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StingRay and BioRay

With a compact modular design measuring only 19 mm in diameter and using the industries' premier laser diodes, the StingRay delivers best-in-class performance. High-quality glass optics and sophisticated drive electronics deliver the power and control to your application to improve signal-to-noise and measurement speed.

StingRay is the highest-performing top-hat-profile laser available that comes in a variety of fan angles to create the line you need for measurement and profiling applications. Offering the same focus adjustment as the BioRay, the StingRay allows the user to optimize the focus location for the best measurement resolution.

BioRay is a Stingray with an included Heat Sink and Mounting Plate for Life Science applications with an elliptical beam output and a user-adjustable beam divergence (adjustable focus).

With optional RS-232 control the laser power is adjustable as well as onboard diagnostics for operating hours, diode current, output power, temperature, and more.

Select StingRay and BioRay models also include the µFocus and Fiber-Ready (FR) versions.



FEATURES & BENEFITS

- High Signal-to-Noise with superior Contained Power in the line
- 405 nm to 830 nm
- Power up to 200 mW
- User adjustable focus
- Pointing stability <10 $\mu rad/^{\circ}C$
- Analog or digital modulation
- Microprocessor controlled
- Onboard diagnostics monitor
- RS-232 control option
- Power supply range: 5 to 24 VDC
- ESD protection, over-temperature protection, and reverse polarity protection
- Optional fiber-ready version

APPLICATIONS

- Microscopy
- Cytometry
- Medical Imaging and Instrumentation
- Genetics
- High Throughput Screening
- Machine Vision
- 3D Profiling
- Industrial



LASER OUTPUT SPECIFICATIO	NS				
Spatial Mode		TEM ₀₀ (Single Transverse Electric Mode)			
Beam Quality, M ² (ModeMaster with 90/10	Clip Level)	<1.5			
Pointing Stability over Temperature (µrad/°	C)	<10			
Beam Angle (boresight) (mrad)		<3			
RMS Noise (%) (20 Hz to 20 MHz)		<0.5			
Peak-to-Peak Noise (%) (20 Hz to 20 MHz)		<1			
Long Term Power Stability (%) (over 8 hours	s and ±3°C)	<2			
Warm-up Time (minutes)		<5			
LASER ELECTRICAL SPECIFICA	TIONS				
Operating Voltage (V DC)		+5 to +24 (recommend 12 VDC for best efficiency) ¹			
Operating Current (mA) (maximum at 25°C)	200			
Power-on Delay (seconds) (if enabled)		5			
Power Consumption (W)		<5			
ESD Protection		EN61326-1 (8 kV Air Discharge, 4 kV Contact Discharge)			
LASER MECHANICAL AND ENV	IRONMENTAL	SPECIFICATIONS			
Operating Temperature		-10 to 50°C (except 450 nm, 520 nm, and 525 nm with 10°C to 40°C)			
Non-Operating (storage) Temperature		-20 to 60°C			
Weight (grams) (standard model)		<70			
Diameter (mm)		19.05			
Material		Aluminum 6061 T1			
LASER WIRING					
Signal	Wire Color	Description			
V _{in}	Red	Power Supply input for +5 to +24 Volts DC, Recommend 12 VDC ¹			
V _{in} Ground	Black	Power Supply Ground			
Output Signal for Over-Temperature Green or Over-Current		Open Collector Output, 30 Volts DC maximum, 100 ma current load maximum ²			
V _{mod} Blue		Modulation Input, 5 kOhm input impedance, 5 Volts maximum			
V _{mod} Ground Red/Black		Modulation Ground			
RS-232 Transmit	Orange	RS-232 Transmit for models with RS-232 option installed			
RS-232 Receive	White	RS-232 Receive for models with RS-232 option installed			
RS-232 Ground	White/Black	RS-232 Signal Ground for models with RS-232 option installed			

Minimum operating voltage for lasers between 400 nm to 525 nm is 6V DC.
 Not available on Fast Digital Modulation (FT or RFT models).



CHOOSE YOUR LASER

The StingRay and BioRay products come in a variety of wavelength, output power, and configuration options.

Use the following simple ten-step selection guide to choose the ideal laser and features for your application. Refer to the last page for our most popular versions, their part numbers, and pricing available for immediate delivery.

Configure your laser with these ten steps:

STEP 1:	Package
STEP 2:	Wavelength
STEP 3:	Output Power
STEP 4:	Output Power Control Mode
STEP 5:	Beam Shape
STEP 6:	Focus Distance
STEP 7:	Communication Option (RS-232)
STEP 8:	Cable Length/Connector
STEP 9:	Data Report
STEP 10 :	Power-On Delay





STEP 1:

Choose your package with optional separated electronics, mounts, and/or fiber attachment. Choose only one option from the following selections.



