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For Your Information ...



Limitations on Using CAT5 Wire with Sivoia QED™

Overview

Lutron offers two cables that can be used to wire a Sivoia QED system: Lutron SVQ-CBL-250 combines power and communications, and Lutron GRX-CBL-346S-500 is a communications cable. Lutron recommends using 4 conductors for communications (1 pair #18 AWG, 1 pair #22-18 AWG twisted/shielded) and 3 conductors for power (2 #16 AWG and 1 #18AWG). Refer to Application Note #2 “Cable recommendations for wiring Sivoia QED and the SVQ-10-PNL” for other suggested cables.

Lutron does **NOT** recommend CAT 5 or CAT 5e for Sivoia QED installations. However, it is possible to use CAT 5 or CAT 5e provided that all of the precautions and instructions in this application note are observed.

IMPORTANT NOTE:
Under no circumstances can a single CAT 5 cable be used for EDU power and communications!

Lutron does not recommend using CAT 5 for the following reasons:

A) Wire Breakage

- CAT5 is #24 AWG solid wire. This smaller gauge solid wire is more brittle and more susceptible to breakage than the stranded wire in the cable that Lutron recommends.
- CAT5 wires are more susceptible to nicking when they are stripped. This leads to a greater chance of wire breakage.
- Wire breakage can lead to intermittent connections that are difficult and time consuming to troubleshoot.

B) Connection Issues

- Connections are more difficult. Multiple CAT 5 wires must be joined together for the power and ground conductors, due to the current-carrying limitations of the smaller gauge wire.
- The terminal blocks on Sivoia QED products are not designed to be used with solid wire, so care must be taken to insure that over-tightening the terminal blocks does not cut the wire.
- EDUs need special attention to how the wiring is dressed, as it is possible for the vibration to cause the connection to fail over time.

C) Electrical Noise

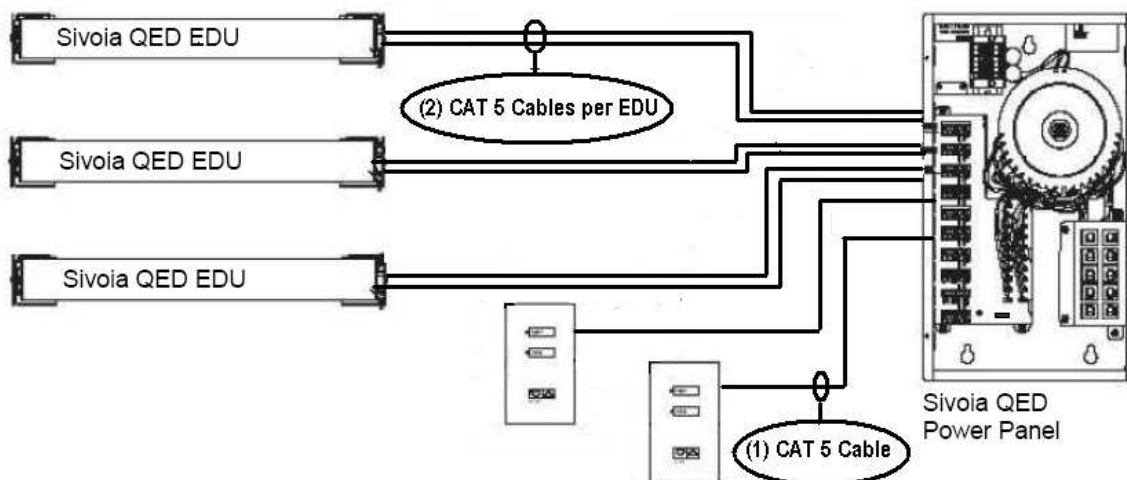
- CAT 5 is typically unshielded, and thus provides poor noise rejection. This can be reduced by using shielded CAT 5, and by being careful not to run the wires parallel to electrical noise sources such as high voltage wiring.

D) Wiring Limitations

- Sivoia QED will require **two CAT 5 cables** per EDU, and **one CAT 5 cable** per keypad or CCI.
- Wiring **must** be home-run, and maximum wire lengths are reduced (refer to the following page for distances)

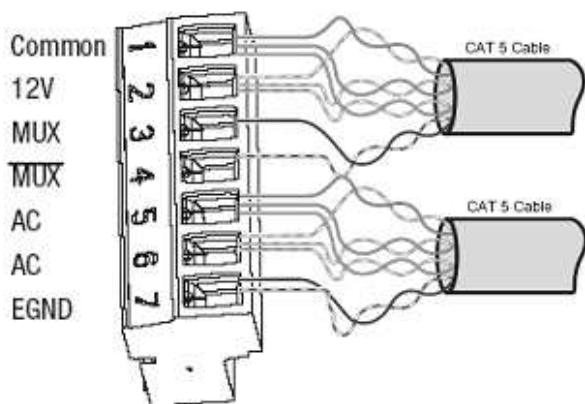
Wiring with CAT 5

Overview of Wiring with CAT 5

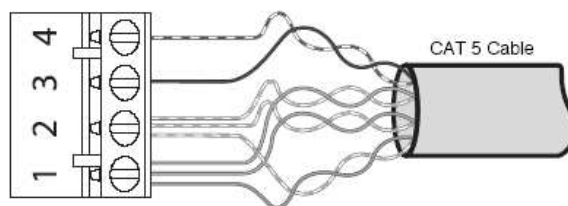


Since CAT 5 is only #24 AWG, the current-carrying capacity is greatly reduced. As a result, when using CAT 5, there must be **two** CAT 5 cables per EDU – one for communications, and one for power. In addition, when using CAT 5, the Sivoia QED communications link must be **home-run** to a SVQ-10-PNL (no daisy-chaining)

EDU Wiring Detail



Keypad Wiring Detail



In order to provide the current carrying capability required by Sivoia QED, Common and 12V in the communications link, and the AC power wires **must be tripled-up**. Even with tripling-up these conductors, the maximum wire lengths are reduced.

For Power Wiring, use both conductors in one pair for Earth Ground. Use the remaining striped colors for one of the AC connections, use the remaining solid colors for the other AC connection.

For Communications wiring, use one twisted pair for MUX and $\overline{\text{MUX}}$. Use the remaining solid colors for +12V and the remaining striped colors for Common.

Maximum Wire Lengths When using CAT 5

| | |
|-----------------------|----------|
| EDU to Power Panel | 75 feet |
| Keypad to Power Panel | 750 feet |

CAT 5 Installation Practices

- Eliminate tension and stretching when pulling the wire – wire stress can cause problems in communication
- Leave cable ties loose. Do not cinch bundles tightly (such as with a tie gun).
- Reduce untwisting of pairs – the more untwisting that is done, the more susceptible communications will be to outside interference.
- Avoid kinks and 180-degree bends – sharp kinks and narrow bends increase the likelihood of conductor breakage and weaken the ability to reject interference.

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