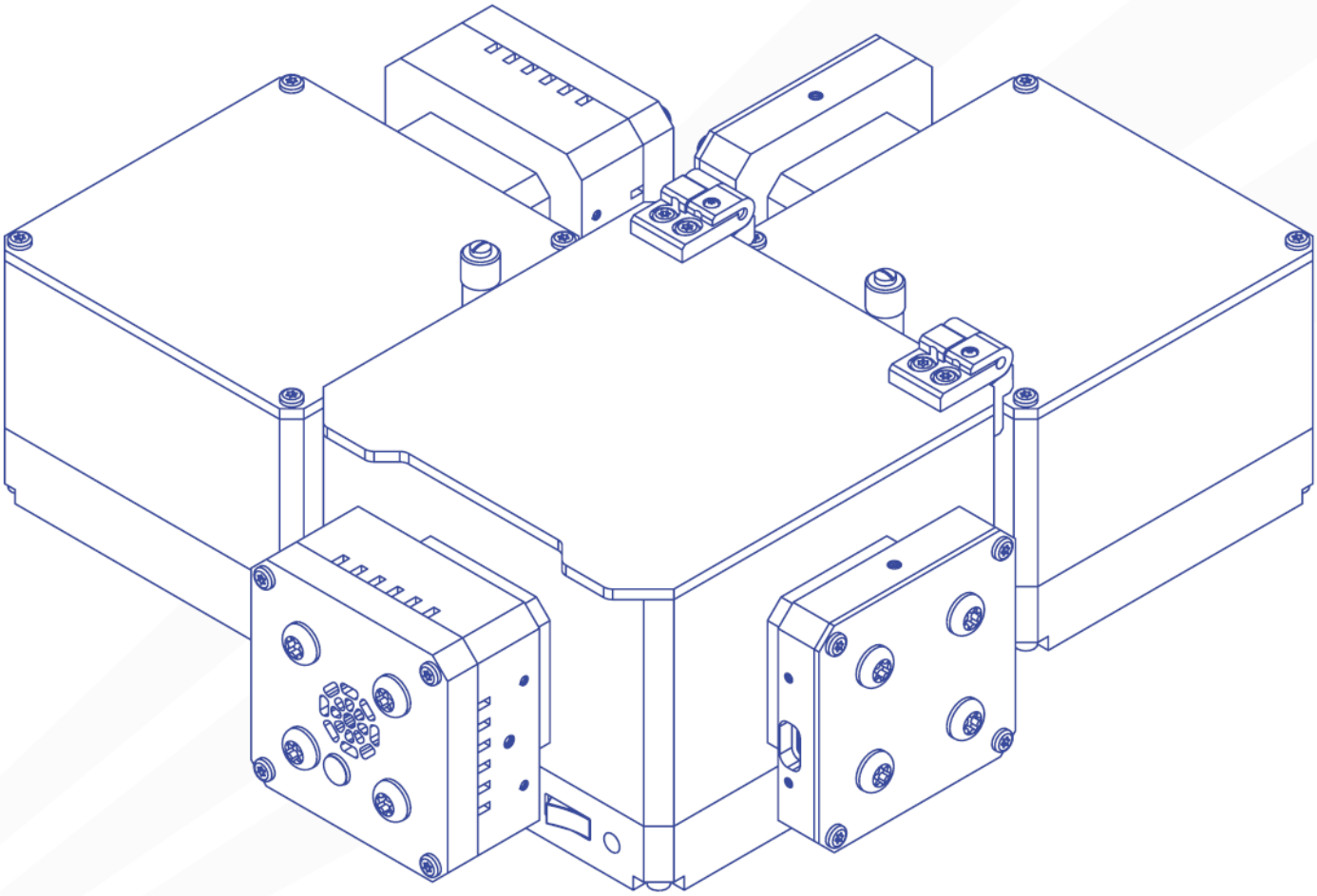
Ossila
enabling science

SPECTROFLUOROMETER
USER MANUAL

Manual version: 1.0.0
Product code: G3000A1
Product Version: 1.0



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Contents

1. EU Declaration of Conformity

We

Company Name: Ossila BV

Postal Address: Biopartner 3 building, Galileiweg 8

Postcode: 2333 BD Leiden

Country: The Netherlands

Telephone number: +31 (0)718 081020

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declare that the DoC is issued under our sole responsibility and belongs to the following product:

