PHYTEC

digital imaging 2010 english version

PC-based Systems

grabber-kits
framegrabbers
firewire-cameras
lightening

SOM-based Systems

embedded imaging
microcontrollers
embedded video kits
digital cameras

System House

Customized Solutions for:

automation
medical
security
measuring systems
quality assurance

>>>

France

Contents

detailed information available

on our website: www.phytec.fr

Image processing and more ...

„Image processing and microprocessor applications will grow together even more in the next few years. Industrial series solutions will become more significant than individual solutions.

We can offer complete solutions and the expertise to achieve joint success. Let us attack the future together."

Dipl.-Ing. Michael Mitezki, Management PHYTEC Technology Holding AG

Image processing is one of the core competences of PHYTEC. Our customers have been working successfully for years with plug-in cards appropriate for industrial requirements – particularly with regard to ruggedness and reliability. This catalog underlines the importance of this product group within our product range.

The importance of classic imaging solutions

Image processing is embedded in our company within a complete range of modular microcompu-ter technology. Our engineers combine these core competences into successful systems solutions. Observe the references in this catalog to convince yourself of the success of image processing solutions suitable for series design which we have produced together with our customers.

The combination of core competencies

On the following pages, read how we assess the developing image processing market and the strategies with which we can fulfill your current and future requirements using intelligent products and the additional services offered by PHYTEC as a solution provider.

Building the future together with you

Consider this catalog as our business card, as an invitation to become better acquainted with us and our products.

We are looking forward to your challenges!

„From classic imaging to complete embedded image solutions"

Image processing is at an exciting stage:
Individual solutions are being supplemented by highly efficient series devices with integral image data aquisition and evaluation. The performance provided by state–of–the–art microcontroller technology opens the path to solutions far beyond standard PC–based solutions.

PC-based image processing – with application-specific plug-in cards and a wide range of cameras – provides a flexible basis for highly efficient imaging solutions. Many tasks require an individual approach: in particular the lighting conditions and embedding of the image analysis in the subsequent processes place high demands on the creativeness of the designers. The choice of the right components decisively influences the costs and efforts for implementing the complete solution.

PHYTEC offers a complete range of PC plug-in cards, cameras and further accessories – basically as a toolbox for your PC-based responses to your customers' requirements. Integral components of our offering also include driver support and consulting with regard to the selection of components.

The technical ruggedness of our components and solutions is to be found throughout our product range. Ruggedness commences with the circuit design, is also evident in the type and quality of the connectors and can be found in the practical suitability of our driver implementations. Our claim is to make your basis as stable, reliable and flexible as possible so that you can focus one hundred percent on your core competence when solving your challenges.

acp GmbH: Inspection unit for analysis of surface purity
PHYTEC contribution: series-based microcontroller module with integral video digitizer

Embedded Imaging Technology

In many sectors, classic computer systems with plug-in cards are being replaced by state-of-the-art microcontrollers. Image processing is also profiting from the increased computing performance and the large number of integral I/O links. Camera interfaces and graphics directly on the µC chip offer further incentives for applying µC-based image processing solutions for efficient solving of tasks.

Such systems offer convincing advantages particularly when considering series costs and the protection of own technologies. As a result of its strong presence for more than 20 years in the sector of modular microcomputer technology, PHYTEC is your ideal partner who understands how to combine both worlds – image processing and µC technology – in a unique symbiosis. Read more about our modular image processing components and their advantages in use later in this catalog.

PHYTEC – your partner for series solutions

Benefit from PHYTEC as a solution provider to expand your core com-
petence and to implement series products for image processing rapidly
and cost-effectively. You can rely on our experiences from numerous
projects and on our detailed knowledge concerning image proces-
sing components and µC technology to develop your series products
together with us. The scope of our preparatory work depends on your
requirements: ranging from consulting on use of our components up
to the complete development of finished products including housing
design, construction, assembly and production.

Your know-how concerning applications and market access ideally
supplements our range of components, basic software, and turn-key-
solutions. Our interface to you is the part where it becomes applica-
tion-specific.

*Image processing conquers series markets; complete solutions guarantee
fast payback of investments in image processing technology. Let's proceed
together on the path into your future.*

**Finding solutions and making an active contribution is our job.
Please don't hesitate to contact us! >>> +33 (0) 2 43 29 22 33**

CORNING Cable Systems GmbH: glass fiber splicing unit
PHYTEC contribution: development of customized hardware, application of
standard modules

Statement
Christian Heidler

**Project manager Splicing Equipment Development;
Corning Cable Systems GmbH & Co. KG**

„At the beginning of development of our new splicing equipment range
for the FTTP market was the demand to develop a powerful yet low-
cost device within a very short time. In order to do so, we contacted
external service providers in order to accelerate the project by applying
their know-how.

With regard to the electronics development, we approached the com-
pany of Phytec which had proven experience in the image processing
sector and whose PXA270 module represented an appropriate basis
for our project. The decision to use a single board computer module
instead of an own development significantly reduced the development
outlay for the electronics.

Our customized hardware was linked to the standardized interfaces of
the PXA module. This meant that integration was extremely simple and
could be carried out with minimum driver overhead. The camera inter-
face of the PXA270 was expanded by minimum hardware requirements
to permit two cameras to be connected in order to observe the splicing

process from two axes. An available evaluation board and a correspon-
ding board support package permitted early starting of the software
development. The parallelism of the hardware and software develop-
ments meant that the project could be advanced rapidly and on time.

Worth particular mention is the excellent cooperation with Phytec.
Even before the project actually begun we had the opportunity to
present our project to the responsible development engineers and to
already discuss initial solutions in the context of a workshop proposed
by Phytec. The project was advanced by Phytec with great commitment
and expertise. Intensive solution-oriented discussions enabled low-cost
and innovative solutions for our FTTP splicing unit to be found, which
also represents an excellent basis for further generations of splicing
equipment from Corning Cable Systems.“

Design services

PC-Grabber

RD-Kits

SOM

Cameras

Accessories

PC-Framegrabber

Industrial frame grabber cards for PC-based solutions

PCI EXPRESS®

pciGrabber-4*express*
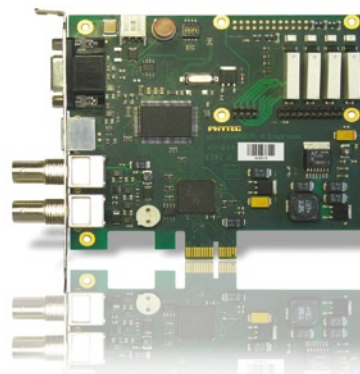*Color Frame Grabber for PCI-Express Bus Systems*

Technical Highlights

- Up to 4 composite video inputs selectable by software
- One S-video input
- Maximum resolution 768 x 576 pixels (PAL)
- PAL and NTSC compatible
- Color and grey scale mode
- Color depth and color format can be selected:
  - 16 million colors:
    RGB32, RGB24, YCrCb 4:2:2, YCrCb 4:1:1
  - 64k colors: RGB16
  - 32k colors: RGB15
  - 256 grey scales: Y8 Grey Scale
- Image size and -resolution can be selected independently for both fields
- Image parameters adjustable:
  - Brightness ($\pm$ 50%) and contrast (0% ... 235%)
  - Saturation and hue
- Supports scaling and cropping
- Gamma correction can be selected
- Direct image transfer to CPU memory in real-time. Either field or frame transfer can be selected
- Flags to indicate input signal conditions
- 12 independently configurable I/O lines for controlling
  additional hardware
- One buffered I/O-line (0 ... 28V)
- I²C interface
- EEPROM (256 Bytes) e.g. for user data or copy protection key
- Supports multiple grabbers in one system
- Suitable for all PCs with PCIe x1 slot or higher, compatible with PCI Express Base Specification Revision 1.0a
- Optional 4 relay outputs and a quad DIP switch

Connectors

- 1 x HD-DB15 socket:
  - 4 x composite input (on HD-DB15 socket, 2 x on BNC socket alternatively
  - 12V DC output, up to 1.5 A for camera supply
  - 1 x S-video input (on HD-DB15 socket, or on Mini-DIN connector alternatively)
  - 1 x multipurpose I/O line
  - 1 x I²C Port
- Mini-DIN connector
- 2 x BNC socket

Software and Drivers

- Software - driver and demo application for DOS, Win 95/98, ME, WinNT, Win 2000, XP, Vista, Windows 7
- Twain Driver
- Linux Driver
- HALCON / ActiVisionTools compatible
- identical drivers and completely software compatible to pciGrabber-4plus (VD-009-X1)

Product Description

With the pciGrabber-4express the proven technology of the pciGrabber-4plus is now also available for the high-performance PCI Express bus. Thus the pciGrabber-4express makes the latest bus technology accessible to applications with analogue camera technology.

All composite inputs, an I²C-bus and a 12V supply voltage output are available at one single HD-DB15 socket. Alternatively, two composite sources can be connected directly by BNC connectors. An additional Mini-DIN connector is available to connect S-video signals. The built-in video multiplexer allows switching between the channels by use of software commands. Because of 12 programmable I/Os and four relay outputs (optional) quick connection of other features is possible. A buffered I/O pin is also available on the HD-DB15 socket.

WK022   WK051   WK075

Accessories
Video cables

- for composite video sources: WK022 - cable with 4 x BNC connector (4 video inputs) and power out.
  WK037 / WK039 - BNC cable (2 m / 10 m)

- for S-video sources: WK051 - S-video cable (2 m)
  WK075 - video and power in one cable, suitable for camera VCAM-110-2

Ordering code	Product name
VD-011	pciGrabber-4*express*
VD-011-RS6	pciGrabber-4*express*
	4 relays / 4 DIP switches
WK075	Combo power cable / S-video
WK022	4 x BNC input, 1 x Power out
WK051	S-video cable Mini-DIN, 2m
WK058	BNC-cable, 2m

Design services

PC–Grabber

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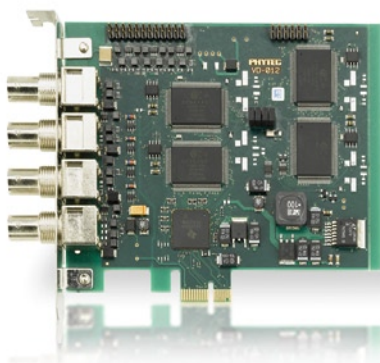
pciGrabber–4x4
Color Frame Grabber with up to four parallel input channels

Product Description

The pciGrabber-4x4 provides up to four totally independent channels. Each channel has a separate video decoder. This makes the pciGrabber-4x4 the perfect capture card for all applications where multiple cameras need to be controlled.

The pciGrabber-4x4, which is designed for the PCI Express bus, combines in principle up to four frame grabber on a single card. The transmission paths of each channel operate independently and can be controlled separately. This gives maximum flexibility in planning the application. Parameters such as frame size, frame rate or color depth can be set for each video decoder individually.

To store the digitised image data each channel has a discrete frame buffer. The circuitry of the single channels is software compatible to pciGrabber-4express and pciGrabber-4plus.

Different versions of the pciGrabber-4x4 with either BNC sockets for composite signals or with Mini-DIN connectors for S-video signals are available. Version VD-012-X2 with two channels provides both connector types which can be selected by software. Use of the expansion card VZ-012 adds four more composite inputs to the pciGrabber-4x4. These are then available as additional input jacks within the transmission paths and can be switched by software. With three expansion cards up to 16 video inputs are available. The pciGrabber-4x4 comes with software drivers and sample programs for Windows. For Linux, the standard BTTV driver can be used.

