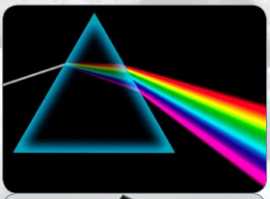
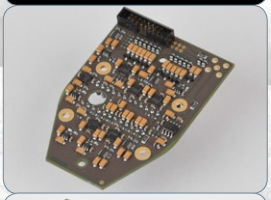
redline
TECHNOLOGIES





Opto-Electronics

Controllers for Spectrometers

Introduction

Applications

Applications for spectrometers with rapid repetition rates at high precision, combined with a small size are rapidly growing.

CCD line arrays promote a high number of spectral lines while maintaing small size. Still for highest precision, low noise measurements photomultipliers are still the number one choice, in spite of their larger size and the need for a high voltage supply.

Controllers for Spectrometer

Our spectrometer electronics are targeted for use in spectrometers in research and development as well as in-line quality control oder material identification in production.

Photomultipliers and CCD line arrays - even of different types - can be combined in a single measurement system. The unique modular approach of our spectrometer controllers makes system design and extension an easy task. By separating the preamplifers from the converters you can achieve a high density of CCD line arrays and thus reducing the size of the whole spectrometer.

Customer Specific

All models shown are examples of our standard range. We are happy to tailor any product to your special requirements or do a complete new design from scratch, conforming to your specifications.

Support for your software development is included at no additional charge.

Disclaimer

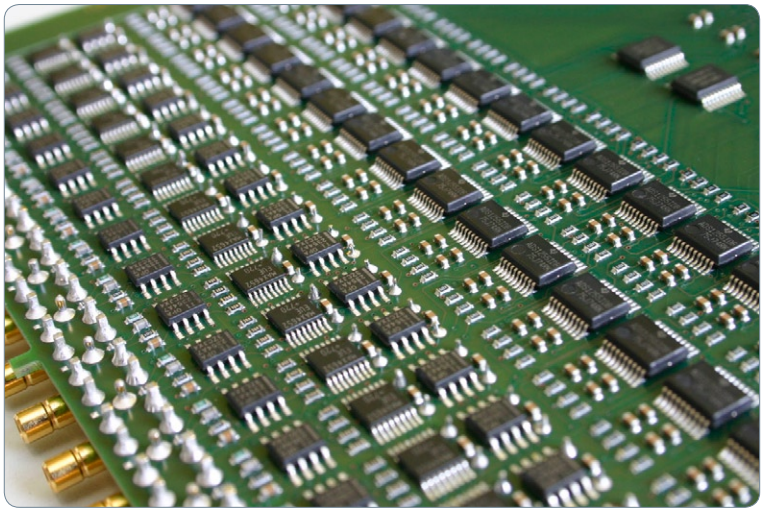
All data, pictures and descriptions presented in this catalog is given at our best knowledge and thought to be reliable. However these may change at any time due to our commitment to continuous improvement. Thus we assume no responsibility that the data is up-to-date, correct or that a product is suitable for a certain use.

If you need an approval for specified data or for the suitability of a product for your application please request a written confirmation before placing an order.

Controllers for Spectrometer

Datasheet

Flexible and extendable set of controller boards for spectrometers: Complete solution for high-speed precision spectrometry using either photomultipliers or CCD image sensors.



16-channel converter board for photomultipliers

Shortform Data

property	value	unit
pixel rate	5	MHz
channels	64	
supply voltage	24	V_{dc}

Applications

- spark induced spectroscopy
- plasma induced spectroscopy
- laser induced spectroscopy
- gas chromatography
- material testing
- material identification

Benefits

- modular design
- high frequency
- simple Ethernet interface
- many supported CCDs
- mixed PMT / CCD assemblies
- programmable trigger system
- programmable exposure per channel
- single supply

Application

The series of controllers is intended for use in high-speed, high-precision spectrometers.

CCD line arrays of different types and photomultipliers can be combined in a single system.

Architecture

A complete spectrometer system consists of

- central unit with Ethernet port and trigger system
- converter units for CCD image sensors or photmultipliers
- channel units for CCD image sensors

Up to 4 converter units connect to a central unit. Each converter unit controls 4 CCD channel units or 16 photomultipliers. Thus one central unit can control 16 CCD arrays or 64 photomultipliers. An even larger system requires another central unit.