Product: Spectrofluorometer (G3000A), Spectrophotometer (G3000B)

Serial number: G3000xx-xxxx

Object of declaration:

Ossila Spectrofluorometer/ Spectrophotometer (**G3000x**)

The object of declaration described above is in conformity with the relevant Union harmonisation legislation:

EMC Directive 2014/30/EU

RoHS Directive 2011/65/EU

The following harmonised standards and technical specifications have been applied:

IEC 62471:2006 Photobiological safety of lamps and lamp systems

Signed:

Name: Dr James Kingsley

Place: Leiden

Date: 04/03/2026

Декларация за съответствие на ЕС
Производител: Ossila BV, Biopartner 3 building, Galileiweg 8, 2333 BD Leiden, NL.
Декларира с цялата си отговорност, че посоченото оборудване съответства на приложимото законодателство на ЕС за хармонизиране, посочено на предходната(-ите) страница(-и) на настоящия документ.

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2. Safety

2.1 Use of Equipment

The Ossila Spectrofluorometer is designed to be used as instructed. It is intended for use under the following conditions:

- Indoors in a laboratory environment (Pollution Degree 2).
- Altitudes up to 2000 m.
- Temperatures of 5°C to 40°C; maximum relative humidity of 80% up to 31°C.

The unit is supplied with a 24 VDC power adapter, in accordance with European Commission regulations and British Standards. Use of any other electrical power cables, adaptors, or transformers is not recommended.

2.2 Hazard Icons

The following symbols can be found at points throughout the rest of the manual. Note and read each warning before attempting any associated operations associated with it:

Table 2.1. Hazard warning labels used in this manual.

Symbol	Associated Hazard
	Electrical shock
	Optical radiation
	Ultraviolet radiation

2.3 Power Cord Safety

Emergency power disconnection options: use the power cord as a disconnecting method and remove from wall. To facilitate disconnect, make sure the power outlet for this cord is readily accessible to the operator.

2.4 Optical Hazards

The Ossila Spectrofluorometer emits intense optical radiation in the ultraviolet, visible, and infrared regions of the electromagnetic spectrum. The device has been assessed according to IEC 62471:2006 (Photobiological safety of lamps and lamp systems) and assigned to Risk Group 3.

2.5 Servicing

If servicing is required, please return the unit to Ossila Ltd. The warranty will be invalidated if:

- Modification or service has been carried out by anyone other than an Ossila engineer.
- The Unit has been subjected to chemical damage through improper use.
- The Unit has been operated outside the usage parameters stated in the user documentation associated with the Unit.
- The Unit has been rendered inoperable through accident, misuse, contamination, improper maintenance, modification, or other external causes.

2.6 Health and Safety – Servicing

Servicing should only be performed by an Ossila engineer. Any modification or alteration may damage the equipment, cause injury, or death. It will also void your equipment's warranty.

3. Requirements

Table 3.1 details the requirements for the Ossila Spectrofluorometer, and the minimum computer specifications for the Spectrophotometry software.

Table 3.1. Ossila Spectrofluorometer requirements.

Power	24 VDC
Operating Systems	Windows 11 (64-bit)
Processor	Dual Core 2 GHz
Memory	8 GB
Storage	270 MB
Monitor Resolution	1920 x 1080
Connectivity	USB-C 2.0

4. Unpacking

4.1 Packing List

The standard items included with the Ossila Spectrofluorometer are:

- The Ossila Spectrofluorometer.
- 24 VDC power adaptor.
- USB-C cable.
- USB memory stick loaded with software installer and user manual.

Figure 4.1. Ossila Spectrofluorometer.

4.2 Damage Inspection

Examine the components for evidence of shipping damage. If damage has occurred, please contact Ossila directly for further action. The shipping packaging will come with a shock indicator to show if there has been any mishandling of the package during transportation.

5. Specifications

The Ossila Spectrofluorometer specifications are shown in **Table 5.1**.

Table 5.1. Ossila Spectrofluorometer specifications.

Spectral range (broadband)	380 – 1000 nm
Wavelength accuracy	<1 nm (in calibrated range)
Wavelength repeatability	<0.1 nm
UV source wavelength	365±15 nm
Spectral resolution	Slit width dependant
Slit type	Manual – micrometer driven with 10 µm resolution
Slit size	50 µm – 6 mm (W) x 10 mm (H)
Maximum Sample size	75 (W) x 50 (H) x 5 (D) mm
Cuvette size	10 x 10 mm; maximum height 52 mm
Dimensions	280 (L) x 260 (W) x 100 (H) mm
Weight	4.2 kg

6. Installation

1. Connect the 24 VDC power adaptor to the power socket on the sample chamber.
2. Connect the sample chamber to your PC using a USB-C cable.
3. Set the power switches on the light sources and sample chamber to the on position.

7. Spectrofluorometer Parts

Figure 7.1. Ossila Spectrofluorometer with parts labeled.

1	White light source
2	Input monochromator
3	Sample chamber
4	Absorption photodetector (silicon photomultiplier)
5	UV light source
6	Output monochromator
7	Emission photodetector (silicon photomultiplier)

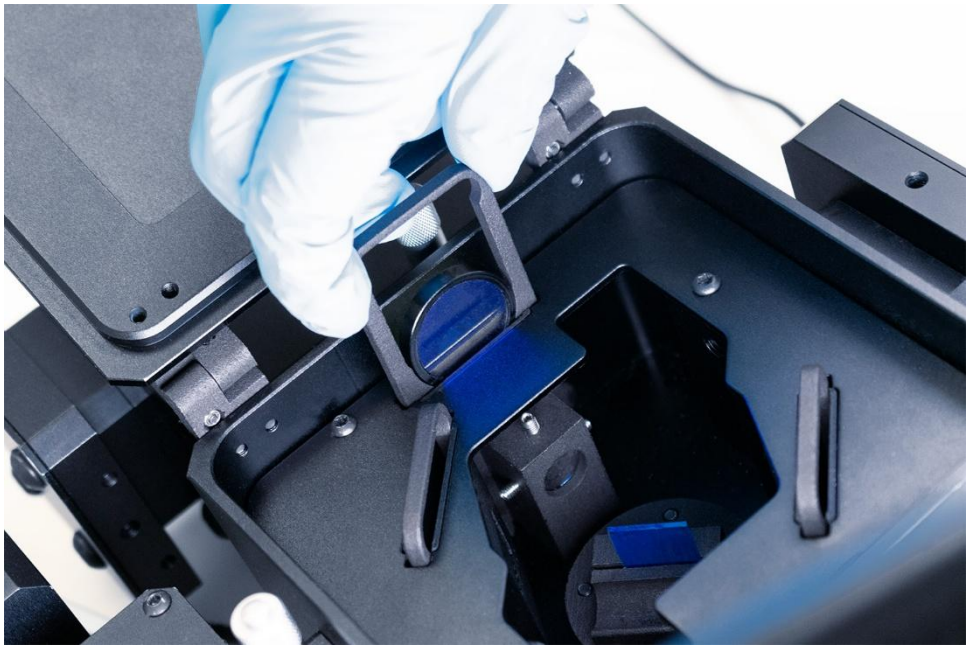

Figure 7.2. Placing a filter in a filter holder.

There are 4 filter holders in the in the sample chamber, one at each input and output. These take standard 25 mm diameter filters. To put a filter in or take a filter out of a holder, simply pull it up by the handle, place the filter in the recess, and push the handle back down.

8. Operation

The Ossila Spectrofluorometer can be controlled either programmatically using serial commands, or through the Ossila Spectrophotometry software.

8.1 Command Library

When connected to a PC, the device will appear as a COM port, to which the serial commands can be sent. This section describes the command protocol and lists the available commands.

8.1.1 Command Format

Commands should be sent to the spectrofluorometer in ASCII format, and responses from the spectrofluorometer will also be in ASCII format.

All commands sent to the spectrofluorometer have a start and end delimiter, < and > respectively. Only commands enclosed by these delimiters will be acknowledged by the device. If any invalid commands are sent between delimiters, the system will return `<Invalid Command>`.

