CXP-6   CXP-5   CXP-3   5W5

25CXP MC258x Camera Manual Rev. 0.01
Camera-Firmware: MC0000258x-V0.00.0-F0.00.000
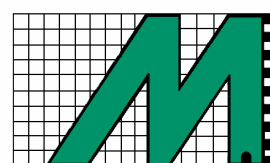Camera ID: MC258x

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MIKROTRON

НАУЧНОЕ ОБОРУДОВАНИЕ
ГРУППА КОМПАНИЙ

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1 General

1.1 For customers in the U.S.A.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment. The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a computing device pursuant to Subpart J of Part 15 of FCC Rules.

1.2 For customers in Canada

This apparatus complies with the Class A limits for radio noise emissions set out in Radio Interference Regulations.

1.3 Pour utilisateurs au Canada

Cet appareil est conforme aux normes Classe A pour bruits radioélectriques, spécifiées dans le Règlement sur le brouillage radioélectrique.

1.4 Life Support Applications

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Mikrotron customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Mikrotron for any damages resulting from such improper use or sale.

1.5 Declaration of conformity

Manufacturer: **Mikrotron GmbH**

Address: Landshuter Str. 20-22
                          85716 Unterschleissheim
                          Germany

Product: **Camera   MC2582 - MC2583**

The dedicated products conform to the requirements of the Council Directives 2004/108/EG for the approximation of the laws of the Member States relating to electromagnetic consistency. The following standards were consulted for the conformity testing with regard to electromagnetic consistency.

EC regulation	Description
EN 61000-6-3	Electromagnetic compatibility
EN 61000-6-1	Immunity

Unterschleissheim, February 09, 2014

Mikrotron GmbH

Dipl.-Ing. Bernhard Mindermann
President of Mikrotron

1.6 Warranty Note

Do not open the body of the camera. The warranty becomes void if the body is opened.

1.7 Remarks, Warnings

This document contains important remarks and warnings. See the corresponding symbols:

ⓘ	**Important remark**

☝	**Attention, Warning**

2 Introduction

Cameras of our new EoSens® 25CXP family are CoaXPress® compliant high speed CMOS cameras with a 25 Megapixel sensor of 5120 (H) x 5120 (V) pixel. The cameras are widely configurable and scalable to fit your needs. They are available in a monochrome and a color version (Bayer Filter).

The new CoaXPress® high speed interface technology allows transfer rates up to 6.25 Gbps. But our CoaXPress cameras support all CoaXPress Link Speeds from 1.25 Gbps to 6.25 Gbps.

Although the camera already offers a very high frame rate with 80 fps at full resolution, you can get even 1000ths of frames by reducing the camera resolution. For this, you can define a Region of Interest on the camera sensor that gives you an optimal relation between resolution and frame rate which you may need for your task.

In this context the very high photo sensitivity of tbd ASA (monochrome) or tbd ASA (RGB) is also a very important feature of the 25CXP cameras.

Configuring the camera to Full HD resolution at 1920 x 1080 with a frame rate of up to 880 fps offers a wide field for new and exciting applications. Full HD recordings make it possible to use the camera not only for industrial applications but also for applications like high speed, high resolution documentary films or for commercial clips.

The camera electronic is enclosed in a very compact and solid full metal cage that is prepared for using the camera in heavy industrial surroundings. This is also encouraged by the use of shielded coaxial cables as used by the CoaXPress® standard.

The camera uses industry-standard C-Mount or F-Mount lenses.

2.1 Top level specifications

- 25 Megapixel high speed CMOS sensor
- 35 mm optical format
- Very high resolution: 5120 x 5120 pixel
- 4.5 µm square pixels
- monochrome or color (Bayer Filter)
- 10/8 bit/pixel
- Up to 80 frames/s at full resolution
- CXP Link Speed from 1.25 Gbps to 6.25 Gbps
- Up to tbd ASA monochrome or tbd ASA RGB
- Extended dynamic range up to 56 db
- Arbitrary region of interest
- "Freeze Frame" full frame shutter
- More than 100000 frames/s with reduced resolution
- Communication and image transfer via CoaXPress® interface
- Small, compact housing
- Wide power supply range

2.2 Differences between the camera types

The 25CXP camera is available as the monochrome MC2582 version or as a
MC4083 color (Bayer Filter) version. All versions have the same sensor with a resolution of
5120 x 5120 pixel. The color version uses a Bayer Filter at the top of the sensor to code the
color information in the image pixels.

The table below shows the different camera models and their max. frame rate:

Type	Data width (bits)	Color/ Mono	C/F-Mount lens adaption	Link speed	max. frame-rate @ 5120 x 5120
MC2582	8/10	M	C/F	CXP-6	80 fps
MC2583	8/10	C	C/F	CXP-6	80 fps

2.3 Using the camera

There are no serviceable parts inside the camera. The camera may not be opened, otherwise
guarantee is lost.

Use dry, soft lens-cleaning tissue for cleaning lenses and, if necessary, the sensors window.
Don't use tools that may harm the sensor. Clean lenses and sensor from dust before rubbing
the lens/sensor surface.

3 Hardware

3.1 CoaXPress® interface

CoaXPress® is a new high speed interface standard for digital machine vision components including frame grabbers and cameras. CoaXPress® uses the GenICam standard for host/camera communication.

Benefits of the new technology are

- High transfer rates between camera and host up to 6.25 Gbps
- Good scalability
- By using the "electronically manual" of the GenICam® specification, CoaXPress ® grants compatibility and interchangeability between different CoaXPress hard- and software components
- Connection between host and camera over (cheap) 75Ω Coax cables
- Max. Coax cable length can be influenced by selecting Link Speeds from 1.25 Gbps to 6.25 Gbps.

3.1.1 The GenICam standard

"The goal of GenICam is to provide a generic programming interface for all kinds of cameras. No matter what interface technology the cameras are using or what features they are implementing, the application programming interface (API) should be always the same (GenICam Specification 1.0)."

Although CoaXPress do not support the full GenICam standard, it uses parts of the specification to ease the interchangeability between different CoaXPress® compliant components. Every camera must be provided with an 'electronically readable manual'. This manual can be read and interpreted automatically by software components to control the features of a camera in a generic way.

3.1.2 GenTL

GenTL is one part of the GenICam standard. It defines a hard- and software independent interface that each CoaXPress® compliant frame grabber must support. One of the benefits that GenTL offers to the user is a general and well defined interface to communicate with the camera over the frame grabber hardware. So the user is not 'chained' to a software offered by the frame grabber manufacturer. He can use the software of its choice select from all components that supports the CoaXPress® and GenTL compliant interface.

3.2 Power supply

The camera needs a DC supply voltage between 12 … 24V at a power consumption of tbd Watt max.

The power supply unit is connected to a dedicated connector at the back side of the camera. Please take attention to the pin wiring of the connector as described below.

Before applying power to the camera we strongly recommend to verify the used pins of the power connector, the polarity (+/-) of the leads and the supply voltage.

The camera may only be used with a supply voltage according to the camera specification. Connecting a lower or higher supply voltage, AC voltage, reversal polarity or using wrong pins of the power connector may damage the camera. If doing so, the warranty will expire immediately.

4 Getting started

Before starting to operate the camera, make sure that the following equipment is available:

- Camera MC258x
- C-Mount/F-Mount lens
- Mikrotron Support CD
- Image processing system, e.g.: PC and software
- Completely installed CoaXPress frame grabber (Device Driver, Software,...)
- CoaXPress® cable according to the CoaXPress specification

> (i) Take care, that all components of the camera/host chain (camera, grabber, software) are fully CoaXPress® compliant.

