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## Troubleshooting Network Wiring

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### Network Wiring

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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.

*When utilizing Ubiquity, once a problem is located and resolved allow 5-10 minutes for polling cycles and then check the site to confirm that the troubleshooting technique solved the communications problem.*

#### 1. CONFIRM ADDRESSES AND BAUD RATES

The factory default address for each Superstat and controller TCS manufacturers is "000" and the factory default baud rate is "9600". 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.

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 QD2020 (or QD1010), it will not appear on the network.

- To program an address or baud rate for a Superstat or controller that has a display, see Network Wiring and Setup document.

- 248 CANNOT be used as an address. This is a default setting used in other programming features of the Superstats and controllers.

- If controller does not have a display (i.e. SZ1025a/SL2108/SZ2161/SZ2165/SZ2166/SZ2181), addresses and baud rates should have been programmed using Revelation Professional PC software and a QD1010 prior to installation. To troubleshoot this once the controls have been installed, load Revelation Professional on a laptop PC, then attach the PC to the controller via a QD1010. Use the Revelation Professional program to insure the controller is properly addressed.

#### 2. COMMUNICATION WIRING

If each controller is reporting to the network with unique addresses and the same baud rates, confirm that remote sensors and network communications meet 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 QD2020 via "A-B" wiring.

- Confirm that the remote sensor and communication wire meet 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 QD2020 are "A over B".*

- Confirm that each shield wire connecting from 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 florescent lighting or electrical motors
- Confirm that communication wires in the Superstat or controllers are not 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

### 3. 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

### 4. TERMINATING RESISTORS AND REPEATERS

The TCS specification requires that a repeater be used for any networks larger than 32 controllers, or longer than 4000 feet. 120 ohm terminating resistors, included with each QD2020 and repeater, are required to be installed at the QD2020 as well as at the controller furthest from the QD2020. On a network with a repeater, two 120 ohm terminating resistors should be installed at both the IN and OUT terminal blocks.

- Confirm that all required 120 ohm terminating resistors are properly installed
- Confirm that repeaters are installed properly for any networks larger 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.
- On short distance networks, intermittent communications problems may be able to be resolved by the removal of the terminating resistor from the QD2020.

If communication problems are still not resolved, call TCS Support