Each central unit requires its own dedicated Ethernet port on your host computer.

Features

The integration (exposure) time is indepently programmable with 20ns resolution on a per-channel basis. For photomultipliers there are even two independent exposure windows per light pulse.

Across the whole pixels up to 64 regions of interest (ROI's) can be programmed on a per-pixel basis. Only the data of these ROI pixels will be transmitted to the host computer, thus severely reducing the amount of data.

The trigger system is fully programmable. The trigger sources are 2 high-speed inputs, a PLC control input or an incremental encoder. All trigger sources can be indepently divided or gated by other trigger sources. There is also a free-running timebase available.

Eight high-speed high-current trigger outputs have indepently programmable pulse timing and level up to 24V, adopting to any kind of receiver.

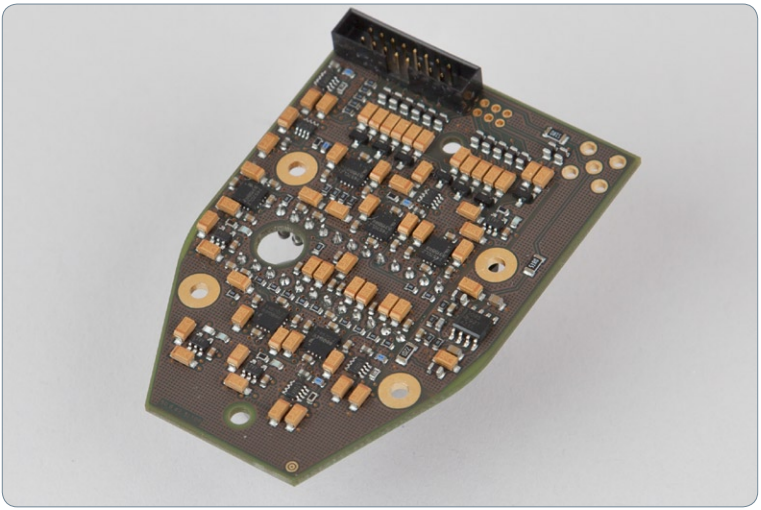
A bank of general pupose input/outputs is programmable via Ethernet messages.

Usage

The central unit is connected to a **dedicated** 100-BaseTx Ethernet port on the host computer.

All register and pixel data is transferred via the Ethernet interface using the UDP protocol. The protocol and all registers are fully documented.

Channel Unit for S11165



The channel unit serves one Hamamatsu CCD line array S11165 or S11166 with 2048 pixel up to the maximum frame rate of 4kHz at 10MHz pixel rate. For reduced power consumption reduced pixel rates are programmable.

The optimized board shape allows for radial placement of CCD lines.

Usage

To be used with 4-channel converter electronics. Power and all signals are connected via a 20-pin ribbon wire connector with 2mm grid.

Specifications

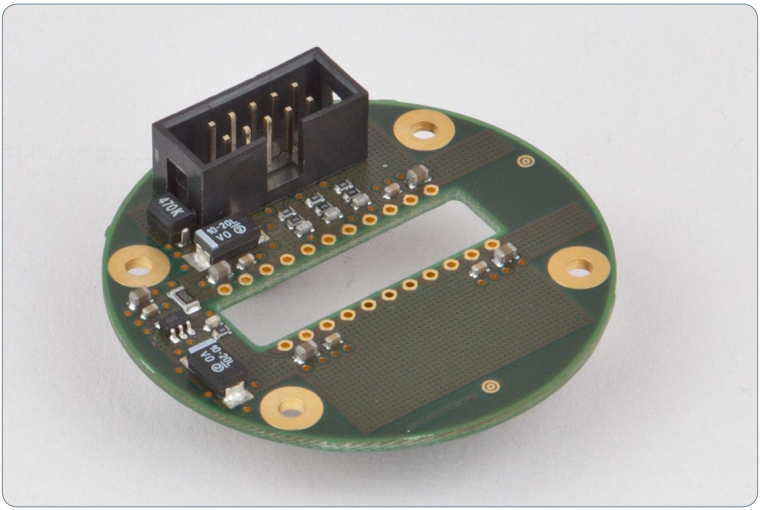
Properties	min	typ	max	unit
pixel data rate			10	MHz
frame rate			4000	Hz

