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# CoaXPress

## Color / Monochrome CMOS Camera

### STC-CMB120ACXP

(12M / Monochrome / M42 mount / Din connector on Rear)

### STC-CMB120ACXP-F

(12M / Monochrome / F mount / Din connector on Rear)

### STC-CMC120ACXP

(12M / Color / M42 mount / Din connector on Rear)

### STC-CMC120ACXP-F

(12M / Color / F mount / Din connector on Rear)

### STC-CMB120ACXP-T

(12M / Monochrome / M42 mount / Din connector on Top)

### STC-CMB120ACXP-T-F

(12M / Monochrome / F mount / Din connector on Top)

### STC-CMC120ACXP-T

(12M / Color / M42 mount / Din connector on Top)

### STC-CMC120ACXP-T-F

(12M / Color / F mount / Din connector on Top)

## Product Specifications and User's Guide

**OMRON SENTECH CO., LTD.**

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## Precautions for safe use

Please read carefully this "Precautions for safe use" before use the camera. Then the camera uses correctly with agreeing with below notes.

In this "Precautions for safe use", notes divides into "Warning" and "Caution" to use the camera safety and prevent to harm and damage.

|  |                |                                                                                                                                             |
|--|----------------|---------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>Warning</b> | This shows, assumption for possibility of serious accident leading death or serious injury if ignore this note and camera uses incorrectly. |
|  | <b>Caution</b> | This shows, assumption for possibility of bear the damage or physical damage if ignore this note and camera uses incorrectly.               |

About Graphic symbols



This symbol shows general prohibition.



This symbol shows completion or instruction.

### [Environment / condition]

|                                                                                                                                                                                          |                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Warning</b>                                                                                                                                                                           |                                                                                                                                                                            |
| Do not use flammable or explosiveness atmospheres.<br>This will cause of personal injury or fire.                                                                                        | Do not use for "safety for human body" related usage.<br>This camera is designed for use "do not harm human body immediately" if by any chance the camera has malfunction. |
| <b>Caution</b>                                                                                                                                                                           |                                                                                                                                                                            |
| Use and store under specified environmental conditions (Vibration, shock, temperature, humidity) in the specifications for this camera.<br>This will cause of fire or damage the camera. |                                                                                                                                                                            |

### [Installation and cable wiring]

|                                                                                                                                                                                                                                                                                |                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Warning</b>                                                                                                                                                                                                                                                                 |                                                                                                                                            |
| Do not use with out of power voltage range that is specified in the specifications for this camera.<br>This will cause of fire, electrification or malfunction.                                                                                                                | Do not wrong wiring.<br>This will cause of fire or malfunction.                                                                            |
| <b>Caution</b>                                                                                                                                                                                                                                                                 |                                                                                                                                            |
| Do not grounding DC power (+) of all devices that are connect to the camera.<br>The camera housing is connecting to 0 V line of camera inside circuit.<br>There is a risk of short circuit between camera inside ciurcuit and frame ground.<br>This will cause of malfunction. | It is necessary to wiring and mounting that is specified in the specifications for this camera.<br>This will cause of fire or malfunction. |
| It is necessary to wiring with turn off the camera.<br>This will cause of electrification or malfunction.                                                                                                                                                                      | It is necessary to mounting the camera without stress for the cable.<br>This will case of electrification or fire.                         |
| Do not use CoaXPress un-supported cable and board.<br>There is a risk of malfunction if the camera connects with wrong environment and turn on the camera.                                                                                                                     |                                                                                                                                            |

[Usage instruction]

|  Warning                                                                                                                                          |                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  Do not touch the terminal and PCB board<br>While turn on the camera.<br>This will cause of electrification or accident<br>caused by malfunction. |  Do not put combustibles near the camera.<br>This will cause of fire.                                                     |
|  Do not use without usage that is specified in<br>the specifications for this camera.<br>This will cause of personal injury or malfunction.       |  Do not push metals including screw driver into<br>radiation holes.<br>This will cause of electrification or malfunction. |
|  Caution                                                                                                                                          |                                                                                                                                                                                                            |
|  Do not push contamination into opening of<br>the camera.<br>This will cause of electrification or malfunction.                                   |  Do not block the radiation holes.<br>This will cause of fire due to increase the<br>camera inside temperature.           |

[Maintenance]

|  Caution                                                                                                 |                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  Do not disassemble or repair the camera.<br>This will cause of fire, electrification or<br>malfunction. |  It is turn off the camera when maintaining or<br>inspecting the camera.<br>This will cause of electrification. |

[Disposal]

|  Caution                                         |  |
|-------------------------------------------------------------------------------------------------------------------------------------|--|
|  It is necessary to dispose as industrial waste. |  |

## 1 Product Precautions

Do not give shock to the camera.

Do not haul or damage the camera cable.

Do not wrap the camera with any material while using the camera. This will cause the internal camera temperature to increase.

When the camera moving or using the place that temperature difference is extreme, countermeasure for dew condensation (heat removal / cold removal) is necessary.

While the camera is not using, keep the lens cap on the camera to prevent dust or contamination from getting in the sensor or filter and scratching or damaging it.

Do not keep the camera under the following conditions.

- In wet, moist, high humidity or dusty place

- Under direct sunlight

- In extreme high or low temperature place

- Near an object that releases a strong magnetic or electric field

- Place with strong vibrations

Apply the power that satisfies the specified in specifications for the camera.

The defective pixels may appear due to the sensor characteristics.

Use below recommend materials (or equivalent materials) to clean the surface of glass.

- Air dust: Non Freon air duster (NAKABAYASHI Co., LTD.)

- Alcohol: Propan-2-ol (SAN'EI KAKO Co., LTD.)

- Non-woven: nikowipe clean room (NKB)

Use a soft cloth to clean the camera.

