

638/520/450 Laser Beam Scan System

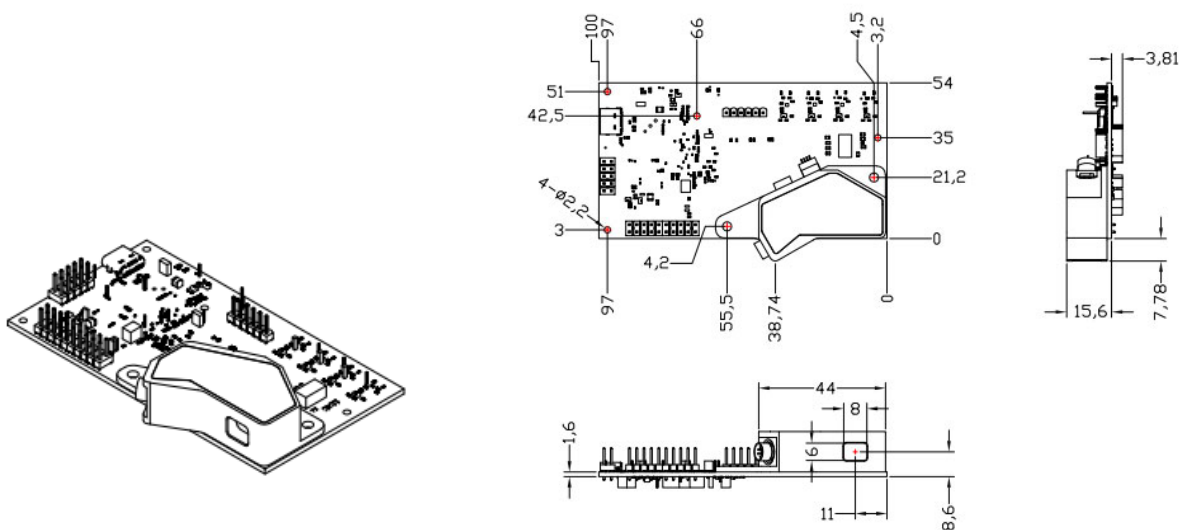
Features

Laser beam movement controller
Create own design scan patterns
USB Communication interfaces, Bluetooth as option

Electrical and optical characteristics (T_c=25 °C)

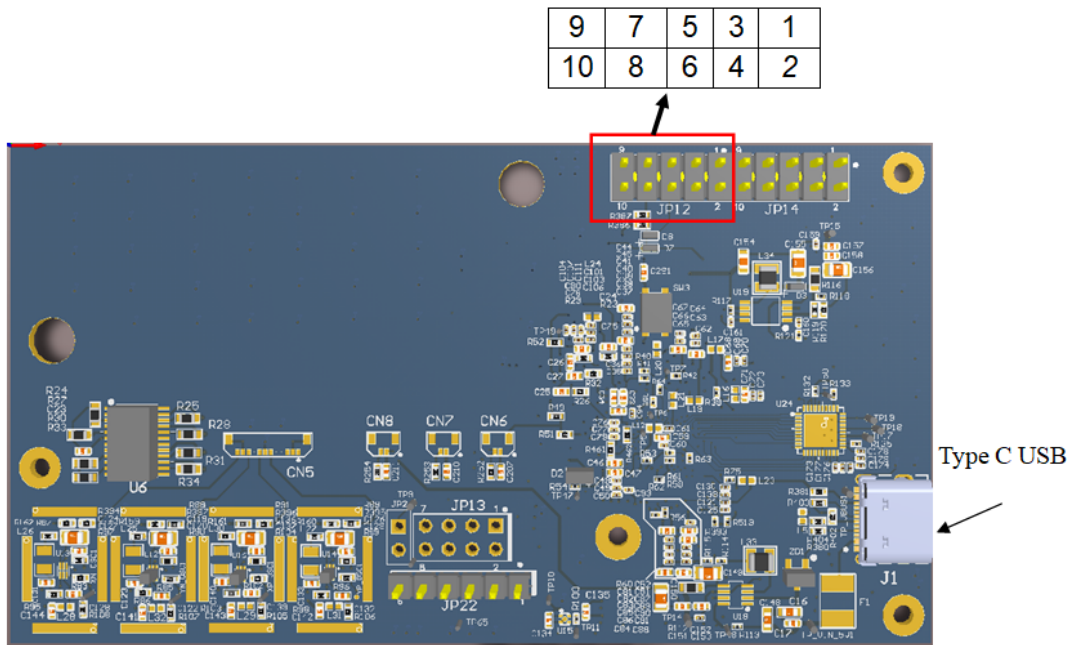
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Wavelength	λ	628	638	648	nm	
Wavelength	λ	510	520	530	nm	
Wavelength	λ	440	450	460	nm	
Output power (After that MEMS) -638nm	P _{out}	12	--	32	mW	
Output power (After that MEMS) -520nm	P _{out}	12		32	mW	
Output power (After that MEMS) -450nm	P _{out}	26		50	mW	
Beam Spot Size at 10M	<30mm (FWHM)					
MEMS scan Angle	X axis:11°; Y axis:11°					
MEMS Slow scan speed	DC driving or 1600Hz(resonance)					
MEMS Fast scan speed	DC driving or 2000Hz(resonance)					
Connectivity	UART/SPI					
USB Type C	5 V					