Dimensions	min	typ	max	unit
width		51		mm
depth		75		mm
height		12		mm

Order Code

number	description
61.134.216.30	channel unit for S11165, rectangular

Channel Unit for TCD1304



The channel unit serves one Toshiba CCD line array TCD1304 with 3648 pixels up to a maximum frame rate of 500Hz at 1MHz pixel rate (4MHz pixel clock). The shutter of the TCD1304 is used for short exposure times.

The round board shape allows for radial placement of CCD lines.

Usage

To be used with 4-channel converter electronics. Power and all signals are connected via a 10-pin ribbon wire connector with 2.54mm grid.

Specifications

Properties	min	typ	max	unit
pixel data rate			1	MHz
frame rate			500	Hz

Dimensions	min	typ	max	unit
diameter		51		mm
height		12		mm

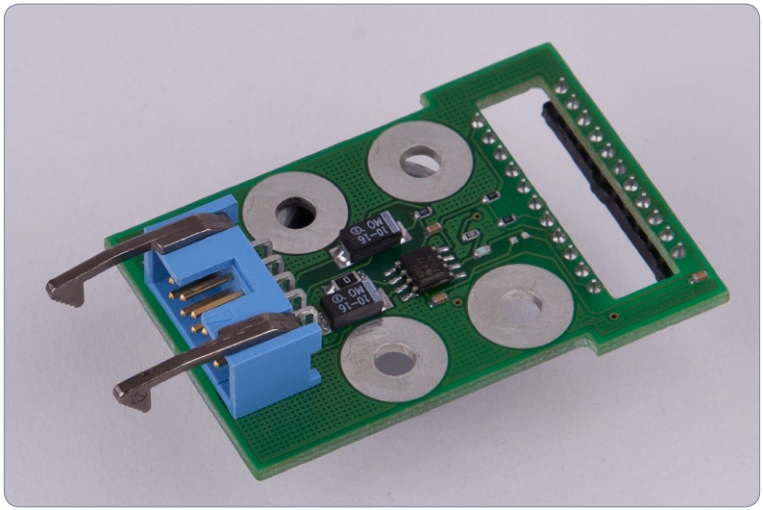
Dimensions are for the round version. Dimension of rectangular version see channel unit for ILX554.

Order Code

number	description
61.134.210.20	channel unit for TCD1304, rectangular
61.134.212.120	channel unit for TCD1304, round

Rectangular version is not recommended for new designs.

Channel Unit for ILX554



The channel unit serves one Sony CCD line array ILX554 with 2048 pixels up to a maximum frame rate of 500Hz at 2MHz pixel rate.

Usage

To be used with 4-channel converter electronics. Power and all signals are connected via a 10-pin ribbon wire connector with 2.54mm grid.

Specifications

Properties	min	typ	max	unit
pixel data rate			2	MHz
frame rate			500	Hz

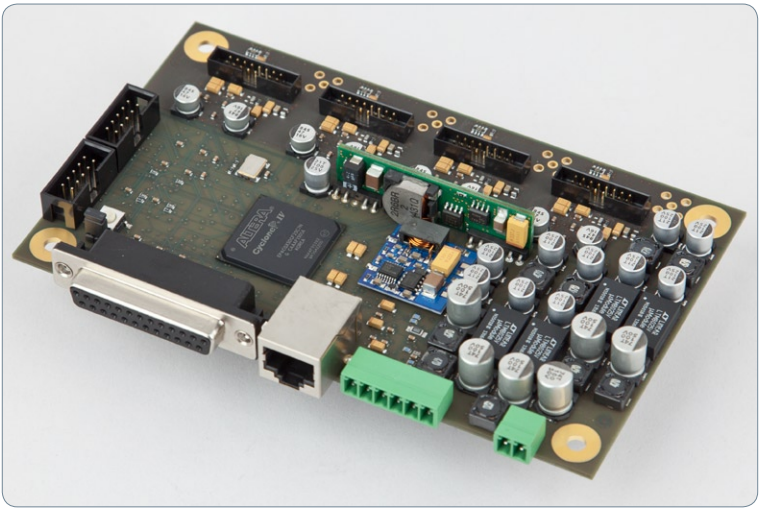
Dimensions	min	typ	max	unit
width		40		mm
depth		56		mm
height		12		mm

Order Code

number	description
61.134.210.10	channel unit for ILX554, rectangular

Rectangular version is not recommended for new designs.
Using ILX554 is not recommended for new designs.

