Manta Hardware Installation Guide

V5.0.1

25 May 2012

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Vision Technologies

Legal notice

For customers in the U.S.A.
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However there is no guarantee that interferences will not occur in a particular installation. If the equipment does cause harmful interference to radio or television reception, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.
• Increase the distance between the equipment and the receiver.
• Use a different line outlet for the receiver.
• Consult a radio or TV technician for help.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment. The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a computing device pursuant to Subpart B of Part 15 of FCC Rules.

For customers in Canada
This apparatus complies with the Class B limits for radio noise emissions set out in the Radio Interference Regulations.

Pour utilisateurs au Canada
Cet appareil est conforme aux normes classe B pour bruits radioélectriques, spécifiées dans le Règlement sur le brouillage radioélectrique.

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Allied Vision Technologies GmbH 05/2012

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Contents

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Introduction

This **Manta Hardware Installation Guide** describes the hardware installation procedures for AVT Manta cameras.

The **Manta Hardware Installation Guide** answers questions about putting AVT cameras into operation, about safety warnings, pin assignments on I/O connectors and GigE ports. Learn how to get more information at the AVT website (accessories), how to get information about software applicable with AVT Manta cameras and how to get deep information from the AVT MANTA Technical Manual.

Note

Please read through this manual carefully before installing the hardware on your PC or laptop (Gigabit Ethernet network card and cables) and operating the AVT cameras.

Document history

Version	Date	Remarks
V2.0.0	15.04.10	New Manual - SERIAL status
V3.0.1	03.06.10	• Minor corrections • Added link to AVT knowledge base in Chapter *GigE sample viewer* on page 51. • **Added Manta G-046, G-145, G-201, G-146** • Added Pin8/9: RS232 in *Figure 25: MANTA: Camera I/O connector pin assignment* on page 49
V4.0.0	25.10.10	• **Added Manta G-033, G-504** • Added 100 Mbit/s for LEDs, see *Status LEDs (MANTA incl. PoE)* on page 46 **New file format:** • Changed file format from FM7 to FM9 **Improved descriptions:** • For resistor values in *Figure 29: MANTA: OutVCC and external resistor* on page 52
<td colspan="2" align="center">**to be continued on next page**</td>		

Table 1: Document history

Version	Date	Remarks
		continued from last page
V4.0.1	06.01.11	• Added photo and description: *Figure 3: Removing IR cut filter/protection glass using special tool (E9020001)* on page 22 • Added Caution (sensor damage) in Chapter *Sensor safety instructions* on page 15 • Corrected some namings of SDKs and filters in Chapter *AVT Manta cameras: installing hardware and software* on page 25 • AVT Manta cameras are compliant to GigE Vision V1.2 in Chapter *AVT software* on page 12 • Changed Manta Technical Manual to AVT Manta Technical Manual in Chapter *AVT MANTA Technical Manual* on page 13 • Revised screenshot for Windows 7 in *Figure 9: Windows firewall settings (Method 1: Off)* on page 30
		to be continued on next page

Table 1: Document history

Version	Date	Remarks
		continued from last page
V4.1.0	24.06.11	**Power over Ethernet (PoE)** • Added PoE voltages in *Figure 25: MANTA: Camera I/O connector pin assignment* on page 49 • Added note about IEEE 802.3at in Chapter *Camera interfaces* on page 44 • Added PoE in *Figure 24: Example: Rear view of MANTA camera (left: no PoE; right: PoE capable)* on page 45 • Added PoE in *Table 3: Rear view of AVT Manta cameras (HIROSE and Gigabit Ethernet RJ-45 port)* on page 44 • Added PoE in Chapter *Overview hardware installation* on page 27 • Added PoE in Chapter *Connecting camera to PC or laptop* on page 34 • Added PoE in Chapter *Gigabit Ethernet port (MANTA)* on page 46 • Added description of third LED: see *Figure 24: Example: Rear view of MANTA camera (left: no PoE; right: PoE capable)* on page 45 and *Table 5: Status LED3* on page 47 • Added Chapter *MANTA (incl. PoE) input block diagram (all Manta models)* on page 50 • Added Chapter *MANTA PoE delay and minimum pulse width* on page 51 (same values as non-PoE Manta cameras) • Added note that higher external values will increase the delay times: see Chapter *Test conditions* on page 53. • Added cross reference to: *Application Note: Hardware Selection for AVT GigE Cameras:* on page 12 **Manta board level** • Deleted (PWR output on demand) at pin 2, see: *Figure 31: MANTA board level camera: I/O pin assignment* on page 54
		to be continued on next page

Table 1: Document history

Version	Date	Remarks
		continued from last page
V4.1.0 [continued]	24.06.11 [continued]	**Manta G-145-30fps and Manta G-201-30fps (non PoE)** • ... have same I/O pin assignment (input circuits and voltage range), power LED and upside down PoE plug as PoE models: see Note *Exception* on page 43 • *Table 5: Status LED3* on page 47 • *Manta G-145-30fps/201-30fps non-PoE behave like standard PoE cameras.* on page 47 • Chapter *MANTA input block diagram (not: Manta G-145-30fps/201-30fps)* on page 48
V5.0.0	16.04.12	**Same mainboard for all Manta models** From serial number **503323258** on all Manta models incl. PoE and board level versions contain the same main board. • Note in Chapter *Camera interfaces* on page 44 (The only distinguishing feature of PoE capable cameras is **PoE** written on the camera's label on the back side and the bottom side of the camera.) • Power indicator LED for all Manta models: standard and PoE: *Table 5: Status LED3* on page 47 • New voltages for U_{in}(high) and U_{in}(low): Chapter *MANTA (PoE) camera I/O connector pin assignment* on page 49 • New voltages for U_{in}(high) and U_{in}(low): Chapter *MANTA input description* on page 50 • Corrected: Current 3 mA ... 4 mA (instead of 3 mA ... 10 mA) due to constant-current source: *Table 6: MANTA (incl. PoE) input parameters* on page 50 • Chapter *MANTA (PoE) camera I/O connector pin assignment* on page 49 • New Pin 3: Video Type Auto Iris Out in Chapter *MANTA board level camera: I/O pin assignment* on page 54 • New: Chapter *MANTA PoE board level camera: I/O pin assignment* on page 55 **Revised PoE descriptions regarding 802.3af and 802.3at:** • See note in Chapter *Camera interfaces* on page 44 and Chapter *Gigabit Ethernet port (MANTA)* on page 46 (Manta **PoE** models can source power from 802.3af (100 MBit/s and 1000 MBit/s) and from 802.3at compliant PSE devices (Power Sourcing Equipment): such as switches injectors or NICs.)
		to be continued on next page

Table 1: Document history

Version	Date	Remarks
		continued from last page
V5.0.1	25.05.12	• Added URL to **GigE Hardware Selection Guide**: see Chapter *Hardware conditions* on page 25 • Added revised CAD drawing (PoE Adapter Board marked): Chapter *MANTA PoE board level camera: I/O pin assignment* on page 55

Table 1: Document history

Manual overview

The manual overview describes each chapter of this manual shortly.

- Chapter *Contacting Allied Vision Technologies* on page 4 lists AVT contact data for both:
  - Technical information / ordering
  - Commercial information

- Chapter *Introduction* on page 5 (this chapter) gives you the document history, a manual overview and conventions used in this manual (styles and symbols). Furthermore you learn how to get more information on **AVT accessories**, available **AVT software** and the **AVT MANTA Technical Manual**.

- Chapter *Safety instructions* on page 14 describes safety instructions for AVT cameras in general and special safety instructions for camera families/models.
  - **Read this chapter carefully before operating any AVT camera.**
  - **Follow all safety instructions, especially the cautions when connecting cameras.**
  - **Take special care when operating board level cameras (Caution-ESD, general warnings, loading and dirty environments). Read all notes and safety instructions before operating any AVT board level camera.**

- Chapter *AVT camera cleaning instructions* on page 19 describes warranty precautions as well as safety instructions/cautions valid for AVT Manta cameras in case of cleaning lenses, optical filters/protection glass or sensors.

- Chapter *AVT Manta cameras: installing hardware and software* on page 25 describes the hardware installation procedures. In this chapter you get links to the AVT website (accessories) and you learn how to get more information on installing software.
  - **Read this chapter before installing any hardware.**
  - **Read and follow the caution when connecting a camera to PC or laptop.**

- Chapter *Camera interfaces* on page 44 describes the interfaces of AVT Manta cameras (I/O connector and GigE port).
  - **Read all notes and cautions carefully.**

Conventions used in this manual

To give this manual an easily understood layout and to emphasize important information, the following typographical styles and symbols are used:

Styles

Style	Function	Example
Bold	Programs, inputs or highlighting important things	**bold**
Courier	Code listings etc.	`Input`
Upper case	Register	REGISTER
Italics	Modes, fields	*Mode*
Parentheses and/or blue	Links	(Link)

Table 2: Styles

Symbols

Note   This symbol highlights important information.

Caution   This symbol highlights important instructions. You have to follow these instructions to avoid malfunctions.

Caution-ESD   This symbol highlights important ESD instructions. Only **qualified personnel** is allowed to install and operate components marked with this symbol.

www	This symbol highlights URLs for further information. The URL itself is shown in blue.
	Example:
	http://www.alliedvisiontec.com

More information

In this chapter you get more information on **GigE Vision/GenICam**, **AVT accessories**, available **AVT software** and the **AVT MANTA Technical Manual.**

GigE Vision and GenICam

- **Introduction to GigE Vision and GenICam**
  http://www.alliedvisiontec.com/emea/support/application-notes.html
- **AVT Manta camera controls**
  http://www.alliedvisiontec.com/emea/support/downloads/product-literature.html

AVT accessories

| Note | Allied Vision Technologies offers a wide range of **accessories** for the use of AVT GigE cameras and the easy integration in already existing applications. |
| | |

- **Gigabit Ethernet** accessories (standard GigE components as well as PoE GigE components)
- **Lenses** for corresponding sensor sizes and resolutions

www	For **more information on accessories** go to:
	http://www.alliedvisiontec.com/emea/products/accessories.html
	For more information on third party hardware components tested with AVT GigE cameras, read:
	Application Note: Hardware Selection for AVT GigE Cameras:
	http://www.alliedvisiontec.com/fileadmin/content/PDF/Support/Application_Notes/Hardware_Selection_for_AVT_GigE_Cameras.pdf
	For **more information on lenses** go to:
	http://www.alliedvisiontec.com/emea/products/accessories/lenses.html
	To **order accessories online** (by clicking the article and sending an inquiry) visit the **AVT web shop** at:
	http://www.alliedvisiontec.com/emea/products/accessories.html

AVT software

Note	AVT Manta cameras are **compliant to GigE Vision V1.2**. Moreover AVT cameras offer many more functions than specified in the **GigE Vision V1.2** standard: so-called AVT SmartFeatures. These features are accessible via camera controls, or by using special functions provided in the following **AVT Software Package**:

- **AVT PvAPI SDK** (see **AVT PvAPI Programmer's Reference Manual**)

All software packages provided by AVT are **free of charge** and contain the following components:

- Drivers
- Software Development Kit (SDK) for camera control and image acquisition
- Examples based on the provided APIs of the SDK
- Documentation and release notes
- Viewer application to operate/configure the cameras and access/test the **AVT smart features.**

www	All **software packages** (including **documentation** and **release notes**) provided by AVT can be downloaded at:
	http://www.alliedvisiontec.com/emea/support/downloads/software.html

www	In addition to the AVT Software Packages Allied Vision Technologies offers special **Integration Packages** to integrate AVT cameras into any third-party vision software that supports the GigE Vision standard.

For more information refer to the **Software Package Selector Guide**.

Go to:

http://www.alliedvisiontec.com/emea/produkte/software.html

Here you also find the **AVT Software Packages for download** and **additional software documentation**:

- AVT PvAPI SDK for GigE Vision cameras
- Release Notes

AVT MANTA Technical Manual

Note	Besides hardware installation procedures (this guide) and the software documentation there is an in-depth description of AVT Manta cameras in the following manuals:

- **AVT Manta Technical Manual**
- **AVT Manta Camera controls**

Here you find: technical data, functional descriptions, features of the camera and how to use.

www	For **downloading the Technical Manuals** go to:
	http://www.alliedvisiontec.com/emea/support/downloads/product-literature.html

Safety instructions

This chapter describes safety instructions/cautions valid for AVT Manta cameras and special safety instructions/cautions depending on the **AVT Manta** camera model used.

General safety instructions

Note

- There are no switches or parts inside the camera that require adjustment. The guarantee becomes void upon opening the camera casing.
- If the product is disassembled, reworked or repaired by anyone other than a recommended service person, AVT or its suppliers will take no responsibility for the subsequent performance or quality of the camera.
- The camera does **not** generate dangerous voltages internally.

Note

- All **color models** are equipped with an **optical filter** to eliminate the influence of infrared light hitting the sensor. Please be advised that, as a side effect, this filter reduces sensitivity in the visible spectrum. The optical filter is part of the back focus ring, which is threaded into the C-Mount.

Sensor safety instructions

Caution

Sensor may be damaged

Light intensity or exposure time exceeding the saturation of the sensor may damage the sensor irreparably.

This may occur in following situations:

- Laser light hitting the sensor directly
- Bright light sources (e.g. sunlight) hitting the sensor directly
- Camera is exposed to X-rays

Damages may be caused by:

- Overheating of color filters, microlenses or pixel structures
- Accelerated aging of color filters or pixel structures

To avoid sensor damage

- Use light source with lower intensity
- Use external shutter
- Use optical filters
- Use lens cap (when camera not in use)
- Vary local light spot / laser spot on sensor
- X-rays:
  - Keep camera out of X-ray path. Guide the light source via mirrors to the sensor. Or
  - Use lead glass to protect lens and sensor.
  - Use lead jacket for the body of the camera.

The warranty does not cover damaged cameras caused by X-ray applications or too much light/laser light.

Changing filters safety instructions

Caution

- Mount/dismount lenses and filters in a **dust-free environment**, and **do not** use compressed air (which can push dust into cameras and lenses).
- Use only **optical quality tissue**/cloth if you must clean a lens or filter.

Ask your dealer if you are not familiar with these procedures.

Cautions: Connecting a camera

Caution

MANTA CAMERAS

- **Use only DC power supplies with insulated cases.**
  These are identified by having only **two** power pins.

Safety instructions for board level cameras

Note	**Read the Manta Technical Manual and this safety instructions before use.**
	Abuse or misapplication of the camera may result in limited warranty or cancelation of warranty.

Caution-ESD	**Board level cameras: ESD warnings**

- Only **qualified personnel** is allowed to install and operate the board level cameras.
- Board level cameras are delivered without housing. Handle the sensor board and main board with care. Do not bend the boards. Do not touch the components or contacts on a board. Hold a board by its edges.
- Sensor board and main board are sensitive to electrostatic discharge. To avoid possible damage, handle all static-sensitive boards and components in a static-safe work area. Follow the procedures below.
- ESD (electrostatic discharge): Static electricity can damage the sensor board or the main board of your Board level cameras. To prevent static damage, discharge static electricity from your body before you touch any of your Board level cameras's electronic components, such as sensor board or main board. To do so, use a static-safe work area with static-dissipative mat and wear a static-dissipative wrist strap. Do not hold any components of your Board level cameras against your clothing. Even if you are wearing a wrist strap, your body is grounded but your clothes are not.
- Do not remove the sensor board and main board from its anti-static packaging unless your body is grounded.
- **ESD shielding**: To protect the boards from radiation of other modules or devices use a special ESD protective housing.

Caution	**Board level cameras: General warnings**
	• Be sure that all power to your board level cameras is switched off, before mounting the sensor board or making connections to the camera.
	• Do not connect or disconnect any cables during an electrical storm.
	• Do not use your board level cameras during an electrical storm.
	• To help avoid possible damage to the sensor board or main board, wait 5 seconds after power is switched off, before connecting or disconnecting any cable to the board level cameras.
	• Ensure that nothing rests on the cables of your board level cameras.
	• Keep your board level cameras away from radiators and heat sources.
	• Do not spill food or liquids on your board level cameras.

Caution	**Board level cameras: Loading**
	• Avoid any mechanical forces to the board level cameras, the boards and its components, especially torsional, tensile and compressive forces. Any of these forces may result in damage of the board level cameras, the boards and its components.
	• To avoid damages of the boards, provide cables with an external pull relief so that no force is applied to the connectors itself.

Caution	**Board level cameras: Dirty environments**
	• Always use clean boards.
	• To protect the boards from dirt like dust, liquids or swarf always use the board level cameras only in clean room environment or use a protective housing.

AVT camera cleaning instructions

This chapter describes safety instructions/cautions valid for all AVT **GigE** camera families in case of cleaning lenses, optical filters/protection glass or sensors.

Note

- Please read these instructions before you contact your AVT camera dealer for assistance.
- Ask your AVT camera dealer if you are not familiar with the procedures described below.

Warranty

Caution

Warranty precautions

- To ensure your warranty remains in force:
  - Do not open the camera housing.
  - Follow instructions described below.
  - Use only optical quality tissue/cloth if you must clean a lens or filter.
  - Use only optics cleaner (60% ethyl alcohol, 40% ether). Never use aggressive cleaners like benzine or spirit. Such cleaners may destroy the surface.
  - **Do not use compressed air which can push dust into camera and lens.**
- AVT does not warranty against any physical damage to the sensor/filter/protection glass or lenses caused by the user during the cleaning process.

Caution

General warnings

- Do not touch any optical component with bare fingers. Oil or other impurities may damage the surface.
- Only follow the processes described below if you are familiar with these procedures and if you have the necessary equipment.
- If you are uncomfortable with the outlined precautions, please return your camera to AVT for cleaning.

Caution-ESD   **ESD warnings**

Image sensors are easily damaged by static discharge (ESD).

- Please use anti-static gloves, clothes and materials. Also use conductive shoes.
- Install a conductive mat on the floor and/or working table to prevent the generation of static electricity.

Avoiding the necessity of camera cleaning

When changing camera lenses please follow these procedures:
- Simply hold the camera with the C-mount opening towards the floor, when removing the dust-cap or changing the lens:

Figure 1: Hold camera like this while changing the lens/removing the dust cap of a camera

- Thread the lens onto the camera while holding the camera in this position. This will minimize the possibility of any contaminants falling on the glass surface.
- Always store cameras and lenses with dust-caps installed.

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Is it an impurity? – Identifying impurities

If you observe any image artefacts in your video preview of your AVT camera you may have impurities either on the lens, filter/protection glass or, theoretically on the sensor protection glass, although every AVT camera gets cleaned prior to sealing and shipment.

Impurities (dust, particles or fluids) on the sensor or optical components (*Figure 2: Image with tiny dust on the filter (left) and dust on the sensor (right)* on page 21) will appear as a dark area, patch or spot on the image and will remain fixed in the preview window while you rotate the camera over the target.

Do not confuse this with a pixel defect which will appear as a distinct point. It is crucial to differentiate between dust (e.g. flakes of skin, particles) and other dirt (e.g. liquids, fingerprints, grease). Particles can either rest loosely or can be more or less stuck to the optical surface.
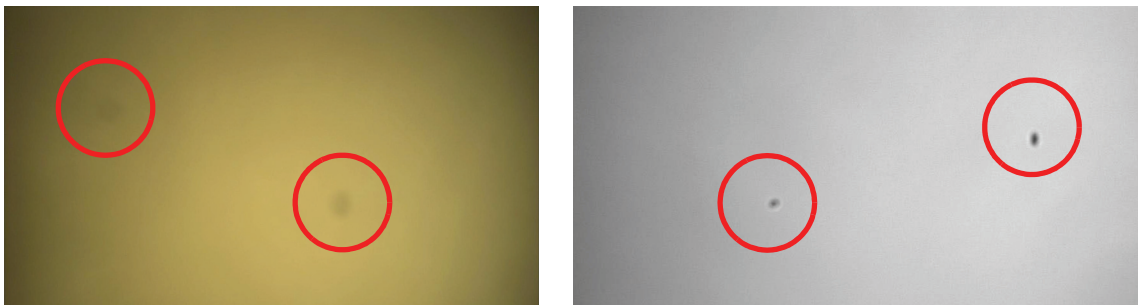
Figure 2: Image with tiny dust on the filter (left) and dust on the sensor (right)

Where is the impurity? – Locating impurities

Before you dismount the lens you should find out if the impurity is on the filter, lens or sensor. Therefore you should record a uniform image (e.g. a white sheet of paper) with the camera. The affected optical surface is identified when a suspected optical component is moved and the dirt follows this movement.

1. If you move only the lens (not the camera) and the impurity moves as well, the impurity is on the lens.

2. If you move the IR cut filter/protection glass window and the impurity moves as well:

   Please carefully remove the filter/protection glass and clean it on both sides using the techniques explained below.

Note

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- Taking out the filter requires special care.
- Ask your dealer to help you if you are not confident with the procedure.

Figure 3: Removing IR cut filter/protection glass using special tool (E9020001)

3. If the impurity is neither on the lens nor the IR cut filter/protection glass, it is probably on the sensor.

Cleaning Instructions

Perform all cleaning operations (lenses, filter/protection glass, sensor in a **dust-free clean-room**. The optical components are very fragile so it is important to avoid touching them with your fingers or any hard material.

1. Unplug the camera from any power supply before cleaning.

2. Apply a small amount of optics cleaner (60% ethyl alcohol, 40% ether) to clean, new lens cleaning tissue.

   Acceptable material includes medical-grade sterile optical cotton, or lens tissue that is chemically pure and free from silicones and other additives.
   – **Do not** use cosmetic cotton.
   – **Do not** use consumer eyeglass cleaning cloths pre-treated with silicon.

Figure 4: Medical-grade sterile optical cotton

The cotton or lens tissue should be moist, but not dripping. Please hold the camera away from your body to avoid falling particles like flakes from skin on the sensor. Hold the camera sensor diagonally upwards.

3. Wipe the glass surface with a spiral motion from the centre to the rim. Normally several spiral wipes are recommended. Wipe only on glass avoiding contact to metal surfaces, because microscopic dirt could be released and could cause scratches on the glass.
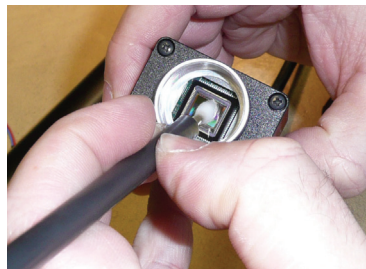
Figure 5: Sensor cleaning

4. When you've finished cleaning, examine the surface in a strong light. Take an out-of-focus picture of a flat, illuminated surface to see if any dirt or dust remains.

5. If dust spots remain, repeat this procedure using new clean lens tissue (as described above).

Caution

- Never wipe lenses with dry swabs or tissue - this causes scratches.
- Do not use any disposable cotton cosmetic swabs; they are not free from contamination.
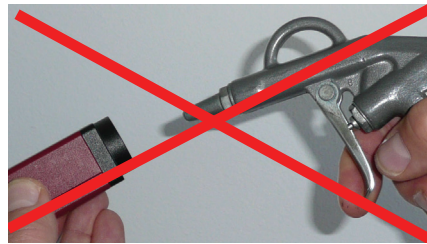
Figure 6: Don't use compressed air

6. If despite warnings you want to clean your camera with compressed air:

Caution

- Use an air blower/compressed air only if you are familiar with cleaning a camera with this instrument.
- **Compressed air may push dust into cameras and lenses**. Therefore keep the pressure at a moderate strength only:
  – The pressure at the tube should be less than 1 bar
  – operating distance: 5-30 cm

7. Gently blow the impurities off with dust-filtered, oil-free air (< 1 bar). Using ionized air will help to remove any dirt stuck to the optical component because of static electricity.

