

Preamplifier Electronics for Sensors Unlimited InGaAs Photodiode Arrays SUxxxLD and SUxxxLX

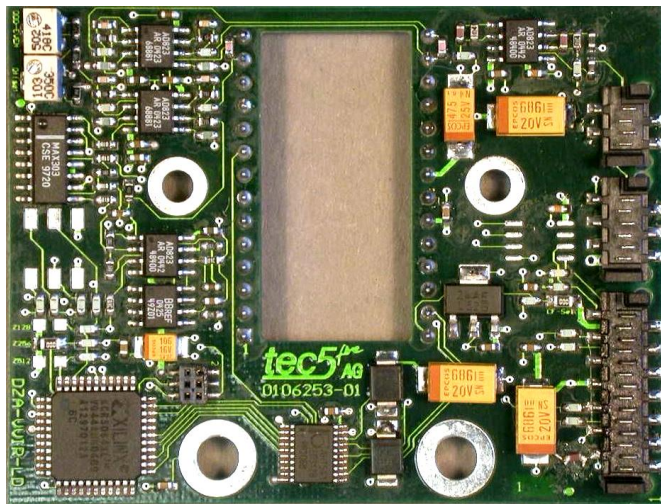


DZA-VVIR-LD

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Short Description

- § Compact preamplifier electronics for Sensors Unlimited InGaAs photodiode arrays of series SUxxxLD and SuxxxLX with RT or T1 pinout
- § Direct positioning of PCB on sensor chip
- § Device input: sensor chip
- § Device output: Front End Electronics with sensor interface ,Sensor_U1' (FEE-1M /NIR-2, FEE-NIR)
- § PCB dimensions: 72 mm x 55 mm
- § Connector for temperature controller

General

The preamplifier electronics DZA-VVIR-LD serves as an interfacing component between the Sensors Unlimited InGaAs photodiode arrays of series SUxxxLD or -LX and the Front End Electronics board of a tec5 operating electronics. Typically, the photodiode array is plugged into the connector DIL-28 on the soldering side of the PCB.

The interface to the Front End Electronics complies to the tec5 specification ,Sensor_U1' (MICS-14, MICS-4 and SMB socket with pin contact, video signal ,differential').

A Peltier cooler control electronics can access the pre-amplifier via a MICS-6 connector.

Features

Based on the CLK and START input signals the pre-amplifier board generates all signals required to read out a sensor chip. The analog signals from the sensor array are primed and are provided differentially for further processing (video signal).

The sampling instant is indicated by the rising slope of the TRIGGER signal. The pixel frequency of a 128 or 256 element LX array or a 512 element LD array equals 1/4 of the CLK frequency. The readout time is derived from the numbers of pixels N as:

$$t_{\text{readout}} = ((N \times p) + 96) / f_{\text{CLK}}$$

with $p = 4$ for the sensors mentioned above. The pre-amplifier board switches automatically between 'odd' and 'even' pixels. After the output of all pixel signals an EndOfScan pulse is generated by the board. With this EOS signal, the integration period starts simultaneously for all pixels and ends with the next START pulse. The complete measurement cycle duration is equal to the integration time plus the readout time.

Technical Data

Diode arrays: Sensors Unlimited InGaAs photodiode arrays of series SUxxxLD and SUxxxLX with RT or T1 pinout

Number of pixels: 128, 256 or 512
CLK frequency: max. 2 MHz
Readout time (512): 1.058 ms at 2 MHz CLK
Min. integration time: 0.1 ms

Analog Range:

Output signal: $\pm 0 \dots 3 \text{ V}$
Total gain: 1.4

Digital Input Control Signals (AHC level):

START: Start of readout cycle, if signal 'START' is High and 'CLK' has a falling slope.

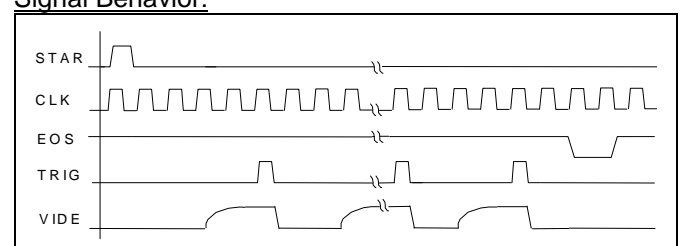
CLK: Clock signal for the array. The pixel frequency is 1/4 of the CLK frequency

Digital Output Control Signals (AHC level):

TRIGGER: Signal for reading out the video signal, read with the rising slope

/EOS: EndOfScan, Signal /EOS is High during readout procedure. After the final pixel is read, a LOW pulse is generated for the time the CLK signal is high. This indicates the end of the array.

Signal Behavior:



For further details refer to Sensors Unlimited datasheet.

