Pavilion Integration Corporation
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BASOE®

Integrated Multi-laser & Multi-channel Optical Engine

This is an optical platform with single or multi-laser that focus into the flow cell at customer specified beam overlap and spacing. The multi-laser optical platform is built with an integrate module with 523nm, 638nm and 405nm lasers (or other lasers with customized wavelengths) inside, laser beam shaping optics, and beam combining optics, and is delivering the final focused beam to the flow cell meeting customer specification.

The optical platform is designed with the customer-adjustable beam positioning and focusing. Based on what we agreed with customer under separated notice and specification, this optical platform shall incorporate the custom-specific flow cell, filters, and SiPM detectors, and it's to be assembled and tested to the customer requirements.

Depend on different kind of requirements, PIC will provide the one-stop ready-to-use solutions with

1 laser, 2-ch;

2-laser, 4-ch or 6-ch;

3-laser 8-ch or 10-ch;

or other customized configurations

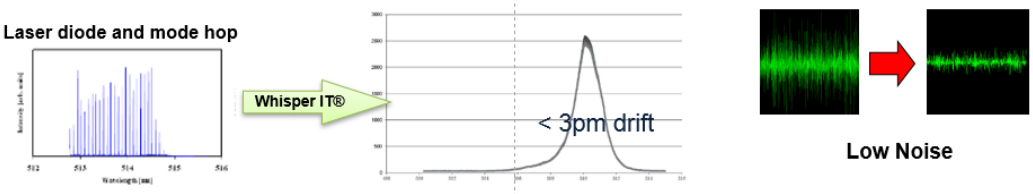
in this custom module.

FEATURES

- **Up to 3-laser, 10-ch.**
- **Custom wavelengths**
- **Custom focus beam**
- **Highly integrated**
- **Co-linear or separated beams**
- **User-adjustable**
- **Fast time-to-market**
- **Cost-saving**

APPLICATIONS

- **Flow Cytometry**
- **Multiplexing**
- **Q-PCR**
- **Hematology**
- **Diagnostics**
- **Clinical**
- **Point-of-care**
- **Optogenetics**
- **Metrology**
- **HLA Typing**
- **Cytokine test**
- **Cancer screening**



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Product Specifications (e.g. RGV module)

Table 1: Laser Engine Optical*

Parameters		Conditions	Specifications Min.	Typ.	Max.	Units
Channel 1	Lasing Wavelength	Max. Power	528	531	534	nm
Channel 2	Lasing Wavelength	Max. Power	634	637	640	nm
Channel 3	Lasing Wavelength	Max. Power	400	405	410	nm
Channel 1	Max. Optical Output Power**	CW Mode	50	51	52	mW
Channel 2	Max. Optical Output Power**	CW Mode	20	21	22	mW
Channel 3	Max. Optical Output Power*	CW Mode	20	21	22	mW
Channel 1	Blocking Optical Power	@1059-1069nm	4			OD
Channel 2	Blocking Optical Power 1	@ 657-800nm	6			OD
	Blocking Optical Power 2	@ 650 – 657nm	3			OD
Channel 3	Blocking Optical Power	@420-440nm	3			OD
Power Stability		8Hrs, T<3ºC			±1.0	%
RMS Noise		20Hz – 2MHz			0.5	%
Beam Quality (M^2)		TEM_{00}	1.0		1.3	
Vertical Beam Height @ $1/e^2$		at the vertical focal plane	20	22	25	μm
Horizontal Beam Width @ $1/e^2$		at the vertical focal plane	95	98	105	μm
Polarization Orientation (reference to baseplate)		Vertical	0		±2	º
Polarization Extinction Ratio			17			dB
Warm-up Time (output power)		Cold Start from ambient temp. 15-30 ºC			1	min

* Stress release to be performed before final test.

** Optical output power is measured at the focus lens output at a specified distance.

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Table 2: Reception Channel

Channel Name	Specifications	
FSC	Working Spectrum	532nm
GSSC	Working Spectrum	532nm
FL1	Working Spectrum	545-625nm
RSSC	Working Spectrum	637nm
CL1	Working Spectrum	649-667nm
CL2	Working Spectrum	701-715nm
CL3	Working Spectrum	750nm
VSSC	Working Spectrum	405nm
CL0	Working Spectrum	459-750nm

Table 3: Laser Engine Alignment*

Parameters	Conditions	Specifications Min.	Typ.	Max.	Units
Beam pointing stability*	22.5±5°C, at the focal plane	-15		15	μm
Laser Static Beam Height	From base plate	18.5	19.0	19.5	mm
Static Beam Alignment	Angle			±2.5	mrad
Beam spacing in the V-plane (Green beam is at the center of the flow. red beam is 50um down by the flow direction)	Measured at the vertical focal plane		-50		μm
Beam overlap at the horizontal plane	Measured at the center beam position at the vertical focal plane	-15		15	μm

*DVT and production sampling test to be performed on beam pointing stability.

