



# GIGABIT ETHERNET COMPLIANT LIST



HARDWARE HANDBUCH

Q.VITEC GmbH  
Hagenburger Str. 54  
31515 Wunstorf • Germany

Phone +49(0)5031 - 949 432 0  
Fax +49(0)5031 - 949 432 9  
E-Mail [info@qvitec.de](mailto:info@qvitec.de)

# Description

The equipment listed below has been tested successfully with the Q.VITEC camera models featuring GigE interface.

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# 1 Technical Background

The following listed equipment has been tested successfully with Q.VITEC Gigabit Ethernet Cameras. The tested PC configurations, PCI boards as well as accessories performed within the specification without any limitations in the data transfer of cameras in the PC configuration.

## 2 Test platforms

### 2.1 Recommended Standard PC configuration for operation of GigE cameras

Single-camera system		Multi-camera system
CPU	Intel® Core™ i5-2520M CPU @ 2.50GHz, Cores: 4	Intel® Core™ i7-3770 CPU @ 3.40GHz, Cores: 8
RAM	4 GB	8 GB
OS	Microsoft® Windows 7™ 32 / 64 bit systems Microsoft® Windows 10™ 32 / 64 bit systems Linux Kernel 4.7.x 32 / 64 bit systems	
Network	Gigabit Ethernet compliant network controller	
Graphic	Recommended resolution at least 1280 x 1024, color depth 32 bit	

### 2.2 Recommended Standard PC configuration for operation of 10-GigE cameras








Minimum recommended configuration	
CPU	Intel® Core™ i7-7820X @ 3.6 GHz, Cores: 4
RAM	2x 16 GB RAM (Dual Channel)
OS	Microsoft® Windows 7™ 64 bit systems incl. Service Pack 1 or higher Microsoft® Windows 10™ 64 bit systems incl. V1607 or higher Linux Kernel 4.7.x 32 / 64 bit systems
Network	Intel® Ethernet Converged Network Adapter X550-T2
Graphic	Recommended resolution at least 1280 x 1024, color depth 32 bit




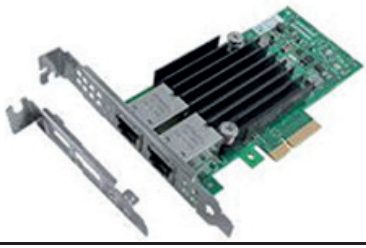
### 2.3 Tested Standard PCs

Test Equipment	Manufacturer / Reseller	Description	Function
PCDERAD345	Casawave Station i5	- Microsoft® Windows® 7™ Professional 32bit - Intel® Core i5-3550, 3,3 GHz - BIOS Intel Corp. 09.08.2012, BHZ7710H.8 6A.0085.2012.0809.1641 - RAM 8GB - Intel Desktop Board DZ77BH-55K	performance within specification without limitation
PCDERAD0520	Dell Optiplex 9020	- Microsoft® Windows® 7™ Enterprise 64bit - Intel® Core i7-4790, 3,6 GHz - BIOS Dell Inc. A09, 20.11.2014 - RAM 16GB	performance within specification without limitation
PCDERAD0536	ASUS X99-F WS	- Microsoft® Windows® 10™ Enterprise 64bit - Intel® Core i7-5820K, 3,3 GHz - BIOS American Megatrends 2003, 04.03.2015 - RAM 16GB	performance within specification without limitation

## 3 Gigabit Ethernet interface






### 3.1 PCI Express boards tested with GigE cameras

	Manufacturer / Reseller	Type / Name	Description
	Intel®	Intel® Ethernet Server Adapter I210-T1	<ul style="list-style-type: none"> <li>- 1-port GigE to PCI Express host adapter</li> <li>- RJ45 connector</li> <li>- Chipset: Intel® i210 Gigabit Controller*</li> <li>- tested Jumbo Frames: 9 kByte</li> <li>- 1 lane connector</li> </ul>
	Adlink	PCIe-GIE74(G)	<ul style="list-style-type: none"> <li>- 4-port GigE to PCI Express host adapter</li> <li>- RJ45 connector</li> <li>- Chipset : Intel® I210-IT *</li> <li>- tested Jumbo Frames: 9 kByte</li> <li>- Power over Ethernet Plus, IEEE 802.3at Compliant, support class 0, 1, 2, 3, 4 and provides up to 30 W</li> <li>- 4-pin Molex connector</li> <li>- Note: 4 lane connector is necessary in the PC</li> </ul>
	Intel®	Intel® Pro / 1000 PT Quad Port LP Server Adapter	<ul style="list-style-type: none"> <li>- 4-port GigE to PCI Express host adapter</li> <li>- RJ45 connector</li> <li>- Chipset : 2 x 82571GB Gigabit Controller*</li> <li>- tested Jumbo Frames: 9 kByte</li> <li>- Note: 4 lane connector is necessary in the PC</li> </ul>
	Intel®	I350-T2 V2	<ul style="list-style-type: none"> <li>- 2-port GigE to PCI Express host adapter</li> <li>- RJ45 connector</li> <li>- Chipset : Intel® I350-AM4 *</li> <li>- IEEE802.3az compliant (EEE – Energy Efficient Ethernet)</li> <li>- tested Jumbo Frames: 9 kByte</li> <li>- improved power supply</li> <li>- Note: 4 lane connector is necessary in the PC</li> </ul>
	Intel®	I350-T4 V2	<ul style="list-style-type: none"> <li>- 4-port GigE to PCI Express host adapter</li> <li>- RJ45 connector</li> <li>- Chipset : Intel® I350-AM4 *</li> <li>- IEEE802.3az compliant (EEE – Energy Efficient Ethernet)</li> <li>- tested Jumbo Frames: 9 kByte</li> <li>- improved power supply</li> <li>- Note: 4 lane connector is necessary in the PC</li> </ul>
	Advantech	PCIe-1672E-AE	<ul style="list-style-type: none"> <li>- 2-port GigE to PCI Express host adapter</li> <li>- RJ45 connector</li> <li>- Chipset : Intel® I350-AM2 *</li> <li>- supported Jumbo Frames: 9 kByte</li> <li>- Power over Ethernet, IEEE 802.3af Compliant, support class 0, 1, 2, 3, 4 and provides up to 18 W</li> <li>- Note: 4 lane connector is necessary in the PC. Please use the external power supply, otherwise lost frames may occur</li> </ul>
	Advantech	PCIe-1674E-AE	<ul style="list-style-type: none"> <li>- 4-port GigE to PCI Express host adapter</li> <li>- RJ45 connector</li> <li>- Chipset : Intel® I350-AM4 *</li> <li>- tested Jumbo Frames: 9 kByte</li> <li>- Power over Ethernet, IEEE 802.3af Compliant, support class 0, 1, 2, 3, 4, and provides up to 18 W</li> <li>- Note: 4 lane connector is necessary in the PC</li> </ul>

	Manufacturer / Reseller	Type / Name	Description
	Matrox®	Concorde	<ul style="list-style-type: none"> <li>- 1-port GigE to PCI Express host adapter</li> <li>- RJ45 connector</li> <li>- tested Jumbo Frames: 9 kByte</li> <li>- 1 lane connector, only runs with MIL (Matrox® Imaging Library)</li> </ul>
	Matrox®	Solios GigE	<ul style="list-style-type: none"> <li>- 4-port GigE to PCI Express host adapter</li> <li>- RJ45 connector</li> <li>- tested Jumbo Frames: 9 kByte</li> <li>- Note: 4 lane connector is necessary in the PC, only runs with MIL (Matrox® Imaging Library)</li> </ul>
	Silicon Software	microEnable IV VQ4-GE	<ul style="list-style-type: none"> <li>- 4-port GigE to PCI Express host adapter</li> <li>- Tested with microDisplay 5.1.0</li> <li>- Note: 4 lane connector is necessary in the PC</li> </ul>
	Intel®	X550-T2	<ul style="list-style-type: none"> <li>- 2-port 10-GigE PCIe server adapter</li> <li>- RJ45 connector</li> <li>- Chipset: Intel® Ethernet Controller X550-AT2</li> <li>- Jumbo Frames supported</li> <li>- Note: 4 lane connector is necessary in the PC</li> </ul>
	IOI	GE10-PCIE4XG202	<ul style="list-style-type: none"> <li>- 1-port 10-GigE PCIe host card</li> <li>- RJ45 connector</li> <li>- Chipset: Intel® Ethernet Controller X550-AT2</li> <li>- Jumbo Frames supported</li> <li>- Note: 4 lane connector is necessary in the PC</li> </ul>

\*) Tests were performed with INTEL driver release version 19.1.51.0. System stability might be affected when using another version. For example with driver version 19.3.141.0 resends and lost frames were encountered.

### 3.2 Express Card bus boards tested with GigE cameras

	Type / Name	Description
	ECL1400	<ul style="list-style-type: none"> <li>• 1-port GigE (RJ45 connector) to Express Card adapter</li> <li>• Chipset: Marvell Yukon 88E8053</li> <li>• 34mm Card bus system</li> <li>• tested Jumbo Frames: 9 kByte</li> </ul>
	ECL1400D	
	EK-106	
	Presto Gigabit Ethernet Pro ExpressCard	<ul style="list-style-type: none"> <li>• 1-port GigE (RJ45 connector) to Express Card adapter</li> <li>• 34mm Card bus system</li> <li>• tested Jumbo Frames: 9 kByte</li> </ul>
	Gigabit Ethernet ExpressCard	<ul style="list-style-type: none"> <li>• 1-port GigE to Express Card adapter</li> <li>• RJ45 connector</li> <li>• Chipset: Marvel Yukon</li> <li>• 34mm Card bus system</li> <li>• tested Jumbo Frames: 9 kByte</li> </ul>

## 4 Tested GigE Chip Sets

Note: Under some circumstances it can happen that some NIC's can't be ordered any more.

The tests are based on below listed configurations between chip set and network card, other configurations have not been tested.

Manufacturer / Reseller	Type	Used Network Interface Card (NIC)	Interface	Tested Throughput*	Notes
Intel	Intel® 82572GI	Intel Pro 1000 PT Server Adapter	PCIe (x1 Lane)	950 Mbit/sec	
		Intel Pro 1000 PT Dual Server Adapter	PCIe (x4 Lane)	1438 Mbit/sec	
	Intel® 82571GB	Intel Pro 1000 PT Quad Port LP Server Adapter	PCIe (x4 Lane)	2879 Mbit/sec	
	Intel® 82572GI	Adlink GIE62+	PCIe (x4 Lane)	1640 Mbit/sec	Please note: Intel® ANS, required for link aggregation, for Windows 10 is supported in the Windows 10 version 1607, build 10.0.14393. Please use the Intel® network driver version 22.0.1 or higher. Future Windows 10 versions might not support ANS.
	Intel® I350-AM4	Intel I350-T2	PCIe (x4 Lane)	1926 Mbit/sec	
		Intel I350-T4		3852 Mbit/sec	
		Advantech PCIe-1674P		3760 Mbit/sec	
		Advantech PCIE-1672E-AE		995 Mbit/sec	
	Intel® i210	Advantech PCIE-1674E-AE	3920 Mbit/sec		
		Intel i210-T1	PCIe (x1 Lane)	950 Mbit/sec	
	Intel® X550-AT2	Adlink PCIe-GIE 74	PCIe (x4 Lane)	3944 Mbit/sec	
		Intel X550-T1	PCIe (x4 Lane)	9,5 Gbit/sec	
IOI GE10-PCIE4XG202	IOI GE10-PCIE4XG202	PCIe (x4 Lane)	9,34 Gbit/sec		
Realtek	RTL 8169	DeLock 61611	PCMCIA	636 Mbit/sec	Packet size >7Kbyte occurs stripes in image
Marvell Yukon	88E8053	Sunix ECL1400	Express Card	950 Mbit/sec	
		Sunix ECL1400D			
		Conrad EK-106			
88E8001	D-Link DGE530T	PCI	790 Mbit/sec		
Agere	ET-131X	Exsys EX-6086	Express Card	950 Mbit/sec	
		DeLock 61383			