## 2 Warranty

### ■Warranty period

One year after delivery (However, the camera had malfunction with camera uses correctly)

In below case for a fee even within warranty period.

- The malfunction caused by incorrect usage, incorrect modify or repair.
- The malfunction caused by external shock including the camera dropping after delivery the camera.
- The malfunction caused by fire, earthquake, flood disaster, thunderbolt struck, other natural disaster or wrong voltage.

### ■Warranty coverage

Exchange or repair the malfunction camera if the malfunction is occurred by our responsibility.

“Warranty” mean is warranty for the delivered camera itself. Please accept the induction damage by the camera malfunction is not included.

### 3 Overview

This document describes the specifications of the following cameras

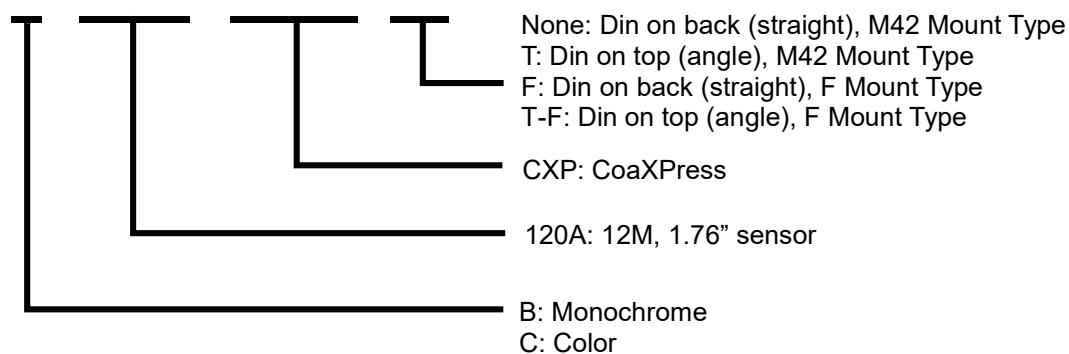
STC-CMB120ACXP / STC-CMC120ACXP / STC-CMB120ACXP-F / STC-CMC120ACXP-F  
STC-CMB120ACXP-T / STC-CMC120ACXP-T / STC-CMB120ACXP-T-F / STC-CMC120ACXP-T-F

#### 3.1 Features

- CoaXPress (CXP) Interface (Dyanamically Configurable)
- Maximum frame rate (Full resolution): 186 fps @ 12M 8bits
- CMOS Global Shutter
- Up to 600 Pixel Defect Correction (Default: ON)
- M42 mount (convert to F mount with "M42-F mount adaptor")

#### 3.2 Product Number Naming Method

# STC-CMx120ACXP-F



## 4 Specifications

### 4.1 Electronic Specifications

| Model Number                    |                    | STC-CMB120ACXP /<br>STC-CMB120ACXP-T /<br>STC-CMB120ACXP-F /<br>STC-CMB120ACXP-T-F                                                                                                                                                                  | STC-CMC120ACXP /<br>STC-CMC120ACXP-T /<br>STC-CMC120ACXP-F /<br>STC-CMC120ACXP-T-F |
|---------------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Image Sensor                    |                    | 1.76" 12M Progressive Monochrome CMOS<br>(CMOSIS: CMV12000)                                                                                                                                                                                         | 1.76" 12M Progressive Color CMOS<br>(CMOSIS: CMV12000)                             |
| Shutter Type                    |                    | Global                                                                                                                                                                                                                                              |                                                                                    |
| Active Picture Elements         |                    | 4,096 (H) x 3,072 (V)                                                                                                                                                                                                                               |                                                                                    |
| Cell Size                       |                    | 5.5 (H) x 5.5 (V) $\mu\text{m}$                                                                                                                                                                                                                     |                                                                                    |
| Sync System                     |                    | External trigger (Hardware, Software) / <b>Free run</b>                                                                                                                                                                                             |                                                                                    |
| Frame Rate<br>(Full resolution) | 8bits 4-Lane       | 186.9 fps                                                                                                                                                                                                                                           |                                                                                    |
|                                 | 8bits 2-Lane       | 93.4 fps                                                                                                                                                                                                                                            |                                                                                    |
|                                 | 8bits 1-Lane       | 46.7 fps                                                                                                                                                                                                                                            |                                                                                    |
| Image Format                    |                    | 8bits                                                                                                                                                                                                                                               |                                                                                    |
| CoaXPress Data Output Type      |                    | CXP-6 (6.25Gbps) 4-Lane / 2-Lane / 1-Lane                                                                                                                                                                                                           |                                                                                    |
| Noise Level (8bits 1-Lane)      |                    | Less than 3.5 digits (Gain 0 dB)                                                                                                                                                                                                                    |                                                                                    |
| Sensitivity (*1)                |                    | 370 Lux                                                                                                                                                                                                                                             | 740 Lux                                                                            |
| Exposure Time                   | 8bits 4-Lane       | 16 $\mu\text{seconds}$ to 16.777 seconds ( <b>Default: 5,283 <math>\mu\text{seconds}</math></b> )                                                                                                                                                   |                                                                                    |
|                                 | 8bits 2-Lane       | 16 $\mu\text{seconds}$ to 16.777 seconds ( <b>Default: 5,300 <math>\mu\text{seconds}</math></b> )                                                                                                                                                   |                                                                                    |
|                                 | 8bits 1-Lane       | 16 $\mu\text{seconds}$ to 16.777 seconds ( <b>Default: 5,300 <math>\mu\text{seconds}</math></b> )                                                                                                                                                   |                                                                                    |
| Gain                            | Analog Gain        | <b>x1</b> , x2 or x3                                                                                                                                                                                                                                |                                                                                    |
|                                 | Digital Gain       | <b>x1</b> to x5                                                                                                                                                                                                                                     |                                                                                    |
| Black Level                     |                    | 0 to 20 digits                                                                                                                                                                                                                                      |                                                                                    |
| White Balance Gain              |                    | N/A                                                                                                                                                                                                                                                 | 0 (Black level) to x4 ( <b>Default: x1</b> )                                       |
| ROI                             |                    | Horizontal: 256 to 4,096 (pixels) / Vertical: 2 to 3,072 (lines) ( <b>Default: 4,096 x 3,072</b> )<br>Adjustable steps for size: Horizontal: 16 pixels / Vertical: 4 lines<br>Adjustable setps for offset: Horizontal: 2 pixels / Vertical: 4 lines |                                                                                    |
| Multi ROI                       |                    | N/A                                                                                                                                                                                                                                                 |                                                                                    |
| Gamma                           |                    | 1.0                                                                                                                                                                                                                                                 |                                                                                    |
| HDR                             |                    | Support                                                                                                                                                                                                                                             | N/A                                                                                |
| Binning                         |                    | N/A                                                                                                                                                                                                                                                 |                                                                                    |
| Decimation                      |                    | N/A                                                                                                                                                                                                                                                 |                                                                                    |
| Image Flip                      |                    | Horizontal / Vertical / Horizontal and Vertical / <b>Off</b>                                                                                                                                                                                        |                                                                                    |
| Defective Pixel Correction      |                    | Up to 600 points                                                                                                                                                                                                                                    |                                                                                    |
| Auto Image Control              | Auto Exposure      | N/A                                                                                                                                                                                                                                                 |                                                                                    |
|                                 | Auto Gain          | N/A                                                                                                                                                                                                                                                 |                                                                                    |
|                                 | Auto White Balance | N/A                                                                                                                                                                                                                                                 |                                                                                    |
| Operational Mode                |                    | Edge Preset Trigger / Pulse Width Trigger / CXP Trigger Packet / <b>Free run</b>                                                                                                                                                                    |                                                                                    |
| Communication Protocol          |                    | Protocol: CoaXPress Standard Version 1.1<br>Interface: GenICam                                                                                                                                                                                      |                                                                                    |
| Input / Output                  |                    | 3 GPIOs                                                                                                                                                                                                                                             |                                                                                    |
| Power                           | Input Voltage (*2) | PoCXP / Power/IO connector (+18.5 to +26 Vdc)                                                                                                                                                                                                       |                                                                                    |
|                                 | Consumption        | Max: Less than 10 W, Typical: 9 W                                                                                                                                                                                                                   |                                                                                    |