1 For more dimension details and CAD drawings, please visit www.coherent.com



STEP 1 (continued):



1 For more dimension details and CAD drawings, please visit www.coherent.com



STEP 2:

Choose your wavelength.

Choose only one of the following selections.

Wavelength Choices ¹ (nm)	405	450	488	520	525	639	640	655	660	685	785	830

1 BioRay FR available in 405 nm, 450 nm, 450 nm, 488 nm and 640 nm. StingRay and BioRay Laser-to-laser wavelength tolerance of 405 nm is ±5 nm, 450 nm is ±10 nm, 488 nm is ±10 nm, 520 nm to 530 nm, 525 nm is 520 nm to 530 nm, 639 nm is 635 nm to 648 nm, 640 nm is ±5 nm, 647 nm is ±5 nm, 655 nm is ±5 nm, 650 nm to 655 nm, 660 nm for <50 mW is 655 to 665 nm, 660 nm for <50 mW is 652 to 662 nm, 685 is ±15 nm, 785 nm is ±19 nm, 830 nm is 845 nm.

STEP 3:

Choose your power.

Choose only one of the following selections.

Wavelength Choices ¹ (nm)	405	450	488	520	525	639	640	655	660	685	785	830
Output Power Available (mW)												
1												
5												
10												
20												
25												
35												
50												
75												
90												
100												
140												
150												
180												
200												

1 BioRay FR (Fiber-Ready) only available in 405 nm 50 mW, 450 nm 50 mW, 488 nm 20 mW and 640 nm 40 mW. BioRay FR offers >70% coupling efficiency with NA=0.22 into a customer-provided 50 µm or 100 µm fiber.



STEP 4:

Choose your output power control: CW, analog modulation (variable output power), or digital modulation. Choose only one of the following selections.

CW Mode	Function
Continuous Wave (CW)	Constant power mode Laser on at full power User can adjust laser output power and monitor power through RS-232 option
	(If enabled)
Analog Modulation'	Function
□ Analog (A)	Input <0.5V = output power is off,
	Bandwidth of 500 kHz 50 40 30 Rise time (10% to 90%) <1 μsec, 500 nsec (typ.)
	Analog Modulation can be used with a DC voltage input to simply vary the output power No adjustable output power through RS-232
	Input >4.5V = output power is off.
	Input = 0V is 100% output power,
□ Reverse Analog (RA)	4.5V to 0V is linear power control from external voltage source
	Bandwidth of 500 kHz
	Rise time (10% to 90%) <1 µsec, 500 nsec (typ.)
	Fall time (90% to 10%) <1 µsec, 500 nsec (typ.)
	Reverse Analog Modulation can be used with a DC voltage input to simply vary the output power $0 + + + + + + + + + + + + + + + + + + +$

1 BioRay is standard with Analog Modulation and will require a 5V input signal to operate.



STEP 4 (continued):

Digital Modulation	Function
	Input 0V to 1V is output power off,
	Input 4V to 5V is 100% output power
Digital TTL (T)	Bandwidth of 100 kHz
	Rise time (10% to 90%) <1 µsec, 500 nsec (typ.)
	Fall time (90% to 10%) <1 µsec, 500 nsec (typ.)
□ Fast Digital TTL (FT)	Bandwidth of 2 MHz
	Rise time (10% to 90%) <150 nsec 0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0
	Fall time (90% to 10%) <150 nsec Input Voltage (V)
	User can adjust output power setting through RS-232 option (if enabled)
	Input 0V to 1V is 100% output power, 100
	Input 4V to 5V is 0% output power
□ Reverse Digital TTL (RT)	Bandwidth of 100 kHz
	Rise time (10% to 90%) <1 µsec, 500 nsec (typ.)
	Fall time (90% to 10%) <1 µsec, 500 nsec (typ.)
□ Reverse Fast Digital	Bandwidth of 2 MHz
TTL (RFT)	Rise time (10% to 90%) <150 nsec
	Fall time (90% to 10%) <150 nsec Input Voltage (V)
	User can adjust output power setting through RS-232 option (if enabled)



STEP 5:

Choose your beam shape.

Choose only one of the following selections.





