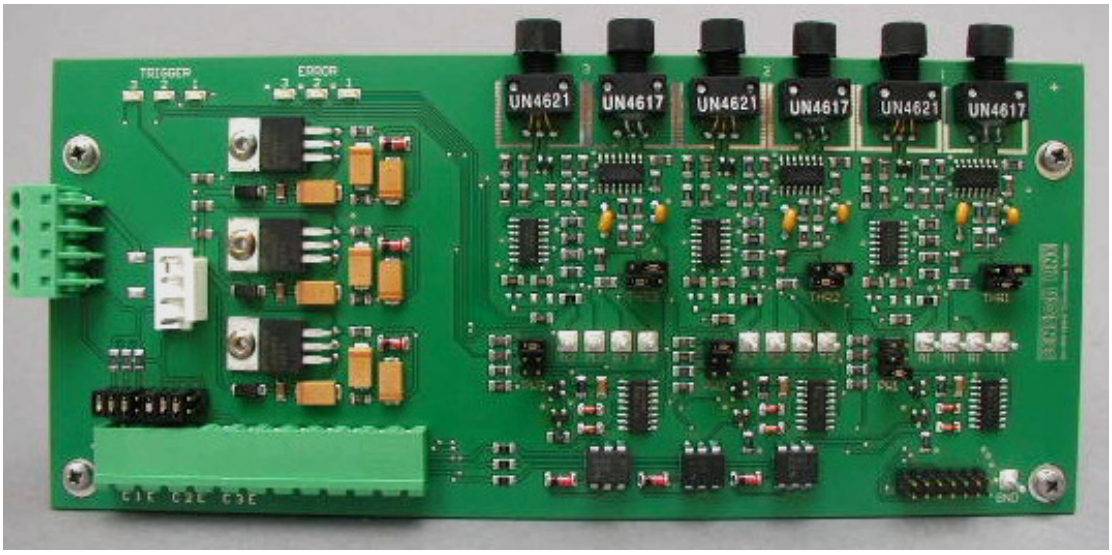
Optical Transmittance Analyzer

SL MA-310_V2



User's Manual

2009/09 Köcher

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1. General

The SL MA-310 three Channel Optical Transmittance Analyzer (OTA) is an electronic interface that operates three fiber optic load sensors. The SL MA-310 serves as the interface between the fiber optic sensor and the processing unit on system level. It should be installed in a weatherproofed road side cabinet.

1.1 Function:

The interface responds to the optical sensor signal in a dynamic (AC-coupled) manner, i.e. the electrical signal caused when a load is applied to the sensor decreases to zero as the load remains applied. At a tuneable threshold, a digital trigger signal per channel is generated. This signal is automatically reset after an adjustable time period. These characteristics allow the SL MA-310 interface to operate without the need for adjustment.

If the interface detects an interruption in the light transmission path of any channels, it flashes a particular light for each interrupted channel. The output signals (trigger signals) are transmitted via optocouplers which behave similar to relays, allowing the use of a variety of output circuitry.

1.2 Features:

- Dynamic interface for detection of light power changes
- Optocoupler digital outputs
- Trigger output (optocoupler)
- Adjustable trigger threshold and duration (0.3%, 1% and 1.5% rel. light change/ 1ms, 22ms and 47ms trigger duration)
- Trigger indication LED for each channel
- Error indication LED for each channel
- Reverse power protection
- Short circuit protection optionally
- Variable output circuits suitable over jumper switches
- ROHS conform

1.3 Dimensions:

3.5'' (88.9 mm) wide x 8'' (203.2 mm) long x 0,06'' (1.5 mm) thick

2. Connections

2.1 Electrical (Output header or 4 pin screw clip)

Pin No	Signal	Description
0	12 ... 24 VDC	Supply Voltage
1	GND	Ground
2	DC Output	Output Voltage
3	GND Output	Output Ground

2.2 Connector Assembly

Pin No	Signal	Description
C1	Collector	Collector output of channel 1
E1	Emitter	Emitter output of channel 1
C2	Collector	Collector output of channel 2
E2	Emitter	Emitter output of channel 2
C3	Collector	Collector output of channel 3
E3	Emitter	Emitter output of channel 3

2.3 Debug Pins

The Board has a GND pin and each channel has for pins for debug proposal. All these outputs are optional connected to an analog output header. The four pins are:

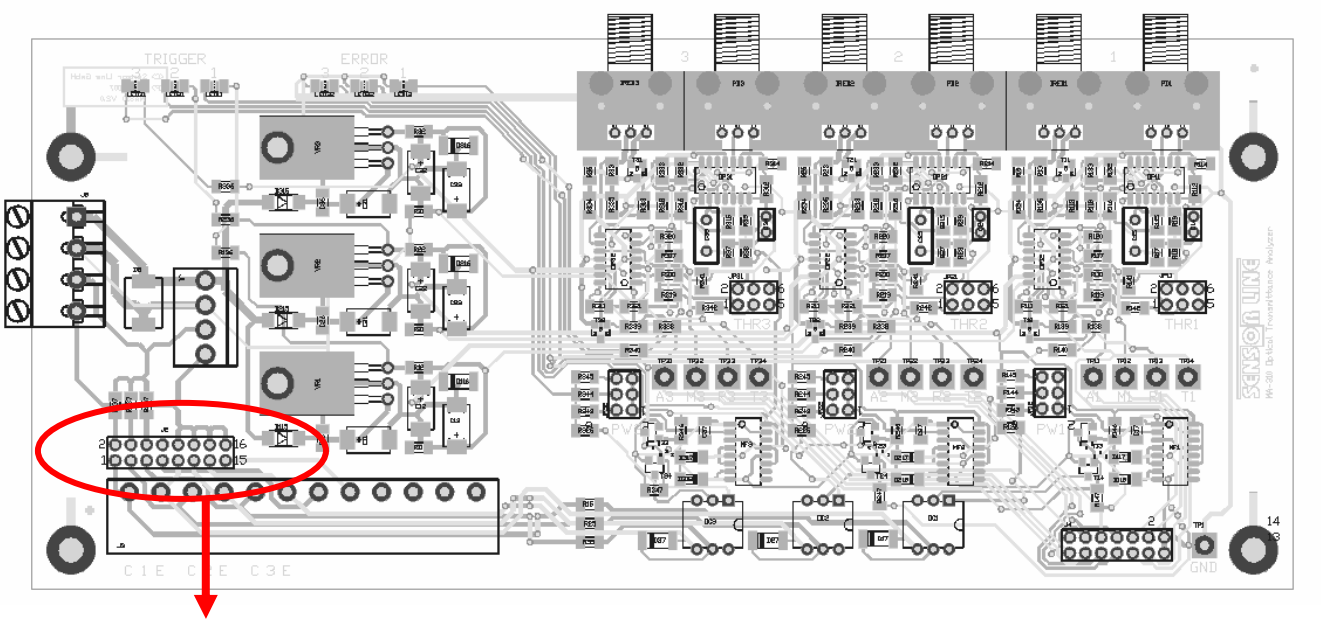
Ax	Analog load signal of channel x
Mx	Monitor signal of channel x
Rx	Reference voltage of channel x
Tx	Trigger voltage of channel x

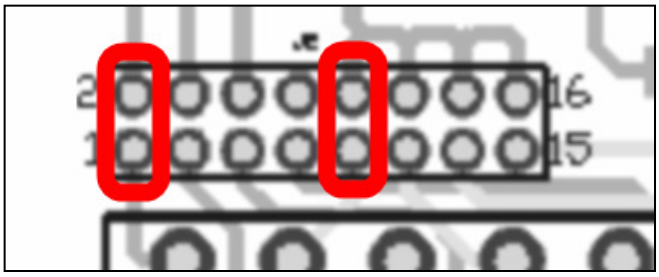
2.4 Optical

SMA-Connectors (SMA series 905)	LED Transmitter, Photodetector

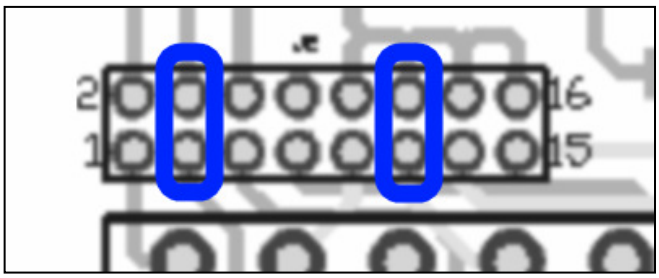
3. Output Circuits and Signals

You can choose the output circuits and signals for each channel separately.