Outline dimensions (Units: mm)



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MEMS Control



UART/SPI Definition

Connector pins	Description
1	SPI_FLASH_WP#
2	SPI_FLASH_HOLD#
3	SPI_FLASH_CS2
4	GPIO13_RM_CTRL
5	SPI_FLASH_RX
6	ILDA_UART_TX
7	SPI_FLASH_TX
8	ILDA_UART_RX
9	SPI_FLASH_SCLK
10	GND

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Packet Format

Send

ID	[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08 ~ end-1]	[end]
Description	Header	SOP	Device	Addr[0]	Addr[1]	Addr[2]	Addr[3]	Len	Data	Checksum

Response

ID	[00]	[01]	[02]	[03]	[04]	[05 ~ end-1]	[end]
Description	Header	SOP	Device	Status	Len	Data	Checksum

Header : 0xFF

SOP : 0x55

Device : bit[7:1] Device ID (0x0D), bit[0] R/W (similar to I2C)

Addr: Addr[1:0] is 16 bit command address and Addr[3:2] is resaved

Len : The length of Data (max 128)

Checksum : Byte[2] ~ Byte[end-1] checksum

Status : OK (0x00), BUSY (0xD2), ERR_CHECKSUM (0xD4), ERR_SOP (0xD5), ERR_OUTRANGE (0xD7)

UART Response Status

OK (0x00): UART command completed

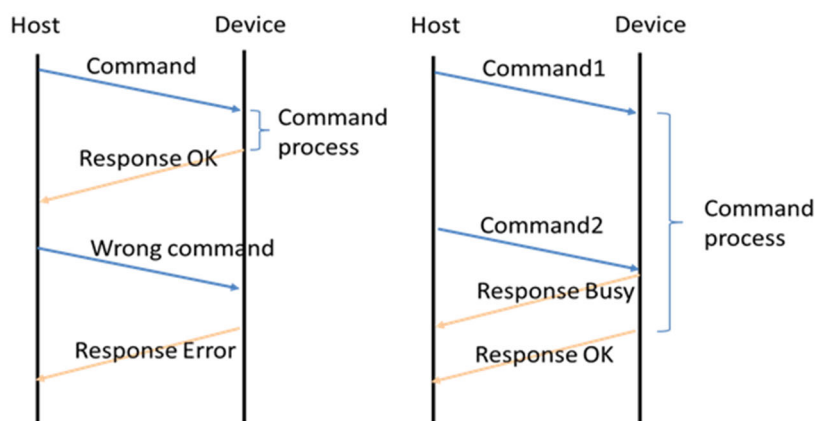
BUSY (0xD2): The previous UART command has not been completed, the command will not be executed, please resend it later.

ERR_CHECKSUM (0xD4): UART command checksum fail, Please check the format or UART transmission problem

ERR_SOP (0xD5): UART header error, please confirm Header is 0xFF, SOP is 0x55

ERR_OUTRANGE (0xD7): The input command is not currently supported or the input parameter is out of the configurable range.

Communication flow



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Load ILDA FILE

- Example: load the ILDA file from host memory address 0x00000000 to ASIC DDR address 0x02000000, and ILDA file size is 0x100 bytes.