STEP 5 (continued):

Line Beam Generator (cont.)	
□ L01-10 Line with 10 degree fan angle	
Fan angle 10º with tolerance ±5%	
Straightness <0.1%	
Relative intensity floor >75%	
Contained Power ≥95%	
Note: Not available in 488 nm	10° FAN ANGLE
□ L01-15 Line with 15 degree fan angle	
Fan angle 15° with tolerance ±5%	
Straightness <0.1%	
Relative intensity floor >75%	
Contained Power ≥95%	
Note: Not available in 488 nm	15°
	FAN ANGLE
□ L01-20 Line with 20 degree fan angle	
Ean angle 200 with tolerance +5%	
Straightness <0.1%	
Relative intensity floor >75%	
Contained Power ≥95%	
Note: Only available for wavelengths 520 nm to 785 nm	20°
	FAN ANGLE
□ L01-30 Line with 30 degree fan angle	
□ L01-30 Line with 30 degree fan angle, micro-focus (µFL)	- °
Fan angle 30° with tolerance ±5%	
Straigntness <0.1%	
Contained Power >05%	
Note: Not available in 488 nm. Micro-focus (µFL) only available in 520 nm to 785 nm.	50° FAN ANGLE



STEP 5 (continued):

Line Beam Generator (cont.)	
 L01-45 Line with 45 degree fan angle L01-45 Line with 45 degree fan angle, micro-focus (μFL) 	
Fan angle 45° with tolerance ±5% Straightness <0.1% Relative intensity floor >60% Contained Power ≥95% Note: Not available in 488 nm. Micro-focus (µFL) only available in 520 nm to 785 nm.	45° FAN ANGLE
□ L01-60 Line with 60 degree fan angle	
 □ L01-60 Line with 60 degree fan angle, micro-focus (µFL) Fan angle 60° with tolerance ±5% Straightness <0.1% Relative intensity floor >60% Contained Power ≥95% Note: Not available in 488 nm. Micro-focus (µFL) only available in 520 nm to 785 nm. 	60° FAN ANGLE
 □ L01-75 Line with 75 degree fan angle Fan angle 75° with tolerance ±5% Straightness <0.1% Relative intensity floor >50% Contained Power ≥95% Note: Not available in 488 nm 	75° FAN ANGLE

GLOSSARY OF TERMS:

Definition	Description			
Fan Angle or Line Length	Length of flat top profile, measured at 80% intensity clip levels. Reported in degrees for the fan angle.	100 (%)	Profile will not drop below the	h
Straightness	Maximum deviation from the best fit line.	0 - 00 - 00 - 00 - 00 - 00 - 00 - 00 -	"Relative Intensity Floor"	Fan Angle (Line Length) measured at 80% Relative Intensity
	Measured as the delta from the best fit line divided by the line length. Reported as a percentage.	40 40 20		Contained Power: power contained within the area of the fan angle above, and the width of the line at 1/a2
Relative Intensity Floor	Minimum relative intensity at any point along the line length. Reported as a relative intensity.	D 20]	Position
Contained Power	Power contained within the defined Flat Top.		Note 500	Line is optimized in the factory at mm working distance from laser



STEP 6:

Choose your focus distance (Coherent can preset the adjustable focus). Choose only one of the following selections.

Focus	Description
□ Standard, Default, 500 mm	Adjustable focus feature factory set for best focus at 500 mm distance from laser. You can readjust and lock as needed.
Custom, mm	Choose from a 50 mm up to a 2000 mm focus distance. Adjustable focus feature factory set to your specified distance from laser. You can readjust and lock as needed. Choosing 2000 mm is "collimated".

STEP 7:

Choose your communication option (RS-232). Choose only one option of following selections.

Focus	Description
□ None	No communications. RS-232 disabled.
□ RS-232	RS-232 enabled for laser control and status. Can monitor hours, power and temperature. Can adjust laser output power for CW and digital modulation modes.



STEP 8:

Choose your cable length and connector/pinout. Choose only one of the following selections.

Code	Description	Image	Connection	
FL	Flying Leads Choose Length (mm) 250 500 1000 1500 2000 2500	FLYING LEADS SX STRIPPED AND TINNED 28 AWG WIRE	V _{in} V _{in} Ground Fault V _{mod} V _{mod} Ground RS-232 Transmit RS-232 Receive RS-232 Ground	Red Black Green Blue Red/Black Orange White White/Black
HR	Hirose R10A-10P-12SC(73)	HIROSE (Ø14.1mm)	V _{in} V _{in} Ground Fault V _{mod} V _{mod} Ground RS-232 Transmit RS-232 Receive RS-232 Ground	9 1 10 2 3 6 4 5
Ρ	Power Plug, Phono 3.5 mm 500 mm Note: Only for CW mode	(\$3.5mm) Vin GND PHONO POWER PLUG	V _{in} V _{in} Ground, Shield Fault V _{mod} V _{mod} Ground RS-232 Transmit RS-232 Receive RS-232 Ground	Tip Base No Connection No Connection No Connection No Connection No Connection
В	Power Plug, Phono 3.5 mm and BNC for Modulation 500 mm Note: Do not order with CW mode	(@14.4mm) (@14.4mm) (@14.4mm) (wmod GND (wmod GND (@10.4mm) (@10.4	V _{in} V _{in} Ground, Shield Fault V _{mod} Ground RS-232 Transmit RS-232 Receive RS-232 Ground	Phono Plug Tip Phono Plug Base No Connection BNC Tip BNC Base No Connection No Connection No Connection



