



Fizoptika

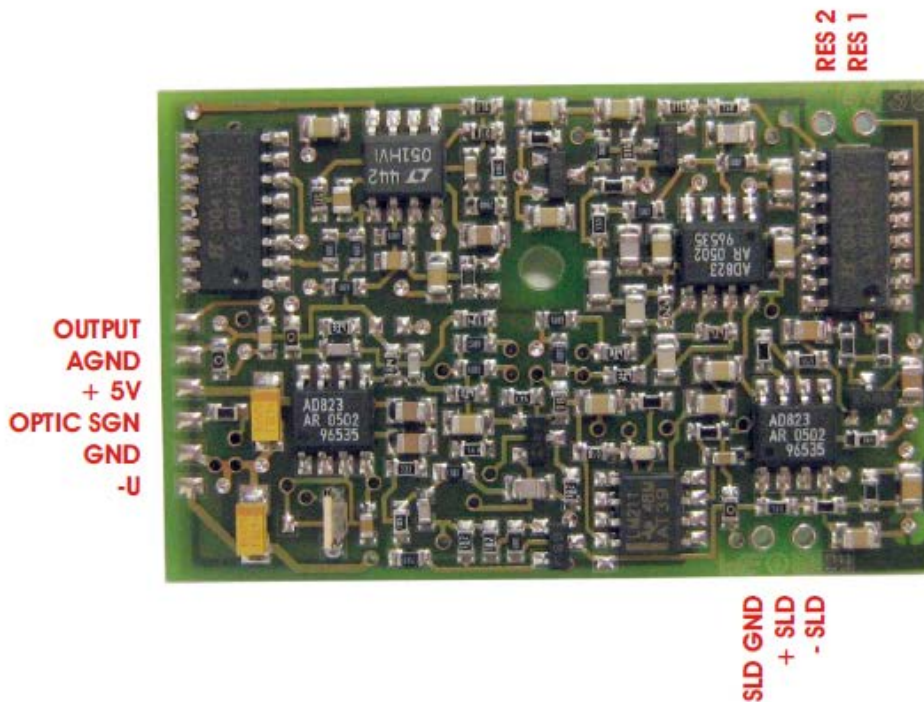
ANALOG ELECTRONICS OE141-35

Info Notes¹



The open-loop gyro requires electronics to drive the super luminescent diode (SLD) and phase modulator (PZT) for signal conditioning and for precise demodulation of the optical signal. The analog electronics board OE141-35 is an advanced board with built-in bias self-calibration and accurate phase control loops. The top level scheme of OE141-35 is illustrated by the block-diagram. OE141-35 is designed as a 4-layer PCB sized 45 mm x 30 mm. It is fabricated in conventional SMT technique and uses active and passive industrial-grade components.

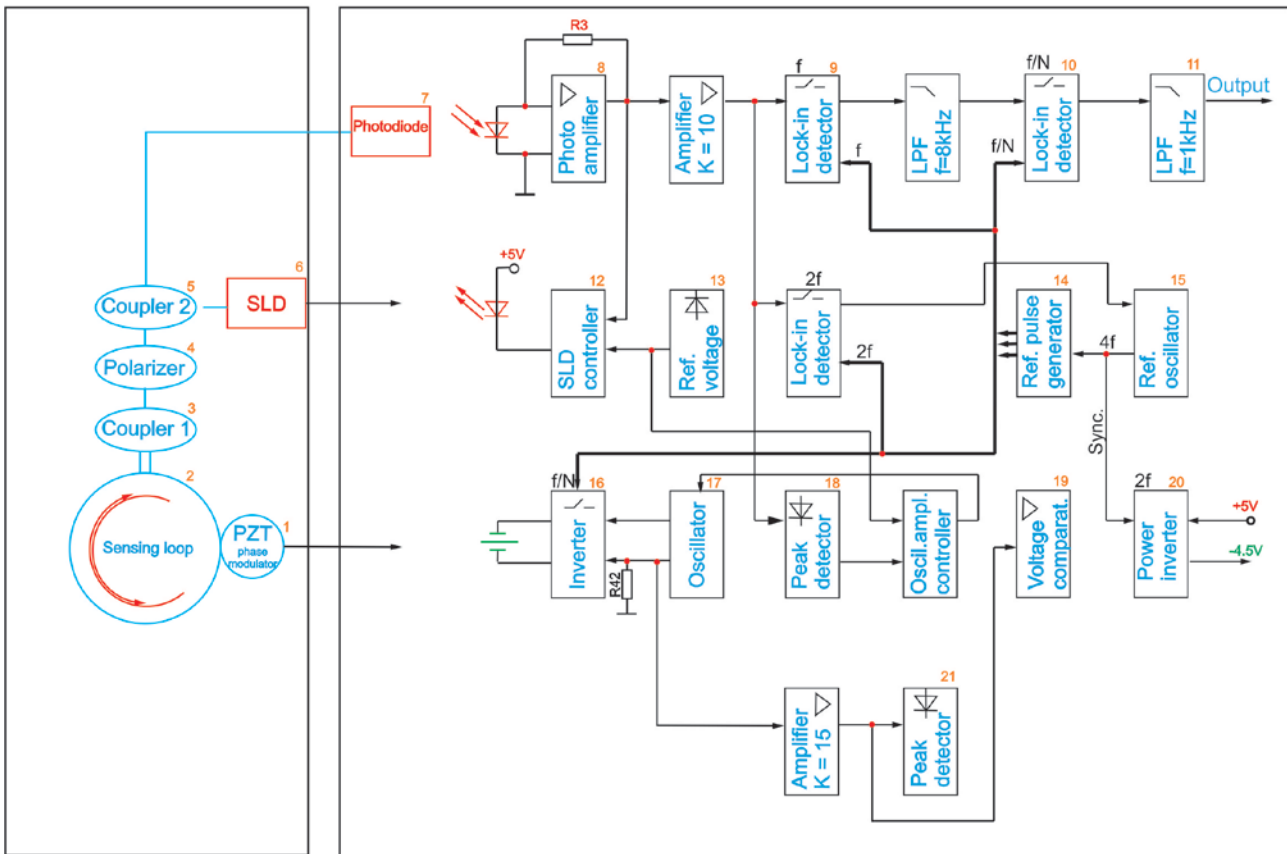
The board terminals assignment is shown in the picture below.



¹ The information contained in this document is believed to be correct, but Fizoptika accepts no liability for any errors it contains, and reserves the right to alter specifications without prior notice.

Optical sensing assembly (OB)

OE141-35 electronic board



BLOCK-DIAGRAM

- 1 – fiber wound on a piezoelectric ring.
- 2 – fiber optic coil.
- 3,5 – fiber optic components to couple two fibers.
- 4 – polarizing and spatial filter.
- 6 – light emitting chip precisely aligned to the fiber input.
- 7 – Si pin photodiode. Optical fiber is fixed in front of the photodiode on the board.
- 8 – transimpedance broadband amplifier.
- 9 - 1st lock-in detector demodulates component at PZT frequency.
- 10 – 2nd lock-in detector restores voltage proportional to rotation and eliminates electronic bias of 1st high frequency lock-in detector
- 11 – 3^d order Bessel filter damps satellite harmonics of switching frequency in the output signal of the lock-in detector. It forms the output bandwidth of the sensor.
- 12 provides DC drive current to the SLD. Operates in DC signal servo by using the photo-amplifier output.

- 13 provides voltage reference for SLD and PZT controllers.
- 14 generates driver frequencies (2f, f, f/N) for lock-in detectors and synchronization signal for the power inverter. It contains VCO – the reference oscillator 15 and logic circuit to form reference pulses.
- 16 works at the 2nd lock-in detector operating frequency.
- 17 PZT is a part of the feedback circuit to set oscillation frequency close to PZT resonance frequency. Feedback gain and oscillation amplitude are voltage controlled.
- 18, 21 returns AC signal amplitude.
- 19 transforms a sine signal of the oscillator to the rectangular pulses for reference signals control.
- 20 is used to generate negative supply voltage for electronics operating. Conversion frequency is synchronized with PZT frequency to avoid unstable cross-coupling with demodulating circuits.

For more information regarding fiber optic sensing assembly and its components, refer to [Optical Assembly Info Notes](#).