Default: **Bold**

## Precautions

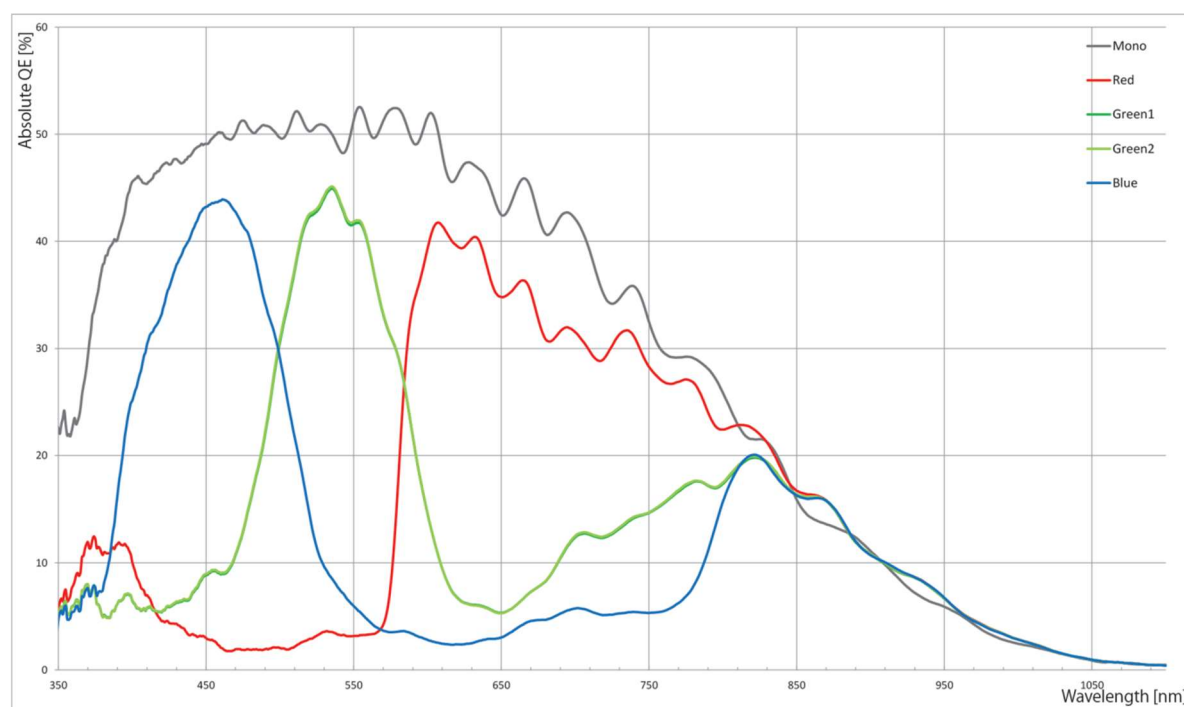
\*1: The sensitivity is measured the light source illumination for 100 % white under below conditions:

| Camera Setting     |                 | Environment       |                   |
|--------------------|-----------------|-------------------|-------------------|
| Parameter          | Setting         | Parameter         | Setting           |
| Gain Up            | 0 dB            | Light Source      | Light Box (White) |
| AGC                | Off             | Color temperature | 5,100K            |
| White Balance      | Optimum         | Lens              |                   |
| Electrical Shutter | 1/30 seconds    | F on Lens         | F5.6              |
| Black Level        | Optimum         | Target Luminance  | IM-600 (Topcon)   |
| Gamma              | Factory Setting |                   |                   |

\*2: When CH1 was connecting with Frame Grabber (FG), then FG provides camera power through PoCXP. Some FG start discovery process when CH1 was connected. In this case camera may not be recognized as CXP-6 (6.25Gbps) 4 Lane camera.

