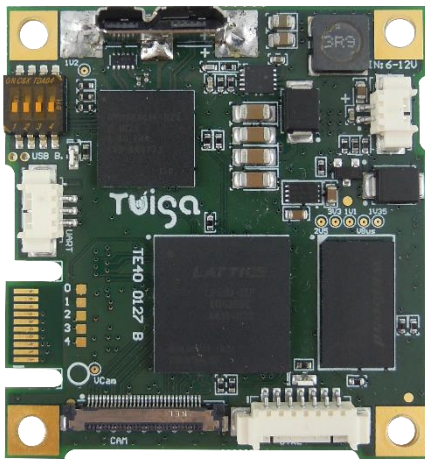# Preliminary User Manual

HDMI 4K to USB3 video capture

P/N – TV20 0008: HDMI 4K to USB3 interface board

P/N – TV80 0099: HDMI 4K to USB3 interface set
Includes: HDMI 4K to USB3 interface board (**P/N TV20 0008**), KEL 30 ways micro coaxial camera cable, 2 ways cable (power supply), 3 ways UART TTL cable, 7 ways cable (GPIOs), camera bracket, screws + spacers

P/N – TV80 0099-L: HDMI 4K to USB3 Basic interface set
Includes: HDMI 4K to USB3 interface board (**P/N TV20 0008**), KEL 30 ways micro coaxial camera cable, 2 ways cable (power supply)

	Writing	Approval
Date	08/06/2021	10/06/2021
Name	Cédric BOULANGER	Cédric BOULANGER
Signature		

Revision History

| Date	Revision	Description	Modified by	Note
17/06/2020	A	Creation of the document	CBO	
26/10/2020	B	Update power supply part and supported software	CBO	
08/06/2021	C	Remove camera passthrough and update with TS10 0089 rev E	CBO	

Table of content

1. Warning

⚠ **4K camera input is J200 available on the add-on board (P/N TS10 0089). If you connect the 4K camera block to another connector, you will break the camera.**
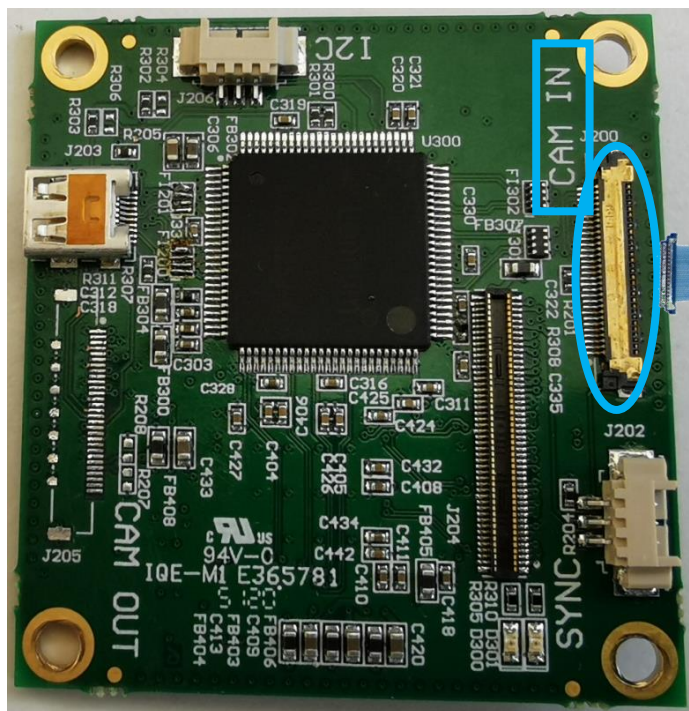
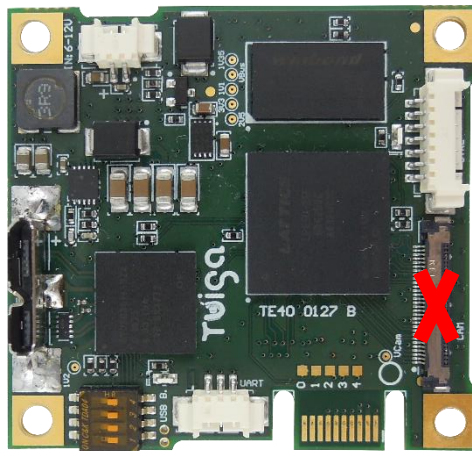Here connect your 4K camera block

