Choosing between *Doric* photometry systems

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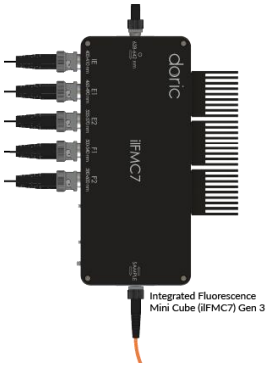
How to choose between *Doric* Photometry systems?

BASIC SYSTEMS

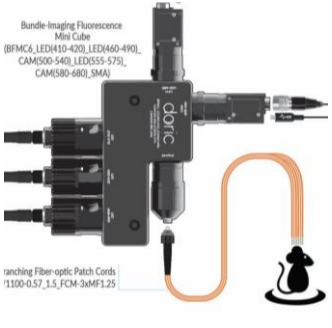
BUNDLE SYTEMS

1. Basic (Gen.1-3)



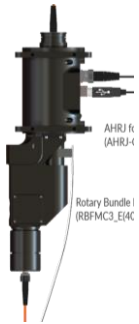
2. Rotary Basic

3. Bundle



4. Bundle with targeted opto

5. Rotary Bundle

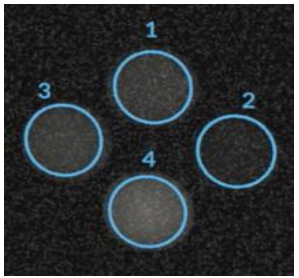


Fiber Photometry

Basic systems

Photodetector

Bundle systems

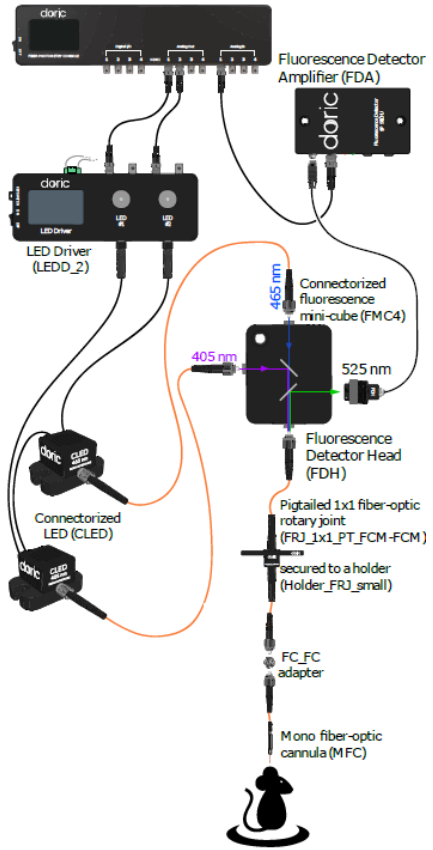


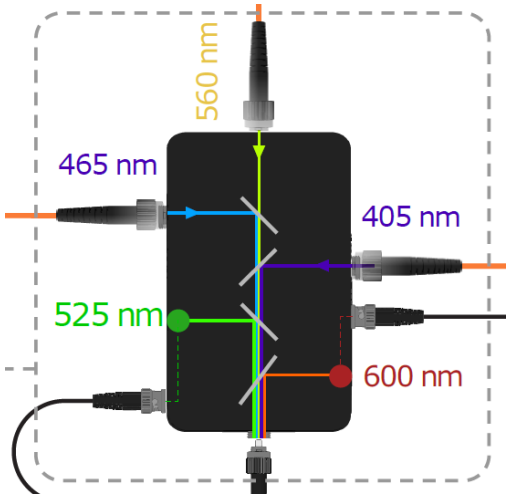
Imaging System

Basic systems

Photodetector

Basic Photometry Systems – gen.1



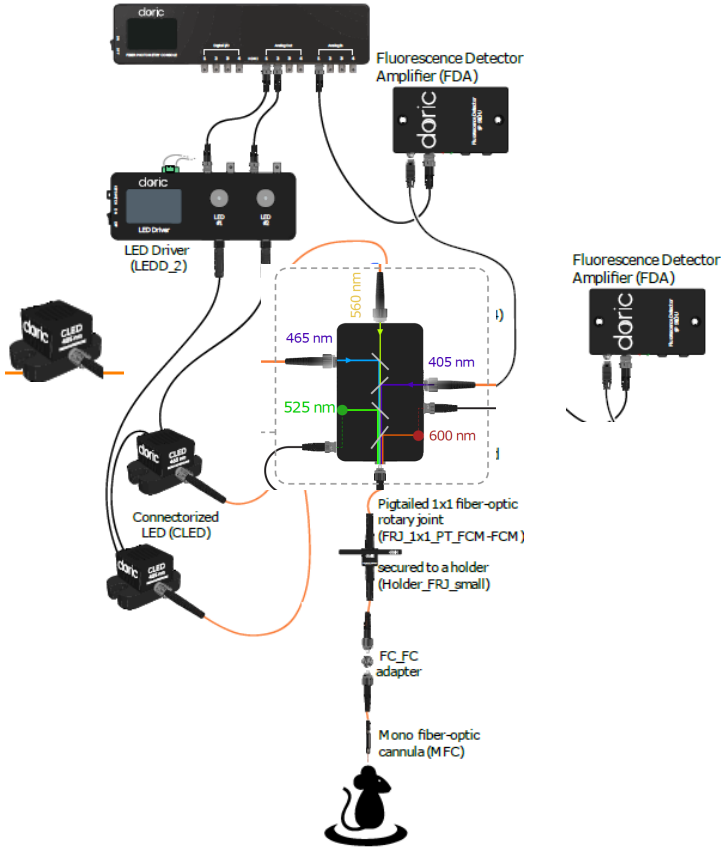


Advantage:

1- or 2-color photometry

Modularity of the system provides great **flexibility** for experimental designs

Basic Photometry Systems – gen.1



<u>Advantage:</u>

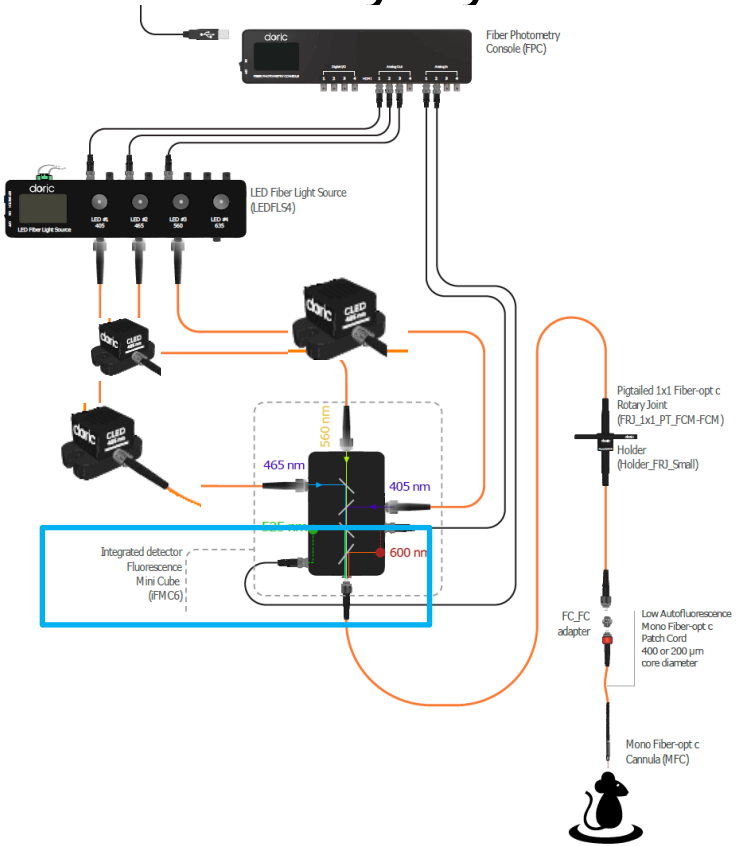
1- or 2-color photometry

Modularity of the system provides great **flexibility** for experimental designs

Compatible with optogenetics **in the same site**

Customization

Basic Photometry Systems – gen.2



Advantage:

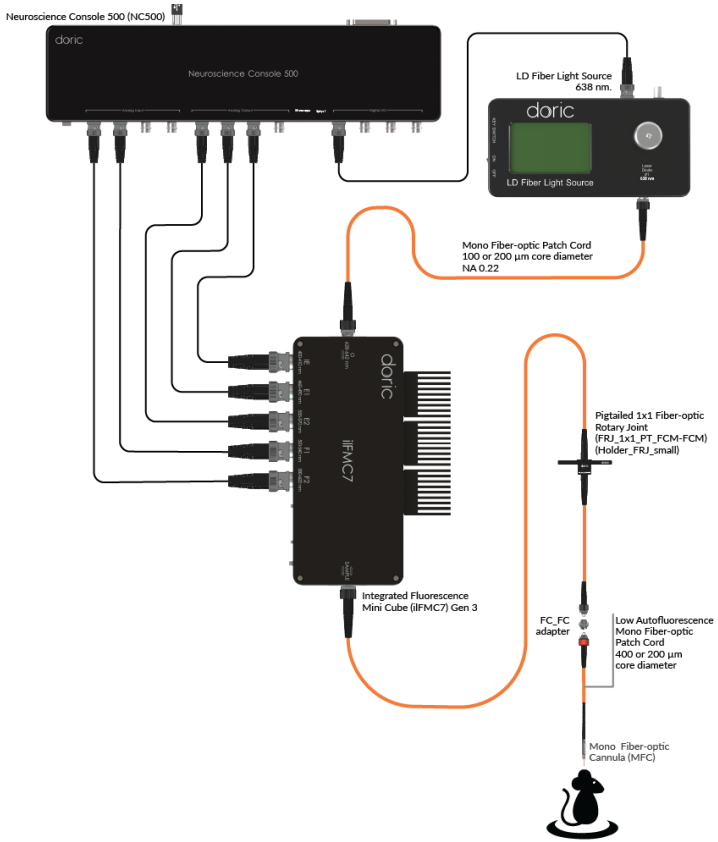
1- or 2-color photometry

Integrated detector provides a **significant signal-to-noise ratio improvement**

Red-shifted (628–642 nm) **optogenetics** in the same site

Moderate flexibility

Basic Photometry Systems – gen.3



Advantage:

1- or 2-color photometry

Integrated *detector* provides a **significant signal-to-noise ratio improvement**

Red-shifted (628–642 nm) optogenetics in the same site

Integrated *LED Driver* and *LEDs* for a **compact form factor** & simplicity

Basic Photometry Cube Comparison (gen.1 - gen.3)

	FMC	iFMC		iiFMC		
	GEN 1 2015	GEN 1 2018	GEN 2 2020	GEN 1 2018	GEN 2 2020	GEN 3 2022
						
High-quality optics & Spectral filtering	✓	✓	✓	✓	✓	✓
Integrated detector for higher sensitivity		✓	✓	✓	✓	✓
Integrated amplifier to simplify system			✓		✓	✓
Integrated LED with adjustable power				✓	✓	✓
Integrated LED & driver to simplify the system						✓
Availability	✓	On custom request	✓	On custom request	On custom request	✓