In order to recognize as CXP-6(6.25Gbps) 4 Lane camera, please connect CH1 after connected CH2, CH3, CH4, or run discovery process again after connected all CHs.

## 4.2 Spectral Sensitivity Characteristics



### 4.3 Mechanical Specifications

#### 4.3.1 STC-CMB120ACXP / STC-CMC120ACXP / STC-CMB120ACXP-T / STC-CMC120ACXP-T

| Model Number        | STC-CMB120ACXP /<br>STC-CMC120ACXP                                                                          | STC-CMB120ACXP-T /<br>STC-CMC120ACXP-T                                  |
|---------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| Dimensions          | 68 (W) x 68 (H) x 40 (D) mm (*1)                                                                            | 68 (W) x 68 (H) x 46 (D) mm (*1)                                        |
| Optical filter      | No Optical Filter                                                                                           |                                                                         |
| Material            | Aluminum alloy (AC)                                                                                         |                                                                         |
| Lens mount          | M42 Mount: M42 × P1.0, FB = 10.0 mm (in Air)                                                                |                                                                         |
| Interface connector | CXP connector: "DIN1.0/2.3, 75 Ohm Jack" x 4<br>Power/IO connector: HR10A-7R-6PB (Hirose) or equivalent x 1 |                                                                         |
| Camera Mounting     | M4 screw holes<br>(Four on front, top, bottom and both sides)                                               | M4 screw holes<br>(Four on front, bottom and both sides,<br>two on top) |
| Weight              | Approximatly 320 g                                                                                          |                                                                         |

(\*1) Excluding connectors

#### 4.3.2 STC-CMB120ACXP-F / STC-CMC120ACXP-F / STC-CMB120ACXP-T-F / STC-CMC120ACXP-T-F

| Model Number        | STC-CMB120ACXP-F /<br>STC-CMC120ACXP-F                                                                      | STC-CMB120ACXP-T-F /<br>STC-CMC120ACXP-T-F                              |
|---------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| Dimensions          | 68 (W) x 68 (H) x 76.5 (D) mm (*1)                                                                          | 68 (W) x 68 (H) x 82.5 (D) mm (*1)                                      |
| Optical filter      | No Optical Filter                                                                                           |                                                                         |
| Material            | Aluminum alloy (AC)                                                                                         |                                                                         |
| Lens mount          | F Mount                                                                                                     |                                                                         |
| Interface connector | CXP connector: "DIN1.0/2.3, 75 Ohm Jack" x 4<br>Power/IO connector: HR10A-7R-6PB (Hirose) or equivalent x 1 |                                                                         |
| Camera Mounting     | M4 screw holes<br>(Four on front, top, bottom and both sides)                                               | M4 screw holes<br>(Four on front, bottom and both sides,<br>two on top) |
| Weight              | Approximatly 395 g                                                                                          |                                                                         |

(\*1) Excluding connectors

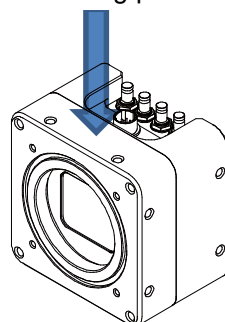
#### 4.4 Environmental specifications

| Model Number                       | STC-CMB120ACXP /<br>STC-CMB120ACXP-T /<br>STC-CMB120ACXP-F /<br>STC-CMB120ACXP-T-F                        | STC-CMC120ACXP /<br>STC-CMC120ACXP-T /<br>STC-CMC120ACXP-F /<br>STC-CMC120ACXP-T-F |
|------------------------------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Operational Temperature / Humidity | Environmental Temperature: 0 to +40 deg. C (*1),<br>Environmental Humidity: 0 to 85 %RH (No condensation) |                                                                                    |
| Storage Temperature / Humidity     | Environmental Temperature: -30 to +65 deg. C,<br>Environmental Humidity: 0 to 85 %RH (No condensation)    |                                                                                    |
| Vibration                          | 20 Hz to 200 Hz to 20 Hz (5 min. / cycle), acceleration 10 G, XYZ 3 directions 30 min. each               |                                                                                    |
| Shock                              | Acceleration 38 G, half amplitude 6 ms, XYZ 3 directions 3 times each                                     |                                                                                    |
| Standard Compliancy                | EMS: EN61000-6-2, EMI: EN55011                                                                            |                                                                                    |
| RoHS                               | RoHS Compliant                                                                                            |                                                                                    |

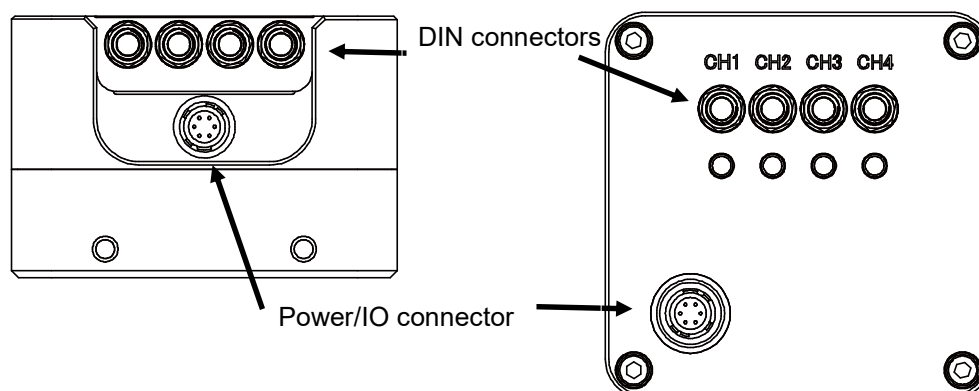
(\*1) Please install the camera with appropriate heat dissipation. If camera is mounted lens and tripod like aluminum plate, it could decrease the camera housing temperature for heat dissipation. When internal temperature sensor on the camera shows less than 68 deg C, camera housing temperature (top plate) would be less than 60 deg. It could be the guideline.