4K
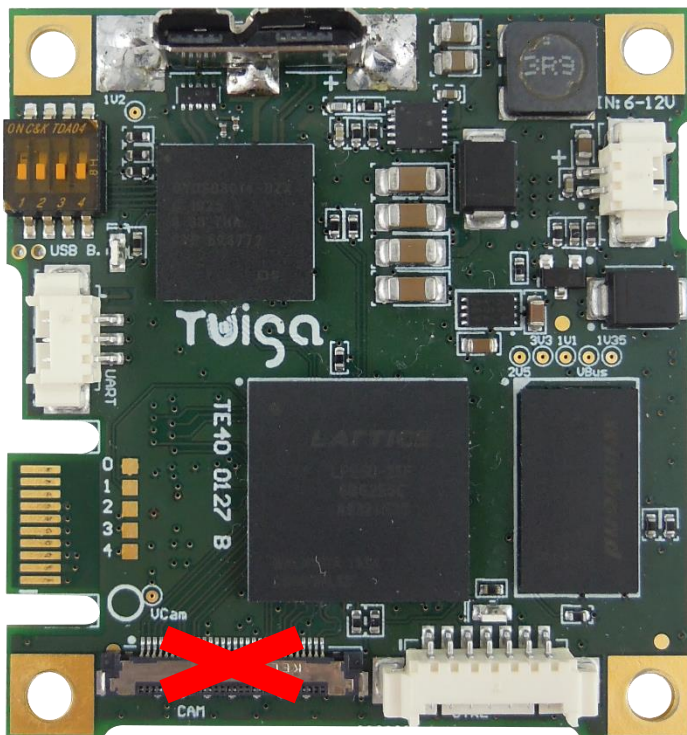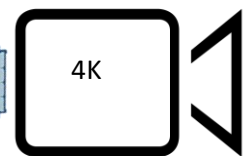
2. Connections

2.1. Global setup

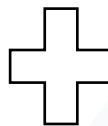Minimum requirements to connect a HDMI 4K camera module to Twiga HDMI 4K to USB3 module:

- ➢ HDMI 4K Sony ER Camera block
- ➢ Twiga USB 3.2 gen 1 Neo interface board
- ➢ Add-on 4K board
- ➢ 30 ways KEL USL type micro coaxial cable
- ➢ USB3 cable
- ➢ (depending on the camera, a 2 ways cable for optional external camera power supply might be required)
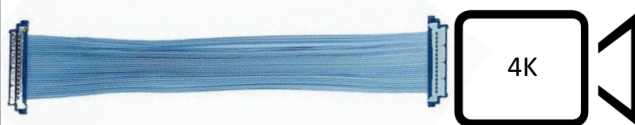

USB 3.2 gen 1 Neo
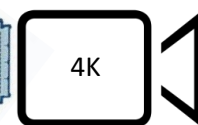
USB3 type A cable

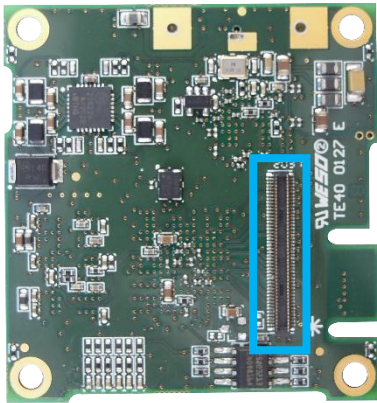Add-on 4K

KEL cable

4K Camera block

4K

Note: Boards are connected via Hirose board to board connectors.

TV10 0083 USB 3.2 gen 1 Neo   *TS10 0089 Add-on 4K*
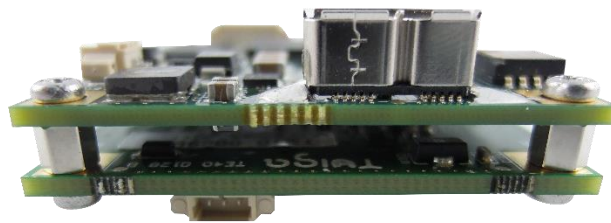
2.2. Power supply

There are two ways to power supply the board and camera:

1. Via USB3 cable

    J204: USB3 connector

2.   External camera power supply (6V-12V): it can be useful if the USB power (1A) is not enough. You could need this external power if you are using a laptop.

