PULSED LIGHT

PulsedLight, Inc.

A NEW BENCHMARK IN OPTICAL SENSOR TECHNOLOGY

LIDAR-LITE SPECIFICATIONS

Dimensions

21 X 48.3 X 35.5 mm

PCB 44.5mm X 16.5mm

Performance

Range: 0-40m Laser Emitter
Accuracy: +/- 0.025m
Power: 5vdc, <100ma
Acquisition Time: < 0.02 sec
Rep Rate: 1-100Hz

Configurations

• Laser/PIN Diode 14mm Optics
  (Class 1 Laser Product)

Interface

• I2C
• PWM

US Patent: 8,125,620
Additional Patents Pending

Overview

PulsedLight targets the need for high performance, very compact optical distance measurement sensors for applications such as robotics and UAV's where a very small, low-power, high performance, reduced cost optical ranging sensor is desired.

Our single chip processing solution in combination with minimal supporting hardware enables a new class of optical distance measurement sensors.

PulsedLight's goal is to make our technology available in an easily configurable sensor module that can be used as the basic building block for sensor applications in robotics, UAV and Maker projects.

Technology

Our single board implementation uses an edge emitting, 905nm, single stripe laser. This Laser Product is designated as Class 1 during all procedures of operation, however operating the sensor without it's optics or housing or making modifications to the housing can result in direct exposure to laser radiation and the risk of permanent eye damage.

The standard detector is based on a Si PIN diode, but optionally, could support a Si Avalanche Photo-Diode (APD) for greater sensitivity and range. Use of an APD would require external power and temperature compensation circuitry and provisions have been made to allow for access to the detector bias input circuit..

Technology innovations

• The use of a signature matching technique (known as signal correlation) that estimates time delay by electronically sliding a stored transmit reference over the received signal in order to find the best match.
• Operation of the laser in short bursts allowing a 100:1 advantage in peak output power over measurement systems using a continuous beam.
• A novel current driver technology with nanosecond signal transition times at high peak currents to produce high power transmit burst sequences.
• A signal processing approach implementable in a single programmable logic chip.

Other Innovations

While not implemented in LIDAR-Lite, other innovations to be released in future products include;

• Detector switching technology allowing multiple detectors to be processed by a single signal-processing channel. Enabling compact multichannel systems.
• Multiple digital processing cores implementable in a single programmable logic chip enable use of our technology in high resolution machine vision or scanning systems.

Signal/Power Interfaces	Specifications
Power	4.7 - 5.5V DC Nominal, Maximum 6V DC
Weight	PCB 4.5 grams, Module 16 grams with optics and housing
Size	PCB 44.5 X 16.5mm, Housing 21 X 48.3 X 35.5mm
Current Consumption	<100ma continuous operation, <2ma @ 1Hz (power off between acquisitions)
Max Operating Temp.	70° C
External Trigger	3.3V logic, high-low edge triggered
PWM Range Output	PWM Signal proportional to range, 1msec/meter, 10µsec step size
I2C Machine Interface	100Kb - Fixed, 0xC4 slave address. Internal register access & control
Supported I2C Commands	Single Distance Measurement, Velocity, Signal Strength
Mode Control	Busy status using I2C, External trigger input PWM Outputs

System Parameters	Laser/Pin[1] Class 1 Laser Product
Transmitter	905nm, 75um, 1watt, 8mrad, 14mm optic
Receiver	Surface mount PIN, 3° FOV wi 14mm optics
Detector Gain	1X
Max Range @ 1Hz 30% Target	30 Meters
Max Range @ 1Hz 90% target	40 Meters
Accuracy	+/- 0.025 meter
Acquisition Time	<0.02 sec
Max Rep Rate	100Hz [2]

NOTES:

1. CLASS 1 LASER PRODUCT CLASSIFIED EN/IEC 60825-1 2007. Complies with US FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007. System contains no user serviceable components. Repair or service of the system is only to be handled by factory-trained technicians. No Service by the user is allowed.

2. Higher Rep Rates have an impact on maximum range. 1Hz to 10Hz there is no change, from 10Hz to 100Hz max range will decrease until it is approximately 50% at 100Hz. Rep Rate can be dynamically configured.

3. All Operating Specifications are Preliminary.