##### Upper side of camera

Measuring point



## 4.5 Connector Specifications



### 4.5.1 DIN Connector

DIN (TO-CONNE) (DIN1.0/2.3, Jack, 75 Ohm) or equivalent x 4

This product is PoCXP compliant.

The power supplys through PoCXP supported frame grabber board.

## 4.5.2 Power/IO Connector

HR10A-7R-6PB (Hirose) or equivalent.

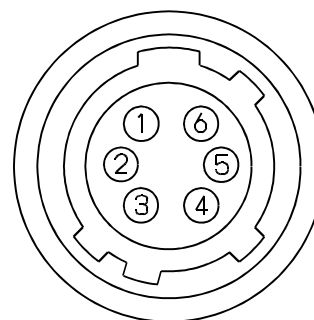
This connector is for external power input, input and output signals.

The trigger input and sync input /output signals can be assigned through the camera setting communication. As for the cable part (Female connector), HR10A-7P-6S (Hirose) or equivalent can be used.

The power of camera can be supply from IO connector.

### Pin assignment

| Pin No. | Signal Name | IN/OUT |
|---------|-------------|--------|
| 1       | GND         | -      |
| 2       | GPIO2       | IN/OUT |
| 3       | GPIO1       | IN/OUT |
| 4       | GPIO0       | IN/OUT |
| 5       | NC          | -      |
| 6       | POWER       | IN     |



\* Possible Maximum Rated Voltage is +24 V.on GPIO0, GPIO1 and GPIO2.

\* Please set electrically "OPEN" on NC (Pin 6).

### Input Output DC characteristics

| Pin No. | Signal Name | Function                     | IN/OUT | Voltage           |                     | Current               | Reference |
|---------|-------------|------------------------------|--------|-------------------|---------------------|-----------------------|-----------|
|         |             |                              |        | Low Voltage       | High Voltage        |                       |           |
| 1       | GND         | GND                          | -      |                   |                     | -                     | -         |
| 2       | GPIO2       | General Purpose Input Output | IN     | Less than +1.00 V | +3.00 to +24 V      | 4 $\mu$ A (typ.) (*4) | 1         |
|         |             |                              | OUT    | 0 to +2.20 V (*1) | +3.00 to +24 V (*2) | 15 mA (Max.) (*3)     | 2, 3      |
| 3       | GPIO1       | General Purpose Input Output | IN     | Less than +1.00 V | +3.00 to +24 V      | 4 $\mu$ A (typ.) (*4) | 1         |
|         |             |                              | OUT    | 0 to +2.20 V (*1) | +3.00 to +24 V (*2) | 15 mA (Max.) (*3)     | 2, 3      |
| 4       | GPIO0       | General Purpose Input Output | IN     | Less than +1.00 V | +3.00 to +24 V      | 4 $\mu$ A (typ.) (*4) | 1         |
|         |             |                              | OUT    | 0 to +2.20 V      | +3.00 to +24 V (*2) | 15 mA (Max.) (*3)     | 2, 3      |
| 5       | N.C.        | NC                           | -      | -                 |                     | -                     | -         |
| 6       | POWER       | External Power               | IN     | +18.5 to +26 V    |                     | -                     | -         |

(\*1): If the current on the IO port is at 15mA when using low voltage output, the output voltage could increase for the internal register.

(\*2): This is the maximum charging voltage when the external IO port is connected.

(\*3): When the external IO port is connected, control the current less than 15 mA on the IO port.

(\*4): This value is the typical current value of the Input Port when High Voltage is input.

### Default Setting of Input Output

| Pin No. | Signal Name | Default |         |
|---------|-------------|---------|---------|
|         |             | IN/OUT  | Setting |
| 2       | GPIO2       | IN      | Disable |
| 3       | GPIO1       | IN      | Disable |
| 4       | GPIO0       | IN      | Disable |

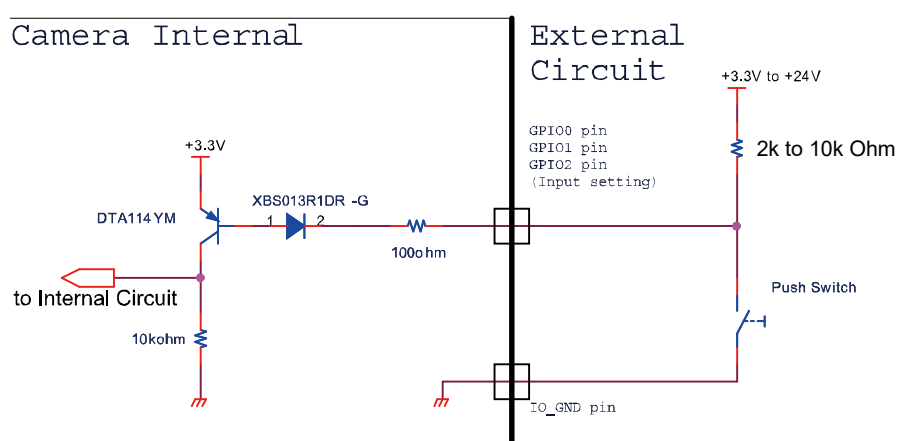
### 4.5.3 GPIO Circuit (Input)

#### Input Signal Functions

| No. | Function          | Polarity             |
|-----|-------------------|----------------------|
| 1)  | Disable (Default) | -                    |
| 2)  | General Input     | -                    |
| 3)  | Trigger Input     | Positive or Negative |

- 1) Disable  
This function should be set when no input signal is necessary.
- 2) General Input  
This function can set high or low level and the user can use this to check the status on the software.
- 3) Trigger Input  
This function is used for the trigger signal in the edge preset mode.

