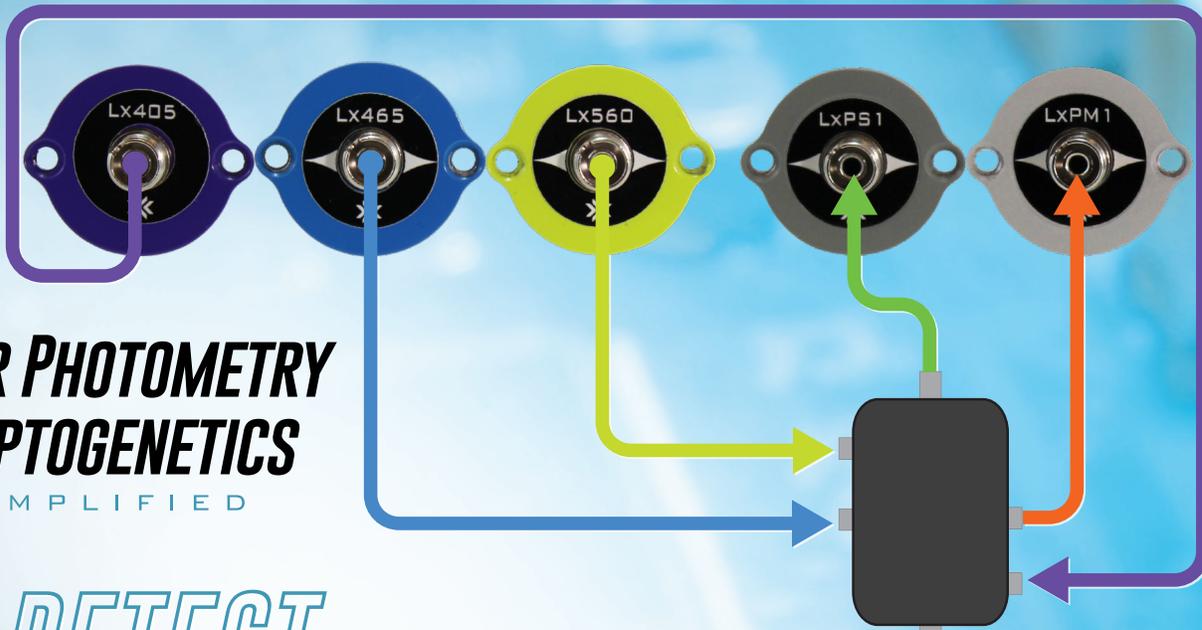




**LUX** PRODUCT CATALOG

- Fiber Photometry
- Optogenetics



# FIBER PHOTOMETRY & OPTOGENETICS

SIMPLIFIED

## DETECT

Integrated LUX LEDs, Photosensors, and Power Meter for real-time Fiber Photometry

## CONNECT

Latest version of Synapse Software to simplify experimental design, testing, and data collection

## GO

Record real-time fluorophore responses from GCaMP, dLight, and more

Use Synapse to incorporate all your experimental data:

### BEHAVIOR



Integrate third party behavioral codes from multiple operant boxes with your fiber photometry recordings and view evoked responses in real-time.

### VIDEO



Synchronize video recordings from up to two USB cameras. Incorporate scoring and timestamps both online and offline.

### ELECTROPHYSIOLOGY



Record neural responses, including single and multi-unit activity, with TDT's PZ5 or Medusa amplifier (up to 32 channels).

# RZ10X LUX-I/O Processor



The RZ10X Fiber Photometry Processor features new integrated LUX LEDs and Photosensors that plug directly into its front panel. The RZ10X is the best real-time acquisition processor for multi-subject and multi-site fiber photometry recordings. The RZ10X can be equipped with 6 LED outputs and 4 sensor inputs and it can be custom configured with swappable LEDs, photosensors, a power meter, M8 or BNC connectors to fit your experiment needs.