Ordering code	Product name
VD-012	**pciGrabber–4x4 (4 decoders)**
	4 x BNC socket
VD-012-X1	**pciGrabber–4x4 (4 decoders)**
	4 x Mini-DIN socket
VD-012-X2	**pciGrabber–4x4 (2 decoders)**
	2 x BNC socket, 2 x Mini-DIN socket
VZ-012	**expansion board,** 4 x BNC socket

Technical Highlights

- 2 or 4 independent video decoders
- Up to 4 composite video inputs on board
- Up to 4 S-video inputs
- Expandable to up to 4 multiplexed composite inputs per decoder with expansion boards
- Maximum resolution 768 x 576 pixels (PAL)
- PAL and NTSC compatible
- Color and grey scale mode
- Color depth and color format can be selected:
  - 16 million colors: RGB32, RGB24, YCrCb 4:2:2, YCrCb 4:1:1
  - 64k colors: RGB16
  - 32k colors: RGB15
  - 256 grey scale: Y8 Grey Scale
- Image size and –resolution can be selected independently for both fields
- Image parameters adjustable:
  - Brightness ($\pm$ 50%) and contrast (0% ... 235%)
  - Saturation and hue
- Supports scaling and cropping
- Gamma correction can be selected
- Direct image transfer to CPU memory in real-time. Either field or frame transfer can be selected.
- Separate memory area for each decoder
- Flags to indicate input signal conditions
- 8 configurable I/O lines for controlling additional hardware
- 4 jumpers e.g. for coding of multiple cards in one PC
- I²C interface
- Up to four EEPROMs (à 256 Bytes) e.g. for user data or copy protection key
- Supports multiple grabbers in one system
- Suitable for all PC with PCIe x1 slot or higher
- compatible with PCI Express Base Specification Revision 1.0a

Connectors VD–012

- 4 x BNC socket (composite video inputs)
- 1 x pin header row (multipurpose I/O, I²C-port)
- 1 x pin header row (video extension inputs)

Connectors VD–012–X1

- 4 x Mini-DIN connector (S-video inputs)
- 1 x pin header row (multipurpose I/O, I²C-port)
- 1 x pin header (video extension inputs)

Connectors VD–012–X2

- 2 x BNC socket (composite video inputs)
- 2 x Mini-DIN connector (S-video inputs, switchable)
- 1 x pin header row (multipurpose I/O, I²C-port)
- 1 x pin header row (video extension inputs)

Design services

PC-Grabber

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Technical Highlights

- Up to 9 composite video inputs selectable by software
- One S-video input
- Maximum resolution: 768 x 576 pixels (PAL)
- PAL and NTSC compatible
- Color and grey scale mode
- Color depth and color format can be selected:
  - 16 million colors:
    RGB32, RGB24, YCrCb 4:2:2, YCrCb 4:1:1
  - 64k colors: RGB16
  - 32k colors: RGB15
  - 256 grey scale: Y8 Grey Scale
- Image size and -resolution can be selected independently for both fields
- Image parameters adjustable:
  - Brightness ($\pm$ 50%) and contrast (0% ... 235%)
  - Saturation and hue
- Supports scaling and cropping
- Gamma correction can be selected
- Direct image transfer to CPU memory in real-time. Either field or frame transfer can be selected
- Flags to indicate input signal conditions
- 12 configurable I/O lines for controlling additional hardware
- One buffered I/O-line (0...28V)
- I²C interface
- EEPROM (256 Byte) for e.g. user data or copy protection key
- Supports multiple grabber in one system
- Suitable for all PC with 5V-PCI-bus

Connectors

- 2 x HD-DB15 socket:
  socket 1: 5 x composite input (VD-009 only)
  socket 2: 4 x composite input and a
  12V DC output, up to 1.5 A for
  camera supply
  1 x S-video input
  One I/O and I²C-Port
- Mini-DIN connector (s-video input)
- Software-compatible to eGrabber-4*plus* and
  pciGrabber-4*express*

Software and drivers

- Drivers and demo applications for Win95/98, ME, WinNT, Win2000, XP, Vista, Windows 7 (C++, VisualBasic, ...)
- Twain Drivers
- QuickCog Drivers
- LINUX Drivers
- HALCON / ActiVisionTools compatible
- Identical drivers and fully software-compatible to pciGrabber-4plus (VD-009-X1). Hence no software modification is required when changing from pciGrabber-4plus.
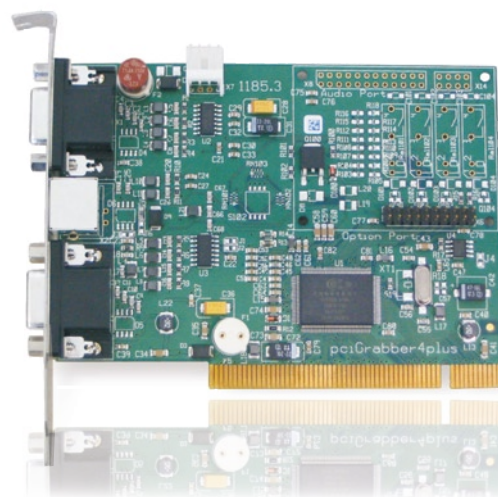
pciGrabber-4*plus*
Color Frame Grabber for PCI Bus Systems

Product Description

Fast image acquisition is a special feature of the pciGrabber-4*plus*. The 5V PCI-Bus card works in bus master mode so image data are stored directly in the PC's main memory (RAM) in real-time. The pciGrabber-4*plus* is a color-frame grabber capable of processing images with up to 16 million colors. It is also excellent for b/w image processing.

Standard TV-cameras can be used as image sources. The pciGrabber-4*plus* supports PAL and NTSC TV systems. A build-in video multiplexer allows up to 9 composite cameras (FBAS) to be connected. An S-video input can be used in applications with high image quality requirements. The pciGrabber-4*plus* has an EEPROM, which can store up to 256 bytes of user data. A software key, for example, may be stored by the application's designer to prevent unauthorised software copying. Digital signal inputs or outputs are often required also. The pciGrabber-4*plus* has 12 TTL I/Os, which can be accessed on a pin header connector for this purpose. Another buffered I/O-Port, which can be used in a 28V environment, is accessible on the lower DB-15 connector. Moreover, an I²C bus which can be addressed by the user via software drivers is provided on the same connector. The -RS6 versions of the pciGrabber-4*plus* have 4 additional relay outputs controlled by user software. Furthermore an ID from 0 to 15 can be assigned with a DIP switch to facilitate the use of multiple cards in one computer.

The pciGrabber-4*plus* comes with software drivers, enabling the user to create applications for Windows 95/98/NT 4.0/2000/XP, Vista and Windows 7.

Example source codes, together with a detailed manual make it easy to start developing applications for the pciGrabber-4*plus*. A demo application for Windows is included. This allows to change the basic settings of the grabber, scaling of image data and capturing a live image. Furthermore, image data can be processed (addition, subtraction, overlay of crosshairs etc.).

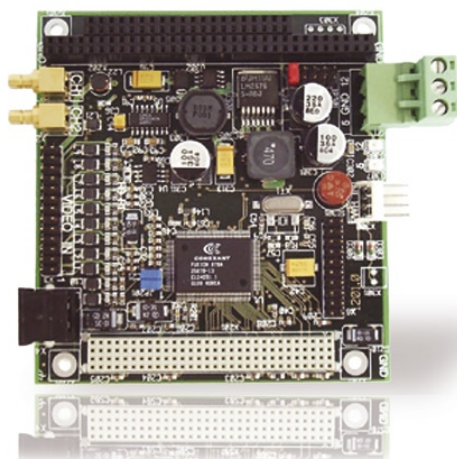| Ordering code	Product name
VD-009-X1	pciGrabber-4*plus*
	3 Video- and 1 S-VHS input
VD-009	pciGrabber-4*plus*
	9 Video- and 1 S-VHS input
VD-009-X1-RS6	same as VD-009-X1, with 4 relay outputs/DIP-switch
VD-009-RS6	same as VD-009, with 4 relay outputs/DIP-switch

eGrabber–4*plus*

Color Frame Grabber for PCI Bus Systems

Product Description

The eGrabber-4*plus* was specially developed to design small applications for image processing, which are PC-compatible. By applying the PC/104plus – standard, the eGrabber-4*plus* can be used together with a large selection of CPU-cards with different processor speeds. These CPU-cards are functional compatible to standard desktop PCs. Thus, the eGrabber-4*plus* has exactly the same functionality as the PC-model pciGrabber-4*plus*. A software which was initially developed on a desktop PC can thus be migrated to the PC/104 system without any changes. While designing the eGrabber-4*plus* special care was taken to the usage in an industrial environment: Besides the durable SMB-connectors for the connection of up to two video sources, all cameras can be connected to a single pin row. The power supply for the camera, an I²C-Bus and one transistor-driven I/O-port are also available at this pin row. 12 additional TTL-I/O-signals can be connected to a second onboard pin row. The eGrabber-4*plus* has an integrated 256 Byte EEPROM for user data - a software protection key for example. The frame grabber is available with 3 or 9 composite-inputs, which are switched by the integrated multiplexer. An s-video input is also available for applications with demand for high quality color reproduction. The digitized images are transferred in real-time by bus-master-DMA into the memory (RAM) of the CPU-board.

The eGrabber-4*plus* comes with software drivers, enabling the user to create applications for Windows 95/98/NT 4.0/2000/XP, Vista and Windows 7.

Example source codes, together with a detailed manual make it easy to start developing applications for the eGrabber-4*plus*. A demo application for Windows is included. This allows to change the basic settings of the grabber, scaling of image data and capturing a live image. Furthermore, image data can be processed (addition, subtraction, overlay of crosshairs etc.).