* Data is always sent from low byte first.

Command	function	param1	param2	param3
0x0000	Load ILDA file	ASIC DDR Addr (uint32 *)	Host memory addr (uint32 *)	ILDA File size (uint32 *)

ID	[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08-11]	[12-15]	[16-19]	[end]
Description	Header	SOP	Device	Addr[0]	Addr[1]	Addr[2]	Addr[3]	Len	Data[3:0]	Data[7:4]	Data[11:8]	Checksum
Data	0xFF	0x55	0x1A	0x00	0x00	0x00	0x00	0x0C	0x02000000	0x00000000	0x100	0x29

ID	[00]	[01]	[02]	[03]	[04]	[end]
Description	Header	SOP	Device	Status	Len	Checksum
Data	0xFF	0x55	0x1A	0x00	0x00	0x1A

Stop playback ILDA File

- Example: stop playback the ILDA file

* Data is always sent from low byte first.

Command	function
0x0002	Stop playback ILDA file

ID	[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[end]
Description	Header	SOP	Device	Addr[0]	Addr[1]	Addr[2]	Addr[3]	Len	Checksum
Data	0xFF	0x55	0x1A	0x02	0x00	0x00	0x00	0x00	0x1C

ID	[00]	[01]	[02]	[03]	[04]	[end]
Description	Header	SOP	Device	Status	Len	Checksum
Data	0xFF	0x55	0x1A	0x00	0x00	0x1A

Set the SPI segment size (use interrupt)

- Example: set the SPI segment size to 0x00018000 bytes

* Data is always sent from low byte first.

Command	function	param1
0x0003	Playback ILDA file	SPI segment size (uint32 *)

ID	[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08-11]	[end]
Description	Header	SOP	Device	Addr[0]	Addr[1]	Addr[2]	Addr[3]	Len	Data[3:0]	Checksum
Data	0xFF	0x55	0x1A	0x03	0x00	0x00	0x00	0x04	0x00018000	0xA2

ID	[00]	[01]	[02]	[03]	[04]	[end]
Description	Header	SOP	Device	Status	Len	Checksum
Data	0xFF	0x55	0x1A	0x00	0x00	0x1A

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Set the brightness (Max is 8)

- Example: set the brightness to 4

* Data is always sent from low byte first.

Command	function	param1
0x0004	Set the brightness	Brightness 0 ~ 8

ID	[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[13]	[end]
Description	Header	SOP	Device	Addr[0]	Addr[1]	Addr[2]	Addr[3]	Len	Data	Checksum
Data	0xFF	0x55	0x1A	0x04	0x00	0x00	0x00	0x01	0x04	0x23

ID	[00]	[01]	[02]	[03]	[04]	[end]
Description	Header	SOP	Device	Status	Len	Checksum
Data	0xFF	0x55	0x1A	0x00	0x00	0x1A

Get the brightness (default is 8)

- Example: get the brightness value, if it is default value.

* Data is always sent from low byte first.

Command	function
0x0004	Get the brightness

ID	[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[end]
Description	Header	SOP	Device	Addr[0]	Addr[1]	Addr[2]	Addr[3]	Len	Checksum
Data	0xFF	0x55	0x1B	0x04	0x00	0x00	0x00	0x01	0x20

ID	[00]	[01]	[02]	[03]	[04]	[05]	[end]
Description	Header	SOP	Device	Status	Len	Data[0]	Checksum
Data	0xFF	0x55	0x1B	0x00	0x01	0x08	0x24

• Precautions

- * Do not operate the device above maximum ratings. Doing so may cause unexpected and permanent damage to the device.
- * Take precautions to avoid electrostatic discharge and/or momentary power spikes. A change in the characteristics of the laser or premature failure may result.
- * Proper heat sinking of the device assures stability and lifetime. Always ensure that maximum operating temperatures are not exceeded.
- * Observing visible or invisible laser beams with the human eye directly, or indirectly, can cause permanent damage. Use a camera to observe the laser.
- * No laser device should be used in any application or situation where life or property is at risk in event of device failure.
- * Specifications are subject to change without notice. Ensure that you have the latest specification by contacting us prior to purchase or use of the product.

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