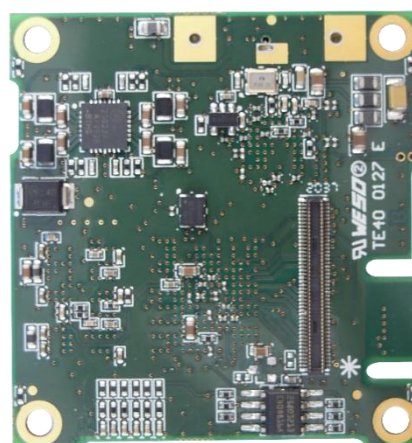




USB3 Neo

Technical Manual





P/N – TV10 0083: USB3 Neo interface board for LVDS zoom cameras

P/N – TV50 0025: Mounting kit for TV10 0083 USB3 Neo I/F board

Includes: 30-way micro-coax camera cable, 2-way cable (power supply), 3-way cable (UART TTL), 7-way cable (GPIOs), right angle black anodized bracket, screws and spacers

P/N – TV50 0026: Cable kit for TV10 0083 - USB3 Neo I/F board

Includes: 30-way micro-coax camera cable, 2-way cable (power supply)

	Writing	Approval
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Signature		

Revision History

Date	Revision	Description	Modified by	Note
09/02/2022	A	Creation of the document	CBO	
28/04/2022	B	Update latency and USB cable length	CBO	
07/04/2023	C	Update board and kit references	CBO	

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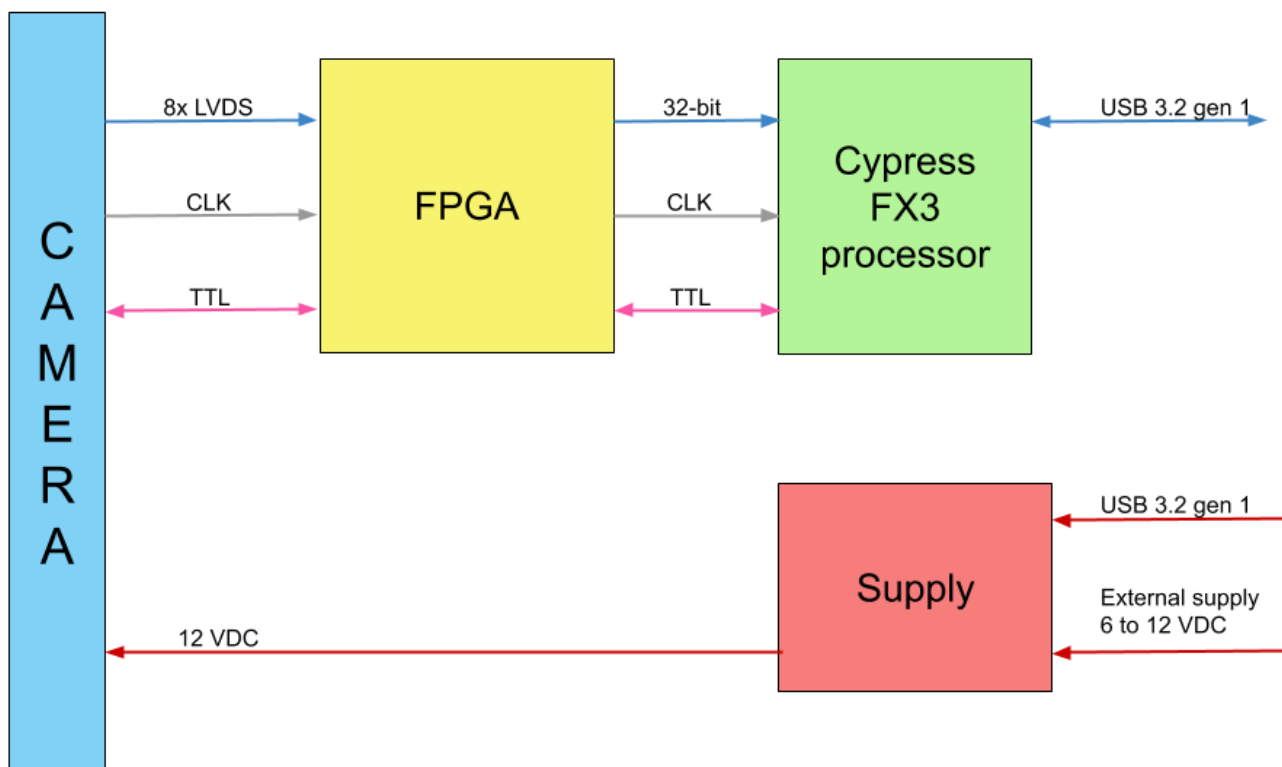
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1. Presentation

