ZYTRONIC

TR0920v1.12 - ZXY500 Multi-Sensor (EDGE) User Guide.Docx

1 Contents

1 Contents 1
2 Introduction 3
3 System Overview 3
4 Configuration of the Graphics Card 3
5 Configuration of the Zytronic EDGE Touch Controllers 4
5.1 Support Equipment 4
5.2 A note about the USB Hub Topology 4
5.3 Comms loop wiring 5
5.4 Hardware configuration of a Primary Device 6
5.5 Hardware configuration of a Secondary Device 6
5.6 ZyConfig Multi-Sensor page 7
6 Wiring Diagrams 9
6.1 Video walls with 2 sensors 9
6.1.1 1x2 9
6.1.2 2x1 12
6.2 Video walls with 3 sensors 14
6.2.1 1x3 14
6.2.2 3x1 17
6.3 Video walls with 4 sensors 19
6.3.1 2x2 19
6.4 Video walls with 6 sensors 21
6.4.1 2x3 21
6.4.2 3x2 23
6.5 Video walls with 9 sensors 25
6.5.1 3x3 25
6.6 Video walls with 10 sensors 27
6.6.1 1x10 27
6.6.2 10x1 30
6.7 Video walls with 12 sensors 32
6.7.1 4x3 32
6.8 Unusual combinations 35
7 Fault finding 36
7.1 Testing individual sensors 36
7.2 Debugging a wiring problem 37
8 Inactive Panels 40

9 Document History 45

2 Introduction

This document describes the integration and configuration of Zytronic EDGE touchscreen controllers with multiple displays, providing seamless touch operation across all displays.

3 System Overview

The overall system consists of taking several separate touchscreens and combining them into a “Wall” that is reported to the PC as a single large touchscreen. Each touchscreen is mounted onto a separate display which are also put together to form a single large display for the PC.

Each sensor has its own dedicated ZXY500 controller, typically mounted on the back of the display that the sensor is mounted too. These are known as “Secondary Controllers”. Another controller is required, known as the “Primary Controller”, that combines the signals from the “Secondary Controllers” and reports to the PC. These controllers talk to each other through a loop of Cat 5e network cables and are wired in a specific order, shown later in this document. The controllers are powered by individual USB cables connected to the PC.

The rest of this document details the set-up process of the sensors and displays and provides some advice on trouble shooting should the setup process not work the first time around.

4 Configuration of the Graphics Card

The graphics card software (e.g. AMD Eyefinity / NVIDIA Mosaic, NVIDIA Studio Control Panel) must first be configured to combine the multiple displays into a single virtual display that is presented to the operating system.

If needed, this software is also used to change the displays into Portrait orientation.

5 Configuration of the Zytronic EDGE Touch Controllers

5.1 Support Equipment

Unless specified otherwise, all testing at Zytronic was completed using the following:

- ZXY500-U-OFF-256-B(EDGE) touchscreen controllers
  - 1x device acts as a primary controller.
  - All other devices act as secondary controllers.

- Communication between touch controllers is provided by 2m Cat. 5e Shielded Twisted Pair (ethernet) cables, for example:
  - Videk 1962-2B
  - https://www.videk.co.uk/section.php/1755/
  - NB “Crossover cables” are not suitable

- All touch controllers are connected via 1.5m USB mini-B cables to a mains-powered USB Hub, for example:
  - Startech ST103008U2C
  - https://www.startech.com/en-gb/cards-adapters/st103008u2c

5.2 A note about the USB Hub Topology

Make sure that you do not use too many layers of USB hubs.

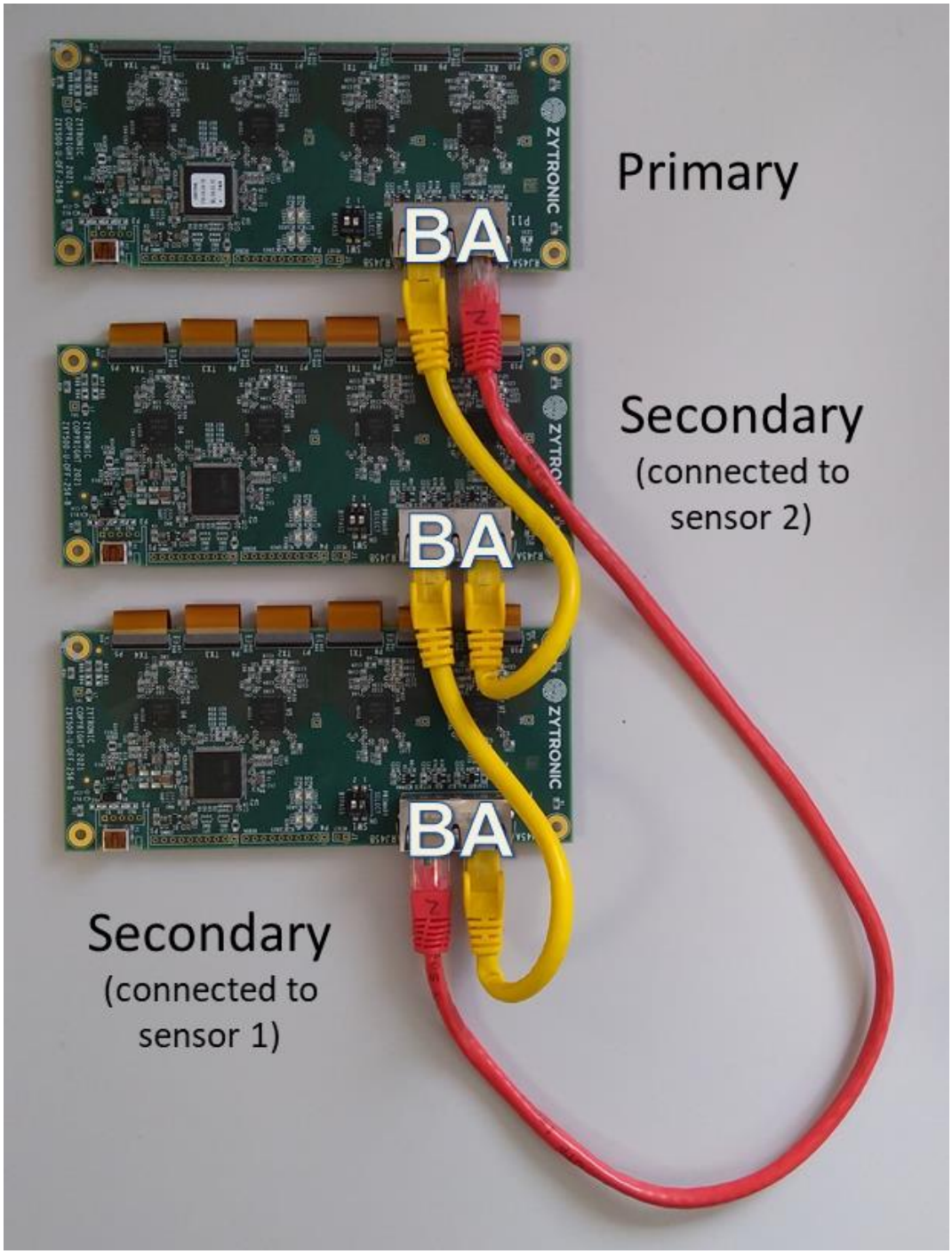
https://superuser.com/questions/1205691/a-usb-hub-will-not-function-when-its-connected-more-than-5-hubs-away-from-the-r

https://acroname.com/blog/how-many-usb-devices-can-i-connect

https://acroname.com/blog/how-many-acroname-usbhub3-hubs-can-i-daisy-chain

5.3 Comms loop wiring

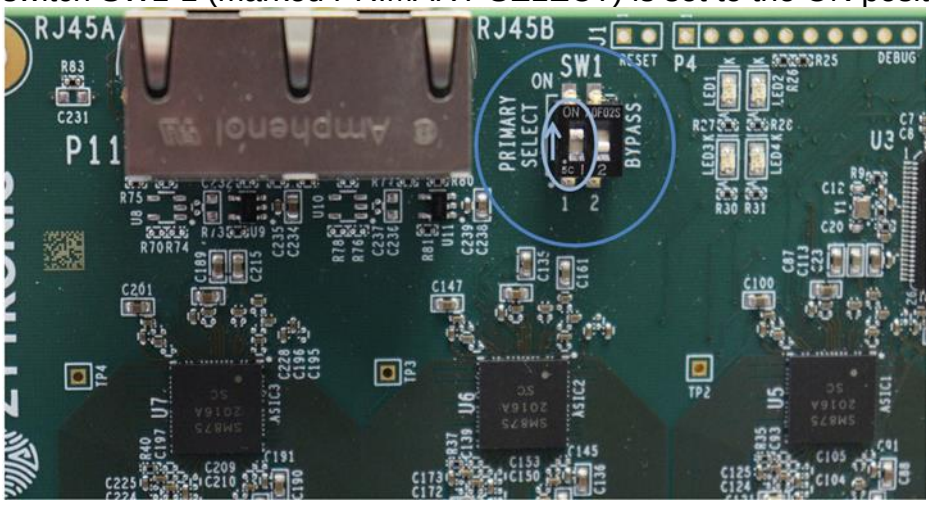
Zytronic EDGE video walls require a primary controller plus one secondary controller for each sensor. For example, a video wall with 2 sensors requires 3 controllers. The controllers communicate via Cat5 cables (network cables) connected in a loop, as illustrated below:



The order in which the wires in the loop are connected is used to determine the location of each sensor within the video wall, so it is crucial that the relevant wiring diagram in Section 5 Wiring Diagrams is followed precisely.

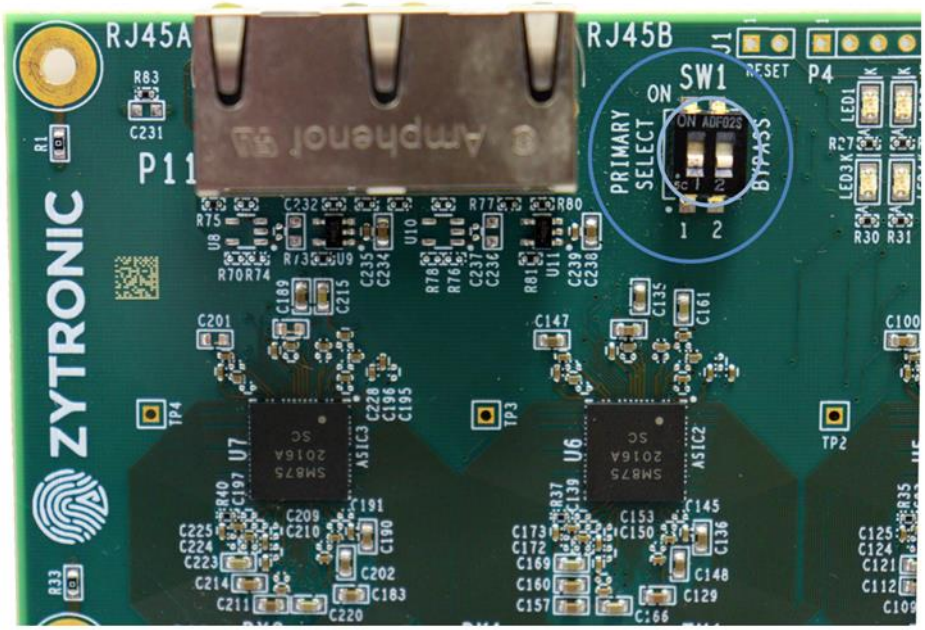
5.4 Hardware configuration of a Primary Device

To configure the touchscreen controller as a primary device, make sure that the switch SW1-1 (marked PRIMARY SELECT) is set to the ON position.



5.5 Hardware configuration of a Secondary Device

To configure the touchscreen controller as a secondary device, make sure that the switch SW1-1 (marked PRIMARY SELECT) is set to the OFF position.

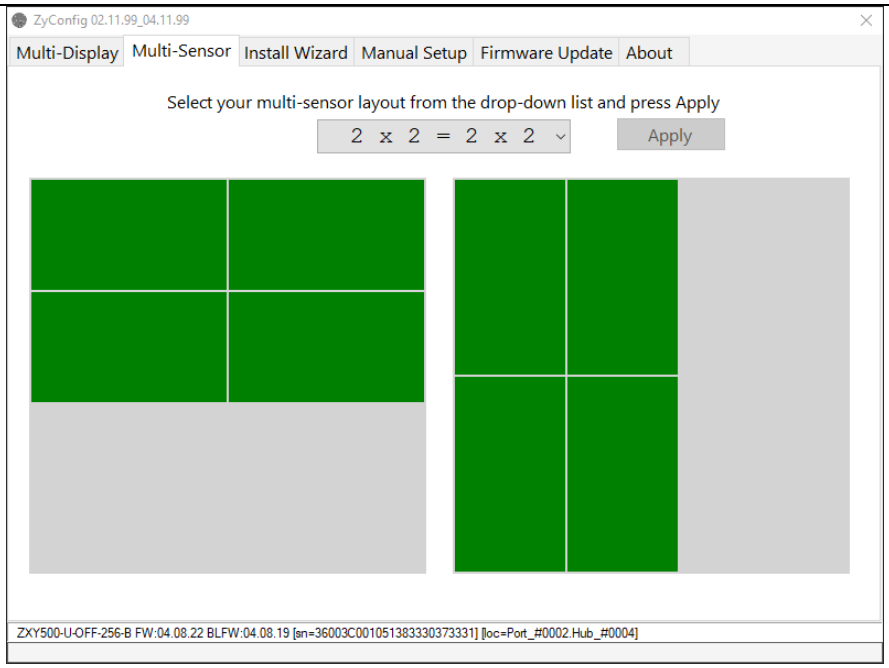


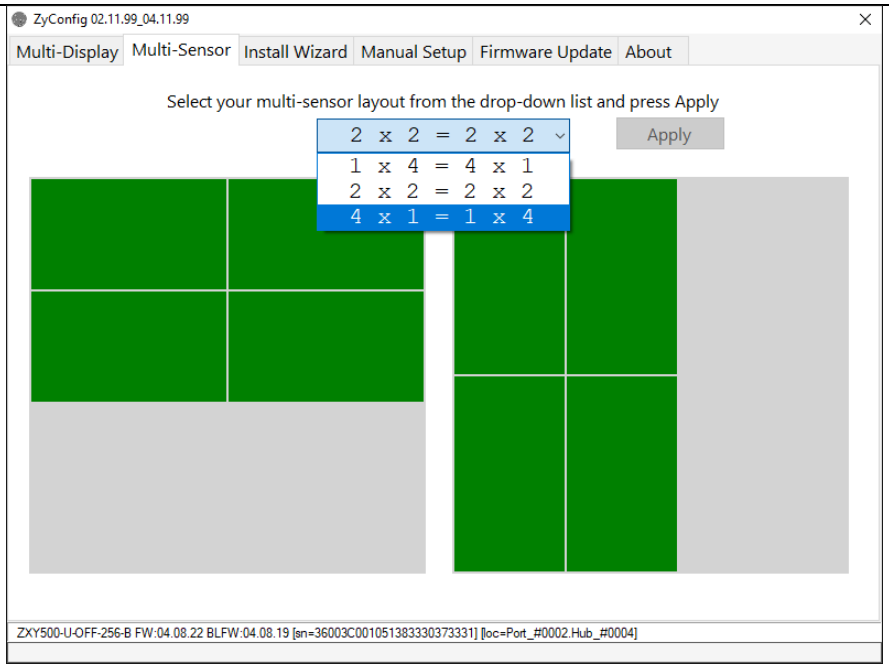
5.6 ZyConfig Multi-Sensor page

Make sure that the controllers of the video wall have been wired up by following the relevant wiring diagram in Section 5 Wiring Diagrams before reading on. When the ZyConfig tool connects to a primary device, you will be presented with the Multi-Sensor page.

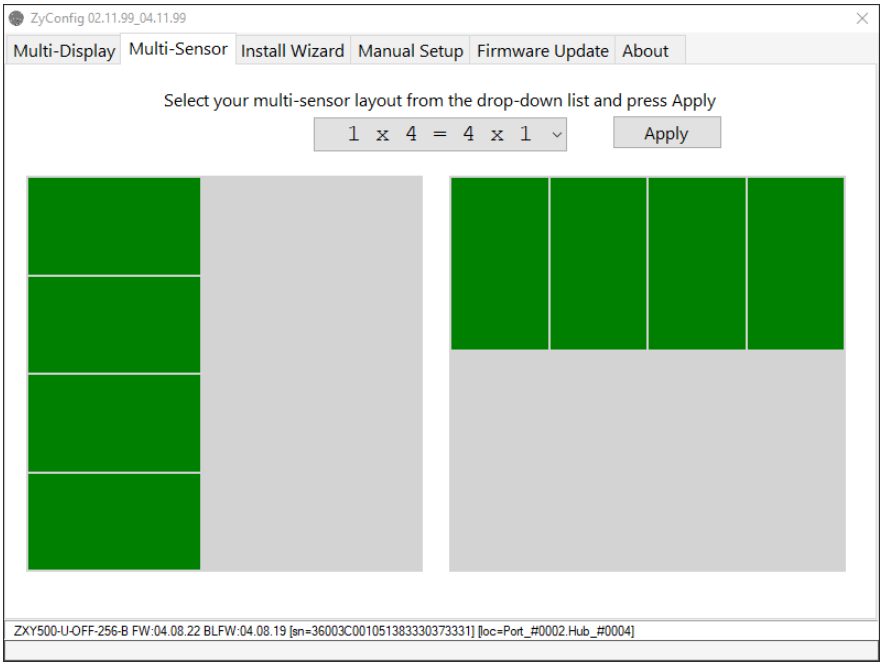
If you have not yet configured the primary device, you will see a best guess that has been made about your hardware layout.

In this example, there are 4 secondary devices connected.

The best-guess is that these are configured in a 2x2 layout.

The drop-down list is populated with all valid options for the number of connected secondary devices.



If the best-guess does not match your layout then select a different configuration that matches your layout from the drop-down list and press Apply.



NOTE: The graphic on the left of the page shows 4x sensors in a Landscape configuration. The graphic on the right of the page shows the same number of sensors in a Portrait configuration.

If you do not see the correct number of secondary devices that are in your hardware layout (e.g. you know that you have 8 devices but a different number is shown on this page), go back and check the wiring diagrams.

6 Wiring Diagrams

The order in which the wires in the loop are connected is used to determine the location of each sensor within the video wall, so it is crucial that controllers are connected in the right order.

Example wiring diagrams are shown below for the most common video wall configurations. These have been grouped by the number of sensors in the video wall.