Technical Highlights

- Up to 9 composite video inputs selectable by software
- One S-video input
- Maximum resolution: 768 x 576 pixels (PAL)
- PAL and NTSC compatible
- Color and grey scale mode
- Color depth and color format can be selected:
  - 16 million colors: RGB32, RGB24, YCrCb 4:2:2, YCrCb 4:1:1
  - 64k colors: RGB16
  - 32k colors: RGB15
  - 256 grey scale: Y8 Grey Scale
- Image size and -resolution can be selected independently for both fields
- Image parameters adjustable:
  - Brightness ($\pm$ 50%) and contrast (0% ... 235%)
  - Saturation and hue
- Supports scaling and cropping
- Gamma correction can be selected
- Direct image transfer to CPU memory in real-time. Either field or frame transfer can be selected.
- Flags to indicate input signal conditions
- 12 configurable I/O lines for controlling additional hardware
- One buffered I/O-line (0...28V / 0.8A)
- I²C interface
- EEPROM (256 Byte) e.g. for user data or copy protection key
- Supports multiple grabber in one system

Connectors

- 2 x SMB-connector: composite input (channels 1 and 2)
- Video pin header connector
  - all composite channels
  - output for camera supply voltage
  - I²C-Port
  - buffered multipurpose I/O line
- Mini-DIN connector: S-video input
- Software compatible to pciGrabber-4*plus*, pciGrabber-4*express*

Ordering code	Product name
EPC–032	eGrabber–4*plus*
	3 Video- and 1 S-Video-input
EPC–032-X1	eGrabber–4*plus*
	9 Video- and 1 S-Video-input

Design services

PC-Grabber

RD-Kits

SOM

Cameras

Accessories

Rapid Development Kits

The fast start with ready-to-use kits for embedded imaging solutions or on the basis of PC components

Technical Highlights
Camera

- Resolution 752 x 582 pixel
- Color camera CCIR-PAL
- Composite and S-VHS output (Y/C)
- Minimum illumination 0.50 lux
- 4x digital zoom
- Horizontal resolution 450 TV-lines
- Electronic iris (1/50-1/30,000s)
- Automatic or manual white balance
- Small-sized camera
- Monochrome and invert mode possible
- Settings can be programmed by software and permanently stored. (Drivers coming with the kit allow to integrate the configuration of the parameters in custom applications)

pciGrabber-4express

- Up to 4 composite video inputs selectable by software
- One S-video input
- Maximum resolution 768 x 576 pixels (PAL)
- Color depth and color format can be selected
- Supports scaling and cropping
- Image size and -resolution can be selected independently for both fields
- Direct image transfer to CPU memory in real-time. Either field or frame transfer can be selected.
- Supports multiple grabber in one system
- EEPROM (256 bytes) e.g. for user data or copy protection key
- 12 configurable I/O lines for controlling additional hardware
- Suitable for all PCs with PCIe x1 slot or higher, compatible with PCI Express Base Specification Revision 1.0a

Software and drivers

- Drivers and demo applications for Win95/98, ME, WinNT, Win2000, XP, Vista, Windows 7 (C++, VisualBasic, ...)
- Twain Drivers
- QuickCog Drivers
- LINUX Drivers
- HALCON / ActiVisionTools compatible
- Identical drivers and fully software-compatible to pciGrabber-4plus (VD-009-X1). Hence no software modification is required when changing from pciGrabber-4plus.

RDK pciGrabber-4express
PCI-Express image processing kit

Product Description

Due to the low series price and an availability corresponding to the industrial needs the pciGrabber-4express is the perfect choice for various image processing tasks.

This kit comes with all necessary components of a PC-based image processing system, and thus enables you to create your image processing application fast and effectively. It is an ideal and cost effective hardware solution for your application.

The use of modern PCI Express bus technology in combination with full compatibility to the pciGrabber-4plus allows to change to the latest computing platforms without any additional effort.

Kit contents

- pciGrabber-4express, real-time color frame grabber, suitable for PCs with PCI-Express bus
- VCAM110-2, high resolution color camera with 0.5 lux, electronically adjustable
- Camera cable WK075, S-VHS and camera power
- Quickstart – Manual, detailed documentation which guides you through the installation
- Programmer's reference manual
- Driver and demo application for Windows

Necessary and optional accessories

- In any case a camera lens (C- or CS-mount) is needed. Please select the appropriate lens from our product range
- Optional: remote control cable which allows to set the parameters of the color camera by software.
- Optional: illumination e.g. ring light CLS49 (VZ001)
- Optional: tripod e.g. AZ012

Ordering code	Product name
VPK-048	RDK pciGrabber-4express
WK032	Remote control cable VCAM-110-x incl. software
AZ012	Tripod

Design services

PC-Grabber

RD-Kits

SOM

Cameras

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RDK pciGrabber–4x4
PCI-Express image processing kit with 2 video decoders

Product Description
This kit comes with all necessary components of a PC-based image processing system, and enables you to create your image processing application fast and effectively.

Because of the second video decoder, a system which can digitize two video sources in parallel can be quickly built up with one single card.

Kit contents
- pciGrabber-4x4 (VD-012-X2), real-time color frame grabber with 2 video decoders, suitable for PCs with PCI-Express bus
- VCAM110-2, high resolution color camera with 0.5 lux, electronically adjustable
- Camera cable WK051, S-VHS on Mini-DIN connector
- Camera cable WK058, composite on BNC connector
- Power supply for the camera
- QuickStart – Manual, detailed start-up documentation
- Programmer's reference manual, Driver and demo application for Windows

Necessary and optional accessories
- In any case, a camera lens (C- or CS-mount) is needed. Please select the appropriate lens from our product range.
- Optional: remote control cable which allows to set the parameters of the color camera by software.
- Optional: illumination e.g. ring light CLS49 (VZ001)
- Optional: tripod e.g. AZ012

Ordering code	Product name
VPK–049	**RDK pciGrabber–4x4**
WK032	**Remote control cable**
	VCAM-110-x incl. software
AZ012	**Tripod**

RDK pciGrabber–4*plus*
PCI-bus image processing kit

Product Description
The kit contains all hardware needed to set up an image processing system and all driver software to integrate it in your software application. It is an ideal and cost effective hardware solution for your application.

The detailed Quick Start Manual guides you step by step through the startup procedure. A detailed description of all the driver functions, which allows you to quickly and easily start creating your application, can be found in the programming guide.

Kit contents
- pciGrabber-4plus, real-time color frame grabber, suitable for PCs with PCI-bus
- VCAM110-2, high resolution color camera with 0.5 lux, electronically adjustable
- Camera cable WK075, S-VHS and camera power
- Quickstart – Manual, detailed documentation which guides you through the installation of the hardware and software.
- Programmer's reference manual
- Driver and demo application for Windows

Necessary and optional accessories
- In any case, a camera lens (C- or CS-mount) is needed. Please select the appropriate lens from our product range.
- Optional: remote control cable which allows to set the parameters of the color camera by software.
- Optional: illumination e.g. ring light CLS49 (VZ001)
- Optional: tripod e.g. AZ012

Ordering code	Product name
VPK–028	**RDK pciGrabber–4*plus***
WK032	**Remote control cable**
	VCAM-110-x incl. software
AZ012	**Tripod**

Design services

PC–Grabber

RD–Kits

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Embedded Video Kits

Technical Highlights of the phyCARD–S

- i.MX27 Controller; ARM9 Core
- 400 MHz
- 128 MB RAM (can be expanded)
- 128 MB NAND-FLASH (can be expanded)
- 4 kB serial EEPROM
- X-Arc standard interface
- all other interfaces are led out on the carrier board

Carrier Board phyCARD series

- X-Arc interface; available across architectures
- Power supply 12 VDC
- AC97 audio/touch controller
- Serial interface (RS-232)
- 1 USB OTG interface
- 3 USB A interface
- Ethernet 10/100 MBit
- LVDS camera interface RJ45 (phyCAM-S)
- MMC/SD – card slot
- 3 audio ports (Line in, Line out, Mic)
- Universal display interface
- 2 expansion ports (USB, I²C, SPI) each
- Pushbutton switches for power and reset
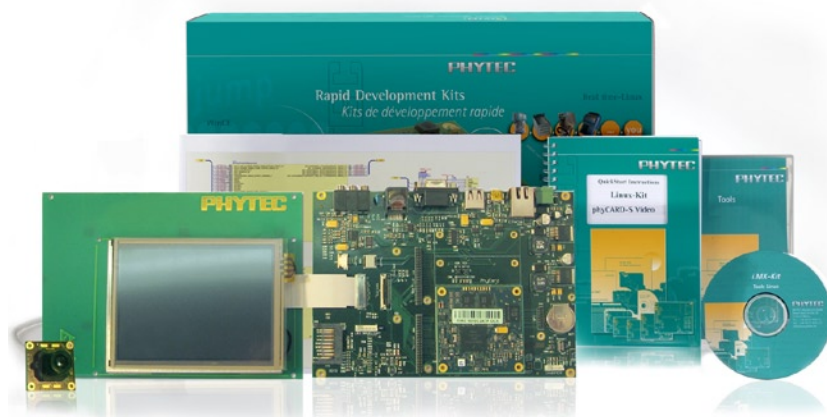
Camera

- VM-007-COL-LVDS-M12
- WVGA 752 x 480 pixel CMOS sensor
- color, RGGB, 8 bit digital
- phyCAM-S interface (LVDS)
- 8-pin connector (Hirose, 1.25 pitch)
- M12 lens mount
- 12 mm lens included

Display

- 5.0" VGA Landscape, 640 x 480 pixel
- RGB 6:6:6 (LVDS)
- LED Backlight
- Touchscreen

Software Description

- Demo application
    - live image stream
    - Saving of snapshots
    - configuration of the camera and interfaces
    - GStreamer examples, including source code
- Halcon 8.0 compatible (not included)
- Driver software
    - V4L2 compatible
    - Control of the camera and CPU interface
    - Automatic basic configuration

Embedded Video Kit phyCARD–S
phyCAM-S Development Kit with Freescale i.MX27

Product description

The serial LVDS interface of the new phyCAM-S camera series gives developers new freedom in system design. Including power supply and configuration interface only eight wires between the camera and computer PCB board are necessary. Thus cameras can be arranged within the device more flexible and wiring is more easy.

Moreover, it is possible to separate the camera head from the main unit. The connection can be easily done using a CAT-5e cable.

phyCARD SBCs are equipped with the appropriate LVDS camera input. Since phyCARD SBCs are compatible with each other, the developer has not only fully scalable computing power, but also design security as the phyCARD series grows with the microcontrollers available in the future.

The phyCARD-S is equipped with a Freescale i.MX27 processor which offers an integrated video pre- and post-processing unit and an MPEG-4 codec for multimedia and streaming applications.

Kit contents

The kit contains all components necessary for the evaluation and the start of the development. The carrier board is equipped with all standard interfaces needed. The detached phyCAM-S - camera head with WVGA color sensor is connected by a CAT-5 cable to the RJ-45 connector of the base board.

The kit includes a 5.0" touchscreen, the software BSP, detailed instructions and all necessary cables.

- phyCARD Carrier Board
- phyCARD-S ARM9-based SBC, 400 MHz, 128 MB RAM, 128 MB Flash
- VM-007-COL-LVDS with M12 lens 12 mm and cable
- VGA 5.0" Color-TFT display with touch and cable
- OSELAS Embedded Linux BSP
- Pre-installed image
- Serial cable, Ethernet cable, camera cable 50 cm, AC adapter
- Tool-CD including drivers, demos and examples
- Start-up guarante

Ordering Code	Product name
KPCA–A–S1–Video–L01	Embedded Video–Kit phyCARD–S with Embedded Linux

Design services

PC-Grabber

RD-Kits

SOM

Cameras

Accessories

Embedded Video Kit i.MX27

phyCAM-P Development Kit with Freescale i.MX27

Product Description

The development kit is based on a phyCORE-i.MX27 SBC. The Freescale i.MX27 Microcontroller with ARM9 core is already equipped with an integrated camera interface, graphics controller and Ethernet. An internal video pre-and post-processing unit and a hardware MPEG-4 codec make it even more interesting for media streaming applications.

The kit has a phyCAM-P interface which enables the development of applications for cameras with a parallel bus. A WVGA camera (color) is included in the kit.

All interfaces of the controller are led out on the Carrier Board. An Expansion Bus connector allows easy testing of hardware extensions.

The kit comes with a 3.5" touchscreen, detailed instructions and start-up guarantee.

Kit contents

- phyCORE-i.MX27 Carrier Board
- phyCORE- i.MX27 SBC, 400 MHz, 128 MB RAM, 32+64 MB Flash
- VM-007-COL-M12 with M12 lens 12 mm and cable
- QVGA 3.5" Color-TFT-Display with touch and cable
- OSELAS Embedded Linux BSP
- Pre-installed LINUX image
- Serial cable, Ethernet cable, AC adapter
- Tool-CD including drivers, demos and examples
- Detailed technical information can be found on our website

Ordering code	**KPCM–038–Video–L**
Product name	**Embedded Video–Kit i.MX27** with Embedded Linux

Embedded Video Kit PXA270–RTG

Compact and close-to-production

Product Description

„Low cost" development and mass production platform for applications that are meant to go into production quickly. All elements of the kit are designed for the use in series. A BSP for either WinCE 6.0 or Embedded Linux is included.

On the basis of the kit components a series product can be designed without any effort for hardware development . The possibility to achieve a more compact form factor in next to no time by dividing and flipping over the carrier board is a special highlight.

The kit has a connector for cameras with phyCAM-P interface and comes with a monochrome WVGA camera.

The phyCORE-SBC is populated with a Marvell XScale PXA270 controller at 520 MHz (32 MB FLASH, 64 MB SDRAM).

Ethernet, USB, audio and RS-232 are brought out to standard connectors on the carrier board. Besides the touchscreen, switches and users-programmable LEDs can be used for user interaction. The integrated power supply allows unregulated supply voltages from 9 to 14 VDC.

Kit contents

- phyCORE-PXA270 Carrier Board
- phyCORE-PXA270 Single Board Computer
- VM-007-BW-M12: M12 lens 2.1mm and cable
- QVGA 3.5" Color-TFT-Display with touch and cable
- Windows Embedded CE 6.0 Binary BSP or OSELAS Embedded LINUX
- Pre-installed WinCE or LINUX image
- Detailed technical informtion can be found on our website

Ordering code	**KPCM–027–Video–RTG–L**
Product name	**Embedded Video Kit PXA270–RTG** with Embedded Linux

Ordering code	**KPCM–027–Video–RTG–W**
Product name	**Embedded Video Kit PXA270–RTG** with Windows CE 6.0

Optimized for series production

Series devices with image processing components must be ideally matched to the application in order to achieve the highest possible market shares as a result of an optimum price/performance ratio.

PHYTEC components permit the combination of scalable microcontroller modules with image processing modules in a complete system which can be ideally matched to the application due to this scalability.

Your development overheads are significantly reduced due to preliminary work for implementation of the operating system, the provision of drivers for the image processing components, and the availability of complex image processing libraries.

Gain further market success through the investments we have made for you.

PHYTEC modules with HALCON Embedded

Embedded image processing solutions become even more flexible through use of the powerful HALCON Embedded image processing software on the PHYTEC modules.

picture: MVTec Software GmbH
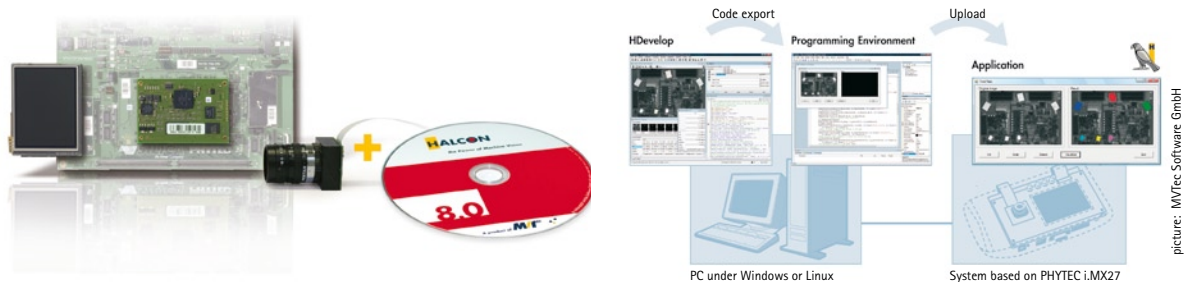
Together with the company MVTec and the HALCON Embedded product, PHYTEC pursues a new path for application of image processing algorithms proven in the PC world on compact embedded modules. The flexibility of the modular technology allows development of a tailored image processing system. HALCON provides the required image processing algorithms, and offers a convenient programming environment on PC basis. This arrangement offers you the advantages of modular preliminary services for both hardware and software.

Embedded Video Solutions

We are development partners for industrial products in a highly versatile range of industries such as medical engineering, automation, measuring and control technology, public transport, and many more.
PHYTEC can offer more than 20 years' experience with microcontrollers in industrial image processing applications.

The embedded video idea

The market for industrial image processing solutions was previously bound to PC components in the application. An initial step toward small, PC-independent systems is provided by intelligent cameras. However, many embedded applications require – besides imaging functionality - further electronic components, for example motor controls, GPS receiver or audio I/O. Furthermore, it is frequently necessary to adapt hardware to specific mechanical conditions. This new quality is achieved by using powerful embedded modules with integrated camera interface.
A compact, industrial series solution can be tailored with the embedded imaging components by selecting appropriate individual components together with complete preliminary services as kits.

The fast way to an embedded system

① Selection of controller   ② Selection of camera module

③ Start with the appropriate development kit

④ Adaptation of hardware   ⑤ Development of software application

⑤ Tailored embedded imaging system
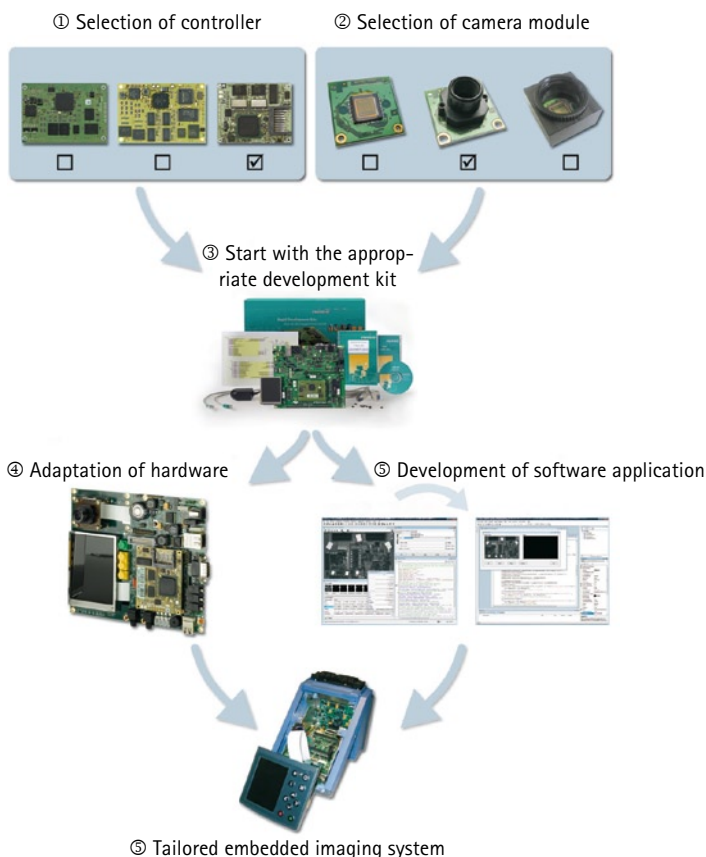
Details of some phyCORE modules

i.MX31   **Web–ID E1531**
- ARM1136JF-S, 532 MHz
- DDR RAM up to 512MB
- NAND Flash up to 1GB
- NOR Flash up to 32MB
- 2 x MMC / SD
- PCMCIA / CompactFlash
- 5 x UART / 3 x I²C
- 2 x SSI / I²S
- 3 x SPI / 3 x USB 2.0
- 10/100 MBit Ethernet
- phyCAM-P Camera Interface

i.MX27   **Web–ID E1570**
- ARM926EJ, 400MHz
- DDR RAM up to 128MB
- NAND Flash up to 1GB
- NOR Flash up to 32MB
- 2 x MMC / SD
- PCMCIA / CompactFlash
- 6 x UART / 2 x I²C
- 2 x SSI / I²S
- 3 x SPI / 3 x USB 2.0
- 10/100 MBit Ethernet
- phyCAM-P Camera Interface

PXA270   **Web–ID E1236**
- ARM V5TE, 512MHz
- SDRAM up to 256MB
- Flash up to 64MB
- MMC / SD
- 3 x UART / 2 x I²C
- SPI / USB 1.1
- 10/100 MBit Ethernet
- phyCAM-P Camera Interface

More SBCs and Kits on www.phytec.de

Design services

PC-Grabber

RD–Kits

SOM

Cameras

Accessories

Design services

PC-Grabber

RD-Kits

SOM

Cameras

Accessories

Digital sensor boards and cameras

CMOS-Camera boards for direct connection to a microcontroller module

phyCAM-P and phyCAM-S - series
Digital sensor boards and cameras with M12 or C/CS-mount lens flange

Product description

Camera Boards with phyCAM - interface can directly connect to the digital camera interface of the PHYTEC microcontroller boards. This allows easy integration of camera technology in compact, custom designed products.

The phyCAM - interface is supported by various, powerful 32-controllers, such as the Marvell PXA - series and the Freescale i.MX - controllers.

Together with the different variants of the camera boards a modular system is available, which empowers the developer to choose the optimal combination for his product. Because of the compatible phyCAM - interface, the cameras are easily interchangeable - even during the design phase.

All camera boards are standardized in size and have the same mounting points.

Each camera is available either as PCB version or with lens holder for C/CS-mount or M12 lenses. Thus, the adaption to the optical requirements of the application can also be done in a very simple way.

The board support packages (BSPs) of the compatible PHYTEC-SBCs contain the appropriate software drivers for the cameras already. Thus, the cameras can be easily integrated into software applications for Windows Embedded CE or Embedded Linux. Under Linux, the cameras can be operated by using for example the V4L2 interface or a GStreamer application.

BSPs are already included in the corresponding development kits (see pages 12, 13 and the PHYTEC module catalog).

All cameras are available in 3 versions:
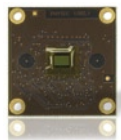
Sensor Board

Ordering option -M12:
with mini lens flange M12

Ordering option -H
with C/CS-Mount lens flange

phyCAM-P Interface

The parallel version of the phyCAM interface provides an extremely simple and inexpensive way to integrate the camera into a system. The data as well as the control signals are transmitted in parallel over a 33-pin FFC cable. This reduces the efforts for the interface to a minimum and still allows for compatibility between the camera types. Reserved pins allow access to special features such as a trigger input or light control. phyCAM-P is particularly suitable for the internal installation of cameras and allows a cable length of up to 30 cm. The phyCAM-P interface is supported by the series of phyCORE - SBCs.

phyCAM-S Interface

The new phyCAM-S interface brings even more flexibility for product developers. Thereby the data is transferred via a serial LVDS interface. Including the power supply and control signals the phyCAM-S interface requires only 8 wires. The cable is even easier to place and can be up to 6 meters. Thus the camera head and the main unit can be separated. The connection can be easily done with a CAT-5e - Ethernet cable.

With the phyCARD - family PHYTEC offers SBCs suitable for the phyCAM-S interface.

All boards are equipped with the appropriate LVDS camera interface. As a result, the developer has not only fully scalable computing power, but also design security because the phyCARD series grows with the microcontrollers available in the future, without losing compatibility.

Design services

PC-Grabber

RD-Kits

SOM

Cameras

Accessories
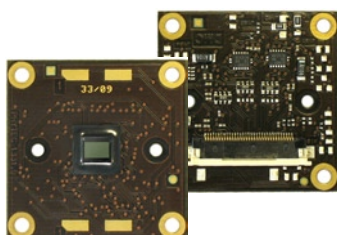
phyCAM-P (VM-007-MUX)
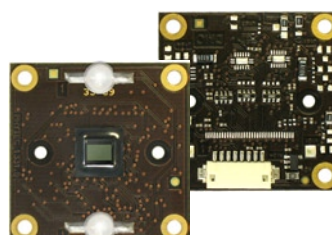
phyCAM-S (VM-007-LVDS-LED)

Model	VM-006-BW	VM-007-BW	VM-007-COL	VM-007-BW-LVDS	VM-007-COL-LVDS	VM-009	VM-009-LVDS
Image sensor	Aptina MT9M001	Aptina MT9V022	Aptina MT9V022	Aptina MT9V022	Aptina MT9V022	Aptina MT9M131	Aptina MT9M131
Resolution	1280 x 1024	752 x 480	752 x 480	752 x 480	752 x 480	1280 x 1024	1280 x 1024
Sensor size	1/2" (5:4) 6.66mm x 5.32mm	1/3" 4.51mm x 2.88mm	1/3" 4.51mm x 2.88mm	1/3" 4.51mm x 2.88mm	1/3" 4.51mm x 2.88mm	1/3" 4.6mm x 3.7mm	1/3" 4.6mm x 3.7 mm
Pixel size	5.2µm x 5.2µm	6.0µm x 6.0µm	6.0µm x 6.0µm	6.0µm x 6.0µm	6.0µm x 6.0µm	3.6µm x 3.6 µm	3.6µm x 3.6 µm
Data format	8 / 10 Bit digital monochrom (Y)	8 / 10 Bit digital monochrom (Y)	8 / 10 Bit digital color (RGGB) Bayer Pattern	8 Bit digital monochrom (Y)	8 Bit digital color (RGGB) Bayer Pattern	8 Bit digital YUV / RGB / Bayer Pattern	8 Bit digital YUV / RGB / Bayer Pattern
Interface type	phyCAM-P	phyCAM-P	phyCAM-P	phyCAM-S	phyCAM-S	phyCAM-P	phyCAM-S
Dataline shifting	optional (note 1)	optional (note 1)	optional (note 1)	-	-	-	-
Frame rate	up to 30 fps	up to 60 fps	up to 60 fps	up to 60 fps	up to 60 fps	up to 30 fps	up to 30 fps
Dynamic range	68.2 dB	>55 dB (linear)	>55 dB (linear)	>55 dB (linear)	>55 dB (linear)	71 dB	71 dB
High dynamic range	-	>80...100 dB	>80...100 dB	>80...100 dB	>80...100 dB	-	-
Shutter	Rolling	Global	Global	Global	Global	Rolling Shutter	Rolling Shutter
Configuration	I²C-Bus	I²C-Bus	I²C-Bus	I²C-Bus	I²C-Bus	I²C-Bus	I²C-Bus
Synchronisation	Master Mode	Master Mode Slave Mode	Master Mode Slave Mode	Master Mode	Master Mode	Master Mode	Master Mode
Power supply	3.3V DC	3.3V DC	3.3V DC	3.3V DC	3.3V DC	2.8V DC	3.3V DC
Power consumption	363 mW	320 mW	320 mW	320 mW	320 mW	170mW	ca. 500 mW
Power cons. in standby	294 mW	100 µW	100 µW	100 µW	100 µW	-	-
Features (optional)	-	LED Light Trigger Strobe	LED Light Trigger Strobe	LED Light Trigger Strobe	LED Light Trigger Strobe	LED Light Trigger Strobe	LED Light Trigger Strobe
Operating temperature	0...70°C	-40...85°C	-40...85°C	-40...85°C	-40...85°C	-30...70°C	-30...70°C
Physical dimensions (mm)(PCB)	34 x 34	34 x 34	34 x 34	34 x 34	34 x 34	34 x 34	34 x 34
Mounting	4 x M2.5	4 x M2.5	4 x M2.5	4 x M2.5	4 x M2.5	4 x M2.5	4 x M2.5
Connection	33pin. FFC	33pin. FFC	33pin. FFC	Hirose 8pin	Hirose 8pin	33pin FFC	Hirose 8pin
Web-ID	E1548	E1551	E1554	E1609	E1610	E1637	E1638

(note 1) Ordering option -MUX: allows for dynamic switching between 8/10 bit interface

Options for different lens mounts

Ordering option		-	-H	-M12
Lens mount		sensor only	C/CS-mount	M12 (0.5)
Physical dimensions *(mm)		34 x 34 x 6	34 x 34 x 17	34 x 34 x 20
Weight		7 g	24 g	8 g
Web-ID	VM-006-BW	E1548	E1549	E1550
	VM-007-BW	E1551	E1553	E1552
	VM-007-COL	E1554	E1556	E1555

*) Approximate information, without lens.

Analog-Video Converter

Video converter with 4 signal inputs and phyCAM-P – interface allows integration of analog video sources in Embedded Video – systems.

- 3 / 4 composite video inputs
- 1 S-Video-input
- NTSC/PAL - system
- Source selection by software
- Parallel data interface phyCAM-P

Ordering code VM-008

Web-ID E1636

Design services

PC–Grabber

RD–Kits

SOM

Cameras

Accessories

USB cameras

USB cameras in a compact metal case suitable for industrial applications and available as b/w or color model with different resolutions.

AK085

USB-CAM-011H / 012H / 111H / 112H

CMOS-cameras, 1280 x 1024, external trigger capability optional

Product Description

The industrial cameras of the USB-CAM - series can be connected to any PC providing an USB interface with a few simple steps. An installation of additional hardware is not required.
A single cable is used for power supply and data transmission.
The cameras are available both as color and monochrome models. The robust metal housing is ideal for use in industrial applications and is equipped with a C/CS lens mount.

A resolution of 1280 x 1024 pixels enables the USB-CAM 011H / 012H / 111H / 112H to deliver more detailed pictures than a standard TV camera.

Software drivers for Windows 2000 (SP2), XP, Vista, demo applications and an SDK are included. Standard and custom applications can control the camera directly by using the Direct X - Interface. The software development kit (SDK) allows to create custom applications quickly and easily.
The software interface is as well compatible for all cameras of the USB-CAM series, as for our FireWire-CAM series. In this way a scalability of the cameras is guaranteed in your application. All cameras are optionally available with an external trigger input which allows to precisely the moment of image aquisition.

Technical Highlights

- Video format: 1280 x 1024, progressive scan
- Power supply: 4.5 to 5.5 VDC (from USB)
- Power consumption: ca. 250 mA (at 5 VDC)
- Lens mount: C/CS-Mount
- Operating temperature: -5 C° to 45 C°
- Dimensions: 50 x 50 x 29 mm*
- Weight: ca. 140g*

AK080 / AK082 (monochrome)

- Sensor: 1/2", 1280 x 1024,
                          Aptina MT9M001
- Frame rate: 7.5 / 15 / 20 / 27 fps.
- Pixel size: 5.2 μm x 5.2 μm
- Minimum illumination: 1 Lux
- Shutter: Rolling
- Exposure time: 1/10.000 to 4 sec (manual/auto)
- Gain: 0 to 12 dB (manual/auto)
- Video format: 1280 x 1024 Y8 (8 bit)

AK081 / AK083 (color)

- Sensor: 1/3", 1280 x 1024,
                          Aptina MT9M131
- Frame rate: 24 fps.
- Pixel size: 3.6 μm x 3.6 μm
- Minimum illumination: 0.5 Lux
- Shutter: Rolling
- Exposure time: 1/10.000 to 4 sec (manual/auto)
- Gain: 0 to 18 dB (manual/auto)
- White balance: +/- 6 dB (manual/auto)
- Video format: 1280 x 1024 RGB32 (8 bit)
                          1280 x 1024 Y800 (8bit)

* preliminary information can be subject to change
   photo similar to product.

Ordering code	Product name
AK080	USB-CAM-011H, monochrome
AK081	USB-CAM-012H, color
AK082	USB-CAM-111H, monochr., Trigger
AK083	USB-CAM-112H, color, Trigger

Shipped without lens, refer to p. 26 for appropriate lenses.

Design services

PC-Grabber

RD-Kits

SOM

Cameras

Accessories

USB–CAM–022H / 122H

CMOS color camera, 1600 x 1200, external trigger capability optional

Product Description

High resolution USB cameras with C/CS lens mount. The cameras offer a unique high-resolution color image at a frame rate of up to 20 fps. Software drivers for Windows 2000 (SP2), XP, Vista, demo applications and an SDK are included.

AK085

Technical Highlights
- Video format: 1600 x 1200, progressive scan
- Power supply: 4.5 to 5.5 VDC (from USB)
- Power consumption: ca. 250 mA (at 5V)
- Lens mount: C/CS-mount
- Operating temperature: –5°C to 45°C
- Dimensions: ca. 50 x 50 x 29*
- Weight: ca. 140 g*

- Sensor: 1/3", 1600 x 1200, Aptina MT9D131
- Frame rate: 20 fps
- Pixel size: 2.8 µm x 2.8 µm
- Minimum illumination: 0.5 Lux
- Shutter: Rolling
- Exposure time: 1/10.000 to 4 sec (manual/auto)
- Gain: 0 to 18 dB (manual/auto)
- White balance: +/- 6 dB (manual/auto)
- Video format: 1600 x 1200 RGB32 (8 Bit)
                         1600 x 1200 Y800 (8 Bit)

*preliminary information can be subject to change
 photo similar to product.

Ordering code	Product name
AK084	USB-CAM-022H, color
AK085	USB-CAM-122H, color, Trigger

Shipped without lens, refer to p. 26 for appropriate lenses.

USB–CAM–001H / 002H / 101H /102H

CMOS-camera, 744 x 480, external triggering capability optional

Product Description

USB cameras with high frame rate of up to 60 fps, and a large pixel surface. C/CS lens mount, available as color and monochrome models. Software drivers for Windows 2000 (SP2), XP, Vista, demo applications and an SDK are included.

AK077

Technical Highlights
- Video format: 744 x 480, progressive scan
- Power supply: 4.5 to 5.5 VDC (from USB)
- Power consumption: ca. 250 mA (bei 5V)
- Lens mount: C/CS-mount
- Operating temperature: –5°C to 45°C
- Dimensions: ca. 50 x 50 x 29*
- Weight: ca. 140 g*
- Sensor: 1/3", 744 x 480 Aptina MT9V023
- Frame rate: 5 / 7.5 / 15 / 30 / 60 fps
- Pixel size: 6.0 µm x 6.0 µm
- Minimum illumination: 0.1 Lux (b/w); 0.5 Lux (color)
- Shutter: Global
- Exposure time: 1/10.000 bis 1/4 sec (man/auto)
- Gain: 0 bis 12 dB (man/auto)
- White balance: +/- 6 dB (man/auto - nur color)
- Video format: 744 x 480 RGB32 (8 Bit, only color)
                         640 x 480 RGB32 (8 Bit, only color)
                         744 x 480 Y800 (8 Bit)
                         640 x 480 Y800 (8 Bit)

*preliminary information can be subject to change
 photo similar to product.

Ordering code	Product name
AK076	USB-CAM-001H, monochrom
AK077	USB-CAM-002H, color
AK078	USB-CAM-101H, monochr., Trigger
AK079	USB-CAM-102H, color

Shipped without lens, refer to p. 26 for appropriate lenses.