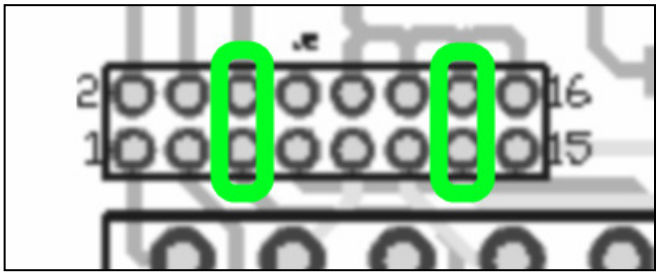




Channel 1

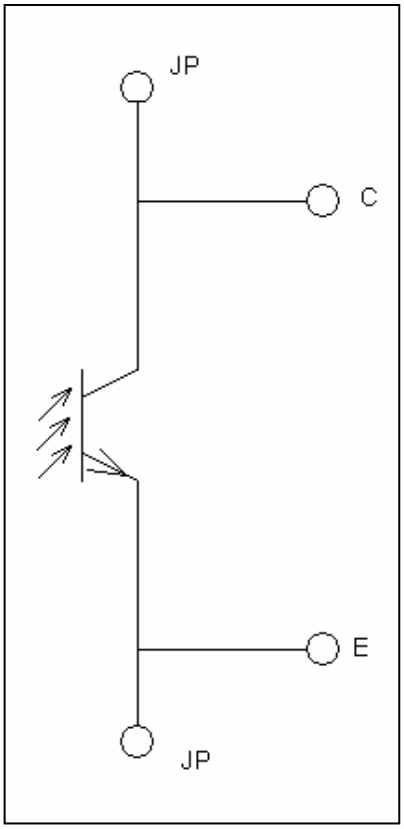


Channel 2

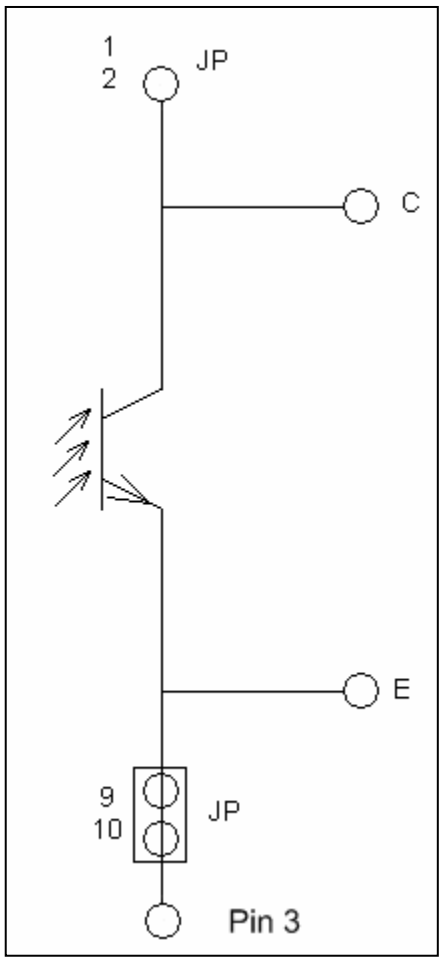


Channel 3

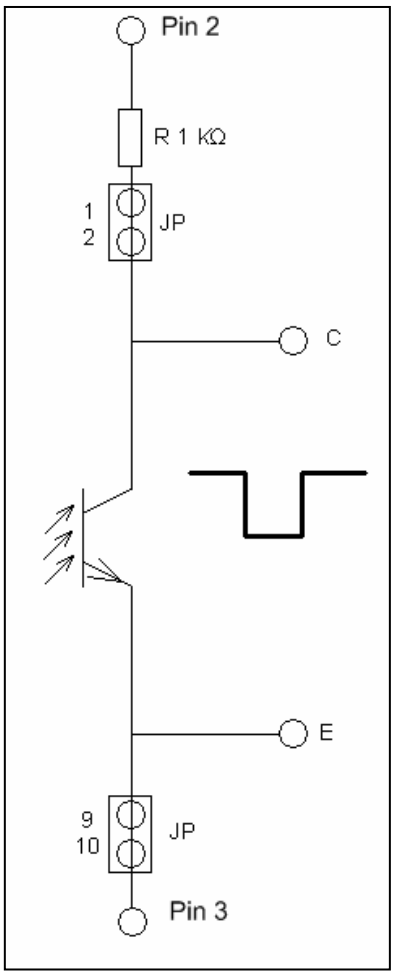
There are three output circuits possible:



Without internal circuit
(remove all Jumpers)



With 1 Jumper e.g. 9/10
(Channel 1) → Open
Collector output



With internal circuit
(Close all Jumpers)

3.1 Without internal output circuit

The optocoupler outputs can be used as a simple relay. You can connect the collector and emitter of the optocoupler directly with your circuit. (Remove all Jumpers and don't connect "DC Output" and "GND Output" PIN2 and PIN3)