> (i) For a detailed cable description read the according section below.

4.1 First steps

- Switch off the image processing system
- Connect the camera to your CoaXPress® frame grabber with an appropriate CoaXPress® cable.
- Connect a power supply to the camera.
- Unscrew dust protection cover from the camera and screw in a lens.
- Switch on the image processing system and the external camera power supply

5 Initial setup

The MC258x is delivered with initial parameters and therefore does not need to be configured via the host software.

5.1 Serial number and firmware revision

Serial number and firmware revision is provided in MC258x non volatile memory. Use the according GenICam feature to read the serial number and firmware revision from the camera (see feature list below). The serial number is also marked on the type plate of the camera.

5.2 PowerUpProfile

A Power Up Profile, permanently stored in the non-volatile memory of the camera, gets loaded automatically if the camera is powered up. The profile consists of a number of camera settings that configures the camera to a defined operation state. So no configuration from the host may necessary to bring the camera to a good working condition. This includes values like the sensor resolution or the frame rate, for example.

6 Configuration

6.1 Camera configuration

The MC258x is based on the CoaXPress® specification. CoaXPress® itself uses elements of the GenICam standard to configure and control the camera. GenICam assumes that the camera uses a flat register layout for configuration. For example if you want to change the exposure time of the camera, you have to write the according value to the camera register representing the exposure time (e.g. 0x1100).

All camera registers are described and summarized in an 'electronically readable manual' file. A register element in this manual is also called a feature. The file itself is coded in ASCII using the Extensible Markup Language (XML) to describe each register as a XML feature knot.

Each knot consists, at least, of the type of the feature (command, string, integer,...), its access mode(R/W), a descriptive name ('friendly name') of the feature, the corresponding register address and a short description of the feature in plain ASCII text. There are also a number of additional elements that make out a complete feature description. For example the min. and max. values for a feature or its default value. Please refer to the GenICam documentation for further details.

The features itself in the XML file are grouped according to their meaning (e.g. Bottstrap registers, Image format,...).

The XML file itself can be saved (compressed or uncompressed) in the camera or can be an external file on the local computer or an remote host. The path (URL) to the file can be read from the camera feature 'XmlUrlAddress' (see feature list below).

The features exposed by the camera and described in the XML file can be roughly subdivided in four groups:

In a set of 9 mandatory features for a basic camera control as described in the CoaXPress® specification.
In a set of mandatory boot registers, used by the host software to connect itself to the camera, to do some connection related settings and to get the path to the XML file and read out the camera feature list. This features are also a part of the CoaXPress specification. The boot registers are the only camera registers that have the same address for a specific register on every CXP compliant camera, no matter who manufactured it.
Not mandatory camera features, which names and meanings are defined in the GenICam 'Standard Features Naming Convention' (SFNC).
Custom features, which names and meaning are special to a manufacturer/camera.

A camera must implement all mandatory features and all boot registers as described in the CoaXPress® specification to be CoaXPress® compliant. Some of them are defined in the GenICam and in the CoaXPress® standard, some of them are CoaXPress® specific.

> ⓘ All integer values are interpreted as 32 bit unsigned integers, if not other mentioned.
> All Strings are NULL terminated and consists of 8 bit chars.

6.2 Bootstrap registers

CoaXPress® compliant Devices must support a number of bootstrap registers as defined in this chapter. In contrast to other CXP camera features, each bootstrap register is assigned to a fixed camera address which is defined in the CoaXPress® specification.

The Bootstrap registers are defined for device information and to allow the frame grabber to establish and maintain the connection between the host and the camera. The connection to the camera is handled by the frame grabber in the 'background' and is normally not in the scope of an application developer. So namely the registers for establishing and maintaining the grabber/camera connection may be not of interest for the 'normal' application programmer.

Name	Address	Access	Length(bytes)	Interface	Chapter
Standard	0x00000000	R	4	IInteger	1.3.1
Revision	0x00000004	R	4	IInteger	
XmlManifestSize	0x00000008	R	4	IInteger	
XmlManifestSelector	0x0000000C	R/W	4	IInteger	
XmlVersion [XmlManifestSelector]	0x00000010	R	4	IInteger	
XmlSchemaVersion [XmlManifestSelector]	0x00000014	R	4	IInteger	
XmlUrlAddress [XmlManifestSelector]	0x00000018	R	4	IInteger	
IidcPointer	0x0000001C	R	4	IInteger	
DeviceVendorName	0x00002000	R	32	IString	
DeviceModelName	0x00002020	R	32	IString	
DeviceManufacturerInfo	0x00002040	R	48	IString	
DeviceVersion	0x00002070	R	32	IString	
DeviceFirmwareVersion	0x00002090	R	32	IString	
DeviceID	0x000020B0	R	16	IString	
DeviceUserID	0x000020C0	R/W	16	IString	
LinkReset	0x00004000	W/(R)	4	IInteger	
DeviceLinkID	0x00004004	R	4	IInteger	
MasterHostLinkID	0x00004008	R/W	4	IInteger	
ControlPacketDataSize	0x0000400C	R	4	IInteger	
StreamPacketDataSize	0x00004010	R/W	4	IInteger	
LinkConfig	0x00004014	R/W	4	IEnumerate	

Name	Address	Access	Length(bytes)	Interface	Chapter
LinkConfigDefault	0x00004018	R	4	IInteger	
TestMode	0x0000401C	R/W	4	IInteger	
TestErrorCountSelector	0x00004020	R/W	4	IInteger	
TestErrorCount [TestErrorCountSelector]	0x00004024	R/W	4	IInteger	
Start of manufacturer specific register space	0x00006000	-	-	-	

6.2.1 Standard

Description: This register provides a magic number indicating the Device implements the CoaXPress® standard.

Access   Read

Type: Unsigned integer

In: -

Out: 0xC0A79AE5

Remark:

6.2.2 Revision

Description: This register provides the revision of the CoaXPress® specification implemented by this Device.

Access   Read

Type: Unsigned integer

In: -

Out:

Bits	Description
31-16	Major Revision
15-00	Minor Revision

Remark: For version 1.5 → 0x00010005

6.2.3 XmlManifestSize

Description: This register returns the number of available XML manifests. At least one manifest must be available.

Access   Read

Type: Unsigned integer

In: -

Out: 1 ... N

Remark:

6.2.4 XmlManifestSelector

Description:	This register selects the required XML manifest registers. It holds a number between 0 and XmlManifestSize – 1.
Access	Read / Write
Type:	Unsigned integer
In:	0 … XmlManfiesSize-1
Out:	0 … XmlManfiesSize-1
Remark:	A link reset sets the value to 0x00000000.

6.2.5 XmlVersion[XmlManifestSelector]

Description:	This register provide the version number for the XML file given in the manifest referenced by register XmlManifestSelector.
Access	Read
Type:	Unsigned Integer
In:	-

Out:

Bits	Name	Description
31-24	Reserved	Shall be 0
23-16	XMLMajorVersion	The major version number of the XML file
15-8	XMLMinorVersion	The minor version number of the XML file
7-0	XMLSubMinorVersion	The sub-minor version number of the XML file

Remark:

6.2.6 XmlSchemaVersion[XmlManifestSelector]

Description:	This register provides the GenICam schema version for the XML file given in the manifest referenced by register XmlManifestSelector
Access	Read
Type:	Unsigned Integer
In:	-

Out:

Bits	Name	Description
31-24	Reserved	Shall be 0
23-16	SchemaMajorVersion	The major version number of the schema used by the XML file
15-8	SchemaMinorVersion	The minor version number of the schema used by the XML file
7-0	SchemaSubMinorVersion	The sub-minor version number of the schema used by the XML file

Remark:

6.2.7 XmlUrlAddress[XmlManifestSelector]

Description:	This register provides the address of the start of the URL string referenced by register XmlManifestSelector.
Access	Read
Type:	Unsigned integer
In:	-
Out:	Register address
Remark:	Reading from the returned register address returns N chars representing the name, the register address and the length of the GenICam XML file stored in the flash memory of the camera.

