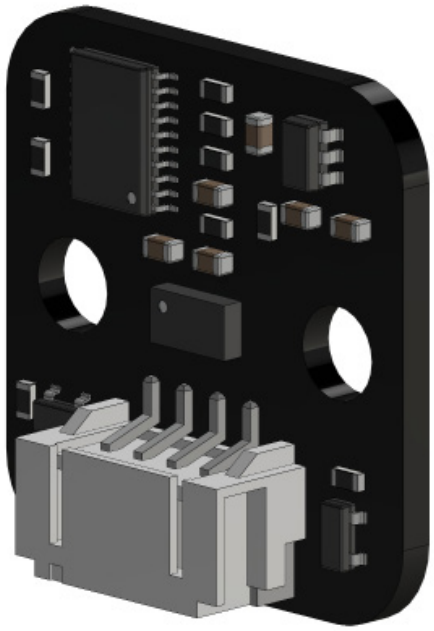
MATRIX™
ROBOTICS SYSTEM

MATRIX Laser Sensor
MS-Laser

1. Feature

· Measures absolute range up to 2 meter.
· Sample rate fix in 50Hz.
· Timeout alarm.



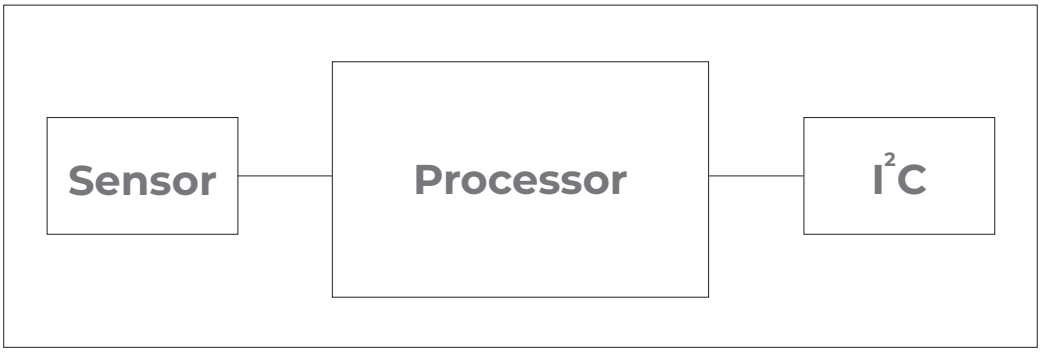
2. Application

· Camera detection
· Spirit level meter
· Location of the robot

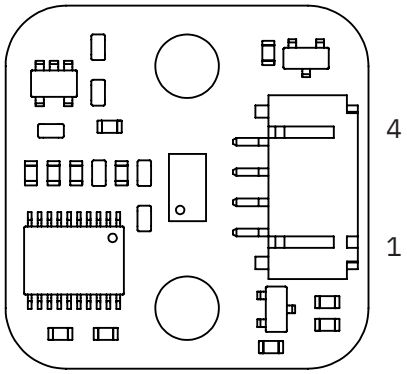
3. Introduction

MATRIX Laser Sensor is a distancing sensor which is more accurate and stable, communicate by I2C interface. Support 21~1999mm distance detection at 50Hz sample rate, scale down to 1mm.

4. Block Diagram



5. Pinout



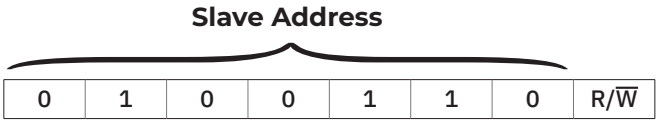
Pinout			
NO.	Name	I/O	Description
1	SDA	I/O	Serial data line.
2	SCL	I	Serial clock line.
3	VCC	I	Supply voltage.
4	GND	-	Supply ground.

6. Electrical Characteristics

Parameter	Min	Typ	Max	Units
Supply Voltage (VCC)	3	3.3	5	V
Sample rate	-	50	-	Hz
Detection Range	21	-	1999	mm
I2C operating speed	100	-	400	KHz
I2C Low-Level Input Voltage	-0.5V	-	0.33*VCC	-
I2C High-Level Input Voltage	0.7*VCC	-	VCC	-

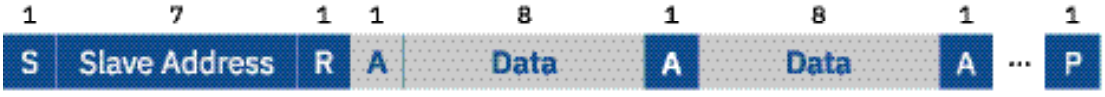
7. Usage

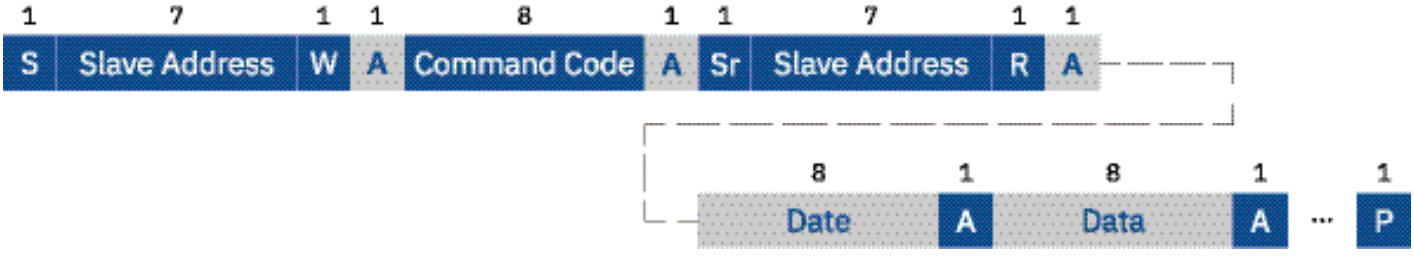
The MATRIX Laser sensor follows the 7-bit I2C bus protocol by Philips. To access the sensor's functions, there are two ways that the master device should follow depends on Read or Write situation.



I²C Write Protocol

I²C Read Protocol





To get the i2c library for Matrix Laser sensor, please visit sites as below :

Arduino Library : https://github.com/Matrix-Robotics/MatrixLaserSensor
Microbit Library : https://github.com/Matrix-Robotics/pxt-MatrixLaser

8. I2C Register Tabel

8.1. Register definitions

Register Tabel (Summary)				
Register(hex)	Name	R/W	Reset Value	BITS Description
01h	Device ID	R	0x47	Device ID [7:0]
02h	Device Control	R/W	0x04	Device Control [2:0]
03h	Distance H	R	0x00	Distance data [15:0]
04h	Distance L	R	0x00	

8.2. Device ID

The Device ID register is one-byte / read-only data. This register will always return 0x43 even when the device power is disabled.

Device ID (01h)				
Bit	Name	R/W	Reset Value	Description
7 to 0	Device ID [7:0]	R	0x47	Device ID [7:0]

8.3. Device Control

The Device Control register is used primarily to power the device on and off, and the timeout flag.

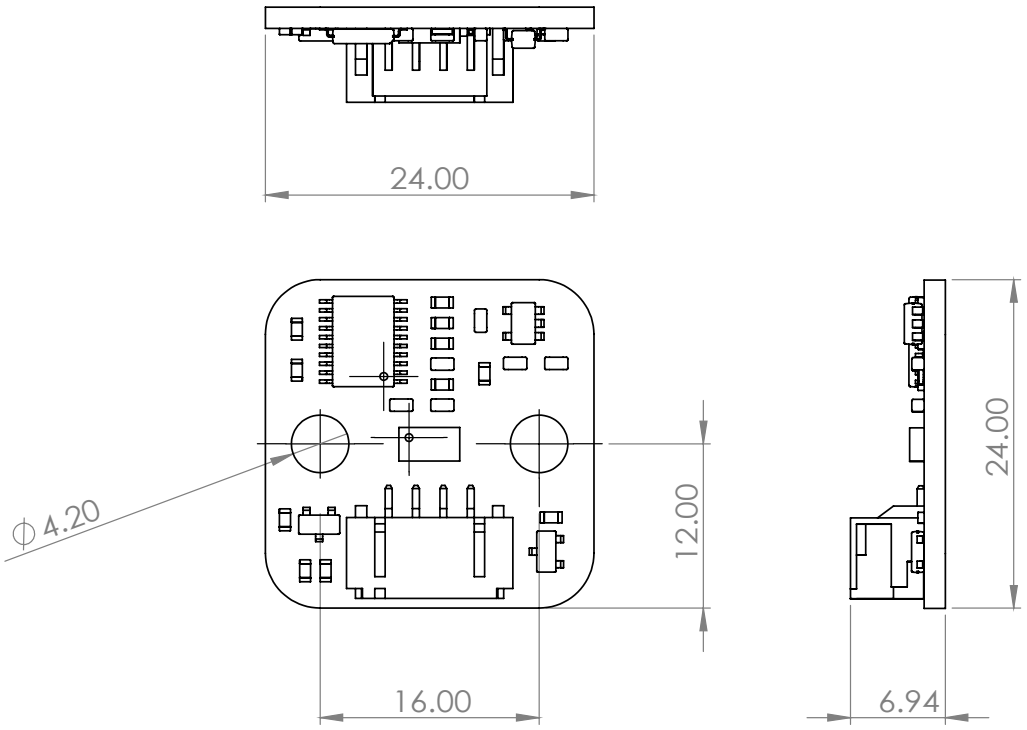
Device Control (02h)				
Bit	Name	R/W	Default	Description
7 to 3	-	R	-	Reserved
2	RST	W	0	Set bit to 1 to reset sensor to default status.
1	PWR	R/W	0	Enable/disable device power.
0	TIMEOUT	R	0	This bit set to 1 while timeout occur.

8.4. Distance Data

16-bits distance data, 03h is high byte, 04h is low byte. (unit: mm)

Color Data (03h~04h)				
Register(hex)	Name	R/W	ResetValue	BITS Description
03h	Distance data H [15:8]	R	0x0000	Data of the Distance[15:0]
04h	Distance data L [7:0]			

9. Dimensions



Unit: mm

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