The Twiga LVDS to USB3 module provides a USB3 output for LVDS Full HD camera blocks. The board automatically detects the model and format of the camera and adapts its video processing consequently. The camera control is done through the USB3 link in CDC or via UART TTL.

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.

1.1. Synoptic



1.2. Features

1.2.1. Main functions

- Receiving and decode LVDS signal (FPGA)
- Formatting 32-bit (FPGA)
- Serialization and adaptation of the USB 3.2 gen 1 standard
- Camera power 12 V
- Camera communication in VISCA via a COM port
- Local GPIOs
- Local UART TTL
- Flash FPGA via USB
- External camera power input (6-12V)
- Protected Golden sector for backup software
- Isochronous or bulk transmission mode

1.2.2. Formats and resolutions

1.2.2.1. *Input*

- Video RAW data format:
 - YUY2 for resolutions up to 1920x1080p60
- Video input resolutions supported:

	25	29.97	30	50	59.94	60
1280x720	√	√	√	√	√	√
1920x1080	√	√	√	√	√	√

1.2.2.2. *Output*

- Video output resolutions supported:

	25	29.97	30	50	59.94	60
1280x720	√	√	√	√	√	√
1920x1080	√	√	√	√	√	√

Note: Please refer to the camera documentation to know which format you can use.

1.3. Consumption

The system is powered by USB 5V and the camera can be powered by USB or by the 2pts external connector (6V-12V).

- USB Neo board 5V consumption = 115mA, power = 0.575W
- LVDS camera block with 12V external power consumption ≈ 200mA, power ≈ 2.4W

1.4. OS support

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

1.5. Supported software

- VLC
- AMCap
- Yawcam
- Gstreamer
- OBS
- Debut from NCH Software
- Camera application on Windows

1.6. USB3 cable length

The system supports a USB3 cable length up to 15m. Adding a boost it can go up to 30m. In both cases you could need to use the external camera power supply.

We recommend this USB3 cable reference: Ugreen Micro USB 3.0 to USB-A Hard Drive Cable

<https://www.ugreen.com/products/micro-usb-3-0-to-usb-a-hard-drive-cable>

1.7. KEL cable length

- The system works with a KEL cable length up to 500mm

1.8. Latency measure

- The latency involved by the board itself is less than 1ms.

1.9. Thermal specifications

The USB3 Neo system supports temperature between 0°C and +60°C. For more details, please consult our thermal tests report.

2. Connections

2.1. Power supply

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

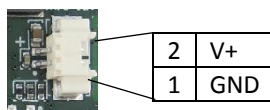
1. Via USB 3 cable

J204: USB 3 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



Note: If you use the external power supply, USB power will be bypassed.


2.2. LVDS camera block connection

The LVDS camera block is connected to the board via a cable 30 ways KEL type USL20-30SS-xxx-C. The camera is powered by the system in 12V.

J203: 30 ways LVDS connector



Note: the connector pinout is compliant with classic Full HD LVDS camera blocks.