The format of the address string is:

Field	Description
Local	Indicates the XML file is stored in non-volatile memory in the Device.
<Filename>	The name of the XML file. The file name has no meaning if the XML file is stored in the camera.
<Extension>	"xml" indicates an uncompressed text XML file. "zip" indicates a ZIP format compressed text file.
<Address>	The start address of the file in the Device memory map, given in hexadecimal form without a leading "0x". The address string can be read from this address.
<Length>	The length of the file in bytes, given in hexadecimal without a leading "0x".

Example: "Local:Mikrotron_MC4080_Rev1.xml;B8000;33A"

References an GenICam XML file in the flash memory of the camera.
The file can be read starting at address 0xB8000 and has a length of 0x33a Bytes.

The returned string could also reference a XML file located on the vendors Homepage. This location ist not used by our cameras.

6.2.8 IidcPointer

Description:	The register provide the address of the start of the IIDC register space.
Access	Read
Type:	Unsigned integer
In:	-
Out:	0x00000000.
Remark:	Not supported

6.2.9   DeviceVendorName

Description:	This register provides the name of the manufacturer of the Device as a NULL-terminated string.
Access	Read
Type:	String[0...32]
In:	-
Out:	Vendor name
Remark:	Example: "Mikrotron GmbH"

6.2.10 DeviceModelName

Description:	DeviceModelName
Access	Read
Type:	String[0...32]
In:	-
Out:	Model name
Remark:	Example: "MC2582"

6.2.11 DeviceManufacturerInfo

Description:	This register provide extended manufacturer-specific information about the Device as a NULL-terminated string.
Access	Read
Type:	String[0...48]
In:	-
Out:	Manufacturer information
Remark:	Example: "Mikrotron GmbH"

6.2.12 DeviceVersion

Description: This register provides the version of the camera hardware as a NULL-terminated string.

Access   Read

Type: String[0...32]

In: -

Out: Device version string

Remark: Format of the version string (Byte numbers from left to right):

Byte	Description	Sample
0	Hardware tag	"H"
1-3	Hardware version major number	"000"
4		"."
5-7	Hardware version minor number	"001"
8		"."
9-13	Hardware version sub minor number	"00000"

So the sample row would result in the device version string:

"H000.100.00000"

6.2.13 DeviceFirmwareVersion

Description: This register provides the version of the firmware in the Device as a NULL-terminated string.

Access   Read

Type: String[0...32]

In: -

Out: Firmware version string

Remark: Format of the version string (Byte numbers from left to right):

Byte	Description	Sample
0	Controller software version tag	"V"
1-3	Software version major number	"000"
4		"."
5-7	Software version minor number	"013"
8		"."
9-13	Software version sub minor number	"00007"
14	Delimiter	"-"
15	FPGA program version tag	"F"
16-18	FPGA version major number	"000"
19		"."
20-22	FPGA version minor number	"015"
23		"."
24-28	FPGA version sub minor number	"00304"

So the sample row would result in the device version string:

"V000.013.00007-F000.015.00304"

6.2.14 DeviceID

Description: This register provides the serial number of the camera as a NULL-terminated string.

Access   Read

Type: String[0...16]

In: -

Out: Serial number of the camera

Remark: Example: "000000000000157"

6.2.15 DeviceUserID

Description: This register provides a user-programmable identifier for the camera as a NULL-terminated string.

Access   Read / Write

Type: String[0...16]

In: User ID

Out: User ID

Remark: The User ID can free defined by the user.
                It gets saved in the flash memory of the camera, so that it is preserved even if the camera power
                is switched off.

6.2.16 LinkReset

Description: Initiates a Device link reset.

Access   Read / Write

Type: Unsigned integer

In: 0x00000001

Out: 0x00000000

Remark: A Link Reset sets the bit rate of the camera to the discovery bit rate and resets all relevant values
                to allow a new connection recovery by the host. A link reset stops a running image acquisition.

6.2.17 DeviceLinkID

Description: This register provide the ID of the Device link via which this register is read.

Access   Read

Type: Unsigned Integer

In: -

Out: Link ID

Remark:

6.2.18 MasterHostLinkID

Description:	This register holds the Host Link ID of the Host link connected to the Device Master link.
Access	Read/Write
Type:	Unsigned integer
In:	Host Link ID
Out:	Host Link ID
Remark:	The value 0x00000000 is reserved to indicate an unknown Host ID. All writes to Device extension links gets ignored.

6.2.19 ControlPacketDataSize

Description:	This register provides the maximum control packet data size the Host can read from the Device, or write to the Device, in multiples of 4 bytes
Access	Read
Type:	Unsigned integer
In:	-
Out:	Control packet size in multiples of 4 bytes.
Remark:	

6.2.20 StreamPacketDataSize

Description:	This register holds the maximum stream packet data size the Host can accept, in multiples of 4 bytes.
Access	Read / Write
Type:	Unsigned integer
In:	Stream packet data size in multiples of 4 bytes.
Out:	Stream packet data size in multiples of 4 bytes.
Remark:	The Device can use any packet size it wants to up to this size. A link reset sets the value 0x00000000.

6.2.21 LinkConfig

Description: This register holds a valid combination of the Device link speed and number of active links. Writing to this register sets the link speeds on the specified links.

Access   Read / Write

Type: Enumeration

In: Link configuration :

Enumeration	Description
LINK1SPEED1250	One Link, 1.250 Gbps
LINK2SPEED1250	Two Links, 1.250 Gbps per Link
LINK3SPEED1250	Three Links, 1.250 Gbps per Link
LINK4SPEED1250	Four Links, 1.250 Gbps per Link
LINK1SPEED2500	One Link, 2.500 Gbps
LINK2SPEED2500	Two Links, 2.500 Gbps per Link
LINK3SPEED2500	Three Links, 2.500 Gbps per Link
LINK4SPEED2500	Four Links, 2.500 Gbps per Link
LINK1SPEED3125	One Link, 3.125 Gbps
LINK2SPEED3125	Two Links, 3.125 Gbps per Link
LINK3SPEED3125	Three Links, 3.125 Gbps per Link
LINK4SPEED3125	Four Links, 3.125 Gbps per Link
LINK1SPEED5000	One Link, 5.000 Gbps
LINK2SPEED5000	Two Links, 5.000 Gbps per Link
LINK3SPEED5000	Three Links, 5.000 Gbps per Link
LINK4SPEED5000	Four Links, 5.000 Gbps per Link
LINK1SPEED6250	One Link, 6.250 Gbps
LINK2SPEED6250	Two Links with 6.250 Gbps per Link
LINK3SPEED6250	Three Links, 6.250 Gbps per Link
LINK4SPEED6250	Four Links, 6.250 Gbps per Link

Out: Link configuration

Remark: Format of the enumeration values:

Bits	Name	Description
31-16	Number of links	Number of Device links to use (e.g. 1 for one link, 2 for two links, etc.)
15-0	Link speed	Bit rate selection code (see table below)

Bit Rate (Gbps)	Bit Rate Code
1.250	0x28
2.500	0x30
3.125	0X38
5.000	0x40
6.250	0x48

