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UNIVERSAL OPTICAL DNA DETECTION SYSTEM FOR PATHOGENS INCLUDING COVID-19, SARS, EBOLA, CHOLERA, SALMONELLA, ETC. (LAMPPY™ SERIES)

PRELIMINARY

Features:

- Use to detect viral and bacterial DNA/RNA including Covid-19, SARS, Ebola, Cholera, Salmonella etc.
- Rapid DNA/RNA detection (as little as 20 minutes)
- Highly sensitive and specific detection of low viral levels
- Intuitive software displays real time data during testing
- Compact modular design allows easy cleaning and maintenance
- Test up to 8 samples simultaneously (higher count systems with up to 96 samples available soon)
- Wireless communication to computers and smartphones (coming soon)
- A fraction of the cost of qPCR based systems

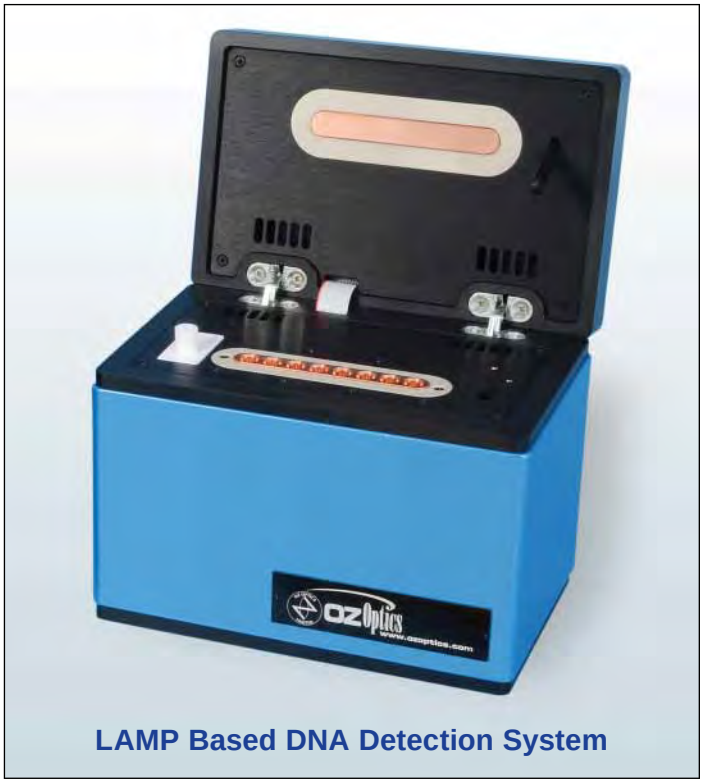
Applications:

- Screening and diagnosis of infection disease
- Food and water testing for microbes
- Molecular Biology Research
- Dry block incubator

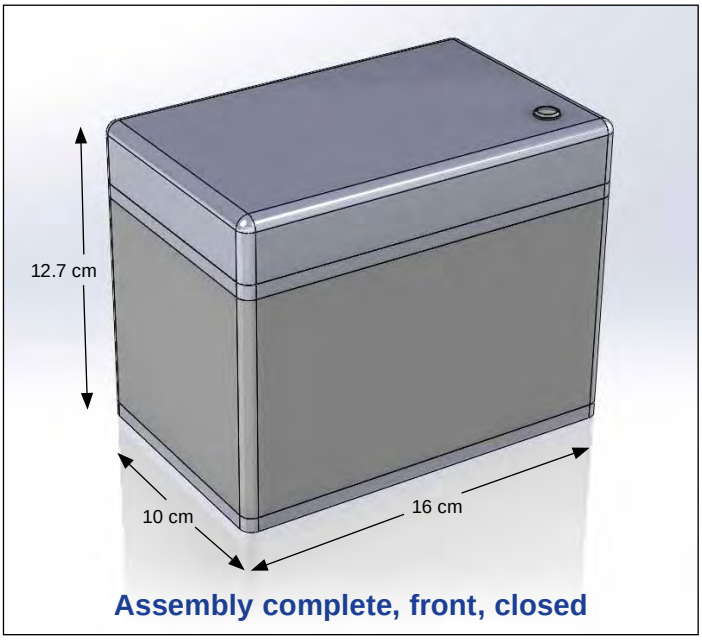
Product Description:

OZ Optics offers an exceptionally affordable yet reliable optical DNA/detection system based on Loop-mediated isothermal amplification (LAMP). Much like polymerase chain reaction (PCR) amplification, LAMP is a highly sensitive method of DNA detection that creates millions to billions of copies of a target DNA from a minute amount of sample RNA or DNA. However unlike PCR, LAMP applies an isothermal process that does not require expensive and complex equipment, as well as time consuming thermal cycling. It is a more cost-effective and rapid system. LAMP is especially ideal for rapid diagnosis of pathogens or infectious diseases, with results usually within 30 minutes and for high viral loads less than 20 minutes.

The LAMPPY™ system uses an array of high powered LEDs, photodiodes and filters for real-time quantitative detection. Samples to be tested are first mixed with a solution of primers and enzymes as well as an intercalating dye, then dispensed in standard 0.1 mL PCR tubes with flat caps, commonly known as low-profile PCR tubes. Acceptable sample volumes can be between 5 to 125 µL (10–30 µL recommended). OZ Optics does not provide the solutions/kits. Instead, we collaborate with companies who make these solutions/kits for specific applications and pathogens. The instrument can work with many different solution kits for different pathogens. For that reason we consider it to be a universal DNA/RNA detection system.