STEP 9:

Choose data report.

Data Reports	Description
🗹 Basic	Every laser includes a final quality test report
Line Data	Add uniformity and straightness data for lines (L01)

STEP 10:

Choose five-second start-up power-on delay. Choose only one of the following selections.

Power-on Delay	Description
🗖 None	Laser will start emission at power-on
Yes, default	Laser will have an approximate five-second delay for laser emission after power-on

CONGRATULATIONS:

You have completed the laser configuration steps! Please email this to your local Coherent Sales representative to get a quote on price and delivery. You can also view our most popular models on the next two pages.



MOST POPULAR CONFIGURATIONS:

Part Number	Description
1264213	BioRay 405 nm 50 mW Elliptical Dot Laser Analog Modulation enabled, Includes mount, 1 meter cable and Hirose connector, typical 1x3 mm collimated beam
1264214	BioRay 450 nm 50 mW Elliptical Dot Laser Analog Modulation enabled, Includes mount, 1 meter cable and Hirose connector, typical 1x3 mm collimated beam
1270002	BioRay 488 nm 20 mW Elliptical Dot Laser Analog Modulation enabled, Includes mount, 1 meter cable and Hirose connector, typical 1x3 mm collimated beam
1264216	BioRay 520 nm 50 mW Elliptical Dot Laser Analog Modulation enabled, Includes mount, 1 meter cable and Hirose connector, typical 1x3 mm collimated beam
1264218	BioRay 640 nm 40 mW Elliptical Dot Laser Analog Modulation enabled, Includes mount, 1 meter cable and Hirose connector, typical 1x3 mm collimated beam
1286584	STR-520-20-CW-FL-L01-75-S-XX-3, CDRH Class II StingRay, 520 nm, 20 mW, Single Line, 75° Fan Angle, Pre-focused to 500 mm distance, 5-second Power-on Delay, 500 mm cable with Flying Leads
1253606	STR-520-35-CW-FL-D01-XX-S-TX StingRay, 520 nm, 35 mW, Elliptical Dot Beam, Pre-focused to 500 mm distance, 5-second Power-on Delay, 500 mm cable with Flying Leads, Includes RS-232 communications
1285005	STR-639-5-CW-FL-L01-20-S-XX-8 StingRay, 639 nm, 5 mW, Single Line, 20 ^o Fan Angle, Pre-focused to 500 mm distance, 500 mm cable with Flying Leads. NOTE: Does not have 5-second power-on delay for laser emission.
1276557	STR-639-5-CW-FL-L01-45-S-XX-8 StingRay, 639 nm, 5 mW, Single Line, 45 ^o Fan Angle, Pre-focused to 500 mm distance, 500 mm cable with Flying Leads. NOTE: Does not have 5-second power-on delay for laser emission.
1277105	STR-639-10-CW-P-L01-75-E-XX StingRay, 639 nm, 10 mW, Single Line, 75° Fan Angle, Pre-focused to 500 mm distance, Extended Depth of Focus, 500 mm cable with Flying Leads
1262766	STR-660-10-CW-FL-L01-10-S-XX-8 StingRay, 660 nm, 10 mW, Single Line, 10° Fan Angle, Pre-focused to 500 mm distance, 500 mm cable with Flying Leads. NOTE: Does not have 5-second power-on delay for laser emission.
1255565	STR-660-10-A-FL-L01-20-E-XX StingRay, 660 nm, 10 mW, Single Line, 20° Fan Angle, Pre-focused to 500 mm distance, Extended Depth of Focus, 500 mm cable with Flying Leads, Analog Modulation enabled
1258287	STR-660-10-CW-FL-L01-60-S-TX StingRay, 660 nm, 10 mW, Single Line, 60° Fan Angle, Pre-focused to 500 mm distance, 500 mm cable with Flying Leads, Includes RS-232 communications
1289028	STR-660-35-CW-HR-L01-1-S-XX-8 StingRay, 660 nm, 10 mW, Single Line, 1º Fan Angle, Pre-focused to 500 mm distance, ~1 Meter cable with Hirose Connector. NOTE: Does not have 5-second power-on delay for laser emission.