Commands are either set commands with the format `<command value>` or query commands with the format `<command?>`.

Set commands take between 0 and 2 values and each `value` must be separated by a space. If a command is successfully implemented, it will be echoed back.

Query commands allow the user to find current system settings without modifying them. If a query command is successfully interpreted, the system will return `<command value>`.

Set commands that have a corresponding query command list both commands together. In these cases, the set command `value` and query command return `value` have the same format.

`Values` will be one of the following types depending on the command:

- `float` – Floating-point number
    I. These can be sent in scientific notation (for example, 123e4 or 123E4).
- `int` – Integer
    I. If a floating-point number is sent instead, it will be rounded down to an integer.
- `bool` – Boolean (0 or 1)
    I. Non-zero integers or floating-point numbers will be interpreted as 1.
- `str` – String
    I. Only used as returns in some query commands.

8.1.2 Monochromator Commands

Monochromator commands and responses are prefixed with `MCX` where ***X*** is **1** for the input monochromator and **2** for the output monochromator. For a list of monochromator commands, see the Ossila Monochromator user manual.

Command	Values	Function
`<MCX command value>`	***X*** – int – monochromator to control	Send a setting command to a monochromator.
`<MCX command?>`	***X*** – int – monochromator to control	Send a query command to a monochromator.

8.1.3 Silicon Photomultiplier Commands

Silicon photomultiplier (SiPM) commands and responses are prefixed with `PDX` where ***X*** is **1** for the absorption detector and **2** for the emission detector. For a list of silicon photomultiplier commands, see the Ossila Silicon Photomultiplier user manual.

Command	Values	Function
`<PDX command>`	***X*** – int –SiPM to control	Send a read command to a SiPM.
`<PDX command value>`	***X*** – int –SiPM to control	Send a setting command to a SiPM.
`<PDX command?>`	***X*** – int –SiPM to control	Send a query command to a SiPM.

8.1.4 Setting Commands

Command	Values/Returns	Function
`<LS1 X>` `<LS1?>`	***X*** – int – power of the light as a percentage	Sets the output power of the broadband white light source.
`<LS2 X>` `<LS2?>`	***X*** – int – power of the light as a percentage	Sets the output power of the UV light source.

8.1.5 Query Commands

Command	Returns	Function
`<device?>`	`<device str>`	Returns the product code of the spectrofluorometer.
`<serial?>`	`<serial int>`	Returns the serial number of the spectrofluorometer.
`<firmware?>`	`<firmware int.int.int>`	Returns the firmware version of the spectrofluorometer in the format `major.minor.patch`.

8.1.6 Example Python Code

```python
# The PySerial library is required to run this example
from serial import Serial


# Create a serial connection to the spectrofluorometer
# A large timeout is used to allow for long SiPM read times at high precisions
with Serial('COM23', timeout=5, write_timeout=5) as SF:

    # Set the power level of the white light source to 20%
    SF.write('<LS1 20>'.encode())
    # The command will be echoed back if successful
    # The response will be in bytes, so it is decoded to a string for printing
    response = SF.readline().decode()
    # The response should be the same as the command sent
    print(f'Light source response: {response}')
    # Reading the response will also clear the read buffer for the next command

    # Set the output wavelength of the input monochromator to 600 nm
    SF.write('<MC1 600>'.encode())
    # As before, the command will be echoed back if successful and the read
    # buffer will be cleared for the next command
    _ = SF.readline()

    # Read the counts from the absorption photodetector
    SF.write('<PD1 read>'.encode())
    # The response includes new line characters, so these are stripped
    response = SF.readline().decode().strip()
    # The echoed command back and the start and end characters are also removed
    counts = response.strip('<>').split()[-1]
    print(f'Absorbance counts: {int(counts)}')
```


