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

PRELIMINARY

Features:

- Use to detect viral, fungal, 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
- Melt analysis available with the included software
- Lid heater prevents evaporation and condensation
- Compact modular design allows for easy cleaning and maintenance
- Pair with an external battery for a portable and field-deployable system
- Test up to 8 samples simultaneously (higher throughput systems with up to 96 samples available upon request)
- Wireless communication to computers and smartphones (coming soon)
- A fraction of the cost of qPCR based systems
- OZ Optics also offers private labelling for volume OEM applications

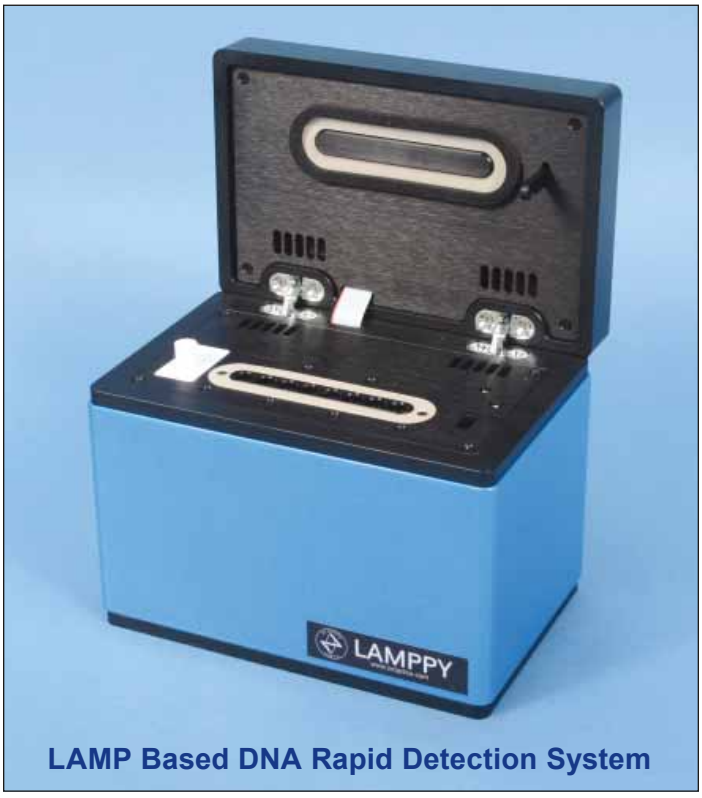
Applications:

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

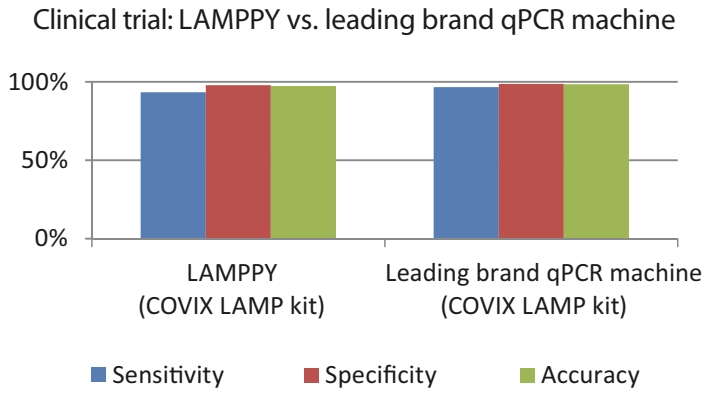
Product Description:

OZ Optics offers an exceptionally affordable yet reliable optical DNA detection system based on isothermal techniques such as Loop-mediated Isothermal Amplification (LAMP). Much like polymerase chain reaction (PCR) amplification, LAMP is a highly sensitive method of DNA detection that creates 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, nor 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. The system can be paired with an external battery for a compact, field-deployable diagnostic instrument. Samples to be tested are first mixed with a solution of primers, enzymes, an intercalating dye,



LAMP Based DNA Rapid Detection System



In a lab study done at Acibadem University using saliva samples taken from patients at the Acibadem Hospitals, LAMPPY was compared to a well-known conventional qPCR machine in performance and speed. The comparison study was carried out with a sample size of 262 using the COVIX LAMP-based kit on both instruments and then verified with the KrosQuanT SARS-COV-2 (2019 nCOV) Real Time PCR Diagnostic Kit on a leading brand conventional qPCR machine.