MOST POPULAR CONFIGURATIONS (continued):

Part Number	Description
1288507	STR-660-35-CW-HR-L01-20-S-XX-8 StingRay, 660 nm, 35 mW, Single Line, 20 ^o Fan Angle, Pre-focused to 500 mm distance, ~1 Meter cable with Hirose Connector. NOTE: Does not have 5-second power-on delay for laser emission.
1280731	STR-660-100-T-FL-L01-10-S-TX StingRay, 660 nm, 100 mW, Single Line, 10º Fan Angle, Pre-focused to 500 mm distance, ~1 Meter cable with Hirose Connector, Digital Modulation enabled, Includes RS-232 communications
1280028	STR-660-100-T-HR-L01-15-E-TX-5 Stingray, Separate Driver (Enclosed) with 150 mm between laser and driver, 660 nm, 100 mW, Single Line, 15° Fan Angle, Pre-focused to 500 mm distance, Extended Depth of Focus, ~1 Meter cable with Hirose Connector, Digital Modulation enabled, Includes RS-232 communications
1280027	STR-660-100-T-HR-L01-30-E-TX-5 Stingray, Separate Driver (Enclosed) with 150 mm between laser and driver, 660 nm, 100 mW, Single Line, 30° Fan Angle, Pre-focused to 500 mm distance, Extended Depth of Focus, ~1 Meter cable with Hirose Connector, Digital Modulation enabled, Includes RS-232 communications
1285314	STR-660-100-CW-HR-L01-45-S-XX-8 StingRay, 660 nm, 100 mW, Single Line, 45º Fan Angle, Pre-focused to 500 mm distance, ~1 Meter cable with Hirose Connector. NOTE: Does not have 5-second power-on delay for laser emission.
1262526	STR-660-100-CW-FL-L01-60-S-XX StingRay, 660 nm, 100 mW, Single Line, 60º Fan Angle, Pre-focused to 500 mm distance, 500 mm cable with Flying Leads
1286514	STR-785-90-T-FL-D01-XX-S-XX StingRay, 785 nm, 90 mW, Elliptical Dot Beam, Pre-focused to 500 mm distance, 500 mm cable with Flying Leads
1231404	StingRay Controller with Keyswitch and Interlock Accessory for enhanced integration. Includes control software and power supply. Use with lasers that include a Hirose connector. For more details, refer to the StingRay Accessory datasheet.





StingRay Accessories

The StingRay laser is the highest-performing laser available for measurement and profiling applications with a variety of accessories help accelerate your integration. Accessories include mounting options, remotes, and cabling.

FEATURES

- Laser Power Supply
- Multi-Axis Mount
- Heat Sink Mount
- Mount Adapter Plate
- StingRay Remote
- CDRH Controller Kit
- CDRH Controller Power Supply
- 12 Pin Hirose to Flying Lead Connector
- Connection Software



StingRay Power Supply

Part Number: 1232091



StingRay Multi-Axis Mount

Part Number: 1280838

The StingRay Multi-Axis Mount provides the user/integrator with the capability of precision movement/alignment of the laser as it is installed into an instrument or application.

This movement consists of:

- · 360-degree rotation about the laser's mechanical axis
- Tilt about the x-axis up to seven degrees

The StingRay Multi-Axis Mount provides multiple mounting options for the user, conforming to the standard StingRay/OBIS footprint. It also allows for more general mounting with two machined slots for quick installation.







StingRay Heat Sink Mount

Part Number: 1222896



Part Number: 1222894









Coherent StingRay Accessories Datasheet

StingRay Remote

Part Number: 1231404

The StingRay remote is meant to be used with lasers that include a Hirose connector. It includes a keyswitch, an interlock, the control software, and a power supply. Use with lasers that include a Hirose connector.



StingRay 12 Pin Hirose Connector to Flying Lead Break Out

Part Number: 1229640





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Coherent follows a policy of continuous product improvement. Specifications are subject to change without notice. Coherent's scientific and industrial lasers are certified to comply with the Federal Regulations (21 CFR Subchapter J) as administered by the Center for Devices and Radiological Health on all systems ordered for shipment after August 2, 1976.

Coherent offers a limited warranty for all StingRay and BioRay Lasers. For full details of this warranty coverage, please refer to the Service section at www.coherent.com or contact your local Sales or Service Representative. MC-010-17-0M1221Rev.G Copyright ©2021 Coherent, Inc.

