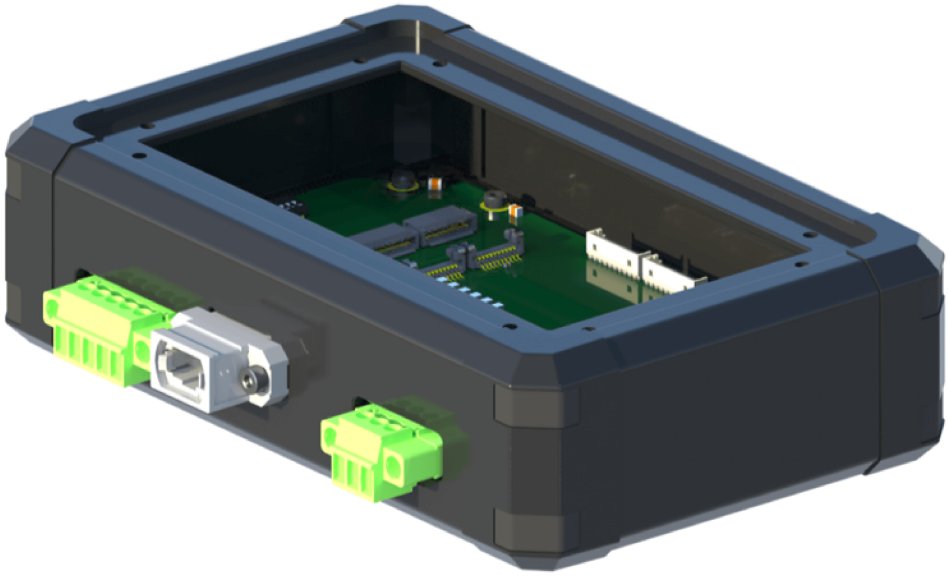
ximea



XS-8P-X2G2-FF-X8G3-MTP

Multi camera platform

XIMEA Accessories

Technical Manual

Version v250708

Introductions

About this manual

Dear customer,

Thank you for purchasing a product from XIMEA.

We hope that this manual can answer your questions, but should you have any further queries or if you wish to claim a service or warranty case, please contact your local dealer or refer to XIMEA Support on our website: www.ximea.com/support

The purpose of this document is to provide a description of XIMEA Accessories and to describe the correct way to install related software, drivers and run it successfully. Please read this manual thoroughly before operating your new XIMEA Accessories for the first time. Please follow all instructions and observe the warnings.

This document is subject to change without notice.

About XIMEA

XIMEA is one of the worldwide leaders for innovative camera solutions with a 30-year history of research, development and production of digital image acquisition systems. Based in Slovakia, Germany and the US, with a global distributor network, XIMEA offers their cameras worldwide. In close collaboration with customers XIMEA has developed a broad spectrum of technologies and cutting-edge, highly competitive products.

XIMEA's camera centric technology portfolio comprises a broad spectrum of digital technologies, from data interfaces such as USB 2.0, USB 3.1 and PCIe to cooled digital cameras with CCD, CMOS and sCMOS sensors, as well as X-ray cameras.

XIMEA has three divisions – generic machine vision and integrated vision systems, scientific imaging and OEM/custom.

Our broad portfolio of cameras includes thermally stabilized astronomy and x-ray cameras, as well as specialty cameras for medical applications, research, surveillance and defense.

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1 General description

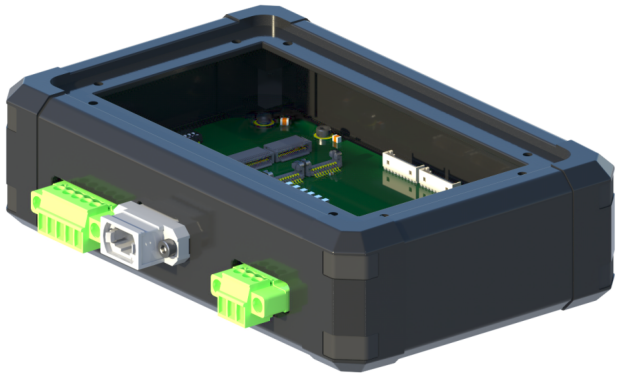

Figure 1: Isometric view of xSWITCH XS-8P-X2G2-FF-X8G3-MTP

The xiSwitch XS-8P-X2G2-FF-X8G3-MTP is a multi-camera platform designed for high-performance synchronization of up to 8 cameras equipped with FireFly connectors from xiX family.