Converter Unit for CCD S11165



The converter unit serves up to 4 channel units with CCD line array Hamamatsu S11165.

Usage

To be used with channel electronics for S11165. Power and all signals to channel electronics are connected via a 20-pin ribbon wire connector with 2mm grid. From central unit power is connected via a 2-pin terminal. All other signals are connected via a 25-pin SUB-D connector.

A temperature controler for a Peltier cooler and Pt100 sensor is built-in.

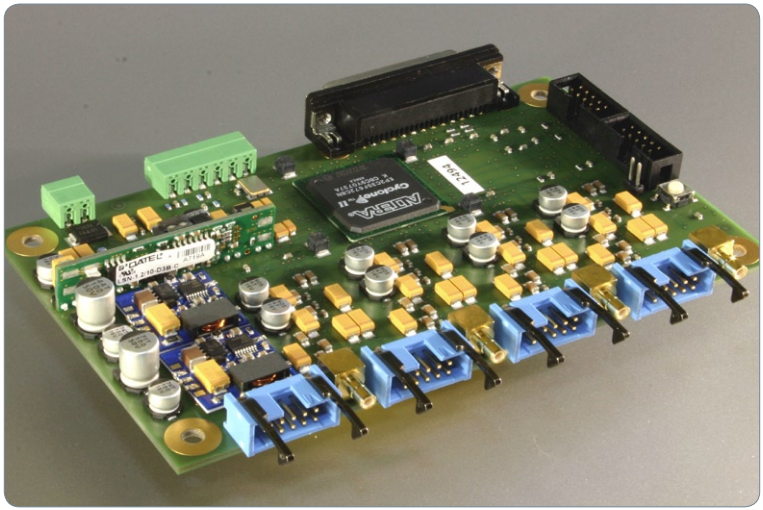
Specifications

Dimensions	min	typ	max	unit
width		150		mm
depth		90		mm
height		18		mm

Order Code

number	description
61.134.220.20	CCD converter for 4x S11165

Converter Unit for CCD ILX554 / TCD1304



The converter unit serves up to 4 channel units with CCD line array Sony ILX554 or Toshiba TCD1304. Mixed configurations are allowed.

Usage

To be used with channel electronics for ILX554 or TCD1304. Power and all signals to channel electronics are connected via a 10-pin ribbon wire connector with 2.54mm grid. From central unit power is connected via a 2-pin terminal. All other signals are connected via a 25-pin SUB-D connector.

A programmable temperature controller for a Peltier cooler and Pt100 sensor is built-in.

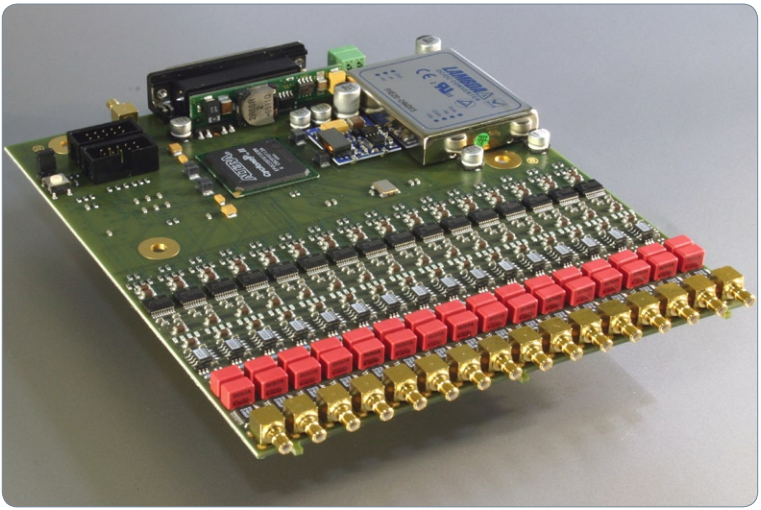
Specifications

Dimensions	min	typ	max	unit
width		150		mm
depth		90		mm
height		18		mm

Order Code

number	description
61.134.220.10	CCD converter for 4x ILX554/TCD1304

Converter Unit for Photomultiplier



The converter unit serves up to 16 photmultipliers. Each channel has two independent integrators for extracting two time windows out of a single light pulse.

