THUNDER LINK

WQHD

TL3K7052

WQHD DVI(HDMI) Output Video Transceiver

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.

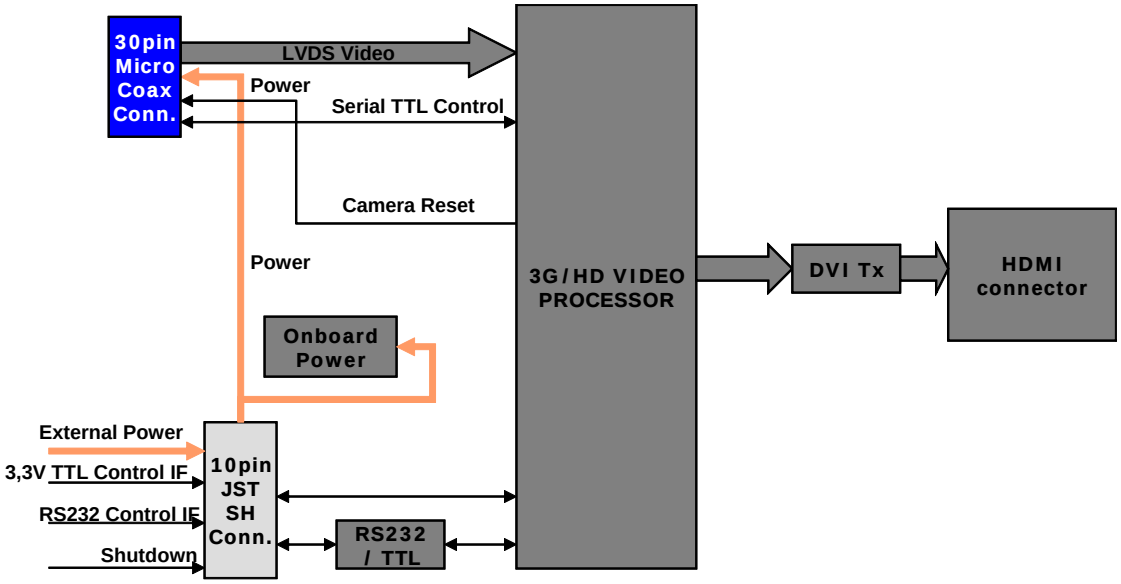
These modules connect to the digital LVDS video interface of zoom block cameras and support several progressive and interlace HDTV or SDTV formats. As no analog to digital conversion is done on these modules, excellent output image quality is achieved.

TL3K7052 - Features

WQHD DVI(HDMI) Output

+ Supports Aivion AZM-WQHS36L-LL 36x optical zoom camera
+ Digital 4Ch./8Ch. LVDS video input from camera
+ 2560 x 1440 pixel WQHD resolution support
+ 1440p output at 30Hz and 25Hz
+ 1080p and 720p output at 30Hz and 25Hz
+ Full automatic video input standard detection
+ WQHD/FHD/HD DVI video output over HDMI connector
+ Native digital signal processing chain for best image quality
+ RS232 and TTL level serial control interface
+ Supply voltage 12V DC regulated
+ Temperature monitoring with alert function

Block Diagram TL3K7052



Order Code:

TL3K7052

WQHD DVI(HDMI) output

This datasheet is valid for all B Revision Boards.

AIVION
Modular Imaging & Video Solutions

Specification Camera Interface

INPUTS:

DATA	8/4 CH. LVDS digital video (from camera)
CLOCK	LVDS (from camera)
CONTROL Rx	3.3V TTL serial control interface
ANALOG	--

OUTPUTS:

CONTROL Tx	3.3V TTL serial control interface
RESET	3.3V TTL, active low

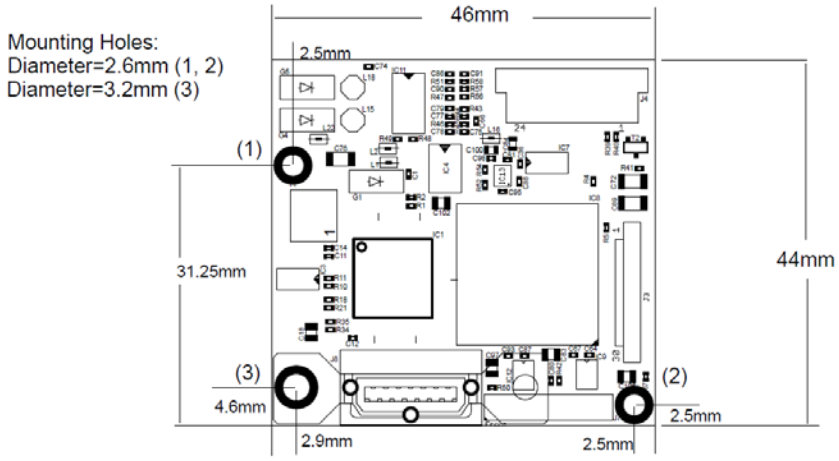
Power and Environment

POWER INPUT:
9V to 12V DC regulated (13V DC absolute maximum)
Power consumption (incl. camera) 5.3W (cam motors inactive)

