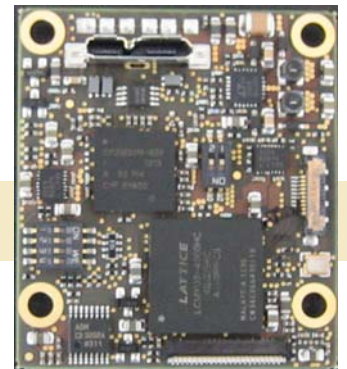


Thunder Link is a family of small form factor modules for formatting and converting generic digital video streams to standard compliant formats. Different interface standards are supported from the transmitter side including DVI/HDMI, VGA, 3G-SDI, HD-SDI, SDI, CVBS and USB. Supported physical media are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

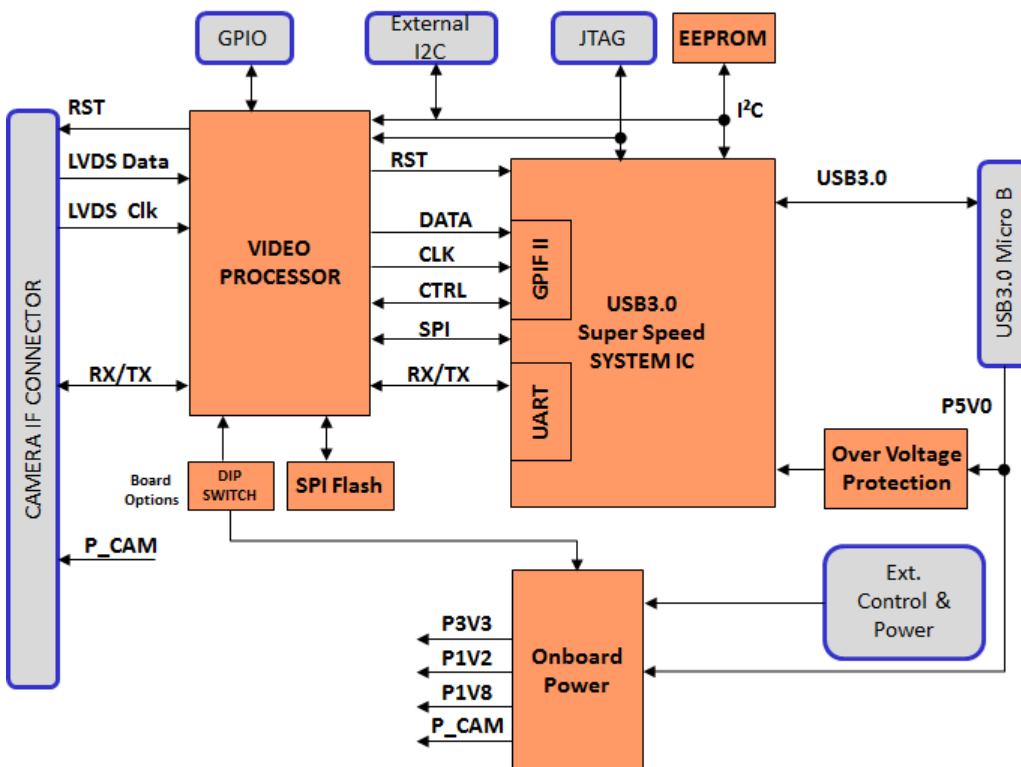
TL6035 connects to the digital video interface of Sony's FCB-EV, FCB-EH and FCB-SE block cameras and supports several progressive HDTV formats.