Example: 4 Links by an connection speed of 3.125 Gbps → 0x00040038

6.2.22 LinkConfigDefault

Description:	This register provides the value of the LinkConfig register that allows the Device to operate in its default mode. This feature is not supported in the current version.
Access	Read
Type:	Unsigned integer
In:	-
Out:	0x00000000
Remark:	This allows a simple Host (e.g. a basic "closed system" format converter) to automatically set the correct bit rate and obtain images from a Device

6.2.23 TestMode

Description:	Writing the value 0x00000001 to this register enables test packets transmission from Device to Host.
Access	Read / Write
Type:	

In:

Value	Description
0x00000000	Normal operation mode
0x00000001	Sending test packets to host

Out:	Same as above
Remark:	

6.2.24 TestErrorCountSelector

Description:	This register selects the required TestErrorCount[] register. It shall hold a valid Device Link ID.
Access	Read / Write
Type:	Unsigned integer
In:	0x00000000...0x00000003
Out:	0x00000000...0x00000003
Remark:	

6.2.25 TestErrorCount[TestErrorCountSelector]

Description:	This register provides the current link error count for the Device Link ID stored in register TestErrorCountSelector.
Access	Read / Write
Type:	Unsigned Integer
In:	0x00000000
Out:	Error count
Remark:	Writing 0x00000000 to this register resets the error count for the Device Link ID stored in register TestErrorCountSelector to zero. A link reset sets all link error counters to zero.

6.3   Acquisition Control

Name	Access	Length(bytes)	Interface	Chapter
AcquisitionMode	R/W	4	IEnumeration	
AcquisitionStart	W	4	ICommand	
AcquisitionStop	W	4	ICommand	
ExposureMode	R/W	4	IEnumeration	
ExposureTime	R/W	4	IInteger	
ExposureTimeMax	R	4	IInteger	
AcquisitionFrameRate	R/W	4	IInteger	
AcquisitionFrameRateMax	R	4	IInteger	
TriggerMode	R/W	4	iEnumeration	
TriggerSource	R/W	4	IEnumeration	
SoftwareTrigger	W	4	ICommand	

6.3.1   AcquisitionMode

Description: This feature controls the acquisition mode of the Device.

Access   Read / Write

Type: Enumeration

In:

Enumeration	Description
Continuous	In this mode, the camera records a sequence of images.

Out: See above

Remark: Frame acquisition can be stopped with command 'AcquisitionStop '.

6.3.2   AcquisitionStart

Description: This feature starts acquisition from the Device.

Access   Write

Type: Command

In: 0x00000001

Out: -

Remark: The feature 'AcquisitionMode' defines how images gets captured.

6.3.3   AcquisitionStop

Description: This feature stops acquisition from the Device.

Access   Write

Type: Command

In: x00000001

Out: -

Remark:

6.3.4 ExposureMode

Description: This feature sets the operation mode of the Exposure. It defines how a picture gets exposed if the camera is in triggered mode.

Access   Read / Write

Type: Enumeration

In:

Enumeration	Description
Timed	In this mode sets the camera to free running mode. The camera sends a continuous sequence of images to the frame grabber. The images gets exposed by the time defined by the feature 'ExposureTime'. The frame rate is defined with feature 'AcquisitionFrameRate'.
TriggerWidth	In this mode the camera waits for a trigger start message from the host to start to expose the next image. The end of the exposure time is defined by an following trigger stop message. After receiving the exposure stop message the exposed image gets streamed to the host. So the exposure time corresponds to the length of the trigger signal.

Out:

Remark: The ExposureMode is only relevant if the camera is in triggered mode. To set the camera to triggered mode the feature TriggerMode must be set to 'On'.

6.3.5 ExposureTime

Description: This feature defines the exposure time in [µs] if the exposure mode is 'Timed'.

Access   Read / Write

Type: Unsigned Integer

In: 0 … ExposureTimeMax

Out: Exposure time

Remark:

6.3.6 ExposureTimeMax

Description: This feature returns the maximal possible exposure time for the current camera settings in [µs].

Access   Read

Type: Unsigned Integer

In: -

Out: Max. exposure time

Remark: The max. exposure time depends on the current frame rate.

6.3.7 AcquisitionFrameRate

Description:	Controls the acquisition rate (in Hertz) at which the frames are captured.
Access	Read / Write
Type:	Unsigned Integer
In:	1 … AcquisitionFrameRateMax
Out:	AcquisitionFrameRate
Remark:	To capture continuously frames with the selected frame rate the camera must be in continuous mode.

6.3.8 AcquisitionFrameRateMax

Description:	This feature returns the max. possible frame rate in dependency of the current camera settings.
Access	Read
Type:	Unsigned Integer
In:	-
Out:	Max. frame rate
Remark:	The max. frame rate depends on the currently defined frame size, on the used link speed and on the number of CoaXPress lines used for image streaming.

6.3.9 TriggerSelector

Description:	This feature selects the trigger type to configure.
Access	Read / Write
Type:	Enumeration

In:

Enumeration	Description
FrameStart	If FrameStart is selected the camera will take one picture per trigger signal.
FrameBurstStart	Selects a trigger that starts the camera to capture a sequence of frames on the occurrence of a trigger signals. The number of frames captured is defined by the feature **'Acquisition-BurstFrameCount'.** controls the length of each burst unless a FrameBurstEnd trigger is active.

Out:	-
Remark:	Set feature 'AcquisitionBurstFrameCount' to define the number of frames to capture if 'Frame-BurstStart' is selected.

6.3.10 TriggerMode[TriggerSelector]

Description: This feature activates or deactivates the selected trigger type..

Access   Read / Write

Type: Enumeration

In:

Enumeration	Description
On	This sets the camera to triggered mode. In triggered mode, the camera waits for a trigger signal to take a picture. The trigger signal can be a (hardware) trigger signal from the frame grabber or a software trigger initiated by a software command. If the trigger source is a hardware or a software signal is defined by the feature 'TriggerSource'. The 'frame rate' of the camera depends on the frequency of the trigger signals.
Off	If the trigger mode is 'Off' the camera is set to free running mode. All trigger signals gets ignored while the camera is in this mode. The camera captures continuously images that can be send to the frame grabber. The frame rate is defined by the feature 'AcquisitionFrameRate', the exposure time by feature 'ExposureTime'.

Out:

Remark: The feature 'ExposureMode' defines how the camera exposes the next image as reaction to a trigger signal. The settings of ExposureMode are only relevant if the camera is in triggered mode.

6.3.11 TriggerSource[TriggerSelector]

Description: This feature defines the source for the selected trigger type.

Access   Read / Write

Type: Enumeration

In:

Enumeration	Description
SoftwareTrigger	If software is defined as the source of a trigger signal the user can trigger the camera to take a picture by referencing the feature 'SoftwareTrigger'. It is no external (hardware) trigger signal needed to request a new image from the camera.
CXPTrigger	If set to CXPTrigger, the camera waits for an external trigger signal from the frame grabber before it makes a new image. How the image gets exposed depends on the setting of feature 'ExposureMode'.
Line0	If set to Line0 the camera waits for an external trigger signal on the CXP DIN 1.0/2.3 connector to take an image. This feature is only available on Mikrotron CXP cameras with a DIN 1.0 connector.
Line1	If set to Line1 the camera waits for an external trigger signal on the CXP DIN 1.0/2.3 connector to take an image. This feature is only available on Mikrotron CXP cameras with a DIN 1.0 connector.

Out: See above

Remark: There can always be just one trigger source active at one time.

