Thunder Link is a family of small form factor modules for formatting and converting generic digital video streams to standard compliant formats. Different interface standards are supported from the transmitter side including DVI /HDMI , VGA, 3G-SDI , HD-SDI , SDI , CVBS and USB. Supported physical media are copper and fibre cables.

TL6636 connects to the digital video interface of Tamron's MP2030M-GS global shutter block camera and supports several progressive HDTV formats.

TL6636 - Features

+ Provides a small size, easy to use HDTV USB 3.0 compliant video streaming capture solution

+ Up to 1080p30 uncompressed HDTV video data, 4:2:2 YUV format

+ The module receives digital video signals at the input and sends UVC (USB Video Class) compliant data packets containing digital video payload to a connected host computer

+ Operates always as Super Speed USB3.0 device (Host or OTG operation modes are not supported)

+ Host computer must run a UVC capable operating system

+ Parallel up- and downstream of camera control and status data is possible (USB CDC)

+ 4 channel multiplexed LVDS input

+ Real-time external trigger input for MP2030M-GS global shutter camera block

+ Single LVDS data format provided by Tamron camera blocks

+ Full USB bus powered camera solution possible depending on USB3 power

+ Power supply voltage for camera is generated onboard

Block Diagram TL6636
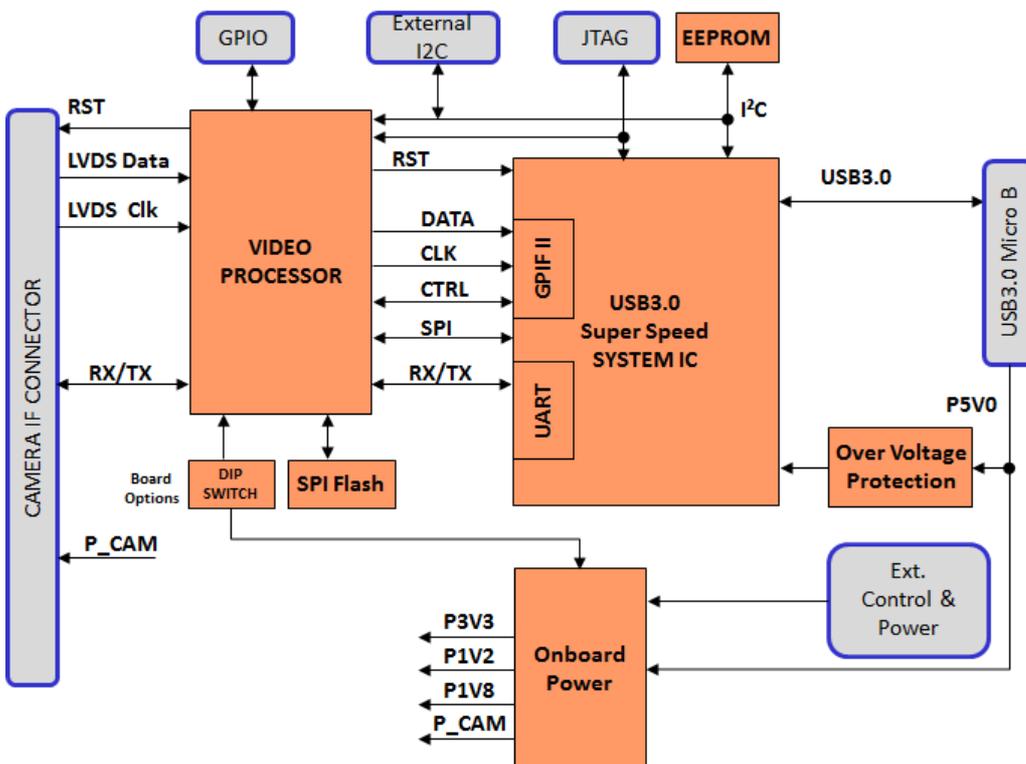
3D CAD model (Step Format) is available on request.