Design services

PC–Grabber

RD–Kits

SOM

Cameras

Accessories

FireWire cameras

Rugged industrial cameras, available as monochrome or as color version with different resolutions. The cameras can be connected directly to the FireWire bus.

FireWire–CAM–011H / 012H
CCD-cameras, 1024 x 768

Technical Highlights
- Video format: 1024 x 768, progressive scan
- Frame rate: 3.75 / 7.5 / 15 / 30 fps.
- Power supply: 8 to 30 VDC
- Power consumption: ca. 200 mA (at 12 VDC)
- Operating temperature: -5 C° to 45 C°
- Dimensions: 50 x 50 x 55.7 mm
- Weight: ca. 180g
- Exposure, gain and offset can be adjusted

Monochrome (AK062)
- Sensor: 1/3", 1024 x 768, Sony ICX204AL
- Video format: 1024 x 768 Y8 (8 bit)

Color (AK063)
- Sensor: 1/3" 1024 x 768, Sony ICX204AK
- Video format: 1024 x 768 Y8 (8 bit)
                         1024 x 768 YUV (4:2:2)
- Saturation, hue and white balance can be adjusted

Product Description

With the FireWire series PHYTEC introduces cost efficient industrial cameras with Firewire interface. The cameras are available as color and monochrome models and are built in a robust metal case with C/CS lens mount. The cameras can be connected directly – without additional frame grabber card – to computers with FireWire interface. The set-up operations are thus reduced to a minimum. Image acquisition, camera control and power supply are carried out by the FireWire cable only. A resolution of 1024 x 768 pixels at a frame rate of up to 15 fps. allows the cameras to be used in applications in which the resolution of analogue cameras is no longer sufficient. A special advantage is the global shutter. In contrast to cameras with a Rolling shutter, a global shutter exposes the entire image at a single point in time. Thereby distortions of moving objects are avoided. All cameras of the FireWire CAM series have an IEEE 1394a-interface. The cameras communicate with the computer using the standardised DCAM 1.31 - protocol. Drivers for Windows 2000 (SP2) and Windows XP / Vista are included. The camera can be easily integrated into software applications. Standard and custom applications which are using the DirectX interface can be applied directly with the supplied WDM drivers. For a quick and easy creation of custom applications, shipment also includes a Software-Development-Kit (SDK) along with the FireWireCAMs. The structure of the SDK allows the user to develop his own application without extensive practice in DirectX interfaces.

Ordering code	Product name
AK062	**FireWire–CAM–011H, monochrome**
AK063	**FireWire–CAM–012H, color**

FireWire-CAM-111H / 112H

CCD-cameras, 1024 x 768, trigger option

Product Description

FireWire camera, C/CS-mount, with input for external trigger to precisely control the moment of exposure. The delivery includes the DCAM drivers and a software DK for Win2000/XP.

Ordering code	Product name
AK064	**FireWireCAM-111H, monochrome**
AK065	**FireWireCAM-112H, color**

Shipped without lens, refer to p. 30 for matching cables and accessories.

Technical Highlights
- Video format: 1024 x 768, progressive scan
- Frame rate: 3.75 / 7.5 / 15 / 30 fps.
- Trigger input: 3.3 to 12V (BNC-socket, 50 Ohm)
- Power supply: 8 to 30 VDC
- Power consumption: ca. 200 mA (at 12 VDC)
- Operating temp.: –5 C° to 45 C°
- Dimensions: 50 x 50 x 55,7 mm
- Weight: ca. 180g
- Exposure, gain and offset can be adjusted

Monochrome (AK064)
- Sensor: 1/3", 1024 x 768, Sony ICX204AL
- Video format: 1024 x 768 Y8 (8 bit)

Color (AK065)
- Sensor: 1/3", 1024 x 768, Sony ICX204AK
- Video format: 1024 x 768 Y8 (8 bit)
  1024 x 768 YUV (4:2:2)
- Saturation, hue and white balance can be adjusted

FireWire-CAM-001 / 002

CCD-cameras, 640 x 480

Product Description

FireWire camera, C/CS-mount
The delivery includes the DCAM drivers and a software DK for Win2000/XP.

Ordering code	Product name
AK060	**FireWire-CAM-001, monochrome**
AK061	**FireWire-CAM-002, color**

Shipped without lens, refer to p. 30 for matching cables and accessories.

Technical Highlights
- Video format: 640 x 480, progressive scan
- Frame rate: 3.75 / 7.5 / 15 / 30 fps.
- Power supply: 8 to 38 VDC
- Power consumption: ca. 90 mA (at 12 VDC)
- Operating temp.: –5 C° to 45 C°
- Dimensions: 50 x 50 x 47 mm
- Weight: ca. 165g
- Exposure, gain, offset, gamma, sharpness and back light compensation can be adjusted

Monochrome (AK060)
- Sensor: 1/4", 640 x 480, Sony ICX098BL
- Video format: 640 x 480 Y8 (8 bit)

Color (AK061)
- Sensor: 1/4", 640 x 480, Sony ICX098BQ
- Video format: 640 x 480 Y8 (8 bit)
  640 x 480 YUV (4:1:1) or
  (4:2:2)
  640 x 480 RGB (24 bit)
- Saturation, hue and white balance can be adjusted

Analog cameras

Case or PCB version, M12 or C/CS–mount lens holder and special function designed for industrial applications.

Technical Highlights

- Sensor: 1/3", 752(H) x 582 (V) SONY ICX409AK
- Pixel size: 6.5µm x 6.25µm
- TV-system: CCIR-PAL (B,G,H), Composite and Y/C (S-video)
- Zoom: 4x digital
- Horizontal resolution: > 450 TV-lines
- Synchronisation: internal/ external
- Minimum illumination: 0.5 Lux /1:1.4 AGC „ON" and +39dB
- S/N-ratio: > 48dB
- AEC: – electronic iris (1/50-1/30,000s), can be cut off – control output for lenses with electronic iris
- AGC: automatic (0...18dB), can be cut off
- White balance: automatic, can be cut off
- Power supply: 10.5V to 15V DC
- Power consumption: 1.6W
- Operating temperature: -5°C ... +50°C
- Dimensions: 52 (W) x 62 (L) x 42 (H) mm
- Mounting: 1/4", top and bottom
- Weight: 160 g
- Connectors: BNC-socket: composite, Mini-DIN: Y/C Out (S-video), BNC-socket: external Sync., 2 pin clamp: power supply, 4 pin socket: iris control, C/CS-mount, 3.5 mm jack: Remote
- Remote control of all parameters by software
- Parameters can be permanently stored in the camera

Highlights of the Control Kit for the VCAM-110

- Featured settings: Shutter time Gain White Balance Gamma correction Image inversion Auto exposure – measuring range Zoom (digital) BLC, BLC range Auto-Exposure – response time White balance – response time
- Integration in custom applications by use of DLLs
- Up-/Download from/to camera possible
- Permanent saving of he configuration in the camera possible
- Connection to serial interface (COM-Port)
- Software for Windows 2000, NT4.0, XP, Vista

Color camera VCAM–110–2

Small CCD-color camera, 752 x 582, PAL with digital zoom

Product Description

The VCAM-110-2 is a high resolution camera in a small aluminium housing. It is suitable for image acquisition in connection with all pciGrabber products, a video monitor or VCR. Because of its small housing is it suitable for the complete range of security applications as well as image processing tasks, where mounting space is crucial. The high resolution image sensor qualifies the camera also for demanding image processing tasks. A separate s-video output allows superior image quality.

A control kit, which is optionally available, enables remote control of the camera parameters by a PC. It contains a cable to connect the camera to the PC's RS-232 interface, as well as software for windows Adjustments made on the PC are directly visible in the video image and can be permanently stored in the camera at the touch of a button. Using a DLL-kit it is also possible to adjust the camera by the application software continuously. This allows, for example, optimal image capturing without time-consuming post-processing at the PC even for image processing applications with complex or changing light conditions.

Ordering code	Product name
AK039–2	**VCAM–110–2**
	High resolution color camera
WK032	**Control cable for VCAM–110–x**
	Remote configuration via RS-232 interface
WK051	**S-video cable**
SV009	**AC adapter**

Shipped without lens , please choose an appropriate C/CS-mount lens (p. 26–27)

VCAM-010

VCAM-020

VCAM-010 / VCAM-020

CCD-B/W-Cameras, 500 x 582, CCIR

Product Description

Compact black/white cameras with excellent image quality and automatic exposure control for image processing and surveillance applications. Both cameras have a solid metal housing and C / CS-mount lens thread. The VCAM-020 allows for manual adjustment of all important parameters by DIP switches. Additionally the video signals and voltage supply can be connected by a HD-DB- 15 - a plug.

Ordering code	Product name
VCAM-020	**VCAM-020**
	manually adjustable b/w-camera
AK001	**VCAM-010, b/w-Camera**
SV001	**AC-adaptor, 4,5...12V/500mA**
WK022	**Video-cable**
	for pciGrabber with HD-connector

Shipped without lens, please choose an appropriate C/CS-mount lens (p. 26-27)

Technical Highlights VCAM-010

- Image Sensor: 500(H) x 582(V) 1/3", SONY ICX055AL
- TV-system: CCIR (B,G,H), Composite
- horizontal resolution: 420 TV-Lines
- Minimum illumination: 0.05 Lux / F1:1.2
- S/N Ratio: > 48 dB
- AEC / AGC: automatic
- Video output: 1.0 V_{pp}, 75 Ω, (BNC-Connector)
- Power supply: 12V DC (150 mA)
- Mounting: ¼", top and bottom
- Weight: 185g
- metal housing: solid metal 51 x 51 x 51 mm (color: grey)
- Operating temperature: 0°C... +40°
- BNC-socket: composite
- coaxial DC-Connector (5.5 mm): power supply
- 4 pole miniature plug: iris control
- C/CS-mount: lens mount

VCAM-020 additional features

- AEC: electronic iris 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/5000, 1/10000, can be adjusted by DIP-switch
- AGC: automatic (5...32dB) or manual
- connectors: see VCAM-010,
- Features: HD-DB-15
- Image aquisition: Frame/Field mode selectable
- Synchronisation: H-sync. and V-sync. output, external V-sync. input
- Weight: approx. 225g

VCAM-040-1

CCD-B/W-Camera , 752 x 582, CCIR

Product Description

The VCAM-040 is a high resolution b/w camera in a small aluminum housing. It is suitable for image acquisition in connection with all pciGrabber products, a video monitor or VCR.
The special features of this camera are:

- high sensitivity
- high resolution sensor
- very low image noise
- excellent image quality
- compact dimension

Ordering code	Product name
AK049-1	**VCAM-040-1**
SV009	**AC-adaptor**
WK012	**Video-cable for pciGrabber**

Shipped without lens , please choose an appropriate C/CS-mount lens (p. 26-27)

Technical Highlights VCAM-040-1

- Image Sensor: 752(H) x 582(V), 1/3", SONY ICX409AL
- TV-system: CCIR (B,G,H), Composite
- horizontal resolution: 570 TV-Lines
- Minimum illumination: 0.05 Lux / 1:1.4 AGC "ON"
- S/N-Verhältnis: > 53 dB
- AEC: electronic iris (1/50...1/100,000)
- AGC: automatic
- Video output: 1.0 V_{pp} /75 Ω (BNC-Connector)
- Power supply: 12V DC (210mA)
- Mounting: ¼", top and bottom
- Weight: 160g
- Operating temp.: 0°C... +40°C
- Dimensions: 52 x 62 x 42 mm
- Connectors: BNC-socket: Composite, BNC- socket: externe Sync., 2 pol. clamps: power supply, 4pole miniature plug: iris control, C/CS-mount: lens mount

Design services

PC-Grabber

RD-Kits

SOM

Cameras

Accessories

Design services

PC-Grabber

RD-Kits

SOM

Cameras

Accessories

Technical Highlights

- Sensor: 1/3", 752(H) x 582 (V) SONY ICX409AK
- Pixel size: 6.5µm x 6.25µm
- TV-system: CCIR-PAL (B,G,H), Composite (FBAS), Y/C (S-video)
- Zoom: 4x digital
- Horizontal resolution: > 450 TV-lines
- Synchronisation: internal/external (vertical, VS)
- Minimum illumination: 0.5 lux /1:1,4 AGC „ON" at +39dB
- S/N-ratio: > 48dB
- AEC:
  - electronic iris (1/50...1/30,000s), can be cut off
  - control output for lenses with electronic iris
- AGC: automatic (0...18dB) , can be cut off
- White balance: automatic, can be cut off
- Power supply: 10.5V to 15V DC
- Power consumption: 1.6W
- Operating temperature: -5°C ... +50°C
- Dimensions: 42 (W) x 42 (L) x 29 (H) mm
- Lens: fix focus lens 5.6 mm, 1:1.4
- Weight: 20 g
- Connectors: Composite (FBAS), Y/C out (S-video), external synchronisation, supply voltage, socket for remote control
- Remote control of all parameters by software
- Parameters can be permanently stored in the camera.

Highlights of the Control Kit for the VCAM-003-2

- Featured settings: Shutter time
  Gain
  White Balance
  Gamma correction
  Image inversion
  Auto exposure – measuring range
  Zoom (digital)
  BLC, BLC range
  Auto-Exposure – response time
  White balance – response time
- Integration in custom applications by use of DLLs
- Up-/Download from/to camera possible
- configuration can be permantently stored in the camera
- Connection to serial interface (COM-Port)
- Software for Windows 2000, NT4.0, XP, Vista
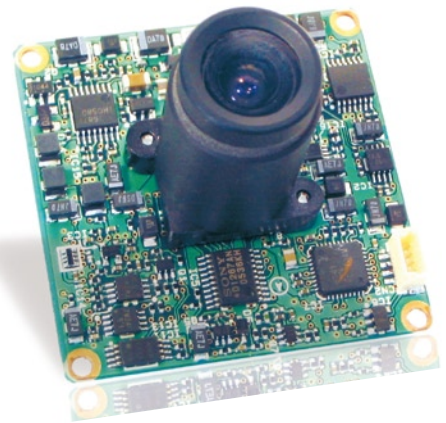
Color Camera VCAM-003-2

CCD-Color camera, 752 x 582, PAL with digital zoom

Product Description

The VCAM-003-2 is a high resolution PCB color camera. It is suitable for image acquisition in connection with all pciGrabber products, a video monitor or VCR. The high resolution image sensor (752 x 582) qualifies the camera also for demanding image processing tasks. A separate s-video output allows superior image quality.

A control kit, which is optionally available, enables remote control of the camera parameters by a PC. It contains a cable to connect the camera to the PC's RS-232 interface, as well as software for Windows. Adjustments made on the PC are directly visible in the video image and can be stored in the camera at the touch of a button. Using a DLL-kit it is also possible to adjust the camera by the application software continuously. This allows, for example, optimal image capturing without time-consuming post-processing at the PC even for image processing applications with complex or changing light conditions.

Ordering code	Product name
AK035-2	**VCAM-003-2**
	with prime lens 5.6 mm
WK136	**Control cable for VCAM-003-2**
	Remote configuration via RS-232 interface

Other lenses suitable for VCAM-003-2:

AO027 D-Mount, f= 2.3mm, F4.0

AO038 D-Mount, f= 4.0mm, F4.0

AO030 D-Mount, f= 5.6mm, F4.0

AO029 D-Mount, f= 8.0mm, F4.0

AO039 D-Mount, f= 16mm, F4.0

AO040 D-Mount, f= 25mm, F4.0

At order quantities from 20 pieces we can ship the camera with your specific lens without surcharge**.**

Design services

PC-Grabber

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Cameras

Accessories

VCAM-001-3

CCD B/W camera module, 537 x 597, CCIR

Product Description

Black/white CCD camera module with firmly mounted fix focus lens. This camera is sensitive in the near infrared and has an electronic shutter control.

The shipment includes the adjustable fix focus lens.

Ordering code	Product name
AK048-3	VCAM-001-3
	PCB camera without housing, CCIR

Additional lenses for VCAM-001-3:

AO031	S-Mount, f= 2.1 mm, F2,5
AO009-1	S-Mount, f= 4.3 mm, F1,8
AO045	S-Mount, f= 6.0 mm, F2,0
AO046	S-Mount, f=12.0 mm, F2,0

Technical Highlights

Image sensor:	1/3", 537(H) x 597(V)
Horizontal resolution:	420 TV-Lines
TV-system:	CCIR (B,G,H), Composite (BAS)
Minimum illumination:	0,03 Lux / lens 1:1.2
S/N-Ratio:	52 dB (min.) / 60 dB (typ.)
AGC:	automatic
AEC:	1/50 ~ 1/20,000 sek.
BLC:	can be cut off
Mirror:	connectible
Video output:	1.0 VPP, 75 W
Connectors:	3-lead connector video out / +12V supply / ground
Lens:	fix focus S-Mount 3.6mm F2.0
Power supply:	12V $\pm$1V DC, 120mA
Operating temp.:	−20°C to 50°C
Dimensions:	32 x 32 x 32 mm
Weight:	ca. 27g
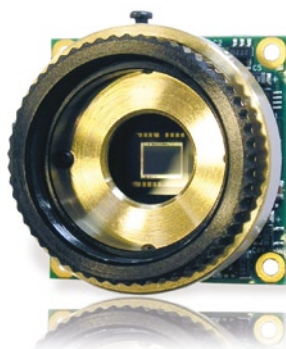
VCAM-002-3

CCD B/W camera module, 537 x 597, CCIR

Product Description

B/W-CCD-camera module with C/CS-mount lens holder. This camera is sensitive in the near infrared and has an electronic exposure control.

The lens is not included.

Ordering code	Product name
AK008-3	VCAM-002-3
	C/CS-mount, PCB camera, CCIR

Technical Highlights

Image sensor:	1/3", 537(H) x 597(V)
Horizontal resolultion:	420 TV-Lines
TV-system:	CCIR (B,G,H), Composite (BAS)
Minimum illumination:	0.03 Lux / lens 1:1.2
S/N-Ratio:	52 dB (min.) / 60 dB (typ.)
AGC:	automatic
AEC:	1/50 ~ 1/20,000 sek.
BLC:	can be cut off
Mirror:	connectible
Video output:	1.0 VPP, 75 W
Connectors:	3-lead connector video out / +12V supply / ground
Lens:	fix focus S-Mount 3.6mm F2.0
Power supply:	12V $\pm$1V DC, 120mA
Operating temp.:	−20°C to 50°C
Dimensions:	32 x 32 x 32 mm
Weight:	ca. 27g

Design services

PC-Grabber

RD-Kits

SOM

Cameras

Accessories

Lenses

We offer a wide selection of C/CS-mount lenses for our cameras. The following lenses are just a port of the product range. We will be glad to advise you if you need a lens with different focal length or other properties.

Lens calculation

You can easily calculate the focal length needed with the following approximate formula:

$$f = \frac{4,8mm}{B} * L$$

B = width of the object
L = distance between camera and object
f = focal length of the lens
(all measures in mm)

Note: The formula is valid only for cameras with 1/3" sensor (e.g. VCAM-110-2, VCAM-003-2 etc.).

For other sensor sizes replace 4,8 mm (1/3" sensor) with:
6.4 mm (1/2" sensor; e.g. VM-006-Serie)
3.6 mm (1/4" sensor; e.g. FireWireCAM-001/002)
Round the resulting focal length down to the next available value. This increases the visible field of view. (if necessary please feel free to ask for other focal lengths.) The above formula relates to the image width. The aspect ratio of TV cameras is 4:3. Therefore, the corresponding image height is:

$$H = 3/4 \ B$$

Minimum Object Distance (M.O.D.)

The M.O.D. is the minimum object distance which gives a sharp image. In case the camera should be closer to the object, adaptor rings can be used (see AZ005). They are placed between the lens and the camera. The distance required is determined experimentally.

Fixed focus

High quality video fixfocus lenses from **PENTAX**.
Very good image quality for image processing and visualization applications. The lenses are mostly equipped with manually adjustable aperture. Fixing screws allow you to lock the setting. Other values on request.

Focal Length	Aperture	M.O.D.	Lens mount	Angle of view at 1/3"	Fixing screws	Ordering code
4,8 mm Fixfocus	1.8...C manual	0.2 m	C-mount	55°07'	+	A0016
6,0 mm	1.2...C manual	0.2 m	C-mount	43°33'	–	A0053
8,5 mm	1.5...C manual	0.2 m	C-mount	31°52'	+	A0047
12 mm	1.2...22 manual	0.2 m	C-mount	22°04'	+	A0035
16 mm	1.4...22 manual	0.3 m	C-mount	16°55'	+	A0026
25 mm	1.4...22 manual	0.3 m	C-mount	10°58'	+	A0007
35 mm	1.6...16 manual	0.35 m	C-mount	7°51'	+	A0051
50 mm	2.8...22 manual	0.9 m	C-mount	5°30'	+	A0052
50 mm	1.4...C manual	1.0 m	C-mount	5°30'	+	A0049
75 mm	1.4...C manual	1.2 m	C-mount	3°40'	+	A0008

Zoom lenses

Due to the variable focal length, these PENTAX lenses are best qualified for applications where precise adjustment of the image section is important or if the object's size changes frequently.

Focal Length	Aperture	M.O.D.	Lens mount	Angle of view at 1/3"	Fixing screws	Ordering code
3.0...8.0 manual	1.0...C manual	0.3 m	CS-mount	38 mm 44 mm	–	A0020
8.0...48.0 manual	1.0...22 manual	1.2 m	C-mount	57 mm 95 mm	+	A0006
12.5...75.0 manual	1.8...22 manual	1.0 m	C-mount	51 mm 90 mm	–	A0018

Design services

PC-Grabber

RD-Kits

SOM

Cameras

Accessories

COMPONON-S 50

High resolution close-up lens

Ordering code	AO023
Product name	Componon S-Set

- lens Componon-S 50 mm/2.8
- focussing system Unifoc 12
- C-mount connector
- 3 adaptor rings 8mm, 10mm and 25 mm
- mounting instructions and hex key

High resolution close-up lens from Schneider Kreuznach. Suitable for close-up and macro shots in superb image quality. Operation in retro position is possible. Focal length 50mm, manual iris 2.8–C, MOD 0.7m, C-mount thread, compact diameter 47mm.