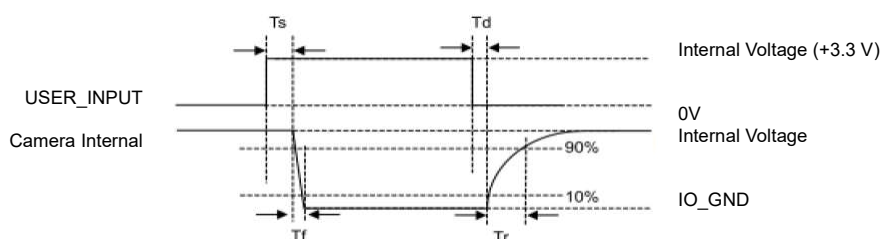
#### General Purpose Input (Reference 1)



#### Input Response Characteristics

The following table and timing chart show the Input Response Characteristics (Reference1).

|    |               |
|----|---------------|
| Td | 0.09 μseconds |
| Tr | 0.07 μseconds |
| Ts | 3.30 μseconds |
| Tf | 1.50 μseconds |



Required pulse width is  
 Positive signal: More than  $T_s + T_f$   
 Negative signal: More than  $T_d + T_r$

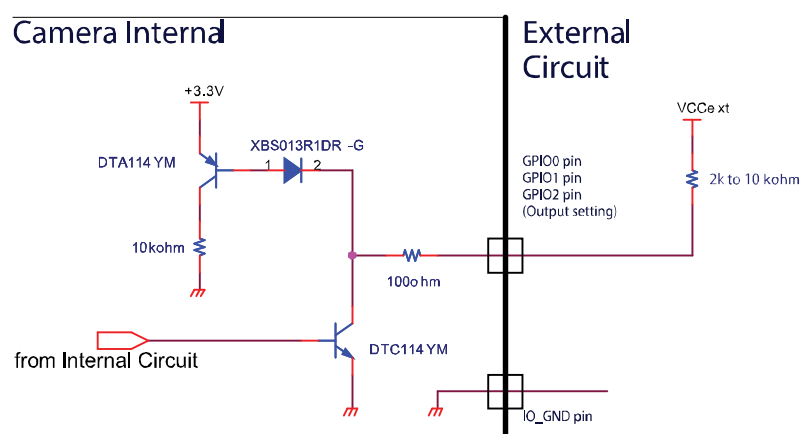
#### 4.5.4 GPIO Circuit (Output)

##### Output Signal Functions

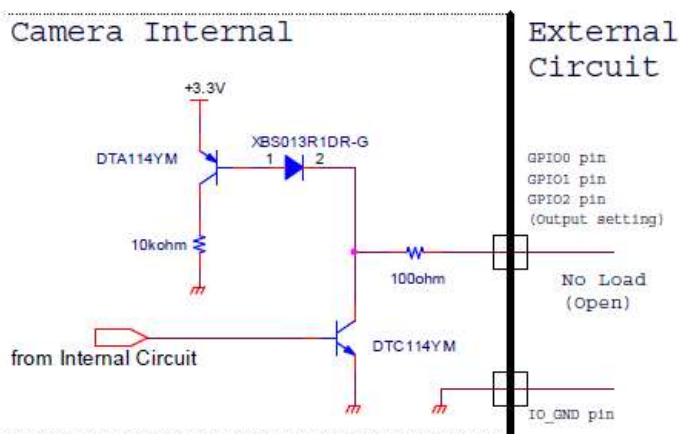
| No/ | Function                            | Polarity             |
|-----|-------------------------------------|----------------------|
| 1)  | Disable (Default)                   | -                    |
| 2)  | General Output(UserOutput0 / 1 / 2) | -                    |
| 3)  | Frame End                           | Positive or Negative |
| 4)  | Exposure Active                     | Positive or Negative |

- 1) Disable  
This function should be set when no output signal is necessary.
- 2) General Output (UserOutput0 / 1 / 2)  
This function outputs high or low level signals set on the software.
- 3) Frame End  
This function outputs when exposure ended with the pulse delay setting and pulse duration applied.
- 4) Exposure Active  
This function outputs the High or Low signal while in actual exposure time.

##### General Purpose Output (Reference 2)



##### General Purpose Output (Reference 3)



### Characteristics of the output signals

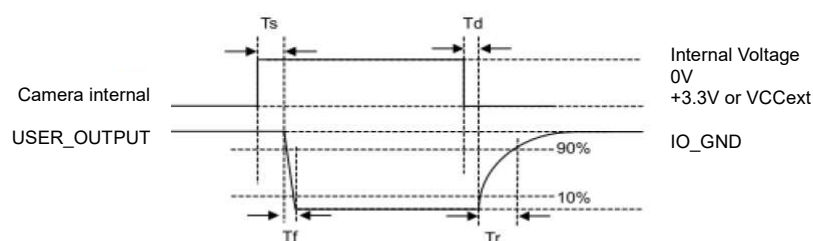
Response characteristics of the General Purpose output (Reference 2), and General Purpose output (Reference 3) are shown in the diagram below. Pulse width is configurable through software.