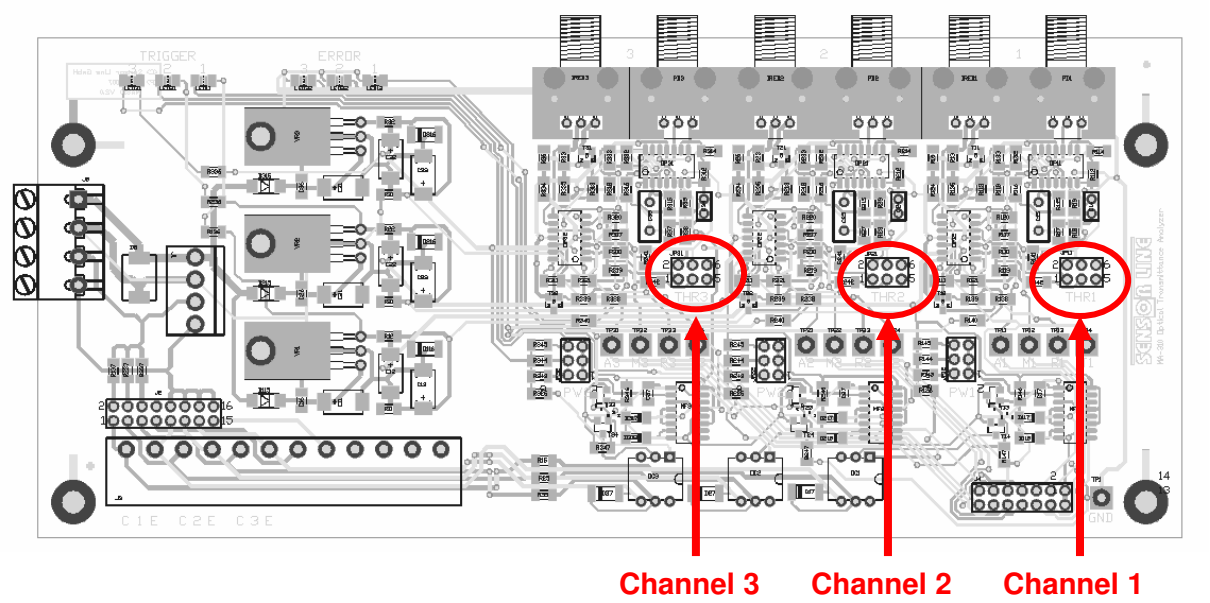
3.2 With internal output circuit

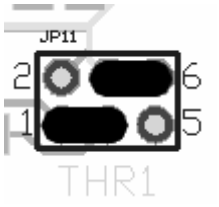
You can use the internal output circuit by closing the Jumper switches for each channel (e.g. Cannel 1 Jumper 1/2 and 9/10 Channel 2 Jumper 3/4 and 11/12 …). The value of the output voltage is controlled by the DC output and GND output (PIN2 and PIN3).
Or use only one jumper to PIN 3 and the circuit behaves like an open collector circuit.

4. Adjusting trigger threshold and duration

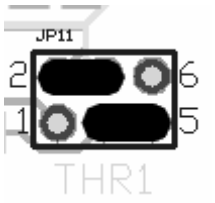
4.1 Trigger threshold

You can choose the trigger threshold for each channel separately between 0.3%, 1% and 1.5% of relative light change.