    J300: 2 ways external power supply connector

2	V+
1	GND

J204

+
-
J300

3. Getting started

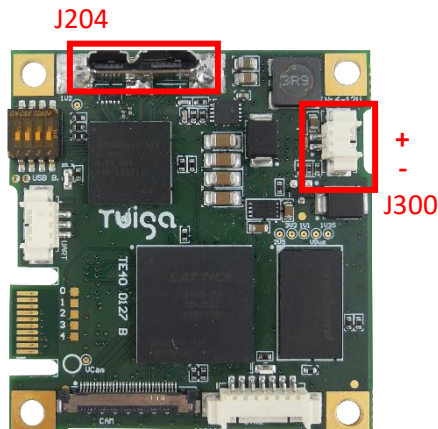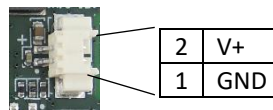You can consult our support website to find all information about USB3 Neo: https://www.twiga-support.com/ Documentation, latest software, 3D file can be downloaded and a wiki will guide you through your first steps with the USB3 Neo. Feel free to contact us for further information.

3.1. Video stream

OS support:

➢ Windows 7 / Windows 8 / Windows 8.1 / Windows 10
➢ Linux (tested on Ubuntu 16.04)

Using Windows:

Use 4K compatible software to display the video:

➢ VLC (tested with 3.0.8): in Media select "Open a capture device" and chose TWIGA USB3 NEO as Video device name

Using Linux:

The board is automatically detected as a device video in /dev/, to found it use "ls /dev/". By default, the device is called video0. To display the stream, you can use a Gstreamer pipeline:

gst-launch-1.0 v4l2src device=/dev/video0 ! autovideosink

Supported software:

➢ VLC
➢ Gstreamer
➢ OBS
➢ Debut from NCH Software
➢ Camera application on Windows

3.1. Communication

There are two ways to communicate with the camera:

1. **CDC protocol**: it allows you to send commands (VISCA) to the camera through the USB3 cable. You can change video format, zoom, manage camera parameters such as focus, iris, shutter… You can use basic communication software (Termite) or specific software according to the camera block you use.
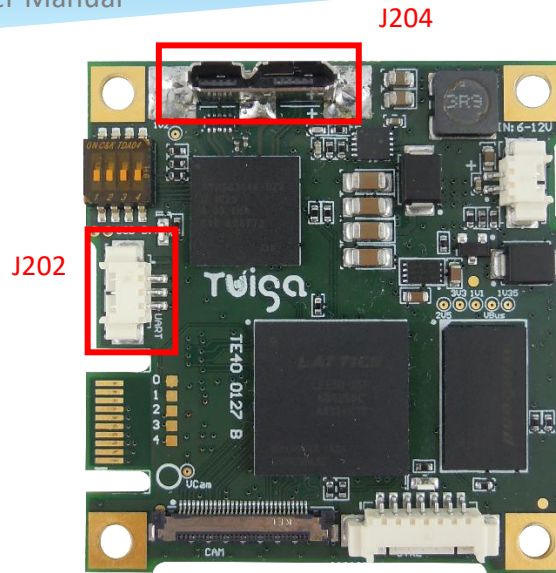
   J204: USB 3 connector

2. **UART TTL**: you can also use the J202 connector to send VISCA commands to the camera.

   J202: 3 ways UART TTL connector

3	Tx
2	Rx
1	GND
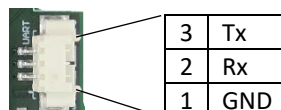
Note: For custom application, you can also communicate via the board to board connector (J204 of the TS10 0089). These different communication ways have the same priority level.

On Windows:

The first time please refer to the driver installation procedure.
You can use Termite or putty to open the communication with the dedicated COM port and send VISCA commands.

On Linux:

The communication port is recognized on LINUX as a **/dev/ttyACMx** device, where *x* is the number of the device.

When a **ttyACM** device appears on Linux, some daemons software analyze it and it will not be available for 10sec. After that the device is released and the communication works as a COM Port on Windows.

You can use a serial communication terminal to send commands to the camera (e.g. **gtkterm**).