Usage

To be used with photomultiplier tubes. Signals from photomultipliers are connected via a dedicated SMB coaxial connector per channel. From central unit power is connected via a 2-pin terminal. All other signals are connected via a 25-pin SUB-D connector.

The high voltage power supply for the photomultipliers ist not contained in the converter unit.

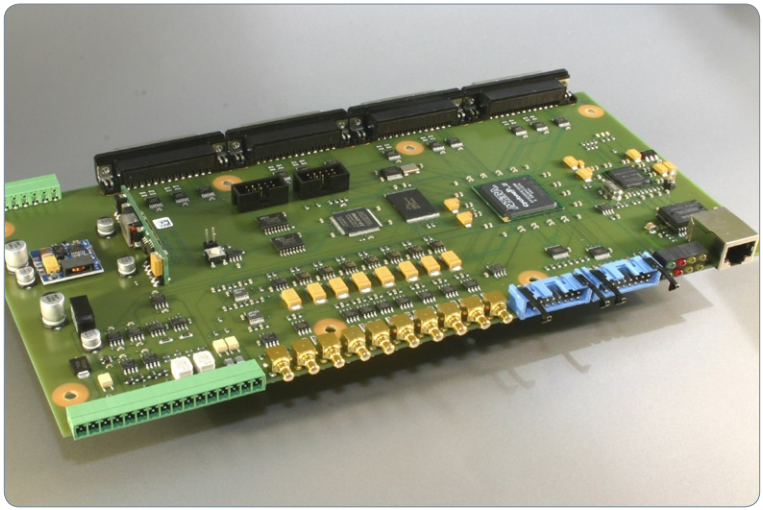
Specifications

Dimensions	min	typ	max	unit
width		145		mm
depth		164		mm
height		18		mm

Order Code

number	description
61.134.220.10	photomultiplier converter 16 channels

Central Unit



The central unit serves up to 4 converter units for photmultiplier and/or CCD line arrays. Mixed configurations are allowed.

Usage

To be used with any converter electronics for CCD or photomultiplier. Power is connected via a 2-pin terminal. All other signals are connected via a 25-pin SUB-D connector.

The central unit is also available in a metal case. Also available is the central unit with 1 to 4 photomultiplier converter units built in.

Specifications

Dimensions	min	typ	max	unit
width		275		mm
depth		135		mm
height		18		mm

Interfaces	level	connector	count
Ethernet 100Base-Tx		RJ45	1
incremental encoder, 2 phases	RS422	terminal	1
trigger inputs	5-24V	SMB	2
trigger outputs	5-24V	SMB	8
general purpose input/output	5V TTL	16pin header	8 / 8
converter units	LVDS	25-pin SUB-D	4

Order Code

number	description
61.134.500.10	central unit PCB
61.134.500.12	central unit in case
61.134.100.100	central unit in case for 4 PMT converters
61.134.100.116	central unit and 1 PMT converter in case, 16 channels
61.134.100.132	central unit and 2 PMT converters in case, 32 channels
61.134.100.148	central unit and 3 PMT converters in case, 48 channels
61.134.100.164	central unit and 4 PMT converters in case, 64 channels

System Specifications

Operating Range	min	typ	max	unit
supply voltage	21		27	V_{dc}

Properties	min	typ	max	unit
pixel data rate (regions of interest)			5	MHz
regions of interest			64	
timebase and trigger resolution	20			ns
pixel data resolution, CCD		16		bits
pixel data resolution, photomultiplier		20		bits

Environment	min	typ	max	unit
ambient temperature	0		40	°C
storage temperature	-10		70	°C

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