OXFORD INSTRUMENTS

ANDOR
an Oxford Instruments company

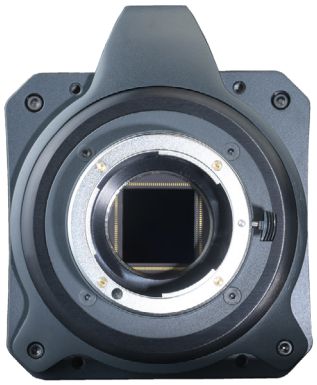
Sona

sCMOS

Configure Sona with Micro-Manager

andor.com

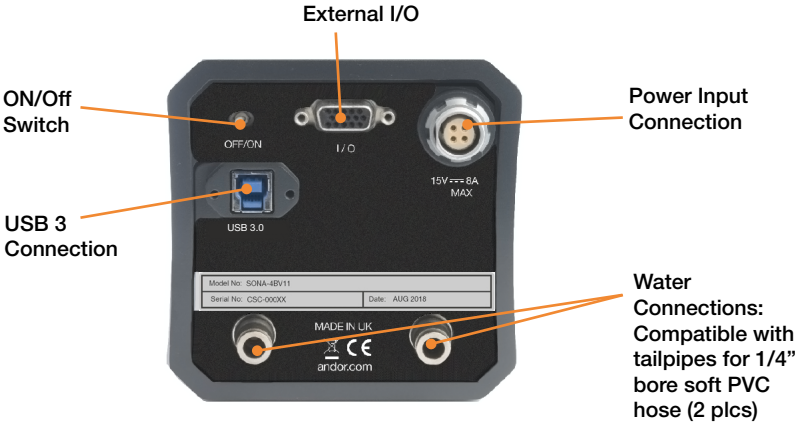
Sona with Micro-Manager



This document describes integration of **Sona 4.2B-11 or Sona 2.0B-11 with Micro-Manager**, which includes installation of the Andor Driver Pack 3.

Micro-Manager has supported Sona (4.2B-11 and 2.0B-11) since September 2018.

Sona Connectivity



USB 3 Connection

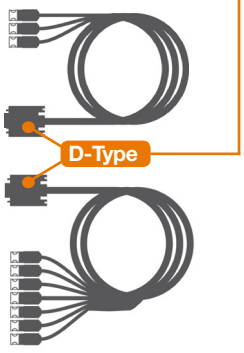
USB 3 connection (USB 3.1) provides a robust high speed connection to the control PC.

USB3 Cable

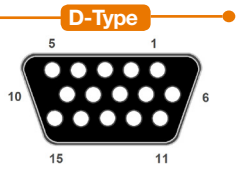
External I/O: TTL / Logic

The TTL/Logic connection permits connection to other devices for synchronisation and control of fire, trigger and shutter operations. Option of 3-way or 7-way cable type.

Connector type: D-type to BNC cable Fire (Output), External Trigger (Input), ARM.



I/O Cable (3 or 7-way)



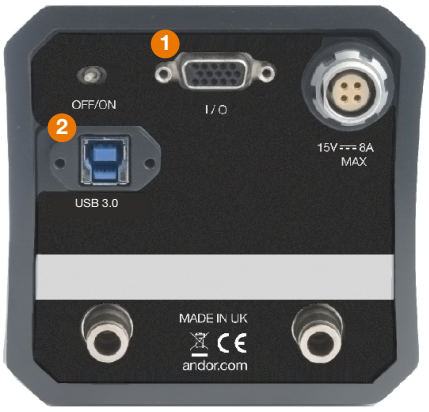
Pinouts for the 15-way D-type connector

Pin	3-way cable	7-way cable
1	ARM	ARM
2	AUX_OUT_1	AUX_OUT_1
3	Reserved	FIRE n
4	Reserved	FIRE
5	Reserved	AUX_OUT_2
6	Ground	Ground
7	External Trigger	External Trigger
8	Reserved	Spare
9	Reserved	Reserved
10	Reserved	Reserved
11	Reserved	Reserved
12	Reserved	Reserved
13	Reserved	Reserved
14	Reserved	Reserved
15	Reserved	Reserved