Supported Camera Blocks

Model	Comment
MP2030M-GS global shutter	Progressive FHD/HD Video Standards
MP1010M-VC rolling shutter	Progressive FHD/HD Video Standards
MP1110M-VC rolling shutter	Progressive FHD/HD Video Standards

Supported Video Standards

The following HDTV video standards are supported by the TL6636. Note that video standard availability is always dependent on the capability of the camera block used.

+ 1920x1080p @ 25Hz, 30 Hz
+ 1280x720p @ 50Hz, 59.94Hz, 60Hz, 25Hz, 29.97Hz, 30Hz

Note: As interlace video modes are not supported, make sure to set camera to any supported progressive video mode to enable correct video image data transmision to any host PC.

Host (PC) - Device Communication

Connecting the TL6636 to the Host PC

Operating System Support
TL6636 can be used with operating systems which fully support USB UVC type data and communication.
Currently supported Microsoft Windows operating systems:
Windows 7 (32 and 64bit)
Windows 8.1 (32 and 64bit)
Windows 10 (64bit, validated OS versions 1511, 1803)

Driver Requirements
Full UVC compliant driver is required. Such drivers are supplied with Microsoft Windows 7 and 8 *<usbvideo.sys>*. Manual driver installation is not necessary. For the USB UART feature, the *<usbser.sys>* class driver is used. Aivion provides suitable driver assignment files. Win 10 does not require such a driver assignment file.

Video Application on Host PC
Video display and recording can be done with standard application programs like VLC player, Mplayer or similar. VLC and Mplayer are open source based applications and can be free downloaded. If users want to design their own applications software, they are free to do so. All software programming tasks are OS based and have to be built upon UVC drivers. For further information please refer to Microsoft Windows API information.

Controlling TL6636 from the Host PC via USB UART
TL6636 supports the USB UART functionality. Tamron cameras connected to TL6636 can be controlled via a virtual COM port. Any host software which uses COM ports can be used. The USB UART channel is transparent for any protocol. Communication speed is 9600bit/s or 38400bit/s maximum. Other COM port settings are (8N1).

AIVION
Modular Imaging & Video Solutions

Board Connector Layout (Bottom View)
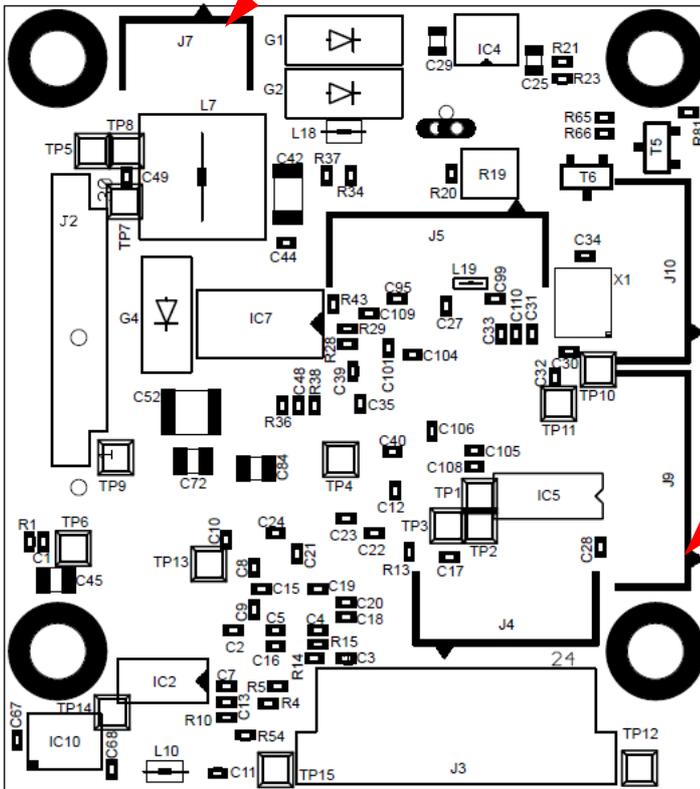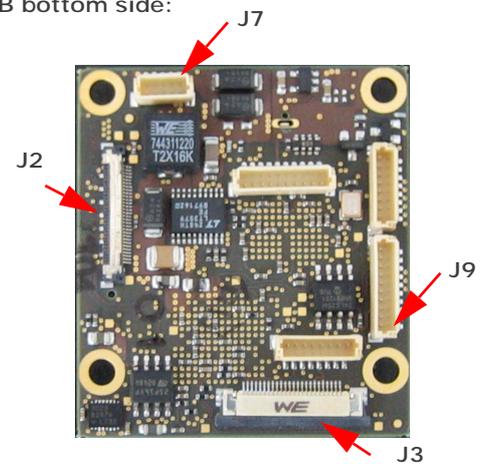