Basic Photometry Systems – rotary joints

FRJ_1x1_PT
(passive)

FRJ_2x2_PT
(passive; rats)

AFRJ_2x2_PT
(motorized; mice)

Advantage:

Reduce cable tension & **disruption** to animal for more robust behavior measures

2x2 prevents optic cables from tangling

Useful for **long photometry** recordings (> hours – days)

Use with any Basic system

Basic Photometry Systems – rotary joints

FRJ_1x1_PT
(passive)

FRJ_2x2_PT
(passive; rats)

AFRJ_2x2_PT
(motorized; mice)

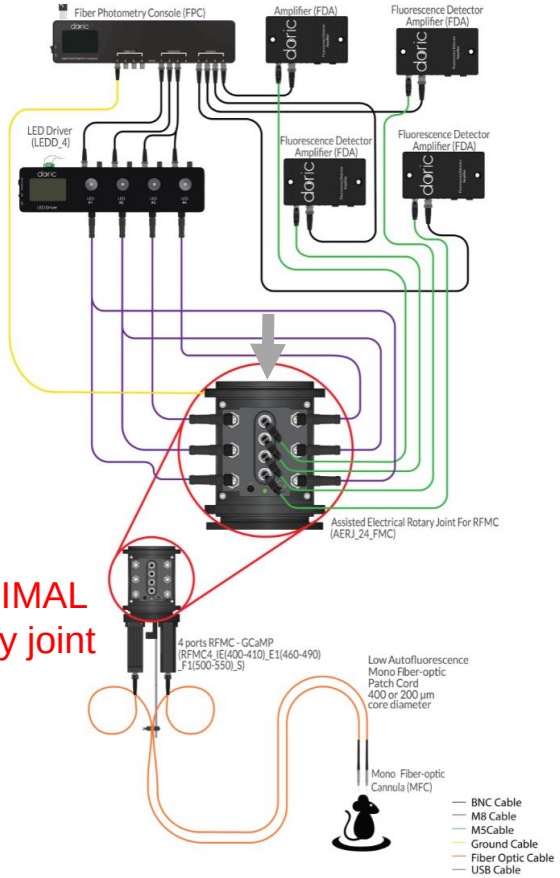
Limitation:

Rotation of the joints leads to small fluorescent variations in the signal.

While this added variation is much **smaller than the signal of interest** (under 3% of peak-to-peak signal) and can **be removed post-processing**, interest in abolishing this variation led us to develop:

Rotary Basic Photometry System

Rotary Fiber Photometry System



ONE ANIMAL
per rotary joint

Advantage:

2 x 1- or 2-color photometry

Integrated *detector* provides **significant signal-to-noise ratio improvement**

Integrated *LEDs, mini cube*, and *detector* on the rotary joint itself to **abolish rotational variation**

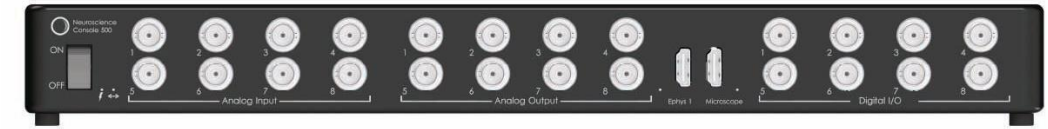
Central channel can be used for either:

- 3rd (independent) **optogenetic** site
- **Fluid delivery**

Basic Photometry Console Comparisons

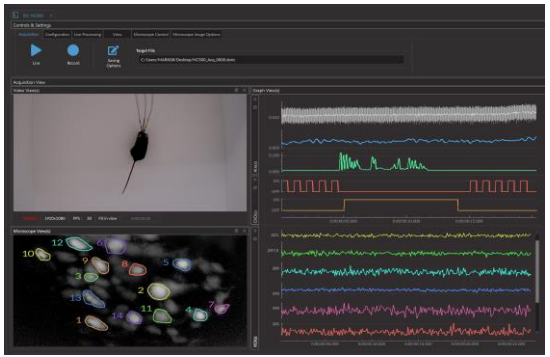
Fiber Photometry Console (FPC)

Neuroscience Console 500 (NC500) NEW!



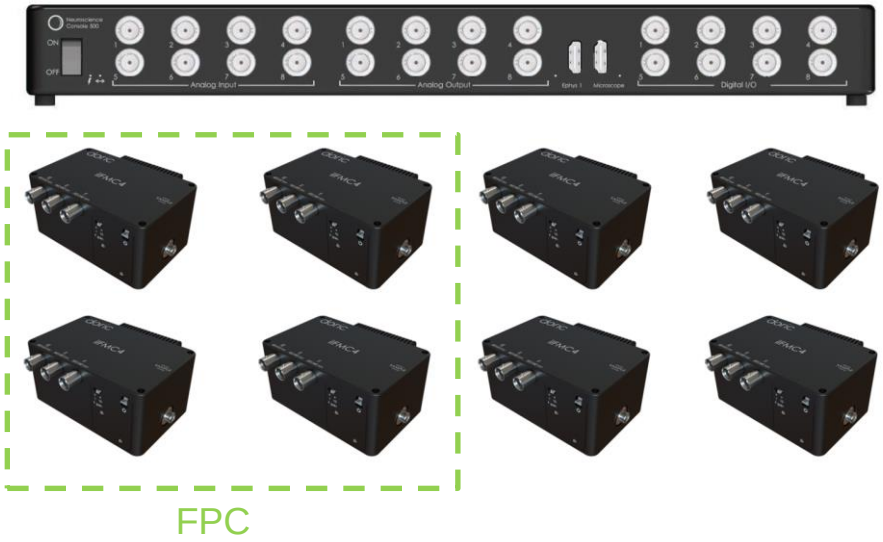
NC500 >> double FPC ports, allowing recordings with:

- Microscopy & Ephys ports
- Visualize and record optogenetics, fiber photometry, microscopy and ephys **in a single interface**

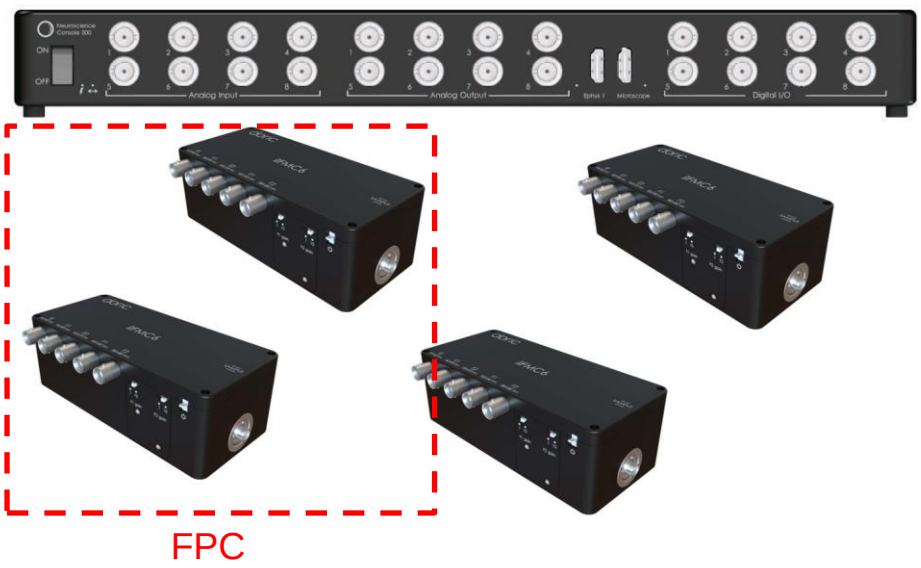


The NC500 supports many more animals / sites in parallel

8 x 1-color



4 x 2-color



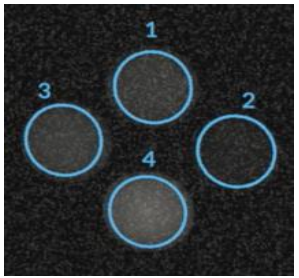
Fiber Photometry

Basic systems

Photodetector

High temporal resolution
1000 Hz captures events < 1 sec

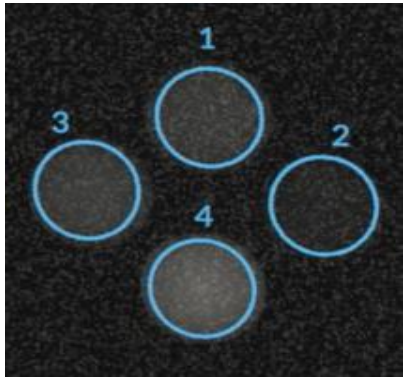
Bundle systems



Imaging System

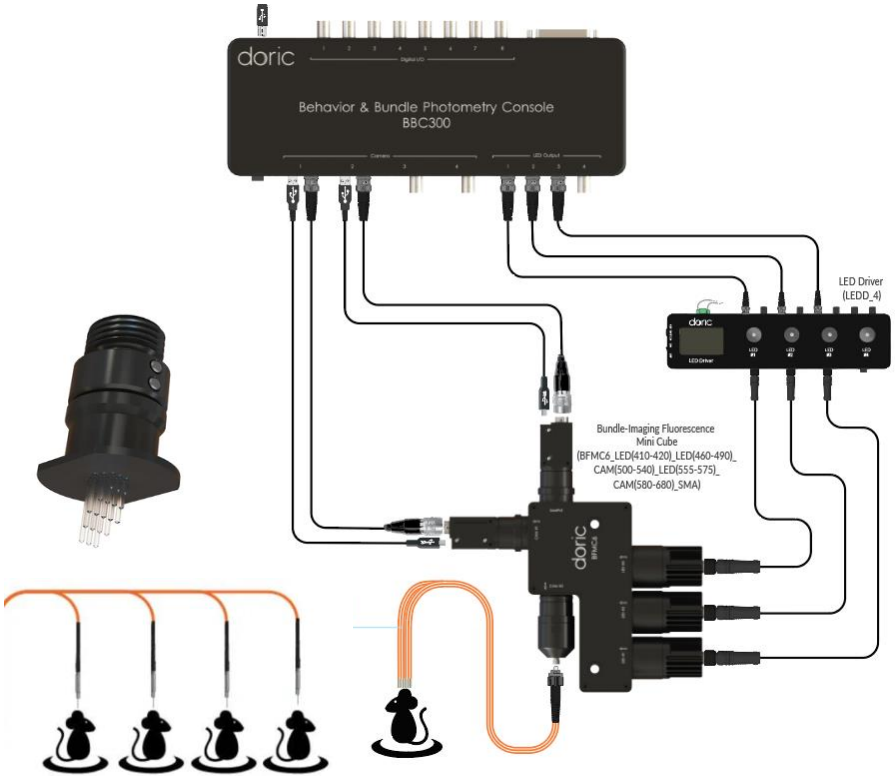
Moderate temporal resolution
20 Hz captures events > 1 sec