1	NC
2	NC
3	NC
4	NC
5	Reset
6	NC
7	NC
8	NC
9	NC
10	NC
11	GND
12	GND
13	VCAM
14	VCAM
15	VCAM
16	VCAM
17	VCAM
18	RxD (TTL camera input)
19	TxD (TTL camera input)
20	GND
21	TX0-
22	TX0+
23	TX1-
24	TX1+
25	TX2-
26	TX2+
27	TXCLKOUT-
28	TXCLKOUT+
29	TX3-
30	TX3+

2.3. Camera communication

Two ways are available 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: USB3 connector



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

J202: 3 ways UART TTL connector



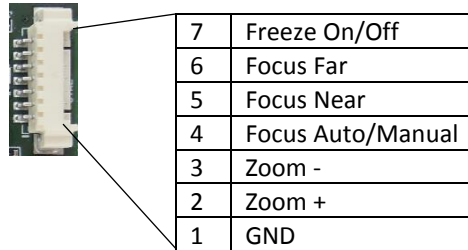
3	Tx
2	Rx
1	GND

Note: These different communication ways have the same priority level.

2.4. GPIOs

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

J200: 7 ways GPIOs connector

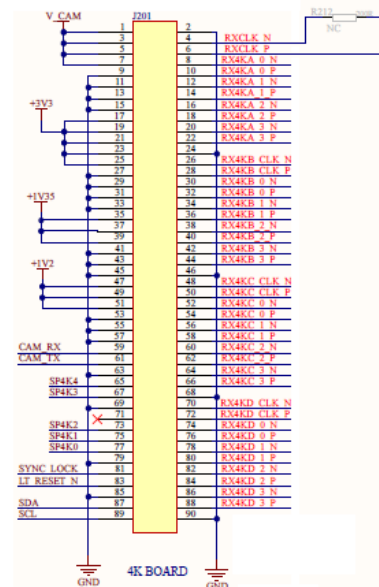


Note: To active the GPIO you must connect it to GND (0V).

2.5. Board to board connector

A 90 pins Hirose connector is available on the bottom side of the board to plug an add-on board dedicated to support 4K cameras blocks.

J201: 90pts Hirose connector



2.6. Tests points

On the board you can find two types of tests points:

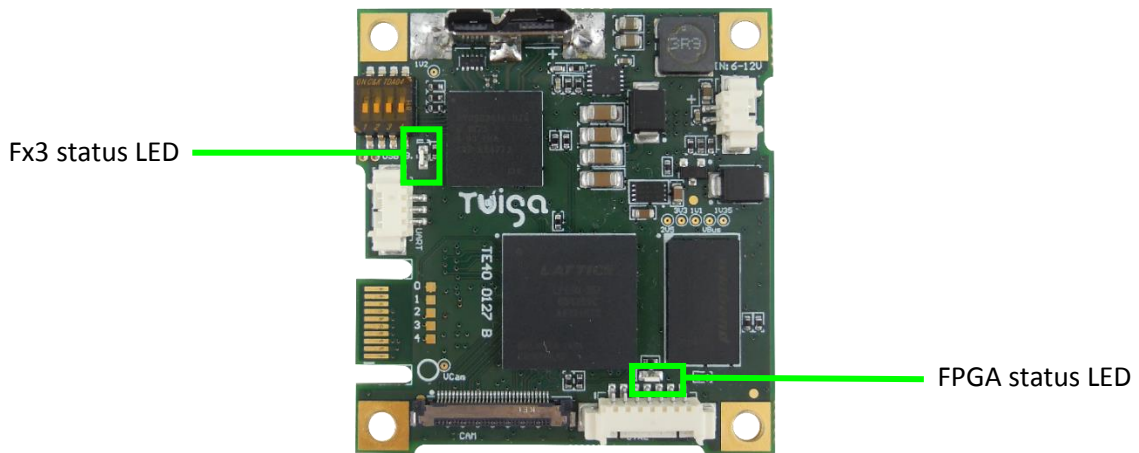
- Power supply tests points: You can test different tension levels: 2.5V, 3.3V, 1.1V, 5V and 1.35V.

- Control signals:

0	GND
1	Vblank
2	Hblank
3	FX3_Tx
4	FX3_Rx

3. LED signalization

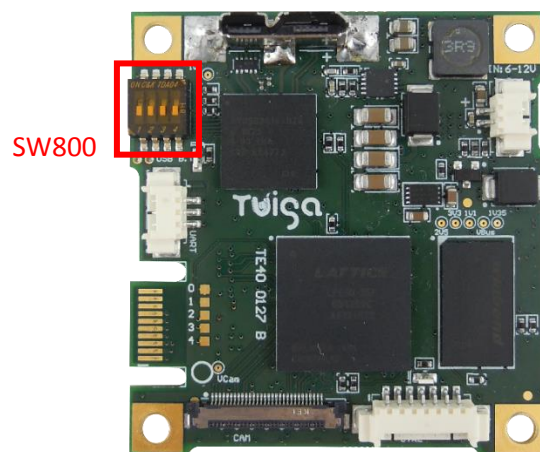
Two Leds are used to signalize the status of the board.



Number of Fx3 Status LED blink per 2 seconds	Meaning
1	Error
2	Communication error
3	Format error
4	Configuration ok

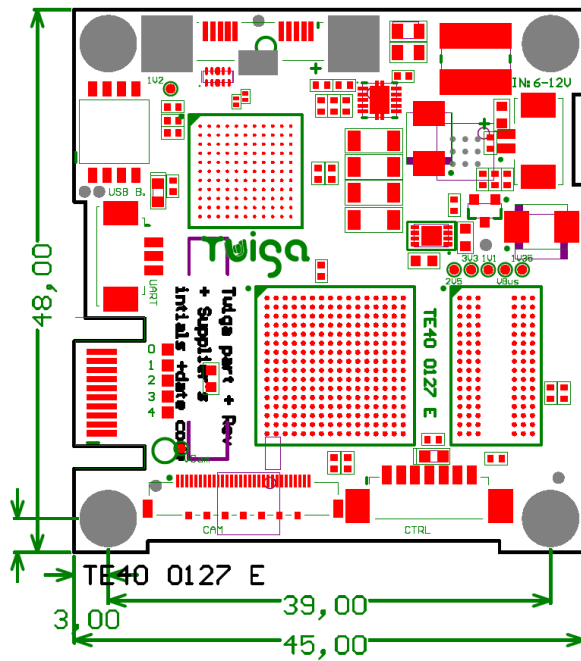
Number of FPGA Status LED blink per 3 seconds	Meaning
2	FX3 not detected
4	Video error
6	Configuration Ok

4. Multi switch

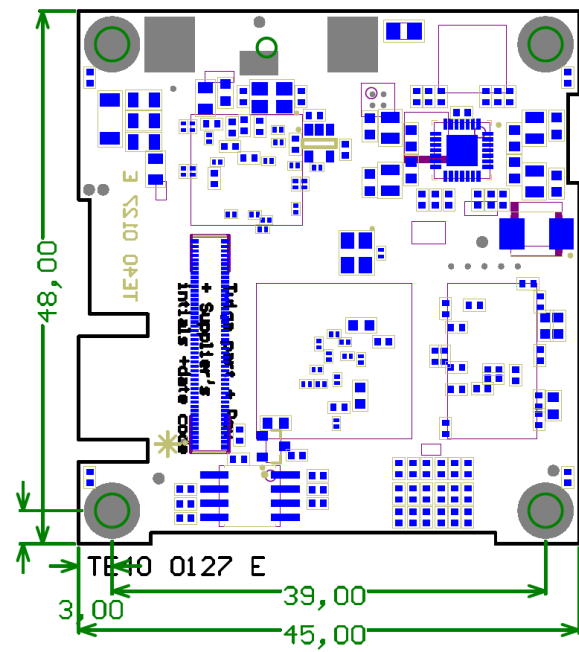


Switch number	Meaning
1	Unused
2	Unused
3	Unused
4	Transmission mode : OFF = Bulk mode (default), ON = Isochronous mode

5. Form factor



TOP



BOTTOM

48mm (L) x 45mm (W) x 11mm (H)

4 holes \varnothing 3mm

13g