*One processor integrates all of your fiber photometry needs*

**RZ10X Processor:** Deluxe fiber photometry processor, 3 colors x 2 sites

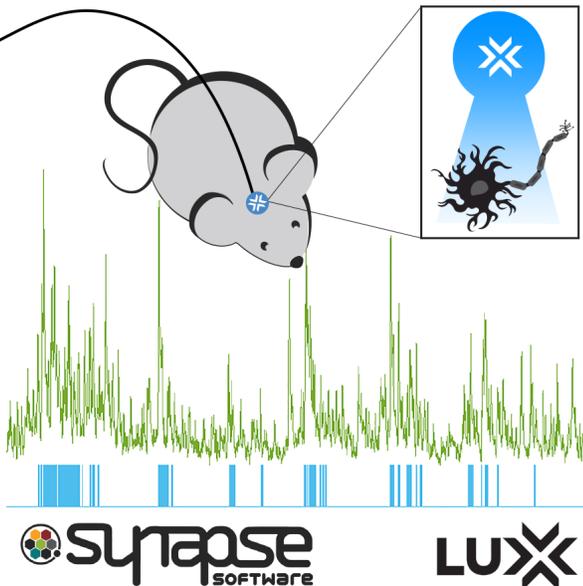
**RZ10 Processor:** Base fiber photometry processor, 3 colors x 1 site

**Technical Specifications:**

	<b>RZ10X Processor</b>
DSPs:	3 DSPs, upgradable up to 4 DSPs or QZDSPs
LED Outputs:	6-channel LED driver, integrated Lux LED slots
Sensor Inputs:	4-channel A/D, integrated Lux Sensor slots
Max sampling rate:	~50 kHz
Additional A/D:	2 channels, 16-bit PCM
Digital I/O:	24 bits programmable, 4 bit addressable BNCs
Ephys Support:	PZ5 amplifier input, up to 32 channels Medusa amplifier input, up to 16 channels
Dimensions:	19 inches wide, 5.25 inches tall (3U), 12 inches deep

**RZ10 Processor:**

DSP:	1 DSP, upgradable up to 4 DSPs or QZDSPs
LED Outputs:	3-channel LED driver, integrated Lux LED slots
Sensor Inputs:	2-channel A/D, integrated Lux Sensor slots
Max sampling rate:	~50 kHz
Additional A/D:	1 channel, 16-bit PCM
Digital I/O:	24 bits programmable, 4 bit addressable BNCs
Ephys Support:	Medusa amplifier input, up to 16 channels
Dimensions:	19 inches wide, 5.25 inches tall (3U), 12 inches deep



## A Complete System for Studying Neural Circuits

**LUX is the next generation of research tools for calcium-imaging and optogenetics**

Recording and stimulating with light has rapidly expanded the neuroscience toolkit. LUX incorporates calcium imaging and optical stimulation into a single, turn-key device.

Investigate complex neural circuits with LUX. Simultaneously record from various fluorophores, including GCaMP and dLight, and measure behavioral timestamps.

