Java Version: **icedTea6-1.12.5**  
 Hardware Version: **AAA** OS: **qdos4**  
 MAC: **001F7B005A3** OS Version: **7.4**  
 Site Name:

**Location**  
 Address Line 1:  Address Line 2:   
 Country:  State:   
 City:  Zip:

**Site Time**  
 Wait up to two minutes for the values to change.  
 Current Time:  :  @        
 Timezone:

### Application Information

**Application Options**  
 Controller Network Polling Cycle:   
 Caching Settings: ☐ Enable Cache  
 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 USB1-1:   
 Protocol Support:  Baud Rate:   
 Time-Out Period:  milliseconds Autodetection Range:  to

### Communication Information

**Communication Options**  
 Communication Type: ☒ Ethernet to Central Server ☐ Setup  
 Communication Mode: ☐ DHCP ☒ Static IP  
 Central Server Location:    
 Special Options: ☒ Disable TCP Window Scaling ☒ Disable IPV6 ☐ Enable SSL  
 HostName:

**Network**  
 IP Address:     DNS1:      
 Gateway:     DNS2:      
 Subnet:     Virtual IP:

**Proxy**  
 Enable Proxy Server Usage:

### Security Information

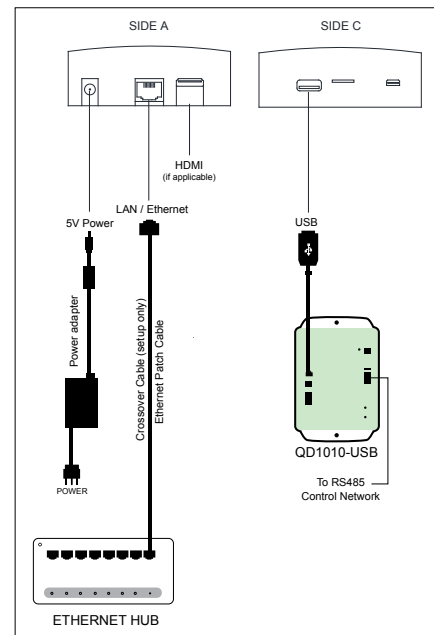
**Application Security**  
 Secure Mode: ☐ Enable  
 User:  Strong Password Example   
 Password:  Retype Password:

from excessive dust, heat sources, moisture, or direct sunlight. The ideal environment is a server room. The temperature of the room can not exceed 77°F (25°C), with good ventilation mandatory.

## Connections

To power the QD2010a, attach the power cord to the back of the unit and insert the power plug into a 120 VAC socket. Upon connection the unit will power up automatically. If it does not, simply press the power button. Ensure that you have clean power with minimal service interruptions, if you do not or you are unsure, connect to a UPS (PK3100).

To connect the QD2010a to a LAN / Ethernet, connect an Ethernet cable (not included) to the RJ-45 connection on the side of the unit. Connect the other end to the LAN network hub.



## RS485 Network Wiring and Setup

All controls connected to the network will need to be programmed with the same communication baud rate as well as a unique communication address from 0 to 255, excluding 248. On units with displays, this can either be done from the face of the controller using the keypad and display or by individually direct connecting controllers to the QD2010a. On units without displays, controller addressing is done by direct connect to QD2010a. (see Control Addressing section).

To connect your controllers to the QD2010a, you will need to create an "RS485" network by connecting all of the controllers "A" terminals together, "B" terminals together and "REF" terminals together, using 18 or 20 AWG, 120 ohm impedance, twisted, shielded 3 conductor (triple) wire. This "RS485" network connects to a QD1010-USB which plugs into the USB port on the QD2010a.

