POLYMETRIC

Hardware Guide – PT-M

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1 Safety

1.1 Basic Safety Information

The PT-M 3D scanner is a state-of-the-art device and is delivered in a state that is safe to operate. There are still hazards that may be associated with its use, however. Using the product improperly can result in damage to the eyes or to the product.

- Read the entire operating manual along with the safety information before you begin working with the PT-M, and do not ignore these warnings or information.
- Always keep the operating manual near the place of use when working so that you can quickly refer to it if necessary.
- Always observe the country-specific safety regulations.

1.2 Proper Use

The PT-M is designed for use only in closed rooms with artificial lighting.

The ideal working distance depends on the current calibration of the device. Always maintain a working distance consistent with the current calibration.

All other types of use will be considered as improper. Device safety cannot be guaranteed when used in an improper way.

1.3 Improper Use

Modifications to the product performed by the user are prohibited. The product must not be dismantled, added on to or used with incompatible components without the written consent of Polymetric GmbH.

Do not look directly into the light of the projector.

This product is not intended for use by children who are not supervised by their guardian.

Device safety cannot be guaranteed when used in an improper way.

1.4 Hazards

This section describes the different types of hazards or damages that may result from operating the PT-M 3D scanner.

1.4.1 Bodily Harm

Epilepsy Warning

Under certain circumstances, some persons experience epileptic seizures or a loss of consciousness when subjected to certain kinds of flashing lights or light effects. These persons may suffer a seizure when using the PT-M. This may also affect persons who do not have to history of epilepsy or who have never experienced an epileptic seizure before.

- If a person or family member has ever shown symptoms (such as losses of consciousness or seizures) likely related to epilepsy when exposed to flashing lights, please consult a doctor before using the PT-M.
- If you experience symptoms such as dizziness, impaired vision, eye or muscle twitching, loss of consciousness, disorientation, any type of involuntary movement or cramps when using the unit, switch it off immediately and consult a doctor.

1.4.2 Material Damage

- Never let the device get wet. Moisture can damage the electronics.
- Make sure that no accidentally spilled liquids get in contact with the device.
- Only use dry cloths to clean the device.
- Never cover the ventilation holes of the device to avoid overheating.
- Always keep a minimum distance of 20cm between the device and walls to ensure airflow at the ventilation holes.
- Ensure that no objects penetrate the device, for example through the ventilation holes.
- Ensure that no objects that are not provided for the intended use are pushed in the connection sockets on the backside of the device.
- Use the device only if it has been at room temperature for a considerable amount of time. Temperature changes can cause condensation to collect inside the unit. Moisture can damage the electronics.
- Avoid electrostatic discharges when connecting or disconnecting the device. Electrostatic charges can damage the electronics. Before connecting or disconnecting the device, touch a grounded object such as a heating element.
- Always follow the instructions and warnings carefully for operating the scanner and any optional auxiliary equipment.
- Make sure that the scanner is always attached safely and steadily to a stand. For information on this topic, refer to the operating manual for the stand.
- Make sure that the stand is set up safely and steadily.

2 Installation and Setup

2.1 Preparation

Administrator rights are required to install QTSculptor and to connect the PT-M scanner to your computer. They can be set in the Windows User Account Settings.

The delivery contains two disks. One disk contains the setup of the QTSculptor software. The second volume contains system-specific files (hardware settings and basic calibration) that are needed to install your scanner.

The license management of QTSculptor is stored in a hardware dongle that is delivered with the system.

2.2 Installation of the Software

1. Insert the CD with the QTSculptor Setup in your disc drive.
2. Execute the Setup File and follow the instructions of the installation routine.
3. Please restart your computer after the installation is complete.

2.3 Hardware Setup

2.3.1 Connecting the PT-M Sensor Head

1. Connect the control cables and the power cables to the projector.
2. Fixate the connecting cable with a cable tie to the strain relief.
3. Connect, if available, the cables to the color camera. The color camera is marked with an orange label. The connection cables for the color camera are also marked.
4. Connect the cables to the monochrome cameras.

2.3.2 Connecting the Sensor Head with the PT-M Controller

All sockets that are needed to connect the PT-M scanner to the PT-M controller unit are located on the opposite side to the power switch. The order of the cables to the GigE ports is not relevant.