Note

If dust spots remain after cleaning twice, please contact your AVT dealer.

AVT Manta cameras: installing hardware and software

This chapter describes the **hardware installation** of AVT Manta cameras, Gigabit Ethernet network cards (PC or laptop) and the necessary cabling.

Note	For **software/driver installation** read the documentation of the **AVT Universal Package** or **AVT PvAPI SDK**.
	Read this chapter carefully and follow the instructions. nevertheless, if you get problems read Chapter *Troubleshooting* on page 56.

www	Documentation of **AVT Universal Package** or **AVT PvAPI SDK**:
	http://www.alliedvisiontec.com/emea/support/downloads/software.html

Hardware conditions

- AVT Manta camera with corresponding lens
- PC or laptop with built-in Gigabit Ethernet interface
- The following Gigabit Ethernet network cards are recommended for full camera performance:
  - Intel Pro 1000 GT (PCI, 1 port)
  - Intel Pro 1000 PT (PCIe x1, 1 port)
  - Intel CT (PCIe x1, 1 port)
  - Intel Pro 1000 PT Dual Port (PCIe x4, 2 ports)
  - Intel ET2 Server Quad Port (PCIe x4, 4 ports)
  - Intel i340-T4 Server Quad Port (PCIe x4, 4 ports)

www	For **more information on Gigabit Ethernet network cards, switches, corresponding PoE equipment etc.** see **GigE Hardware Selection Guide**:
	http://www.alliedvisiontec.com/emea/products/accessories/gige-accessories.html

- To maximize PC hardware performance, devices that offer jumbo packet support (8 kB MTU size) are recommended.
- For best performance all network devices including cameras, PCs and switches should support the packet size output by the camera.

Note

- The best way is to use a separate (second) Gigabit Ethernet network card in your PC for GigE camera applications. This is important to avoid conflicts and because image transfers from your GigE camera require considerable bandwidth through your network card.
- AVT offers a wide range of Gigabit Ethernet network cards for PCs

www

For **more information on accessories** go to:

http://www.alliedvisiontec.com/emea/products/accessories.html

For **more information on lenses** go to:

http://www.alliedvisiontec.com/emea/products/accessories/lenses.html

To **order accessories online** (by clicking the article and sending an inquiry) visit the **AVT web shop** at:

http://www.alliedvisiontec.com/emea/products/accessories.html

PoE capable cameras

Note

How can I distinguish between PoE capable cameras and cameras that are not PoE capable?

PoE capable cameras have the letters **PoE** written on the camera's label on the bottom side of the camera.

Overview hardware installation

- Install Gigabit Ethernet network card (recommended: a second network card for your PC) and configure network card (Jumbo Frames, Receive Descriptors, Performance Options and IP address settings).

- Install software (**AVT Universal Package** incl. viewer application or **AVT PvAPI SDK** plus corresponding viewer application) and start the viewer:
  see **AVT Universal Package User Guide or Chapter** *Start GigE Sample Viewer application and configure IP settings* on page 36

- Connect camera to PC or laptop and ensure that the camera is powered.
  - If you are supplying power via PoE, the power provided must comply with IEEE **802.3at**.

Note	Read the software manual (**AVT Universal Package User Guide/AVT PvAPI Programmer's Reference Manual**) to get information on acquiring your first image with UniCam or GigE sample viewer and troubleshooting.

www	Documentation of **AVT Universal Package** or **AVT PvAPI SDK**:
	http://www.alliedvisiontec.com/emea/support/downloads/software.html
	For GigE sample viewer see Chapter *Using the GigE Sample Viewer* on page 38.

Installing Gigabit Ethernet network card

Note	Use a recommended network card listed in Chapter *Hardware conditions* on page 25.
	The following steps describe the installation of an Intel PRO/ 1000 GT network card in your host computer. For other network cards, the steps required are almost the same.
	Notes are included for other (non-Intel) network cards where there is likely to be a difference.
	Read also the documentation from your network card manufacturer before installing the network card.

1. **PC:** Install the (second) Gigabit Ethernet network card in your host computer according to the instructions you got from your network card manufacturer.

2. Cancel the **Found new Hardware Wizard** window that may appear when Windows detects your network card.

3. Install the network card driver from your network card manufacturer.

4. [Windows XP] Click **Start** → **Control Panel** → **Network connections**
    [Windows Vista] Click **Start** → Right-click **Network** → **Properties** → **Manage Network Connections** → Click **Properties**
    [Windows 7] Click **Start** → Right-click **Network** → **Change adapter settings** → Right-click on connection corresponding to the network card → Click **Properties** (The Properties window opens; skip the next step.)

5. Double-click the network connection corresponding to the network card that was just installed. [The following steps and screenshots show the **Intel PRO/1000 GT** as an example.]

    The **Properties** window opens.
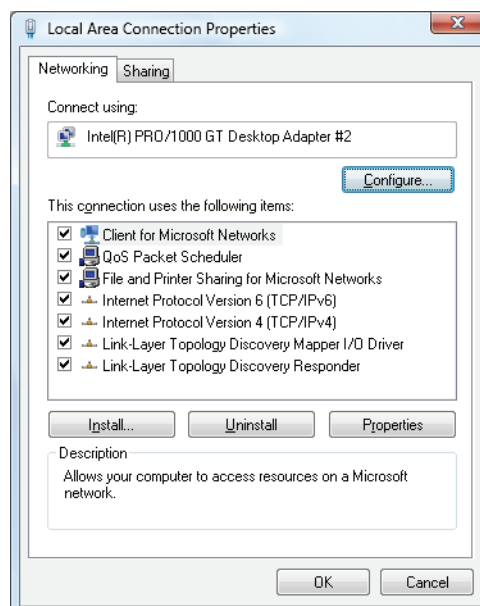
Figure 7: Network card main properties window (Intel PRO/1000 GT under Windows Vista)

6. Click **Configure** and click on **Advanced** tab to configure the network card for Jumbo Frames/Packet.

| Note | The Property list on this tab will be different between differ-ent types/brands of Gigabit Ethernet network cards. Common expressions are **Jumbo Frames** or **Jumbo Packet**.

If **Jumbo Frames** or **Jumbo Packet** does not appear in this list, then your network card probably does not support it.

If your card does not support **Jumbo Frames** or **Jumbo Packet**, then you may not be able to achieve the full performance of the camera. |

The following window opens:
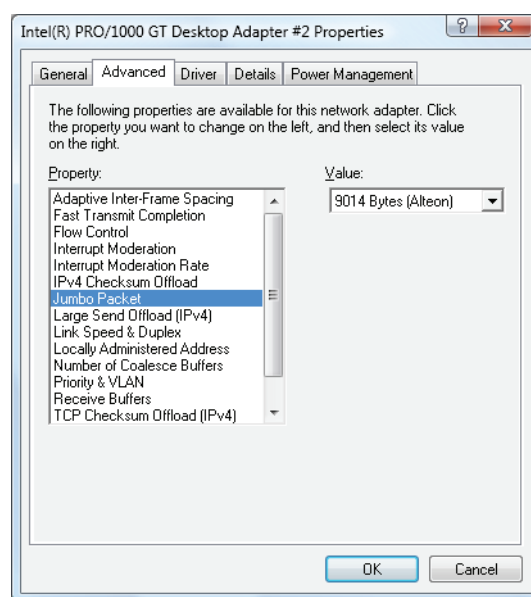
Figure 8: Network card Advanced Properties window (Intel PRO/1000 GT under Windows Vista)

7. In the **Property** list adjust the following:
   – Select **Jumbo Frames** or **Jumbo Packet** and change the value to **9014** bytes or higher.
   – Select **Receive Descriptors** or Receive Buffers on the same list and change the value to **512**.
   – Select **Performance Options** and set **Interrupt Moderate Rate** to **Extreme.** [On newer cards:] Set **Interrupt Moderation Rate** to **Extreme**.

8. Click **Ok** to validate your change.

Method 1 (firewall off)

9a. [Windows XP] Again double-click the network connection corresponding to the network card that was just installed. [The following steps and screenshots show the **Intel PRO/1000 GT** as an example.] The **Properties** window opens. On **Advanced** tab click on **Settings.** Choose

Off to turn off the Windows firewall. [If you installed the GigE filter driver, skip this step. Installation and deinstallation of GigE filter driver can be done with AVT Universal Package.]
[Windows Vista] Click **Start → Control Panel → Security → Turn Windows Firewall on or off →** Choose option **Off**
[Windows 7] Click **Start → Control Panel → System & Security → Windows Firewall → Turn Windows Firewall on or off →** Choose option **Off** (dependent on your surrounding: see Windows 7 screenshot)
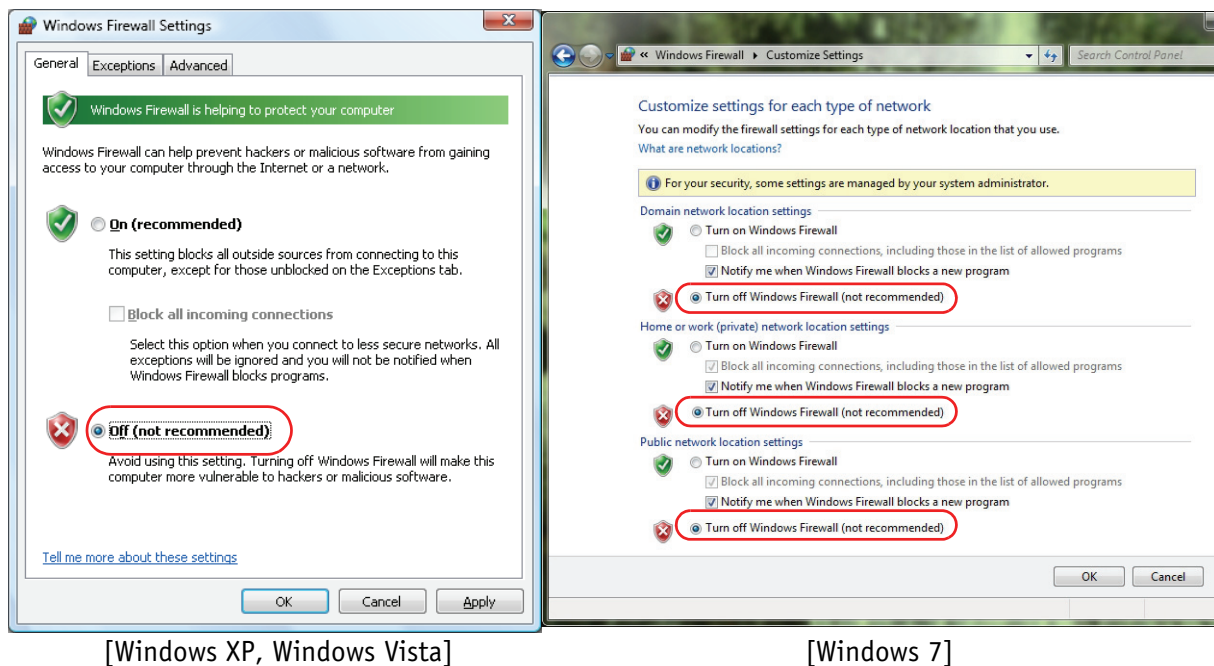
[Windows XP, Windows Vista]   [Windows 7]

Figure 9: Windows firewall settings (Method 1: **Off**)

Note

If your IT environment doesn't allow to deactivate the firewall, then choose Method 2: setting the firewall to on and defining an exception for the AVT UniCam viewer (see the following alternative step b).