## Mounting

The QD2010a is designed to be hung on a wall or set on a table or shelf. When mounting directly to a wall, use the included mounting bracket. Select a sturdy wall made of masonry, wood, or metal. If mounting on dry wall, it is recommended that you first attach a wood or metal back plate to the wall and then mount the QD2010a. Always mount the unit with the main label facing in an upright orientation. When selecting a location to mount the QD2010a, be sure to allow space for cable connections. Place the QD2010a away

If a single port has more than 64 Controllers or is longer than 4000 ft., you will need a bus repeater (QD1011a) or QW1010a Zigbee wireless gateway (limit of 15 wireless units per wireless gateway). You will need an additional bus repeater for each wired group of 64 units.

For best results, on wired networks, we recommend that you segment the network into groups of approximately 40 controllers (requires separate QD1010-USBs plugged into different comm/USB ports for each network segment). This ensures all devices on each network leg will be polled and reply during a single polling cycle (factory default is a 1 minute polling cycle). Although using a repeater will allow all devices on large networks to communicate and the network to function, you may find that it takes multiple polling cycles to communicate with every device.

When connecting controllers on a network, you may use any wiring configuration (i.e. "daisy chain", "star", etc.), as long as all "A" terminals are connected together, all "B" terminals are connected together and all "Ref" terminals connected together. The integrity of the "A", "B" and "REF" wiring runs must be maintained or the network will not communicate properly. Also, a 120 ohm terminating resistor should be installed at the farthest end of the network (one is already built-in on the QD2010a).

**CAUTION:** You must maintain proper polarity of "A", "B" and "REF" connections. All shields must be tied together, taped off to prevent any accidental connections then grounded at one end of the network. Caution should be taken to avoid running wire near power wires, frequency drives, fluorescent lights, ballasts, etc., which can all compromise the communications signal. Care should also be taken to leave as little wire exposed as possible.

**Critical:** Avoid noise on the communications line by grounding the shield. The signal that passes information is 1 to 5 V. If you measure across A and B, you should get 0 VAC, and 1 to 4 VDC. There should be 0 VAC and 0 VDC between either A or B and the shield. If you are getting more than this, check for runs against high voltage, for exposed wires, to see if grounding at only one side, or that you have used dedicated power for the controllers or if you have reversed power on a Controller(s).

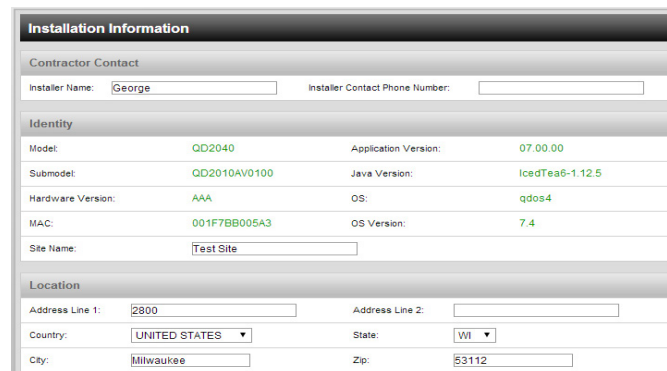
**NOTE:** By using wire cable consisting of one triple of twisted shielded wire and one pair of unshielded wire, you can run power to controllers and run communications wire in the same cable. Part # PM2000A

**NOTE:** Be sure to check any local codes to confirm the wire choice meets the code.

The QD2010a requires at least one QD1010-USB (USB/RS485 communications converter) be attached directly to the USB port on the side of the unit. The controller network wiring connects to the QD1010-USB as described above. Up to 3 controllers can be placed on the built-in USB port.

## Setup Page

Once you have made connection and have logged in you are able to configure the operation of the unit by selecting the proper parameters for your application. All Ubiquity Application software and functionality is accessed by logging into the Central Server ([www.ubiquitysystems.net](http://www.ubiquitysystems.net)) NOT by using this setup page.



