POWERWISE TROUBLESHOOTING GUIDE

Troubleshooting 1-WIRE Networks

Most common problems:

1. Wiring (incorrect wire or miswired sensors)
2. Incorrect or inefficient topology

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Wiring: 1-Wire networks should be wired using Twisted pair Cable (e.g. Cat 5e or Cat 6).

- **MUST** use twisted pair for 1-Wire and GND
- If the sensor requires power use one twisted pair for the power.
- A wire break anywhere in the bus will cause a fault downstream from the break.
- Any short on the bus will affect all sensors on the bus.
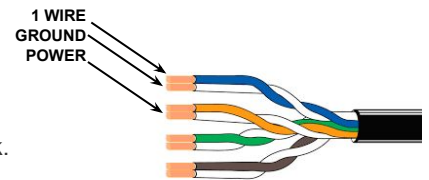
Topology: A Linear topology is prefered, Star topologies should be avoided if possible.

When a stub is connected to a 1-Wire bus, there is an impedance mismatch at the branch point. Reflections from the end of the stub return to the main trunk, delayed only by the time it takes for the signal to travel the length of the stub. These reflections can then cause problems for other slaves on the network. A resistor in series with the stub will reduce the severity of the mismatch and the amplitude of the reflected energy. That resistor mitigates adverse effects from stub-generated reflections on the main trunk.
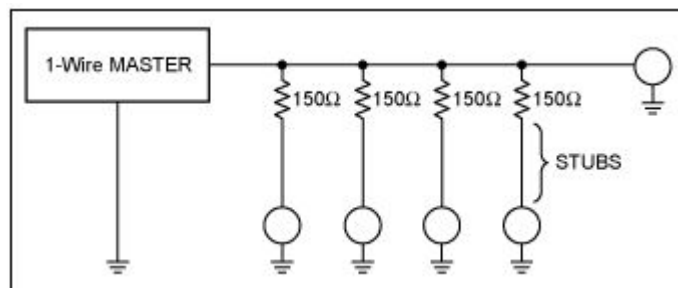
The most successful implementation of this concept uses 150Ω resistors at each point where a stub is connected to the main trunk. This value reduces the mismatch at the connection point by about 20%, and attenuates the resulting stub reflections by about 40%. However, the added resistance also degrades noise immunity by about 80%, so caution must be observed. Tests have also shown good performance using 100Ω resistor values, which do not degrade noise immunity quite as much.