Power consumption value conditions:
Power 12V DC, video mode 1440p30
Ambient temperature +25°C/77°F
Humidity 45%

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%

Board Mechanical



Maximum top component height = 10.5mm (HDMI connector)

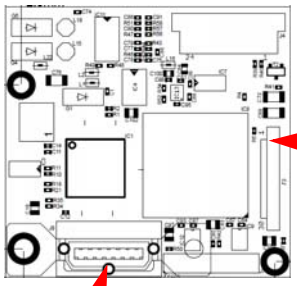
Maximum bottom component height = 3.5mm

PCB thickness = 1.56mm

POWER INPUT:
9V to 12V DC regulated (13V DC absolute maximum)

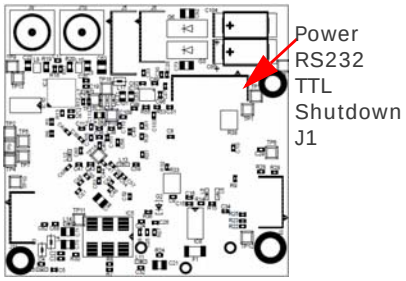
Onboard Connectors

PCB Top Side:



PCB Bottom Side:

TL3K7052 has no
MCX connectors



Note: Arrowheads indicate pin 1 location

J4: Do not connect
J5: Do not connect
J6: Do not connect
J7: Do not connect
J11: Do not connect

SAFETY NOTES: All digital inputs are specified for maximum voltages of 3.3V (+5%).

 © 2008-2019 Visual Communication Systems GmbH, all rights reserved.

Pin Assignment of external Interfaces

J8 HDMI connector type is Kycon KDMIX_FS1V_WS or equivalent

J1 JST BM10B-SRSS-TB

Power and RS232/TTL Control IF

1 DC IN
2 DC IN
3 GND
4 GND
5 Reset / Shut Down, pull to GND to reset/shut down TL7050 and camera*
6 GND
7 TXD_TTL (serial IF transmit, 3.3V) and/or temperature alert output
8 RXD_TTL (serial IF receive, 3.3V)
9 RXD_232 (serial IF receive, RS232 level)
10 TXD_232 (serial IF transmit, RS232 level)

Note: Connect RS232 or TTL serial interface, not both

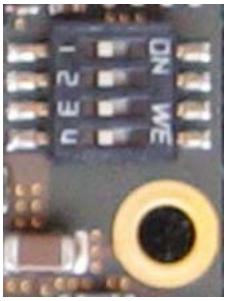
*for reset, pull to GND for one second or longer

Onboard Mode Switches

Switch	OFF (default)	ON
1 - mode	keep off	
2 - cam control	RS232/TTL	do not use
3 - temp alert enable	no alert on J1/ pin7	J1/pin7 alert enabled
4 - mode	Camera	Test pattern*

Table 1: Onboard Switch Functions

* Refer to page 7 for test pattern generator operation

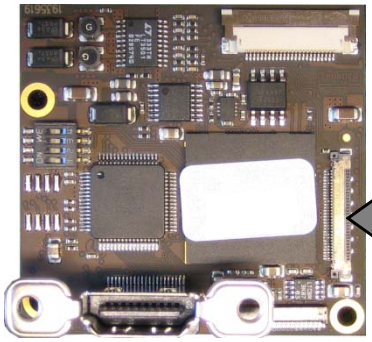


SAFETY NOTES: All digital inputs are specified for maximum voltages of 3.3V (+5%).

© 2008-2019 Visual Communication Systems GmbH, all rights reserved.

Camera Connection Diagram

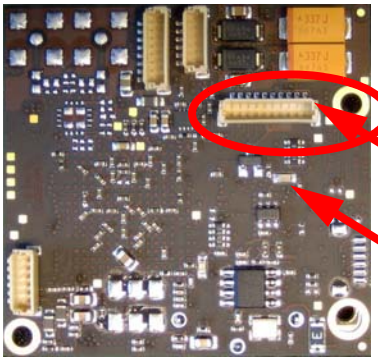
TL3K7052 top side



30pin Micro Coax Cable

AZM-WQHS36L-LL

TL3K7052 bottom side



J1, 12V DC Power input, Reset and RS232/TTL serial interface

Pin 1 location

Temperature alert signalling LED (red colour when on)

Temperature Alert Function

When board temperature exceeds 80°C (176°F), red LED will be switched on.

In addition such an event can be signalled on connector J1/pin7 by setting switch 3 (temp alert enable) to ON position.