Please refer to the following response timing in the table.

|    | VCCext        |               |               |               |
|----|---------------|---------------|---------------|---------------|
|    | OPEN (*1)     | 5 V (*2)      | 12 V (*2)     | 24 V (*2)     |
| Td | 1.82 μseconds | 1.72 μseconds | 1.77 μseconds | 1.72 μseconds |
| Tr | 8.58 μseconds | 0.97 μseconds | 0.91 μseconds | 0.89 μseconds |
| Ts | 0.11 μseconds | 0.12 μseconds | 0.14 μseconds | 0.15 μseconds |
| Tf | 0.10 μseconds | 0.13 μseconds | 0.23 μseconds | 0.36 μseconds |

\*1: Reference 2. Measured on +1.8 V internal Voltage.

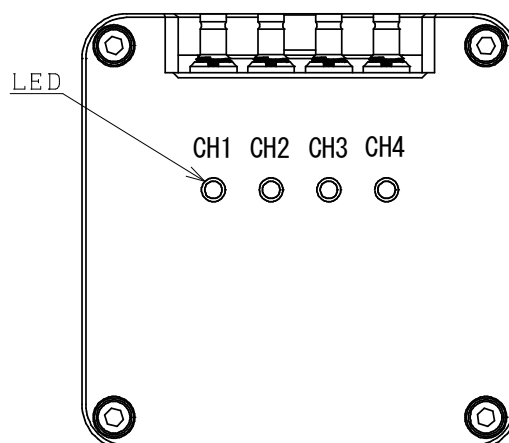
\*2: Reference 3



#### 4.6 Conector Indicator Lamps (LED) Specifications

Conector indicator LED exists beside of each DIN connector.

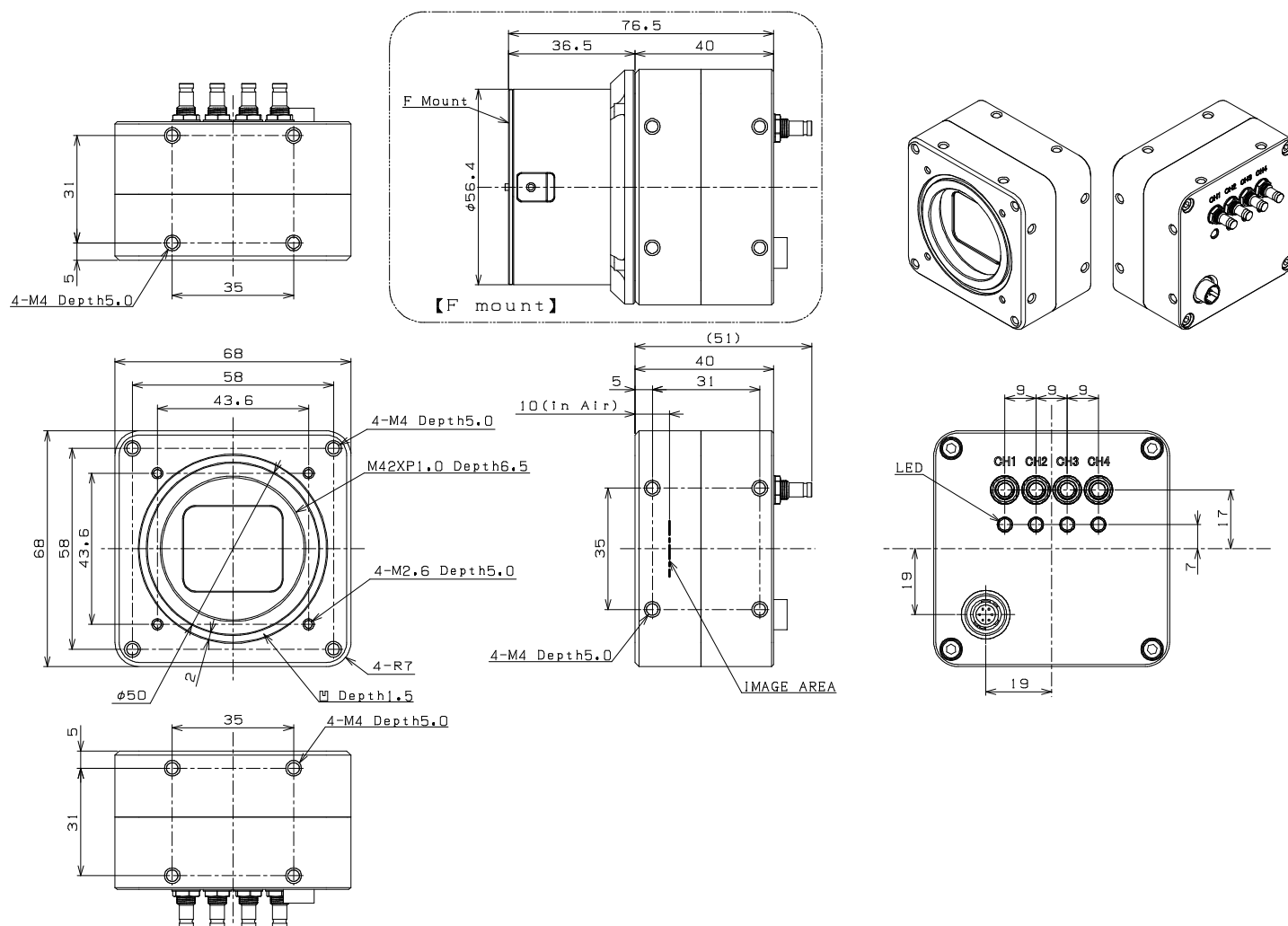
Each LED informs each status of communication. The detail of status is as following table.