2.3.3 Connecting the PT-M Controller with the Computer

The PT-M scanner comes with 2 GigE cable for connecting the PT-M controller with the computer. Upon delivered the PT-M is configured to be connected to two separate Gig-E network ports on the computer to achieve maximum scanning speed.

1. Connect the two cables to the GigE ports on the side of the PT-M controller where the power switch is located.
2. Connect both cables to the computer.

If you need to connect the scanner to your computer with a single cable, you must reconfigure the scanner (see chapter “Configuring the PT-M for a Single Network Port”).

2.3.4 Connecting the PT-M Controller with a Power Socket

1. Make sure that the power switch of the PT-M controller is turned off.
2. Connect the PT-M controller with the supplied cable to a power socket.

After all connections are complete, turn on the scanner via the power switch on the PT-M controller.

2.3.5 Configuration of the Network Adapter

Open the Network Adapter Settings in Windows.

Windows 7/8/10: Control Panel → Network and Sharing Center → Change adapter settings

Identify both network adapters to which the scanner is connected. If you are not sure, you can turn off and on the scanner. The connected adapters will change status when the connection is separated and re-established.

Configure the first adapter as explained below. After finishing the configuration of the first adapter please perform the same on the second adapter.

Network Adapter - Properties

Open the network adapters “Properties” from the context menu (right mouse button). Then click “Configure”.

Activate “Jumbo Frames” (sometimes called “Jumbo MTU”) in the “Advanced” tab. Set the value to 9KB MTU if possible.

Deactivate all power management options in the “Power Management” tab.

Confirm your settings.

Network Adapter - IP Address

Open the network adapters “Properties” from the context menu (right mouse button). Then open the properties of the TCP/IPv4 connection.

First Adapter:

Enter the following IP address: 192.168.101.1
Enter the following Subnet mask: 255.255.255.0

Second Adapter:

Enter the following IP address: 192.168.102.1
Enter the following Subnet mask: 255.255.255.0

Confirm your settings and close the Windows Control Panel.

Note: If the IP-range is already in use and you need to change the IP-address of your device please contact Polymetric GmbH.

2.3.6 Software-related Hardware Configuration

Insert the Hardware Setup CD in your disc drive.

Copy the following files to your QTSculptor installation folder (standard location is C:\Program Files\QTSculptor)

- cameraconfigfile (folder)
- QTSculptor_xxx.inf
- ScanSystemConfig_xxx.xml
- ScannerConfig_xxx.xml
- ProjectorCalib_xxx.dat
- calib_xxx.clb
- calib_xxx.mcb

Existing files may be overwritten.

2.3.7 Configuring the PT-M for a Single Network Port

Note: This is only needed if you need to run the PT-M scanner with a single GigE port. We do not recommend this, because the speed of the PT-M will be reduced.

On delivery the PT-M is configured for use on two fully-fledged GigE network ports. The components of the PT-M have the following IPv4 addresses:

- 3D camera left: 192.168.101.10
- 3D camera right: 192.168.102.11
- Texture camera (if available): 192.168.102.12
- Projector control: 192.168.102.13

To be able to run the PT-M on a single GigE port the IP address of " 3D camera left" needs to be set to the unitary IPv4 address 192.168.102.10:

1. Make sure that the scanner is turned on an connected to the computer.
2. Make sure that you have administrator rights.
3. Make sure that the used single network adapter is configured tot he following settings: IPv4 / 192.168.102.1 / 255.255.255.0 (see: "Configuration of the Network Adapter")
4. Open the IP-Configurator from the QTSculptor installation folder (→\Foreign Installers\Basler\Tools\IpConfigurator.exe)
5. Click the left 3D camera (identified by the IP address 192.168.101.10).
6. Change the IP address at "Static IP" to 192.168.102.10
7. Confim the changes by clicking "Save"

As the cameras now need to share a single GigE adapter you also need to limit the cameras maximum use of bandwidth in the "ScannerConfig_xxx.xml":