Method 2 (firewall on and defining exception for viewer)

9b. [Windows XP, Windows Vista, Windows 7] Choose option **On** (instead Off).
[Windows XP, Windows Vista] On **Exceptions** tab click **Add program...**, search for the viewer file (AVT_UniCam.exe) and click **Open**. In the next two windows click **OK**.
[Windows 7] Go back to the Windows Firewall screen. Click **Allow a program or feature through Windows Firewall →** Check if there is

already an exception in the list shown. If not, click Allow another program.
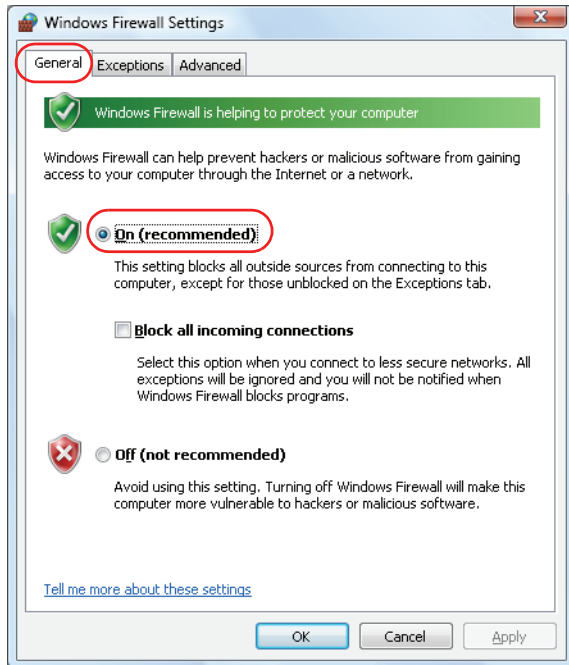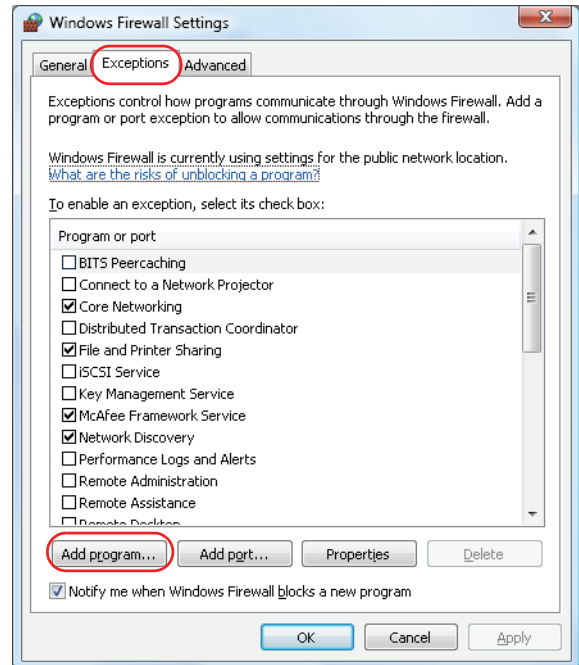
[Windows XP, Windows Vista]   [Windows XP, Windows Vista]
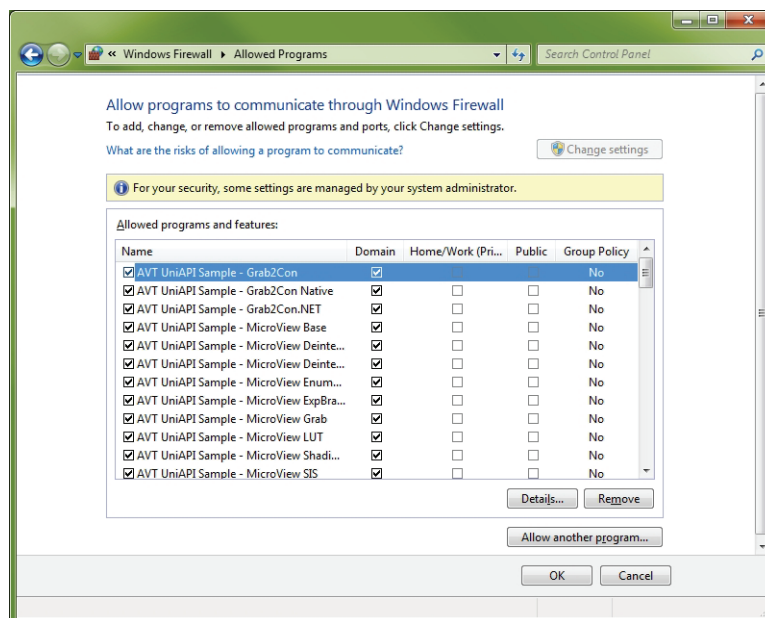
[Windows 7]

Figure 10: Windows firewall setting (Method 2: **On**)

Go on configuring network (Method 1+2)

10. [Windows XP] Again double-click the network connection corresponding to the network card that was just installed. [The following steps and screenshots show the **Intel PRO/1000 GT** as an example.]
[Windows Vista] Click **Start** → Right-click **Network** → **Properties** → **Manage Network Connections** → Click **Properties**
[Windows 7] Click **Start** → Right-click **Network** → **Change adapter settings** → Right-click on connection corresponding to the network card → Click **Properties** (The Properties window opens; skip the next step.)

The **Properties** window opens.
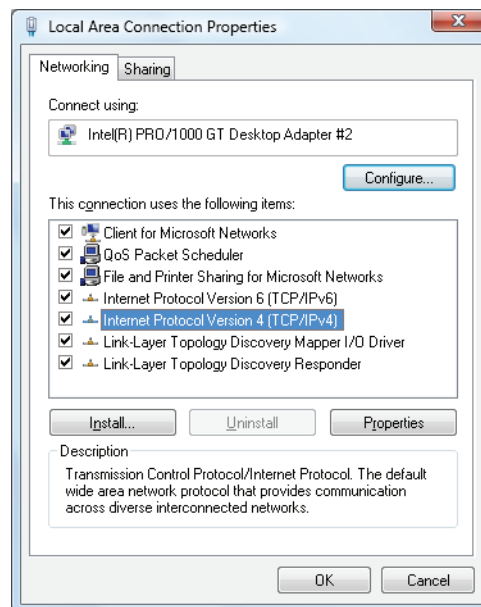
Figure 11: Internet Protocol (TCP/IP) Properties

11. In the list of items select
[Windows XP] **Internet Protocol (TCP/IP)**
[Windows Vista, Windows 7] **Internet Protocol Version4 (TCP/IPv4)**
and click **Properties**.
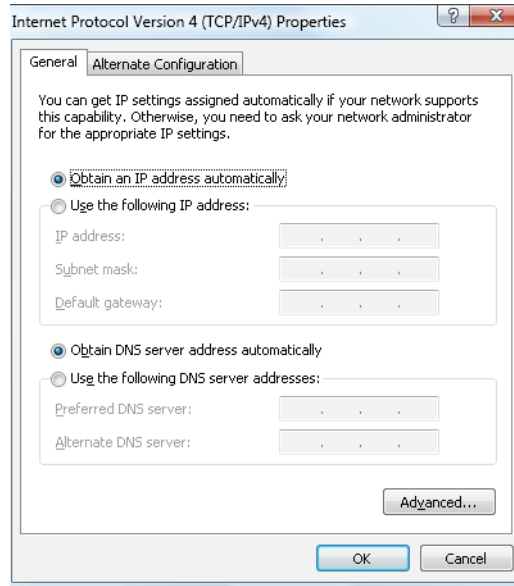
Figure 12: Internet Protocol Version 4 (TCP/IPv4): IP address

12. Choose **Obtain an IP address automatically** and click **OK**.
    – If there is a DHCP server in your network, then the IP address for your network card will be distributed from the DHCP server.
    – If there is no DHCP server in your network, then the Link-Local Address mechanism (APIPA or Auto IP) provides your network card with an IP address.

Note

ⓘ

For more information on the differences and problems of obtaining an IP address automatically or setting the IP address manually see Chapter *Troubleshooting* on page 56.

13. If this network connection is used for the camera only:
    In the **Properties** window, deactivate every item except **Internet Protocol (TCP/IP)** and click **OK**.

    Your Gigabit Ethernet network card is now fully configured and optimized for use with AVT GigE cameras.

Connecting camera to PC or laptop

Caution

• **Use only DC power supplies with insulated power pins.** These are identified by having only **two** power connectors.

1. Insert one end of the CAT-5e (or better) Ethernet cable into your Gigabit Ethernet network card.

2. Insert the other end of the CAT-5e (or better) Ethernet cable into your GigE camera.

3. Connect the external power supply to the GigE camera and check that the camera is powered.
    – You can power the camera via **I/O connector** or
    – You can power the camera via **PoE** (must comply with IEEE **802.3at**).

Start AVT UniCam Viewer application and configure IP settings

Note

The following description refers to the **AVT Universal Package** with **AVT UniCam Viewer**.

For description of GigE sample viewer see Chapter *Using the GigE Sample Viewer* on page 38.

1. Start the **AVT UniCam viewer: Start → All Programs → Allied Vision Technologies → Universal Package → AVT UniCam Viewer**

    Your GigE camera should appear in the list of cameras in the viewer application. This may take a few seconds.

Note

It may take some time for your GigE camera to be recognized by the host computer.

• If your GigE camera doesn't appear in the viewer application's list after 1 minute, reset your GigE camera by disconnecting and re-connecting the power.
• If it still doesn't appear, restart the viewer application.
• If it still doesn't appear, read Chapter *Troubleshooting* on page 56ff.

2. Optional: Configure IP settings manually: Again double-click the network connection corresponding to the network card that was just installed. In the list of items select **Internet Protocol (TCP/IP)** and

click **Properties**. You can see the automatically obtained IP address. Take over this IP address by choosing **Use the following IP address** and click **OK.**

3. Optional: Open the IP settings from AVT UniCam viewer: Right-click desired GigE camera and choose **IP settings** or in menu click on **Camera → IP settings**. Take over the IP address/Subnet mask from your camera list. Choose **Use the following Persistent IP address**, enter this IP address/Subnet mask and click **OK.**
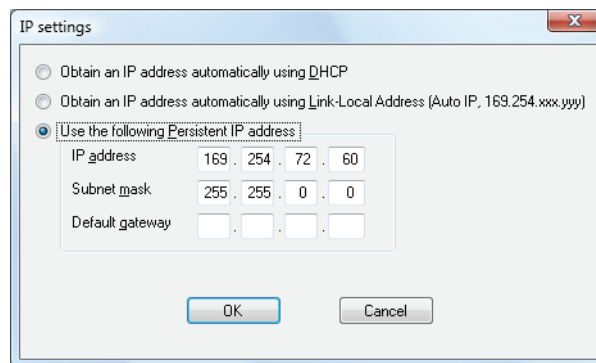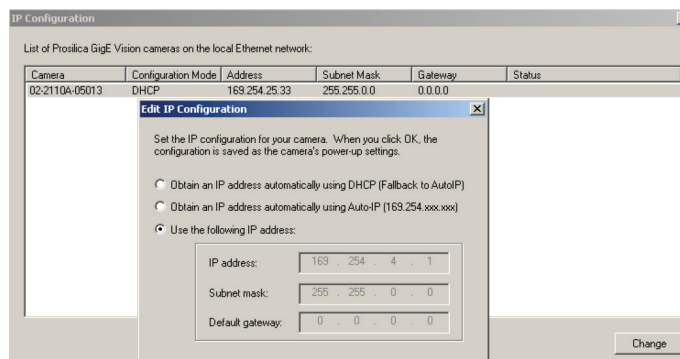

Figure 13: Using Persistent IP address for camera

Note

Background: Automatic acquiring of an IP address may take some time (up to one minute). To shorten this time, you can manually enter IP address for your Gigabit Ethernet network card and also for your GigE camera as described above.

If you want to enter IP addresses manually without getting IP address automatically before, you need knowledge about your network (DHCP server, APIPA) and knowledge of private IP addresses. For more information read Chapter *Trouble-shooting* on page 56ff.