# Software:

## Synapse: The Fiber Photometry Gizmo

### Configuring the Gizmo: Detect, Connect, and Go!

**DETECT:** Just select 'Detect Hardware' for LUX LEDs, Photosensors, and Power Meters.

**CONNECT:** Simply add the Fiber Photometry Gizmo, as easy as click-drag-drop.

**GO:** Add your subject, preview your settings, press record and go!

Main LUX Digital I/O ADC DAC **DEVICE CONFIGURATION**

Detect Hardware

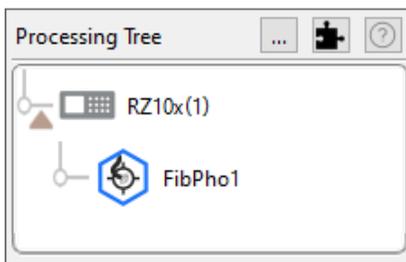
Upper Bank  Legacy Control

Drv-1 Drv-2 Drv-3 Sen-A Sen-B  
LED\_405 LED\_465 LED\_560 PS1 PS1

Lower Bank  Legacy Control

Drv-4 Drv-5 Drv-6 Sen-C Sen-D  
M8 M8 M8 BNC PM1

ADC In



Drv-1

Name: 405  Auto ID

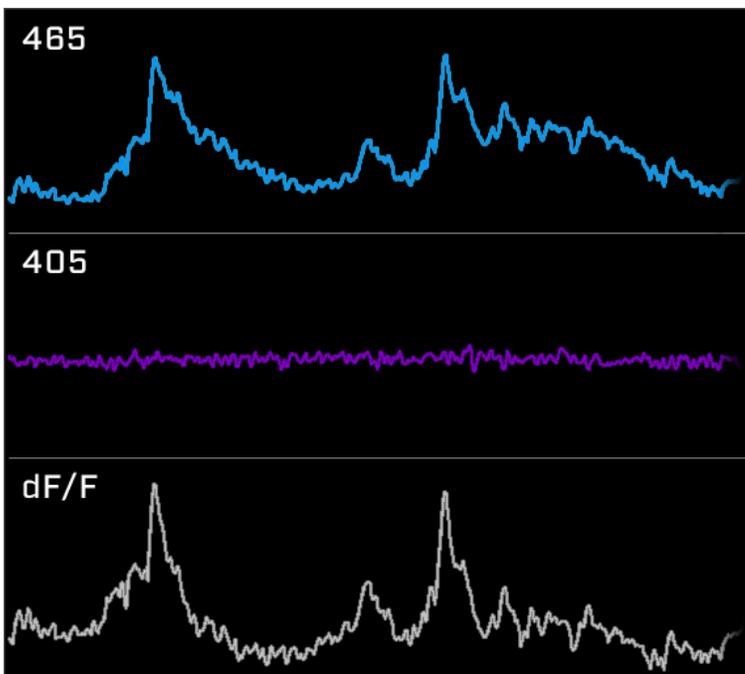
Max: 200 mA

Defaults

Frequency: 210 Hz

Level: 10 mA

Offset: 5 mA



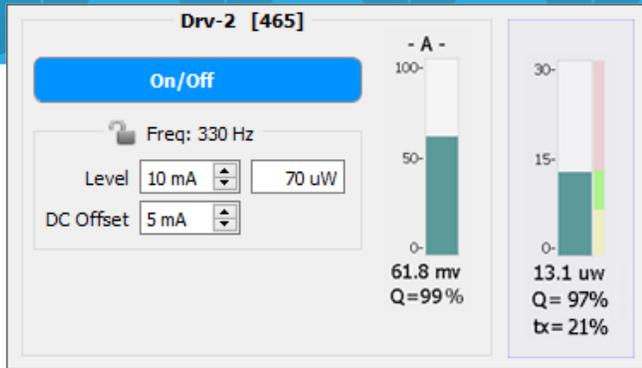
### Record multi-color and multi-site fluorescent responses, calculate online dF/F, and more

TDT's Fiber Photometry Gizmo plots the lock-in amplified fluorophore response in real-time. Visualize neural activity with online dF/F. Measure all forms of calcium signals, including GCaMP, dLight, and RCaMP, and record from two sites simultaneously.





Synapse makes using the RZ10X easy. The Fiber Photometry gizmo simplifies the user setup and includes tools for optimizing light power.

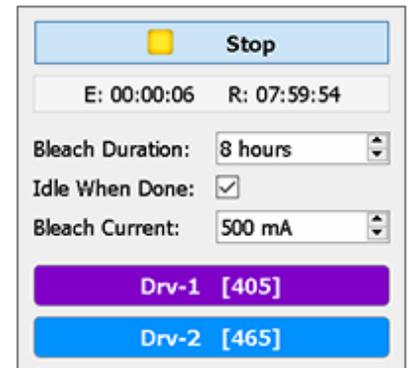


### Optimize light power and signal to noise with the Lux PM1 Power Meter

Measure power delivered through your optical interface to your subject using the LUX PM1 power meter. Reduce the guess work and simplify system setup and troubleshooting. Measure total light loss from LED to fiber tip.

### Minimize cable autofluorescence

Photobleaching reduces cable autofluorescence that can obscure your signal. Selectively bleach fiber optics for a specified time.



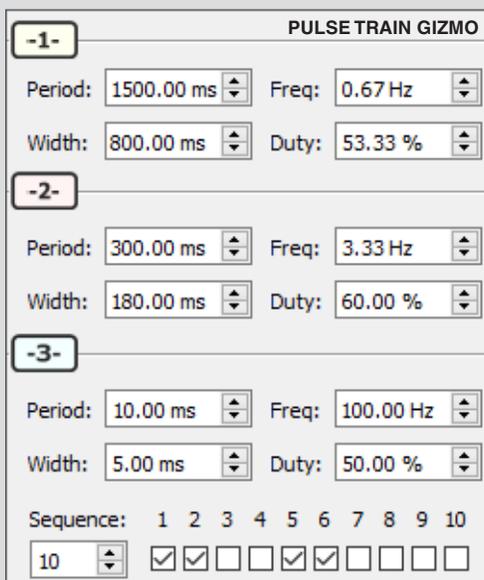
### Run experiments longer with Timing Controls

Minimize accidental bleaching of your fluorophore from long term in-vivo recordings. Timing Controls automatically turn LEDs on and off for set durations.