Bundle Photometry



Imaging System

Bundle Fiber Photometry Systems – Gen.2



Advantage:

Use the **same** LEDs and detectors for **all** photometry sites, which **decreases cost per site**

Compatible with *High-density cannula* for **multi-site** photometry

Interchangeably compatible with both ***bundle*** and ***branching*** patch cords

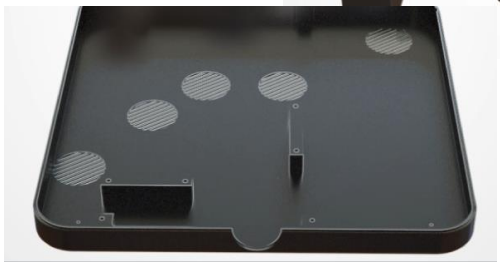
Increase data collection **efficiency**

Bundle Fiber Photometry Systems – Gen.3

Advantage:

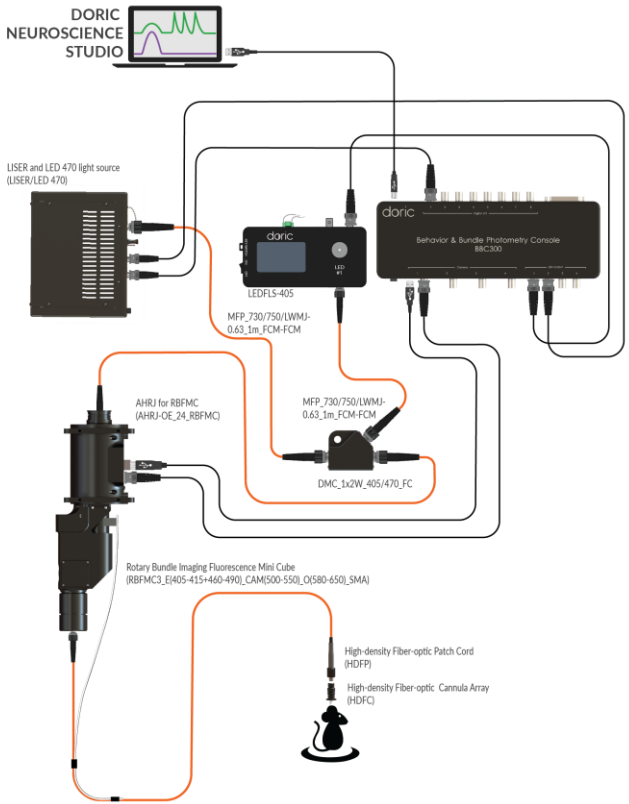
Integrates the console, *LED Driver*, *LEDs*, and optical components for a **compact form factor** and **simplicity**

Gen.2



Gen.3

Rotary Bundle Photometry System



Advantage:

Use the **same** LEDs and detectors for **all** photometry sites, which **decreases cost per site**

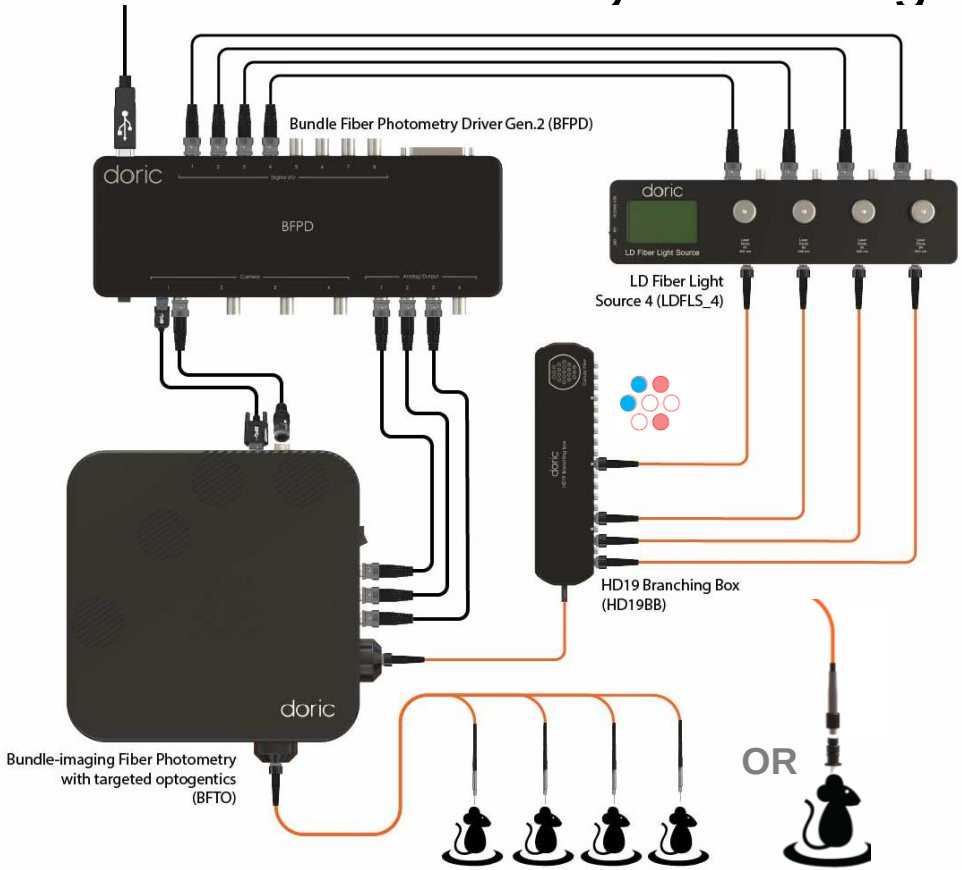
Compatible with *High-density cannula* for **multi-site** photometry

Integrated *detector* on the rotary joint itself to **abolish rotational variation**

Red-shifted **optogenetics** on all sites

NEW!

Bundle Photometry with Targeted Optogenetics (BFTOS)



Advantages:

Use the **same** LEDs and detectors for **all** photometry sites, which **decreases cost per site**

Compatible with *High-density cannula* for **multi-site** photometry (HD7, 9 or 19)

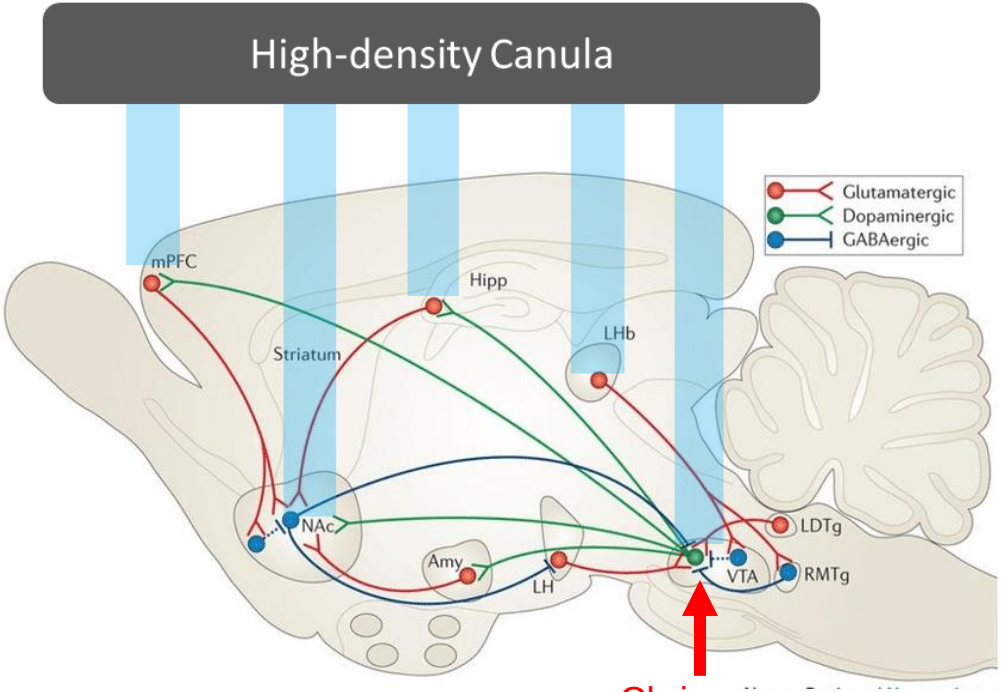
Interchangeably compatible with both ***Bundle*** and ***Fan out*** patch cords

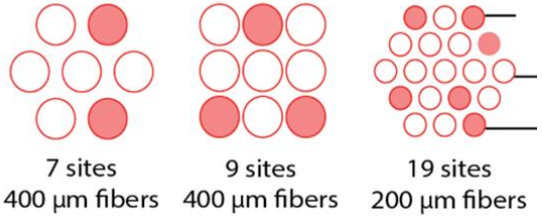
Targeted optogenetics on all sites

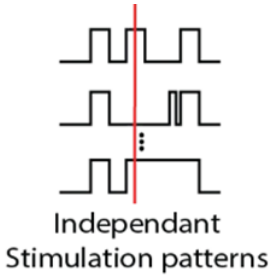
Best experiment **flexibility**

NEW!

Examine **neural dynamics** of entire **brain circuits** during freely moving behaviors







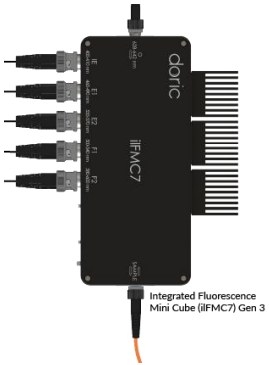
(Russo & Nestler, Nature Reviews Neuroscience, 2013)

How to choose between *Doric* Photometry systems?

BASIC SYSTEMS

High temporal resolution

1. Basic (Gen.3)

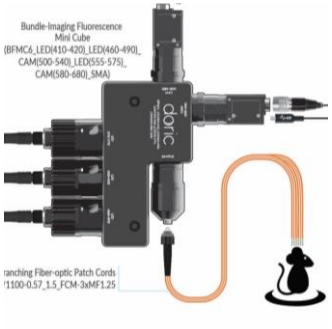


2. Rotary Basic

BUNDLE SYTEMS

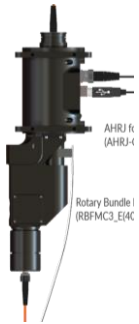
Moderate temporal resolution

3. Bundle



4. Bundle with targeted opto

5. Rotary Bundle



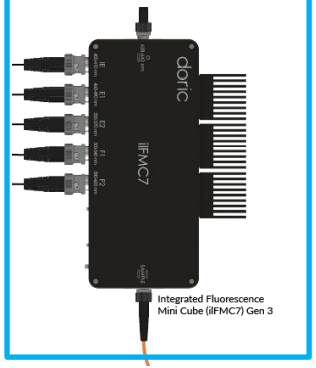
How to choose between *Doric* Photometry systems?