6.3.12 TriggerActivation[TriggerSelector]

Description: This feature defines the activation mode for a selected trigger type.

Access   Read / Write

Type: Enumeration

In:

Enumeration	Description
RisingEdge	The camera will start to capture frames on the arrival of a CXP 'trigger rising edge' trigger packet. This activator expects a subsequent 'trigger falling edge' trigger packet to finish the trigger sequence.
FallingEdge	The camera will start to capture frames on the arrival of a CXP 'trigger falling edge' trigger packet. This activator expects a subsequent 'trigger raising edge' trigger packet to finish the trigger sequence.
AnyEdge	To increase the trigger frequency by 2 the activator 'AnyEdge' initiate a frame on arrival of a 'trigger rising edge' trigger packet as well as on arrival of a 'trigger falling edge' trigger packet. There is no subsequent trigger packet needed to finish the trigger sequence.

Out: -

Remark: Using the activator 'AnyEdge' doubles the max. trigger frequency.

6.3.13 AcquisitionBurstFrameCount

Description: Tthis feature defines the number of frames to capture if trigger 'FrameBurstStart' is selected.

Access   Read / Write

Type: Unsigned Integer

In: 1… 4294967295

Out: -

Remark:

6.3.1 SoftwareTrigger

Description: This command triggers the camera to make a new picture.

Access   Write

Type: Command

In: 0x00000001

Out: -

Remark: To generate a software trigger signal
- 'TriggerSource' must be set to 'SoftwareTrigger'
- The exposure time for the new image is the time defined by the feature 'ExposureTime'

6.3.2 TestImageSelector

Description: This feature selects the type of test image that is sent by the camera. It also activates/deactivates a frame counter who gets superimposed into each captured image.

Access   Read / Write

Type: Enumeration

In:

Enumeration	Description
Off	This options sets the camera to normal operation mode.
GreyHorizontalRamp	If this option is set, the camera sends an image with a horizontal moving gray scale ramp. The test image includes also a frame counter superimposed in its image (see below).
FrameCounter	If this option is set a frame counter is superimposed into each captured frame or ROI. The frame counter overlays 4 pixel in the upper left corner of each frame. The counter starts with 0 on each activation and will start with 0 again if reaching its max. value. The counter will also be reset to 0 on each acquisition start command. In 10 bit modes the bits 1..0 in each pixel gets set to 0. **Counter layout:** <table><tr><th>Pixel</th><th>Meaning</th></tr><tr><td>0</td><td>Frame counter LSB part (counter bits 7..0). The values of pixel 0 and 1 are used to build a consecutive running16 Bit frame counter in little-endian notation. If the 16 bit counter overruns it starts with 0 again.</td></tr><tr><td>1</td><td>Frame counter MSB part (counter bits 15..8)</td></tr><tr><td>2</td><td>Frame counter active marker. If the frame counter is active this value is always 0xAA.</td></tr><tr><td>3</td><td>ROI number. For cameras with the Multi-ROI feature the frame counter is inserted in each ROI. This value reflects the number of the ROI the frame counter is superimposed starting from 1 for ROI 1. Because a 'set of ROI's' belongs always to one frame the frame counter is in each ROI the same. For cameras without the Multi-ROI feature or if just one ROI is defined this value is always 1.</td></tr></table>

Out: Current test image selector.

Remark:
- A Link Reset sets the camera to normal operation mode.
- If the Grey Horizontal Ramp test pattern is selected the frame counter gets activated automatically too.
- Acquisition-Stop/Start sets the frame counter to 0.
- Activating the FrameCounter also reset the counter to 0.

6.4 Device Control

Name	Access	Length(bytes)	Interface	Chapter
DeviceReset	W	4	ICommand	

6.4.1 DeviceReset

Description: Resets the device to its power up state.

Access   Write

Type: Unsigned Integer

In: 0x00000001

Out: -

Remark:

6.5 Image Format

Name	Access	Length(bytes)	Interface	Chapter
Width	R/W	4	IInteger	
Height	R/W	4	IInteger	
OffsetX	R/W	4	IInteger	
OffsetY	R/W	4	IInteger	
DecimationHorizontal	R/W	4	IInteger	
DecimationVertical	R/W	4	IInteger	
SensorWidth	R	4	IInteger	
SensorHeight	R	4	IInteger	
WidthMax	R	4	IInteger	
HeightMax	R	4	IInteger	
PixelFormat	R/W	4	IEnumeration	
TapGeometry	R/W	4	IEnumeration	
Image1StreamID	R	4	IInteger	
Image2StreamID	R		IInteger	

6.5.1 Width

Description: This feature provides the image width in pixels.

Access   Read / Write

Type: Unsigned Integer

In: 16… WidthMax

Out: Image width

Remark: • The image width must be incremented in 16 pixel increments.
              • The maximal image width is calculated as SensorWidth – OffsetX.

6.5.2 Height

Description:	This feature provides the image height in lines.
Access	Read / Write
Type:	Unsigned Integer
In:	2 … HeightMax
Out:	Image height
Remark:	• The image height must be incremented in 2 lines increments.
	• The maximal image height is calculated as SensorHeight – OffsetY.

6.5.3 OffsetX

Description:	Horizontal offset from the origin to the area of interest (in pixels).
Access	Read / Write
Type:	Unsigned Integer
In:	0 … OffsetXMax
Out:	Horizontal offset
Remark:	The offset must be incremented in 16 pixel increments.

6.5.4 OffsetY

Description:	Vertical offset from the origin to the area of interest (in lines).
Access	Read / Write
Type:	Unsigned Integer
In:	0 … OffsetYMax
Out:	Vertical offset
Remark:	The offset must be incremented in 2 lines increments.

6.5.5 DecimationHorizontal

Description: Horizontal sub-sampling of the image.

Access   Read / Write

Type: Unsigned Integer

In: 1 … 2

Out: Current horizontal decimation factor

Remark: This value defines that each Nth image pixels in horizontal direction must be sampled to build the image. So the size of the image gets reduced in horizontal direction by the factor of **DecimationHorizontal**. A decimation factor of 1 means no horizontal decimation. The **Width** value must be set to the requested number of horizontal pixels. **Width * DecimationHorizontal** may not exceeds the horizontal sensor size or an error gets returned.

Example: To get a sub sampled image which covers the whole horizontal sensor width but uses just the half number of horizontal pixels you have to set the **Width** parameter to **SensorWidth** / 2 and the **DecimatinHorizontal** factor to 2. This will result in an image which is clinched in the horizontal direction by factor 2 but covering the whole horizontal senor width.

6.5.6 DecimationVertical

Description: Vertical sub-sampling of the image.

Access   Read / Write

Type: Unsigned Integer

In: 1 … 255

Out: Current vertical decimation factor

Remark: This value defines that each Nth image line in vertical direction must be sampled to build the image. So the size of the image gets reduced in vertical direction by the factor of **DecimationVertical**. A decimation factor of 1 means no horizontal decimation. The **Height** value must be set to the requested number of lines. **Height * DecimationVertical** may not exceeds the max. vertical sensor size or an error gets returned.

Example: To get a sub sampled image which covers the whole vertical sensor height but uses just the half number of lines you have to set the **Height** parameter to **SensorHeight** / 2 and the **DecimatinVertical** factor to 2. This will result in an image which is clinched in the vertical direction by factor 2 but covering the whole senor in vertical direction.

6.5.7 SensorWidth

Description: Effective width of the sensor in pixels.

Access   Read

Type: Unsigned Integer

In: -

Out: Sensor width

Remark:

6.5.8 SensorHeight

Description: Effective height of the sensor in lines.

Access   Read

Type: Unsigned Integer

In: -

Out: Sensor width

Remark:

6.5.9 WidthMax

Description: Maximum width (in pixels) of the image.

Access   Read / Write

Type: Unsigned Integer

In: -

Out: Max. image width

Remark: The max. possible image width is calculated in dependency of the currently defined horizontal off-set (OffsetX).

6.5.10 HeightMax

Description: Maximum height (in lines) of the image.

Access   Read / Write

Type: Unsigned Integer
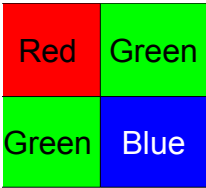
In: -

Out: Max. image height

Remark: The max. possible image height is calculated in dependency of the currently defined vertical off-set (OffsetY).

6.5.11 PixelFormat

Description:	This feature returns the format the camera uses for one pixel.
Access	Read/Write
Type:	Enumeration
In:	

Enumeration	Description	Available for Camera type
Mono8	Monochrome, 8 bit/pixel	monochrome, color
Mono10	Monochrome, 10 bit/pixel	Monochrome, color
BayerGR8 / BayerGR10	Bayer Pattern color image **Order of the Bayern Pattern:** Red Green Green Blue	color

Out:	See above
Remark:	The available pixel formats depends on the type of the camera (monochrome or color)

6.5.12 TapGeometry

Description:	This feature describes the geometrical properties characterizing the taps of the camera as seen from the frame grabber.
Access	Read
Type:	Enumeration
In:	

Enumeration	Description
Geometry_1X_1Y	Single pixel scanning from left to right and single line scanning from top to button.

Out:	See above
Remark:	

6.5.13 Image1StreamID

Description:	This gives the Stream ID of the primary image stream from the Device.
Access	Read
Type:	Unsigned Integer
In:	-
Out:	0x00000001
Remark:	

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6.5.14 Image2StreamID

Description:	This gives the Stream ID of the secondary image stream from the Device.
Access	Read
Type:	Unsigned Integer
In:	-
Out:	0x00000000
Remark:	Not used

6.6 User Set Control

Name	Access	Length(bytes)	Interface	Chapter
UserSetSelector	R/W	4	IEnumeration	
UserSetLoad[UserSetSelector]	W	4	ICommand	
UserSetSave[UserSetSelector]	W	4	ICommand	
UserSetDefaultSelector	R/W	4	IEnumeration	

6.6.1 UserSetSelector

Description:	Selects the feature User Set to load, save or configure.
Access	Read / Write
Type:	Enumeration

In:

Enumeration	Description
Default	Selects the factory setting User set.
UserSet1	Selects the first user set.
UserSet2	Selects the second user set.
UserSet3	Selects the third user set.

Out:	See above
Remark:	Set the **UserSetSelector** first to select a user set for further operations (see below).

6.6.2 **UserSetLoad**[UserSetSelector]

Description: Loads the User Set specified by **UserSetSelector** to the device and makes it active.

Access   Write

Type: Command

In:

Out:

Remark: Loads the User Set selected by selector **UserSetSelector** from the camera flash memory to the camera registers as the current configuration. If the selected User Set is not defined by previously saving a camera configuration to this set, an error message gets returned.
The Default User Set is a set of factory settings that are predefined by the manufacturer.

6.6.3 **UserSetSave**[UserSetSelector]

Description: Save the User Set specified by **UserSetSelector** to the non-volatile memory of the device.

Access   Write

Type: Command

In:

Out:

Remark: A previously saved user set gets overwritten by the new settings.
The Default User Set is a set of factory settings and can not be overwritten.

6.6.4 **UserSetDefaultSelector**

Description: Selects the feature User Set to load and make active when the device is reset.

Access   Read/Write

Type: Enumeration

In:

Enumeration	Description
Default	Selects the factory setting User set.
UserSet1	Selects the first user set.
UserSet2	Selects the second user set.
UserSet3	Selects the third user set.

Out: Currently selected default User Set selector.

Remark:

6.7 Analog Controller

Name	Access	Length(bytes)	Interface	Chapter
Gain	R/W	4	IInteger	
BlackLevel	R/W	4	IInteger	

6.7.1 Gain

Description: The Gain defines an amplification of the video signal in %.

Access   Read / Write

Type: Integer

In: 50...200

Out: Current Gain.

Remark: A gain of 100% corresponds to an amplification of 1.

6.7.2 Blacklevel

Description: BlackLevel defines a DC offset added to the video signal.

Access   Read / Write

Type: Integer

In: 0...200

Out: Current BlackLevel.

Remark: BlackLevel is defined in % from a camera internal reference value.

6.8 Custom features

Name	Access	Length(bytes)	Interface	Chapter
DeviceInformationSelector	R/W	4	IEnumeration	
DeviceInformation[DeviceInfoSelector]	R	4	IInteger	
PrstEnable	R/W	4	IEnumeration	
PulseDrainEnable	R/W	4	IEnumeration	

6.8.1 DeviceInformationSelector

Description: This feature selects one of the elements from the device information list

Access   Read / Write

Type: Enumeration

In:

Enumeration	Description
InfoSnr	Serial number of the camera (same as feature DeviceID)
InfoType	Camera type / model
InfoSubType	Camera sub type
InfoHwRevision	Camera hardware revision
InfoFpgaVersion	Camera FPGA program version
InfoSwVersion	Microcontroller software version
InfoPwrSource	Returns the source of the camera power supply (external Power Supply or PoCXP)
InfoPwrConsumption	The actual power consumption of the camera in [µA]
InfoPwrCxpVoltage	The actual voltage of the camera power supply in [mV]

Out: See above

Remark: First you have to set the selector to define the data you want to read. After setting the selector you can read the data by reading register **DeviceInformation** (see below).

6.8.2 **DeviceInformation**[DeviceInfoSelector]

Description: This feature returns a value of the device information list selected by feature DeviceInfoSelector.

Access   Read / Write

Type: Unsigned Integer

In: -

Out: Device information values

Selector	Description	Sample
InfoSnr	Serial number of the camera (same as feature DeviceID)	0x00000132
InfoType	Camera type / model	0x00004080 → Camera model MC4080
InfoSubType	Sub type number of the camera model. The subtype number describes models withs special features and custom version of the camera.	0x00000001
InfoHwRevision	This number describes the revision of the camera hardware | Bits	Description
---	---
31-24	Major revision number
23-16	Minor revision number
15-00	Build number		0x0103000B → Revision 1.3 Build 11
InfoFpgaVersion	Version of the FPGA program of the camera: | Bits	Description
---	---
31-24	Major version number
23-16	Minor version number
15-00	Build number		0x02050001 → Version 2.5 Build 1
InfoSwVersion	Version of the Microcontroller software version: | Bits	Description
---	---
31-24	Major version number
23-16	Minor version number
15-00	15-00		0x020F0011 → Version 2.15 Build 17
InfoPwrSource	Returns the source of the camera power supply. | Value	Description
---	---
0	External Power Supply
1	Power Over CXP Line (PoCXP)		
InfoPwrConsumption	Returns the actual power consumption of the camera in [µA]	0x00066580 → 419200 µA = 0.4192 A
InfoPwrCxpVoltage	Returns the actual voltage of the camera power supply in [mV]	0x2E4A → 11850 mV = 11.85 Volt
InfoTemperature	Returns the current camera temperature in 0.5 degrees Celsius. The value returned is a signed integer.	0x00000040 → 32 degree Celsius 0xFFFFFF2C → -2 degree Celsius

Remark: • Model number, hardware revision, FPGA version and firmware version are also included in the string of the 'DeviceVersion' Bootstrap feature.