4. Check exposure time and gain. You should now see an image.
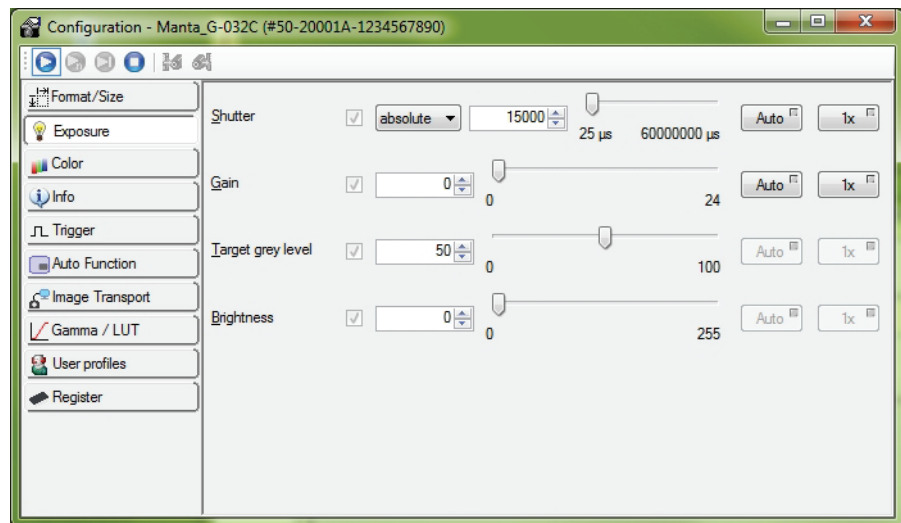
Figure 14: AVT UniCam Viewer

Start GigE Sample Viewer application and configure IP settings

Note

(i)

The following description refers to the **AVT PvAPI SDK** plus corresponding viewer application (**GigE Sample Viewer**).

For more information of GigE Sample Viewer see Chapter *Using the GigE Sample Viewer* on page 38.

1. Download the **GigE Sample Viewer** from the AVT website and install it.

2. Start the **GigE Sample Viewer**: **Start → All Programs → Prosilica → GigEViewer**

   Your GigE camera should appear in the list of cameras in the viewer application. This may take a few seconds.

Note

(i)

It may take some time for your GigE camera to be recognized by the host computer.

- If your GigE camera doesn't appear in the viewer application's list after 1 minute, reset your GigE camera by disconnecting and re-connecting the power.
- If it still doesn't appear, restart the viewer application.
- If it still doesn't appear, read Chapter *Troubleshooting* on page 56ff.

3. Optional: Configure IP settings manually: Again double-click the net-work connection corresponding to the network card that was just installed. In the list of items select **Internet Protocol (TCP/IP)** and click **Properties**. You can see the automatically obtained IP address. Take over this IP address by choosing **Use the following IP address** and click **OK**.

4. Optional: Open the IP settings from **IPConfig** program (which is installed automatically when installing the **GigE Sample Viewer** program):

5. **Start → All Programs → Allied Vision Technologies → GigEIPConfig**
    or
    C:\Program Files\Allied Vision Technologies\GigEViewer\ipconfig.exe)

6. Choose desired GigE camera and click **Change**. Take over the IP address/ Subnet mask from your camera list. Choose **Use the following Persistent IP address**, enter this IP address/Subnet mask and click **OK**.

Figure 15: Using Persistent IP address for camera

Note

ⓘ

Background: Automatic acquiring of an IP address may take some time (up to one minute). To shorten this time, you can manually enter IP address for your Gigabit Ethernet network card and also for your GigE camera as described above.

If you want to enter IP addresses manually without getting IP address automatically before, you need knowledge about your network (DHCP server, APIPA) and knowledge of private IP addresses. For more information read Chapter *Trouble-shooting* on page 56ff.

7. Check exposure time and gain. You should now see an image.

Using the GigE Sample Viewer

This application is used to stream live view images from the camera, adjust the camera parameters and test basic functionality. This can include testing the external trigger cabling by configuring the camera to accept an external trigger rather than run continuously.

Open liveview

Select the desired camera from the cameras window of the **GigE Sample Viewer**.

Left-click the eyeball icon ⊚

A new View window will appear.

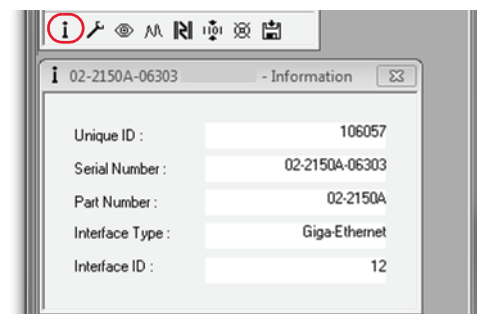Figure 16: GigE Sample Viewer: Live View window

Using default camera settings this will start continuous acquisition from the camera using freerun trigger mode, 15 ms exposure time and 0 dB gain.

Note   If the images are too dark, point the camera directly at a light source to ensure images are not being dropped.

ⓘ

Adjust camera controls

Select the desired camera from the cameras window of the **GigE Sample Viewer**.

Left-click the wrench icon

The controls window will appear:
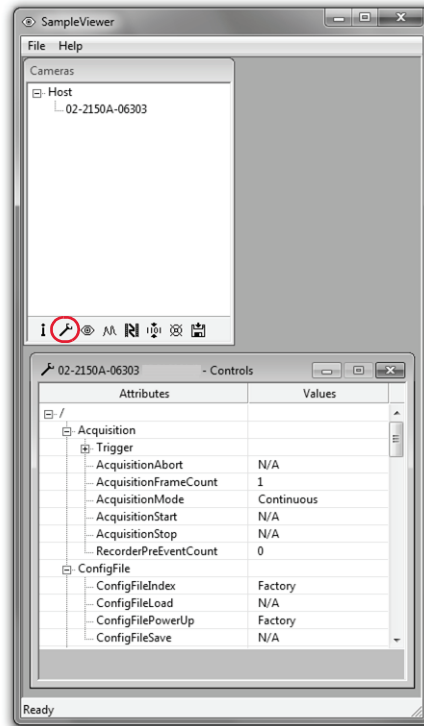
Figure 17: GigE Sample Viewer: Controls window

The controls window is used to configure the camera frame rate, exposure time, color balance, imaging mode, strobe functionality, pixel format, and much more.

www

A detailed explanation of AVT Manta camera controls can be found in the **AVT Manta camera controls** manual
http://www.alliedvisiontec.com/emea/support/downloads/product-literature.html

Live histogram

Select the desired camera from the cameras window of the **GigE Sample Viewer**.

To start Live View from the camera left-click the eyeball icon

Left-click the histogram icon

An 8-bit live histogram will appear:
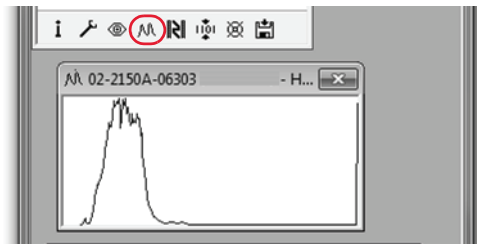
Figure 18: GigE Sample Viewer: Live histogram

A histogram graphs number of pixels on the vertical axis and digital number value on the horizontal axis.

Camera information

Select the desired camera from the cameras window of the **GigE Sample Viewer**.

Left-click the information icon

The information window will appear:

Figure 19: GigE Sample Viewer: Information window

The information window provides camera identify information including the serial and part number.

Event channel

Select the desired camera from the cameras window of the **GigE Sample Viewer**.

Left-click the film icon

The Events window will appear:
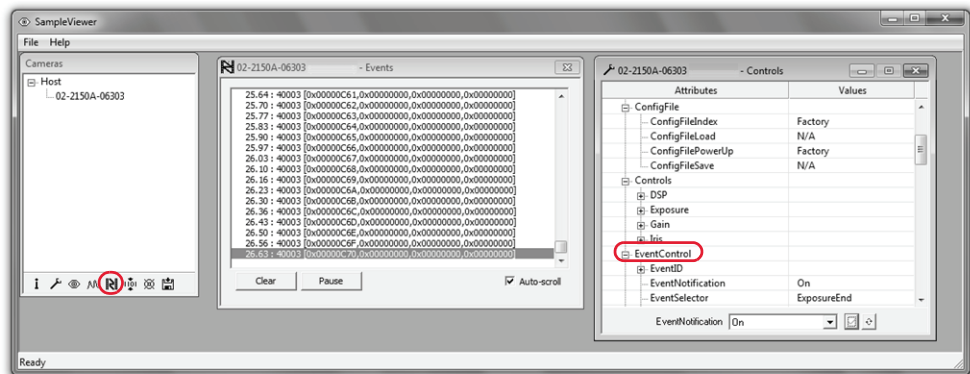
Figure 20: GigE Sample Viewer: Event channel window and Controls window (EventControl)

This is a tool used to monitor in-camera events such as AcquisitionEnd, ExposureStart, ExposureEnd, etc.

The factory default settings disable all event notifications.

Use the camera controls to select which events to monitor.

View the EventID to understand the display format in the Events window.

RS232 serial interface

Select the desired camera from the cameras window of the **GigE Sample Viewer**.

Left-click the 1101 icon

The SerialIO window will appear:
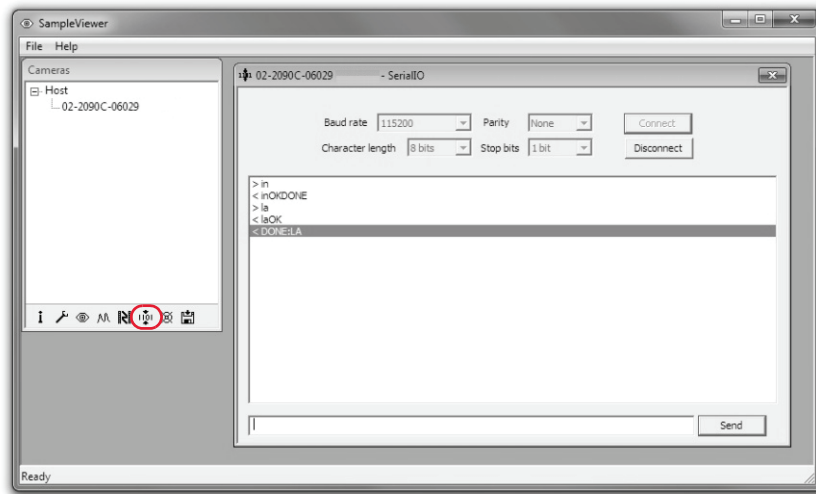
Figure 21: GigE Sample Viewer: SerialIO window

This is a tool used to control the camera's RS232 port which communicates across the RxD and TxD pins on the camera I/O port.

All GigE Vision cameras from AVT offer an RS232 port.

RS232 communication can be used for interfacing the camera to a motorized lens, temperature and pressure sensors, pan tilt zoom and others.

Seek camera

Select the desired camera from the cameras window of the **GigE Sample Viewer**.

Left-click the seek camera icon ⊗

The seek camera window will appear. Enter the camera's IP address into the window shown below:
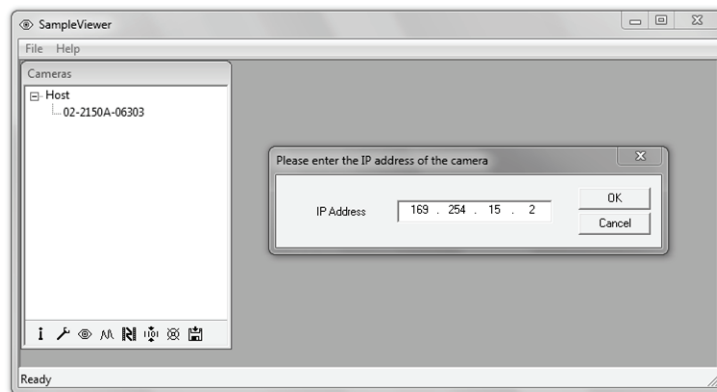
Figure 22: GigE Sample Viewer: Seek camera window

The seek camera window is used when the camera UDP discover broadcast packets are either disabled or blocked by hardware or network administrator preventing the camera from being recognized by the Sample Viewer.

Export camera settings

Select the desired camera from the cameras window of the **GigE Sample Viewer**.

Left-click the floppy disk icon
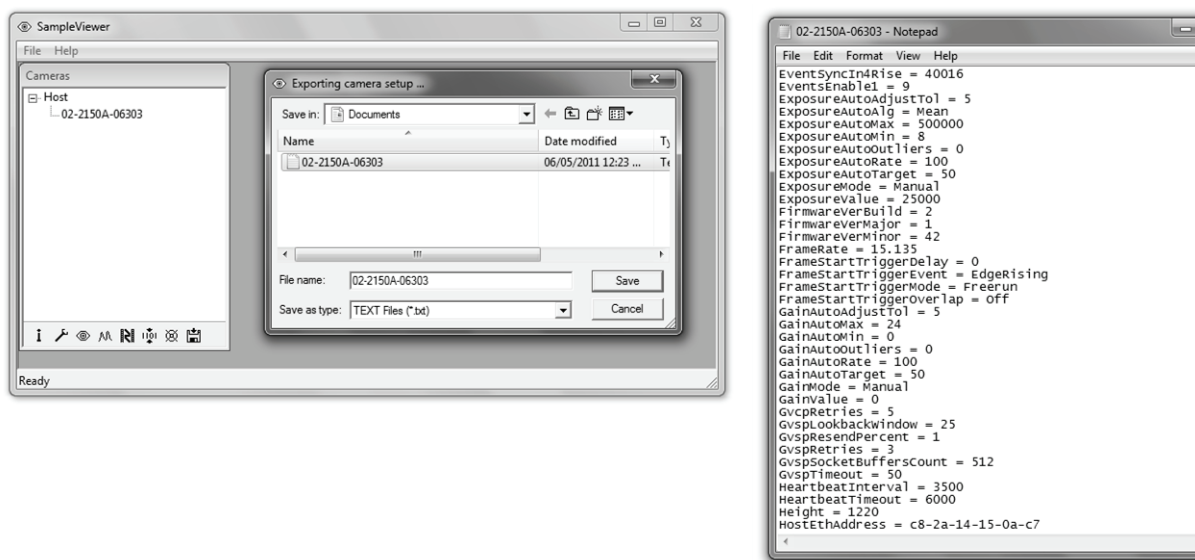
A file explorer window will appear:

Figure 23: GigE Sample Viewer: Export camera settings window + exported text file

The file explorer window requests a download location for the camera setup file. This file captures the current camera settings and creates a simple text file. This file can be uploaded to other cameras allowing both units to utilize the same camera settings.

Note   Load camera settings to other cameras using the CamSetup example code found in PvAPI SDK from AVT.

Camera interfaces

Each AVT Manta camera has the following interfaces:

- The 12-pin camera I/O connector provides different control inputs and output lines and external power (via external power supply).
- One GigE connector with screw lock mechanism provides access to the GigE network and thus makes it possible to control the camera and output frames. For cameras that are PoE capable, the GigE connector can be used to provide power to the camera.

Note

New: From serial number **503323258** on all Manta models incl. PoE and board level versions contain the same main board.

For information on **status LEDs** see Chapter *Status LEDs (MANTA incl. PoE)* on page 46.

Note

- Manta **PoE** models can source power
  - from 802.3af (100 MBit/s and 1000 MBit/s) and
  - from 802.3at compliant PSE devices (Power Sourcing Equipment): such as switches injectors or NICs.
- If both interfaces are used for power (I/O and GigE connector via **PoE**), the camera will only use the power from the I/O connector.

How can I distinguish between PoE capable cameras and cameras that are not PoE capable?

- **PoE** capable cameras have the letters **PoE** written on the camera's label on the back side and the bottom side of the camera.
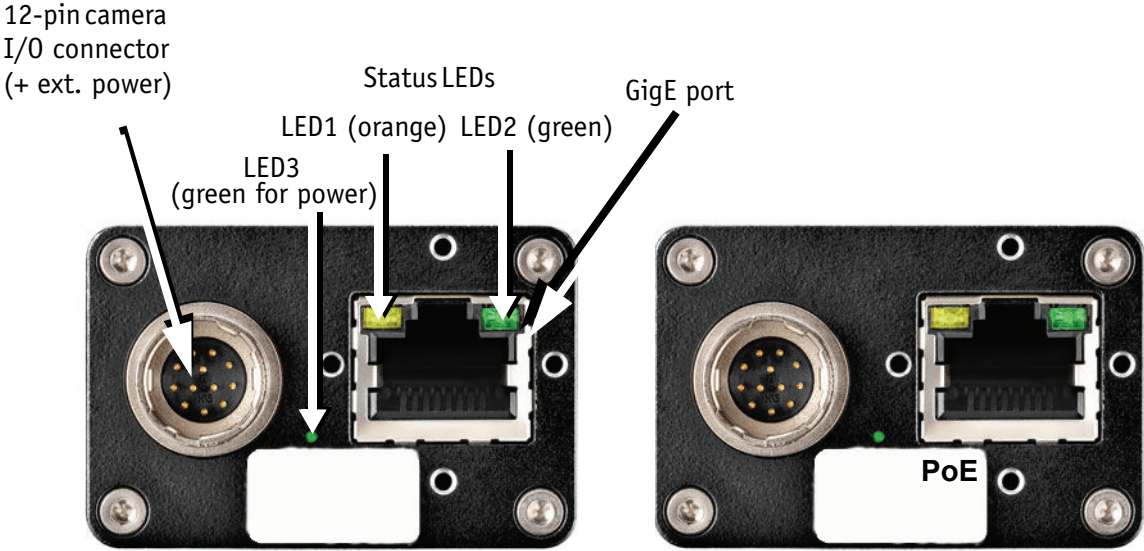
12-pin camera
I/O connector
(+ ext. power)

Status LEDs

GigE port

LED1 (orange) LED2 (green)

LED3
(green for power)

PoE

Figure 24: Example: Rear view of MANTA camera (left: no PoE; right: PoE capable)

Gigabit Ethernet port (MANTA)

This port conforms to the IEEE 802.3 1000BASE-T standard for Gigabit Ethernet over copper. It is recommended that Cat 5e or Cat 6 compatible cabling and connectors be used for best performance. Cable lengths up to 100 m are supported.

- You can also use the Gigabit Ethernet port to provide Power over Ethernet (PoE) to the camera.
- Manta **PoE** models can source power
  - from 802.3af (100 MBit/s and 1000 MBit/s) and
  - from 802.3at compliant PSE devices (Power Sourcing Equipment): such as switches injectors or NICs.

Note   There is no Gigabit Ethernet cable provided with the camera.

For accessories contact customer care:
See Chapter *Contacting Allied Vision Technologies* on page 4.

Status LEDs (MANTA incl. PoE)

The color of the LEDs have the following meaning:

LED color	Status
Solid orange	Ethernet link with 1 Gbit/s established
Flashing orange	Ethernet activity with 1 Gbit/s

Table 3: Status LED**1**

LED color	Status
Solid green	Ethernet link with 100 Mbit/s established
Flashing green	Ethernet activity with 100 Mbit/s

Table 4: Status LED**2**

LED color	Status
Solid green	Camera is powered (HIROSE or PoE)
LED off	No power

Table 5: Status LED**3**

Camera I/O connectors (12 pin) and cables: MANTA

The 12-pin camera I/O connector (MANTA) is also designed for industrial use and, in addition to providing access to the inputs and outputs on the camera, it also provides a serial interface for e.g. the firmware update.

The 12-pin camera I/O connector (MANTA) provides also power if PoE is not used.

The connector is available in straight and angled version.

Note	AVT supplies suitable I/O cables and trigger cables of different lengths (up to 10 m).

www	For more information on cables and on ordering cables online (by clicking the article and sending an inquiry) go to:
	http://www.alliedvisiontec.com/emea/products/accessories/gige-accessories.html

Note	For pinning of the I/O connectors as viewed in pin direction see:
	• Chapter *MANTA (PoE) camera I/O connector pin assignment* on page 49

MANTA (PoE) camera I/O connector pin assignment

Note

From serial number **503323258** on all Manta models incl. PoE and board level versions contain the same main board:

- All I/O circuits have the same properties.
- For **Manta models with older serial number**:
  use Manta Hardware Installation Guide V4.1.0
  (Manta_HardInst_V4.1.0_en.pdf).
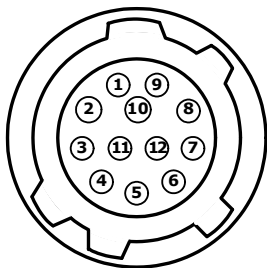
Pin	Signal	Direction	Level	Description
1	External GND	---	GND for RS232 and ext. power	External Ground for RS232 and external power
2	External Power	---	+8 ... +30 V DC	Power supply
3	Video Type Auto Iris Out	---	---	Video type auto iris ($\geq$ FW 1.44)
4	Camera In 1	In	**Standard and PoE** cameras: U_{in}(high) = 3.0 V...24.0 V up to 36 V with external resistor of 3.3 kΩ in series U_{in}(low) = 0 V...1.0 V	Camera Input 1 (GPIn1)
5	---	---	---	---
6	Camera Out 1	Out	Open emitter, max. 20 mA	Camera Output 1 (GPOut1)
7	Camera In GND	In	Common GND for inputs	Camera Common Input Ground (In GND)
8	RxD RS232	In	RS232	Terminal Receive Data
9	TxD RS232	Out	RS232	Terminal Transmit Data
10	Camera Out Power	In	Common VCC for outputs max. 30 V DC	External Power for digital outputs (OutVCC)
11	Camera In 2	In	**Standard and PoE** cameras: U_{in}(high) = 3.0 V...24.0 V U_{in}(low) = 0 V...1.0 V	Camera Input 2 (GPIn2)
12	Camera Out 2	Out	Open emitter, max. 20 mA	Camera Output 2 (GPOut2)

Figure 25: MANTA: Camera I/O connector pin assignment

MANTA input description

MANTA (incl. PoE) input block diagram
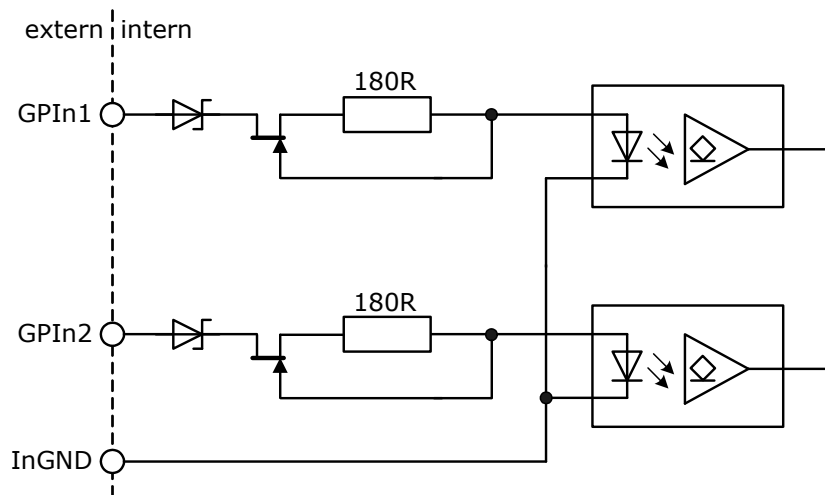## (all Manta models)

Figure 26: MANTA (incl. PoE) input block diagram

The inputs can be connected directly to the system for voltages up to 24 V DC. An external resistor is not necessary.

Note

For customers who designed their system for Manta cameras with serial numbers prior to the above mentioned hardware change:

Use your systems with external resistor without any restrictions.

Parameter	Value
U_{in} (low)	0 V ... 1.0 V
U_{in} (high)	3 V ... 24 V
Current (constant-current source)	3 mA ... 4 mA

Table 6: MANTA (incl. PoE) input parameters

MANTA (incl. PoE) delay and minimum pulse width

The **minimum pulse width** for all MANTA cameras is:
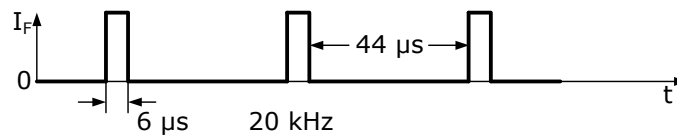
Figure 27: MANTA minimum pulse width

Test conditions

The input signal was driven with 3.3 V and no external additional series resistor.

MANTA output description

MANTA block diagram (also PoE)
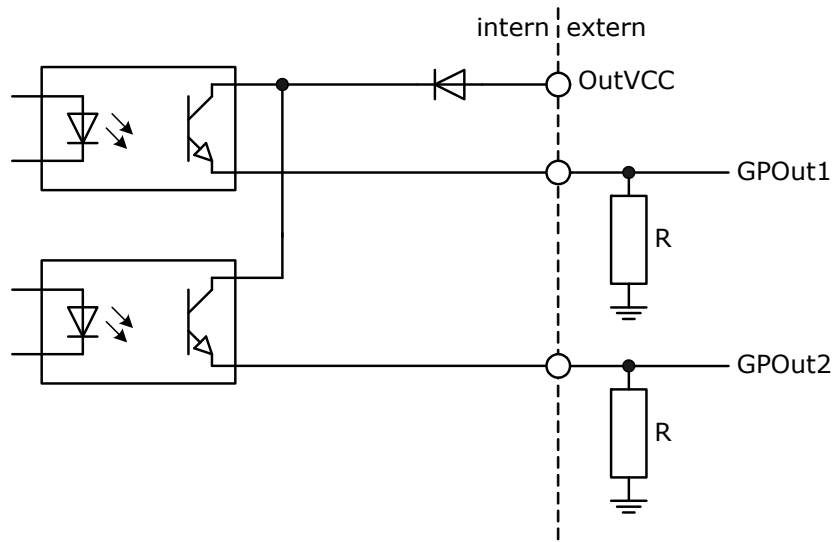
Figure 28: MANTA: output block diagram

Caution	MANTA
	• **Max.** 20 **mA per output**
	• **OutVCC** > 30 **V may damage the camera.**

OutVCC	Resistor value*	
5 V	1.0 kΩ	at ~ 5 mA minimum required current draw
12 V	2.4 kΩ	
24 V	4.7 kΩ	
5 V	270 Ω	at ~ 20 mA maximum allow-able current draw
12 V	620 Ω	
24 V	1.2 kΩ	
* Resistor required if GPOut1/2 connected to a device with < 5 mA draw, i.e. high impedance		

Figure 29: MANTA: OutVCC and external resistor

MANTA delay (also PoE)

The cycle delay for all MANTA cameras is:
tpdLH < 3.5 μs and tpdHL < 30 μs

Note   For this reason we recommend to trigger on the rising edge. This will guarantee a reaction time that is as fast as possible.

t_d	delay time
t_r	rise time
$t_{on}(=t_d+t_r)$	turn-on time

t_s	storage time
t_f	fall time
$t_{off}(=t_s+t_f)$	turn-off time
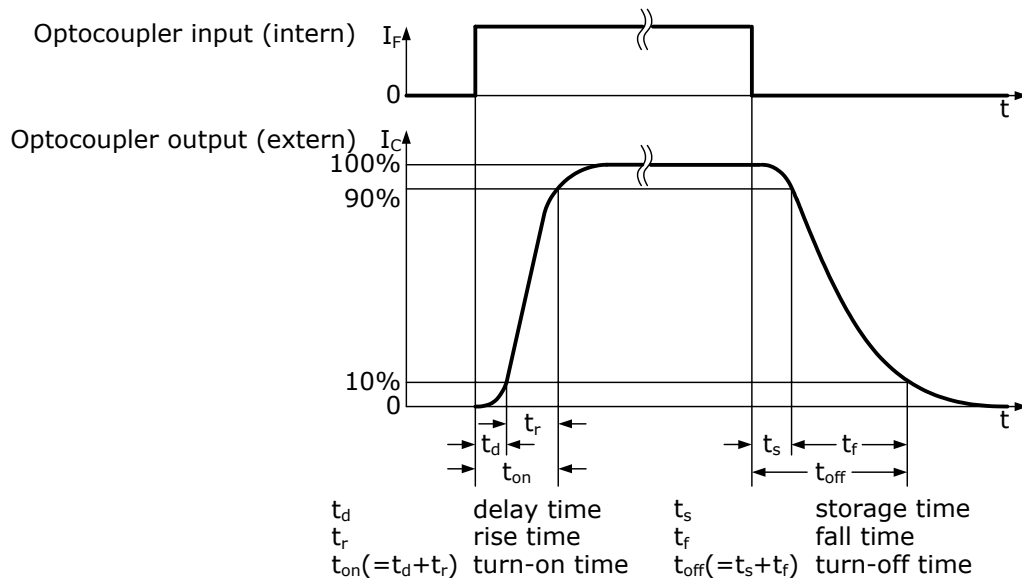
Figure 30: MANTA output switching times

For all MANTA models:

Parameter and value	
$t_d \approx 1$ μs	$t_s \approx 26$ μs
$t_r \approx 1$ μs	$t_f \approx 21$ μs
$t_{on} = t_d + t_r \approx 2$ μs	$t_{off} = t_s + t_f \approx 47$ μs (t_{off} can deviate by ± 5 μs)

Table 7: Parameters for MANTA

Test conditions
Output: external 2.4 kΩ resistor to GND, power input for output ports set to 12 V.

Note   Higher external values will increase the times in table above.

MANTA board level camera: I/O pin assignment

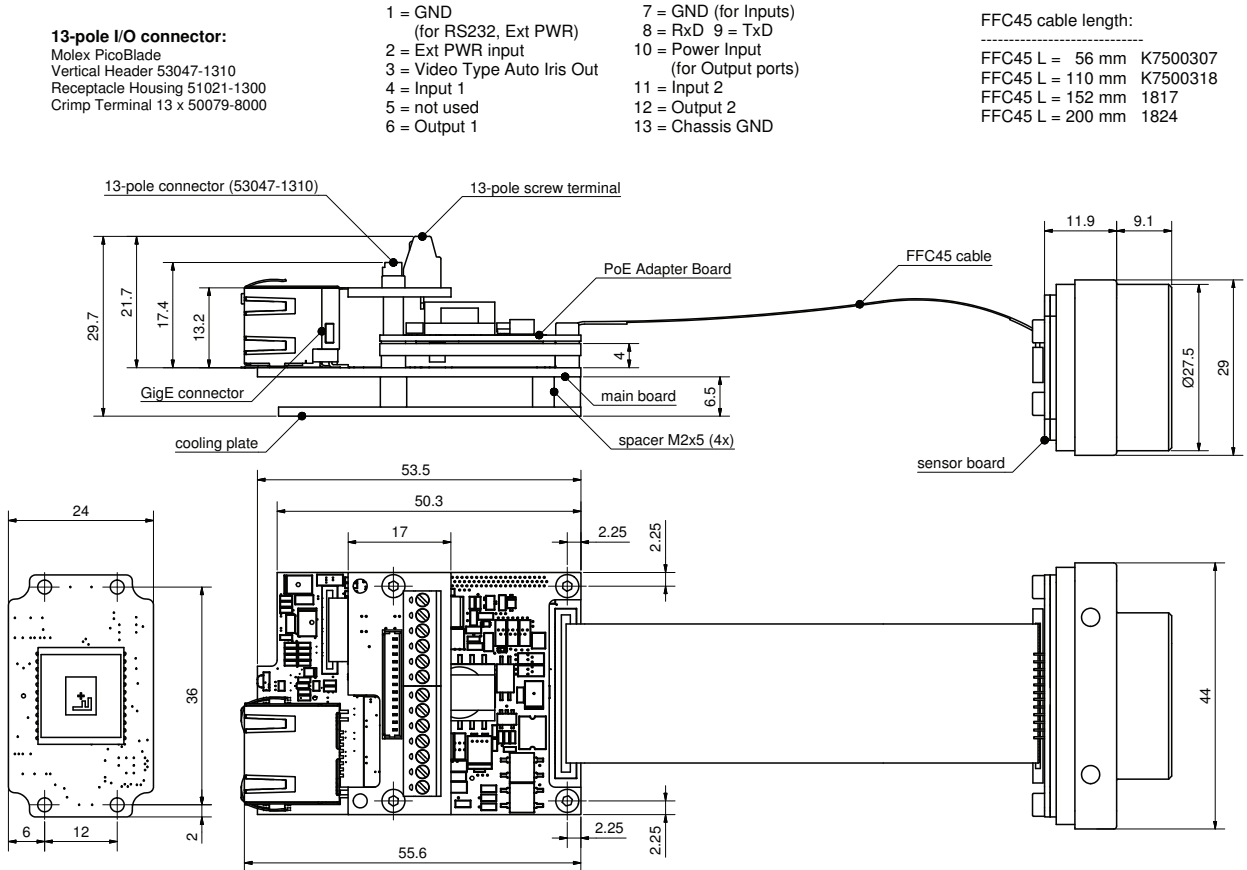The following diagram shows the 13-pole I/O pin connector of a Manta board level camera:

13-pole I/O connector:
Molex PicoBlade
Vertical Header 53047-1310
Receptacle Housing 51021-1300
Crimp Terminal 13 x 50079-8000

1 = GND
    (for RS232, Ext PWR)
2 = Ext PWR input
3 = Video Type Auto Iris Out
4 = Input 1
5 = not used
6 = Output 1

7 = GND (for Inputs)
8 = RxD   9 = TxD
10 = Power Input
    (for Output ports)
11 = Input 2
12 = Output 2
13 = Chassis GND

FFC45 cable length:

FFC45 L =   56 mm   K7500307
FFC45 L = 110 mm   K7500318
FFC45 L = 152 mm   1817
FFC45 L = 200 mm   1824
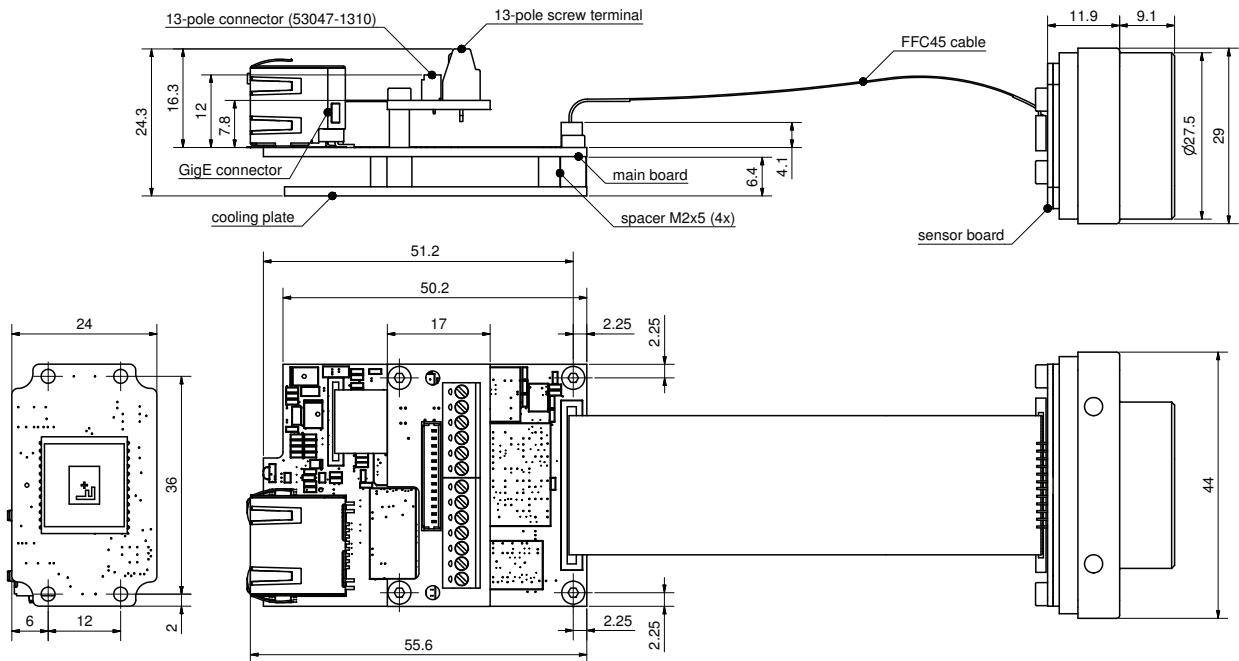
Figure 31: MANTA board level camera: I/O pin assignment