| Status                                                 | LED Blinking Pattern                                      |
|--------------------------------------------------------|-----------------------------------------------------------|
| No connection                                          | Off                                                       |
| System booting                                         | Solid orange                                              |
| External powered, but no CXP connection                | RED slow blinking                                         |
| PoCXP connection                                       | Fast flash alternating green / orange shown for a minimum |
| CXP connection with external power                     | Fast flash orange                                         |
| Device / Host connected, but no data being transferred | Solid green                                               |
| Device / Host incompatible, PoCXP                      | Slow flash alternating red / green                        |
| Device / Host incompatible, CXP with external power    | Slow flash alternating red / orange                       |
| Device / Host connected, waiting for trigger           | Slow flash orange                                         |
| Device / Host connected, data being transferred        | Fast flash green                                          |
| Data Transfer Error                                    | Solid red (500 mseconds)                                  |
| System Error                                           | Red fast blinking                                         |

## 5 Dimensions

### 5.1 STC-CMB120ACXP / STC-CMC120ACXP / STC-CMB120ACXP-F / STC-CMC120ACXP-F



Unit: mm



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## 6 Camera operation

### 6.1 Frame rate calculation fomula

The frame rate can be changed by changing number of variable lines (hight).

The frame rate on configured number of line (hight) is as following formula.

$150 / 258 / (\text{Variable number of vertical lines} + 38) \times 1,000,000$  [fps] (Round down to 1 deciaml palces)

\* The variable number of vertical lines: Unit 4 lines (Minimum is 4 lines)

\* The frame rate does not change even number of horizontal pixel is redouced.

[Reference information]

The frame rate on Minimum ROI (256 (H) x 4 (V)) is 13,842.7 [fps]

## 6.2 Saving and Loading a data

This camera can save and load the camera parameters. It is included restoring the factory defaults. There are two kind of data are existing.

Default: The factory defaults data

UserSet1: User accessible data for saving

The data is loaded and written into in the register on RAM of camera.

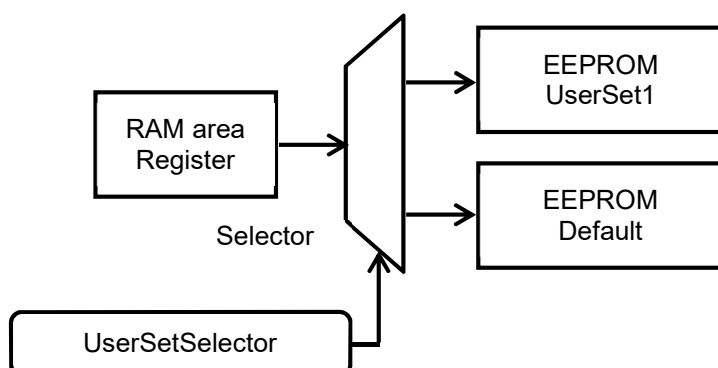
These functions can be accessed through the parameters (UserSetSelector, UserSetDefault) and commands (UserSetLoad, UserSetSave) on UserSetControl category of GenICam.

For the descriptions of the parameters and commands, please see the table as follow.

GenICam parameters

|                 |             |                                                                                                                     |
|-----------------|-------------|---------------------------------------------------------------------------------------------------------------------|
| UserSetSelector | Enumeration | Selects the feature User Set to load from "Default", "UserSet1"                                                     |
| UserSetDefault  | Enumeration | Selects the feature User Set to load and make active by default "Default", "UserSet1" from when the device is reset |
| UserSetLoad     | Command     | Loads the User Set specified by UserSetSelector to the device and makes it active                                   |
| UserSetSave     | Command     | Save the User Set specified by UserSetSelector to the non-volatile memory of the device                             |

### 6.2.1 Save Setting



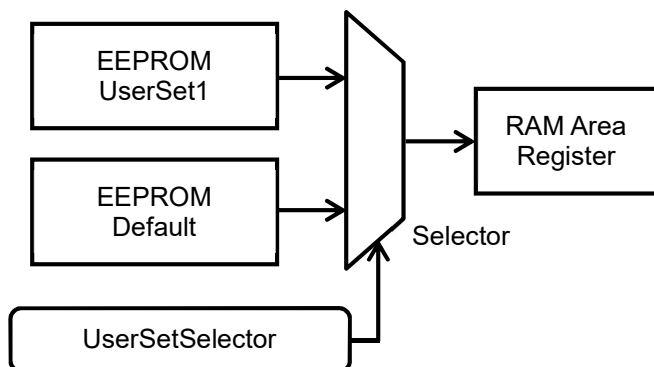
When execute UserSetSave, write the camera setting information from the RAM into memory area that was selected on UserSetSelector.

**Note: UserSetSave is not available when Default on UserSetSelector was selected**

#### Setting Procedure

1. Set UserSet1 on the UserSetSelector
2. Execute UserSetSave

### 6.2.2 Load Setting

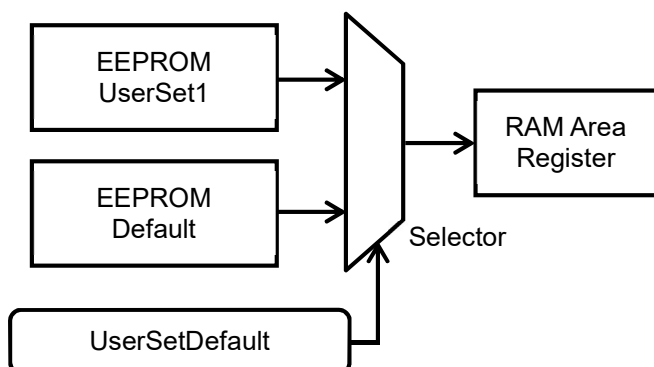


When execute UserSetLoad, write the camera setting information from the RAM into memory area that was selected on UserSetSelector.

#### Setting Procedure

1. Set UserSet1 or Default on UserSetSelector
2. