Smart Cameras made in Germany

Vision ® Components

The Smart Camera People

VC72XX Operating Manual

Hardware Specifications and special Software Functions of

VC72XX Smart Cameras

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The Smart Camera People

since 1996

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Further References under "Support + Download" on www.vision-components.com:

> „**Support News**" – for up to date information on VC Software and Documentation.

> „**Knowledge Base / FAQ**" - searchable Database with latest software developments, frequently asked questions and demo programs.

> "**Download Areas**" for all documentation and Software downloads – refer to the following table:

Description	Title on Website	Download Center
Introduction to VC Smart Camera programming	📄 Programming Tutorial for VC20XX and VC40XX Cameras	Service & Support ▸ Download Center ▸ Documentation ▸ Getting Started VC
Demo programs and sample code used in the Programming Tutorial	🖥 Tutorial_Code	Service & Support ▸ Download Center ▸ Documentation ▸ Getting Started VC
VC4XXX Hardware Manual	📄 VC4XXX Smart Cameras Hardware Documentation	Service & Support ▸ Download Center ▸ Documentation ▸ Hardware
VCRT Operation System Functions Manual	📄 VCRT 5.0 Software Manual	Service & Support ▸ Download Center ▸ Documentation ▸ Software
VCRT Operation System TCP/IP Functions Manual	📄 VCRT 5.0 TCP/IP Manual	Service & Support ▸ Download Center ▸ Documentation ▸ Software
VCLIB 3.0 Image Processing Library Manual	📄 VCLIB 3.0 Software Manual	Service & Support ▸ Download Center ▸ Documentation ▸ Software

The Light bulb highlights hints and ideas that may be helpful for a development.

This warning sign alerts of possible pitfalls to avoid. Please pay careful attention to sections marked with this sign.

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Table of Contents

1   General Information

VC72XX housing   **VC72XX Smart Camera series rear view**

The **VC72XX Smart Camera series** from Vision Components incorporates the VC nano platform in the well-known Vision Components housing.

Employing CMOS sensors, the image resolution can be changed to the ROI required.

Like with all VC Smart Cameras with Texas Instruments DSP, the operating system VCRT allows multi-tasking. This means for instance that user interface commands can execute in parallel without stopping the inspection process. It is also possible to transfer live images via TCP/IP using a background task.

Interfaces include a video output onto a PC via 100MBit Ethernet interface, a high speed trigger input and output, 12-24 V digital inputs and outputs.

In comparison to the VC nano series, the VC72XX Smart Cameras add a serial RS232 interface.

2 Technical Specifications VC72XX

2.1 Technical Specifications VC7210

Component / Feature	Specification
CMOS Sensor:	1/3" Aptina MT9V034 - also available with color sensor (Bayer Filter)
Active pixels:	752(H) x 480(V) (Wide VGA)
Pixel size:	6.0(H) x 6.0(V) µm
Active sensor size:	4.51(H) x 2.88(V) mm
High-speed shutter:	34 µs + steps of 34 µs
Low-speed shutter:	up to 1.11 sec. adjustable integration time
Integration:	Global shutter
Picture taking:	program-controlled or external high speed trigger, full-frame (55 frames per second) & partial scanning, jitterfree acquisition
Parallel image acquisition	Not available
Clamping:	Internal to sensor
A/D conversion:	25 MHz / 10 bit, only the 8 most significant bits used for grey values
Input LUT	none
Image Display	Via 100 Mbit Ethernet onto PC
Processor:	Texas Instruments TMS320DM6435 "Da Vinci" DSP 700 MHz, 5600MIPS
RAM:	128 Mbytes SDRAM (synchronous dynamic RAM)
Memory capacity:	Up to 300 full-size grey value images in format 752 x 480
Flash EPROM:	32 Mbytes flash EPROM (nonvolatile memory) for programs and data, in-system programmable
SD card:	n.a.
Process interface:	4 inputs / 4 outputs, outputs 4x400 mA
Trigger:	Fast 3.3 V TTL input and output, jitter free image acquisition
Serial Interface:	115,200 bd serial RS232 communication port
Ethernet interface:	10/100 Mbit
CE certification:	CE Certification from Vision Components
Storage Conditions	Temperature: -20 to 60 deg C, Max. humidity: 90%, non condensing.
Operating Conditions	Temperature: 0… +55 deg C, Max. humidity: 80%, non condensing.
Power Supply	24V +/-20% DC, max. 300 mA
Power Consumption	≈2.0W
Lens Mount	C Mount with IR-filter

The following diagram shows the **maximum** reachable (with the shortest shutter time) framerate according to the number of captured lines for the VC7210, in 2 cases:
-    with an image width of 752 pixels
-    with an image width of 640 pixels or less
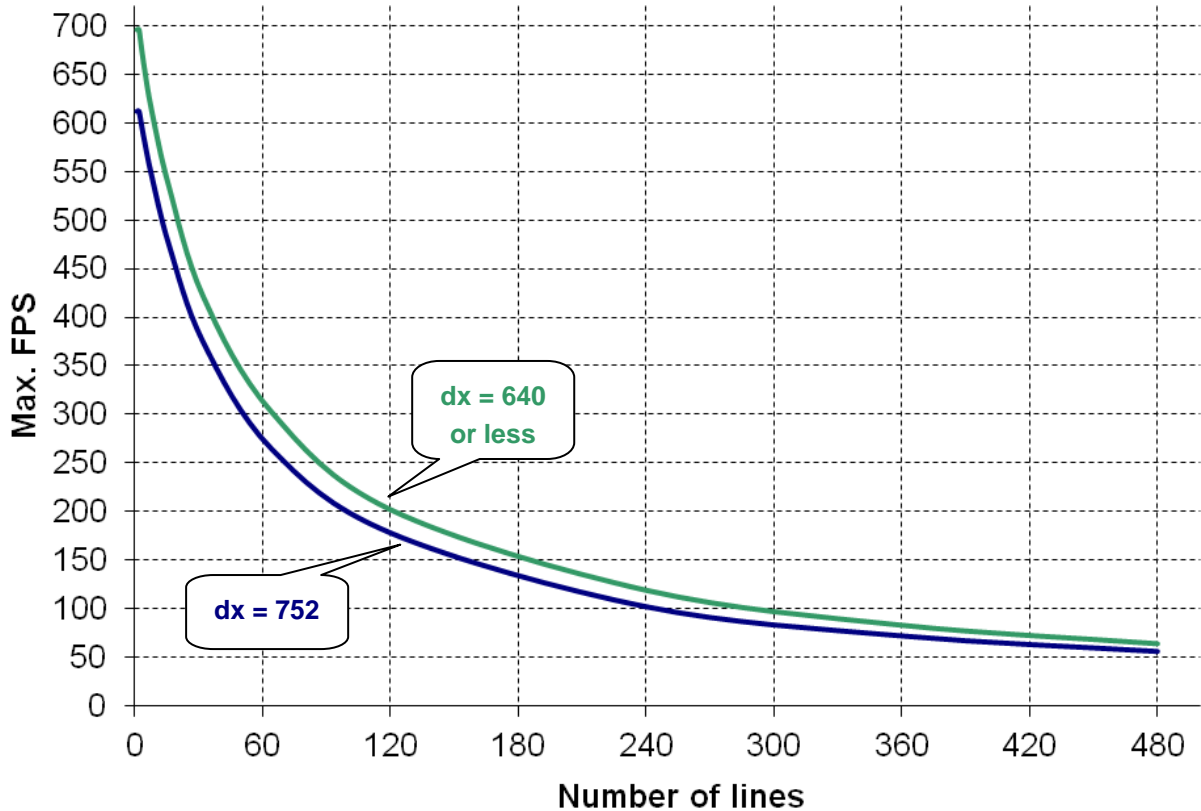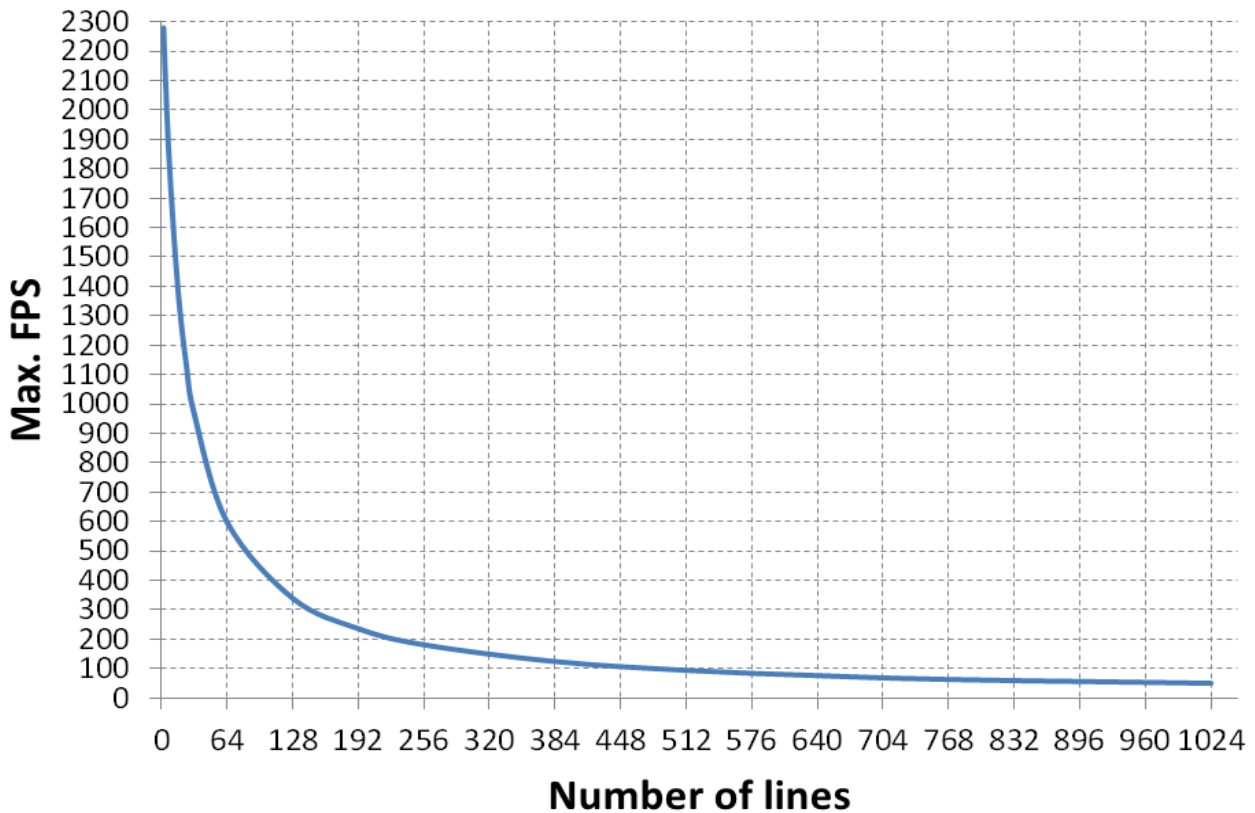

The following table gives some example values.

Number of lines	Max. framerate (FPS) dx = 752	Max. framerate (FPS) dx = 640 or less
480	56	64
360	72	83
240	102	119
120	178	202
64	265	303
32	375	422
16	475	535
8	545	612
4	588	664
2	612	696
1	612	696

2.2 Technical Specifications VC7211

Component / Feature	Specification
CMOS Sensor:	1/1.8" e2V EV76C560 - also available with color sensor (Bayer Filter)
Active pixels:	1280(H) x 1024(V)
Pixel size:	5.3(H) x 5.3(V) µm
Active sensor size:	6.8(H) x 5.5(V) mm
High-speed shutter:	21 µs + steps of 21 µs
Low-speed shutter:	up to 1.35 sec. adjustable integration time
Integration:	Global shutter
Picture taking:	program-controlled or external high speed trigger, full-frame (50 frames per second) & partial scanning (up to 4500 fps for 1280x1), jitterfree acquisition
Parallel image acquisition	Not available
Clamping:	Internal to sensor
A/D conversion:	100 MHz / 10 bit, only the 8 most significant bits used for grey values
Input LUT	none
Image Display	Via 100 Mbit Ethernet onto PC
Processor:	Texas Instruments TMS320DM6435 "Da Vinci" DSP 700 MHz, 5600MIPS
RAM:	128 Mbytes SDRAM (synchronous dynamic RAM)
Memory capacity:	Up to 90 full-size grey value images in format 1280 x 1024
Flash EPROM:	32 Mbytes flash EPROM (nonvolatile memory) for programs and data, in-system programmable
SD card:	n.a.
Process interface:	4 inputs / 4 outputs, outputs 4x400 mA
Trigger:	Fast 3.3 V TTL input and output, jitter free image acquisition
Serial Interface:	115,200 bd serial RS232 communication port
Ethernet interface:	10/100 Mbit
CE certification:	CE Certification from Vision Components
Storage Conditions	Temperature: -20 to 60 deg C, Max. humidity: 90%, non condensing.
Operating Conditions	Temperature: 0… +55 deg C, Max. humidity: 80%, non condensing.
Power Supply	24V +/-20% DC, max. 300 mA
Power Consumption	≈2.0W
Lens Mount	C Mount with IR-filter

The following diagram shows the **maximum** reachable (with the shortest shutter time) framerate according to the number of captured lines for the VC7211:

Number of lines

The following table gives some example values.

Resolution	Max. framerate (FPS)
1280 x 1024	50
1280 x 768	63
1280 x 640	76
1280 x 512	94
1280 x 384	124
1280 x 256	181
1280 x 192	236
1280 x 128	339
1280 x 64	598
1280 x 32	965
1280 x 16	1392
1280 x 8	1795
1280 x 4	2092
1280 x 2	2280
1280 x 1	4500

2.3 Technical Specifications VC7215

Component / Feature	Specification
CMOS Sensor:	1/1.8" e2V EV76C570 - also available with color sensor (Bayer Filter)
Active pixels:	1600(H) x 1200(V)
Pixel size:	4.5(H) x 4.5(V) µm
Active sensor size:	7.2(H) x 5.4(V) mm
High-speed shutter:	1 µs
Low-speed shutter:	up to 1.28 sec. adjustable integration time
Integration:	Global shutter
Picture taking:	program-controlled or external high speed trigger, full-frame (42 frames per second) & partial scanning, jitterfree acquisition
Parallel image acquisition	Not available
Clamping:	Internal to sensor
A/D conversion:	100 MHz / 10 bit, only the 8 most significant bits used for grey values
Input LUT	none
Image Display	Via 100 Mbit Ethernet onto PC
Processor:	Texas Instruments TMS320DM6435 "Da Vinci" DSP 700 MHz, 5600MIPS
RAM:	128 Mbytes SDRAM (synchronous dynamic RAM)
Memory capacity:	Up to 60 full-size grey value images in format 1600 x 1200
Flash EPROM:	32 Mbytes flash EPROM (nonvolatile memory) for programs and data, in-system programmable
SD card:	n.a.
Process interface:	4 inputs / 4 outputs, outputs 4x400 mA
Trigger:	Fast 3.3 V TTL input and output, jitter free image acquisition
Serial Interface:	115,200 bd serial RS232 communication port
Ethernet interface:	10/100 Mbit
CE certification:	CE Certification from Vision Components
Storage Conditions	Temperature: -20 to 60 deg C, Max. humidity: 90%, non condensing.
Operating Conditions	Temperature: 0… +55 deg C, Max. humidity: 80%, non condensing.
Power Supply	24V +/-20% DC, max. 300 mA
Power Consumption	≈2.0W
Lens Mount	C Mount with IR-filter

The following table gives some example values of maximum reachable framerates for the VC7215.

Resolution	Max. framerate (FPS)
1600 x 1200	42
1600 x 1024	49
1600 x 768	64
1600 x 640	77
1600 x 512	96
1600 x 384	127
1600 x 256	185
1600 x 192	240
1600 x 128	345
1600 x 64	609
1600 x 32	984
1600 x 16	1420
1600 x 8	1795

2.4 Technical Specifications VC7222

| Component / Feature	Specification
CMOS Sensor:	2/3" CMOSIS CMV2000 - also available with color sensor (Bayer Filter)
Active pixels:	2048(H) x 1088(V)
Pixel size:	5.5(H) x 5.5(V) µm
Active sensor size:	11.3(H) x 6.0(V) mm
High-speed shutter:	16.3 µs + steps of 5.1 µs
Low-speed shutter:	-
Integration:	Global shutter
Picture taking:	program-controlled or external high speed trigger, full-frame (46 frames per second) & partial scanning, jitterfree acquisition
Parallel image acquisition	Not available
Clamping:	Internal to sensor
A/D conversion:	100 MHz / 10 bit, only the 8 most significant bits used for grey values
Input LUT	none
Image Display	Via 100 Mbit Ethernet onto PC
Processor:	Texas Instruments TMS320DM6435 "Da Vinci" DSP 700 MHz, 5600MIPS
RAM:	128 Mbytes SDRAM (synchronous dynamic RAM)
Memory capacity:	Up to 50 full-size grey value images in format 2048 x 1088
Flash EPROM:	32 Mbytes flash EPROM (nonvolatile memory) for programs and data, in-system programmable
SD card:	n.a.
Process interface:	4 inputs / 4 outputs, outputs 4x400 mA
Trigger:	Fast 3.3 V TTL input and output, jitter free image acquisition
Serial Interface:	115,200 bd serial RS232 communication port
Ethernet interface:	10/100 Mbit
CE certification:	CE Certification from Vision Components
Storage Conditions	Temperature: -20 to 60 deg C, Max. humidity: 90%, non condensing.
Operating Conditions	Temperature: 0… +55 deg C, Max. humidity: 80%, non condensing.
Power Supply	24V +/-20% DC, max. 300 mA
Power Consumption	≈2.0W
Lens Mount	C Mount with IR-filter

2.5 Technical Specifications VC7224

Component / Feature	Specification
CMOS Sensor:	1" CMOSIS CMV4000 - also available with color sensor (Bayer Filter)
Active pixels:	2048(H) x 2048(V)
Pixel size:	5.5(H) x 5.5(V) µm
Active sensor size:	11.3(H) x 11.3(V) mm
High-speed shutter:	27.3 µs + steps of 5.1 µs
Low-speed shutter:	-
Integration:	Global shutter
Picture taking:	program-controlled or external high speed trigger, full-frame (23 frames per second) & partial scanning, jitterfree acquisition
Parallel image acquisition	Not available
Clamping:	Internal to sensor
A/D conversion:	100 MHz / 10 bit, only the 8 most significant bits used for grey values
Input LUT	none
Image Display	Via 100 Mbit Ethernet onto PC
Processor:	Texas Instruments TMS320DM6435 "Da Vinci" DSP 700 MHz, 5600MIPS
RAM:	128 Mbytes SDRAM (synchronous dynamic RAM)
Memory capacity:	Up to 25 full-size grey value images in format 2048 x 2048
Flash EPROM:	32 Mbytes flash EPROM (nonvolatile memory) for programs and data, in-system programmable
SD card:	n.a.
Process interface:	4 inputs / 4 outputs, outputs 4x400 mA
Trigger:	Fast 3.3 V TTL input and output, jitter free image acquisition
Serial Interface:	115,200 bd serial RS232 communication port
Ethernet interface:	10/100 Mbit
CE certification:	CE Certification from Vision Components
Storage Conditions	Temperature: -20 to 60 deg C, Max. humidity: 90%, non condensing.
Operating Conditions	Temperature: 0… +55 deg C, Max. humidity: 80%, non condensing.
Power Supply	24V +/-20% DC, max. 300 mA
Power Consumption	≈2.0W
Lens Mount	C Mount with IR-filter

The following table gives some example values of the maximum reachable framerate with the VC7222 and VC7224 cameras.

Resolution	Max. framerate (FPS)
1024 x 768	120
1024 x 256	370
640 x 480	320
2048 x 64	637
2048 x 1	15 – 24 kHz

3   VC72XX Camera Interfaces
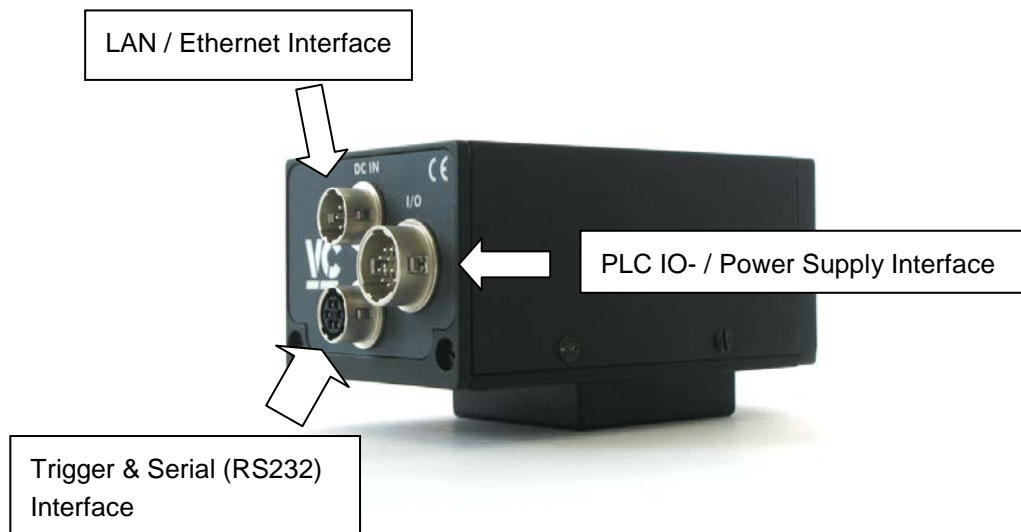
The VC72XX Smart Camera incorporates the following connector interfaces:

1. LAN / Ethernet Interface
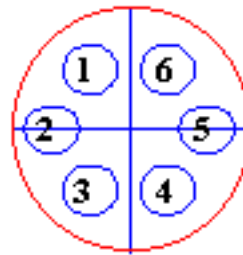2. Trigger & Serial (RS232) Interface
3. PLC IO and Power Supply Interface

The pin assignments, electrical specifications as well as available accessories are shown for each interface connector in the following sections.
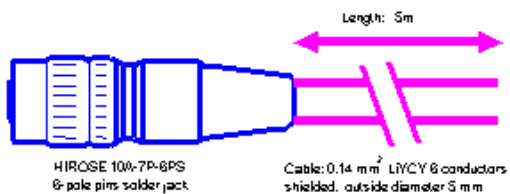
3.1 LAN / Ethernet Interface

3.1.1 Pin Assignments LAN / Ethernet Interface

Signal	Pin
T+	2
T-	1
R+	6
R-	5
-	3
-	4

rear view camera socket:

3.1.2 Available Accessories for LAN / Ethernet socket

Signal	Pin (to cam.)	Pin (to PC)	Cable Color 20m patch cable	Cable Color 10m patch cable
T+	2	1	yellow	white/pink
T-	1	2	orange	pink
R+	6	3	white/green	white/green
R-	5	6	green	green
-	3	NC	-	-
-	4	NC	-	-

Refer to section 4.2 for a list of available cables with order numbers.

3.2   Trigger & Serial (RS232) Interface

The trigger interface incorporates 2 functions:

1.   Image trigger input for hardware controlled image acquisition.
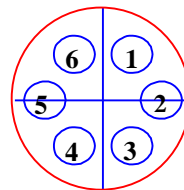2.   Serial RS232 interface.

Multiple use of the trigger interface:

A "Y" adaptor cable is available for connecting several components to the trigger interface – refer to section 3.2.4 for details.
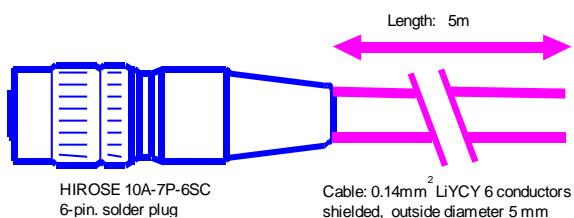
3.2.1   Pin Assignments Trigger & Serial (RS232) Interface

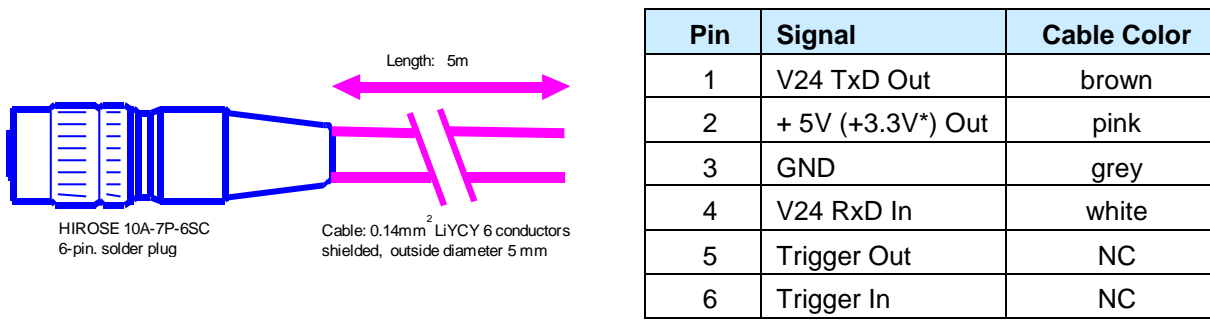| Pin	Signals RS232 / Standard Trigger
1	V24 TxD Out
2	+ 5V (+3.3V*) Out
3	GND
4	V24 RxD In / Keypad in
5	Trigger Out
6	Trigger In

rear view camera socket:

3.2.2   Trigger Cable

Length: 5m

HIROSE 10A-7P-6SC
6-pin. solder plug

Cable: 0.14mm^2 LiYCY 6 conductors
shielded, outside diameter 5 mm

Pin	Signal	Cable Color
1	V24 TxD Out	green
2	+ 5V (+3.3V*) Out	brown
3	GND	white
4	V24 RxD In	pink
5	Trigger Out	grey
6	Trigger In	yellow

Equipped on one end with a Hirose plug, length 5m, 10m or 25m
Refer to section 4.2 for a list of available cables with order numbers.

3.2.3   Serial (RS232) Cable

Length: 5m

HIROSE 10A-7P-6SC
6-pin. solder plug

Cable: 0.14mm^2 LiYCY 6 conductors
shielded, outside diameter 5 mm

Pin	Signal	Cable Color
1	V24 TxD Out	brown
2	+ 5V (+3.3V*) Out	pink
3	GND	grey
4	V24 RxD In	white
5	Trigger Out	NC
6	Trigger In	NC

Equipped on one end with a Hirose plug, length 5m, 10m or 25m and on the other end with a 9 pin D-sub connector. This cable can also be ordered without the D-sub connector.

Refer to section 4.2 for a list of available cables with order numbers.

3.2.4   Y-Cable

length 0.25m

length 0.25m

shrunk-on hose
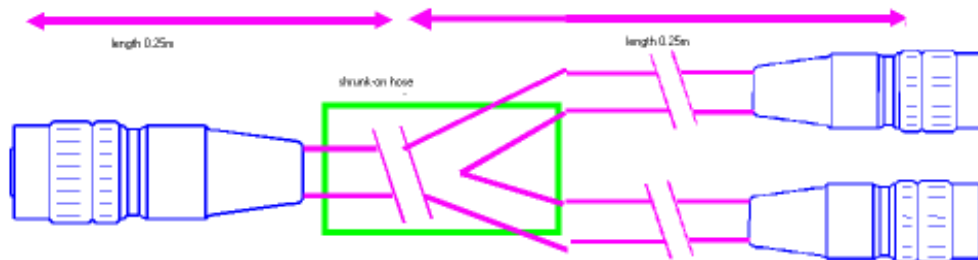
Connectors:

1x HR10A-7P-6P, male connector   2x HR10A-7J-6S, female socket

Cable length: 0.5m

The color coding of this cable corresponds to the Trigger Cable described above.
All cables are connected through – from the camera output to both extension sockets. Beware of possible undesired electrical contacts for instance when switching between encoder and serial input and connecting both at the same time.

Refer to section 4.2 for a list of available cables with order numbers.

3.2.5   Electrical Specifications of Trigger & Serial (RS232) Interface

The trigger interface features a dedicated fast TTL trigger input (for use as image capture trigger) and a fast TTL trigger output (as strobe-light trigger). Since both signals are fast at a very low noise margin, it is recommended to keep the cable as short as possible. Use shielded cable for this purpose.

Please note that input and output are not protected against over current. The output is neither protected against short circuit nor reverse voltage spikes from inductive loads. The trigger input assures constant delay without jitter.

The trigger input/output has been changed from 3.3V TTL to 5V TTL with board revision 1.2. Moreover these interfaces are now opto-isolated. The table below shows for each camera model from which serial number the camera has board version 1.2.

Camera model	Board revision 1.2 from serial number
VC7210	7800073
VC7211	9100042
VC7211C	9190015
VC7215	1500022
VC7215C	1590011
VC7222	1600015
VC7222C	1690012
VC7224	1700015

Technical data of trigger input:

	PWR < 1.2	PWR >= 1.2
input voltage:	2.0 – 3.3 V	2.0 – 5.0 V
input current:	3mA @ 3V / 5mA @ 5V	3mA @ 3V
limiting resistor:	none	none
Opto-isolation:	No	Yes
reverse voltage protection:	None	None
switching delay:	Max. 2µsec + interrupt latency	Max. 2µsec + interrupt latency
Capture delay	Approx 40µsec (constant), for jitter free operation	Approx 40µsec (constant), for jitter free operation

The use of a transistor in the trigger input circuit is recommended as shown in the following figures. These are sample circuits only – please check the final circuit layout as this depends largely on the sensor / equipment connected.
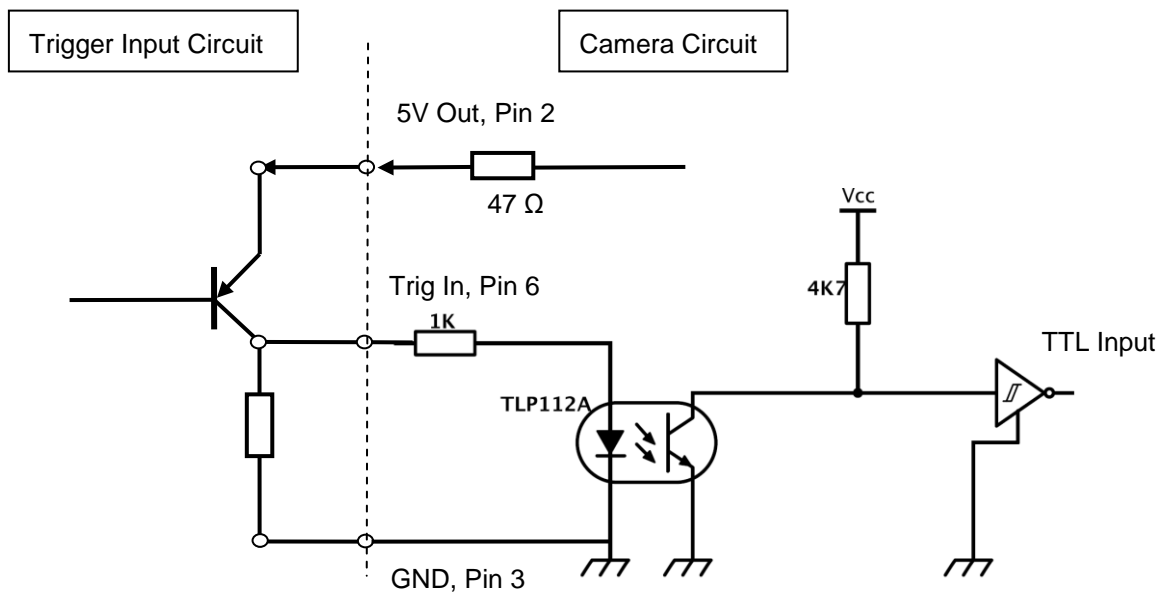
Please also note that the GND of the Trigger / RS232 interface IS IDENTICAL to the Power Supply / PLC GND, GND IN com. (different from the VC4XXX series).
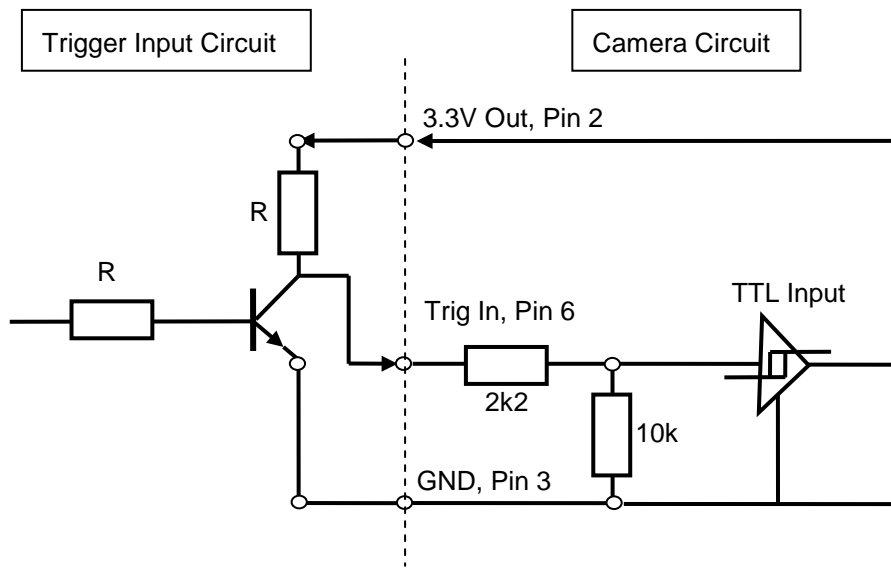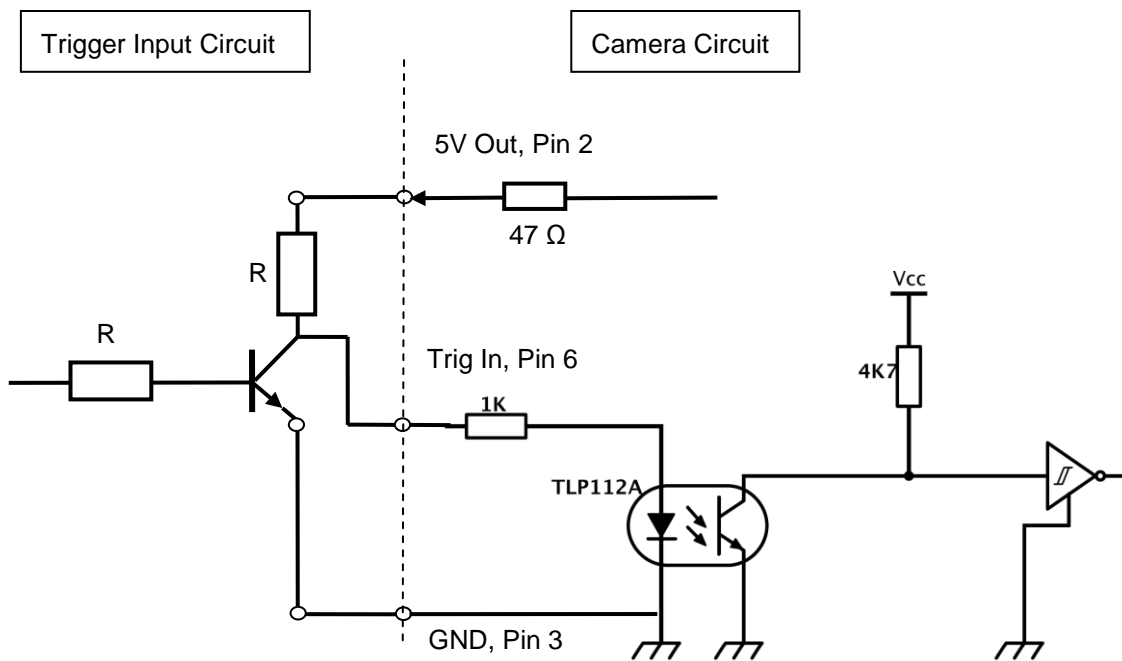
Suggested Trigger Input Circuit PNP (PWR < 1.2)
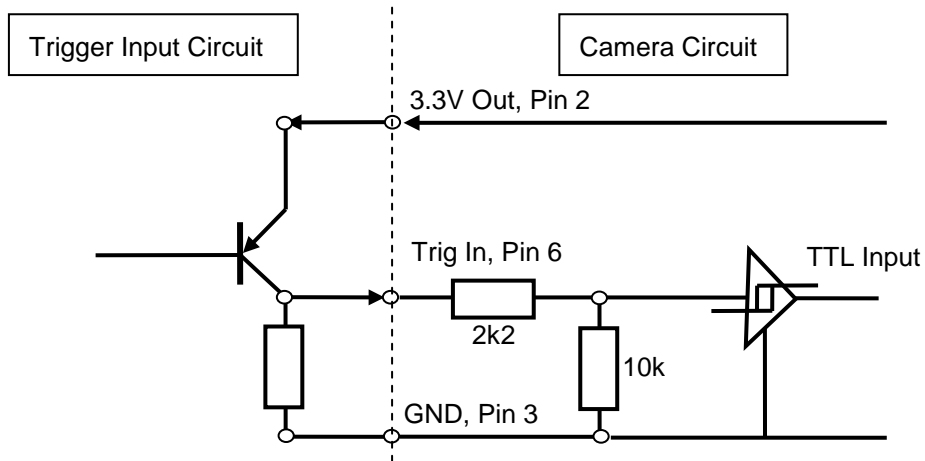
Trigger Input Circuit

Camera Circuit

3.3V Out, Pin 2

Trig In, Pin 6

2k2

10k

TTL Input

GND, Pin 3

Suggested Trigger Input Circuit PNP (PWR >= 1.2)

Trigger Input Circuit

Camera Circuit

5V Out, Pin 2

47 Ω

Trig In, Pin 6

1K

Vcc

4K7

TLP112A

TTL Input

GND, Pin 3

Suggested Trigger Input Circuit NPN (PWR < 1.2)

| Trigger Input Circuit | Camera Circuit |

3.3V Out, Pin 2

R

R

Trig In, Pin 6

2k2

TTL Input

10k

GND, Pin 3

Suggested Trigger Input Circuit NPN (PWR >= 1.2)

| Trigger Input Circuit | Camera Circuit |

5V Out, Pin 2

47 Ω

R

R

Trig In, Pin 6

1K

Vcc

4K7

TLP112A

GND, Pin 3

Technical data of trigger output:

output voltage:	max. 7V
output curent:	max. 50mA
pull-up resistor:	none, **external resistor required**

Note:

An external pull up resistor is required (for instance 1 kΩ) between Trig Out and +5V (+3.3V*) out in order to pull the floating trigger output back to high.

The 100 Ω Resistor protecting the TTL trigger output Pin 5 from the VC20XX has been replaced with a self resetting poly fuse (see the following drawing). The trigger output is switching to ground (active low). The behavior of the output signal however can be programmed high or low during exposure (see the "Programming Tutorial" or the "Trigin.c" demo program).
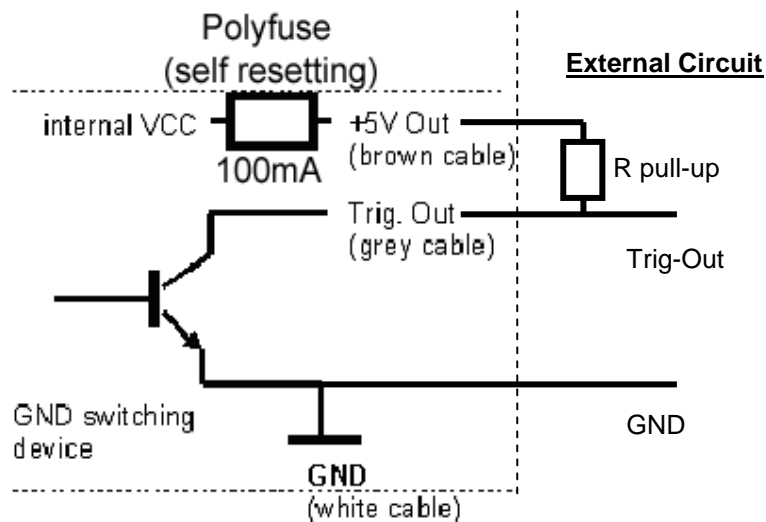
3.3   Power Supply and IO Interface

This connector includes the camera Power Supply and digital PLC IOs.

3.3.1   Pin assignments Power Supply and IO Interface

Pin	Signal	Calbe Colors
1	12-24V PLC[1]	red
2	(12-) 24V IN Cam	red / blue
3	GND IN com.	black.
4	INP 1	pink
5	OUT 3	yellow
6	OUT 2	green
7	OUT 1	brown
8	OUT 0	white
9	12-24V PLC	grey / pink
10	INP 3	purple
11	INP 2	blue
12	INP 0	grey

rear view camera socket:
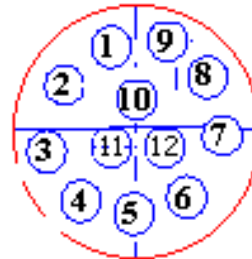
3.3.2   Electrical specifications Camera Power Supply Camera

It is possible to supply the PLC outputs with a voltage different from the camera power supply via pin 1 and 9. For instance is possible to supply the PLC outputs with 12V via Pin 1 and Pin 9, if that is the required output voltage for OUT0 to OUT3.

	VC72XX
Power Supply Voltage	12 - 24 V
Absolute Voltage Limits	10 V – 28 V
PLC output power supply separated from camera supply	PLC outputs supplied separately via Pin 1 and Pin 9, common GND of power supply and PLC outputs

In general the camera power supply is regulated in the camera, so an unregulated power source is sufficient. However the absolute voltage levels specified above - depending on the camera range - should never be exceeded.
In case of unstable power supply (voltage spikes or power interruptions) it is recommended to backup the power supply by a capacitor or a battery large enough to prevent power interruptions.
It is recommended to switch on the low voltage supply (12 to 24V) when booting the camera. Some 110/ 220V power supplies increase the output voltage too slow or drop the voltage under load at start – up which might cause the camera not to boot properly!

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[1] The PLC output voltage equals the power supply voltage.

3.3.3   Electrical Specifications digital PLC IO Interface

The VC72XX series Smart Camera features digital inputs and outputs that allow for instance direct input of light barriers signals or the control of pneumatic valves.
Please observe the current and voltage ratings specified in the following sections.

The PLC circuit of all VC Professional and Optimum Smart Cameras is separated from the camera power supply.
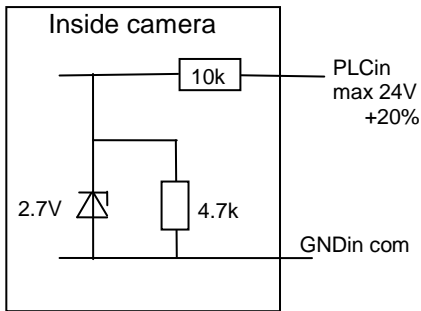
	VC72XX
Separation of PLC output voltage ⚠	PLC output supply **separated** from camera power supply (common GND)
PLC Input Voltage	12 V– 24 V
PLC Input Current (max)	1.5 mA at 12V to 3.5mA @ 24V
PLC Output Voltage	12 V to 24 V - supplied separately via pin 1 and pin 9.
PLC Output Current (max)	4 x 400 mA Max total all outputs: 1A
Max Current for 1 Power / PLC connector pin	500 mA
Power failure detection	-

⚠ When using the PLC outputs connect both PLC output supply pins (pin 1 and pin 9) in order to limit the connector pin current.

The maximum combined current of all outputs should not exceed 1 A.

3.3.3.1   Connection of PLC inputs VC72XX

- 4 digital Inputs
- Operating Voltage 12 to 24 V
- Threshold Voltage 8V (input high for signals greater 8V)
- Maximum Voltage: 28V
- Reverse voltage protection
- Input Current 1mA @ 24V

3.3.3.2   Connection of PLC outputs VC72XX
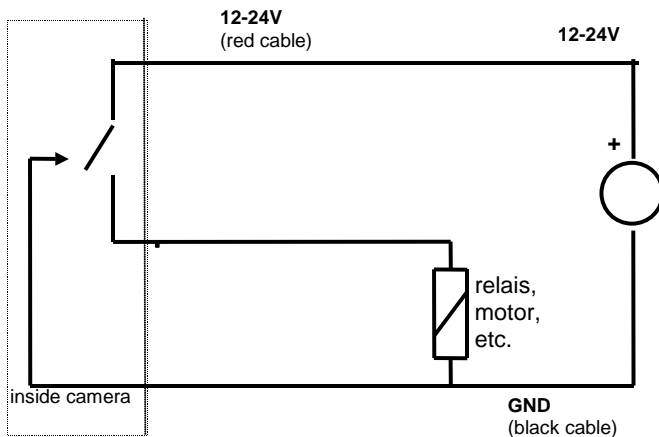
- 4 digital outputs
- Operating Voltage 12 to 24 V
- current per output: 500 mA (total current all outputs < 1000 mA)
- Connect both 12-24 V PLC power supply pins 1 and 9.
- bit = 1 output will switch positive voltage
- short-circuit and over- temperature protection (2A), pulsing

3.3.4   Available Accessories / Cables for Power Supply and IO Interface
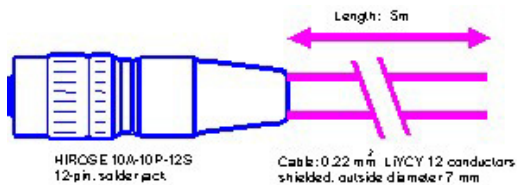
Signal	Pin No.	Cable color
OUT0	8	white
OUT1	7	brown
OUT2	6	green
OUT3	5	yellow
IN0	12	grey
IN1	4	pink
IN2	11	blue
IN3	10	purple
24V IN Cam	2	red/blue
GND IN com.	3	black
24V PLC	1	red
24V PLC	9	grey /pink

Equipped on one end with a Hirose plug jack, length 5m, 10m or 25m
Refer to section 4.2 for a list of available cables with order numbers.

4   Order Numbers Cameras and Accessories
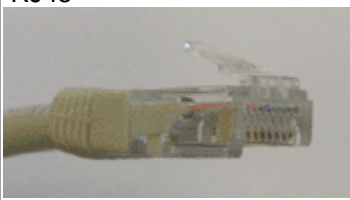
4.1   Order numbers of all available VC72XX Camera Models:

Article Description	Order Number
VC7210	VK001192
VC7210C	Available on request
VC7211	VK001253
VC7211C	VK002009
VC7215	VK001271
VC7215C	VK002007
VC7222	VK001269
VC7222C	Available on request
VC7224	VK001270
VC7224C	Available on request

4.2   Order numbers of all available VC72XX Accessories
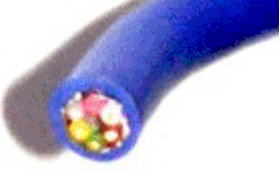
For interface cables and connectors available also consult the corresponding section in chapter 3 of this manual as well as the "*VC Smart Camera Accessories*" section – under the "Product" section on our website **www.visoin-comp.com** .
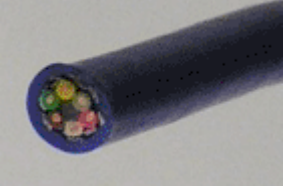
Ethernet Cables (Refer to section 3.1.2):

Article Description	Order Number	Camera Connector	Second Connector
5m LAN-C6-Cable	VK000149	HRS connector female 6 pin	RJ45
10m LAN-C6-Cable	VK000150	HRS connector female 6 pin	RJ45
20m LAN-C6-Cable	VK000151	HRS connector female 6 pin	RJ45

Ethernet Cross Module	VK000156	RJ45	RJ45 female socket

Trigger Cables (Refer to section 3.2.2):

Article Description	Order Number	Camera Connector	Second Connector
5m Trigger-Cable / C6	VK000115	HRS connector male 6 pin	without connector
10m Trigger-Cable / C6	VK000164	HRS connector male 6 pin	without connector
25m Trigger-Cable / C6	VK000153	HRS connector male 6 pin	without connector

V24 (RS232) Serial Cable (Refer to section 3.2.3):

Article Description	Order Number	Camera Connector	Second Connector
5m V24 cable	VK000243	HRS male 6 pin	without connector
5m V24 cable with DSUB	VK000244	HRS male 6 pin	D-SUB 9 pin female
10m V24 cable	VK000239	HRS male 6 pin	without connector
10m V24 cable with DSUB	VK000240	HRS male 6 pin	D-SUB 9 pin female
25m V24 cable	VK000241	HRS male 6 pin	without connector
25m V24 cable with DSUB	VK000242	HRS male 6 pin	D-SUB 9 pin female

Y-Cable for connecting several cables to the Trigger / Serial Interface (Refer to section 3.2.4):

Article Description	Order Number	Camera Connector	Second Connector
		HRS male 6 pin	2 HRS female 6 pin
0.5m Y adapter cable	VK000124		

Power Supply and IO Interface Cables (refer to section 6.3.5):

Article Description	Order Number	Camera Connector	Second Connector
		HRS female 12 pin	without connector
5m Power / PLC-Cable C6	VK000008		
10m Power / PLC-Cable C6	VK000114	HRS female 12 pin	without connector
25m Power / PLC-Cable C6	VK000161	HRS female 12 pin	without connector

Further Accessories:

Article Description	Order Number	Camera Connector
Power Adapter C6 24V, with 12 pins conn. 3m	VK000119	HRS connector female 12 pin
Power adapter for rail mounting, Input Voltage 100 - 240VAC 50/60 Hz, Output Voltage DC 24V +/-5%, max. 300 mA (7.5 W), Equipped with connecting clamps for AC input and 24V output, CE cert. ⚠ Using this power supply with VC Base Cameras (VC4018 and VC4016) is only possible when booting by switching the 24V secondary side! 15W power supply needed if switching the mains supply!	VK000036	

VCSKBC4 Keypad (different from VCSKBC6 for VC20XX cameras!)	VK000238	
IR cut filter (camera is shipped with this filter mounted) refer to Appendix E	EK000625	
Clear glass filter (replaces IR Cut filter)	EK000628	
IR Transmitting Filter	EK000624	

5 Programming VC72XX Smart Cameras

5.1 General settings

Programming the VC72XX cameras requires at least the VCRT library version 5.30.8.

5.2 Compiling and linking with the VC72XX cameras

It is advised to build your C-code as **relocatable code** (standard setting in the VC template Code Composer project files from VCRT 5.29). In this case VCRT manages the program memory allocation by itself (see Programming Tutorial for more details).

For customers who prefer absolute linking, please pay attention to the fact that the memory start address of the VC72XX has changed in comparison to previous VC cameras. In your link file, replace the memory section with this one:

```
MEMORY
{
   PMEM:   o = 080100000h  l = 100000h  /* intended for initialization */
   BMEM:   o = 080090000h  l = 40000h   /* .bss, .system, .stack, .cinit */
}
```

5.3 Image Acquisition

The CMOS sensors of the VC72XX cameras allow, like on the VC nano Series, extra features like:
  - partial scanning
  - 2x / 4x image binning

For demo programs showing those features, please have a look at the **Demo Programs section** in the Download Center of our website, or contact our support at **support@vision-components.com**.

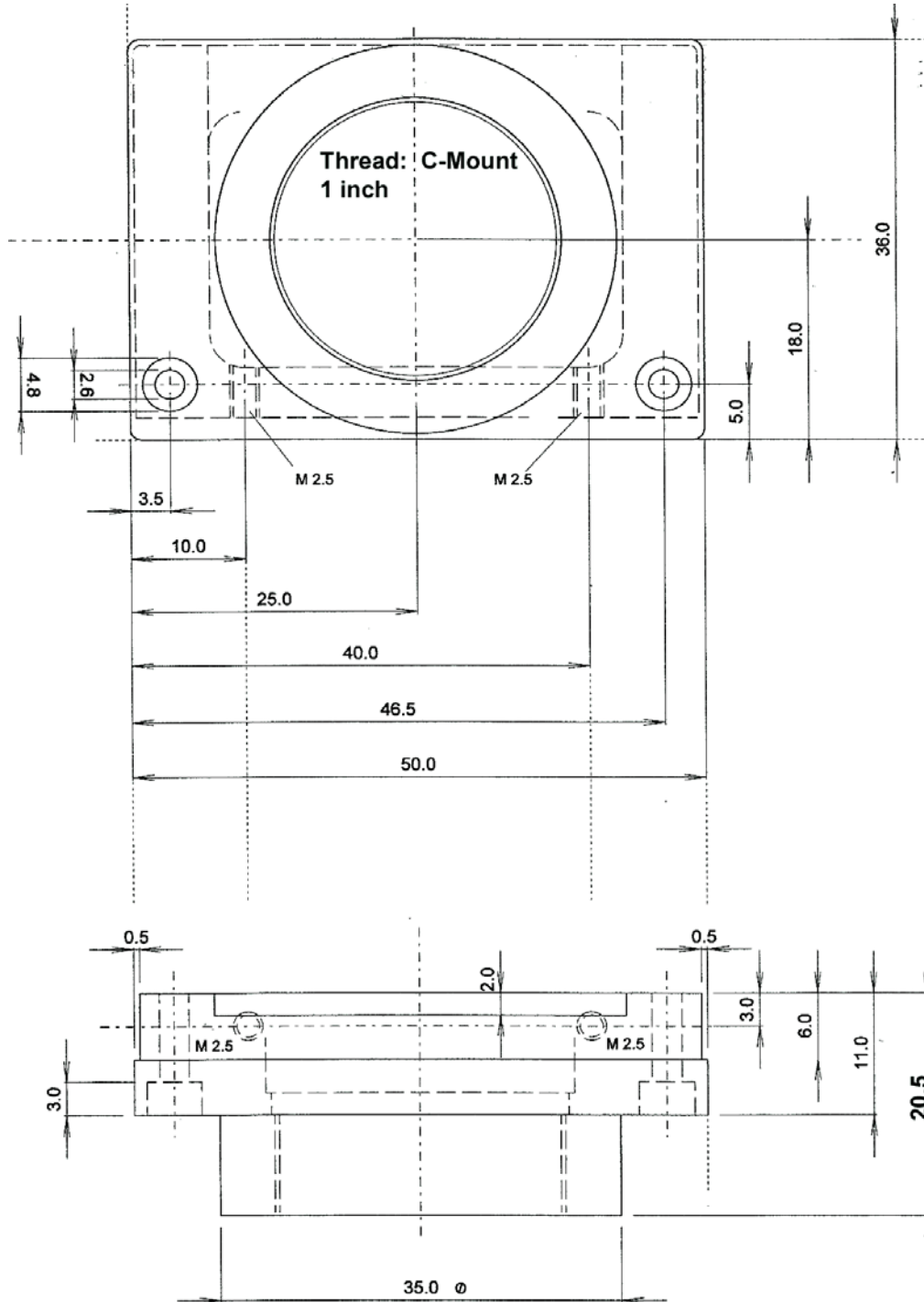# Appendix A: Block diagram VC72XX Smart Cameras
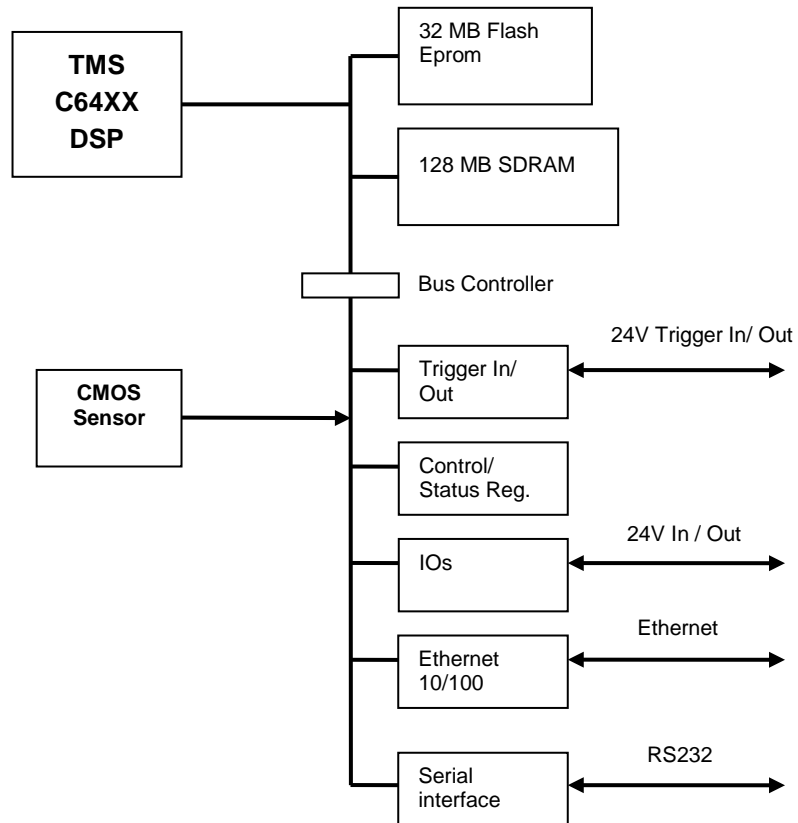
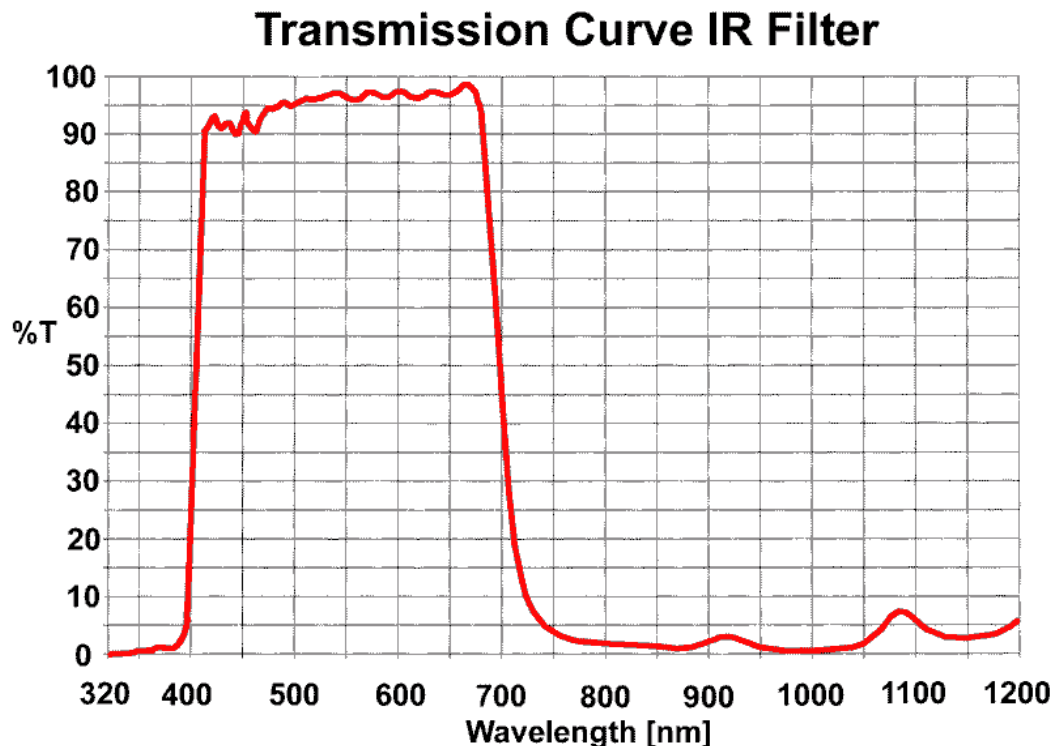# Appendix B: Dimensions VC72XX
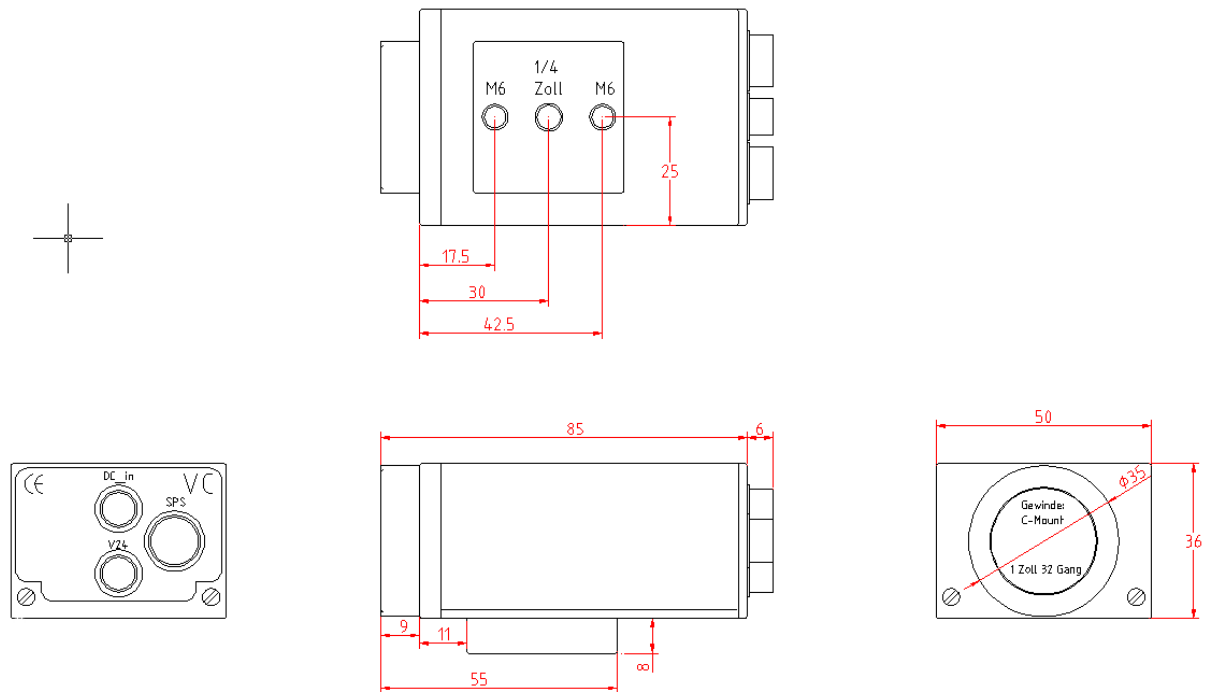
⚠ Maximal torque for M6 screws (all camera models): **10 Nm**

Appendix C: Drawing Camera Head VC72XX

Appendix D: Spectral Transmission of IR Filter

Transmission Curve IR Filter

Note:

This IR cut filter is incorporated in every VC72XX camera. The IR filter can be removed if required without losing Vision Component's manufacturer's warranty. In this case, special care must be taken not to damage the CCD sensor.

If the camera is used without IR filter it is important to replace it by a clear glass of the same size. The C-mount flange distance from the CCD is accurately adjusted for the use of the IR filter – removing the filter decreases the length of the optical path and it may become impossible to focus some lenses to a larger working distance.

If the IR filter is not to be used, please order your camera with a clear glass or contact Vision Components for obtaining a glass window.

The order numbers for the clear glass is: EK000624
The order number for the IR cut filter (standard) is: EK000625

Smart Cameras made in Germany

Visit the Vision Components site **www.vision-components.com** for further information, documentation and software downloads:

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Loan systems	Info about VC loan cameras

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