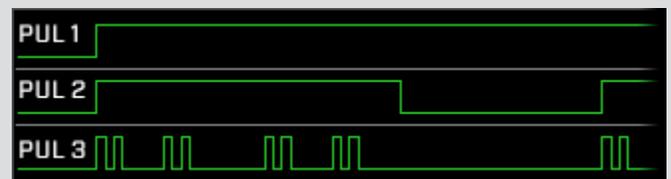
### Behavioral Integration with Python

The Pynapse gizmo fully integrates Python into Synapse by linking hardware events to your custom Python functions for behavioral state control or online analysis, all without leaving Synapse.



### Design Optogenetic Stimulation Protocols

You can precisely define your stimulation paradigm with TDT's Pulse Train Gizmo. Create simple or complex optogenetic stimulation patterns. Use the Gizmo to control LUX LEDs, analog outputs, and digital I/O.



# LUX LEDs and Sensors



Customize your RZ10X for fiber photometry and optogenetics. TDT provides flexibility to easily configure your research rig. The LUX system includes integrated and interchangeable LEDs, Photosensors and Power Meters.

## Integrated LUX LEDs

Select from a wide range of LEDs tailored for fiber photometry and optogenetics. Design the RZ10X for your current research and easily reconfigure with interchangeable LEDs.

### Part Numbers:

LX###: Integrated LED

LX###-HS: Standalone LED including heatsink

LEDs Available in a Range of Wavelengths:

COLOR	PART #	$\Delta$ WL	COMMON FX
UV	Lx405	405	Fiber photometry/ Isosbestic
Violet	Lx415	415	Fiber photometry/ Autofluorescence
Royal Blue	Lx450	450	Optogenetics
Blue	Lx465	465	Fiber photometry/ Optogenetics
Blue-Green	Lx500	500	Optogenetics
Green	Lx530	530	Optogenetics
Lime	Lx560	560	Fiber photometry/ Optogenetics
Amber	Lx590	590	Fiber photometry/ Optogenetics
Red-Orange	Lx615	615	Optogenetics
Red	Lx635	635	
Infrared	Lx850	850	
Infrared	Lx940	940	
White	Lx5K	5000K	





## LUX Photosensor

The PS1 Photosensor is a photodiode that converts light output to voltage. The integrated PS1 has improved sensitivity and is powered directly through the RZ10X.

**Part Numbers:**

**LxPS1:** Photosensor

**Technical Specifications:**

Bandwidth:	DC - 700 Hz
Wavelength Range:	320 nm - 1100 nm
Resolution:	240 fW @ 375 nm, 55 fW @ 900 nm

## LUX Power Meter

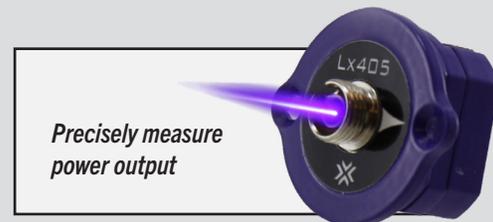
The PM1 Power Meter takes the guess work out of your fiber photometry setup. Prior to recording, measure the power of your rig and optimize your signal. The Fiber Photometry Gizmo displays power output, light loss, and distortion.

**Part Numbers:**

**LxPM1:** Power Meter

**Technical Specifications:**

Bandwidth:	DC - 3000 Hz
Wavelength Range:	320 nm - 1100 nm
Resolution:	36 nW @ 375 nm, 8.2 nW @ 900 nm



## LUX Cable Kit

The LUX Cable Kit has been optimized for 2-color (iso/GCaMP) and 3-color (iso/GCaMP/RCaMP) fiber photometry.

- Small diameter cables connect LEDs to the fiber multiplexer to minimize potential for photobleaching of fluorophores.
- Large diameter cables connect the fiber multiplexer to the PS1 to maximize the fluorophore signal.
- Low autofluorescent cables connect the fiber multiplexer to the Power Meter to measure power output.

**Part Numbers:**

**LxFX-KIT-2C** 2-color fiber cable kit  
**LxFX-KIT-3C** 3-color fiber cable kit

## Other Connections

The M8 connector is for unused analog outputs and can connect and power external LEDs. The BNC connector can convert unused channels to traditional analog outputs and inputs.

**Part Numbers:**

**LxM8:** M8 connector  
**LxBNC:** BNC connector





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