8.2 Spectrophotometry

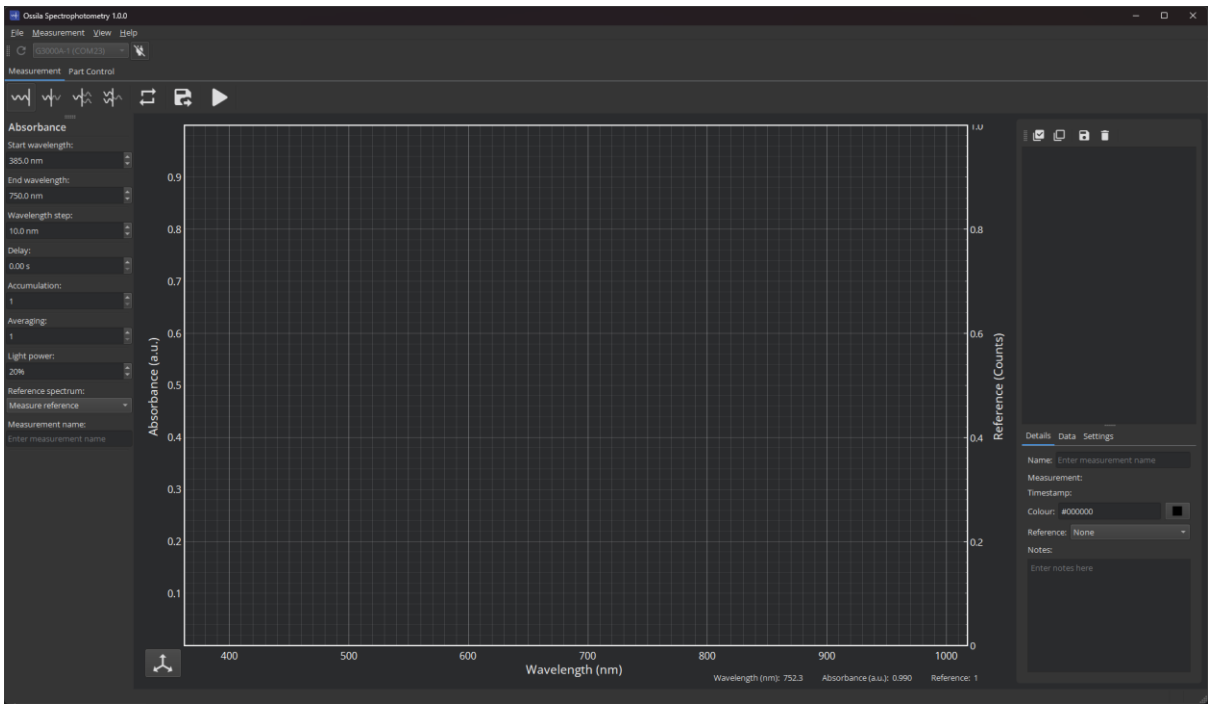

Figure 8.1. Ossila Spectrophotometry.

Ossila provides free software to allow for simple use of the Spectrofluorometer. A Windows installer is provided on the USB drive supplied with the system and can be downloaded from our website at www.ossila.com/pages/software-drivers.

For details on how to use the software, see the Ossila Spectrophotometry user manual.

9. Taking a Measurement

9.1 Absorbance/Transmission

1. Turn on the Spectrofluorometer.
2. Remove any samples from the sample chamber.
3. Set the output power of the **white light source** and **UV light source** to 0%.
4. Read the **absorption photodetector** to get a background measurement.
5. Set the output power of the **white light source** to the desired level.
6. Sweep the **input monochromator** over the desired wavelength range, reading the **absorption photodetector** at each wavelength step to create a reference spectrum.
7. Place your sample in the sample chamber.
8. Sweep the **input monochromator** over the same wavelength range as used for the reference spectrum, reading the **absorption photodetector** at each wavelength step.
9. Subtract the background measurement from each reading of the reference and sample spectra.
10. Perform the appropriate calculations for absorbance or transmission using the reference and sample spectra.

The Spectrophotometry software automatically performs background readings and absorbance/transmission calculations when taking measurements.

9.2 Fluorescence Emission

1. Turn on the Spectrofluorometer.
2. Set the output power of the **white light source** and **UV light source** to 0%.
3. Place your sample in the sample chamber.
4. Read the **emission photodetector** to get a background measurement.
5. Depending on which light source you are using:
    I. **UV light source** – set it to the desired power level.
    II. **White light source** – set it to the desired power level and set the **input monochromator** to the excitation wavelength.
6. Sweep the **output monochromator** over the desired wavelength range, reading the **emission photodetector** at each wavelength step.
7. Subtract the background measurement from each reading of the sample spectrum.