## TL6035 - 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
- + LVDS data format as defined by FCB-EV, -EH and FCB-SE600 camera blocks
- + Full USB bus powered camera solution possible depending on camera
- + Power supply voltage for camera is generated onboard



## Block Diagram TL6035



Supports all FCB-EV cameras in HD progressive modes

## Supported Camera Blocks

Model	Comment
FCB-EV7520A	Progressive HD Video Standards, Camera Register [74] must be set to 00.
FCB-EV75xx/73xx/7100	Progressive HD Video Standards, Camera Register [74] must be set to 00.
FCB-EV5500/5300	HD Video Standards
FCB-EH6500/6300	Progressive HD Video Standards
FCB-EH3410/3400	HD Video Standards
FCB-EH3310/3300	HD Video Standards
FCB-EH3150	HD Video Standards
FCB-SE600	Progressive HD Video Standards

## Supported Video Standards

The following HDTV video standards are supported by the TL6035. Note that video standard availability is always dependent on the capability of the camera block used.

- + 1920x1080p @ 25Hz, 29.97Hz, 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 transmission to the connected host PC.

## Host (PC) - Device Communication

TL6035 operates always as USB device which sends UVC compliant video data to a host PC. The host also communicates with the TL6035 via a serial communication channel (USB UART).

### Connecting the TL6035 to the Host PC

#### Operating System Support

TL6035 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, version 1511)

#### 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

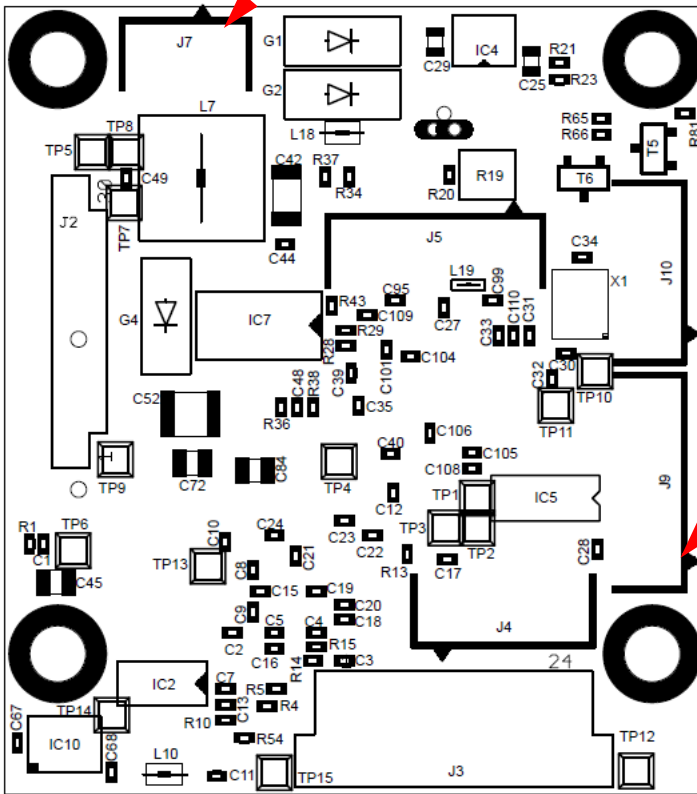
Video display and recording can be done with standard application programs like VLC player, Mplayer or similar. VLC and Mplayer are open source based applications and can be free downloaded. If users want to design their own applications software, they are free to do so. All software programming tasks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

#### Controlling TL6035 from the Host PC via USB UART

TL6035 supports the USB UART functionality. FCB cameras connected to TL6035 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).

**Note: For FCB-EV series cameras, register [74] must be set to value 00.**

### Board Connector Layout (Bottom View)

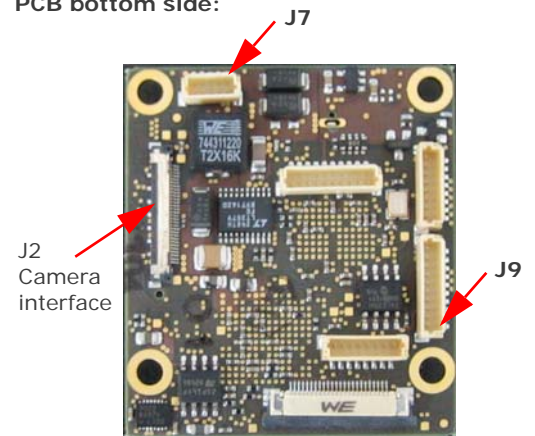


PCB top side:

USB3 microB connector



PCB bottom side:



#### Dual Select Switch 1:

The dual slide Switch 1 must be used to setup the camera operating conditions.