BASIC SYSTEMS

BUNDLE SYTEMS

Best option for a **small number** of animals / sites
- **Short duration** freely moving or **Head-fixed** animals

1. Basic (Gen.3)

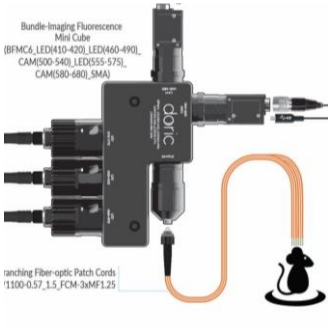


1-2 sites / animal

Opto (red-shifted)
at **same** site

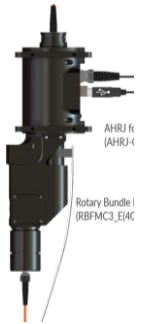
2. Rotary Basic

3. Bundle



4. Bundle with targeted opto

5. Rotary Bundle



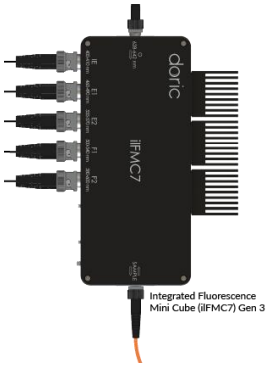
How to choose between *Doric* Photometry systems?

BASIC SYSTEMS

BUNDLE SYTEMS

Best option for a **single, freely moving** animal (limited opto):
- **Long experiments** (hours / days)

1. Basic (Gen.3)

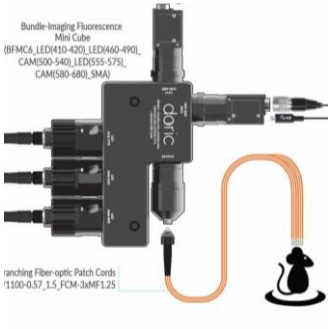


2. Rotary Basic

1-2 sites

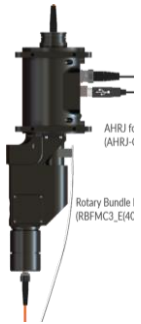
Opto only for a **different** site

3. Bundle



4. Bundle with targeted opto

5. Rotary Bundle



3+ sites

Red-shifted Opto on **ALL** sites

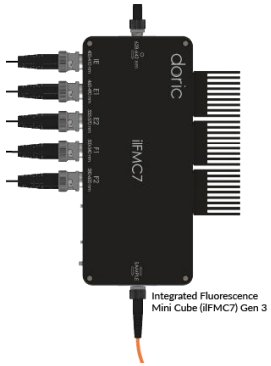
How to choose between *Doric* Photometry systems?

BASIC SYSTEMS

BUNDLE SYTEMS

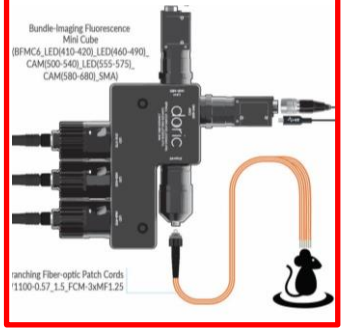
Best option for a **multiple** animals and/or sites:
- **Short duration** freely moving or **Head-fixed** animals

1. Basic (Gen.3)



2. Rotary Basic

3. Bundle

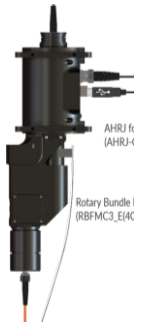


Photometry ONLY

4. Bundle with targeted opto

Combine with **Targeted Opto**

5. Rotary Bundle



How to choose between *Doric* Photometry systems?

