

# Theta

# Installation manual – OneAttension



# **Optical Tensiometer**

Revision 1.7

Biolin Scientific Oy, Tietäjäntie 2, 02130 Espoo, Finland Phone: +358 9 5497 3300 Fax: +358 9 5497 3333, E-mail: info@biolinscientific.com



## Table of Contents

1. Introduction	3
1.1 Features of the Theta	. 3
1.2 Equipment overview	.4
2. Mechanical installation	5
2.1 Unpacking	. 5
2.2 Positioning of the instrument and components	. 5
2.3 Connecting cables	. 6
2.4 Firewire connectivity information	. 6
3. OneAttension software installation	8
3.1 Computer requirements	. 8
3.2 Software Installation with Gigabit Ethernet cameras	. 8
3.3 Software Installation with FireWire cameras	12
4. Contact information	.7



# 1. Introduction

This installation manual describes the detailed hardware and software installation procedure for the Theta instrument.

The modular design of the Theta enables many equipment combinations, allowing the user to configure the instrument in a way that meets their requirements. Optional hardware modules can be purchased and easily installed at a later date.

As this manual only contains information concerned with the installation procedure, please see the Operation Manual for information on calibration, taking measurements and data analysis.

#### 1.1 Features of the Theta

Once installed on your computer the Theta with OneAttension software will offer the following:

- Sessile drop contact angle measurements
- Dynamic contact angle measurements
- Surface free energy calculations
- Surface and interfacial tension measurements by pendant drop analysis
- Pulsating-drop measurements for dilatational interfacial rheology studies \*
- Ultra-fast imaging (up to 2315 fps) e.g. of rapid droplet spreading and absorption into samples\*
- Picoliter sized droplet dispensing and high-zoom optics for characterization of extremely small or irregularly shaped samples\*.
- Automated multi-liquid dispensing, droplet placement, sample -stage movement, instrument tilting (for advancing and receding contact angles) and image capture & analysis for fully automated experiment control\*.
- Topography measurements for enhanced contact angle measurement results for rough surfaces\*.

\*Requires additional optional hardware module.

The latest range of additional modules can be viewed in www.biolinscientific.com/attension



#### 1.2 Equipment overview

The basic setup of the operational Theta is shown below.



Figure 1.1. Physical features of a basic Theta.

- 1) Stage level adjustment
- 2) Stage height adjustment
- 3) Stage height lock
- 4) Stage linear adjustment
- 5) Stage rail lock
- 6) Stage lateral adjustment
- 7) Syringe lateral adjustment
- 8) Liquid dispense holder
- 9) Syringe height adjustment

- 10) Manual dispenser adjustment
- 11) Syringe clamp
- 12) LED light source
- 13) Sample stage
- 14) Camera lens focus adjustment
- 15) Camera lens zoom adjustment
- 16) Level adjustment feet
- 17) Camera rail lock



## 2. Mechanical installation

#### 2.1 Unpacking

The Theta is delivered in one crate. The crate should be opened carefully and checked to see that it contains:

- Theta instrument consisting of base with four adjustable feet, interface unit (which houses the one-touch dispenser and LED light source) and camera stage.
- Sample stage mounting with thumb screw
- Power cable
- Necessary communication cables
- Manual dispensing syringe
- Calibration ball and magnet
- Bubble leveling disk.
- DVD with software, license file (.xml) and manuals

As well as any optional items, which may include for example:

- Automatic single/multi liquid dispenser
- Motorized dispenser movement module
- Motorized x/y-stage
- Tilting cradle
- Interconnect cables for additional modules
- Sample chambers/cuvettes

#### 2.2 Positioning of the instrument and components

The instrument should be placed on a vibration free table in an area where local air currents are at a minimum. Unwrap all plastic wrapping carefully, taking care not to scratch the components if you cut through the wrapping with a knife. Place the bubble leveling disk on the instrument base and adjust the leveling feet until the bubble sits in the central marked circle.

You are then required to align all components in the optical path and to give the sample stage large freedom of movement from its mounted position by following the instructions below.