MANTA PoE board level camera: I/O pin assignment

The following diagram shows the 13-pole I/O pin connector of a Manta **PoE** board level camera:

13-pole I/O connector:
Molex PicoBlade
Vertical Header 53047-1310
Receptacle Housing 51021-1300
Crimp Terminal 13 x 50079-8000

1 = GND
    (for RS232, Ext PWR)
2 = Ext PWR input
3 = Video Type Auto Iris Out
4 = Input 1
5 = not used
6 = Output 1

7 = GND (for Inputs)
8 = RxD 9 = TxD
10 = Power Input
    (for Output ports)
11 = Input 2
12 = Output 2
13 = Chassis GND

FFC45 cable length:

FFC45 L = 56 mm K7500307
FFC45 L = 110 mm K7500318
FFC45 L = 152 mm 1817
FFC45 L = 200 mm 1824

Figure 32: MANTA **PoE** board level camera: I/O pin assignment

Troubleshooting

In which way does a new device (GigE camera) get its IP address in the network?

The following flowchart shows the way to access a new device in the network (implemented by AVT):

1. Persistent IP (factory default: disabled)

2. DHCP (if enabled; factory default: enabled)

3. Link-Local Address (APIPA or Auto IP) (always enabled)

Note

Link-Local Address is abbreviated commonly with LLA.

Other terms are: APIPA or Auto IP
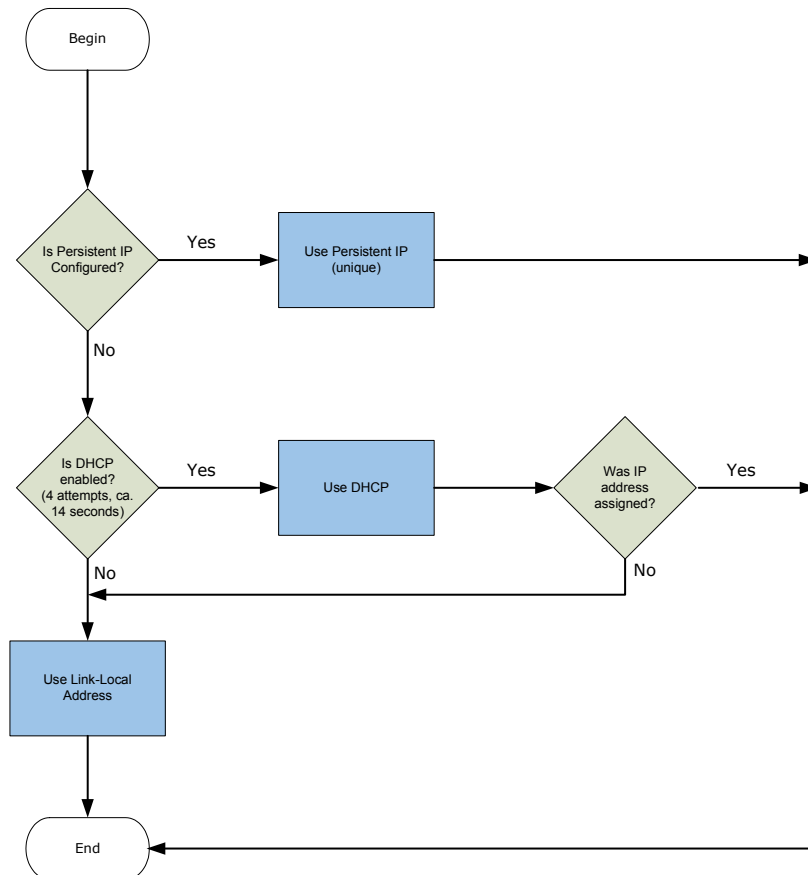
Figure 34: IP address allocation flowchart

Which private IP addresses can I use in my network?

In principal there are 3 private address ranges that can be used. These ranges are defined in RFC 1918. These addresses are private because they are not globally assigned.

IP address range	Networks	Description
10.0.0.1 ... 10.255.255.254 255.0.0.0	1 class A network	
172.16.0.01 ... 172.31.255.254 255.240.0.0	16 class B networks	For more information see: RFC 1918
192.168.0.1 ... 192.168.255.254 255.255.0.0	256 class C networks	

Table 8: Private IP addresses

It is common for organizations to divide it into smaller /16 or /24 networks.

A /24 network for example has the range 192.168.1.0 ... 192.168.1.255 and has therefore 254 hosts.

A second set of special networks is the Link-Local Address (APIPA or Auto IP) range. These ranges are defined in RFC 3330 and RFC 3927:

169.254.0.0
255.255.0.0

What is most done wrong, when connecting a GigE camera to a network is the usage of different network masks for the IP devices (that is GigE camera and PC with Gigabit Ethernet network card).

Example of 2 hosts in different networks (Host1 could be a GigE camera, Host2 could be PC or laptop):

Host	IP address	Description
Host1	192.168.**0**.1 255.255.255.0	In this example you can see: Host2 is in a different network compared to Host1.
Host2	192.168.**1**.2 255.255.255.0	Therefore Host1 and Host2 cannot communicate with each other. Solution: Take care that both hosts are in same network: • Either set third number of Host1 from 0 to 1 or • Set third number of Host2 from 1 to 0.

Table 9: Wrongly addressed IP devices

www

For additional information, see:

RFC 1918
RFC 3330
RFC 3927

http://www.rfc-editor.org/

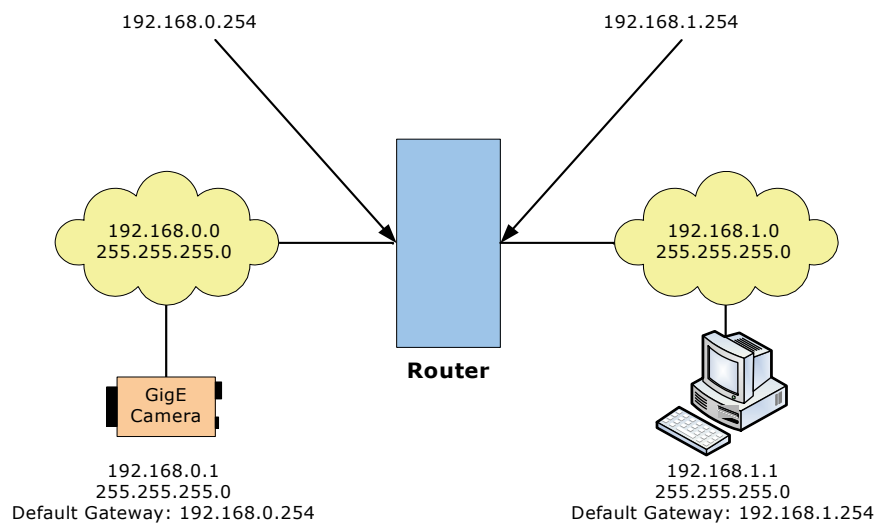Example of GigE camera and PC in different networks:

Figure 35: Two cameras from different networks cannot communicate without router

Because GigE camera and PC are in different networks, they need a router to communicate with each other. For this communication you need a default gateway additionally. If both cameras are in different subnets, check if each camera has the right default gateway.

Note

Using Link-Local Address (APIPA or Auto IP) you cannot communicate between different subnets. Therefore the host would need a default gateway. But when you use Link-Local Address (APIPA or Auto IP) the default gateway is not distributed (see screenshot IPconfig: Default gateway is 0.0.0.0)

Which possibilities do I have to gain a valid IP address in my network?

To open the IP configuration tool:

1.   Start the **AVT UniCam viewer: Start → All Programs → Allied Vision Technologies → Universal Package → AVT UniCam Viewer.**

2.   Right-click desired GigE camera and choose **IP settings** or in menu click on **Camera → IP settings**.
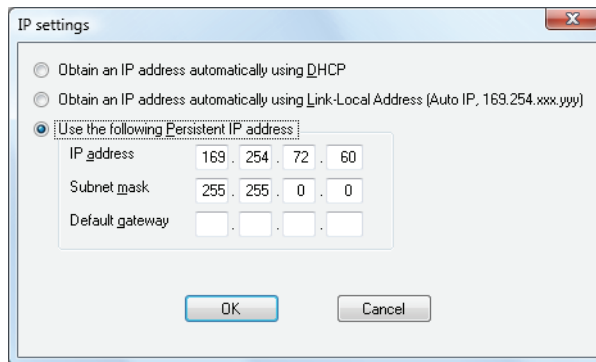
Figure 36: IP settings: 3 methods to get an IP address for GigE camera

In principle you can get the IP address for your GigE camera in 3 ways according to GigE Vision specification:

- Automatically: via DHCP (recommended)
- Automatically: via Link-Local Address (APIPA or Auto IP)
- Manually: assign the IP address manually

Parameter	Link-Local Address (APIPA or Auto IP)	DHCP	Persistent IP (manually)
Installation effort (seen from camera's point of view)	Only use Link-Local Address if DHCP server is not available. [IP settings: automatic rollback to Link-Local Address (Auto IP) if DHCP was chosen]	⇨ Recommended • Least installation effort • Full automatic installation • Communication via several subnets possible • To control the address the DHCP server must have an appropriate configuration.	• Much effort for person who installs camera • High fault liability • Communication via several subnets possible
Advantage	• Very easy • In most cases an IP address is found fast (sometimes several minutes)	• Communication between several subnets possible (but not possible when using AVT UniCam Viewer from AVT Universal package ⇨ Use GigE sample viewer from AVT PvAPI SDK instead).	• Communication between several subnets possible (but not possible when using AVT UniCam Viewer from AVT Universal package ⇨ Use GigE sample viewer from AVT PvAPI SDK instead)
Disadvantage	• No communication between several subnets, because camera gets no default gateway	• No disadvantages from user's point of view (prerequisite: a correctly configured DHCP server)	• When using multi-camera applications: high configuration effort • Knowledge of network configuration needed

Table 10: Methods of getting an IP address

When do I need the option Obtain an IP address automatically using Link-Local Address (Auto IP, 169.254.xxx.yyy)?

This option is ideal for all scenarios which need a short test of the GigE camera. With this method there is no need for a configuration from administrator's side.

What to do if I have no experience in configuration of networks (DHCP/Persistent IP)?

Ask your administrator, he will do for you.

For a short test of the GigE camera use Link-Local Address (APIPA or Auto IP). Note the disadvantage (no communication between subnets): see *Table 10: Methods of getting an IP address* on page 60.

What can I do to have a simple life?

Use 2 Gigabit Ethernet network cards in your PC: one for the PC, one for the GigE camera.

If a DHCP server is available in the same network as the GigE camera, then there are two possibilities for configuring your Gigabit Ethernet network card in your PC:

- Get IP address automatically
- Manually configuring of IP address (Persistent IP)

Index