- In case board temperature is equal to or over 80°C (176°F), level on J1/pin7 will be held constant low (< 0.4V)
- In case board temperature is less than 80°C (176°F), level on J1/pin7 will be high (> 2.4V)

SAFETY NOTES: All digital inputs are specified for maximum voltages of 3.3V (+5%).

© 2008-2019 Visual Communication Systems GmbH, all rights reserved.

Video Standard Selection Table

The video standard provided by the camera is automatically detected by the TL3K7052 module.

Camera Setting	TL7052 Output Format	Camera Register[72] Value
		all values are hexadecimal
1440p / 30Hz	1440p / 30Hz - WQHD	21
1440p / 25Hz	1440p / 25Hz - WQHD	22
1080p / 30Hz	1080p / 30Hz - FHD	06
1080p / 25Hz	1080p / 25Hz - FHD	08
720p / 30Hz	720p / 30Hz - HD	0E
720p / 25Hz	720p / 25Hz - HD	11

Table 2: Video output matrix for TL3K7052 with AZM-WQHS36L-LL

Camera Monitoring Mode Setting	Camera Register[74] Value (LVDS Mode)
1440p / 30Hz or 25Hz	01
All others modes	00

Table 3: Required Camera Register[74] Settings for WQHD operation

Notes:

Refer to AZM-WQHS36L-LL manual for camera operation and setting adjustments

SAFETY NOTES: All digital inputs are specified for maximum voltages of 3.3V (+5%).

Internet: **www.aivion.com**
E-Mail: **sales@aivion.com**

AIVION Modular Imaging & Video Solutions

 © 2008-2019 Visual Communication Systems GmbH, all rights reserved.

Reset Operation

When applying power to TL3K7052, the camera is also automatically powered. During power up all functions on TL3K7052, are reset and initialized.

During operation a manual reset can be applied by pulling pin no. 5 of connector J1 to 0V (GND). This resets also the camera.

Camera Control

Camera control can be done by connecting a PC or CCU via RS232 or serial 3.3V TTL interface to TL3K7052. The interface is passed through to the camera that all VISCA protocol based software can be used.

Cable Kit Contents

TLCK-B, Base cable kit (included):

External connecting cables:

1 pcs. - 10pin flying leads cable for power and control (RS232/TTL), lead length = 15cm / 5.9inch

Camera connecting cables:

1 pcs. - 30pin KEL USL type micro coaxial cable, connector on both sides, length = 20cm / 7.86inch

SAFETY NOTES: All digital inputs are specified for maximum voltages of 3.3V (+5%).

© 2008-2019 Visual Communication Systems GmbH, all rights reserved.

Test Pattern Generator

TL3K7052 has an integrated test pattern generator (TPG) which can be operated independent of any camera. The TPG can be enabled by setting onboard switch number 4 to ON position and repowering the TL3K7052 board. In addition one out of two test pattern and one out of four video standards can be selected by setting onboard switches 1, 2 and 3 accordingly. The following tables summarize all details.

To enable TPG mode, please execute these steps:

1. Set video mode with switches 2 and 3

2. Set pattern with switch 1

3. Set switch 4 to ON to enable TPG mode

4. Switch TL3K7052 power off and on again

Note: For TPG operation on TL3K7052, the camera must be connected.

Switch	OFF	ON
4 (TPG on/off)	Camera video output	TPG video output
1 (Pattern)	Multi test pattern	Stress test pattern

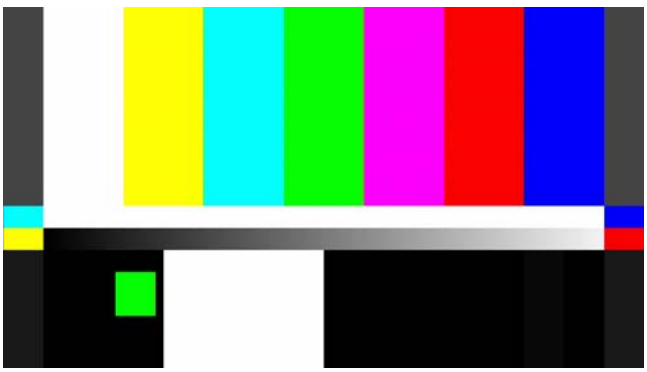
Table 4: TPG on/off and pattern select

	Switch 3 OFF	Switch 3 ON
Switch 2 OFF	1080p 60Hz	1080p 50Hz
Switch 2 ON	1080p 30Hz	1080p 25Hz

Table 5: Video standard selection

Test Images

Multi Test Pattern



Stress Test

Stress test pattern generates worst case bit cycles on the serial 3G/HD-SDI link. It is suitable to check data/clock recovery performance of any connected 3G/HD-SDI receiver.

SAFETY NOTES: All digital inputs are specified for maximum voltages of 3.3V (+5%).

© 2008-2019 Visual Communication Systems GmbH, all rights reserved.