Place the sample stage mounting mechanism on the central rail of the instrument base. Use the x and y-position adjustment screws (#4 and #6 in Figure 1.1) to adjust the sample stage x and y positions so that the sample stage is positioned in the centre of the available travel range in both directions. With the manual syringe dispenser in place, adjust the horizontal position of the one-touch dispenser so that the syringe tip appears near to the centre of the LED light source (when viewed from the camera end of the instrument). Adjust the vertical position of the syringe tip either by loosening the syringe clamp, coarsely adjusting position then retightening the syringe clamp or make fine adjustments using the syringe height adjustment screw (#9 in Figure 1.1). Position the whole of the sample stage mounting mechanism under the syringe tip so that the centre of the square sample stage is positioned centrally beneath the syringe tip. Do this by sliding the sample stage mounting mechanism along the rail while the stage rail lock screw (#5 in Figure 1.1) is loose. Once in position, firmly tighten the stage rail lock screw.

Exact positioning of the camera stage along the rail is user-application specific and depends on the required zoom and focus settings of the camera. This part of the setup is only possible once the software has been installed and is explained in the user manual.

All the additional modules operate with simple plug and play installation, therefore the plug in instructions are included in the user manual together with the operating instructions.



#### 2.3 Connecting cables

Theta requires a computer with one free USB port, and either a Gigabit Ethernet port or a FireWire port depending on your camera type. If the computer does not have a FireWire port available then the FireWire PCI card supplied should be installed

Connect the Theta's **USB1** port to the computer USB port using the supplied USB cable. Connect the Theta's **Ethernet** port to your computer's Gigabit Ethernet port or the Theta's **FW1** port to your computer FireWire port using the supplied cables. Connect the power cable to the three-pin IEC connector beneath the power switch and plug in to the mains power supply.

#### 2.4 Firewire connectivity information

On-board Firewire ports such as those connected to the front-panel of a desktop PC or built-in mini 4-pin ports in laptops are often problematic and may not work correctly with the Theta camera. If during the software installation or initial software loading phase the camera is not detected, even though the cables are connected and the instrument is turned on, then there may be a problem with the type of Firewire port that you are trying to use.

If you are using a desktop computer it is strongly recommended that you install the supplied Firewire PCI card into an available PCI slot on your computer motherboard. As this requires the computer housing to be opened up, it is advisable to contact your I.T. department for this part of the installation unless you are a competent/qualified computer system builder.

If your laptop computer is not equipped with any type of Firewire port, or if the built-in port just doesn't work, it is recommended that you obtain and insert a suitable Firewire expansion card (PC Card or ExpressCard, depending on the laptop). The crucial factor is the controller chip that the Firewire port is built around. Unfortunately, Firewire card manufacturers often don't specify what controller chips their cards use. It can be manually checked from the Device Manager, from "IEEE Bus Host Controllers". The device name is usually in the form "[Chipset name] 1394 OHCI Compliant Host Controller". Texas Instruments and VIA chips are known to work well.

It is also known that a laptop computer running in a lower power state, such as when unplugged from the mains and running from batteries, may not allow successful Firewire communication with the Theta camera. Keeping the laptop computer connected to the mains power supply may solve this class of communication problems.

When experiencing more or less random camera detection problems with **Windows 7 + ImagingSource** (60 FPS) camera, switching to the legacy 1394 bus driver as follows may help (this is not needed with the high-speed (420 FPS) Basler camera, as a special bus driver will automatically be installed for it):

- 1. In the Device Manager, select 'Properties' for the 1394 controller.
- 2. Select the 'Driver' page and 'Update Driver' button.
- 3. Select 'Browse my computer for driver software.'
- 4. Select 'Let me pick from a list of device drivers on my computer.'
- 5. Within the list of devices, you will see a device with '(Legacy).' This is the 1394 bus driver that previously shipped in Windows. Select this device and select 'Next.'

This will install the legacy 1394 bus driver on Windows 7.

It is possible to ascertain if the camera is successfully identified by your computer by checking the Windows Control Panel/ System/ Device Manager. When connecting the Firewire cable with the instrument power turned on, an extra item should appear in the hardware list. When the camera drivers are installed later on, the camera will be labeled correctly but for now it may simply be labeled as a 'generic 1394 camera'. If after software installation the camera is still only labeled as a 'generic 1394 camera', instead of being correctly identified as an 'Imaging Source' or 'Basler' (high-speed) camera, then there may have been a problem with driver installation. Even if everything seems to be all right in the Device Manager, it's possible that OneAttension can't properly communicate with the camera. It could behave as the camera didn't exist at all, or a message "Camera found, but initialization failed" may pop up. If the usual restart / reboot / reinstall attempts or the "Windows 7 + ImagingSource" bus driver



trick above don't help, then the problem is almost certainly caused by a defunct Firewire controller. A Firewire adapter should be installed then, as described above.