LAMP Based DNA Detection System



Assembly complete, front, closed

LAMP Based DNA Detection Kit showing Application Software

The standard system utilizes an excitation diode/filter combination emitting at 465–488 nm and a filter/detector combination for 500 nm to 590 nm light. This setup is compatible with many popular fluorescent dyes, including SYTO 9, SYBR Green and EvaGreen dyes. Solution kits using these or similar dyes can work with our instrument as-is. However, if the user wants to work with different dyes that utilize different wavelengths, OZ can provide sample blocks with different diode and filter combinations. The sample blocks can be exchanged by the user, making the instrument extremely versatile.

The instrument heating system precisely monitors and controls the sample temperature, ensuring fast ramping, temperature uniformity, and accuracy across all samples. A spring-loaded lid heater prevents condensation within the caps of the tubes for reliable results. An option to preheat before running an experiment is available with a temperature range of 25°C to 85°C. For safety, a lock engages when a run begins. However, a safety override option is available to pause or stop an experiment and open the lid during a run. LEDs and fluorescence acquisition will pause when lid is open during an experiment but heaters can stay on. The lid button also functions as a status indicator light for the system.

Assembly complete, back, closed

The accompanying software is intuitive and easy to use, providing quantative measurements in real-time while allowing fast and easy setup of assays, protocols, and experiments that can be saved. It will automatically detect attached instruments for quick setup and can run multiple instruments simultaneously on one computer. Temperature and optical settings can be easily changed and saved as a protocol for repeated use. Built-in self-test and tube detection routines monitor system integrity and optical performance, keeping lab operations incident-free. Self-calibration eliminates the requirement for additional reference dyes. Real-time detection can be visualized during the run, and analysis can be performed after the run is complete. The software makes monitoring an experiment easy by showing in real-time the temperature of the heater and lid, the elapsed time and the remaining time, as well as the template amplification. Data can be exported as CSV, XML, JSON or RDML (the structured and universal data standard for exchanging qPCR data) formats. Standard communication is via a USB 2.0 cable. Wireless communication via Wi-Fi will be offered shortly.

Product Specifications: LAMPPY™

Parameter	Specification
Electrical Dynamic Range	~ 120 dB
Optical Dynamic Range	~ 60 dB
Excitation Wavelength[1]	478 nm, FWHM = 20 nm (Typical)
Detection Wavelength Range[1]	500–595 nm
Temperature Range[2]	Adjustable from ambient to 80°C in 0.5°C steps
Heating Ramp Rate[3]	Around 3 seconds / °C
Long-Term Temperature Stability	Better than ± 0.2°C
Acquisition Frequency	Adjustable from 10 seconds to every 5 minutes in 1 second steps
Acquisition Duration	Adjustable from 10 ms to 50 ms in 1 ms steps
Light Source	High intensity LED array
Detector	Photodiode array
Connections	USB type A
Power Consumption	< 50 W
Power Supply	100–240 Volts AC input, 12 Volts DC output
Dimensions (W x D x H)	6.4″ x 4.1″ x 5.0″, 16.256 cm x 10.414 cm x 12.695 cm
Compatible PCR Tubes	0.1 mL Corning Axygen®. Other sizes supported on request.

Notes:

[1] Optional: The LEDs along with optical filters on detection and exitation sides can be customized to enhance the system sensivity for a given dye.

[2] Minimum temperature is slightly above ambient temperature.

[3] Temperature cycling for PCR is not advised as there is no dedicated cooling system.

Ordering Information For Standard Parts:

Bar Code	Part Name	Description
68575	LAMPPY-01-8-478/500-1	LAMP based optical DNA Detection System with 8 sample wells, with a 478 nm peak wavelength emitter and a detection system for emission wavelengths between 500 nm and 595 nm. Compatible with Corning Axygen® 0.1 mL low profile PCR tubes.
69016	PCR-0108-LP-C	Corning Axygen® 0.1 mL low profile PCR tubes. Sold in packs of 125 strips with 8 tubes per strip.
69017	PCR-02-FCP-C	Corning Axygen® PCR strip caps. Sold in packs of 125 strips with 8 caps per strip.

Ordering Information For Custom Parts:

Part Number **LAMPPY-01-*N*-*W1*/*W2*-*TS***

N = Number of sample wells:
1, 8 sample wells standard
16, 24, 48, and 96 sample wells are optional
(Subject to availability)

TS = Compatible Tube Sizes. See table 1 for a listing of compatible PCR tubes.

W2 = Emission Wavelength, in nm
500 for >500 nm (500–595 nm)
Contact OZ Optics for other wavelengths

W1 = Excitation Wavelength, in nm
478 for 478 ± 10 nm emission band
Contact OZ Optics for other wavelengths

Table 1: Compatible PCR tubes

TS #	Compatible PCR tubes
1	Corning Axygen® 0.1 mL low profile PCR tubes, P/N: PCR-0108-LP-C with matching PCR strip caps, P/N: PCR-02-FCP-C