The power supply operates with a DC voltage range of 12 to 24 V. FireFly cables (e.g. CBL-ECUE-X4G3-1M0, CBL-ECUE-X4G3-2M0) provide length options of up to 3 m.

The xiSwitch XS-8P-X2G2-FF-X8G3-MTP features:

- Camera ports: 8x PCIe X2G2 FireFly Connectors with 10 Gbit bandwidth each for camera connections
- Host port: MTP Optical Connector (MTP Cable, 24 Fiber, Type-A, PCIe X8) with output bandwidth of 64 Gbit
- External power for reliable operation of connected cameras
- Communication, control, and synchronization through IO connector

The xiSwitch XS-8P-X2G2-FF-X8G3-MTPF is designed for a wide range of applications, including:

360 panorama, Augmented or Virtual Reality (AR, VR), Autonomous self-driving vehicles, Street/city mapping, Deep learning tasks, Stereo camera systems, 3D scanning, Entertainment, Photogrammetry, FACS scanning, Face and Motion capture, UAV / UAS (drones), Cinematography, Videogrammetry and more.

2 Dimensional drawings

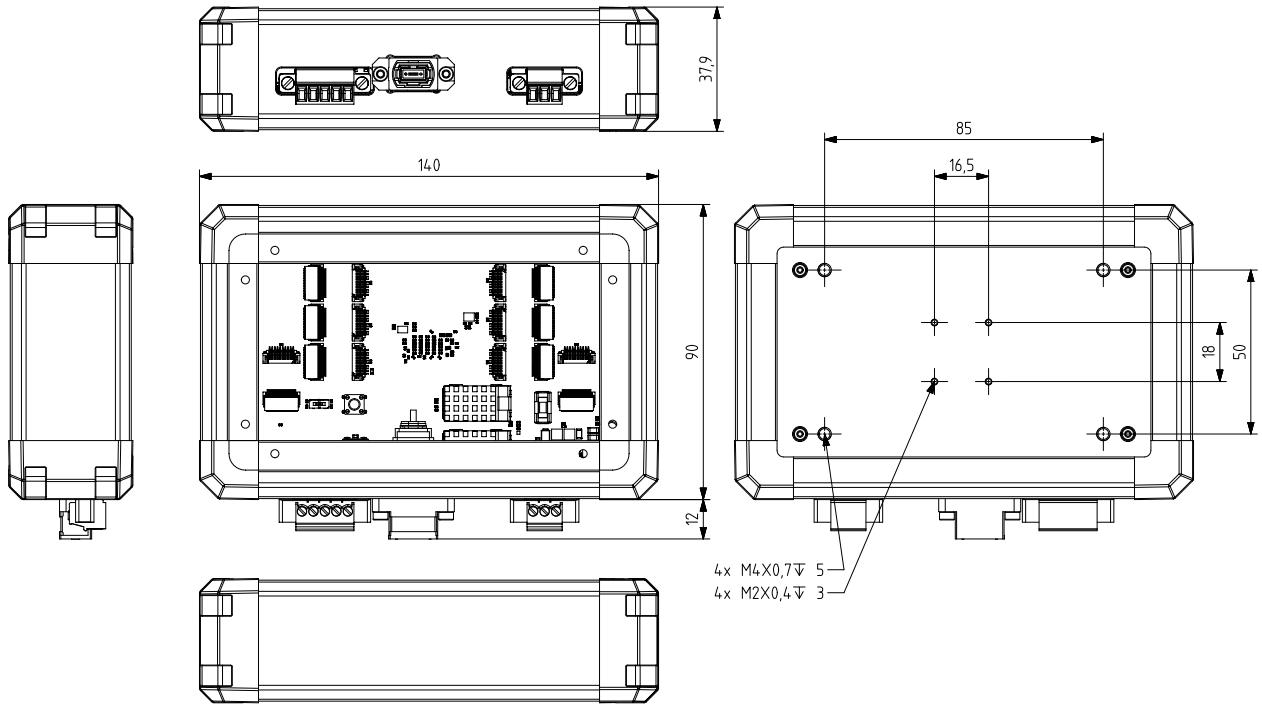

Figure 2: Dimensional drawing of XS-8P-X2G2-FF-X8G3-MTP

Width [W]	Height [H]	Depth [D]	Mass [M]	Material and technology
140 mm	102 mm	37.9 mm	TBD	Extruded aluminum

Table 1: Parameters and mass

3 Configuration

3.1 DIP switches

The numbering of the camera ports (PCIe X2G2: 1-8) correspond to the number of the respective GPI and GPO dip switches (left side in the figure below).

The DIP switches have annotation on their body. The description of DIP switches (GPI, GPO) is written directly on the PCB top layer.

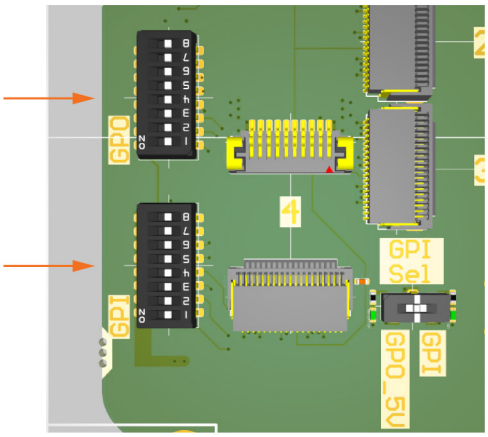

Figure 3: GPI / GPO DIP switches

The switch to select the synchronization mode is in the left bottom area, next to the annotation “GPI Sel” with two possible states - “GPI” and “GPO_5V”. For more information see section IO-subsystem.