#### SW 1-1:

OFF: Camera Power = 9.55V

ON: Camera Power = 5.6V (for FCB-SE600 only)

#### SW 1-2:

OFF: FCB-EH/FCB-SE600 mode

ON: FCB-EV mode



#### Quad Select Switch 2:

The quad slide Switch 2 is used to setup special features.

#### SW 2-3:

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

ON: Camera control over RS232 UART (connector J9)

SW 2-4: ON for FCB-EV mode, OFF for all other modes

Switches 2-1 and 2-2 must be kept in OFF position.



**Note: For FCB-EV series cameras, register [74] must be set to value 00.**

**J2: FCB-EV, -EH, -SE 30pin LVDS connector**

**J1,J3,J8: not assembled**

**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**

**RS232 UART Connector J9**

**(arrow marks pin 1):**

Pins 1 to 7: do not connect

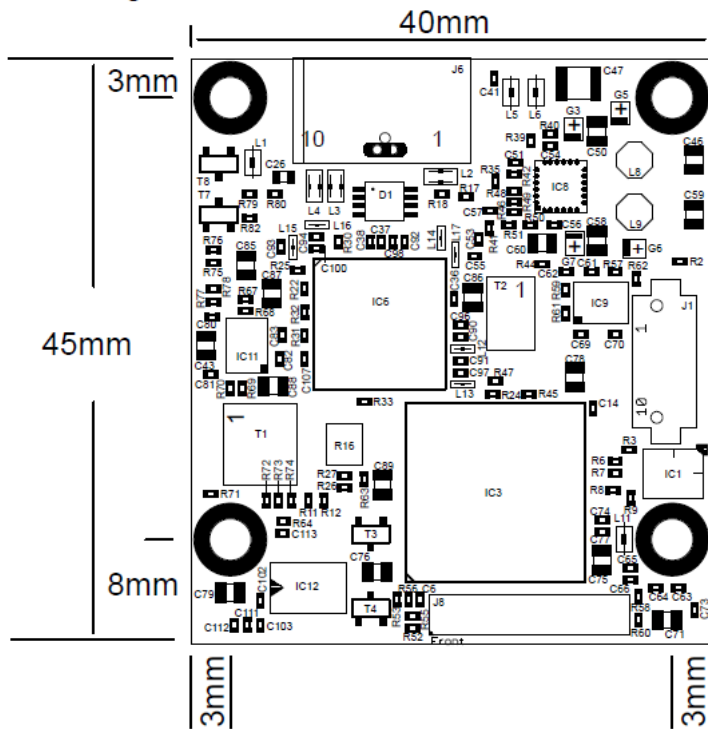
Pin 8: GND

Pin 9: RXD (host to camera)

Pin 10: TXD (camera to host)

## Board Mechanical (Top View)

Mounting Holes Drill=3.2mm, Land=5.6mm



## Power and Environment

**POWER INPUT:**  
5V DC from USB3 port

Power consumption (FCB-EV75xx + TL6035) 5.6W  
Power consumption (FCB-SE600 + TL6035) 3.5W  
(cam motors inactive)  
Power consumption TL6035: 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 TL6035 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 output power. In case of notebook and laptop computers, IPCs and SBCs, it has to be checked case by case if USB3 output power is sufficient or not. This is in the sole responsibility of the user of TL6035.

### TL6035 EXTERNAL POWER OPTION:

TL6035 allows to use an external power supply in case USB3 power of the used 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 TL6035 for the camera supply boost converter only. All other electronic devices on TL6035 are always powered from USB3 port. No adjustments on TL6035 are required for using external power. When powering up such a configuration, external power must be supplied before or coincident with USB3 power.