

# Troubleshooting Network Wiring

tcs Basys Controls®

TCS Technical Bulletin

## Symptom:

The QD/QWL Series is not communicating with the local hard wired RS485 controller network. **NOTE: This support bulletin does not apply to ZigBee Wireless products.**

## Cause:

If one or more of the Superstats or Controllers on a network are not communicating, or communication is intermittent and produces error messages, the following troubleshooting guidelines should be attempted. If after each step there are still Superstats or controllers that do not appear on the network, or communication is intermittent and produces error messages in Ubiquity, please go to the next troubleshooting step. **NOTE: IF utilizing Ubiquity, once a problem is located and resolved allow 5-10 minutes for polling cycles to settle out and then check the site to confirm that the troubleshooting technique solved the communications problem.**

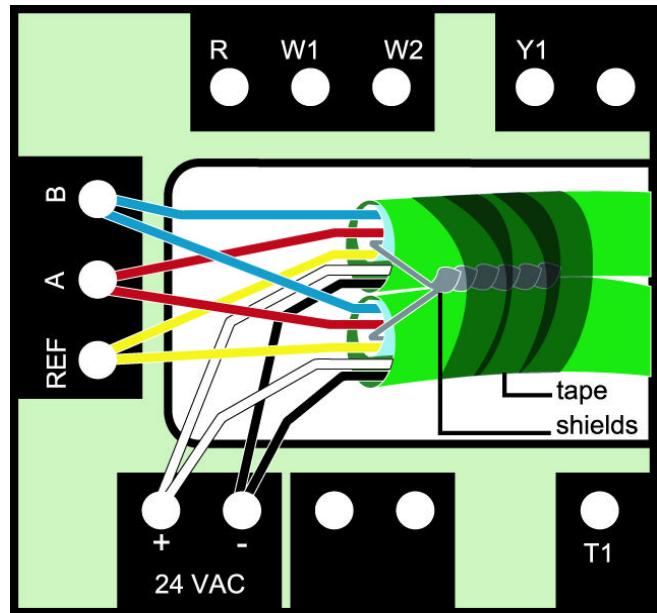
## Solution:

- CONFIRM ADDRESSES AND BAUD RATES** - The factory default address for each Superstat and controller with a display TCS manufacturer is "000" for controller without a display see list below for factory default address. Each Superstat and controller on the network must be programmed with a unique address number. If it is not unique, the network will read errors, or not read that the Superstat or controller is on the network. **248 CANNOT be used as an address.** This is the default broadcast address used in other programming steps and features of the Superstats and controllers.

SEQ100=100  
SL2105=105  
SL2108=108  
SZ2141=141  
SZ2144=144  
SZ2161=161  
SZ2165=165  
SZ2166=166  
SZ2181=181  
SZ2182=182  
SLQ218=218

The factory default baud rate is "9600". All Superstats and controllers on a network must have the same Baud rate. If a Superstat or Controller is not programmed with the same baud rate as the QD/QWL Series and the QD1010, it will not appear on the network.

- COMMUNICATION WIRING** - If each controller is reporting to the network with a unique address and all have the same baud rate, confirm all wiring (remote sensors and network communication) meets TCS specifications. See the product manual for each device, or refer to the Wiring and Setup sections of the FAQ. Communications from each Superstat or controller must communicate to the QD/QWL Series and QD1010 via "A-B" wiring.
  - Confirm that the network wire meets TCS specification of 22 AWG, shielded, twisted, 120 Ohm impedance cable.
  - Confirm that the remote sensor and power wires meets TCS specifications of 18 or 20 AWG shielded, twisted wire cable.
  - Confirm that "A-to-A", "B-to-B" and "REF-to-REF" communication wiring is maintained throughout the entire network.