6.8.3 CustomSensorClkEnable

Description: This feature enables/disables the camera clock overwriting by a customer selected value.

Access   Read / Write

Type: Boolean

In:

Value	Description
On	The camera uses the sensor clock defined with feature '**CustomSensorClk**'.
Off	The camera uses the default sensor clock defined for the current CoaXPress link settings.

Out: On/Off

Remark: The 25CXP camera defines a default sensor clock for each CoaXPress link speed to run the cam-era in an optimal frame rate / image quality relation.
With the custom sensor clock feature this default value can be overwritten by a customer selected value (see feature '**CustomSensorClk**' below). Overwriting the default sensor clock by a higher sensor clock may result in substantial higher frame rates (depending on the frame size) but may also downgrade the image quality. It is up to the user to find a setting that fits his needs.
This feature may be mainly of use for frame grabber boards with a max. link speed less than CXP6.

6.8.4 CustomSensorClk

Description: Overwrites the default camera sensor clock by a customer defined value.

Access   Read/Write

Type: Enumeration

In:

Enumeration	Description	
Clk_50MHz	Set camera sensor clock to 50 MHz..	
Clk_75MHz	Set camera sensor clock to 75 MHz.	(default for CXP1-CXP3)
Clk_100MHz	Set camera sensor clock to 100 MHz.	
Clk_125MHz	Set camera sensor clock to 125 MHz.	(default for CXP5)
Clk_150MHz	Set camera sensor clock to 150 MHz.	(default for CXP6)

Out: Currently selected sensor clock.

Remark: See above.

7 Firmware update

Our 25CXP camera hardware is based on a number of programmable logical units. This allows us to modify and update the firmware of the camera on an easy and fast way. The flexibility of this concept guaranties you always to have an 'up to date' product. Further it allows us to integrate new and improved function into our cameras, so you can profit on it. Even customer modifications are possible to provide you with a camera that fits exactly your needs.

Normally it is not necessary to send your camera to us to do a firmware update. To simplify the update procedure we will support you with an easy to handle 'Firmware Updater' program. So it should be no problem for you to do an update by your own.

Please Note: Not all CXP frame grabber manufacturer supports our 'Firmware Updater' software. So if you should have any problems to update the camera firmware please contact us. We are sure we will find a solution to accomplish the firmware update with your frame grabber too.

8 Technical Data

| MC 2582	Monochrome
MC 2583	Color (Bayer Filter)
Resolution	5120 x 5120
Sensor type	CMOS sensor
Pixel depth	8 Bit / 10 Bit monochrome or RGB (Bayer Filter)
Pixel size	4.5 x 4.5 µm
Active area	35 mm diagonal
Light sensitivity	Monochrome:　tbd ASA , 3.4 V/lux-s RGB-color:　　tbd ASA
Shutter	Shutter time from 1 µs to 1 s in 2 µs steps
Internal dynamics	56 dB
Spectral bandwidth	tbd nm
Fill factor x quantum efficiency	50% at 550 nm
Full well charge	22000 e⁻
Video output	CoaXPress®, CXP-3, CXP-5 and CXP-6
Communication	CoaXPress® with Gen<I>Cam based technology
Trigger	Asynchronous shutter over CoaXPress® interface
Power supply	12…24 V external power supply
Power consumption	tbd W max.
Shock & vibration	70g, 7grms
Dimensions　(WxHxD)	80 x 80 x 53 mm (C-Mount) 80 x 80 x 81 mm (F-Mount)
Case temperature	+5…+50 °C
Weight	450 g (C-Mount) 490 g (F-Mount)
Lens mount	C-/F-mount (depending on adapter)

8.1   Resolution and Speed

The table below shows a number of possible camera resolution and their max. speed for this resolution for an 8 bpp image and 4 CXP Coax Lines. Please note, that the max. speed that finally can be achieved depends on the selected transfer rate (CXP-6/CXP-3) and the number of CXP links used.

Resolution		Speed (fps)		Remark
H	**V**		**CXP- 6**	
5.120	5.120		80	
2.048	2.048		470	
1.920	1.080		880	Full HD!
1.024	1.024		920	
640	480		1.860	
256	256		3.210	

8.2 Spectral response

The charts below show the sensitivity of the monochrome and the color sensor with a bayer pattern filter on the sensor glass lid. The color camera is by default equipped with a UV/IR cut filter with a transmittance of 370-670nm resulting in a sensitivity shown in the second chart.
By request all types of cameras can be delivered with or without UV/IR cut filter.

8.2.1 Typical Photovoltaic Response
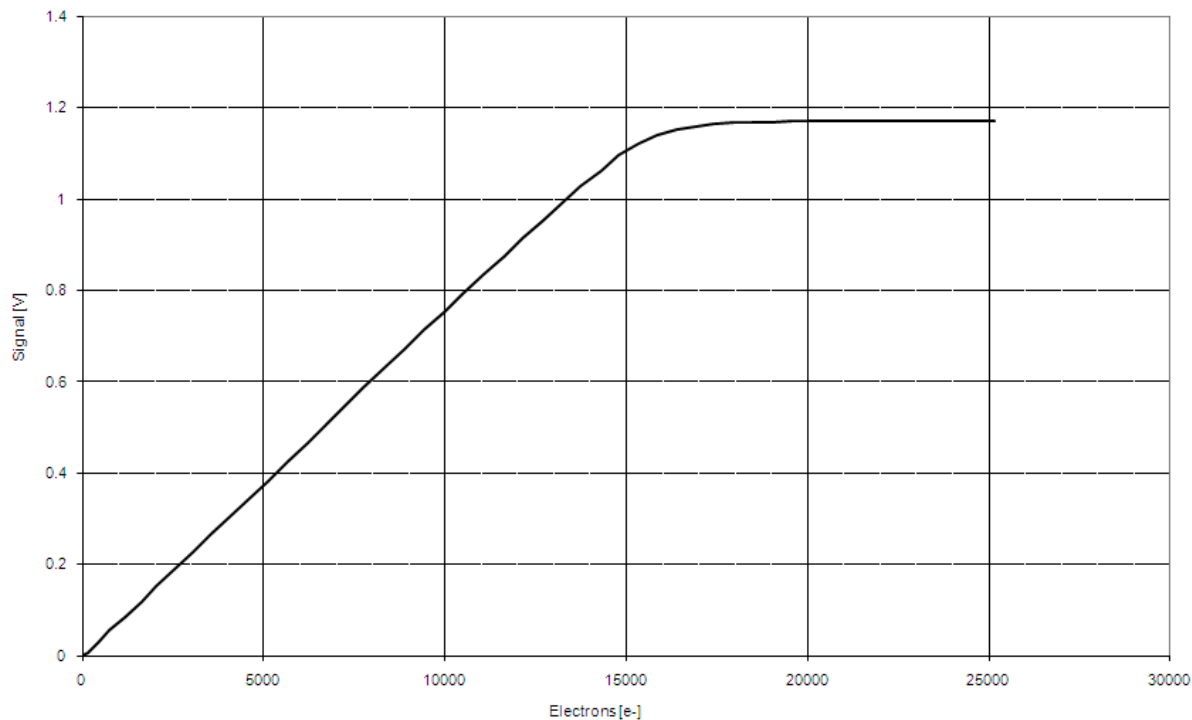
8.2.2 Spectral response for the MC4082/83 (color with Bayer Pattern filter)
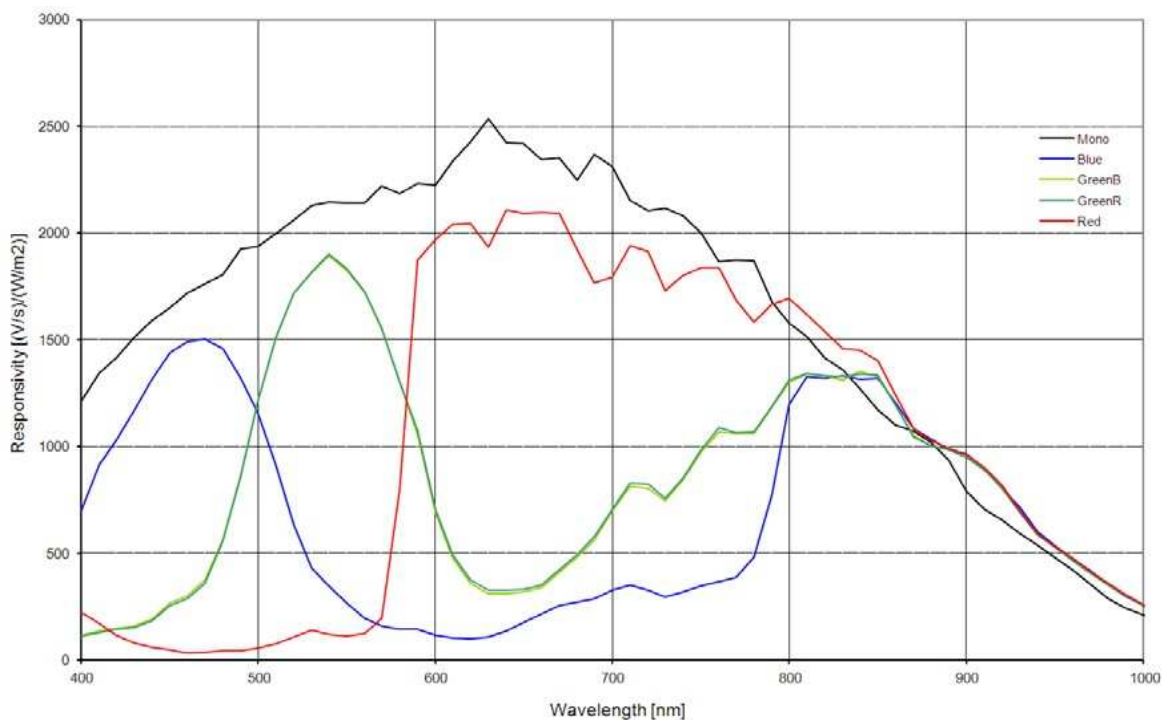
8.3 Bayer pattern filter