PCB top side:

USB3 microB connector
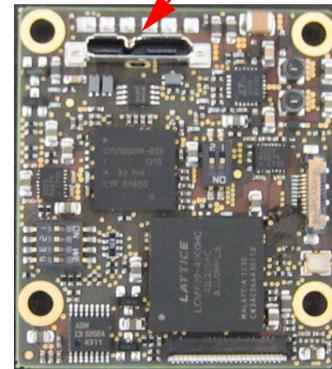
PCB bottom side:

Dual Select Switch 1:

Factory Configuration Setup

SW 1-1:

OFF: Keep off at all times

SW 1-2:

Keep always ON.

Quad Select Switch 2:

The quad slide Switch 2 is used to setup special features and for boot time adjustment.

SW 2-3:

OFF: Camera control over USB (USB UART, default)

ON: Camera control over RS232 UART (connector J9)

SW 2-4:

OFF: Short boot cycle for MP1010M-VC and MP1110M-VC

ON: Long boot cycle, required for MP2030M-GS

J2: Camera LVDS connector

J3: Do not connect

J9: RS232 UART connector

J7: External power connector

(arrow marks pin 1):

Pins 1, 2: Input voltage 5V to 7V DC

Pins 4, 5: GND

Pin 3: System reset, pull to GND for reset

J4, J5, J10: do not connect

External Trigger GPIO and RS232

GPIO and RS232 UART Connector J9

(pin 1 marked by red arrow)

Pin 1: External trigger pulse* input, 3.3V max

Pin 2: Trigger demo mode select input**, 3.3V max

Pin 3: do not connect
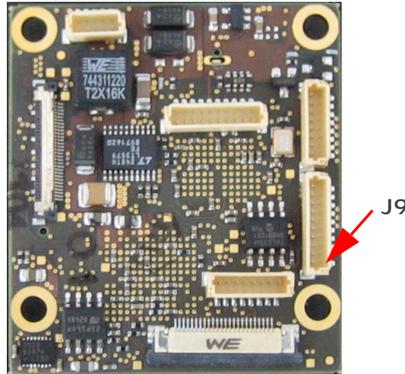
Pin 4: Trigger response output

Pin 5: 3.3V output (20mA max.)

Pins 6, 7: do not connect

Pin 8: GND

Pin 9: RXD (host to camera)

Pin 10: TXD (camera to host)

J9

Notes:

*Active high trigger pulse duration must be 1us minimum. Trigger pulse input has a 10kohms pullup resistor

**Trigger mode select input has a 10kohms pulldown resistor

Cables

TLCK-B4 cable kit is supplied with TL6636.

It contains:

- 1pcs 30wire micro coaxial cable, l=20cm

- 1pcs 10pin/7wire flying leads cable, l=15cm

- 1pcs 5pin/5wire flying leads cable, l=15cm (use of this cable is optional)

Real-Time external Trigger Operation

NOTE: EXTERNAL TRIGGER IS AVAILABLE WITH MP2030M-GS ONLY.

Tamron's MP2030M-GS global shutter block camera module allows for real-time triggered still image capture. Refer to MP2030M-GS technical manual provided by Tamron for details on real-time triggered still image capture operation.

TL6636 USB3 full HD video streamer provides a trigger mode input for selecting one out of two available trigger modes.

Mode 1 (default, pin2/J9 0V or open): External direct trigger

Trigger pulse input on pin1/J9 is glitch filtered and driven to MP2030M-GS trigger input port.