6.1 Video walls with 2 sensors

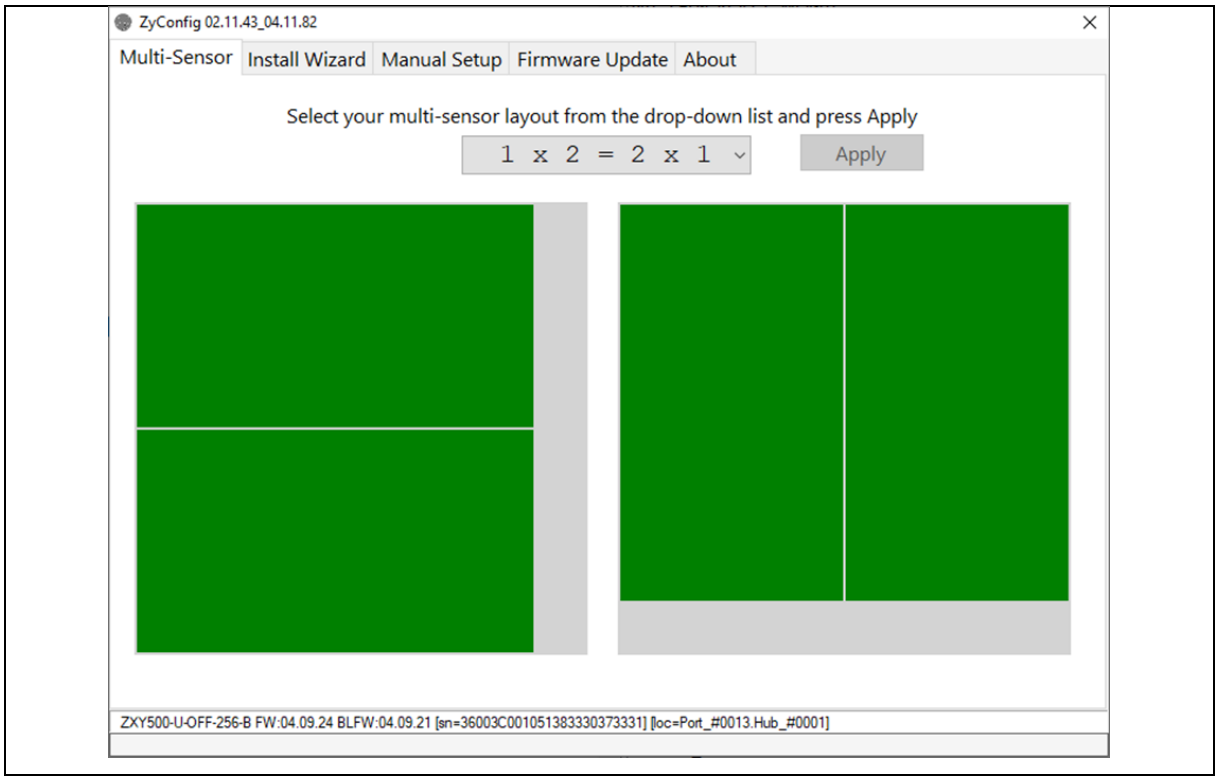
Video walls with 2 sensors can be configured as:

- 1x2, or
- 2x1

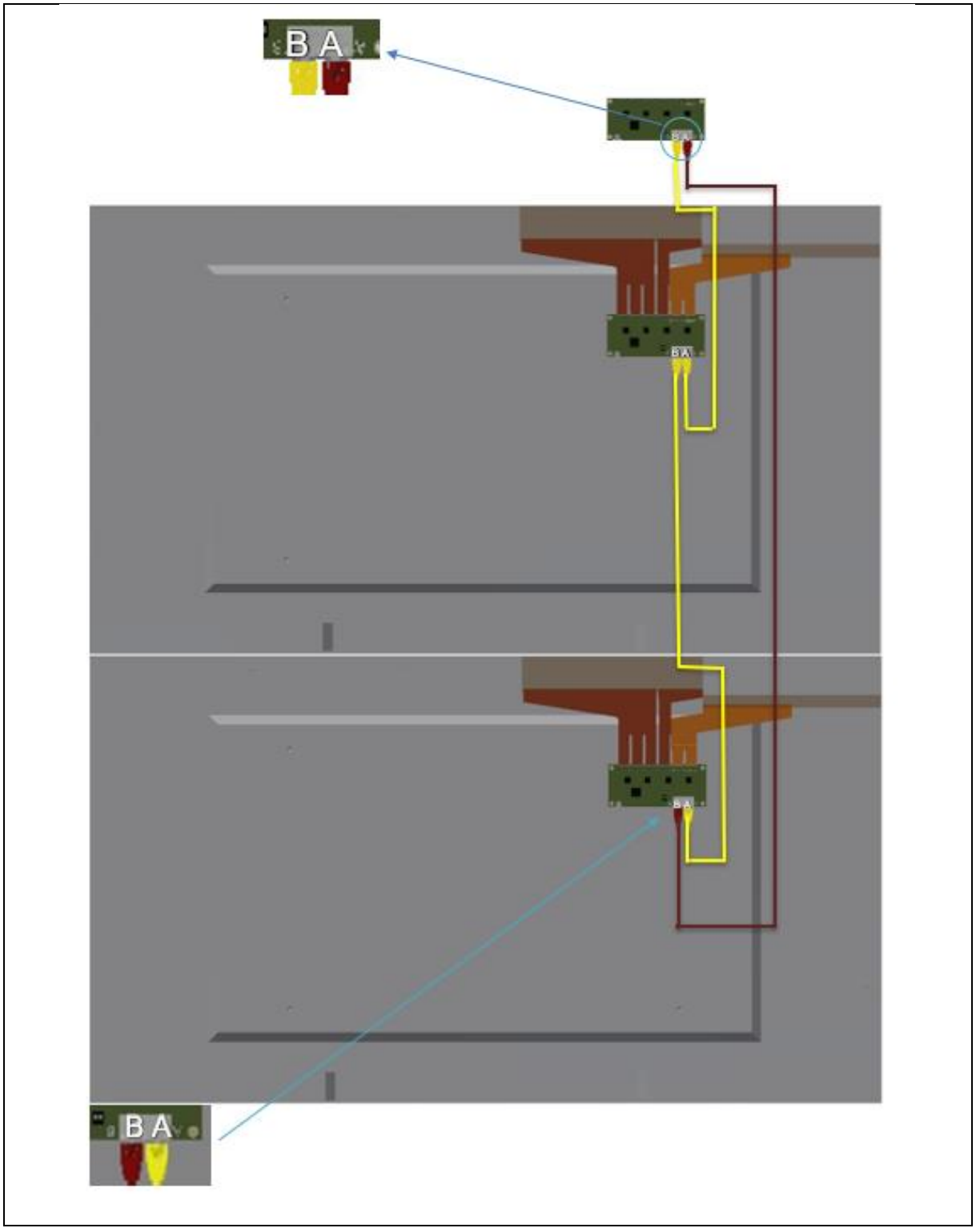
The following sections show the wiring diagram and Multi-Sensor page for both options.

6.1.1 1x2

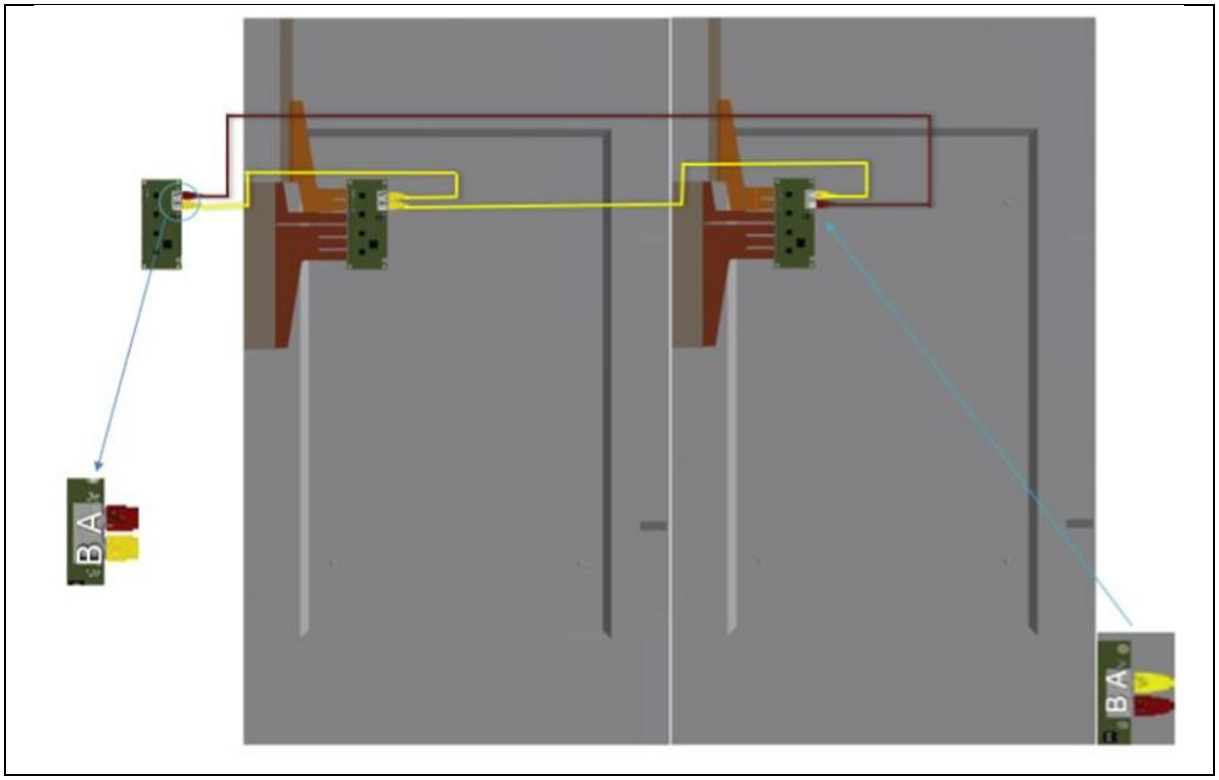
To use this configuration the Multi-Sensor page in ZyConfig must look like this:



Wiring for this configuration is shown below: (rear view)



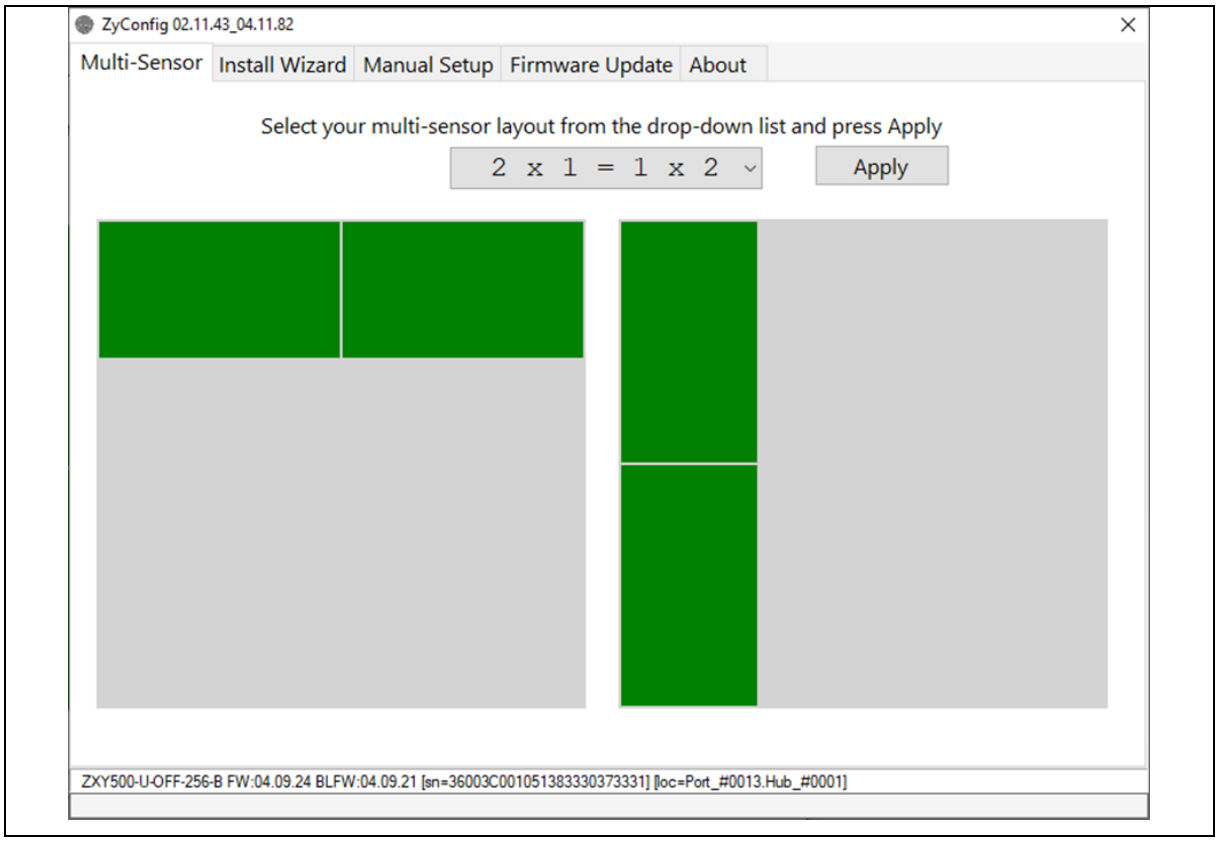
The same diagram rotated 90 degrees (“portrait”) is shown below: (rear view)



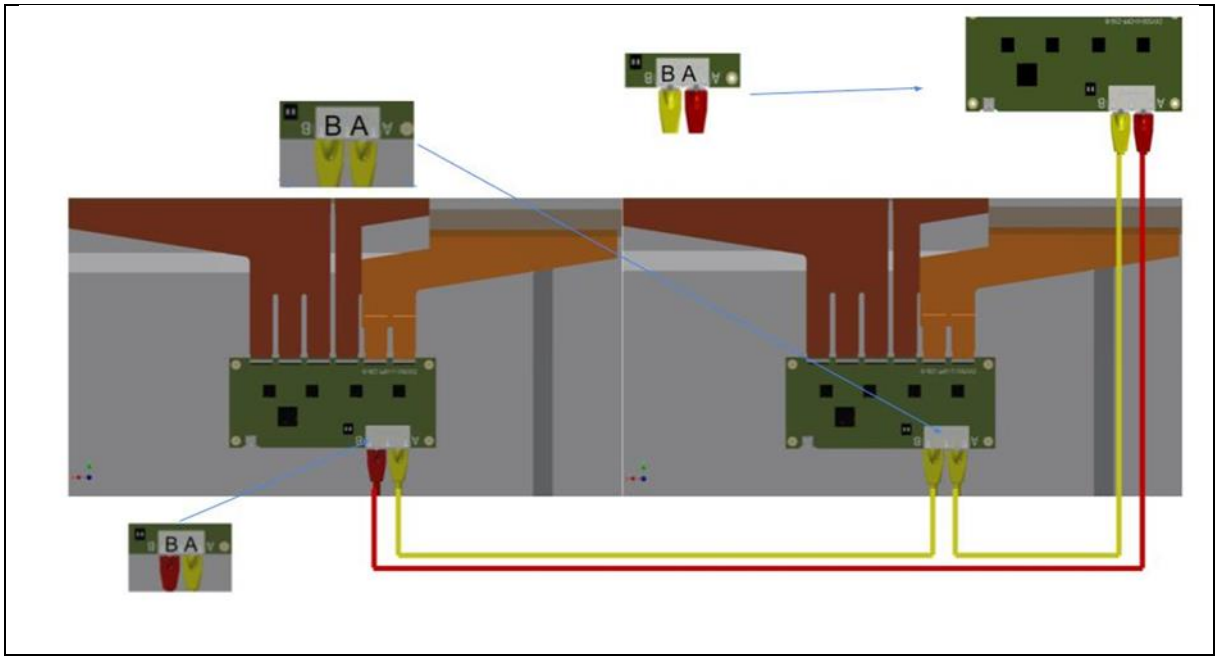
Note that further rotations of 180 or 270 degrees would also be possible, and should be wired the same way.

6.1.2 2x1

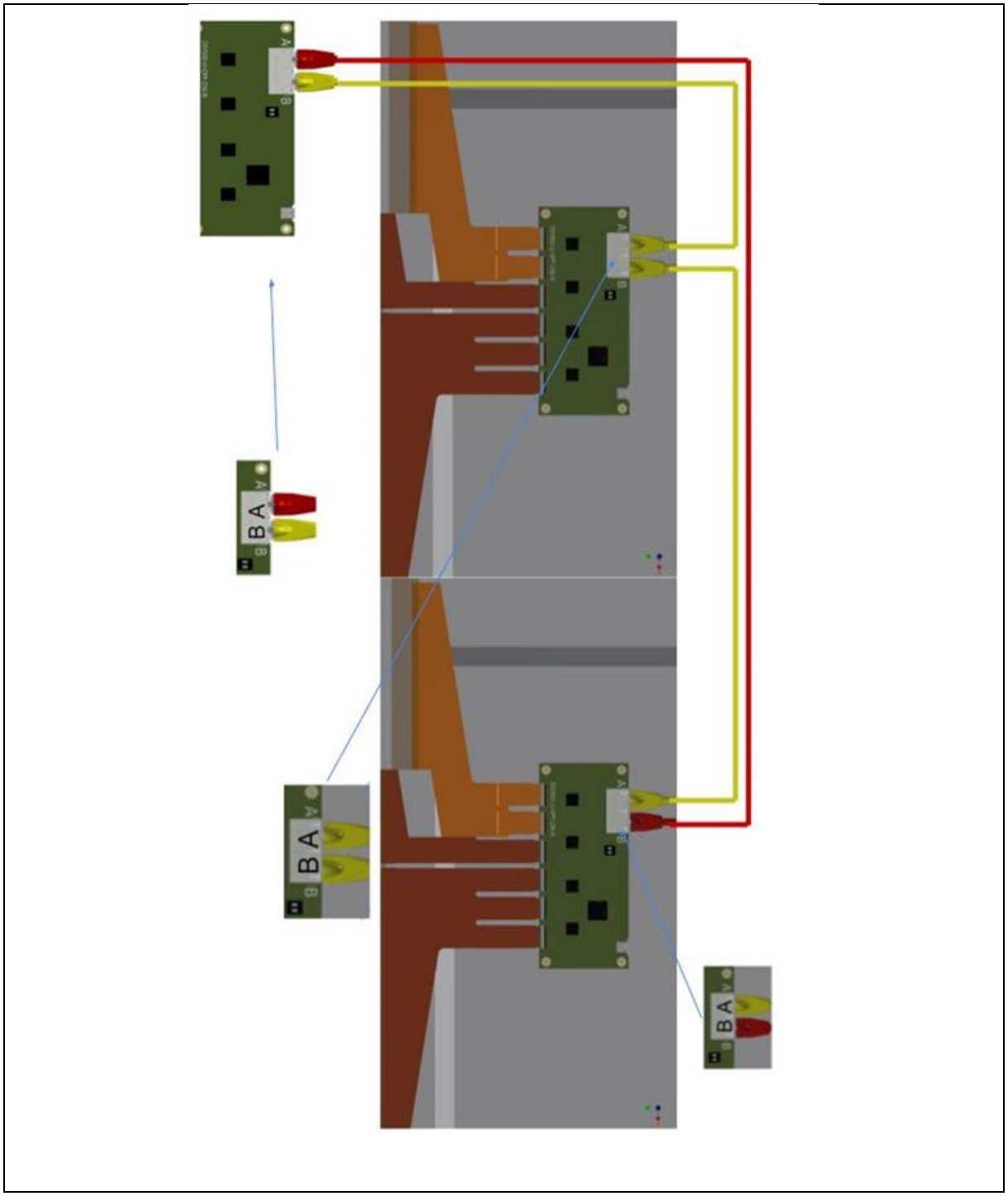
To use this configuration the Multi-Sensor page in ZyConfig must look like this:



Wiring for this configuration is shown below: (rear view)



The same diagram rotated 90 degrees (“portrait”) is shown below: (rear view)



Note that further rotations of 180 or 270 degrees would also be possible, and should be wired the same way.