You can also use the "**echo**" command with a Linux terminal:

➢ Configure the tty with the correct baud rate: **stty 9600 -F /dev/ttyACMx**
➢ For checking the configuration use: **stty -a -F /dev/ttyACMx**
➢ Send commands like zoom plus as it **echo –en '\x81\x01\x04\x07\x02\xff' > /dev/ttyACMx** where *x* is the device number and **8101040702FF** the zoom in command in hexadecimal

3.2. HDMI output

Twiga 4K to USB3 module features an HDMI output through J203 Micro HDMI connector. You can get a 4K video stream over any 4K compliant devices. HDMI 2.0 standard cable is recommended.
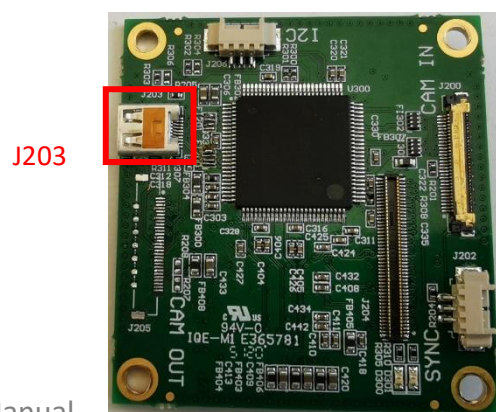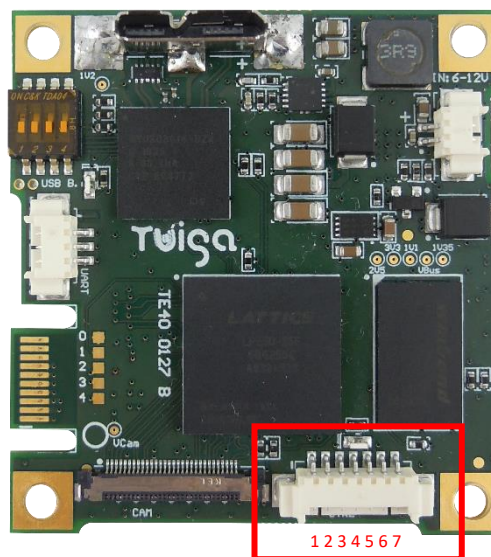
3.3. GPIOs

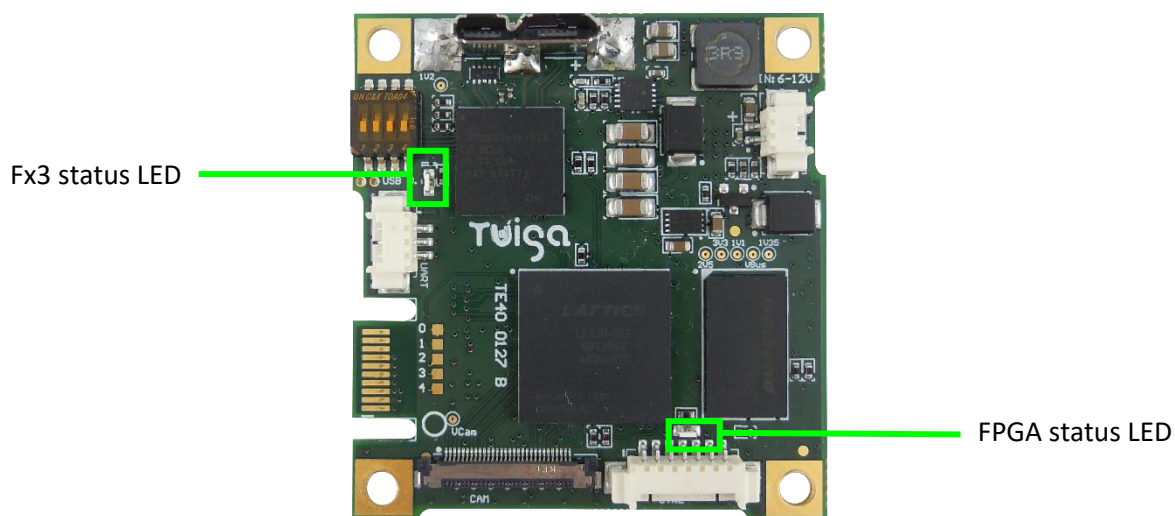For each GPIO corresponds a VISCA command to send to the camera.

To active the GPIO you must connect it to GND.

J200 pin out	Function
1	GND
2	Zoom +
3	Zoom -
4	Focus Auto/Manual
5	Focus Near
6	Focus Far
7	Freeze On/Off

J200

3.4. LED signalization

Fx3 status LED

FPGA status LED

Number of Fx3 Status LED blink per 2 seconds	Meaning
1	Error
2	Video and communication error
3	Format and video error
4	Video error
5	Communication error
6	Configuration ok

Number of FPGA Status LED blink per 3 seconds	Meaning
2	Searching video format
3	Video format found