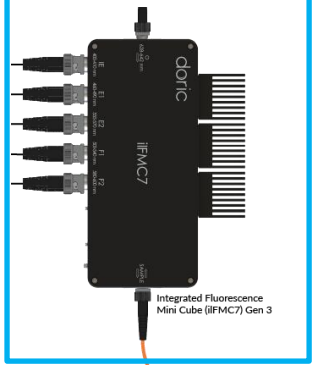
BASIC SYSTEMS

High temporal resolution

Small number of animals

Single, freely moving animal

1. Basic (Gen.3)



1-2 sites / animal

Opto (red-shifted) for **same** site

2. Rotary Basic

1-2 sites

Opto for a **different** site

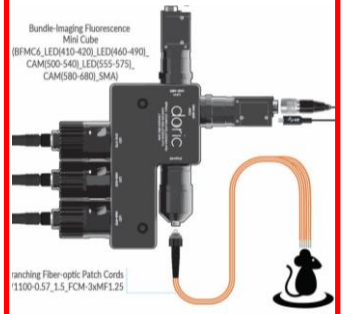
BUNDLE SYTEMS

Moderate temporal resolution

Multiple animals

Single, freely moving animal

3. Bundle



3+ sites

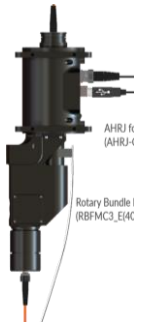
Photometry ONLY

4. Bundle with targeted opto

3+ sites

Combine with **Targeted Opto**

5. Rotary Bundle



3+ sites

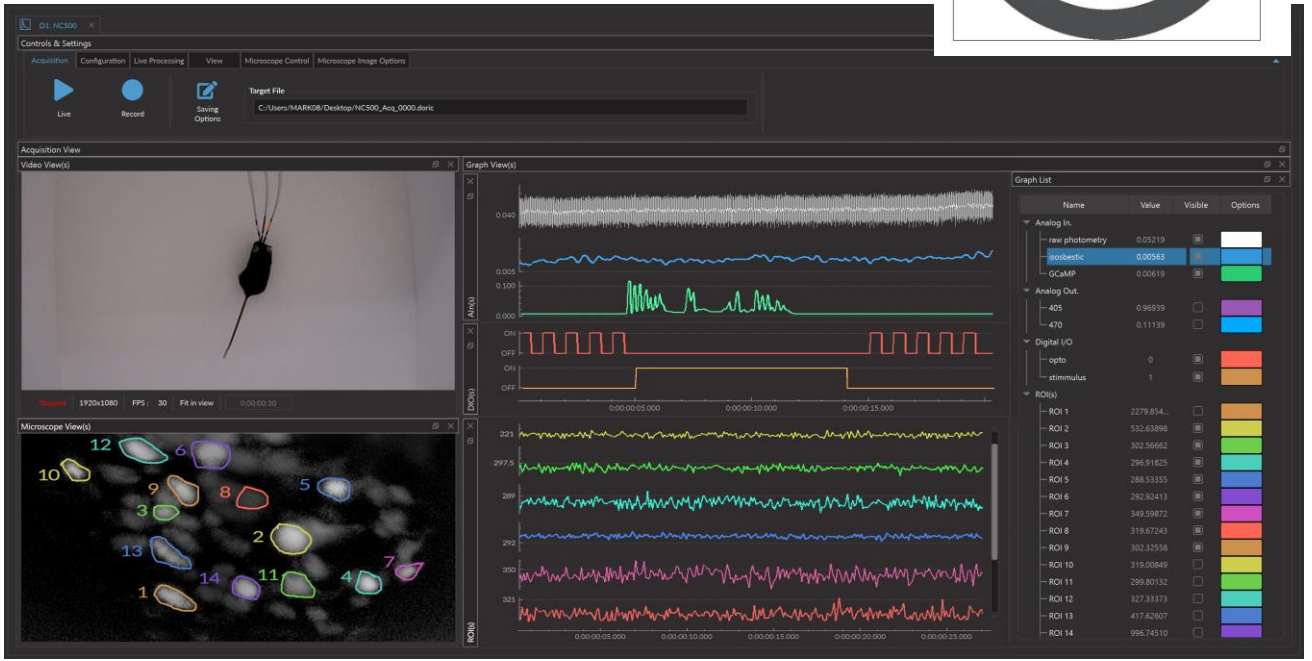
Opto on **ALL** sites

Doric Neuroscience Studio V6

All *Doric* photometry systems come with FREE ***Doric Neuroscience Studio*** s

- Simple and easy to use!
- **Visualize** Photometry & Behavior together
- *Analyzer Plugins* for **basic data processing**:
  - Calculate dF0/F
  - Find spikes
  - Animal Tracking

DOWNLOAD HERE



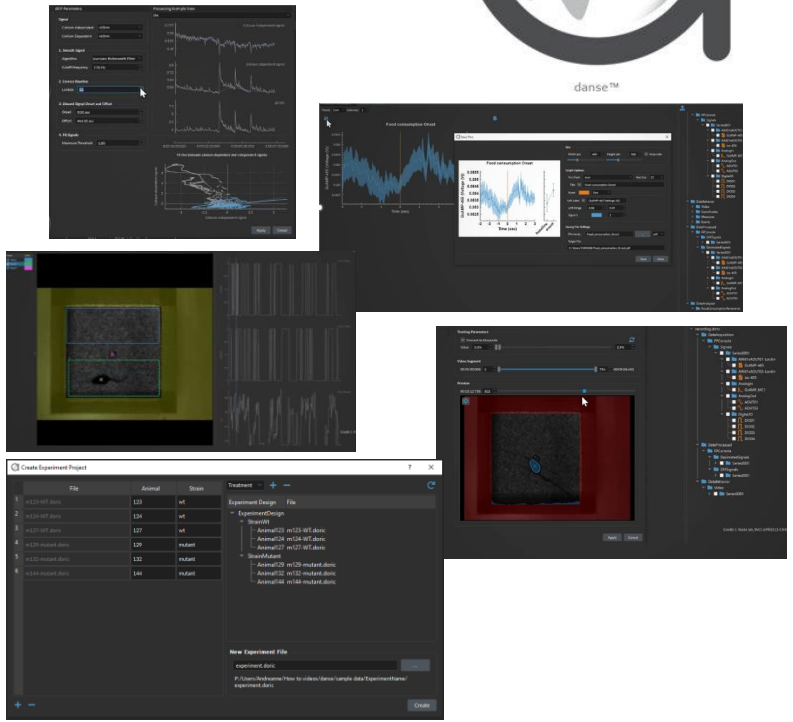
NEW!

All *Doric* photometry systems are compatible with *danse*™ **data analysis software**

Download *danse*™

Process & Analyze microscopy, photometry and behavior data with **NO coding required**, including:

- **Basic processing** (Remove artifacts, Decimate, DF/F0, Find spikes, etc.)
- **Import stimuli/behavior measures** and **videos** from other devices (CSV files, Anymaze, Ethovision, etc.) to **combine with neural data**
- **Calculates behavior measures** (Animal tracking, Animal presence in zones, Animal distance from points, Speed, Motion score, etc.)
- **Creates** and **export plots** (e.g. Peri-event histograms)
- **Records all parameters** used in each processing/analysis operation
- Test different parameters for the same operation
- **Batch processing** applies operations/parameters to many recordings
- Combine recordings of many animals/conditions to **analyze experiments**
- **Simplify data storage**: 1 recording = 1 file (including settings, raw, processed, and analyzed data & figures)
- Growing library of **tutorial videos**



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