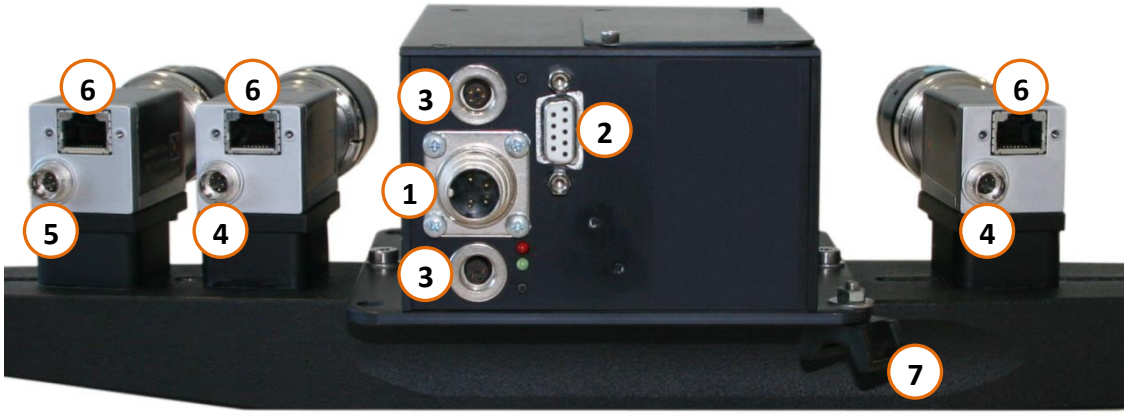
1. Open the file "ScannerConfig_xxx.xml" from the QTSculptor installation folder with a text editor.
2. Look for the camera settings. They have the following format:
```
<Camera value="ID, CAMERA_3D, 100" CameraConfig="" InitialCameraConfig="DEFAULT"/>
<Camera value="ID, CAMERA_3D, 100" CameraConfig="" InitialCameraConfig="DEFAULT"/>
<Camera value="ID, CAMERA_TEXTURE, 90" CameraConfig="" InitialCameraConfig="DEFAULT"/>
```
3. Change the following values from 100 to 50
```
<Camera value="ID, CAMERA_3D, 50" CameraConfig="" InitialCameraConfig="DEFAULT"/>
<Camera value="ID, CAMERA_3D, 50" CameraConfig="" InitialCameraConfig="DEFAULT"/>
<Camera value="ID, CAMERA_TEXTURE, 90" CameraConfig="" InitialCameraConfig="DEFAULT"/>
```
4. Save your changes.

To be able to run the PT-M scanner in full speed on two separate GigE network ports, all made changes need to be set back in the described way.

Note: Depending on the used network cards the maximum achievable speed of the cameras can vary. We recommend using a two-port network card with two separate Intel Pro/1000 chips on-board. The above values (100 / 50) are default values that typically work for operation with two / one network adapter. The adjustable range is from 1-100 (use of existing transmission bandwidth in percent). In particular cases it may be necessary to use smaller values.

3 Connectors

3.1 PT-M Sensor Head



1 Power port

Power port for connecting the sensor with the delivered connection cable to the controller.

2 Control port

Control port for connecting the sensor with the delivered connection cable to the controller.

3 Trigger out ports (3D)

Trigger output ports for connecting the projector with the delivered connection cable to the 3D cameras.

4 Trigger in ports (3D)

Trigger input ports for connecting the 3D cameras with the delivered connection cable to the projector.

5 Trigger port (Color)

Trigger port for connecting the color camera with the delivered connection cable to the controller.

6 Data ports

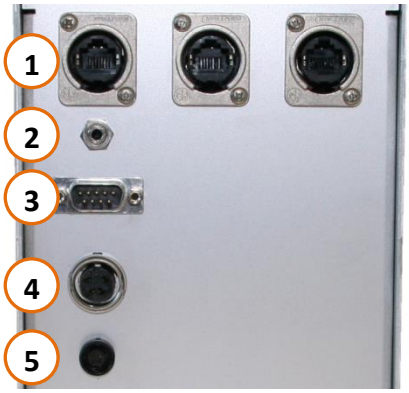
Data ports for connecting the cameras with the delivered connection cable to the controller.

7 Strain relief

Fixate the connecting cable with a cable tie to the strain relief.