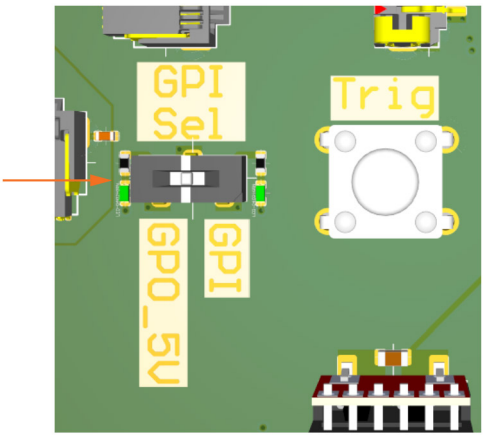

Figure 4: Switch for selecting synchronization mode

4 Connectors

4.1 Location of connectors

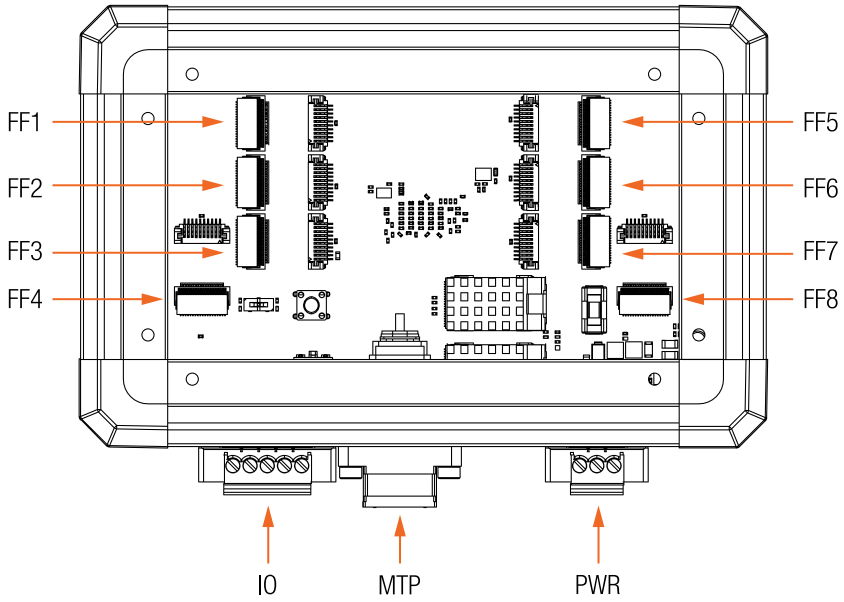

Figure 5: Conectors location

Name	Description
FF1-FF8	FireFly X2G2 camera connectors, Samtec (UEC5-019-1-H-D-RA-1-A + UCC8-010-1-H-S-1-A)
IO	5-pin IO connector, 1843826
MTP	MTP optical connector (MTP cable 24 fiber Type-A PCIe X8)
PWR	3-pin Power input connector, 1843800

Table 2: Location of connectors

4.2 Data interfaces

4.2.1 Power connector

Item	Value
Connector	CONN Header Block 3-POS, 3.5MM, Right Angle, 250V/8A, THT, 1843800
Signals	Power, GND
Mating connector	Phoenix Contact 1847068

Table 3: Power connector description

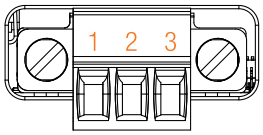

Figure 6: Power connector pinout

Pin	Name	Description
1	Vin 12 to 24 V	Power 12 to 24 V
2	SHLD	Shielding
3	GND	Power supply Ground

Table 4: Power connector pin assigment

4.2.2 MTP connector

The MTP connector on the xSwitch is a 24-fiber male MTP connector. For proper operation, use MTP cables with a 24-fiber female connector, such as CBL-MTP-X8G3-FF-xxxM0.

4.2.3 GPIO

Item	Value
Connector	CONN Header Block 5-POS, 3.5MM, Right Angle, 250V/8A, THT, 1843826
Signals	IO, GND
Mating connector	Phoenix Contact 1847084 or 1863330

Table 5: IO connector general description

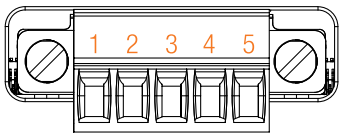

Figure 7: IO connector pinout

Pin	Name	Description
1	ISO_GPO	Open collector output from the selected “master” camera
2	ISO_GPO_5V	Push-pull 5 V output from the selected “master” camera
3	ISO_GND	(common) Isolated Ground for the IO subsystem
4	ISO_GPI	External input trigger signal, 3.3 to 24 V input
5	ISO_5V0	Isolated 5 V power output for IO subsystem[1]

[1]Do not connect external power supply to this pin. Sourcing capability limited to 5 V 400 mA, including power needed for IO subsystem.

Table 6: IO connector pin assigment

5 IO-subsystem

The IO subsystem is designed to enable synchronized operation of connected XIMEA cameras. Synchronization can be achieved either through an external trigger signal or by using a master-slave configuration. An external trigger signal is connected to the input pin ISO_GPI. In the master-slave mode, one of the cameras connected to the switch is designated as the master, while the remaining cameras are synchronized using the output signal from the master camera.

5.1 Internal power supply

To enable synchronization of all connected cameras via either an external trigger or the master camera's output, the switches include an internal 5 V power supply (an isolated 2 W DC/DC converter) that powers the IO subsystem.