6.2 Video walls with 3 sensors

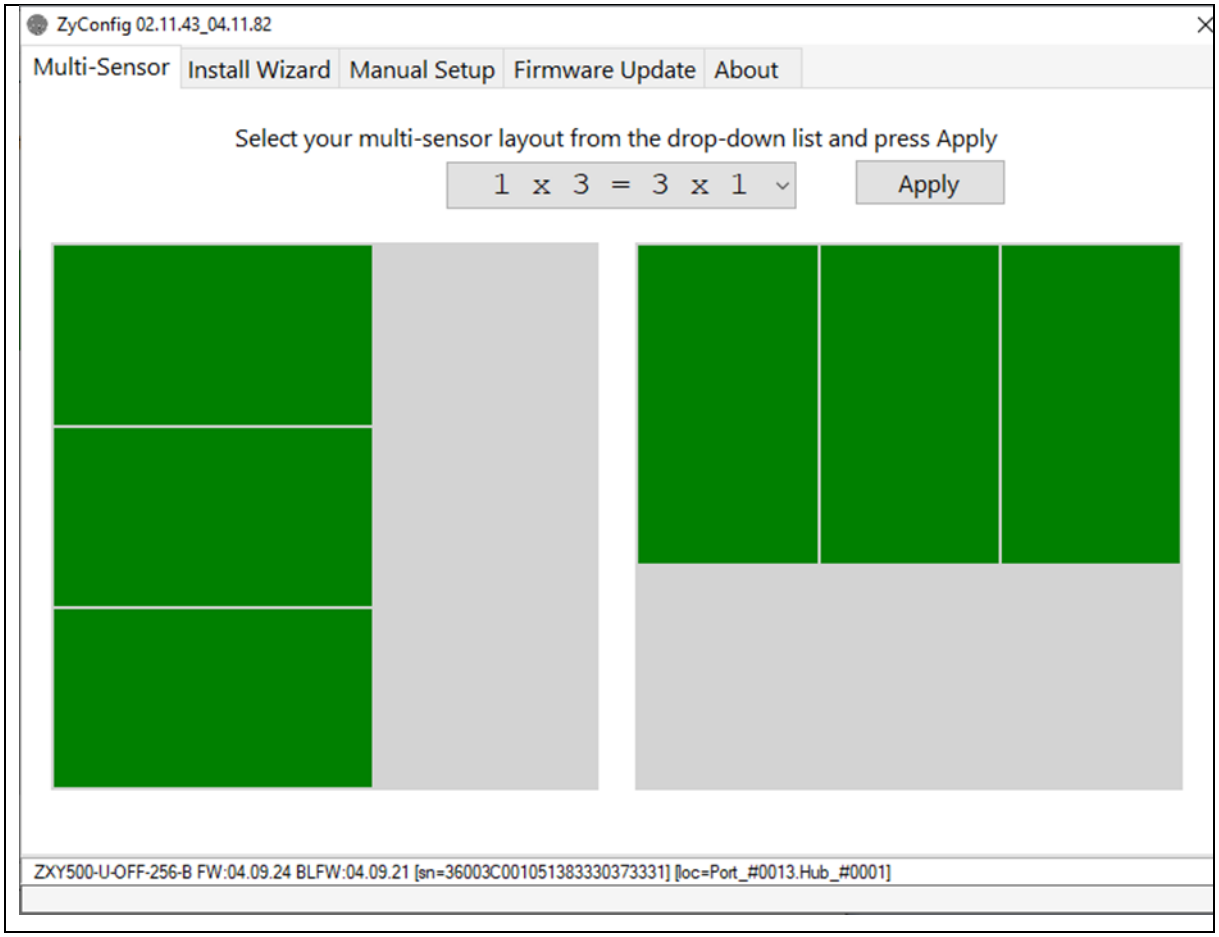
Video walls with 3 sensors can be configured as:

- 1x3, or
- 3x1

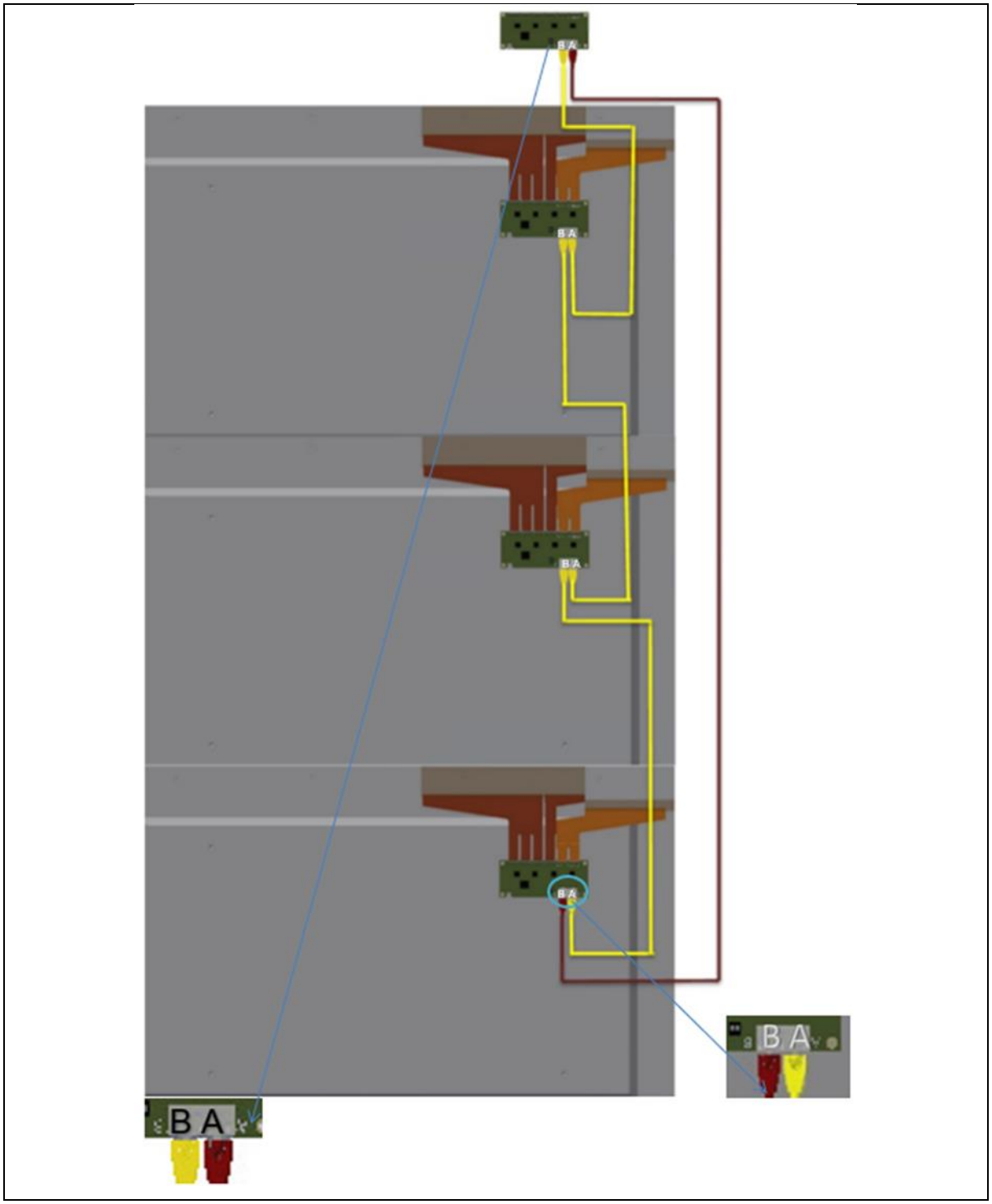
The following sections show the wiring diagram and Multi-Sensor page for both options.

6.2.1 1x3

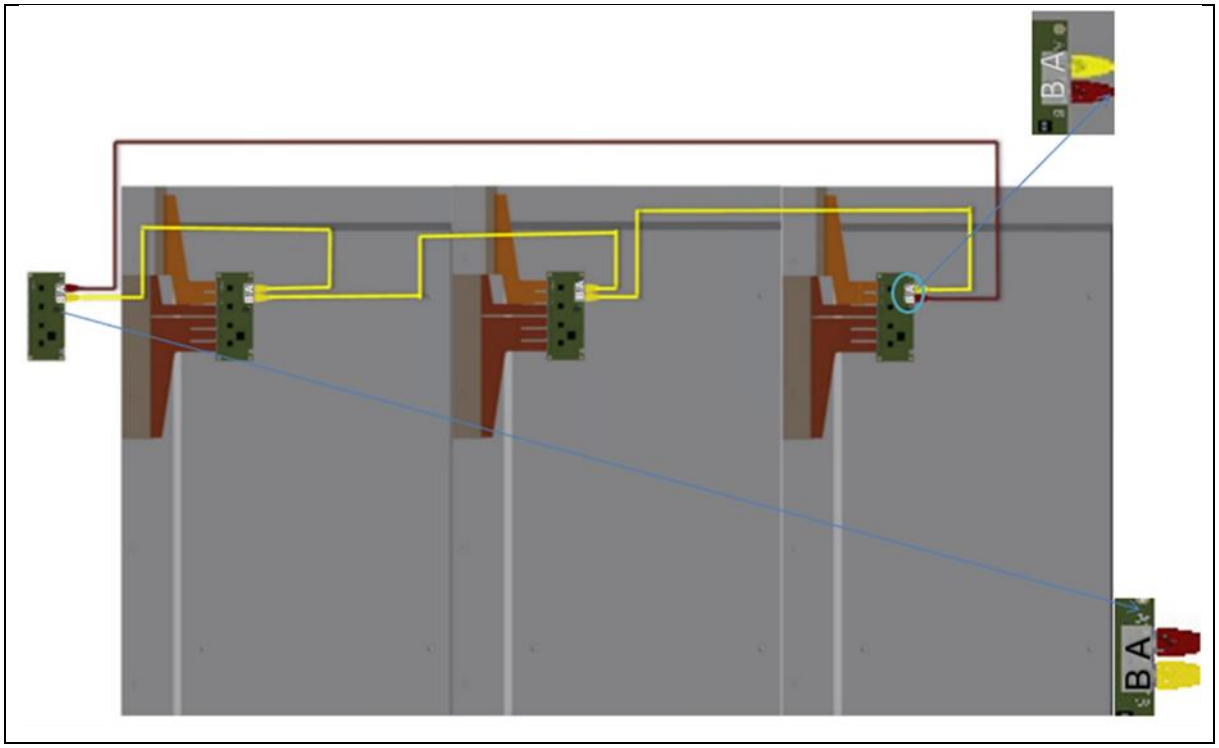
To use this configuration the Multi-Sensor page in ZyConfig must look like this:



Wiring for this configuration is shown below: (rear view)



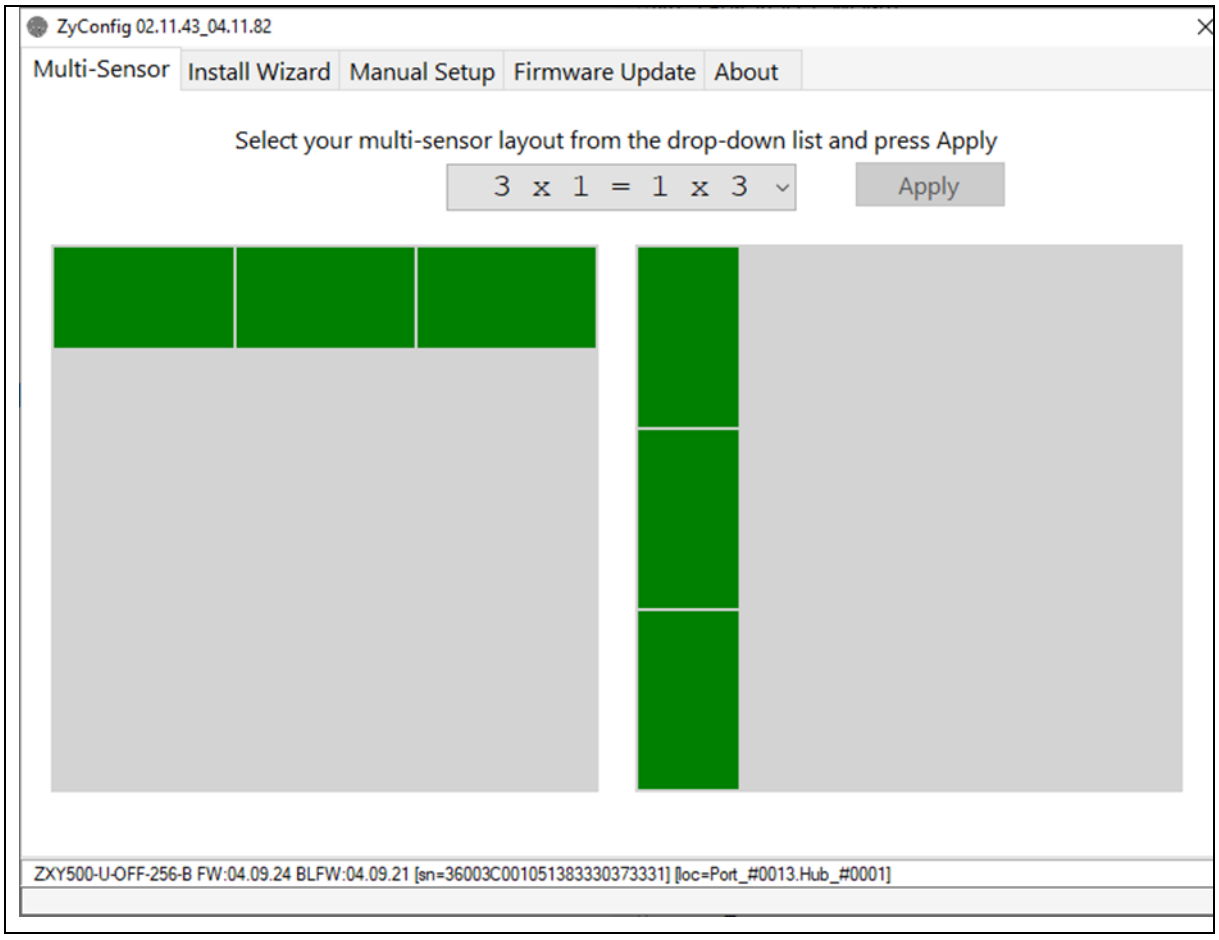
The same diagram rotated 90 degrees (“portrait”) is shown below: (rear view)



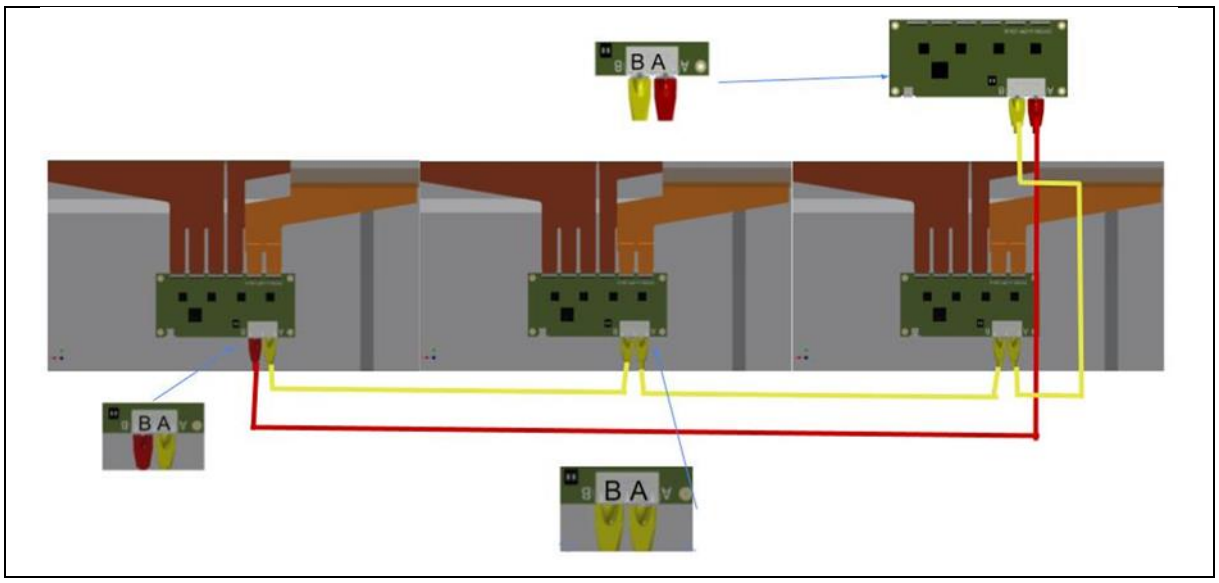
Note that further rotations of 180 or 270 degrees would also be possible, and should be wired the same way.

6.2.2 3x1

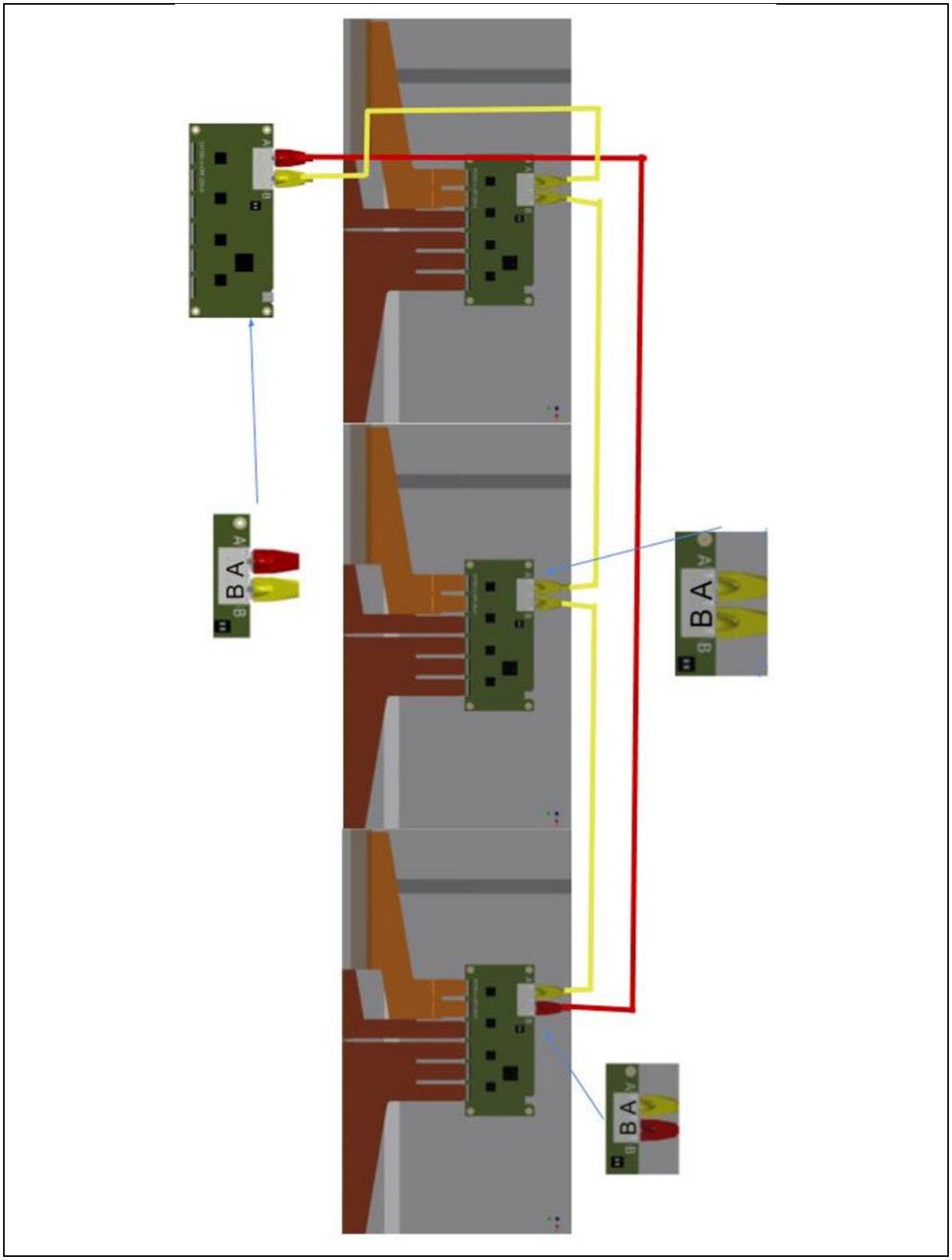
To use this configuration the Multi-Sensor page in ZyConfig must look like this:



Wiring for this configuration is shown below: (rear view)



The same diagram rotated 90 degrees (“portrait”) is shown below: (rear view)



Note that further rotations of 180 or 270 degrees would also be possible, and should be wired the same way.

6.3 Video walls with 4 sensors

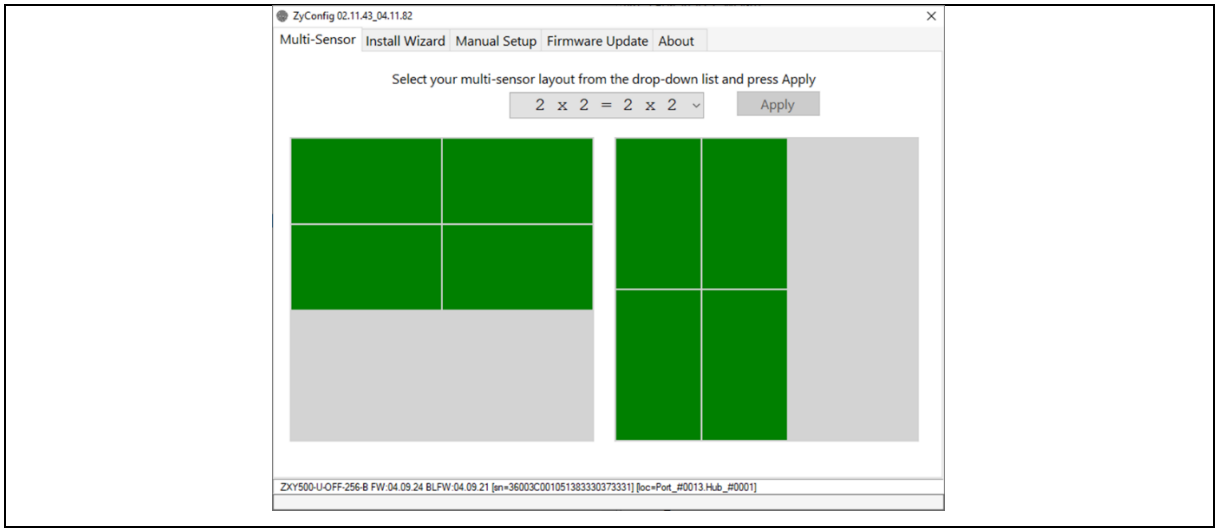
Video walls with 4 sensors can be configured as:

- 1x4, or
- 2x2, or
- 4x1

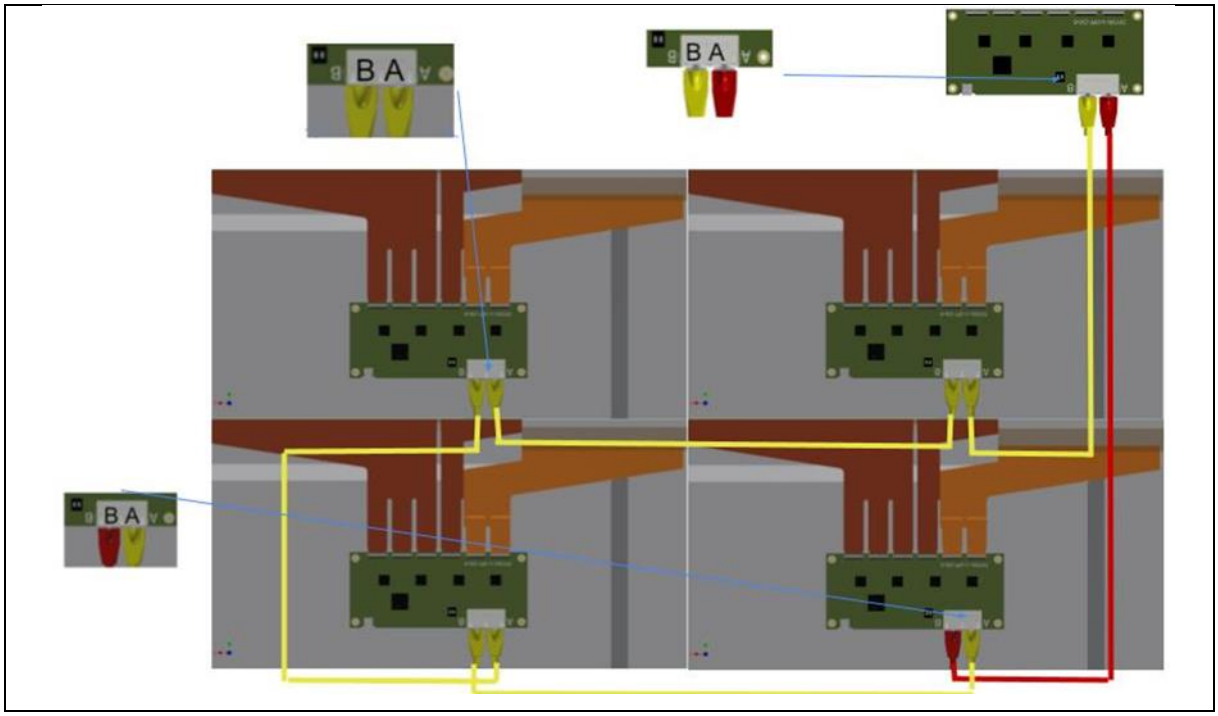
The following section shows the wiring diagram and Multi-Sensor page for the 2x2 option.

6.3.1 2x2

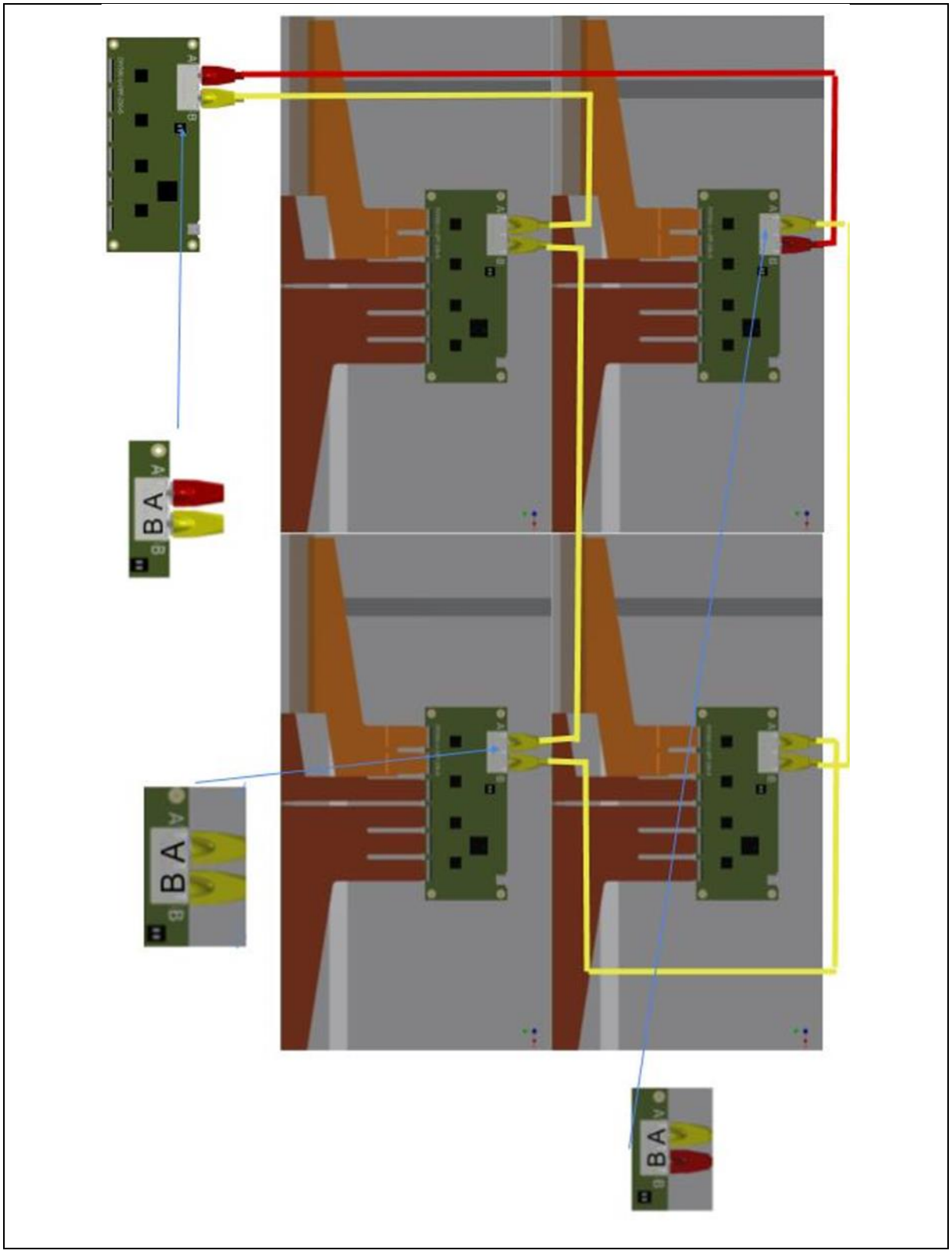
To use this configuration the Multi-Sensor page in ZyConfig must look like this:



Wiring for this configuration is shown below: (rear view)



The same diagram rotated 90 degrees (“portrait”) is shown below: (rear view)



Note that further rotations of 180 or 270 degrees would also be possible, and should be wired the same way.

6.4 Video walls with 6 sensors

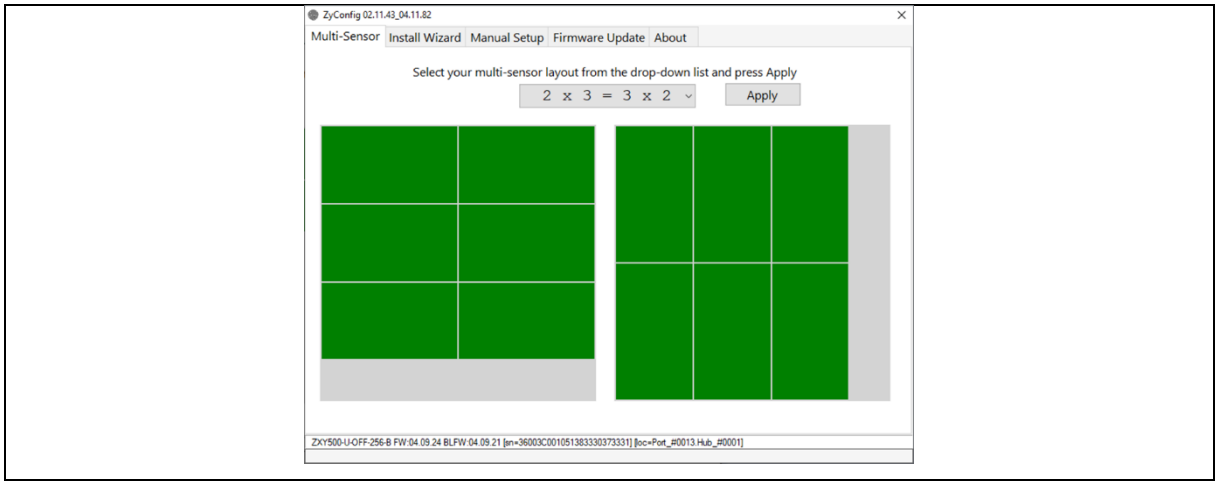
Video walls with 6 sensors can be configured as:

- 1x6, or
- 2x3, or
- 3x2, or
- 6x1

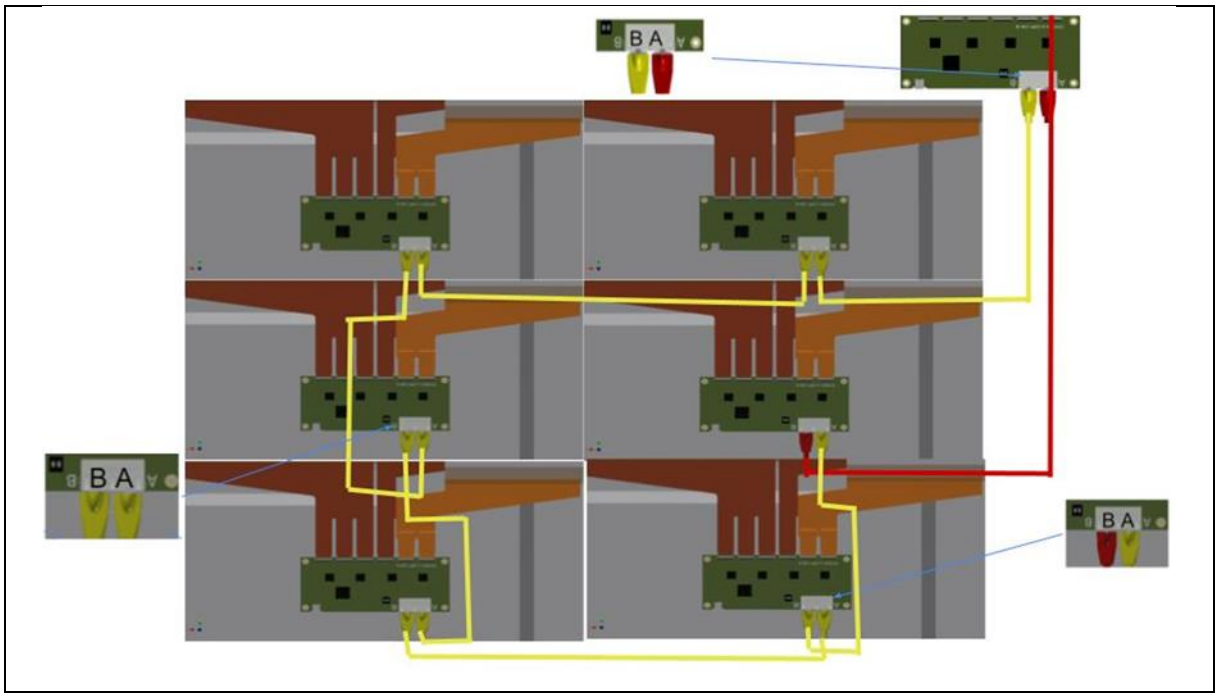
The following sections show the wiring diagram and Multi-Sensor page for the 2x3 and 3x2 options.

6.4.1 2x3

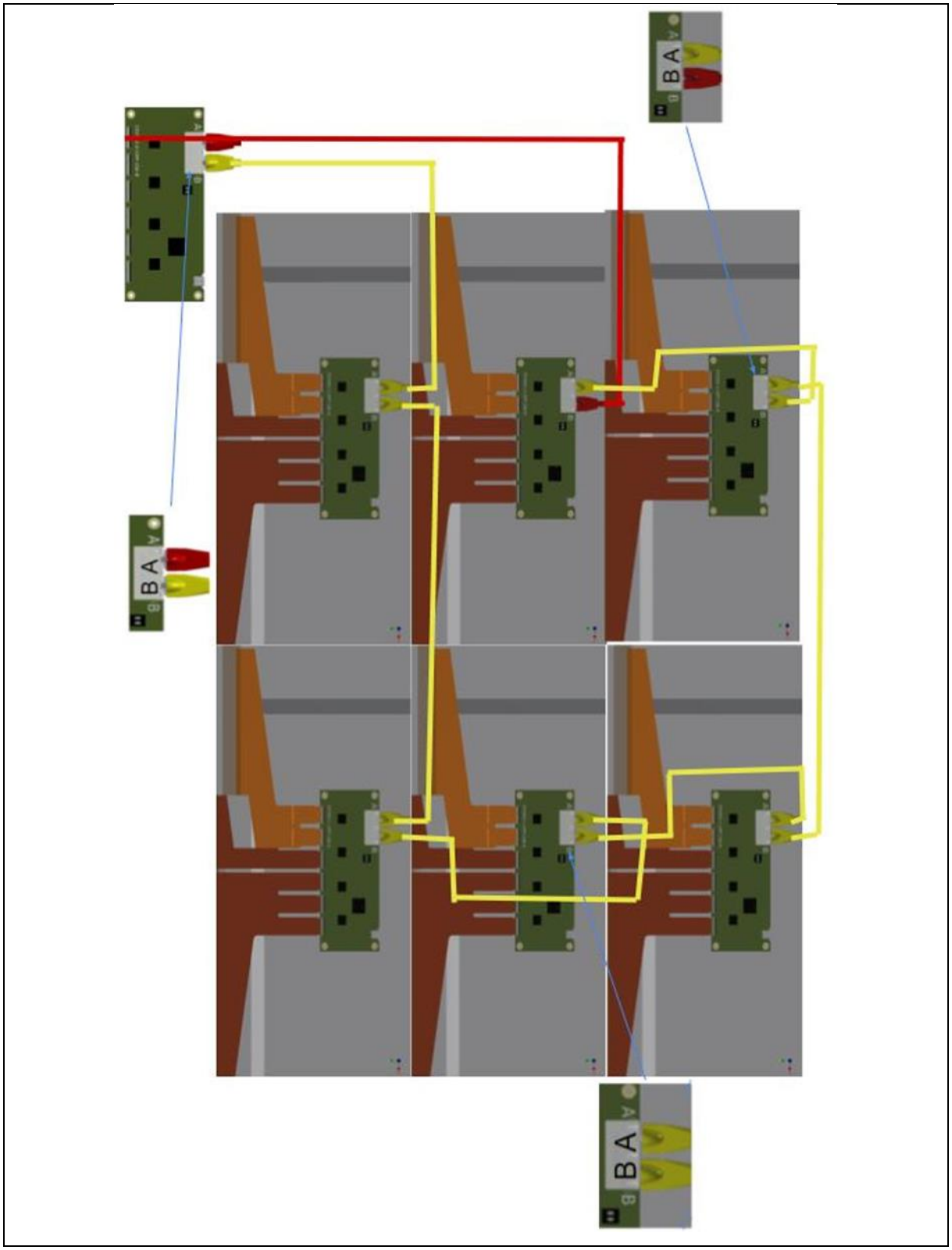
To use this configuration the Multi-Sensor page in ZyConfig must look like this:



Wiring for this configuration is shown below: (rear view)



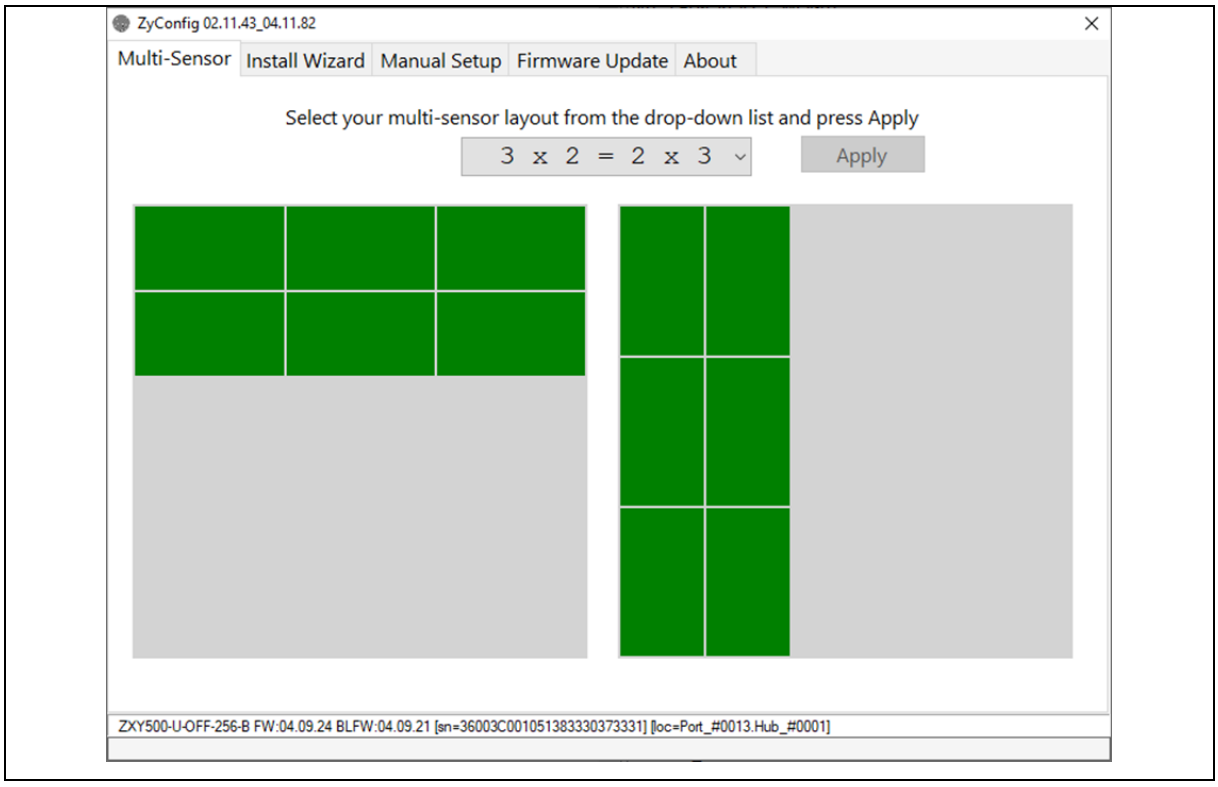
The same diagram rotated 90 degrees (“portrait”) is shown below: (rear view)



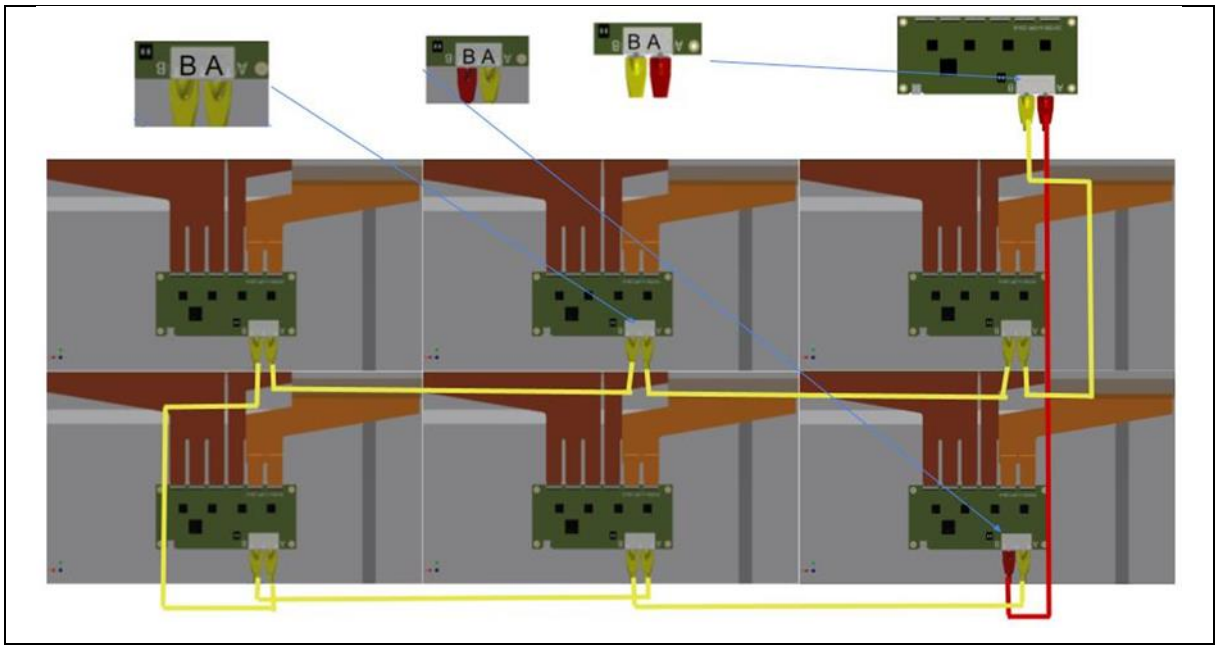
Note that further rotations of 180 or 270 degrees would also be possible, and should be wired the same way.

6.4.2 3x2

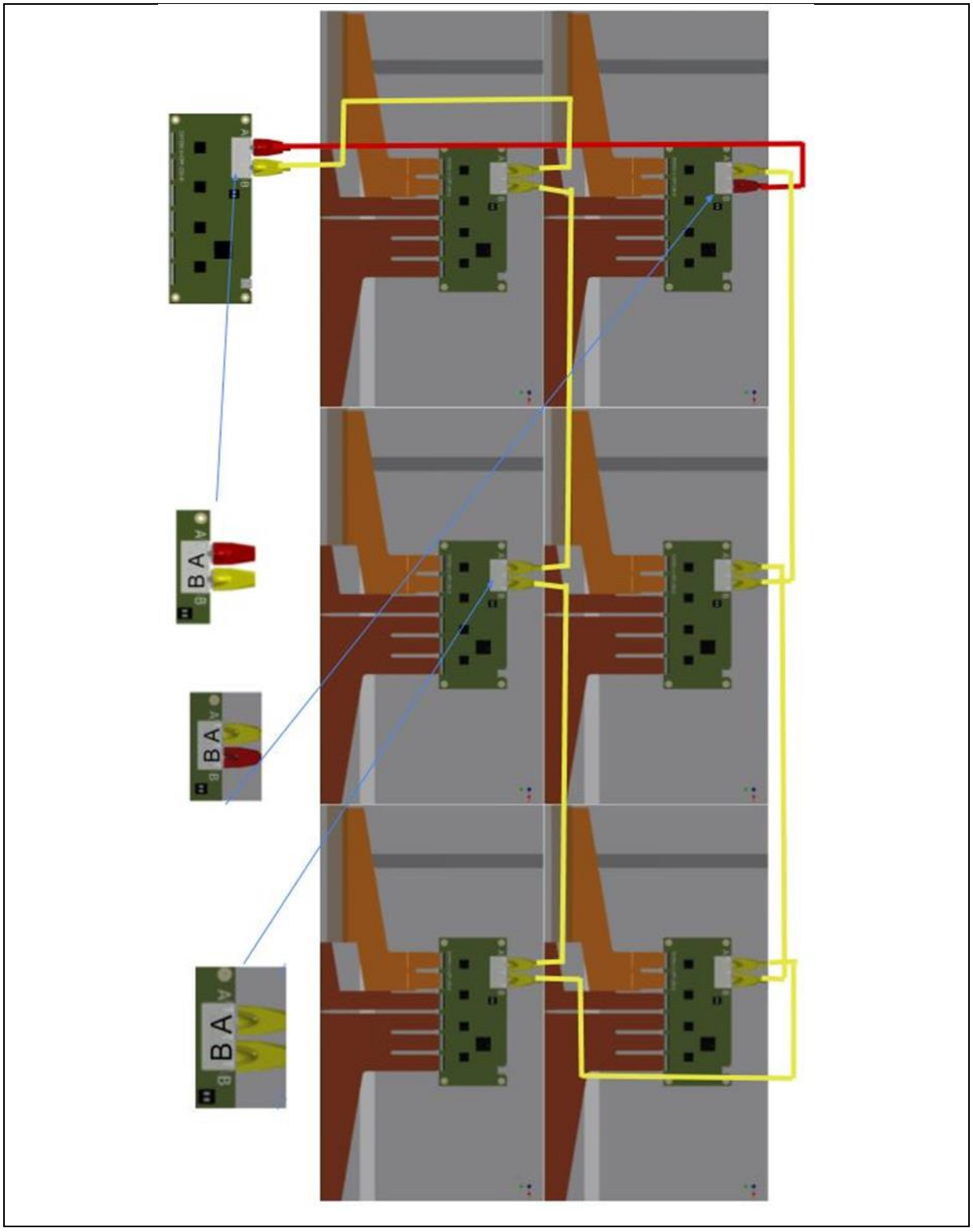
To use this configuration the Multi-Sensor page in ZyConfig must look like this:



Wiring for this configuration is shown below: (rear view)



The same diagram rotated 90 degrees (“portrait”) is shown below: (rear view)



Note that further rotations of 180 or 270 degrees would also be possible, and should be wired the same way.

6.5 Video walls with 9 sensors

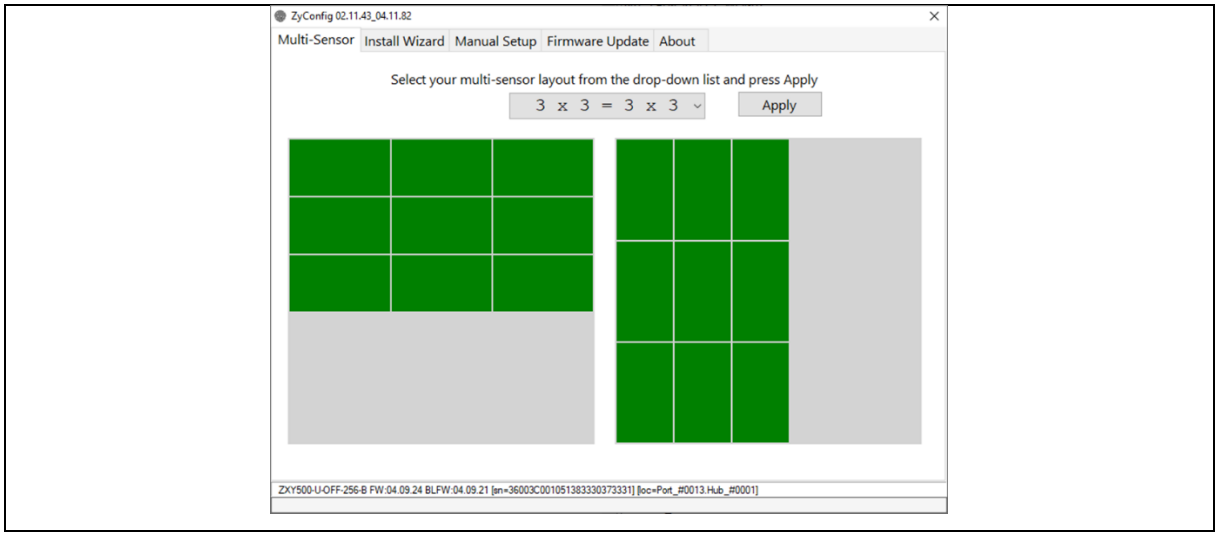
Video walls with 9 sensors can be configured as:

- 1x9, or
- 3x3, or
- 9x1

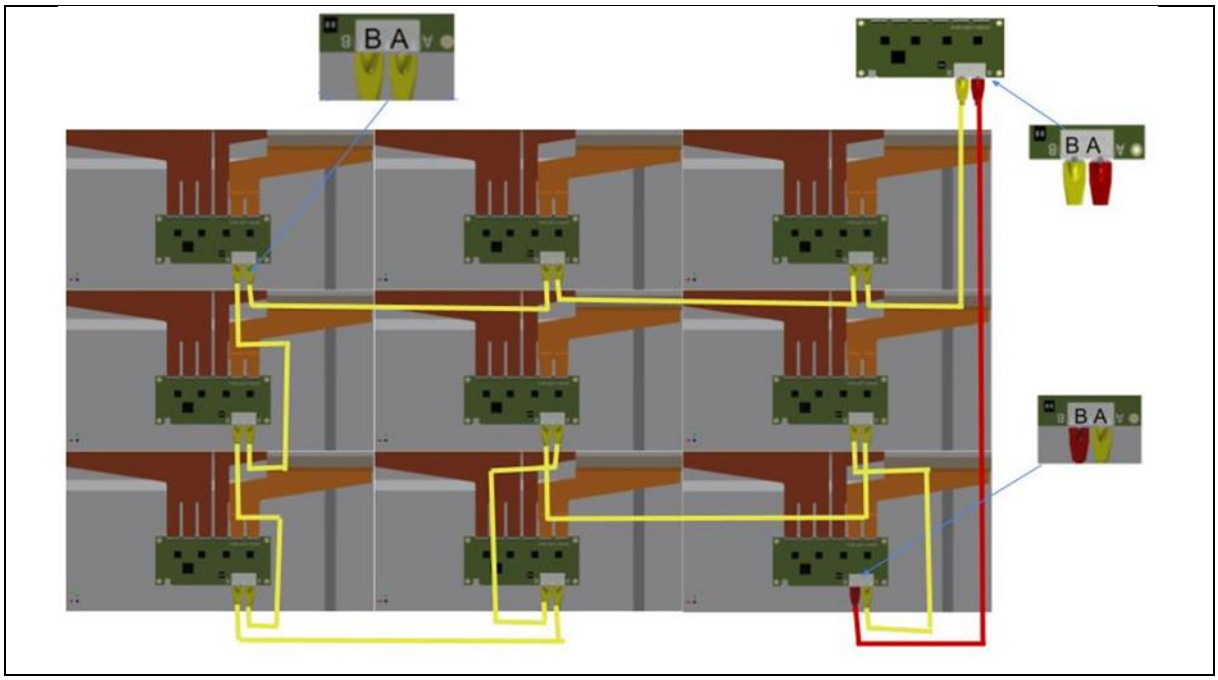
The following section shows the wiring diagram and Multi-Sensor page for the 3x3 option.

6.5.1 3x3

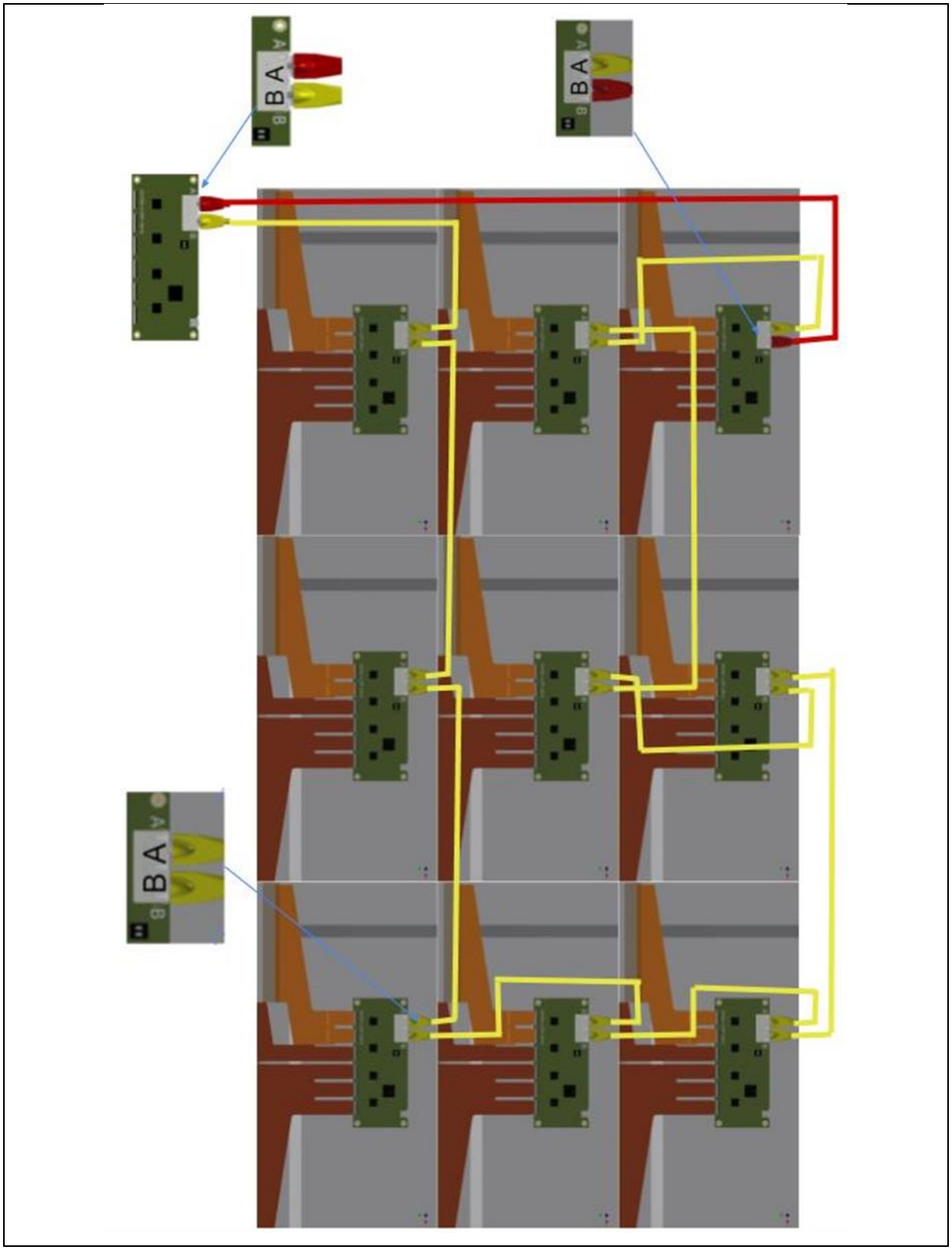
To use this configuration the Multi-Sensor page in ZyConfig must look like this:



Wiring for this configuration is shown below: (rear view)



The same diagram rotated 90 degrees (“portrait”) is shown below: (rear view)



Note that further rotations of 180 or 270 degrees would also be possible, and should be wired the same way.

6.6 Video walls with 10 sensors

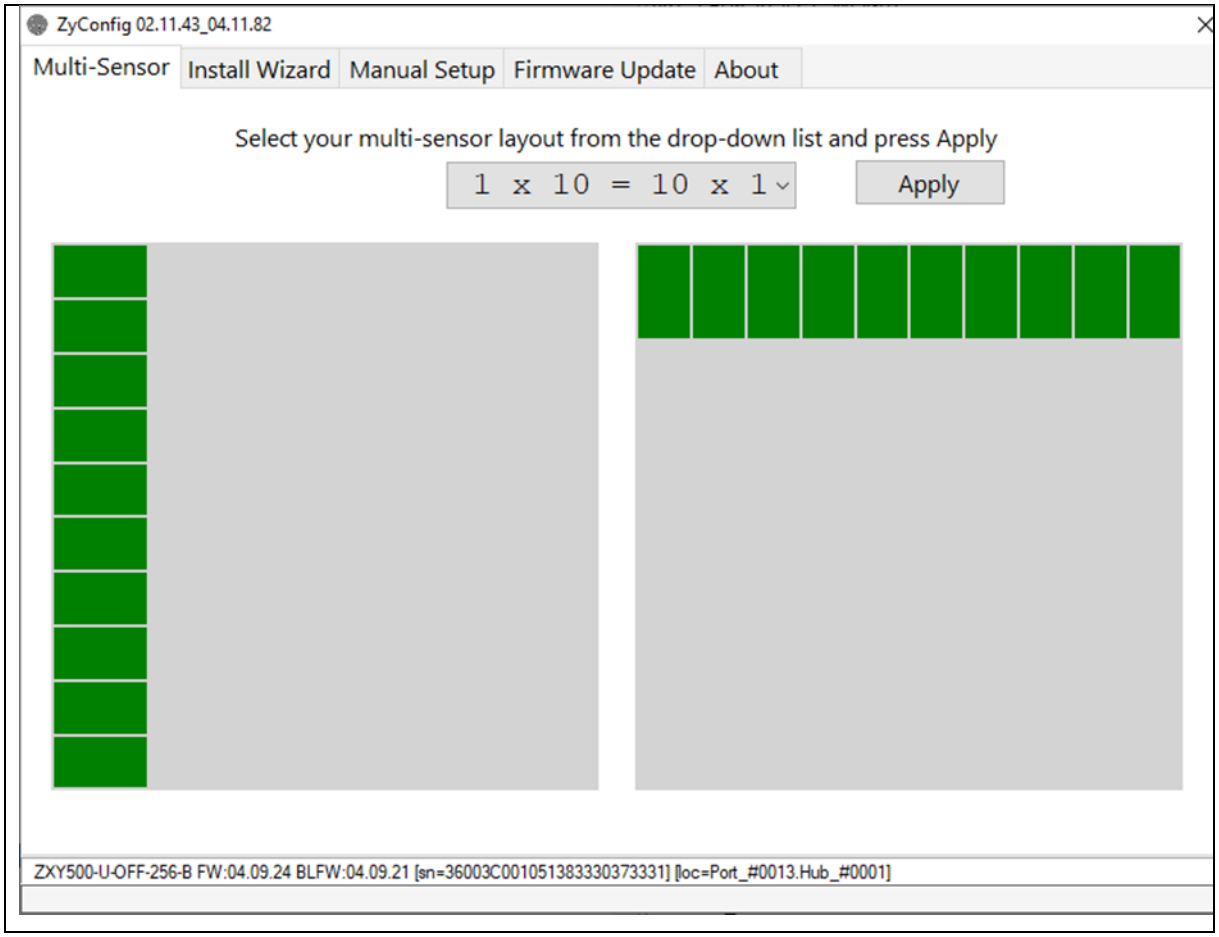
Video walls with 10 sensors can be configured as:

- 1x10, or
- 2x5, or
- 5x2, or
- 10x1

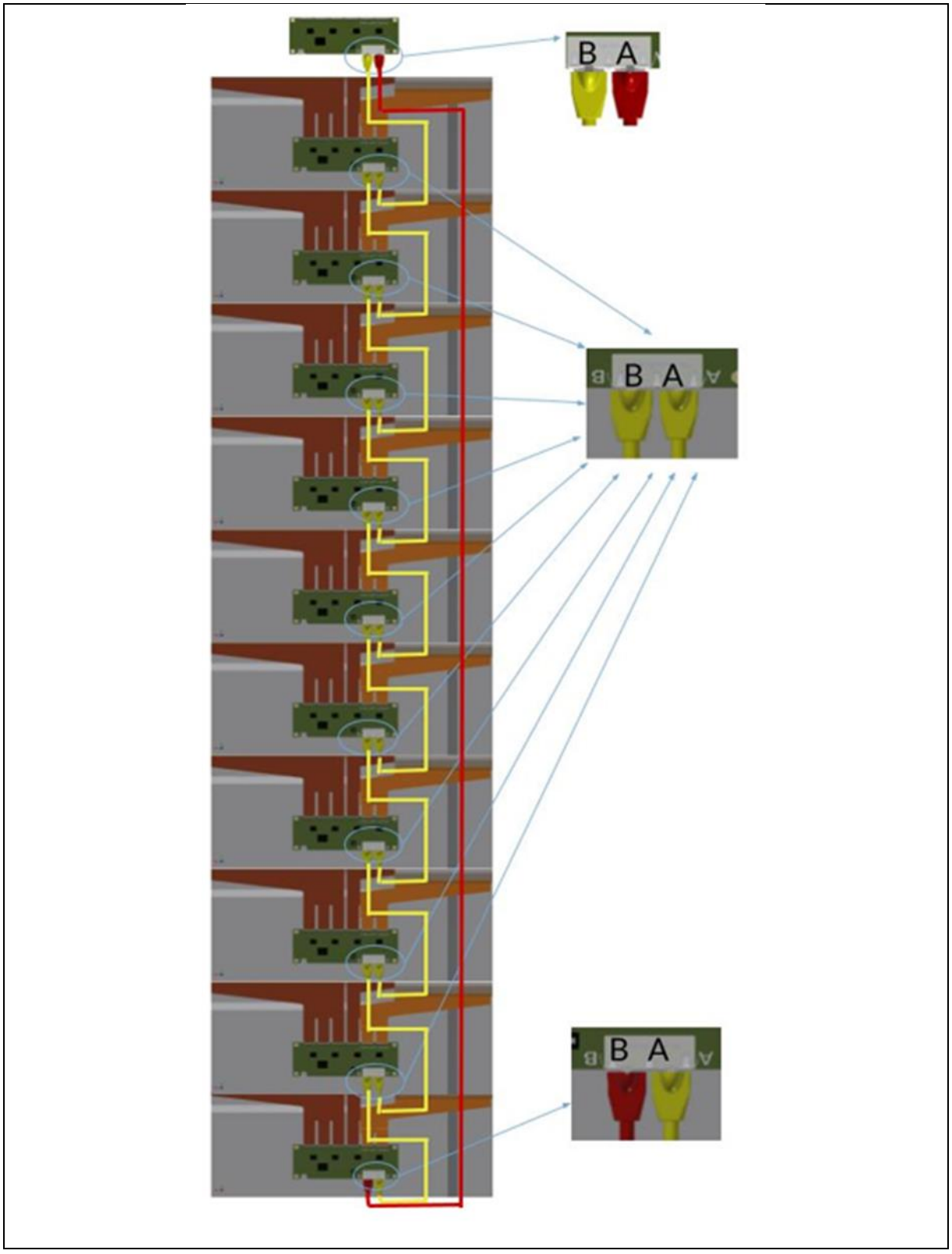
The following sections show the wiring diagram and Multi-Sensor page for the 1x10 and 10x1 options.

6.6.1 1x10

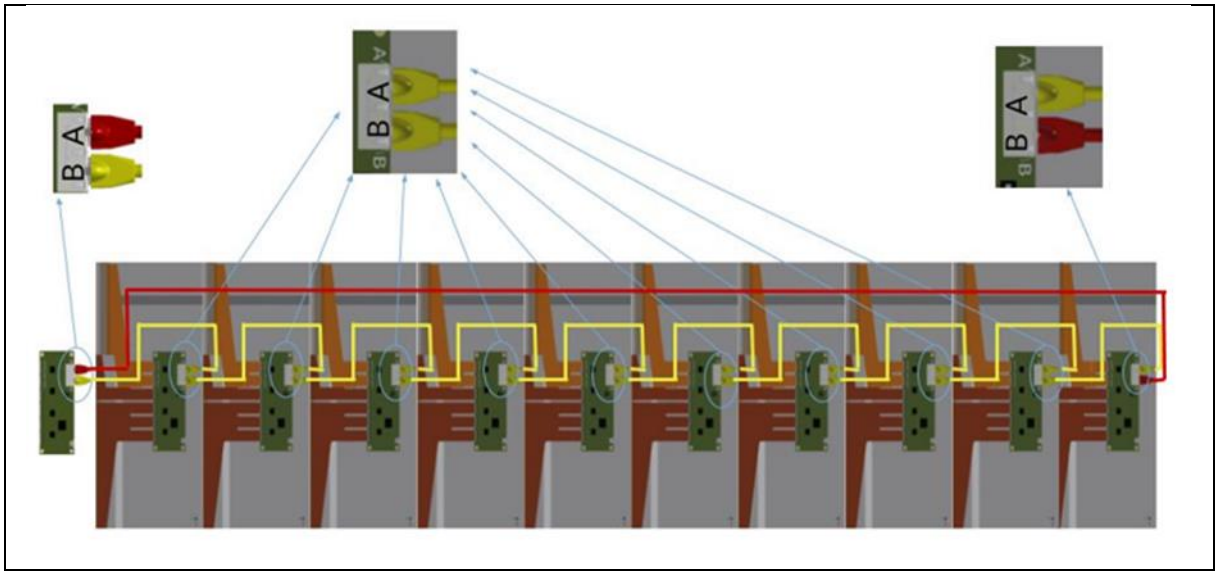
To use this configuration the Multi-Sensor page in ZyConfig must look like this:



Wiring for this configuration is shown below: (rear view)



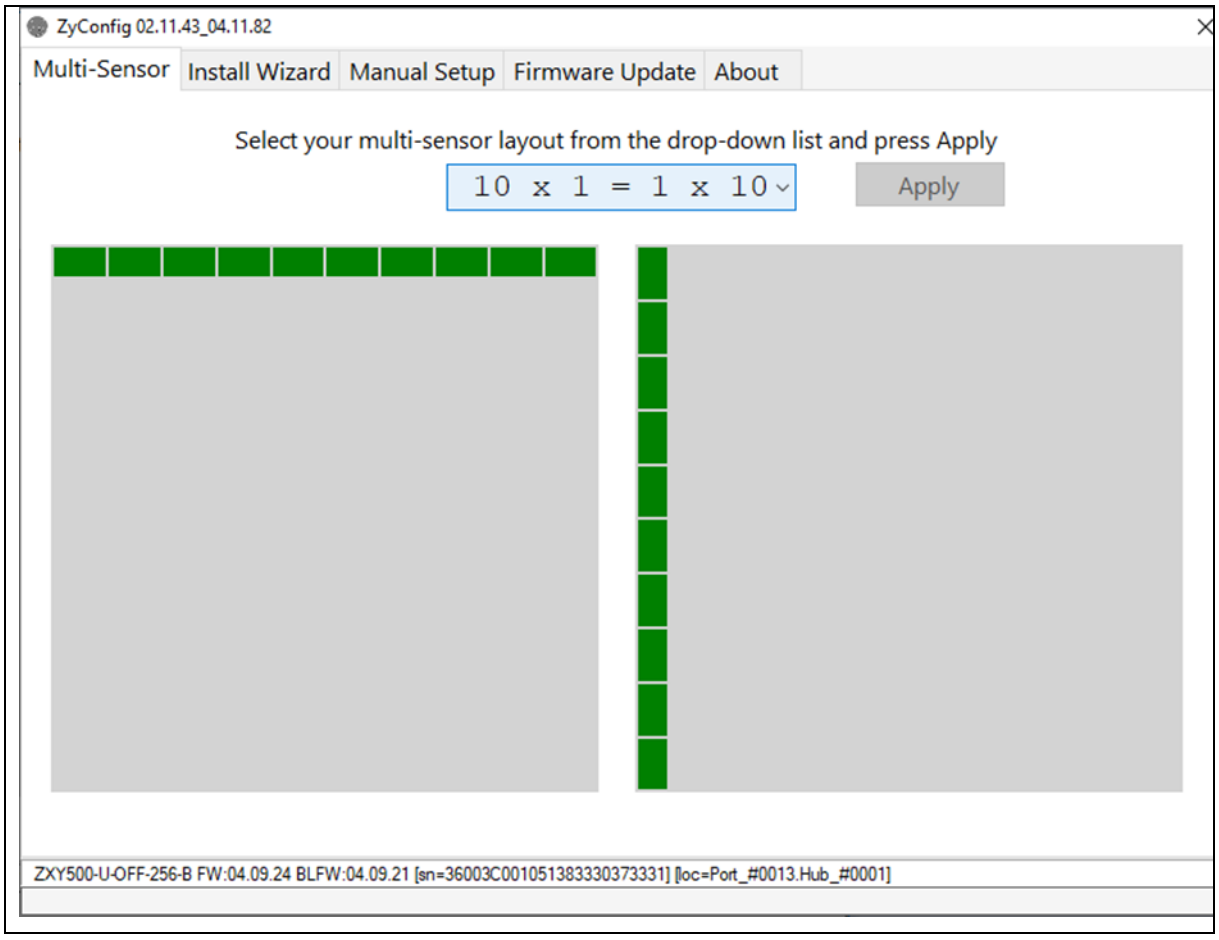
The same diagram rotated 90 degrees (“portrait”) is shown below: (rear view)



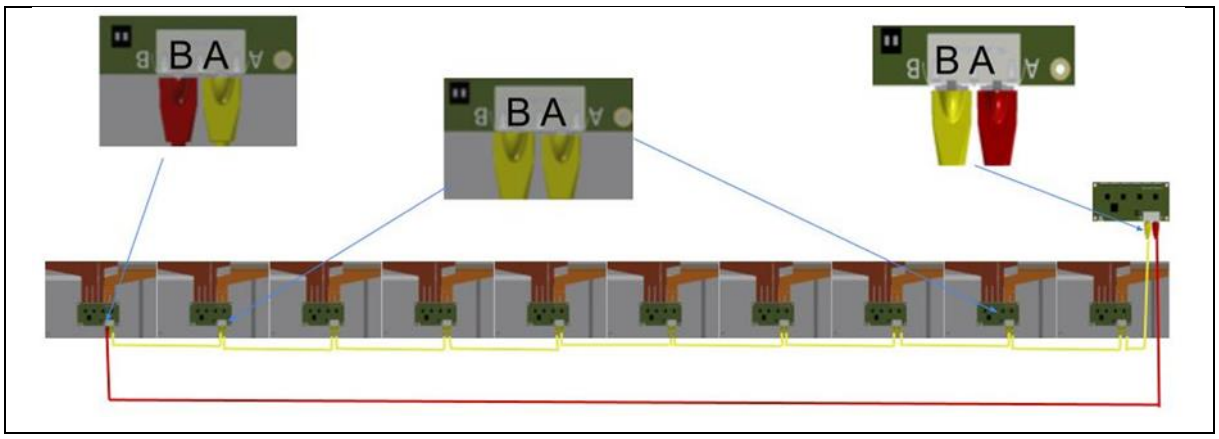
Note that further rotations of 180 or 270 degrees would also be possible, and should be wired the same way.

6.6.2 10x1

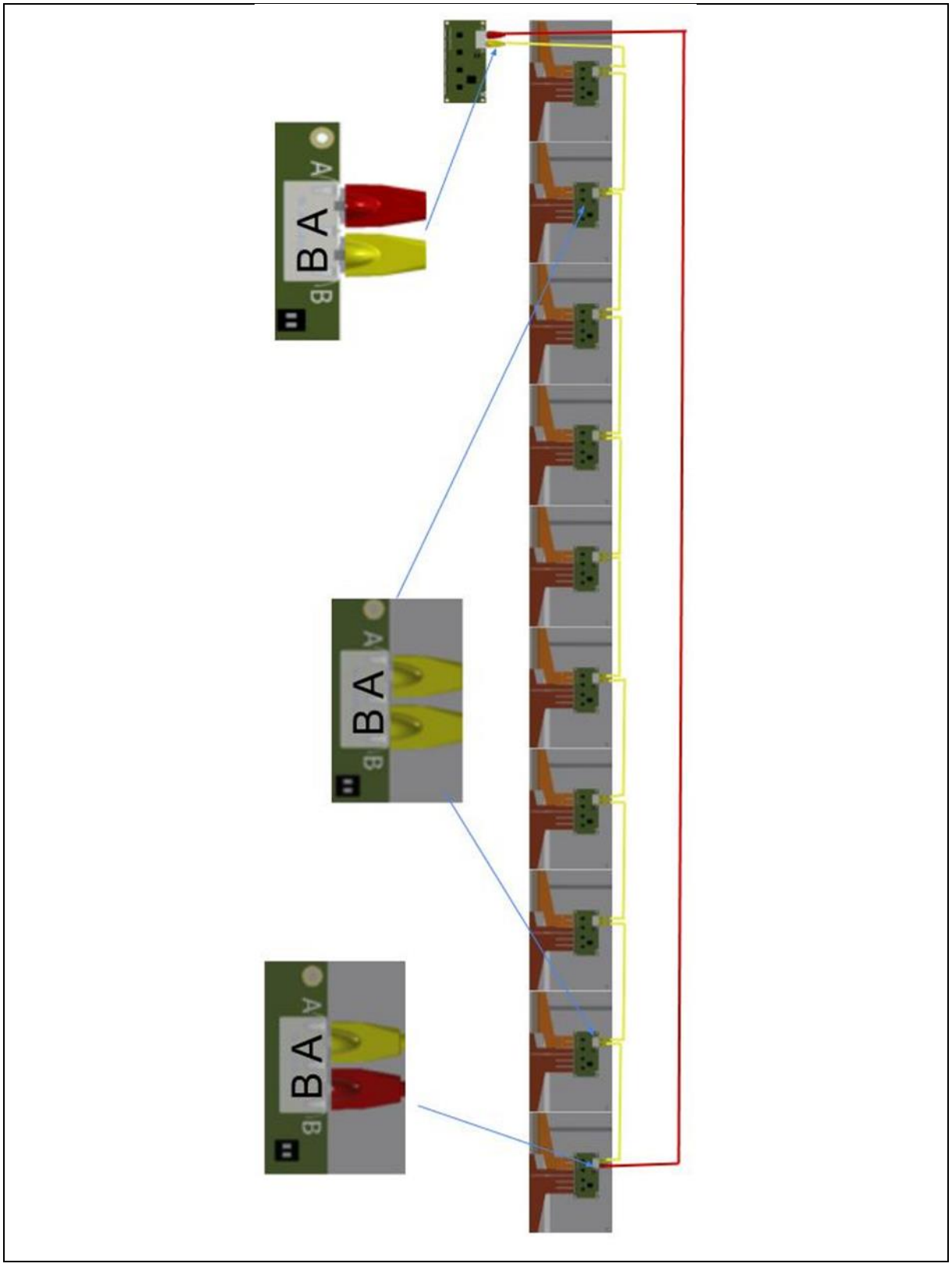
To use this configuration the Multi-Sensor page in ZyConfig must look like this:



Wiring for this configuration is shown below: (rear view)



The same diagram rotated 90 degrees (“portrait”) is shown below: (rear view)



Note that further rotations of 180 or 270 degrees would also be possible, and should be wired the same way.

6.7 Video walls with 12 sensors

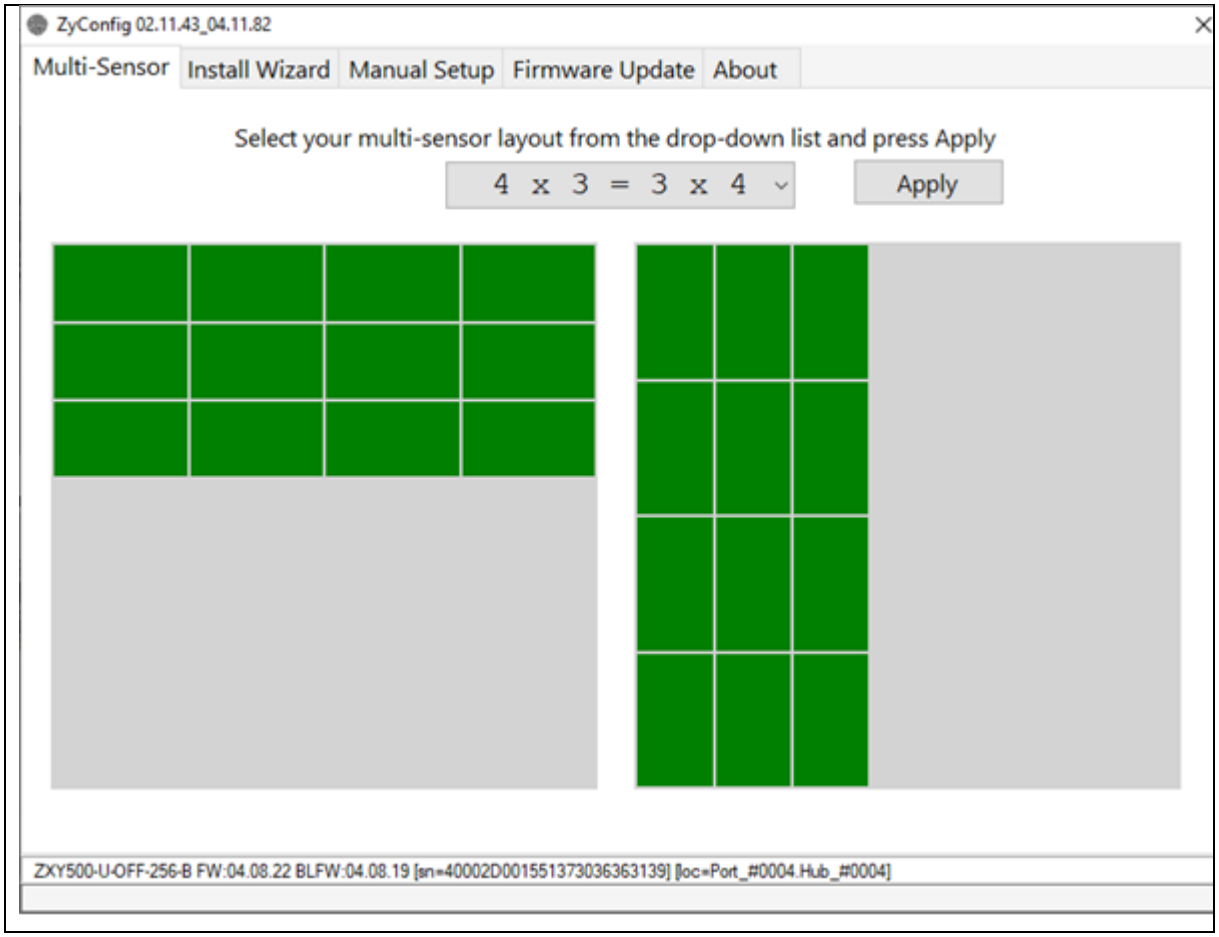
Video walls with 12 sensors can be configured as:

- 1x12, or
- 2x6, or
- 3x4, or
- 4x3, or
- 6x2, or
- 12x1

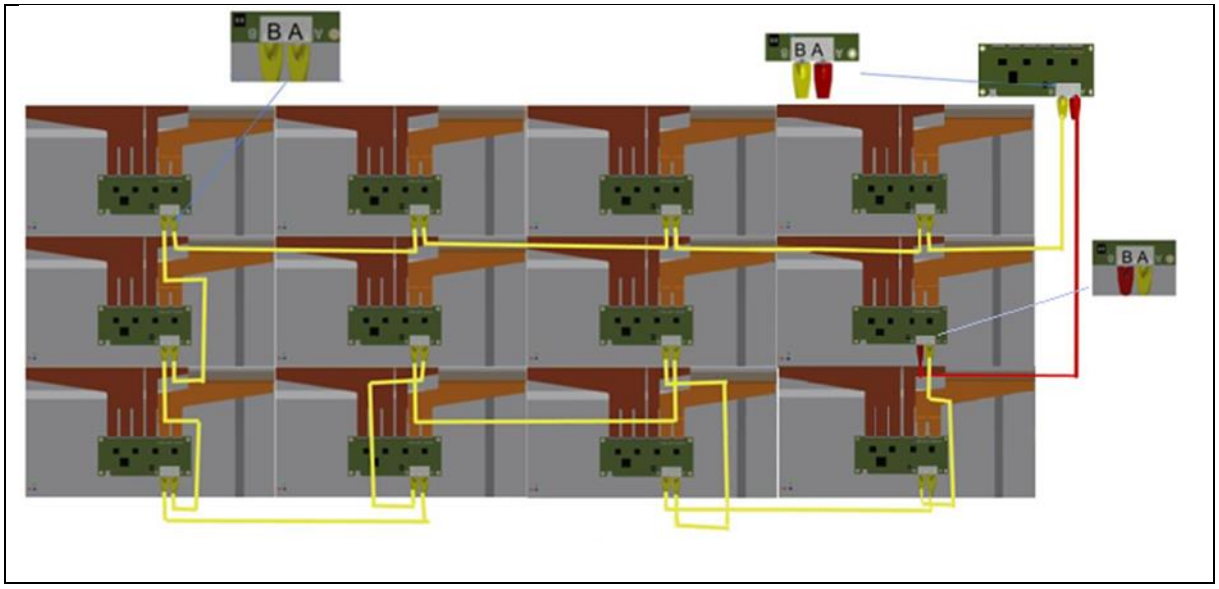
The following sections show the wiring diagram and Multi-Sensor page for the 4x3 option.

6.7.1 4x3

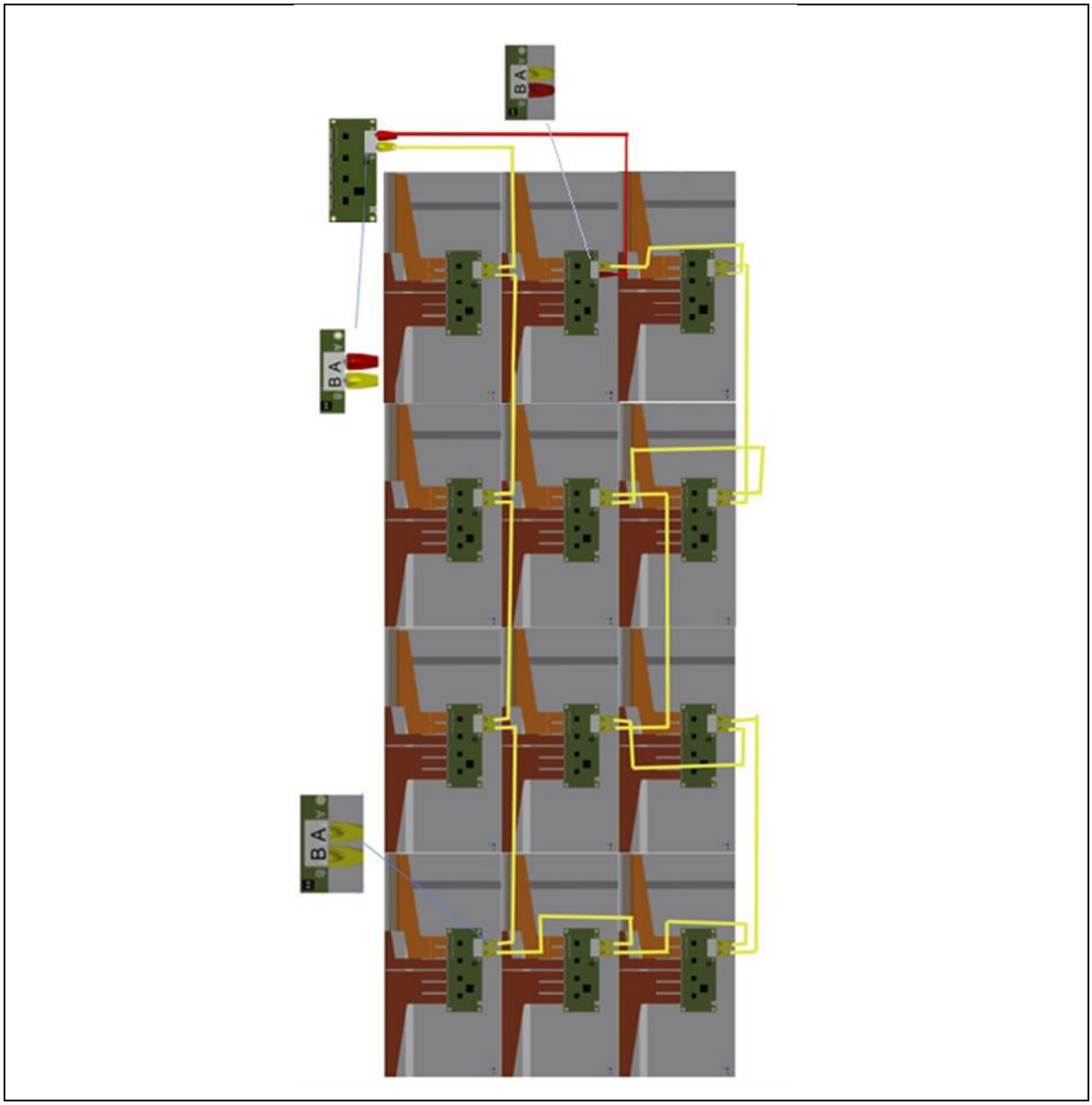
To use this configuration the Multi-Sensor page in ZyConfig must look like this:



Wiring for this configuration is shown below: (rear view)



The same diagram rotated 90 degrees (“portrait”) is shown below: (rear view)



Note that further rotations of 180 or 270 degrees would also be possible, and should be wired the same way.

6.8 Unusual combinations

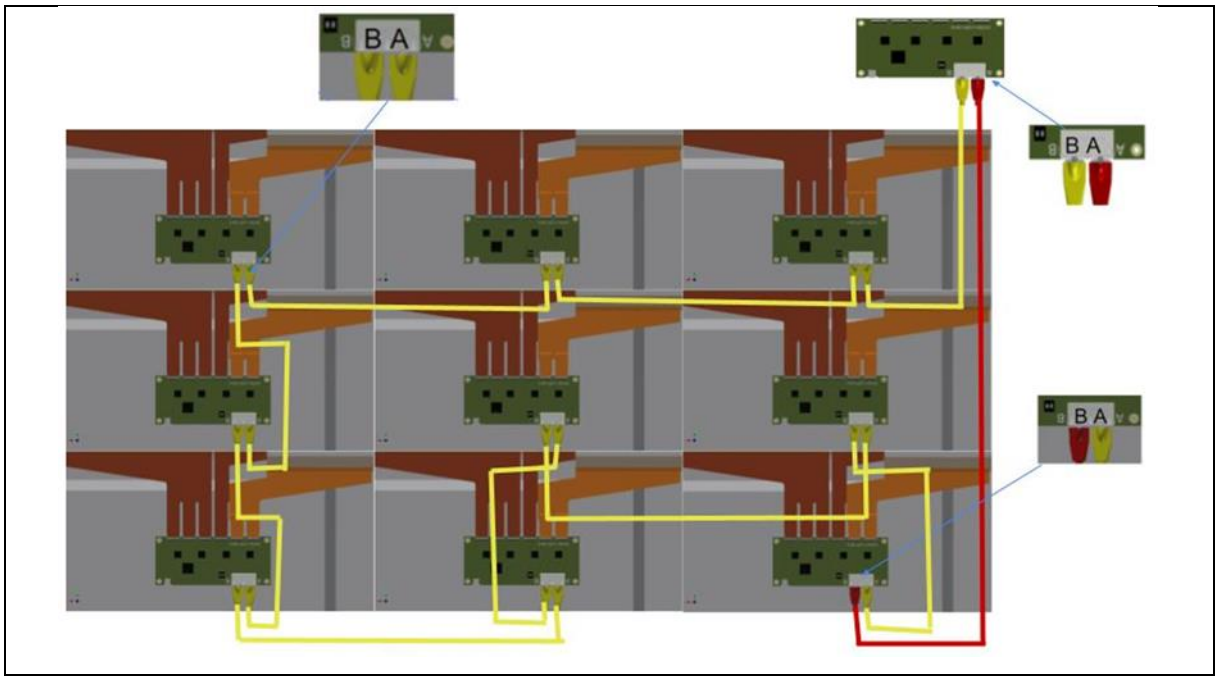
Wiring diagrams for the most common video walls configurations are given in the sections above, and using these is preferable where available. However other video wall combinations are possible, for example 1x4, 4x1, 9x1, etc. In order to support these the “general rule” is described below, but it is rather involved, so please use the examples above instead if you can.

The following discussion is as seen from a rear view, and assumes the wall is oriented with sensors in “landscape” with the controller at the top. Where the text refers to the “top right” controller (as seen from the back) it means the controller of the sensor which the user would touch if touching in the far top left of the video wall.

Connections should be in a loop as follows:

- From port B of the primary controller to port A of the “top right” controller
- From port B of the “top right” controller, to port A of the one left of it
- (repeat moving left as required until the “top left” controller is connected)
- From port B of the “top left” controller, to port A of the one beneath it
- (repeat moving down as required until the “bottom left” controller is connected)
- From port B of the “bottom left” controller, to port A of the one right of it
- From port B of that controller to port A of the one above it in the same column (if there is one)
- (repeat moving up as required until all controllers in the column are connected)
- (repeat moving right, down one column then up the next, until all controllers are connected)
- From port B of the last controller to port A of the primary controller

The 3x3 arrangement image (rear view) is duplicated here for reference whilst reading the above.