Please see your Sona Hardware Guide for more information on connectivity

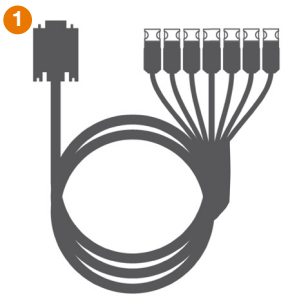
Sona with Micro-Manager

Setup



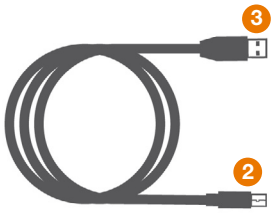
Sona back panel

+



I/O Cable
(3 or 7-way)

+



USB3 Cable

+

StarTech PEXUSB3S25
USB3 card in hp Z440.

Part 1 Install the latest Micro-Manager build

1 Install Micro-manager 2.0 beta nightly from here: https://micro-manager.org/wiki/Version_2.0#Downloads

Version 2.0

Micro-Manager 2.0 is a major step forwards compared to the 1.4 series that preceded it. The user interface (UI) has been overhauled, especially with respect to the image display window. The API has also been completely reworked, allowing for more powerful scripts and plugins. This was all enabled by a new internal data model for working with images and image metadata.

This page serves as a "hub" for various other pages related to Version 2.0.

Contents

- 1 Downloads
- 2 Contributing to MM2.0
- 3 API
- 4 API Events
- 5 Other Documentation

Downloads

Beta nightly builds: Windows | Mac OS X

2.0.0-beta2 (obsolete) Windows 32-bit | Windows 64-bit | Mac OS X (Note: there is no 2.0.0-beta1.)

Alpha nightly builds (obsolete): Windows | Mac OS X)

Current source code on GitHub: mm2 branch

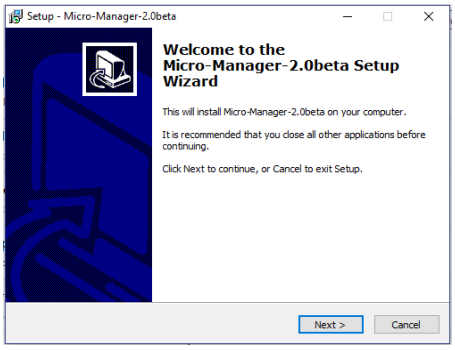
Contributing to MM2.0

How to debug and develop MM2.0

Index of /~MM/nightlyBuilds/2.0.0-beta/Windows

Name	Last modified	Size	Description
Parent Directory		-	
MMSetup_64bit_2.0.0-beta3_20190228.exe	28-Feb-2019 23:01	70M	
MMSetup_32bit_2.0.0-beta3_20190228.exe	28-Feb-2019 23:01	68M	
MMSetup_64bit_2.0.0-beta3_20190227.exe	27-Feb-2019 23:02	70M	
MMSetup_32bit_2.0.0-beta3_20190227.exe	27-Feb-2019 23:02	68M	
MMSetup_64bit_2.0.0-beta3_20190226.exe	26-Feb-2019 23:00	70M	
MMSetup_32bit_2.0.0-beta3_20190226.exe	26-Feb-2019 23:00	68M	
MMSetup_64bit_2.0.0-beta3_20190225.exe	25-Feb-2019 23:00	70M	
MMSetup_32bit_2.0.0-beta3_20190225.exe	25-Feb-2019 23:00	68M	

2 Follow the setup wizard steps:



Notes

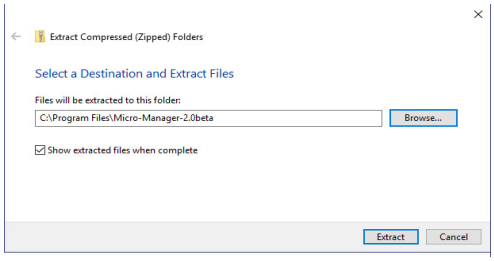
1. The latest build will be at the top of the list. Example here shows build for 28-Feb-2019
2. Admin rights are required to run the executable file
3. The Micro-Manager install file directory path is needed for Part 2