LAMP Based DNA Rapid Detection Kit showing Application Software

and several other components. This mixture is then dispensed into standard 0.1 mL PCR tubes with flat caps, commonly known as low-profile PCR tubes. Acceptable sample volumes can be between 5–125 µL (10–30 µL recommended). OZ Optics does not provide the reagents/kits to carry out the reaction. Instead, we collaborate with companies who make these reagent/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.

The standard system utilizes an excitation diode/filter combination emitting at 450–488 nm and a filter/detector combination for 500–595 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 filter blocks with different filter combinations. The filter blocks can be exchanged by the user, making the instrument extremely versatile and easy to service with downtime reduced to a minimum.

The instrument heating system precisely monitors and controls the sample temperature, ensuring fast ramping, temperature uniformity, and accuracy across all wells. A spring-loaded lid heater prevents condensation within the caps of the tubes for reliable results. Melt curve analysis can be performed to distinguish between true and false positive results. LEDs and fluorescence acquisition will not need to pause when lid is open during an experiment as the lock-in-amplifier prevents ambient light from affecting the data. The lid button also functions as a status indicator light for the system.

The accompanying software is intuitive and easy to use, providing quantitative measurements in real-time while allowing fast and easy setup of as- says, protocols, and experiments that can be saved and reused. 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 self-calibration routines monitor system integrity and optical performance, keeping lab operations incident-free and eliminating the need 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 block and lid temperatures, the elapsed and remaining time, as well as the amplification plots, melt curve and peak, and temperature profile. Data can be exported as CSV, XML, JSON, or PNG. Standard communication is via a USB cable. Wireless communication via Wi-Fi will be offered shortly.

Introduction to LAMPPY™
https://www.ozoptics.com/video/video80.html

In this video, we will demonstrate how easy it is to set up and use the LAMPPY™ DNA detection system, and how intuitive our software is. We will prepare a demonstration to show what results on the LAMPPY™ look like and how to interpret and analyze the data.

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 94°C (block) and 99°C (lid) in 1°C increments
Heating Ramp Rate[3]	Around 9.6 seconds / °C
Long-Term Temperature Stability	Better than ± 0.2°C
Standard Throughput/Test Wells	8
Acquisition Frequency	Adjustable from 10 seconds to every 2 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 B
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
Weight	1.67 kg, 3.67 lbs.
Compatible PCR Tubes	0.1 mL tubes with flat caps. See Table 1 below. Other sizes supported on request.
LAMPPY Application	Uses Windows operating system. Included with instrument. Browser-based application available soon.

Notes:

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

[2] Minimum temperature is slightly above ambient temperature.

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

Assembly complete, front, closed


Assembly complete, back, closed

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 TS #1 in Table 1 below.
70293	LAMPPY-FB-8-478/500-1	Filter block for LAMPPY 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 TS #1 in Table 1 below.
70294	LAMPPY-FB-8-478/500-2	Filter block for LAMPPY 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 TS #2 in Table 1 below.
69016	PCR-01-8C-T	0.1 mL low profile 8-strip clear tubes. Sold in packs of 125 strips with 8 tubes per strip.
69017	PCR-01-8C-FC	Optically clear 8-strip caps for 0.1mL tubes. Sold in packs of 125 strips with 8 caps per strip.
70314	PCR-01-8F-TFC	0.1 mL low profile 8-strip frosted tubes with attached flat caps. Sold in packs of 125 strips with 8 tubes per strip.
70314	BAT-LIFEPO4-12.8V/6500MAH	External LiFePO4 rechargeable battery, 12.8V/6500mAh with charger and cables included.

Ordering Information For Custom Parts:

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

M = Model
01 = Complete system
FB = Replacement filter block

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[1]

TS #	Compatible PCR tubes	Drawings
1	• P/N: PCR-01-8C-T with P/N: PCR-01-8C-FC • Corning Axygen® 0.1 mL low profile PCR tubes with matching PCR strip flat caps.	
2	• P/N: PCR-01-8F-TFC • Luna Nanotech MPPCRF-8W 0.1 mL 8-Strips PCR tubes with attached flat caps.	

Notes:
[1] Tubes in Table 1 have been tested and verified for performance. Other 0.1 mL tubes with flat caps can be used but may not produce optimal results.

For more information about our module LAMPPY™ and about volume private labelling email to sales@ozoptics.com