The Eo*Sens* color cameras have a Bayer Pattern filter on their sensor glass lid. To get the color information the imaging software must decode the information for one pixel to RGB by using the values of its neighbor pixels. There exists a lot of different Bayer Pattern algorithms, which differ in speed and quality of the decoded image. You will find a lot of information and algorithms on the Internet which handle the Bayer Pattern thematic.

The Bayern Patter filter of the MC408x consists of a number small red, green and blue filter elements, each covering exactly one pixel on the sensor. A matrix of 2 x 2 filter elements build a filter element matrix. The order and the color of the filter elements building a 2 x 2 filter matrix are always the same. The image below shows the colors and the order of a filter matrix as used by our cameras.
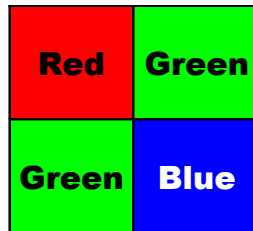
The sensor is completely covered by identically 2 x 2 filter matrix elements. So, the color pattern of the first line of the matrix is repeated each mod(2) pixel number on each even line number. The color pattern of the second line is repeated on each (mod2) pixel on each odd line number. That means, that always 2 consecutive lines shows exactly the same order of Bayer Pattern elements.


From the size and the order of a filter matrix element results...

- Any (sub) region of a Bayer Pattern coded image must always start with the same color on the top left (0/0) pixel position of the region.
- A Bayer Pattern image must always have an even number of pixels and an even number of lines.
- Changing the image size can only be done by steps of 2 in the horizontal **and** in the vertically direction.
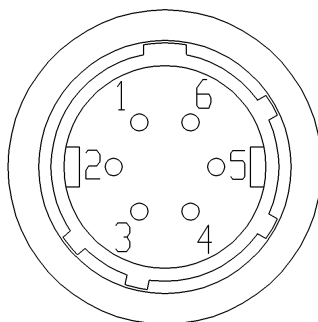
8.4 Connectors

8.4.1 CoaXPress® connector 5W5
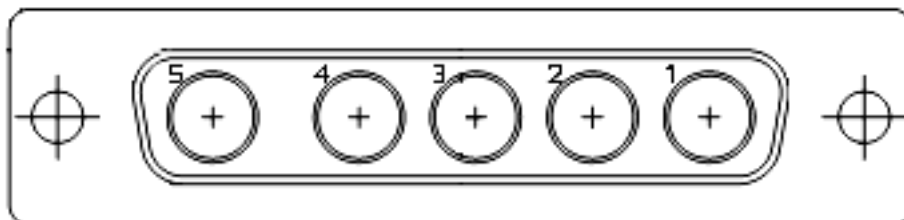
All signals according to CoaXPress® specification

8.4.2 Circular power connector, 6-pin

Pin	Signal	Pin	Signal
1	VCC	4	DGND*
2	VCC	5	GND
3	STRB	6	GND

*DGND ... digital GND for signal STROBE_OUT

Manufacturer: Hirose
Order no.:   HR10A-7P-6S

Before applying power to the camera we strongly recommend to verify the used pins of the power connector, the polarity (+/-) of the leads and the supply voltage.
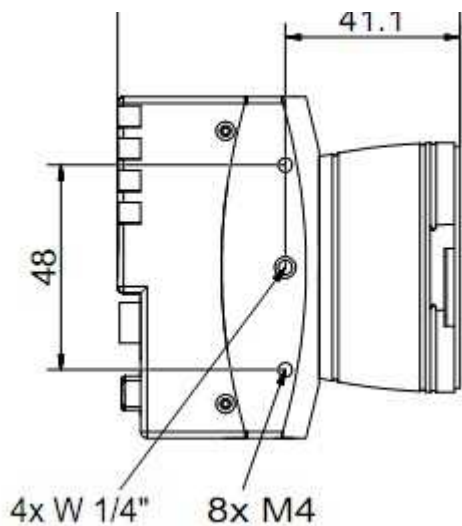
The camera may only be used with a supply voltage according to the camera specification. Connecting a lower or higher supply voltage, AC voltage, reversal polarity or using wrong pins of the power connector may damage the camera. If doing so, the warranty will expire immediately.

8.5 Mechanical dimensions
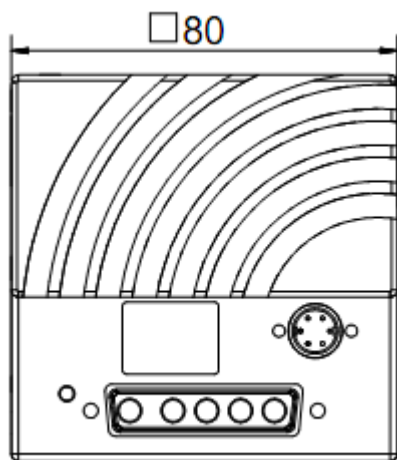
MC258x camera body

F - Mount

C - Mount