Sona with Micro-Manager

Part 2 Install the Andor Driver Pack 3

1 Download the following exe file **Andor Driver Pack - 3.14.30031.0 (sCMOS)** at http://www.andor.com/downloads

2 Install the Andor Driver Pack 3 into to the Micro-Manager install directory (from Part 1)



3 Additional files will now be present in the Micro-Manager install directory, an example of some of these additional files is shown below:

Notes

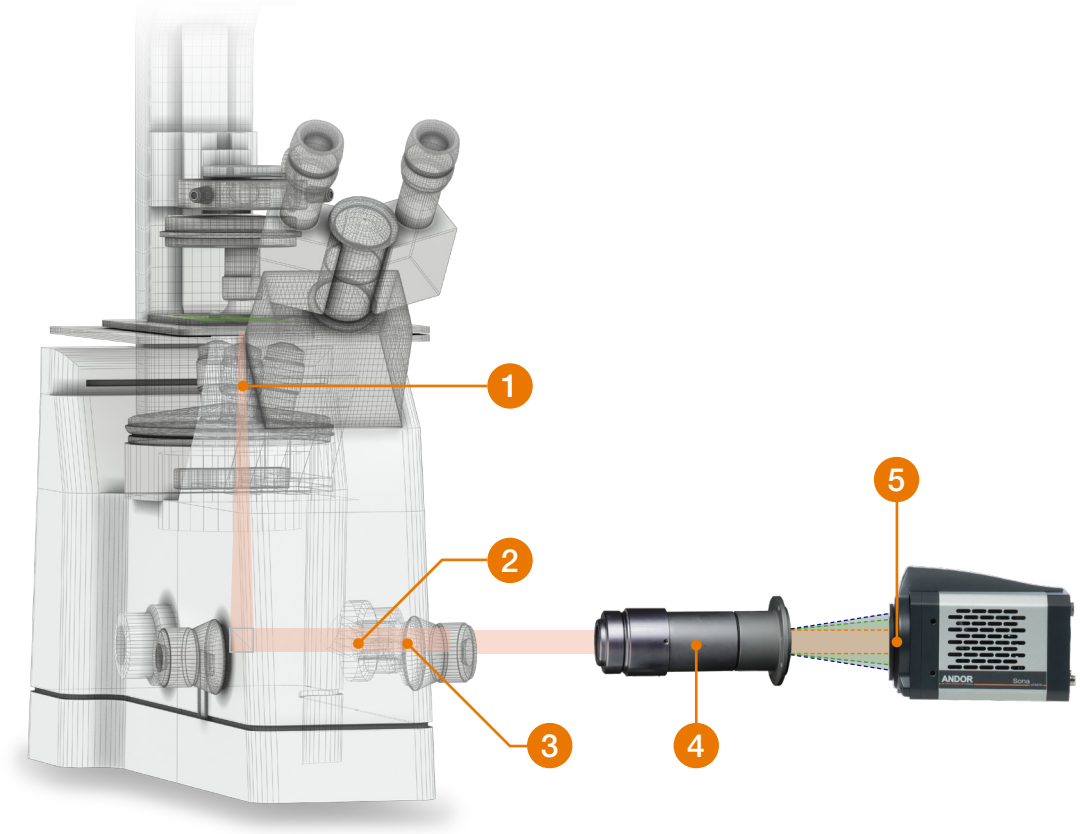
1. The install directory should be set during the micro-manager install, in this example default was: C:\Program Files\Micro-Manager-2.0beta

2. The Andor Driver Pack will be updated regularly and the version number of the file may differ from that given above. The most recent release can be found at http://www.andor.com/downloads

Selecting a Magnifying Coupler Unit

There are many possible combinations of various manufacturers' tube lenses, their native microscopes' couplers and the Andor Magnifying Coupler Unit (MCU).

These should be selected so that the image overfills the sensor area, but also that Nyquist oversampling is still maintained. This ensures both maximum field of view and resolution.



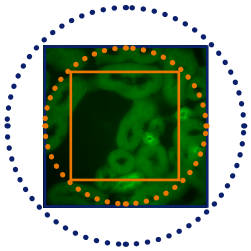
1. **Objective lens**
   Use lower magnification objectives e.g. x40 and x60 to maximize on-sample field of view while preserving resolving capability when combined with additional coupler magnification such as the MCU.

2. **Microscope output port**
   Wider aperture ports are readily available up to Ø25 mm and up to Ø32 mm aperture (FN32) is also now available.

3. **Tube Lens**
   Tube lenses of different focal lengths and magnifications are available to match the output of the microscope with various accessories.

4. **MCU**
   The MCU provides additional magnification so that the output from the microscope port can be matched to sensor area of the Sona.

5. **Sensor**
   The Sona 4.2B-11 sensor is Ø32 mm (2048 x 2048, 11 x 11 µm pixels). Due to this size additional magnification such as from the MCU is required to fill the sensor area.
   Sona 2.0B-11 has a smaller Ø22 mm area and is perfectly matched to 22 mm C-mount without additional magnification.



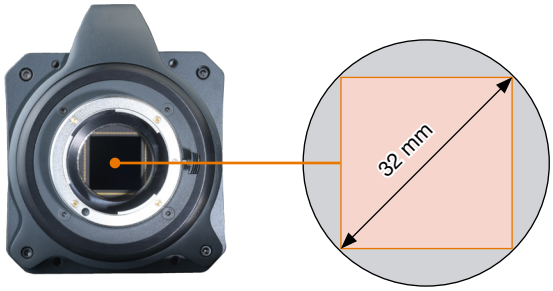
Relative sensor and aperture sizes
(shown actual size)

- Ø22 mm
- Ø32 mm

Magnifying Coupler Unit

Sona 4.2B-11

The following table presents sets of commonly used magnifications and components as shown in the lightpath diagram on page 11. These combinations make full use of the Sona 4.2B-11 sensor providing different effective pixel sizes and oversampling.



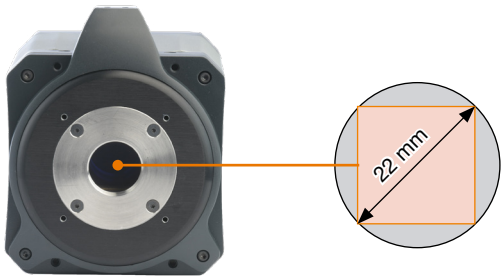
Microscope Configuration		④ Magnifying Coupler (MCU)	⑤ Effective Pixel Size	⑤ Oversampling (Nyquist)
① Objective Magnification	NA			
x100	1.49	x1 (not present)	11	2.23
x60	1.4	x1.5	7.3	2.14
x60	1.4	x2.0	5.5	2.85
x40	0.95	x1.5	7.3	2.10
x40	0.95	x2.0	5.5	2.8

* Calculations performed assuming emission wavelength of 600 nm.

Description	Order Code
MCU with x2 magnification for matching Sona to Leica Microscopes	**MCU-SONA-LEI**
MCU with x2 magnification for matching Sona to Nikon Ti Series (TiE and Ti2) Microscopes	**MCU-SONA-NIK-TI**
MCU with x2 magnification for matching Sona to Olympus Microscopes	**MCU-SONA-OLY**

Sona 2.0B-11

The Sona 2.0B-11, with its smaller 2.0 megapixel sensor is a perfect match for modern microscopes that have a standard 22 mm C-mount port. When coupled with a x100 objective there is no need for an additional coupler. A magnifying coupler can be used if required for e.g. smaller port apertures, or for lower objective magnifications.



Help and Support

For more detailed information on specific combinations please refer to the tech note Optimizing Field of View and Resolution in Microscopy: Matching sCMOS Camera to Objective Lenses. For further help or assistance please contact customer support: https://andor.oxinst.com/support/