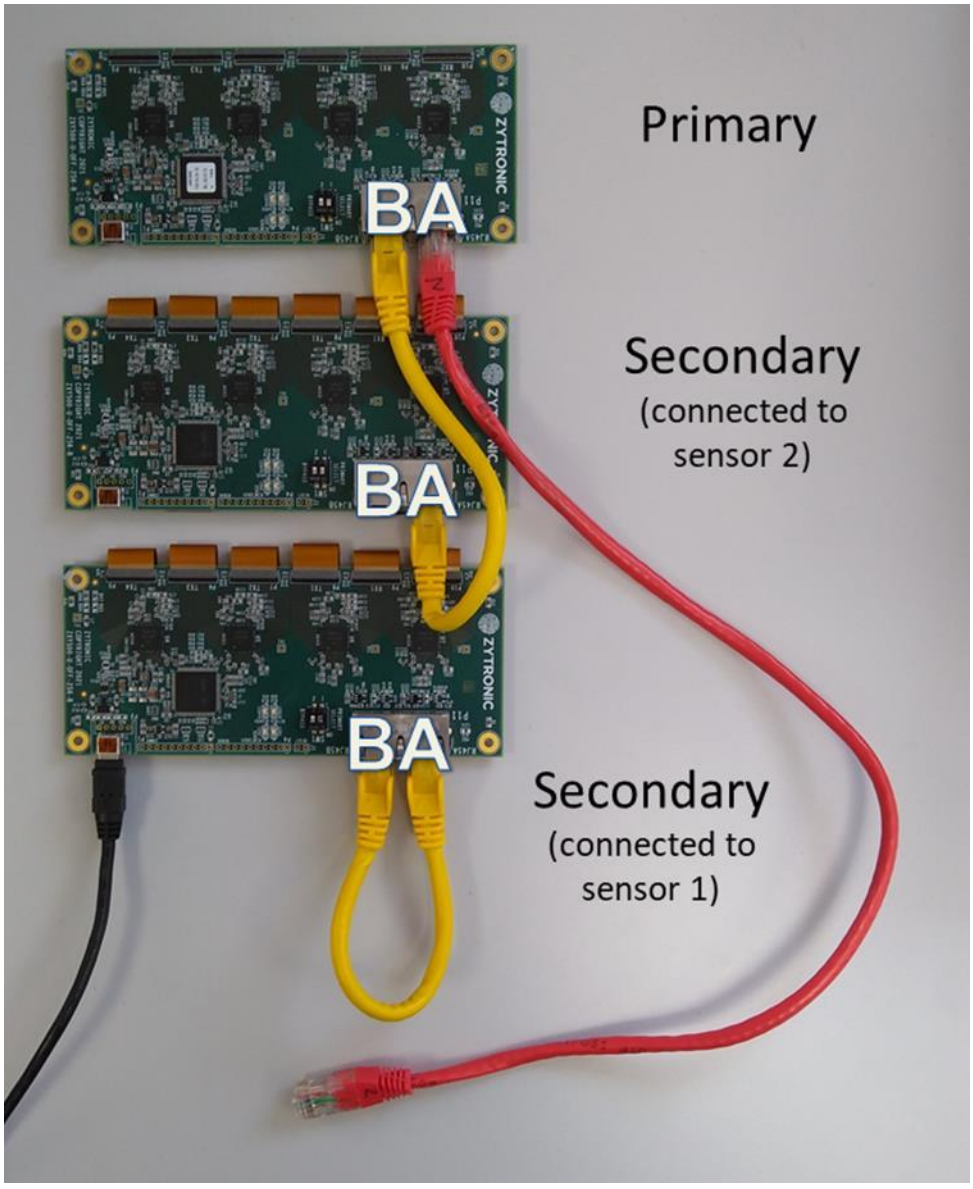
7 Fault finding

7.1 Testing individual sensors

An individual sensor/controller can be tested as follows:

- Remove USB power from all controllers
- Remove comms loop cables from the controller to be tested
- Plug a single cable from port A to port B of the controller to be tested
- Temporarily change switch SW1-1 to the “ON” position.
- Plug a USB from this controller to the PC
- Run the ZyConfig tool as for a normal sensor
- When testing is complete, reinstate the original video wall wiring and switch SW1-1 position, and cycle the power to all controllers.

For example, to test “sensor 1”, temporarily reconfigure the wiring as shown below:

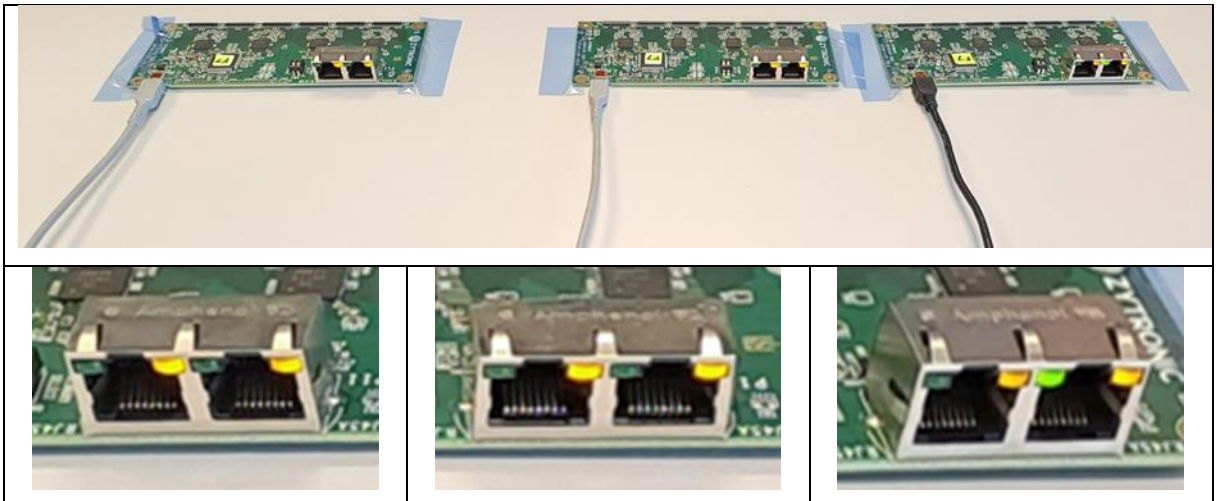


7.2 Debugging a wiring problem

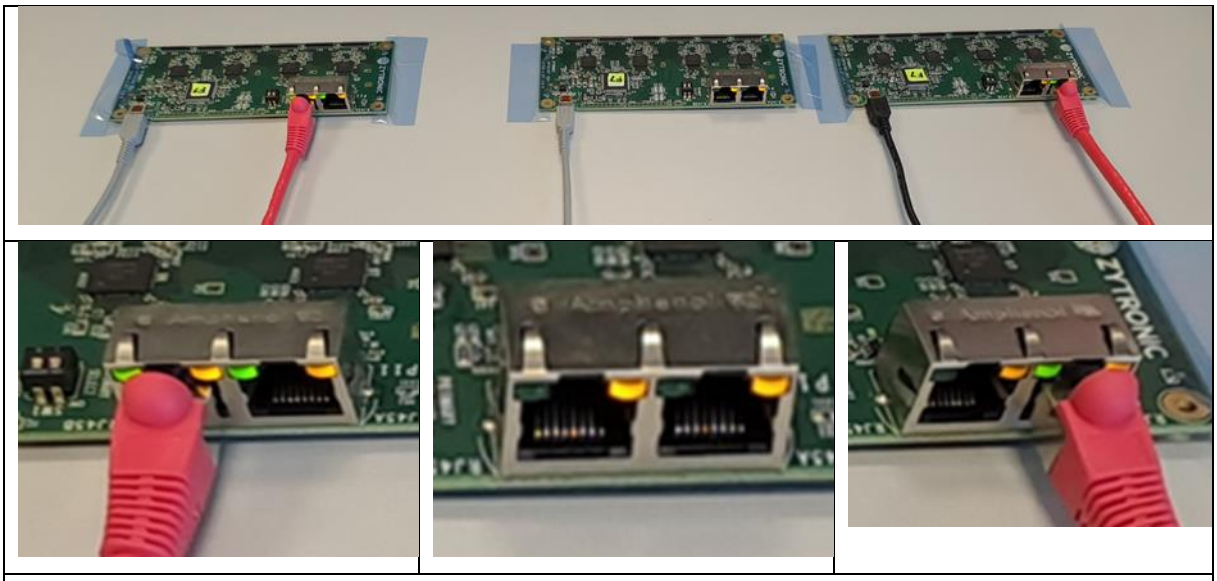
The following notes are provided to assist debugging a wiring problem:

- When the video walls controllers are powered-up they carry out initial communications around the comms loop. During this time the RJ45 LEDs operate as follows:
    - Both yellow RJ45 LEDs are on for all devices
    - LED3 (red) is on for all devices
    - On the primary controller
        - Green “out” LED is on (RJ45A)
        - Green “in” LED is off (RJ45B)
    - On secondary controllers
        - Initially both green “in” and “out” LEDs are off
        - If all parts of the comms loop from the “out” port (RJ45A) of the primary controller as far as the “in” port (RJ45B) of this controller are working correctly, then both green “in” and “out” LEDs are turned on.
- This facilitates rapid debugging where the comms loop is not operating correctly.
- Once the comms setup is complete, the RJ45 LEDs operate as follows:
    - yellow LEDs are off
    - green LEDs flash at 1Hz with LED1
- In case of a problem with a controller or the comms loop, all controllers revert to comms setup mode until the fault is cleared.

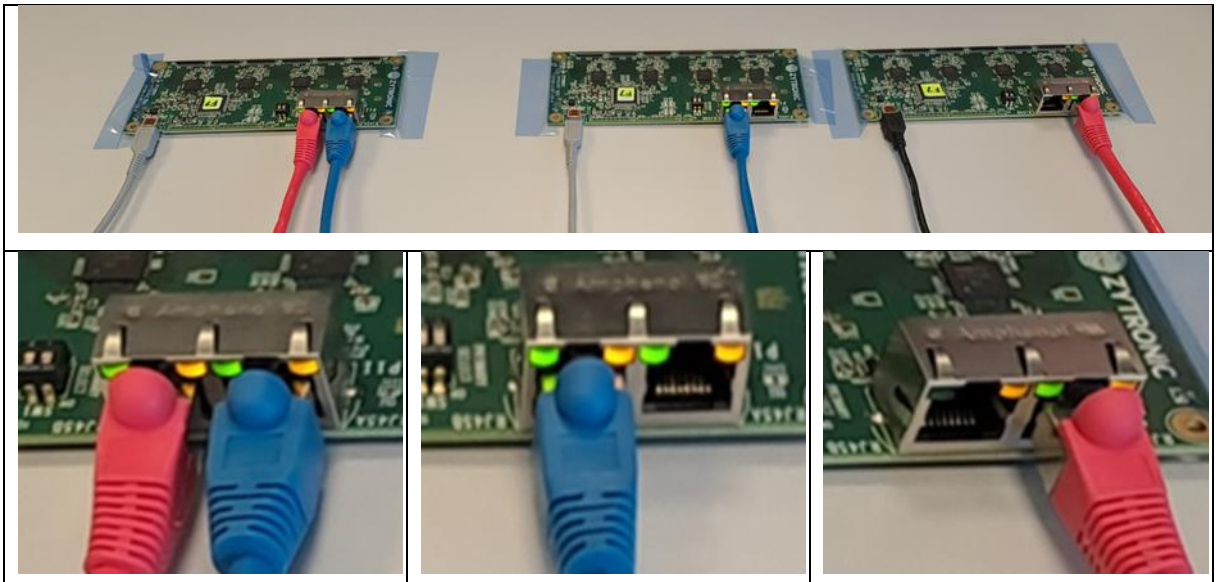
The debugging process is illustrated in the following diagrams:



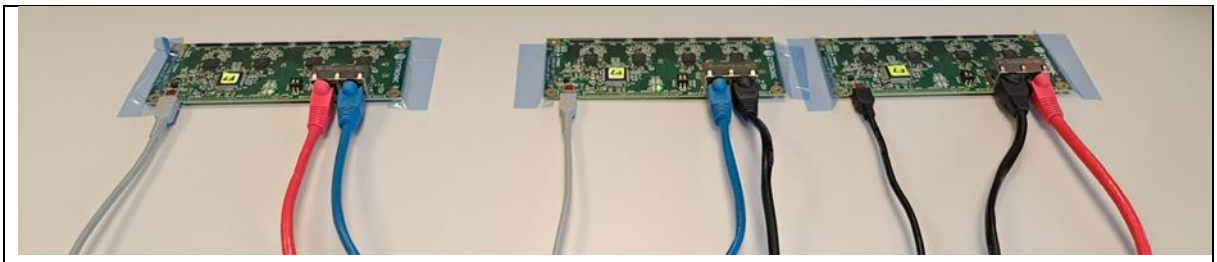
All powered on, right hand controller is primary, no cables connected. All orange LEDs are on. Green “OUT” LED is on on the primary only



Cable from primary to first secondary is connected (red). 2 green LEDs come on on the first secondary



Cable from first secondary to second secondary is connected (blue). 2 green LEDs come on on the second secondary

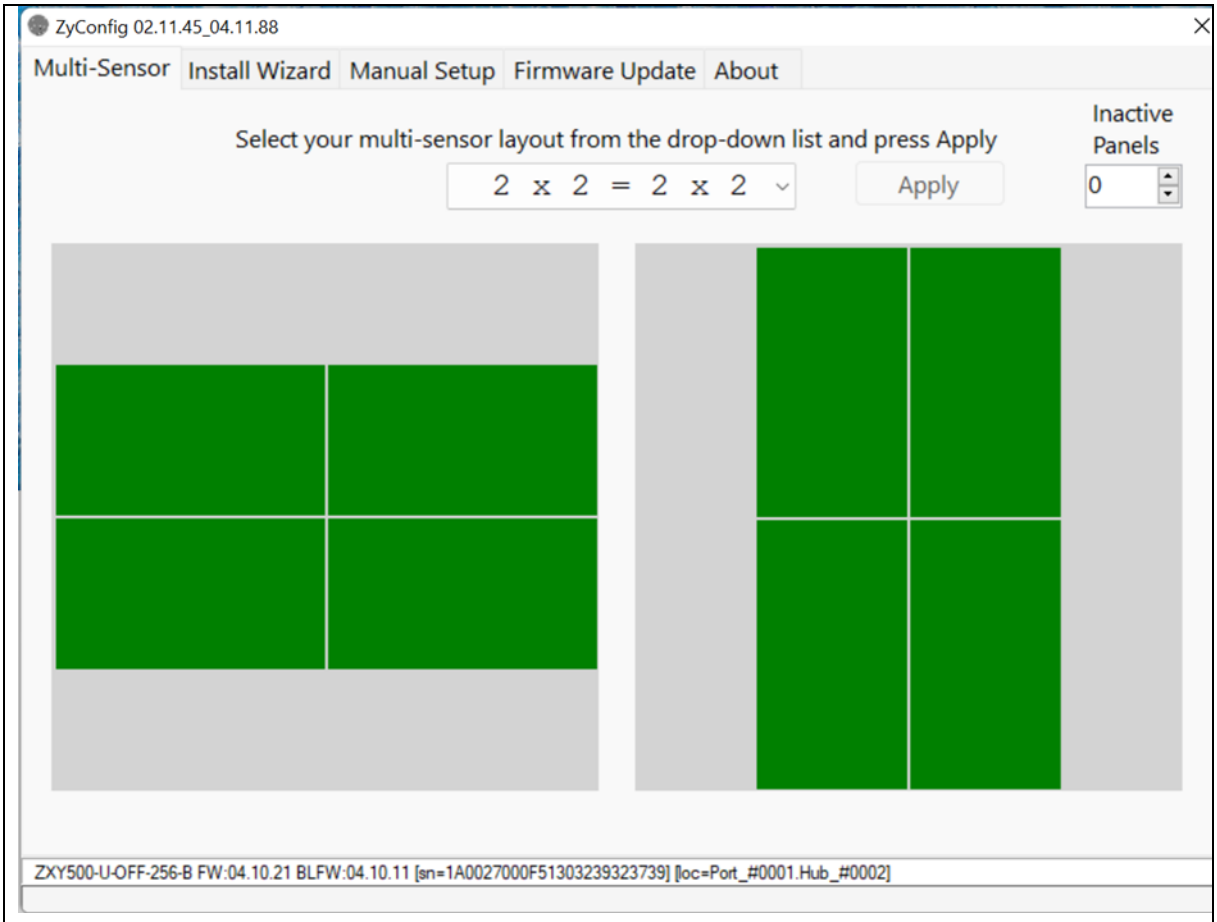


Cable from second secondary to primary is connected (black). All LEDs go out, then all green LEDs start flashing once per second. This is now working.

8 Inactive Panels

Recent versions of ZyConfig (ZyConfig_Windows_2023_02_02 (02.11.45_04.11.88) and later) support the Inactive Panels feature. This can be used as a workaround to replace controllers that are temporarily absent or non-functional. The part of the video wall served by the inactive controller will not be available for touches, but this feature makes it possible for the remaining parts of the wall to continue to be used.

For example, you might have a 2x2 video wall. Normally it appears in ZyConfig as shown below:



ZyConfig showing an example 2x2 video wall, all controllers operating

If however there is a fault on one of the controllers such that it could not even communicate correctly, then the whole wall would stop working.

As a workaround connect a cable from the OUT port (RJ45A) of the previous controller in the loop, bypassing the failed controller, directly into the IN port (RJ45B) of the next controller in the loop. This appears in ZyConfig as a video wall with 3 controllers. Now increase the “Inactive panels” count, as shown below:

ZyConfig showing an example 2x2 video wall, one failed controller bypassed, and represented in ZyConfig as an inactive panel (default location)

The red rectangle marks the location of the failed controller. This must be dragged to the location of the failed controller, as shown in this image:

ZyConfig showing an example 2x2 video wall, one failed controller bypassed, and represented in ZyConfig as an inactive panel (actual location)

This video wall can now continue to be used, albeit with one panel not working, until a replacement part can be arranged and fitted.

The Inactive Panels features can also be used to represent parts of a video wall which have displays but no touch sensors, for example because they are so high up that nobody could touch them anyway. In the example below a 3x3 video wall has only the bottom 6 displays fitted with touch sensors. This appears in ZyConfig as shown below:

3x3 touchscreen of which only the lower 6 are touch sensors

It is possible to use calibration to cope with this as it stands. Alternatively, the top row of displays (without touch sensors) can be represented in ZyConfig by indicating that there are 3 inactive panels, and dragging them to the appropriate locations along the top of the display. This is illustrated below:

3x3 touchscreen of which only the lower 6 are touch sensors, and the top 3 displays are represented by inactive panels

In this case the 3x3 wiring diagram should be followed, with a cable bypassing the 3 top controllers.

The Inactive Panels feature is not needed in most circumstances for most users, but it is available in case it is required.

9 Document History

Version	Date	Author	Description
1.01	2021-06-30	Stephen Ormston	First version
1.02	2021-07-28	Stephen Ormston	Review
1.03	2021-08-04/10	Stephen Ormston	Rename file, add wiring diagrams, add ZyConfig screenshots
1.04	2021-08-17	Stephen Ormston	Review location of wiring diagrams
1.05	2022-03-09	Rory Cowen	Improved wiring diagrams
1.06	2022-03-14	Rory Cowen	Fixed wiring diagrams
1.07	2022-03-24	Phil Rudland	Reorganised wiring diagrams, added fault finding section
1.08	2022-03-29	Phil Rudland	Added a diagram to the fault finding section
1.09	2022-04-27	Phil Rudland	Fixed error in fault finding section
1.10	2022-09-12	Kenneth Sandman	Moved wiring diagrams ahead of fault finding Improved wording in section 4, configuration of controllers
1.11	2022-09-12	Kenneth Sandman	System Overview section added after team discussion
1.12	2023-05-11	Phil Rudland	Updated for firmware 04.10.21, including adding inactive panels