**Mode 2 (pin2/J9 3.3V): Automatic periodic trigger (demo mode)**

After selecting and activating trigger mode at MP2030M-GS by the related VISCA commands, the automatic trigger period is set to 1.5s. In this demo mode the camera takes an image every 1.5s (approx.).

Image shows TL6636 USB3 full HD video streamer with all cables attached

Board Mechanical (Top View)

Mounting Holes Drill=3.2mm, Land=5.6mm
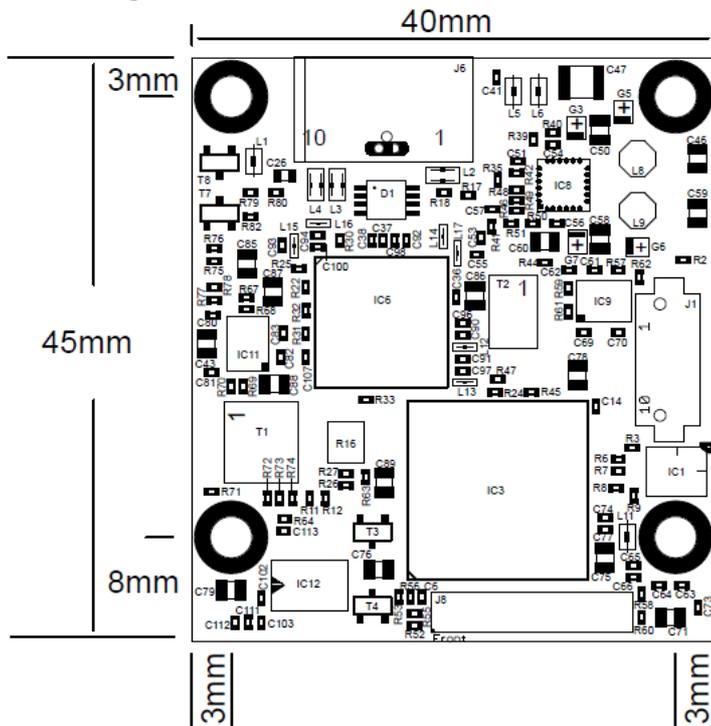
Power and Environment

POWER INPUT:
5V DC from USB3 port

Power consumption (MP2030M-GS + TL6636) 7.65W (cam motors inactive)

Power consumption (MP2030M-GS + TL6636) 9.3W (boot cyle and cam motors active)

Power consumption TL6636: 2.7W/540mA@5V DC (max.)

Power consumption value conditions:

Camera monitoring mode set to 1080p30

Ambient temperature +25°C/77°F

Humidity 30%

OPERATING CONDITIONS:

Ambient temperature (min/max): -5°C/+60°C = 23°F/140°F

Humidity: 20%-80%

STORAGE CONDITIONS:

Temperature (min/max): -20°C/+60°C = -4°F/140°F

Humidity: 20%-80%

Camera Power

Camera supply voltage is generated on TL6636 by a boost converter circuit. This circuit provides 9.55V DC (+/-3%) to the camera.

NOTE:

USB3.0 is specified for 4.5W maximum output power per USB3.0 port on a computer. However, many main boards used in desktop computer systems are able to provide more USB3.0 output power. In case of notebook and laptop computers, IPCs and SBCs, it has to be checked case by case if USB3.0 output power is sufficient or not. This is in the sole responsibility of the user of TL6636. In case the host computer provides a USB3.1 port, it is recommended to use this one instead of a USB3.0 port.

TL6636 EXTERNAL POWER:

TL6636 allows to use an external power supply in case USB3 power of the computer is not sufficient. As described on page 3 of this document, external power can be input on J7. Using a voltage of 6V DC is recommended. In case an external power supply is used, this voltage is used on TL6636 for the camera supply boost converter only. All other electronic devices on TL6636 are always powered from USB3 port. No adjustments on TL6636 are required for using external power. When powering up such a configuration, external power must be supplied before or coincident with USB3 power.

EXTERNAL POWER USE PER CAMERA MODEL:

MP2030M-GS: Recommended, should be used

MP1010M-VC: Not required but can be used

MP1110M-VC: Not required but can be used