\*) tested throughput, the maximum throughput can be higher



# 5 GigE accessories

## 5.1 Network Components


	Manufacturer / Reseller	Description
		<ul style="list-style-type: none"> <li>Industrial 6-Port PoE Gigabit Ethernet Switch</li> <li>Standard housing with DIN Rail</li> <li>5 x RJ45 and 1 x SFP</li> <li>Max. supported Jumbo Frames: 10 kByte</li> <li>Unmanaged switch</li> <li>Power over Ethernet: 15,4 W per port</li> <li>Operating voltage 24 .. 48 VDC (PoE: 48VDC)</li> </ul>
	Dell™ PowerConnect™ 2816	<ul style="list-style-type: none"> <li>16 Ports Gigabit Ethernet switch</li> <li>Switching capacity: 32 Gbit/sec</li> <li>Max. supported Jumbo Frames: 9 kByte</li> <li>Flow control</li> <li>Managed switch</li> <li>Packet Buffer memory: 2 MByte **</li> </ul>
	D-Link® DGS 1005D	<ul style="list-style-type: none"> <li>5 Ports Gigabit Ethernet switch</li> <li>Max. supported Jumbo Frames: 9 kByte</li> <li>Flow control, Unmanaged switch</li> <li>Packet Buffer memory: 64 kByte per device **</li> </ul>
	D-Link® DGS 1008D	<ul style="list-style-type: none"> <li>8 Ports Gigabit Ethernet switch</li> <li>Switching capacity: 16 Gbit/sec</li> <li>Max. supported Jumbo Frames: 9 kByte</li> <li>Flow control, Unmanaged switch</li> <li>Packet Buffer memory: 192 kByte per device**</li> </ul>
	SMC Networks® SMC8024L2 Tigerswitch	<ul style="list-style-type: none"> <li>24 Ports Gigabit Ethernet switch</li> <li>Switching capacity: 48 Gbit/sec</li> <li>Max. supported Jumbo Frames: 9 kByte</li> <li>Flow control, Managed switch</li> <li>Packet Buffer Memory: 400 kByte**</li> </ul>
	Netgear® GS724TP	<ul style="list-style-type: none"> <li>24 Ports Gigabit Ethernet switch</li> <li>Switching capacity: 48 Gbit/sec</li> <li>Max. supported Jumbo Frames: 9 kByte</li> <li>Flow control</li> <li>Managed switch</li> <li>Power over Ethernet until 192 W**</li> <li>Packet Buffer Memory: 3 MByte per system**</li> </ul>
	Netgear® ProSafe XS712T	<ul style="list-style-type: none"> <li>12 Ports 10-Gigabit Ethernet switch, 2 Combo SFP+ Ports</li> <li>Switching capacity: 240 Gbit/sec</li> <li>Max. supported Jumbo Frames: 9 kByte</li> <li>Smart managed switch</li> <li>Packet Buffer Memory: 2 MByte per system**</li> </ul>
	Cisco SG-300-10P	<ul style="list-style-type: none"> <li>10 Ports Gigabit Ethernet switch ( 2 Gigabit Ethernet-Kombi)</li> <li>Switching capacity: 10Gigabit/sec</li> <li>Max. supported Jumbo Frames: 10KByte</li> <li>Flow control</li> <li>Managed switch</li> <li>Power over Ethernet until 62W</li> <li>Packet Buffer memory: 4Megabyte</li> </ul>
	Harting Ha – VIS eCon 3070GB-A-P	<ul style="list-style-type: none"> <li>7 Ports Gigabit Ethernet switch (4x PoE, only active at 48V)</li> <li>Switching capacity: Non-Blocking</li> <li>Max. supported Jumbo Frames: 10KByte</li> <li>Power over Ethernet: 15 W per port</li> <li>Flow control deactivated (advice from manufacturer and IEEE)</li> <li>Unmanaged switch</li> <li>Packet Buffer memory: 1Mbit</li> <li>Operating voltage 24 .. 48 VDC (PoE: 48VDC)</li> </ul>
	Harting Ha-VIS eCon 3070GB-A-PP	<ul style="list-style-type: none"> <li>7 Ports Gigabit Ethernet switch (4x PoE, full voltage range)</li> <li>Switching capacity: Non-Blocking</li> <li>Max. supported Jumbo Frames: 10KByte</li> <li>Flow control deactivated</li> <li>Unmanaged switch</li> <li>Packet Buffer memory: 1Mbit</li> <li>Power over Ethernet: 34.2 W per port</li> <li>Operating voltage 18 .. 60 VDC, typical 24 .. 48 VDC</li> </ul>
	Perle IDS-105GPP	<ul style="list-style-type: none"> <li>7 Ports Gigabit Ethernet switch (4x PoE, full voltage range)</li> <li>Switching capacity: Non-Blocking</li> <li>Max. supported Jumbo Frames: 10KByte</li> <li>Flow control</li> <li>Unmanaged switch</li> <li>Packet Buffer memory: 1Mbit</li> <li>Power over Ethernet: 30 W per port</li> <li>Operating voltage 18 .. 57 VDC, typical 24 .. 48 VDC</li> </ul>

\*) for PoE+ 24 VDC input is needed


\*\*) information from vendor specific datasheet

## 5.2 GigE Cables

### 5.2.1 GigE cables for RJ45 (screw lock) connector to standard RJ45 connector

	Interface	Article-No.	Cable Length
 <ul style="list-style-type: none"> <li>• GigE (Cat5e)</li> <li>• RJ45 – RJ45 connector</li> <li>• screw lock on camera side</li> <li>• Robotic suitable</li> </ul>		CC-GE-05-L-F-R-V2	5 m
		CC-GE-10-L-F-R-V2	10 m
		CC-GE-15-L-F-R-V2	15 m
		CC-GE-20-L-F-R-V2	20 m
		CC-GE-30-L-F-R-V2	30 m

### 5.2.2 GigE cables for x-coded M12 connector to standard RJ45 connector

	Interface	Article-No.	Cable Length
 <ul style="list-style-type: none"> <li>• GigE (Cat6a)</li> <li>• M12-X - RJ45 connector</li> <li>• Drag-chain suitable, high flex</li> </ul>		CC-GE-02-L-M12X-R	2 m
		CC-GE-05-L-M12X-R	5 m
		CC-GE-10-L-M12X-R	10 m
		CC-GE-15-L-M12X-R	15 m
		CC-GE-20-L-M12X-R	20 m
		CC-GE-30-L-M12X-R	30 m



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Q.VITEC GmbH  
Hagenburger Str. 54  
31515 Wunstorf

Tel. +49 (0)5031 - 949 43-20  
Mail: [info@qvitec.de](mailto:info@qvitec.de)  
Web: [www.qvitec.de](http://www.qvitec.de)