Optical Detection Solutions for Automated Hematology Analyzers

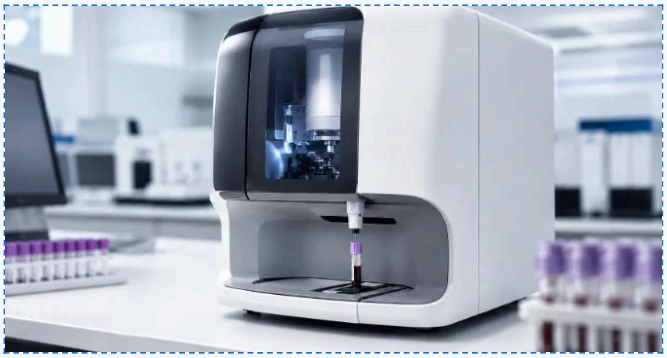
Standard photodiodes, photodiode preamplifiers, and LEDs for hemoglobin colorimetry, optical sensing, and biomedical instrumentation.

TARGET SUBSYSTEM

3-part CBC Analyzer

HGB colorimetric channel

FIG.01 — OPTICAL PATH · HEMOGLOBIN COLORIMETRIC CHANNEL



APPLICATION CONTEXT

Optical hemoglobin measurement in 3-part analyzers.

Three-part hematology analyzers count WBC, RBC, and platelets through electrical impedance. Hemoglobin (HGB) is measured separately on a dedicated optical channel: a stable LED illuminates a lysed sample in a cuvette, and a photodiode behind it measures the transmitted light. Absorbance is computed as $A = \log(I_0/I)$.

SOURCE	LED · 540–580 nm typical · TO-can hermetic package
SAMPLE	Cuvette / reaction chamber · lysed whole blood + reagent
DETECTOR	Silicon photodiode (blue-enhanced) + transimpedance amplifier
OUTPUT	Conditioned voltage → ADC → HGB concentration in g/dL

01 / PRODUCT FIT

Opto Diode standard products for the HGB channel

CATEGORY	STANDARD PRODUCTS	USE CASE	VALUE
Photodiode Preamplifier Modules	ODA-6WB-500M ODA-6WB-100M	HGB colorimetric receiver, absorbance detection, low-light optical signal measurement.	Integrated photodiode and transimpedance amplifier for simplified optical receiver design.
Blue-Enhanced Silicon Photodiodes	ODD-1WB · ODD-5WB ODD-12WB · ODD-15WB ODD-42WB	Discrete detector option for visible-wavelength colorimetry.	Blue-enhanced response for biomedical and analytical instrumentation.
Visible LEDs	OD-469L OD-624L	Potential LED source or reference channel depending on optical chemistry and system wavelength.	Hermetic TO-package options for stable optical output.
Custom & Standard Detector Support	Photodiodes · LEDs Value-added assemblies	OEM analyzer platforms, sample monitoring, calibration channels, biomedical sensing systems.	US-based design, manufacturing, and technical support.

02 / SELECTION

How to choose

WAVELENGTH

Match the chemistry band.

Most HGB chemistries absorb in the 540–580 nm range. Blue-enhanced silicon detectors are well matched; LED source wavelength is chosen by reagent chemistry.

SIGNAL LEVEL

Integrated TIA simplifies low-light receivers.

For sub-microwatt absorbance signals, the ODA-6WB preamplifier modules combine a photodiode with a transimpedance amplifier, reducing layout-sensitive noise.

PACKAGE & STABILITY

Hermetic TO packages, US-built.

Hermetic TO-can detectors and LEDs deliver the long-term stability required for repeatable clinical measurement and for instrument calibration intervals measured in months.

- Sensitive detection for low-level optical signals.
- Stable response for repeatable measurements.
- Standard and customizable package options.
- Built for biomedical and analytical instruments.

TECHNICAL NOTE

Why the HGB channel is the strongest standard-product fit.

In 3-part hematology analyzers, the primary cell-counting method is typically impedance based. Opto Diode's strongest fit is the optical hemoglobin measurement path, where an LED and detector measure absorbance through a prepared sample. Product selection depends on wavelength, signal level, response time, package constraints, and amplifier architecture.

Get in touch

Need help matching a detector or emitter to your analyzer design?

Contact Opto Diode to discuss standard products and custom optical solutions.

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