If you want to take a reference measurement, simply use the same procedure and then subtract it from your sample's spectrum.

The Spectrophotometry software automatically performs background readings when performing measurements.

9.3 Fluorescence Excitation

1. Turn on the Spectrofluorometer.
2. Set the output power of the **white light source** and **UV light source** to 0%.
3. Place your sample in the sample chamber.
4. Read the **emission photodetector** to get a background measurement.
5. Set the output power of the **white light source** to the desired level.
6. Set the **output monochromator** to the desired measurement wavelength.
7. Sweep the **input monochromator** over the desired wavelength range, reading the **emission photodetector** at each wavelength step.
8. Subtract the background measurement from each reading of the sample spectrum.

If you want to take a reference measurement, simply use the same procedure and then subtract it from your sample's spectrum.

The Spectrophotometry software automatically performs background readings when performing measurements.

9.4 Second Order Effects

As the spectrofluorometer uses a grating monochromator to select wavelengths, second order effects occur and can impact your measurement. Second order effects occur where a monochromator's output wavelength is double the wavelength also produced by the light source. For example, if a monochromator can output at 400 nm and 800 nm, when the output is set to 800 nm, there will be second order effects from the 400 nm dispersed light. In these situations, both signals from the 800 nm first order light and the 400 nm second order light will be combined in the output. However, the second order 400 nm signal will be at a lower power than when the monochromator is selecting the 400 nm first order signal.

To avoid second order effects, you need to select a wavelength range that does not cover any wavelengths that are double any other wavelengths in the range. For example, to measure the absorbance between 380 nm and 1000 nm, you would need to do two measurements: the first between 380 nm and 750 nm and the second measurement between 750 nm and 1000 nm.

Additionally, if measurements do overlap into the second order, a filter should be used to prevent the second order light from illuminating the sample. In the previous example, a 750 nm long pass filter can be used to prevent second order signals.

10. Troubleshooting

Most of the issues that may arise will be detailed here. However, if you encounter any issues that are not detailed here, then contact us by email at info@ossila.com. We will respond as soon as possible.

Problem	Possible Cause	Action
No power/display	The power supply may not be connected properly.	Ensure the system is firmly plugged into the power supply, and that the plug is connected to both the adaptor and a working power socket.
	The power supply adaptor has a fault.	Contact Ossila for a replacement power supply adaptor.
Software does not start	The wrong version of Windows is installed on the computer.	Install the software on a computer with Windows 11.
	The software has not installed properly.	Try reinstalling the software.
Cannot connect to the system via USB	The USB cable may not be connected properly.	Ensure the USB cable is firmly plugged in at both ends.
	The USB cable may not be connected to a working USB port.	Try connecting the unit to a different USB port on the computer.
	The USB drivers may not be installed or may not have installed properly.	Try installing or reinstalling the USB drivers. If the drivers on the USB provided are not working, try following the Windows 7 installation instructions found in the Installation Guide.
	The USB cable is defective.	Try using a different USB-B cable, contact Ossila if necessary.
No signal from the photodetectors	The light sources are not switched on.	Turn the light sources on.
	The slits are completely closed.	Open the appropriate slit.

11. Related Products

Sapphire Substrates

Highly optically transparent substrates ideal for spectroscopic measurements.

Product codes: S2005

Optical Filters

Longpass and shortpass filters in a range of wavelengths.

Product code: G2103 / G2104 / G2105

Quartz Cuvettes

UV and IR Quartz Cuvettes for spectrophotometric setups to measure the optical properties of solvents and solutes.

Product codes: C2003 / C2004 / C2021

Substrate Cleaning Rack

Holds 20 substrates for a variety of processing techniques.

Product code: E101

USB Spectrometer

Fully programmable, compact UV-Vis-NIR optical spectrometer.

Product code: G2001A1 / G2001B2

USB LED Light Source Set

USB powered light sources in a range of wavelengths from UV to IR.

Product codes: G2011 / G2012