### 3. OneAttension software installation

#### 3.1 Computer requirements

The computer attached to the Theta is required to have

- Windows Vista (32 bit), Windows 7 (32 or 64 bit), Windows 8 (32 or 64 bit) or Windows 10 (32 or 64 bit, only available for the Basic Ethernet camera and Basic FireWire camera).
- During installation the user must have administrative privileges to the computer.
- One free USB port.
- One free **Gigabit Ethernet** port or an IEEE 1394 **FireWire** port (if unavailable use the supplied PCI adapter) depending on the camera you have in your Theta.

#### 3.2 Software Installation with Gigabit Ethernet cameras

First, turn Theta power off. Connect the USB and Ethernet cables between Theta and the computer. Do not turn Theta power on yet.

Insert the OneAttension installation DVD into the optical disk drive. Access the disk (typically drive D:\) and double-click on **OAsetup.exe**. In case the **OAsetup.exe** is copied from the DVD e.g. in the computer's desktop before installation, please note that you need to copy also a **license.xml** file in the computer. The **license.xml** file is a unique file for each licensed OneAttension copy.

The installation will now begin. Follow the instructions on screen.

During the installation it is extremely important to choose the correct drivers from the list of drivers:

OneAttension Setup		_ <b>_</b> X
	oose Components hoose which features of OneAttension you war	nt to install.
Check the components you war install. Click Next to continue.	nt to install and uncheck the components you d	on't want to
Select components to install:	Theta Lite USB Theta Basic Ethernet Theta High Speed Ethernet Basler (420 FPS) FireWire Imaging Source (60 FPS) FireWire Topography Support Dependence	* III +
Space required: 169.6MB	Description Position your mouse over a component to se description,	e its
	< <u>B</u> ack Next >	Cancel

Choose either "Theta Basic Ethernet" in case you have the basic camera that goes up to 344 fps or "Theta High Speed Ethernet" in case you have the high speed camera that goes up to 2315 fps. If you have the 3D Topography module, choose also the "Topography support".

If for some reason the Windows cannot verify the publisher of the driver software, choose "Install this driver software anyway".





The installer may also ask you to turn your instrument on during installation. This also applies to the optional 3D Topography module.

a	<b>Installing</b> Please wait v	vhile OneAttension	is being installed.	
OneAttension Setup				
Please turn your Theta or	1			•
OK	ensio	n 1.0\bin\windows\ t\Windows\Start Me	\drivers\USBDriver	s ension\
Create shortcut: C:\Progr. Create shortcut: C:\Users Created uninstaller: c:\Att	amData (Micros (Public (Deskto) ension (OneAtt	oft\Windows\Start o\OneAttension.Ink ension 1.0\Uninsta	Menu\Programs\A u ill.exe	ttensio
Adding ImagingSource Sup	port			*
anoora a rosan o yotoiii (16110 -		-		-

Some of the drivers open a separate driver installation wizard in order to install the drivers. In this case, choose next and wait until the drivers have been installed.

Driver Installation Wizard	
	Welcome to the Driver Installation Wizard! Please select the devices you want to update and click 'Next' to continue. IF OEM AFWCAMVM
	< Back Next > Cancel

If the installer asks you to connect your video capture device, the camera cannot be detected. In this case, please check that the instrument is on and all cables are connected.



Finally, choose "Finish" in order to finish the OneAttension installation.

11		
etection		
Please conno and click Ret click Cancel	ect your video ca try or to abort!	pture device
[	Retry	Cancel
sion 1 O\bin\win	dows\drivers\Imag	ing Source
1.0\\bin\windows	s\drivers\ImagingS	ource\dectd
L.O ( Ipin (windows	s (drivers (driagings)	ource pecta
	Please conn and click Re click Cancel	Please connect your video ca and click Retry or click Cancel to abort! Retry sion 1.0\bin\windows\drivers\ImagingS

OneAttension Setup	
Mall Sud	Completing the OneAttension Setup Wizard
	OneAttension has been installed on your computer. Click Finish to dose this wizard.
	< Back Finish Cancel

#### Possible issues

In most cases, OneAttension installation goes very easily and all software components are installed automatically. However, occasionally the drivers won't install properly.

#### Basic Gigabit Ethernet camera

In some cases, the IP address for the camera has to be set manually. If you installed OneAttension with the "Theta Basic Ethernet" drivers and OneAttension cannot locate the camera, please try the following actions:

Open "pylon IP Configurator" program in your computer. The program should locate your camera. Choose your camera and write the following IP addresses to the Static IP cells:

IP Address: 169.254.1.0



Subnet Mask: 255.255.0.0

Gateway: 0.0.0.0

2			pylon IP	Configura	tor v4.0 64-Bit			- 🗆 🗙
<u>F</u> ile <u>V</u> iew <u>?</u>								
Name E	evice User ID	Serial Number	MAC Address	Status	IP Configuration	IP Address	Subnet Mask	
🔚 Local Area Conr	nection							
acA780		21421644 (	0:30:53:15:B1:4C	OK	Static IP	169.254.1.0	255.255.0.0	
Static IP		Basler acA7	80-75gm (2142)	1644)				Refresh
IP Address:	169.254.1.0	Vendor:	Basler					
Subnet <u>M</u> ask:	255.255.0.0	Model Name Device User	e: acA780-75gr TD:	n				
<u>G</u> ateway:	0.0.0	MAC Addre	er: 21421644 ss: 00:30:53:15	:B1:4C				
		IP Configura	ation: Static IP					
O Auto IP (LLA)		IP Address: Subnet Mas	169.254.1.0 k: 255.255.0.0					
Device <u>U</u> ser ID:		Gateway:	0.0.0.0					
	Save							

Click the Refresh. The IP addresses have now been updated and the camera should be located by OneAttension.

#### High speed Gigabit Ethernet camera

High speed Gigabit Ethernet camera drivers cannot be installed, if they already exist in the computer. However, there might sometimes be a need to install the drivers again. In this case, the old drivers need to be removed first.

🗃 🎧 🗢 🖾 🕨 Control Panel 🛛	Programs > Programs and Features				- 49	Search Programs and Features	
Control Panel Home View installed updates	Uninstall or change a program To uninstall a program, select it from the list and then	click Uninstall, Change, or Rep	air.				
off	Organize - Uninstall Change Repair					10	- (
Install a program from the network	Name	Publisher	Installed On	Size	Version		
	Important         Stager           Windows Driver Packager         FTDI CDM Driver Package           Windows Driver Packager         FTDI CDM Driver Package           Of cooped Crowner         Stager           Windows Driver Package         FTDI CDM Driver Package           Import Audio         Stager           Import Audio         Stager           Import Audio         Stager           Import Package         Frankishe Hest Controller Driver           Import Package         Stager           Import Package         Frankishe Hest Controller Driver           Import Package         Stager           Import Package         Frankishe Hest Controller Driver           Import Package         Stager           Import Packager         Stager	Fortinet Inc. FTDI FTDI Google Inc. IDT Intel Corporation Intel Corporation Intel Corporation Intel Corporation Intel Corporation Intel Corporation	14.3.2014 11.6.2013 10.4.2014 23.4.2014 10.4.2014 10.4.2014 21.5.2013 10.4.2014 10.4.2014 10.4.2014 10.4.2014 21.5.2013	1,65 MB 18,4 MB 18,4 MB 20,4 MB 74,2 MB 1,46 MB 1,20 MB	4.0.2084 04/10/2012 2.08.24 01/27/2014 2.10.00 15.0.1916.114 1.0.6491.0 1.0.8.251 11.2.0.1006 9.5.14.1724 9.17.10.3040 1.2.11011 2.0.0.37149 3.5.40.0		
	Intel® PROSet/Wireless WiFi Software	Intel Corporation	21.5.2013	228 MB	15.03.1000.1637		
	BA results 1.34     Windows Tearshow 2.010     Windows Tearshow 2.5.1     Windows Tearshow 2.5.1     Windows Tearshow 2.5.2     El Microsoft Visual C+ 2008 Addinishidade - 450.2.	KV Instruments Ltd Microsoft Corporation Microsoft Corporation Microsoft Corporation Microsoft Corporation Microsoft Corporation Microsoft Corporation Microsoft Corporation Microsoft Corporation Microsoft Corporation Microsoft Corporation	6.9.2013 25.7.2013 18.3.2014 21.5.2013 10.4.2014 5.6.2013 5.6.2013 5.6.2013 18.7.2013 18.7.2013 14.3.2014 21.5.2013	38,8 MB 13,8 MB 222 KB 230 KB 788 KB 300 KB 101 M6 788 KB	2.03.0002 2.3.4 14.0.7015.1000 4.5.50938 16.4.3505.0912 10.0.40219 9.0.30729.4148 9.0.30729.4148 9.0.30729.6161 8.0.61001 4.0.7577.4419 9.0.30729		
	MISXML 4.0 SP2 (X8954430)     Microsoft Silverlight     Microsoft Silverlight     Microsoft Visual C++ 2008 Redistributable - x86 9.0.3     Microsoft Visual C++ 2008 Redistributable - x86 9.0.3	Microsoft Corporation Microsoft Corporation Microsoft Corporation	5.6.2013 12.3.2014 21.5.2013 5.6.2013	1,27 MB 199 MB 596 KB 600 KB	4.20.9870.0 5.1.30214.0 9.0.30729 9.0.30729 6161		

Go to Start  $\rightarrow$  Control Panel  $\rightarrow$  Programs  $\rightarrow$  Programs and Features. You will see a list of all installed software. Go to JAI SDK and uninstall it. Windows will ask you to restart your computer, but do not do this yet.

Then go to the folder where you have installed your OneAttension. By default the path is C:\Attension\OneAttension\bin\windows\cameras. There you will find a folder called JAI which you need to delete. After deleting, restart your computer so that the changes will be taken into effect.

After the computer has been restarted, you can install the high speed camera drivers again normally.



#### 3.3 Software Installation with FireWire cameras

First, turn Theta power off. Connect the USB and FireWire cables between Theta and the computer. Do not turn Theta power on yet.

If you have the high-speed (420fps) **Basler** camera option **and** a laptop with a FireWire extension card, the *FireWire extension card* must be connected to the laptop during OneAttension installation, because a special bus driver will be installed for it.

Insert the OneAttension installation DVD into the optical disk drive. Access the disk (typically drive D:\) and double-click on **OAsetup.exe**. In case the **OAsetup.exe** is copied from the DVD e.g. in the computer's desktop before installation, please note that you need to copy also a **license.xml** file in the computer. The **license.xml** file is a unique file for each licensed OneAttension copy.

The installation will now begin and the following series of pop-ups will appear on screen.



Click Next to continue

6	License Agreer	nent	
	Please review th	ne license terms before installin	OneAttension.
9			
Press Page Down to se	ee the rest of the agree	ment.	
LEASE READ THIS SO	OFTWARE LICENSE AGR	REEMENT ("LICENSE") CAREFUL WARE, YOU ARE AGREEING TO	LY BEFORE
BOUND BY THE TERMS TERMS, DO NOT USE	S OF THIS LICENSE. IF THE SOFTWARE.	YOU DO NOT AGREE TO ALL O	THE
The terms of this Licer proprietary software, upgrade of the software and any copy of these license agreement, Bio	nse cover any and all (u including related docum are delivered to you as e items (the "Software") olin hereby grants you a	se) of Biolin Scientific Oy's ("Bio nentation and any modification, defined in the accompanied do ). For any Software not accomp a license to use the Software in	lin") update or cumentation panied by a accordance
with these terms.			+
If you accept the term agreement to install O	is of the agreement, dic neAttension.	k I Agree to continue. You mu	accept the
lsoft Install System v2	.46		

Click I Agree to accept the terms of the license agreement



OneAttension Setup	
a c	noose Components Choose which features of OneAttension you want to install.
Check the components you wa install. Click Next to continue.	nt to install and uncheck the components you don't want to
Select components to install:	Theta Lite USE         Theta Basic Ethernet         Theta High Speed Ethernet         Basler (420 FPS) FireWire         Imaging Source (60 FPS) FireWire         Topography Support
Space required: 169.6MB	Description Position your mouse over a component to see its description.
	< <u>B</u> ack Next > Cancel

Select the appropriate camera drivers to install. If you have the standard-speed (60fps) ImagingSource camera check the *ImagingSource camera* box. If you have the high-speed (420fps) Basler camera option check the *Basler camera* box.

OneAttension Se	tup			
6	Choose I	nstall Location		
9	Choose t	he folder in which to ins	stall OneAttens	ion.
Setup will install O Browse and select	neAttension in the fo another folder. Click	ollowing folder. To insta Install to start the inst	ll in a different tallation.	folder, dick
c: Attension (	er OneAttension 1.0\		E	Browse
Space required: 1	44. 7MB			
Space available: 4	6.0GB			
Nullsoft Install Syster	n v2.46			
		< Back	Install	Cancel

An installation directory needs to be chosen. It is strongly recommended that you proceed with the default installation directory as shown above. Do not install to your *Program Files* folder as this may cause problems when running the OneAttension program.

	Installing			
a	Please wait v	vhile OneAttension i	s being installed.	
dding Im <mark>agi</mark> ngSou	urce Support			
Extract: ftlang.d	I 100%			
Extract: ftser2k.	sys 100%			
Extract: ftserui2.	.dll 100%	and the second s		
Output folder: c:	\Attension\OneAttensio	n 1.0\bin\windows\a	drivers\USBDrive	rs
Installing the driv	/er			
Create folder: C:	VProgramData Wicrosof	t\Windows\Start Me	nu\Programs\Atl	tension\
Create shortcut:	C: ProgramData Micros	oft\Windows\Start1	4enu\Programs∖	Attensio
Create shortcut:	C: Users Public Deskto	OneAttension.Ink		
Created uninstall	er: c:\Attension\OneAtt	ension 1.0\Uninstall	.exe	Ē
	ource Support			1
Adding ImagingS				
Adding ImagingS				



The installation progress can be monitored with the progress bar. Please allow several minutes for this stage of the installation to complete.



If Windows informs you that it can't verify the publisher of the driver software, select Install this driver software anyway.

nsion is being installed.
dows\drivers\USBDrivers
art Menu\Programs\Attension\ Start Menu\Programs\Attensio
on.lnk ninstall.exe
_

When the ImagingSource camera driver is being installed you will be asked to turn on your Theta instrument. Ensure that the USB and FireWire cables are connected to the computer first and that the power supply is plugged in. Switch the 0/1 power switch to the 1 position on the Theta interface panel then click *OK*.





If there is a problem detecting the camera you will see the *Device Detection* error message above. Please check all FireWire cable connections and click Retry. If the software does not proceed beyond this screen click *Cancel* and refer to **Section 2.4 FireWire connectivity information** for further support.

If you are installing the Basler camera driver the installation will automatically proceed through to completion without any further action required.



If the ImagingSource camera driver was selected a Driver Installation Wizard will start up. All the connected & detected ImagingSource cameras will be listed. Usually only the Theta ImagingSource camera will be listed (but named as shown above). Ensure that the tickbox is checked and click *Next*.

Updating Device Drivers		-
Please wait while the wizard insta	alls the drivers for your device(s)	(R)

The progress of the ImagingSource driver installation will be indicated by the progress bar.



Driver Installation Wizard	
	Installation completed
	Click on "Finish" to close this window
	×
	< Back Finish Cancel

When the ImagingSource camera driver installation is completed you will see the above screen. Click Finish.

OneAttension Setup	
March 1	Completing the OneAttension Setup Wizard
	OneAttension has been installed on your computer. Click Finish to close this wizard.
	< Back Finish Cancel

Following camera driver installation you will be informed that OneAttension has been installed on your computer. Click *Finish* to complete the software installation.



## 4. Contact information

If any problems arise please feel free to contact a local distributor or Attension directly. Attension can be contacted from this address: Attension, Biolin Scientific Tietäjäntie 2 FI-02130 Espoo Finland Tel. +358-(0)9-5497 3300 Fax +358-(0)9-5497 3333 info@biolinscientific.com for sales requests support@attension.com for service or technical support and maintenance http://www.biolinscientific.com/attension

Local distributors are listed at our website, http://www.biolinscientific.com/attension