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For Your Information ...



Confirming Proper Wiring of *Sivoia QED™* with a Multi-meter

Introduction

Sivoia QED allows for large systems of shades and draperies. The Sivoia QED system allows many Electronic Drive Units (EDUs) to be connected together, allowing for easy and flexible programming of the system. This applications note explains how to use a multi-meter to measure voltages on the QED communications link to confirm proper wiring before programming the system, or help diagnose miswire conditions.

The Sivoia QED system has all Sivoia QED components connected on a single 4-wire Communication Link. This 4-wire communication link is wired to all QED components, including Electronic Drive Units (EDUs), keypads, and Contact Closure Inputs (CCIs). EDUs require an additional 3 wires to supply 24VAC and Earth Ground.

Proper operation of Sivoia QED requires proper wiring of both the communications and the power wiring for each component. For many installations, it is useful to confirm correct wiring before starting to program the QED system. The way to confirm proper wiring is by measuring the voltages on the Sivoia QED communications link. Sivoia QED systems shipped after May 15, 2004 are designed such that correct communications wiring can be checked with a multi-meter.

Symptoms of Miswire Conditions

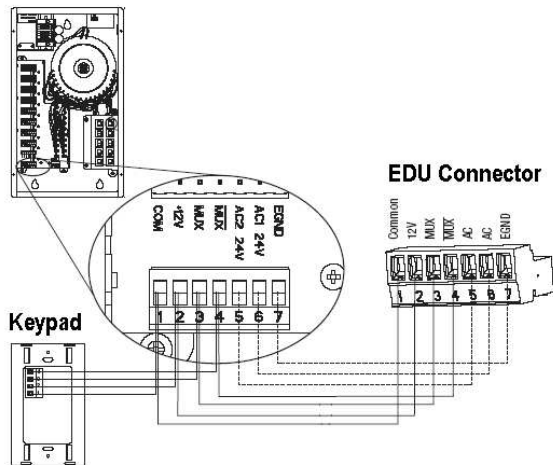
Improperly wired Sivoia QED systems can show the following symptoms:

- Inability to properly Address the Sivoia QED system
- Inability to properly Assign the Sivoia QED system
- Improper LED feedback on keypads
- Inability to return the entire Sivoia QED system to factory defaults
- HomeWorks™ will be unable to upload its database to some shades/draperies

The types of miswires that can cause the above symptoms include:

- Swapped wires
- Loose wires
- Shorted wires
- Too many keypads or CCIs on the communication link

Typical System Wiring with Power Panels

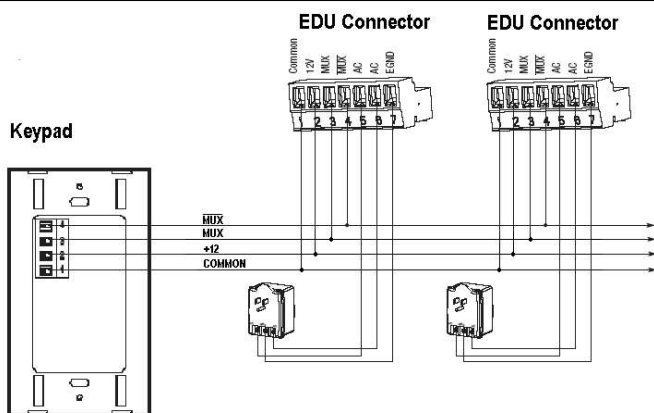


When a QED system is wired using Power Panels, 4-conductor cable is home run back to the Power panel from each keypad or CCI, and 7-conductor cable is home run from each EDU back to the Power Panel.

The 7 position connectors are used to land wires from EDUs and Keypads. The 4-pin connector is used to connect multiple panels together. The first 4 positions of each of the 7 pin connectors, and the 4 pin connector are used for communications wiring, and are electrically connected internally in the panel. For example, Pin 1 of the first connector is electrically the same as pin 1 on all of the other connectors.

When measuring voltages, measure at the 4-pin connector in the power panel.

Typical System Wiring with Individual Transformers



When a QED system is wired using individual transformers, a 4-conductor cable is used to connect all components of the Sivoia QED system.

When measuring voltages, measure at the EDU connectors or the keypad connectors.