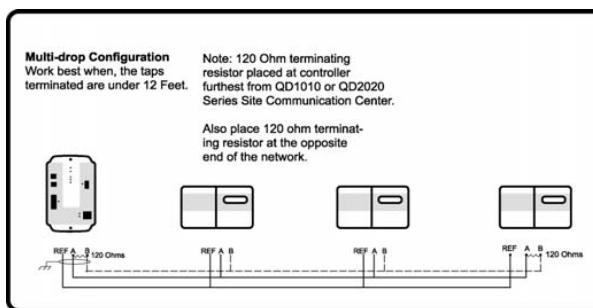
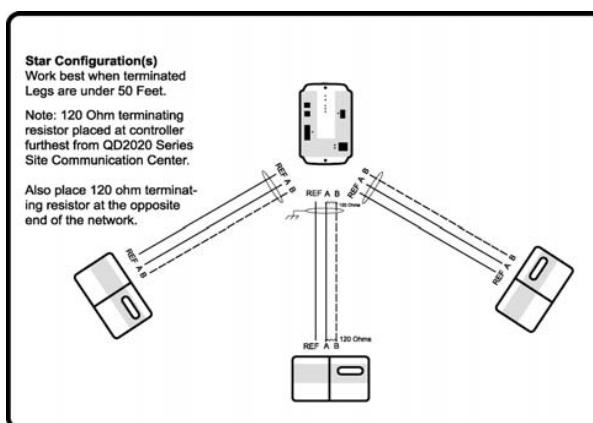
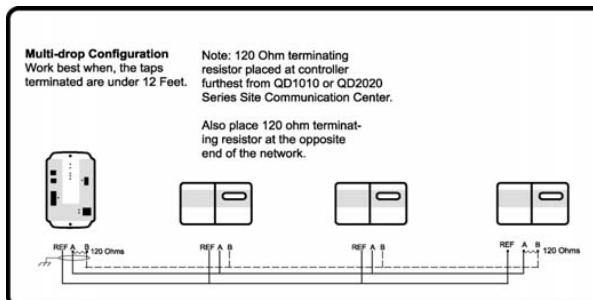
**IMPORTANT NOTE:** The terminal blocks on all Superstats are "B over A", while the terminal blocks on all other devices, including the QD1010 are "A over B".

- Confirm that the shields on wire connecting one controller to the next is twisted together and taped to insure a solid connection and protect from interference.
  - Confirm that wire runs do not pass within 6 feet of any equipment producing magnetic fields, such as fluorescent lighting or electrical motors.
  - Confirm that communication wires in the Superstat or controllers are not bare or exposed from their casing to the extent that they allow the A and B wired to touch, causing communication interference.
  - Confirm that the shield is grounded at one end
- POWER POLARITY AND DEDICATED 24 VAC POWER** - To prevent ground loops from creating communication problems throughout the communication system, each Superstat or controller on a network must utilize dedicated 24 VAC power, provided by a transformer. Multiple Superstats or controllers can be powered from the same transformer, provided that the transformer has sufficient power (Superstats require 8 VA @ 24 VAC) and that proper polarity has been maintained.
    - Confirm that all Superstats and controllers on the network are powered with dedicated 24VAC power, provided by a transformer.
    - Confirm that +/- polarity has been maintained throughout the power network.

# Troubleshooting Network Wiring -- continued

- 4. TERMINATING RESISTORS AND REPEATERS** - The TCS specification requires that a repeater be used for any networks made up of more than 32 controllers, or longer than 4000 feet. 120 ohm terminating resistors, included with each QD1010 and repeater, are required to be installed at the QD1010 as well as at the controller furthest from the QD1010. On a network with a repeater, a 120 ohm terminating resistor should be installed at both the IN and OUT terminal blocks.

- a. Confirm that all required 120 ohm terminating resistors are properly installed.



- b. Confirm that repeaters are installed properly for any networks made up of more than 32 controllers, or longer than 4000 feet. Insure that the QD1011a is powered by dedicated 24 VAC power, power polarity is maintained and proper "A-to-A", "B-to-B" and "REF-to-REF" communication wiring is correct.
- c. On short distance networks, intermittent communications problems may be able to be resolved by the removal of the terminating resistor at the QD1010.