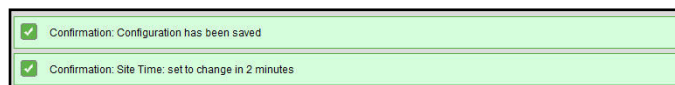
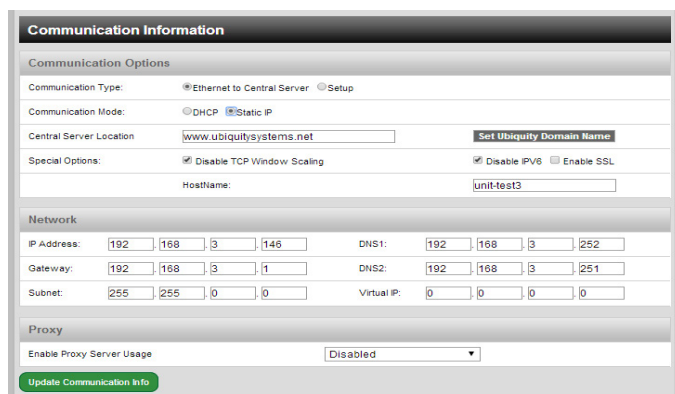
### INSTALLATION INFORMATION

This section contains installer and site related information. The information entered here is sent along to the central server when a site initially comes online to help identify the site to link it to the correct Ubiquity site. For the most part, this information is for reference purposes only, except for the Site Time. The Site Time is used by the local network and QD2010a until the Ubiquity central server performs a time synchronization with the site.

**NOTE:** Be sure to set the time 5 minutes ahead of the actual time. This allows the correct time to be used when the gateway next resets its time.

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

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



## COMMUNICATION INFORMATION

This section contains settings which control how the QD2010a connects out through the LAN or WAN to the Internet. All of these settings are determined by your local network administrator or IT department. The correct settings, network permissions, and port openings (typically port 80) need to be verified with them to installation and connecting to the local network.

**Communications Options:** In many cases the QD2010a starts out in setup mode which allows you to access the Setup Page. The QD2010a will need to be set to Ethernet to Central server after fully configuring it to work with the local network and prior to connecting it to the local network.

When connecting to the centrally hosted Ubiquity server through an Ethernet connection, the QD2010a supports both static and Dynamic Host Configuration Protocol (DHCP) IP addressing. When using static IP addressing, it is also necessary to enter the Gateway, Subnet and DNS protocol settings. The IP protocol settings will need to be 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.

Select the desired Communication Mode (DHCP or static IP addressing) to be used. If static IP addressing is selected, you must also enter the Gateway, Subnet and DNS protocol settings. You will be required to confirm these settings when submitting the page.

Enter the Central Server Location, typically [www.ubiquitysystems.net](http://www.ubiquitysystems.net). If an IP address is required by your network admin, be aware that using the direct IP requires additional routing in some cases and may cause delays, consume additional resources, and limit fail over options.

There are a few special options which can be enabled, including TCP window scaling IPUC and SSL. Select whether to enable or disable TCP window security (typically checked). Select whether to enable or disable IPV6 (typically checked).

Select whether to enable or disable Secure Sockets Layer (SSL) communication with the central server (typically left unchecked). Enter host name if needed (typically left blank).

**Proxy:** In most cases a proxy server will not be used and the drop-down menu will be left at Disabled. If a proxy is required, you can select the correct type from the drop-down and then enter all the related details in the fields that appear.

Once you are finished entering information in this section, click the Update Commissioning Info button. Unlike the other section, updating this section may cause the unit to reboot automatically within 5 minutes of clicking the button (a message will appear if a reboot is needed).

The screenshot displays the 'Application Information' section of the QD2010a web interface. At the top, two green confirmation messages are visible: 'Confirmation: Configuration has been saved' and 'Confirmation: Special Options: will take in 5 min'. Below these, the 'Application Options' section includes a 'Controller Network Polling Cycle' set to '1 Minute', 'Caching Settings' with 'Enable Cache' unchecked, and 'Connection Times' set to 'Always On'. The 'RS485 Network - Port Configuration' section shows 'Autodetection of Controllers on All Ports' as 'Enabled', 'All Ports are Automatically Detected Once Hardware is Installed' as checked, 'Device' as 'USB1-1', 'Port 1 (addr 0 to 255)' as 'Port 1 (addr 0 to 255)', 'Protocol Support' as 'TCS', 'Baud Rate' as '9600', 'Time-Out Period' as '200 milliseconds', and 'Autodetection Range' as '0 to 255'. An 'Update Application Info' button is located at the bottom of this section.