COMPUTAR TEC-M 55

Telecentric lens

Ordering code	AO024
Product name	COMPUTAR TEC-M55

Lens with constant reproduction scale along its operating range. This 55mm lens allows to displace the object within +/- 12.4mm with only 1% change in scale. C-mount thread, manual iris 2.8...32C, magnification x 0.5...0.4, MOD 12.5 cm.

Adaptor ring set

For C/CS-mount lenses

Ordering code	AZ005
Product name	Adaptor ring set
	for C/CS-mount lenses
	(0.5/1/5/10/20/40 mm)

With adaptor rings C/CS-mount lenses can be adjusted for close-up shots (shortening of the M.O.D).
The set consists of 6 rings from 0.5 mm to 40 mm. They can be freely combined.
At purchase of larger quantities individual rings / ring combinations can be customized as requested.

CS/C-mount adaptor

Adaptor CS-to-C-Mount

Ordering code	AZ008
Product name	C/CS-mount adaptor

The CS/C-mount adaptor (AZ008) enables use of C-mount lenses at CS-mount cameras.

Design services

PC–Grabber

RD–Kits

SOM

Cameras

Accessories

Ring Lights and Accessories

The individual components of an image processing system are the cogs in the entire wheel. Complete your application with our accessories.

Repro Stands
Repro stand and Lighting Units

AZ001

Non-reflective, matt black base board with printed fine grid and cm/inch scale. Aluminum column also with cm/inch-scale, Hand-cranked height adjustment by friction drive in plastic bearings. Camera arm horizontally adjustable to change the distance to the column, moves approx. 7 cm, camera mount 1/4".

Base board: approx. 400x420x25mm
Column height: 760mm
Maximum load: 1.5 kg

AZ001   **Repro stand RS2XA**
                  without lighting

AZ002   AZ0023

The optional lighting unit enable a low-shadow illumination of the objects. Version **AZ002** has two E27 sockets for standard reflector lamps with up to 250 W. The lamp arms allow flexible adjustment of the lamps.

The high-end system **AZ023** is equipped with two small light banks with one daylight fluorescent lamp each (18W, color temp. 5400 K). The high-frequency ballast operates the lights with a frequency of about 40kHz, thus flickering can not occur. Mounting with strong die-cast clamp bases, clamp width up to 48 mm.

AZ002   **Lighting Unit**
                  RB3, without lamps

AZ023   **Lighting Unit**
                  RB218HF with lamps

Mini Tripods
Mini Tripods with 1/4"-mounting screw

AZ004

For cameras, lights etc.
Well suited for flexible laboratory setups. Pivotable mounting plate with thread B 1/4 (1/4"). The tripods can be folded flat and space saving.

AZ004   **Mini Tripod**
                  foldable, 1/4" screw,
                  75 mm fully extended

AZ012

AZ012   **height–adjustable Mini Tripod**
                  foldable, 1/4" screw,
                  up to 160 mm fully extended

AC–Adaptors and Fuses
for Cameras, Frame grabber and Kits

SV009

SV001   **AC-Adaptor**
                  4.5V...12V, max. 600mA
                  with universal output connector set

SV008   **AC-Adaptor**
                  3V...12V, max. 1A
                  with universal output connector set

SV009   **AC-Adaptor**
                  4.5V...12V, max. 600mA
                  with open cable ends

SV023   **AC-Adaptor**
                  12V, max. 2A for WK113-2.0

KF012   **Spare Fuse**
                  for pciGrabber-4 series, 1.6 A
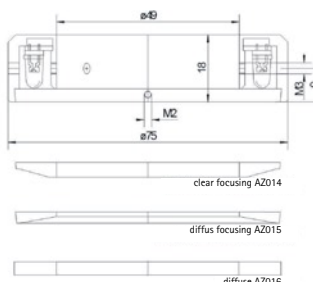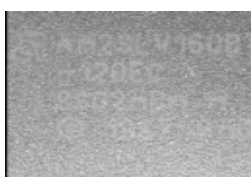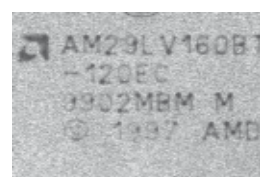
KF014   **Spare Fuse**
                  0.5 A

Design services

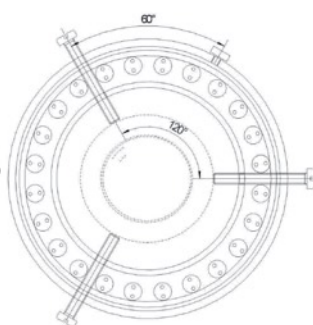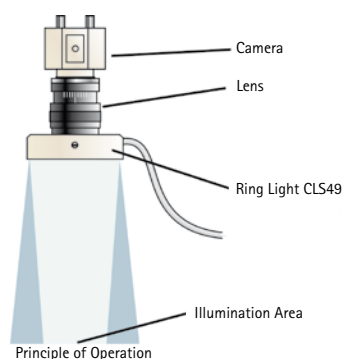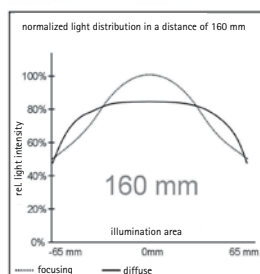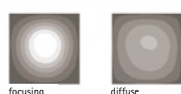PC–Grabber

RD–Kits

SOM

Cameras

Accessories

Ring Light CLS49
LED-Light for attachment to the lens

Product Description

The ring light CLS49 establishes an even, shadow and reflection-free illumination of any object – a basic requirement for all image processing applications. Three clamping screws the camera lens. A selection of different filters makes it possible to adapt the light easily to a given task. The focusing filters focus the light on a small area in the centre. This is useful especially for small objects and high focusing lenses. An even and non-reflective illumination can be achieved with diffuse filters, e.g. when using wide angle lenses.

The brightness of the CLS49 is exactly adjustable by a small trimmer on the upper side. An integrated current control guarantees a constant brightness over a large range of the input voltage (10...18 V or 20...32 V DC). Unregulated versions are also available. For applications with color cameras the white version gives an illumination with constant color temperature. The model with red LEDs can be used with b/w cameras. It has an even higher brightness than the white type. Other colors (or infrared versions) are available upon request.

Technical Highlights

- Intensity (max.): 200 000 mcd (red), 78 000 mcd (white)
- Brightness: adjustable (stabilized)
- Number of LEDs: 24
- Colors: white, red
- Supply current: <160 mA at 12V
- Power supply: 10V...18V DC or 20V...32V DC
- Outside diameter: 75 mm
- Inside diameter: 49 mm
- Connection: NG-connector
- available with integrated current stabilisation or as voltage controlled version

Ordering code

Sets with 3 Filters

clear focusing, diffuse focusing, diffuse **Ring Light Set CLS49** stabilized, **with 3 filters**

VZ-001-X1	**white, 78 000 mcd,**	**10...18V**	
VZ-002-X1	**red, 200 000 mcd,**	**10...18V**	
VZ-003-X1	**white, 78 000 mcd,**	**20...32V**	
VZ-004-X1	**red, 200 000 mcd,**	**20...32V**	

Ring Light CLS49 with 1 Filter

stabilized, 1 filter **clear focusing**

VZ-001-X2	**white, 78 000 mcd,**	**10...18V**	
VZ-002-X2	**red, 200 000 mcd,**	**10...18V**	
VZ-003-X2	**white, 78 000 mcd,**	**20...32V**	
VZ-004-X2	**red, 200 000 mcd,**	**20...32V**	

stabilized, 1 filter **diffuse focusing**

VZ-001-X3	**white, 78 000 mcd,**	**10...18V**	
VZ-002-X3	**red, 200 000 mcd,**	**10...18V**	
VZ-003-X3	**white, 78 000 mcd,**	**20...32V**	
VZ-004-X3	**red, 200 000 mcd,**	**20...32V**	

stabilized, 1 filter **diffuse**

VZ-001-X4	**white, 78 000 mcd,**	**10...18V**	
VZ-002-X4	**red, 200 000 mcd,**	**10...18V**	
VZ-003-X4	**white, 78 000 mcd,**	**20...32V**	
VZ-004-X4	**red, 200 000 mcd,**	**20...32V**	

unregulated versions upon request

SV–023	**AC–adaptor**	
	for VZ-001 and VZ-002	

focusing

diffuse

normalized light distribution in a distance of 160 mm

rel. light intensity

160 mm

illumination area

-65 mm   0mm   65 mm

focusing   diffuse

Camera

Lens

Ring Light CLS49

Illumination Area

Principle of Operation

60°

720°

ø49

18

M2

ø75

clear focusing AZ014

diffus focusing AZ015

diffuse AZ016

Advantages of different types of illumination:
Chip imprint with focusing and diffusing illumination

Analog–Video
Cables and Accessories

WK012

WK012	**Camera cable pciGrabber**	
	HD-DB15 to 5x BNC-plugs	
	Length: 2 m	

WK022

WK022	**Camera cable pciGrabber**	
	HD-DB15 to 4x BNC-plugs and	
	1x Power-Out, Length: 2 m	

WK075

WK075	**Combination cable pciGrabber**
	Power- and S-video for
	VCAM 110-x

WK023	**Camera cable for EPC–032**
	SMB-plug BNC-plug
	Length: 2 m
WK057	**Video cable 75 Ω**
	BNC-plug/BNC-plug
	Length: 1 m
WK058	**Video cable 75 Ω**
	BNC-plug/BNC-plug
	Length: 2 m
WK039	**Video cable 75 Ω**
	BNC-plug/BNC-plug
	Length: 10 m
WK051	**S-video cable**
	Length: 2 m
WK093	**S-video cable**
	Length: 10 m

FireWire
Cables and Accessories

FireWire cable, 6-pin/6-pin type for connecting FireWireCAM-series to a device with 6-pin socket

WK096

WK096–1.8	**Length 1.8 m**
WK096–3.0	**Length 3.0 m**
WK096–4.5	**Length 4.5 m**

FireWire cable, 4-pin/6-pin type for connecting FireWireCAM-001/002 to a device with 4-pin socket (e.g. notebook)

WK097

WK096–1.8	**Length 1.8 m**
WK096–3.0	**Length 3.0 m**
WK096–4.5	**Length 4.5 m**

FireWire cable, 4-pin/6-pin type with additional power jack for connecting FireWire-CAM-011/012/111/112 to a device with 4-pin socket (e.g. notebook)


WK113

WK113–2.0	**Length 2.0 m**
SV023	**suitable AC-**
	adaptor
	12V, max. 2A

FireWire card for PCs with PCI-bus: Adds FireWire-Interface to PC s (requires Win2000/XP/Vista). 6-pin type with power output

PC–109	**PCI/FireWire card**
	for standard PCs

FireWire card for notebooks with PC-card / PCMCIA slot (for Win 2000/XP/Vista). 6-pin type, additional power jack for external power supply optional
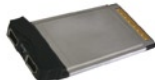
PC–110

PC–110	**FireWire card**
	for PC-card interface
SV001	**suitable AC-adaptor**
	4.5V...12V (optional)

FFC–camera cable
suitable for digital camera boards

33pol. FFC 0.5mm

WF062

WF062	**Length 12.0 cm**
WF043	**Length 20.0 cm**
WF046	**Length 30.0 cm**
WF057	**Length 40.0 cm**

USB
cable

USB-cable with USB2.0 A-plug 5pin to B-plug Mini 5pin

WK184

WK184	**Length 1.5 m**

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