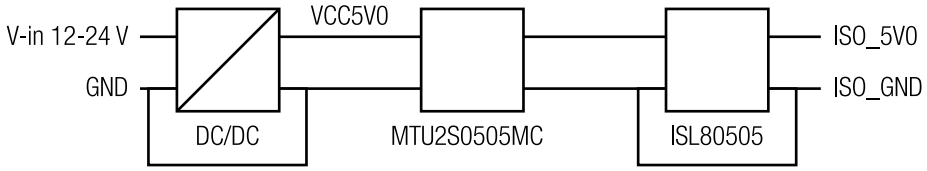

Figure 8: Power supply of IO-subsystem

5.2 Circuitry requirement

All components of the IO subsystem are powered by the two voltage levels: ISO_5V0 and ISO_GND.
ISO_5V0 is generated by the internal power supply.

5.3 Synchronization mode selection

Two synchronization modes are available:

- External trigger
- Master-slave mode

The selection between both modes is made via the dip-switch GPI-Select:

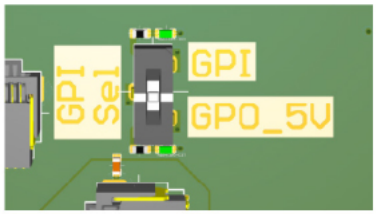

Figure 9: Synchronization mode selector

Position GPI-Sel	Synchronization mode
GPI	External trigger (pin ISO_GPI signal)
GPO_5V0	Master-Slave-Mode (pin ISO_GPO_5V signal)

Table 7: DIP switch mode description

5.4 IO configuration

The xSWITCH is designed to support different synchronization modes of the connected XIMEA cameras.