3.2 PT-M Controller

3.2.1 Frontside



1 Data ports

Data ports for connecting the controller with the delivered connection cable to the sensor.

2 Flash port

Use the flash port to connect external flashes if needed. Flashes and matching connection equipment can be obtained separately at Polymetric or from selected stores.

3 Control port

Control port for connecting the controller with the delivered connection cable to the sensor.

4 Power port

Power port for connecting the controller with the delivered connection cable to the sensor.

5 Trigger port (Color)

Trigger port for connecting the controller with the delivered connection cable to the color camera.

3.2.2 Backside

1 Data ports

Data ports for connecting the scanner with network cables (Cat-5e) to free 1000-Mbit/s Ethernet (GigE) ports on your PC.

2 Optional power port

Additional power input port to connect the controller to a 24V DC / 300W power source. Do not use the optional power port (2) and the power port (5) at the same time. Please contact Polymetric for matching connection equipment.

3 Power switch

Please always turn off the power supply when connecting/disconnecting the sensor or controller.

4 Power port

Power input port to connect the controller to a power socket (88-264V AC / 320W).

4 Technical Specifications

Electrical power ratings	
Power supply	AC 88 - 264 V (47 - 63 Hz)
Power consumption (maximum)	320 W
Additional specifications	
Type	optical white light analog sinus pattern scanner
Dimensions (sensor head)	500 mm (W) x 110 mm (H) x 170 mm (D)
Weight (sensor head)	2,7 kg
Dimensions (controller)	130 mm (W) x 170 mm (H) x 285 mm (D)
Weight (controller)	3,1 kg
Measuring distance	adjustable
Measuring field	adjustable
Camera resolution	PT-M4/4c: 2048 x 2048 Pixel PT-M5/5c: 2456 x 2058 Pixel
Inputs/outputs	
Controller/data	GigE port
Flash	2.5 mm stereo jack socket
Ambient conditions	
Temperature during operation	0°C – +50°C
Humidity during operation	20% - 80%, relative, non-condensing
Storage temperature	-20°C – +80°C
Storage humidity	20% - 80%, relative, non-condensing
Stand connectors	
Screw thread	M 5 x 0.8
Connector cables	
Power cable for PT-M controller	Kettle cord (IEC-60320-C13/C14)
Data cables for PT-M controller	Ethernet Cat-5e EIA/TIA-568A-5 ClassD (ISO/IEC 11801:2002 / EN 50173-1:2002)

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5 Taking out of Operation and Disposal

- To shut down the unit, switch it off and disconnect all cables.
- Return it to the manufacturer for disposal.
  - ↳ The manufacturer will recycle the unit as electronics waste in compliance with the EC Directive governing used electrical devices.

6 Warranty and Limitation of Liability

6.1 Warranty

Product returns from the buyer directly to Polymetric GmbH or one of its national subsidiaries require prior written confirmation from Polymetric GmbH.

Polymetric GmbH has no influence over the setup, use or maintenance of the product or any product combinations selected the buyer. Polymetric GmbH offers no guarantee and rejects any claims for injuries or damages resulting from use.

6.2 Limitation on Liability

Polymetric GmbH assumes no responsibility for the quality of the data captured (scans) because the quality of the scans depends on variables (device temperature, ambient temperature, ambient light, calibration, decalibration of the unit due to vibrations, settings, use), which are beyond the control of Polymetric GmbH.

6.3 Questions, Support and Repairs

Please contact your Polymetric GmbH representative. Polymetric GmbH will make an appropriate decision in each individual case in order to help you as quickly as possible.

6.4 Warranty and Repairs

Only warranty claims that are submitted along with the original sales receipt clearly indicating the buyer and date of purchase will be processed. If the warranty claim is accepted, the product will be repaired or replaced. This decision is solely up to Polymetric GmbH.

6.5 Repairs Subject to Charge

For repairs that are subject to charge, Polymetric GmbH will provide you a cost estimation. The repair will be completed only after you have accepted the estimation.

Thank you for using QTSculptor.

If you encounter problems while using QTSculptor or if you have any suggestions how to improve QTSculptor feel free to contact us.

For more information about the use of QTSculptor and the effect of different settings please refer to the Quick Reference Guide.

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