Table 4: Laser Engine Electrical *

	Parameters	Conditions	Specifications Min.	Typ.	Max.	Units
Channel 1 (532nm)	Input Voltage (TEC)	22.5±5°C	4.8	5	5.2	VDC
	Voltage Ripple (TEC)				5	%
	Current Consumption (TEC)				1.7	A
	Input Voltage (LD)		4.8	5	5.2	VDC
	Voltage Ripple (LD)				5	%
	Current Consumption (LD)				0.5	A
	Laser Head Heat Dissipation (Steady at 30^0C Baseplate)				10	W

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	Total Power Consumption (Steady at 30^{0}C Baseplate)				12.5	W
	Laser Connector	Molex Nano-Fit105307-2205	Pin1: +5V Pin2: NC Pin3: GND Pin4: GND Pin5: Power monitor(40mV/mW)			
Channel 2 (637nm)	Input Voltage (TEC)	22.5±5°C	4.8	5	5.2	VDC
	Voltage Ripple (TEC)				5	%
	Current Consumption (TEC)				1.7	A
	Input Voltage (LD)		4.8	5	5.2	VDC
	Voltage Ripple (LD)				5	%
	Current Consumption (LD)				0.2	A
	Laser Head Heat Dissipation (Steady at 30^{0}C Baseplate)				10	W
	Total Power Consumption (Steady at 30^{0}C Baseplate)				11	W
	Laser Connector	Molex Nano-Fit105307-2205	Pin1: +5V Pin2: Power adjustment (0~2.6V, 0~100%; 2.6~5V, 100%) Pin3: GND Pin4: GND Pin5: Power monitor(40mV/mW)			
Channel 3 (405nm)	Input Voltage (TEC)	22.5±5°C	4.8	5	5.2	VDC
	Voltage Ripple (TEC)				5	%
	Current Consumption (TEC)				1.7	A
	Input Voltage (LD)		8.6	9	9.4	VDC
	Voltage Ripple (LD)				5	%
	Current Consumption (LD)				0.2	A
	Laser Head Heat Dissipation (Steady at 30^{0}C Baseplate)				10	W
	Total Power Consumption (Steady at 30^{0}C Baseplate)				12	W
	Laser Connector	Molex Nano-Fit105307-2205	Pin1: +5V Pin2: +9V Pin3: GND Pin4: GND Pin5: Power monitor(40mV/mW)			

Table 5: Mechanical

Parameters	Conditions	Specifications Min.	Typ.	Max.	Units
Optical Plate	L x W x H		300 x 300 x 79.2		mm

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Cable Type	1/8” Polyester expandable sleeve (Mfr.: Alpha Wire)				
Cable Length	For each channel		75		mm

Mechanical Diagram

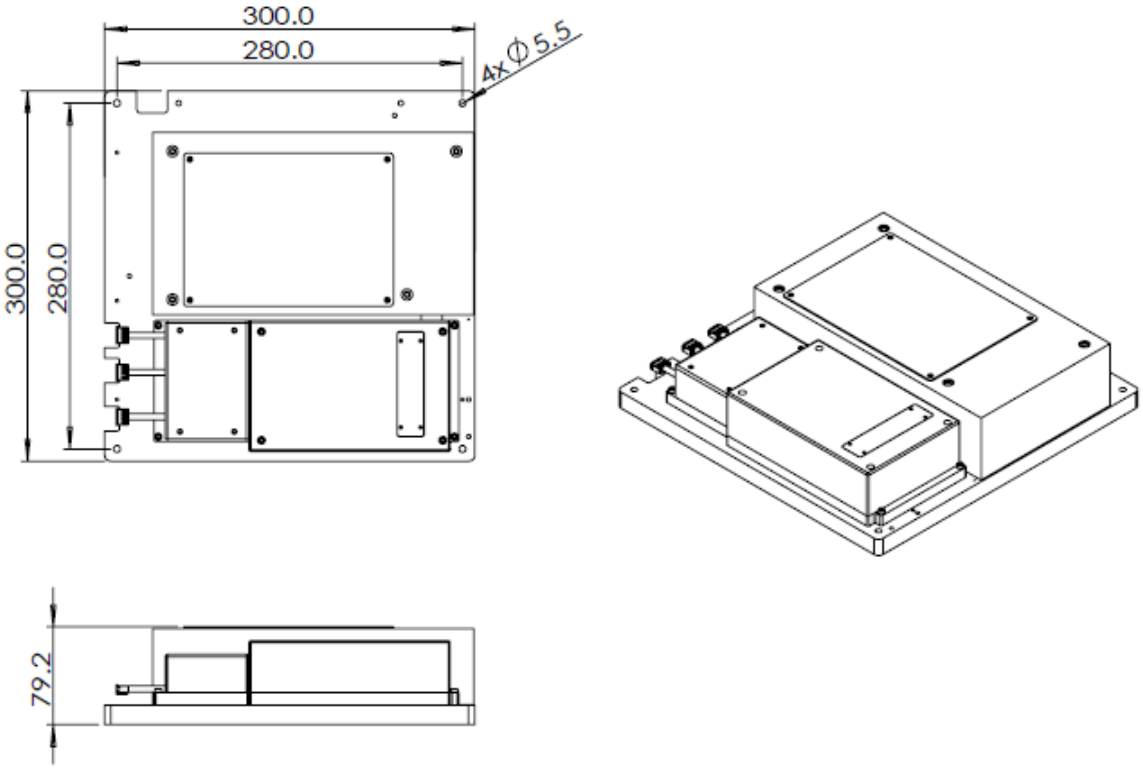

Figure1. Optical Deck Dimensions

This OEM laser does not comply with 21 CRF 1040.10 and 1040.11 without appropriate integration. Please contact Pavilion Integration Corp. for additional support or questions.

ISO9001 & ISO13485 Registered