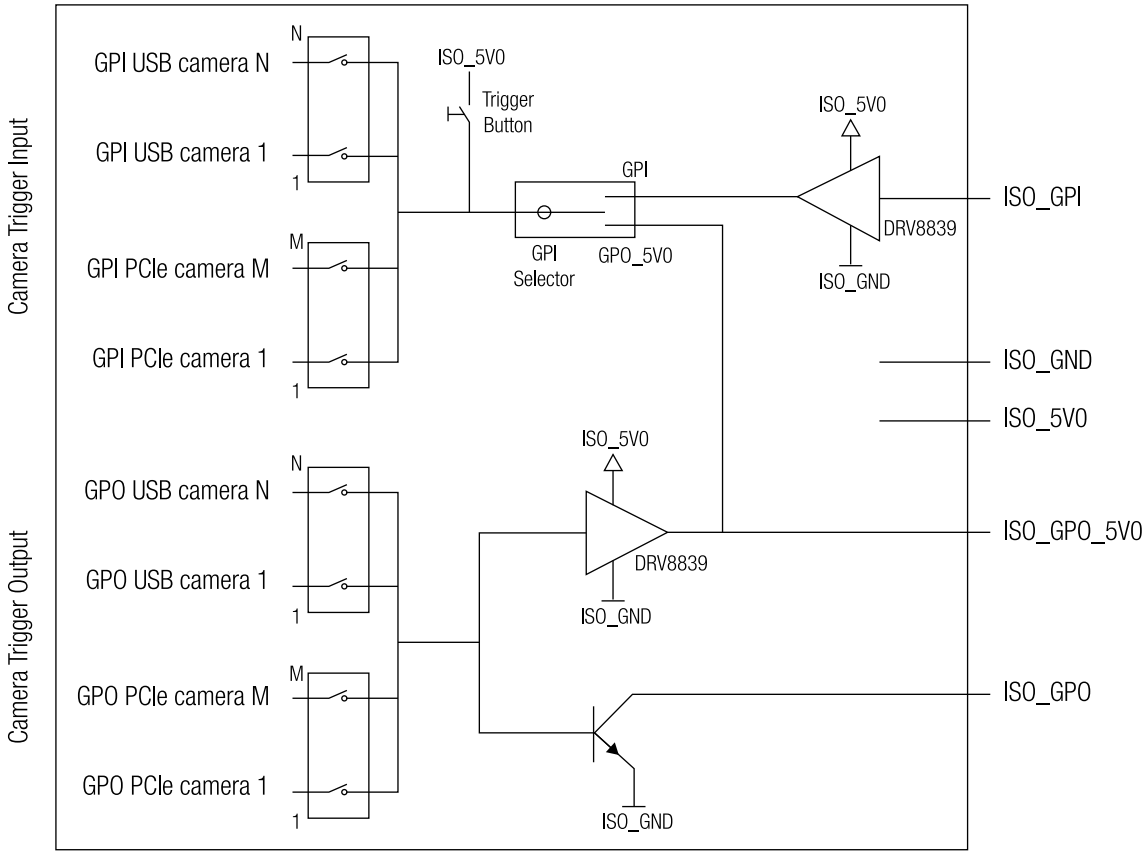

Figure 10: Functional diagram of the IO-system

The interconnected IO ports of the cameras are the optically isolated input and output lines.

5.4.1 Trigger input configuration

To synchronize the cameras, either the IO connector pin ISO_GPI (for external trigger mode) or the internal signal ISO_GPO_5V0 (for master-slave mode) is connected to the GPI pins of the cameras that require synchronization. The specific cameras to be synchronized are defined by configuring their individual DIP switches (GPI USB Camera n or GPI PCIe Camera n). These DIP switches connect the input signal to the corresponding camera's input line.

5.4.2 Trigger output configuration

One camera can be selected — and only one should be selected — to generate the output signal by configuring its specific DIP switch (GPO USB Camera n or GPO PCIe Camera n). This output signal can be used to:

- Trigger all cameras connected to the same switch
- Trigger external devices (e.g., another xSWITCH)

The selected output signal will be connected to the internal and external signal ISO_GPO / ISO_GPO_5V0.

5.5 Signal level

5.5.1 ISO_GPI signal level

The signal level of the GPI is described in the following table:

V-in-min [V]	V-in-max [V]	State
0	<0.4	Off (0)