## APPLICATION INFORMATION

This section contains settings which confirm how the QD2010a interacts with the controller network and how it communicates the data to the actual server.

**Application Options:** You must select a Network Polling Cycle Time for the QD2010a. This is the time interval that the unit will poll the entire network of controllers on all ports. The default setting is 1 minute. You must select whether or not to allow caching of data. Typically this is left unchecked. You must select how often the QD2010a connects to the central server. Typically this is set to "Always On."

**RS485 Network - Port Configuration:** Here you will configure the COM port for this site. Typically, you will leave Auto Detection of Controls on the Port enabled so the QD2010a will configure to find and add the controller as they are included on one of the networks (wired or wireless).

The communication port is automatically detected once the QD2010a is powered up. Once detected the COM port needs to be configured to ensure proper functioning of the network on the port. The port can be enabled or disabled from the drop down menu. You must also select the proper protocol being used on the port. The current protocol selections from the drop down menu are TCS or Modbus Veris Meter. The Modbus Veris Meter selection will support the PE Series Modbus Meters.

You must also select the communication baud rate for the port. This setting must be the same as all of the controllers on that port. You can also adjust the Time-Out Period for the port. The Time-Out Period is the amount of time, in milliseconds, that the network will wait to send information requests from the controllers on the port before it times out. If time-out errors are occurring on the network you should increase this value until there are no longer time-outs. Generally, the more controllers on a particular network, the higher this value will need to be.

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

## SECURITY INFORMATION

This section contains settings which control the security of the gateway within the QD2010a and whether or not it can be accessed by directly connecting to it. Enabling Secure Mode disables all web interfaces INCLUDING THE SETUP PAGE and requires a specially configured USB flash drive or TCS Technical Support access to the QD2010a unit if it is online with Ubiquity central server to "unlock" it. Typically, this Secure Mode is left unchecked (disabled). You also have the option to change the default login credentials used to access the Setup Page. Changing this to something other than the default requires a specially configured USB flash drive or TCS Technical Support access to the QD2010a unit if it is online with the Ubiquity Central Server to reset it back to the default password. Typically, this password is left at the default (see Initial Configuration section for details). Once you are finished entering information in this section, click the Update Security Info button.

## Commissioning Tools

A separate page which contains various commissioning tools can be accessed by clicking the "Commissioning Tools" button at the bottom of the Setup page. This page gives you access to additional information about the connection status of the QD2010a and the controller network connected to it. This page is mainly designed to be used while the unit is in setup mode. However, in some cases you may be directed to access it once the unit is communicating with the central server. In that case, TCS Basys Controls technical support staff will instruct you on how to access this page.

Port	State	Address	Controller Model	Communication Status
1	Confirmed	2	1024	OK
1	Confirmed	3	1051	OK
1	Confirmed	4	1017A	OK
1	Confirmed	5	1031	OK

## UBIQUITY CONNECTION STATUS

This section displays the status of the connection between the QD2010a and the central server. You have 3 options for the message that will appear her:

- 1) Error - No Route to Host -- this means the unit does not currently have an Ethernet connection. You will also see this message when the unit is in Setup mode.
- 2) Connected -- this means the unit is able to talk to the Ubiquity central server BUT is not being matched up with a specific Site Home page. This will be the case until one of our staff has linked the QD2010a to its webpage.
- 3) Established -- this means the unit is able to talk to the Ubiquity central server AND it has been matched up with its Site Home page. 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 QD2010a and view each controller's address, show, 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 central server. This information allows the installer to verify that each controller has been found by the QD2010a and is communicating with the local network.

Clicking the green button with the arrow on it on the right side of the Controller View title bar will refresh each controller's status.