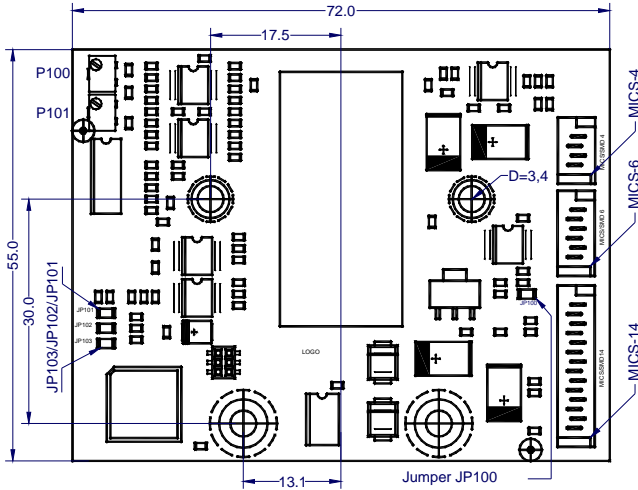
Current consumption:

+5V: typically < 65 mA
 -5V: typically < 10 mA

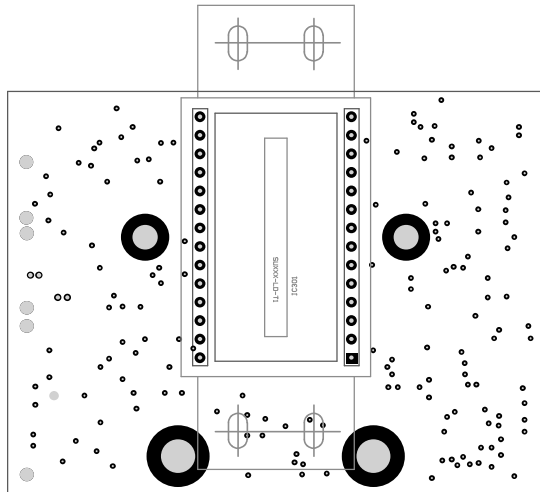
Ambient Conditions (DZA-VVIR-LD only):

Operating temperature range: 0 °C ... 65 °C
 Storage temperature range: -40 °C...+70 °C
 Humidity (@25°C, non condensing): 10 % ... 90 %

Board Layout



PCB DZA-VVIR-HM, component side



PCB DZA-VVIR-HM, soldering / sensor side

Mechanical Interfacing

Board dimensions: 72 mm x 55 mm
 Connector diode array: 2x sockets on soldering side of board
 Mounting of board: 2x holes, symmetric to diode array and 2x holes asymmetric

Electronic Interfaces

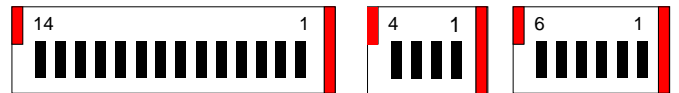
Type: tec5 specification „Sensor_U1“
 Video output: MICS-4
 Digital control: MICS-14
 Cooling control: MICS-6

Pin Assignment MICS-14 Connector:

Pin	Designation	Pin	Designation
1	TRIGGER – Sync Video Grabber	2	START – Start of Scan
3	DIN1 (not used)	4	CLK - Sensor Clock
5	DIN2 (not used)	6	/EOS - End of Scan
7	0V - Digital Ground	8	-5V – Supply
9	0V - Digital Ground	10	+5V – Supply
11	DOUT1 (not used)	12	DOUT2 (not used)
13	I2C-SDA	14	I2C-SCL

Pin Assignment MICS-4 Conn.: MICS-6 Connector:

Pin	Designation	Pin	Designation
1	0V – Analog Ground	1, 2	Peltier +
4	0V – Analog Ground	3, 4	Peltier -
2	Video Out (inverted)	5	Thermistor
3	Video Out (non inverted)	6	Thermistor



Solder Jumpers / Potentiometer

Jumper 128 pixels: only JP101 closed
 256 pixels: only JP102 closed
 512 pixels: only JP103 closed
 Jumper JP100: closed for CAP=10.4pF
 Default settings: 512 pixels, 10.4 pF
 Potentiometer 100: Gain balance even - odd
 Potentiometer 101: Offset balance even - odd

System Data

System data, realized with tec5 16 bit Operating Electronics incl. FEE-NIR and sensor SU512LD-T1 (cooled, sensor temperature = 0 °C)
 Integration time: 1 ms
 Clock frequency: 312.5 kHz
 Intensity resolution: 16 Bit
 Ambient temperature: +25 °C
 Resulting single pixel dark noise: < 3 counts rms

User Information

General

The information in this data sheet has been checked carefully. However, no responsibility is assumed for inaccuracies. tec5 reserves the right to make changes to any portion of this document without notice. Each product is tested carefully before being shipped. If, however, problems should occur while initial operation or during later operation, please first check your specific settings and correct installation (connectors).

Warranty

The warranty period for this product is 12 months. The warranty begins on the day of delivery. Within the warranty period, tec5 will repair free of charge any faulty functioning of the product resulting from faulty design or defective material. All other claims are excluded, in particular consequential damage.

Handling

The electronics is partly constructed in CMOS technology and is thus sensitive against electrostatic discharge. Take appropriate precautions whenever handling the component. Please switch off the power before connecting or disconnecting the product.