

InGaAs Line Array Driver TEES

Description

IG22 and IG26 x-InGaAs line arrays are complex parts that require a complex and precise drive electronics. Usually, large users design their own circuit. However, small to mid-size users in many cases do prefer to purchase the electronics as well. Unfortunately, our devices will not work with traditional InGaAs drive electronics that have been available on the market so far due to inherent improvements and modifications.

So, we had to close this gap quickly with a high performance, reliable and user friendly new device. Of course, this is impossible without experienced partners. Therefore, we decided to team up with a company that has more than 2 decades of experience in electronics and software for spectroscopy and one advanced user in addition.

The finished drive electronics is "Made in Germany" and we named it TEES (Tempe Electronics & Software Set). This shall remind people that the line arrays, which are driven by this set, are manufactured at our facility located in Tempe, AZ.

The TEES Set Consists of the Following Components:

- Sensor board (without housing) (Fig. 1)
- Main processing and control unit (Fig. 2)
- Software for control and data analysis
- Cable set
- Sub heatsink (Fig. 3)
- TEES does support thermoelectric cooling.

Fig. 1: Backside of a sensor board PCB. There is a 28 pin socket at the top side that fits to the detector.

Fig. 2: Main processing and control unit

Fig. 3: The sub heatsink has to be attached to the bottom of the detector with a small amount of thermal epoxy. A thermally conductive adhesive tape can be an alternative. It is a flexible thermal interface from the detector to a larger heatsink, which has to be chosen and installed by the user.



Fig. 1



Fig. 2



Fig. 3

Sensor Board

The sensor board is a separate PCB board that converts the analog output signals to digital. It houses the array physically, communicates with the main unit and interfaces with the optics and the heat sink.

The sensor board does have holes, which fit to optics manufactured by Polytec GmbH, located in Waldbronn, Germany and by Carl Zeiss Spectroscopy GmbH, located in Jena, Germany. ⁽¹⁾

The detector will be shipped separate and must be integrated by the user with usual ESD precautions.

The basic idea of integration can be seen best by looking at Figure 4.

A detailed description can be downloaded separately.

The sensor board is plug and play with the main processor and control unit and the software. Communication protocol is available for OEM customers on special request and under NDA.



Fig. 4

Fig. 4: The sub heat sink has been attached to the bottom of the detector and is ready to interface to a larger heat sink ⁽²⁾. The detector itself is hidden in this picture. Its pins have been plugged into a socket without mechanical stress. A custom optics has been applied to the top side of the detector by using screws and an additional submount. Care has been taken to make a stress release and not to bend the detector.

⁽¹⁾ Different optics must be integrated by adapters that use the holes that are already there.

⁽²⁾ It makes sense to choose a removable thermal connection. This can be achieved by just applying a small amount of thermal epoxy or by using "Thermally Conductive Adhesive Transfer Tapes".

Main Processing and Control Unit (MPCU)

The MPCU is the smart link inbetween the sensor board and the user PC (and even more). The unit offers all necessary interfaces and displays in a clear design and enables straightforward integration into custom instruments. Temperature controller is included as well.

The heart of the MPCU unit is based on powerful XILINX Virtex 4 technology in combination with IBM Power PC which is ideal for spectroscopic applications. Data acquisition and sensor control is separated from first data handling. Therefore, it is possible to send preprocessed data to a PC app via LAN/WLAN quickly. A data buffer up to 2000 data sets enables continuous and lossless data acquisition and streaming even for kinetic applications.

Hardware Characteristics

Architecture	Virtex-4 FPGA with PowerPC
Data buffer	2000 spectra
Size of aluminum housing	6.5 cm x 10.5 cm x 17.0 cm
Features	
Integration time	0.1 ms to 10 sec
Measuring modes	Single, Multiple, Continuous
Kinetic mode with independent time bases	Yes
Trigger options	External digital input with up to 50Hz. By time. By Software
Shutter and lamp control	Yes
On-board diagnostic system	Yes. Temperature, voltage, current etc
Communication	
Data transmission	Ethernet TCP/IP 10/100/1000 MBit/s
IP adress	DHCP or programmable
Galvanically isolated digital I/O	32
RS-232 for control of external devices	2
Status display	8 x LED
Electrical and environmental specifications	
Storage temperature	-10°C to + 60°C (no condensation)
Operating temperature	+5°C to + 50°C
Power consumption with TEC	25 W
Operating voltage	5 V DC

Software

The TEES software has been written for plug and play operation of the MPCU and the sensor board. It has 3 basic functions:

- Organization of MPCU and sensor control
- Organization of data acquisition
- Data evaluation

TEES Software

Instrument control	
Array parameters	Integration time, temperature, average, measurement range, well size
Standard measuring modes	Single, multi, continuous
Kinetic mode	Yes. Up to 4 independent time bases.
Trigger options	Yes. Timer, digital I/O, event etc.
Synchronisation & control of optical accessories	Possible.
Data handling and storage	
Representation for transmission and absorbance	Yes.
User definable normalization and calibration	Yes.
File formats	SPC, UVD/3D, ASCII
Data viewer	Yes. Math options and Excel export.
Advanced features	
User defined processing	Yes. By script language.
Trend analysis	Yes.
Multivariate data analysis	Yes. With module, i.e. CAMO.
Concentration, Film Thickness, Color Analysis	Yes.
Minimum requirements	
CPU	Pentium IV processor or better
Operating System	Windows 7 SP1 (32 & 64 bit)
Memory	4 GB
Available Disc Space	500 MB
Graphics adapter	Standard graphics
Screen resolution	1024 x 768 pixel at least

Product Changes

LASER COMPONENTS reserves the right to make changes to the product(s) or information contained herein without notice. No liability is assumed as a result of their use or application.

Ordering Information

Products can be ordered directly from LASER COMPONENTS or its representatives. For a complete listing of representatives, visit our website at www.lasercomponents.com

Germany & Other Countries

Laser Components Germany GmbH
Tel: +49 8142 2864 - 0
Fax: +49 8142 2864 - 11
info@lasercomponents.com
www.lasercomponents.com

France

Laser Components S.A.S.
Tel: +33 1 39 59 52 25
Fax: +33 1 39 59 53 50
info@lasercomponents.fr
www.lasercomponents.fr

United Kingdom

Laser Components (UK) Ltd.
Tel: +44 1245 491 499
Fax: +44 1245 491 801
info@lasercomponents.co.uk
www.lasercomponents.co.uk

Nordic Countries

Laser Components Nordic AB
Tel: +46 31 703 71 73
Fax: +46 31 703 71 01
info@lasercomponents.se
www.lasercomponents.se

USA

Laser Components USA, Inc.
Tel: +1 603 821 - 7040
Fax: +1 603 821 - 7041
info@laser-components.com
www.laser-components.com