## CONTROLLER ADDRESSING

Prior to accessing controllers via the network, all controls must be configured with the same communication baud rate as the QD2010a (9600 baud is the factory default for all controllers AND the QD2010a). In addition, all controls must be programmed with a unique communication address from 0 to 255 excluding 248. All thermostats and many other controllers come with a factory default address of zero. All 2100 series controllers come with a factory default address that is NOT zero -- their address corresponds to the last three digits of their model number (i.e. an SL2105 has a default address of 105). On units with displays, control addressing can be done using the keypad and display, TCS Insight, or by utilizing the QD2010a controller addressing subsection on the Commissioning Tools page. Controllers with no displays need to be addressed using TCS Insight or through the QD2010a. To address using the QD2010a you must first follow the necessary connection procedures to access the unit (see Initial Configuration section).

After the initial connection is established and before the controller network is attached to the QD2010a, you can address each controller. (See the Control Network Wiring and Setup section for instruction on connecting controllers to the serial or USB ports of the QD2010a)

To access the addressing page press Commissioning Tools button at the bottom of the Setup Page. Select which port you are connected to from the drop-down menu. If the controllers address is known, select the current address from the drop-down (most controllers come from the factory with a default address of 0 menu). Then select the new address you want to give the controller from the other drop-down menu. When finished press the Change button at the bottom of the Controller Addressing section.

If the controller address is NOT known, the relevant COM port can be set to disabled temporarily (in the RS485 Network-Port Configuration section) to allow an address change to be broadcasted to ALL controllers on that COM port. BE SURE a single controller is all that is connected if this method is being used. You will also need to reconfigure the COM port when finished.

**NOTE:** When using this second method for changing addresses, ALL controllers connected to that COM port will be given the same address. So there must only be ONE controller connected to the network.

## NETWORK CHANGE LOG

In this subsection you will be able to view all address changes performed using the QD2010a. When an address change is completed, a table appears which

shows the controller's old address, the new address, and status of the address change command. The controllers will be visible at their new address in the Controller View table after approximately 1 minute. Once the controllers show up at their new address, you can remove the listing at the old address OR simply wait until the unit is connected to Ubiquity, at which time, all non-existed controllers will be removed automatically.

## SYSTEM COMMANDS

In this subsection you are able to set a couple of system flags for the QD2010a itself. "Reboot Unit" sets a flag which will shut off and restart the QD2010a after a 5 minute wait time. "Check for Update" contacts the Ubiquity Central Server for any updates relevant to its particular model number and firmware version. Once the update has been downloaded, it is automatically applied, and the unit may reboot within a 5 minute wait time.

**NOTE:** The "Check for Update" command requires that the QD2010a have Internet access to retrieve the update patch.

## Ubiquity Systems Software

The Ubiquity system addresses the market's desire for a fully integrated system in a single, customizable package. Ubiquity is a centrally hosted application that readily and easily interfaces with the local QD2010a. The system is designed on a modular approach to collect and manage information and data. This strategy provides us the opportunity to effectively package a solution tailored to embrace your most immediate concerns. Plus our advanced controls and monitors, combined with this easily modified modular approach, offers the scalability to effectively meet your future demands.

The Ubiquity systems modular design incorporates:

- Energy and environmental management
- TCS Basys Controls energy management system
- Automated lighting management
- Refrigeration and freezer monitoring and alarming
- Global scheduling, programming and alarming
- Integrated preventive and reactive maintenance functions

*Refer to the Ubiquity Manual for further information*

## **Checkout & Troubleshooting**

---

### **CHECKOUT**

1. Be sure to check and verify all wiring before powering the QD2010a.
2. Apply power.
3. If the QD2010a has not been pre-programmed, it can be programmed at this time.
4. The unit is now ready for operation.

### **TROUBLESHOOTING**

#### **No Communications with Controllers on the network**

Make sure the baud rate selection for the QD2010a is set to match the baud rate of all the controllers on each port network. All controllers on the network must have a unique address, excluding the address '248'. Network wiring should also be checked.

Rev:0616