Preparation

Here are some tips on using a Multi-meter:

- A) What Settings to Use
 - The meter should be set to read DC Voltage.
 - The meter should accept values as high as 40 volts DC.
- B) Which Leads to Use
 - The “Common” or “-“ lead (typically black) should always be placed on Pin 1 (common) of the Sivoia QED communications link.
 - Use the “V” lead (typically red) to measure the voltage at pins 2, 3, and 4.
- C) Where to Measure
 - Power panel is typically the easiest place to measure
- D) Screw Terminals
 - Touch the leads of the multi-meter to the screws of the terminal blocks in the panel.
 - *If measuring at an unused terminal block, make sure the screws are fully tightened.*
- E) Multi-meter “Float”
 - It is normal for the multi-meter to “float” around by a few hundredths of a volt.
 - Measure to the nearest tenth of a volt.

Procedure for Checking Link Wiring

- 1) Confirm that the number of keypads + CCIs does not exceed the number of EDUs on the communications link. If the number of keypads + CCIs exceeds the number of EDUs, refer to Application note #1.
- 2) Determine if a miswire condition exists by evaluating the voltages on the communications link. With all Sivoia QED devices powered and connected to the Sivoia QED Communication link, measure the DC voltages at the following points.

DC Voltage between +12 (pin 2 / blue wire) and Common (pin 1 / yellow wire)

Example: “Red test lead from Multi-meter on Pin 2, Black test lead from Multi-meter on pin 1”

DC Voltage between MUX (pin 3 / gray wire) and Common (pin 1 / yellow wire)

Example: “Red test lead from Multi-meter on Pin 3, Black test lead from Multi-meter on pin 1”

DC Voltage between MUXBAR (pin 4 / violet) and Common (pin 1 / yellow wire)

Example “Red test lead from Multi-meter on Pin 4, Black test lead from Multi-meter on pin 1”

The voltages measured should fall within the ranges shown in the chart to the right:

Label	Pin	DC voltage
+12	Pin 2	10 to 32
MUX	Pin 3	2.8 to 4.2
MUX	Pin 4	0.8 to 1.8

- 3) If the voltages measured are as shown above, then the communications link is most likely wired correctly. Proceed with programming the system.

OR

Follow the instructions on the next page (“Procedure for Locating a Miswire”)

Procedure for Locating a Miswire

- 1) Unplug every device from the system at the panels. If using individual transformers, unplug every device from the system at the device. Measure the voltages as shown step 2 on the previous page and verify that with no EDUs attached, all communications link voltages are 0.
- 2) Plug in EDUs one at a time. Each time an EDU is plugged in, measure voltage on the communications link as shown on the previous page.

If the voltages are within the range shown in the chart to the right, then plug in another EDU and re-check voltage.

OR

If the voltages are out of range (or negative):

- a) Unplug that EDU and re-check voltages to verify that the problem goes away. Re-plug in the EDU to make sure the problem returns. This confirms that the wiring problem is a result of a specific EDU being plugged in, and it is likely that that EDU is miswired.
NOTE: It is possible for the voltages to change up to 1 minute after the EDU is plugged in.
- b) When the miswire has been narrowed down to a specific EDU, inspect both the connection in the panel and at the EDU for:
 - i. Make sure that all the screw terminals are tight and the wires do not pull out easily
 - ii. Verify that the order of the wires in the terminal blocks is correct at the EDU and the power panel
 - iii. Verify that no wires are cut where the sheath of the wire was removed
 - iv. Check for strands that may be shorting out two or more pins on the connector
 - v. Verify that the wires are stripped about 3/16" to prevent shorting
- c) If inspecting the wiring does not reveal any miswires or wiring faults, try running a separate external wire for communications to that EDU and re-check communication link voltages. This helps rule out the possibility of damage to the cable that is not visible.
- d) When the wiring has been corrected, re-check the voltage on the communications link, to verify the problem has been corrected. Proceed to check the other EDUs in the system.

Label	Pin	DC voltage
+12	Pin 2	10 to 32
MUX	Pin 3	2.8 to 4.2
MUX	Pin 4	0.8 to 1.8

NOTE: These voltages are supplied by EDUs and used by keypads and CCIs.

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If you need assistance call the toll-free **Lutron Technical Support Center**. Please provide exact model number when calling.

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