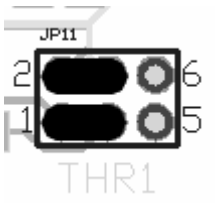




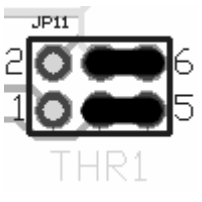
Trigger 0.3%



Trigger 1.5%



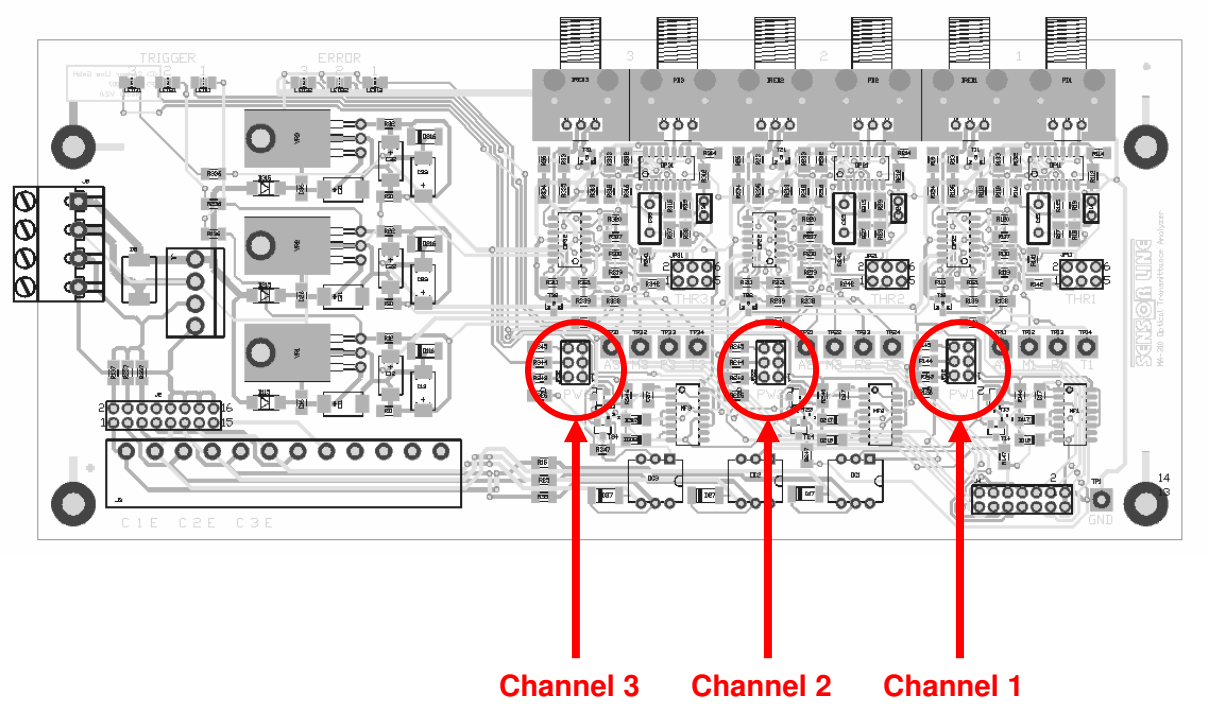
Trigger 1.0%

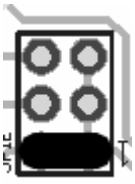


Trigger 0.5%

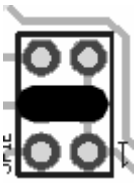
4.2 Trigger duration

You can choose for each channel separately between 1ms, 22ms and 47ms trigger duration.

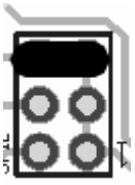




Trigger duration 1 ms



Trigger duration 22 ms



Trigger duration 47 ms

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5. Fitting and starting

1) Fit the interface with screws. Take care that road vibrations will not influence the board and in specific the fiber optic connectors

2) Remove the safety caps from LED transmitter and photodetector.

3) Connect the sensor SMA connectors with transmitters and photodetectors of each channel. Fasten properly the sensor SMA connectors with transmitters and photo detectors in order to guarantee smallest attenuation, but do not use any pliers. The connectors of transmitters and photodetectors are allowed to be interchanged per channel.

4) Connect the pins 0 (Supply Voltage) and 1 (Ground) to the power supply.

5) Connect the signal outputs (Connector Assembly)

6) Turn on power supply

7) Test the installation by driving over the embedded sensors and monitor the Trigger signals (Trigger LEDs) or Vanalog signal (Debug Pin Ax). Test the sensor Error signal (Error LED) by disconnecting one of the fiber connectors.

6. Specifications

Supply Voltage:	+12 to +24 VDC
Supply Current (continuous):	< 400mA
Trigger Threshold:	0.3% / 1% / 1.5% of light transmittance change
Sensor Attenuation for MA 310 RED:	3 – 23 dB (red transmitter)
Sensor Attenuation for MA 310 IR:	3 - 33 dB (infrared transmitter)
Max. Strain Optocouplers:	60V/25mA
Velocity Range:	1 to 250 km/h
Feeder Length:	up to 250 meters
Laser Class:	3A
Certification	ROHS

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7. Safety and Warnings

- **Do not stare into the LED light beam with unprotected eyes.**
- **Only turn on power supply after connecting the sensor or with applied safety caps.**
- **The equipment may only be used for the considered purpose.**
- **The manual should be stored at hand and be delivered to every user.**
- **Any changes and the use of spares which are not sold by the manufacturer cause rejects of warranty.**
- **Repairs are only allowed to the manufacturer.**

Important notice

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