0.4	2.5	Transient
>2.5	24	On (1)

Table 8: Digital trigger input ISO_GPI, signal levels

Note: The Input level **V-in** represents the amplitude of the input signal. Voltage levels referenced to common ground ISO_GND

5.5.2 ISO_GPO signal level

The digital output ISO_GPO type is Open Collector NPN, the maximum usable open circuit voltage level is 24 V.

5.5.3 ISO_GPO_5V0 signal level

The signal level of the ISO_GPO_5V0 is described in the following table:

Logic status	V-out [V]
Off (0)	0.0
On (1)	5.0

Table 9: Digital output ISO_GPO_5V0, signal levels

Note: The Output level **V-out** represents the amplitude of the input signal. The voltage levels refer to ISO_GND

6 Usages

6.1 Buttons

Two buttons are soldered on the multicamera platform.

6.1.1 Trigger button

This button can be used to generate a trigger pulse on the GPI-Selector output position to test the GPI configuration.
A rising edge trigger pulse (0V -> 5V) will be generated.

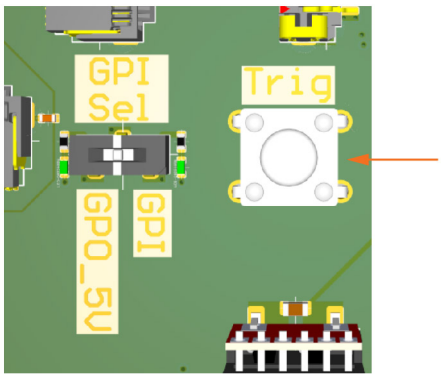

Figure 11: Trigger button

6.1.2 PCIe reset button

Pressing this button will result in reset of the xSWITCH PCIe bus and all connected cameras.

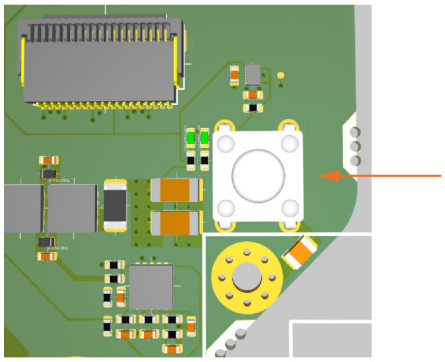

Figure 12: PCIe reset button

Note: This PCIe reset button is for debugging purposes only.

7 Quickstart guide

7.1 Hardware setup

7.1.1 Essential components

- XS-8P-X2G2-FF-X8G3-MTP multi camera platform
- Power cable: Cable with one DC power input socket female (OD5.5/ID2.1, Center +)
- Camera cable: Firefly ECUE copper cable (CBL-ECUE-X4G3-xM0)
- xiX XIMEA cameras with PCIe FireFly interface
- Host cable: optical MTP cable (CBL-MTP-X8G3-FF-xxxM0)
- Host PC

7.1.2 Connecting the components

Step 1. Ensure the power supply and the computer are turned off before connecting any cables. The order of cable connections is not strictly specified, but you can follow the steps 2, 3, and 4 in this order.

Step 2. Connect the cable CBL-ECUE-X4G3-xM0 to the FF port on XS-12P-X2G2-FF-X8G3-SFF and then on the xiX XIMEA cameras with PCIe FireFly interface.

Step 3. Connect the cable CBL-MTP-X8G3-FF-xxxM0 to XS-12P-X2G2-FF-X8G3-SFF and to the host computer.

Step 4. Connect the power cable to XS-12P-X2G2-FF-X8G3-SFF and to the power supply.

Step 5. Power on the power supply.

Step 6. Power on the computer.

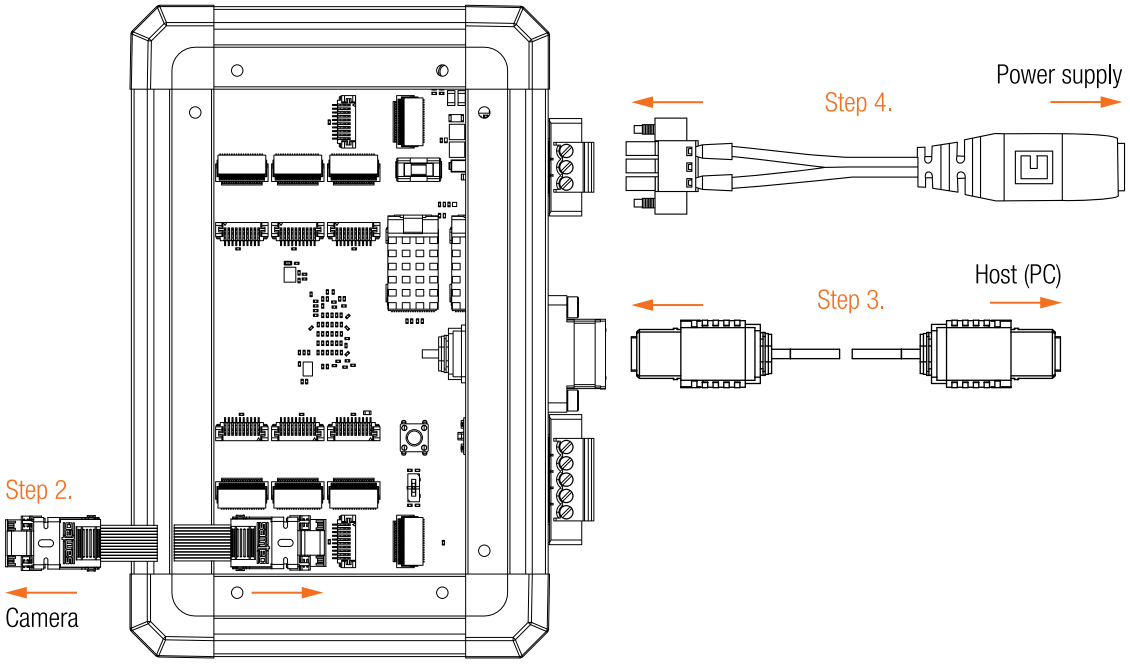

Figure 13: XS-8P-X2G2-FF-X8G3-MTP cable connection

For more information about XS-8P-X2G2-FF-X8G3-MTP please contact: sales@ximea.com.

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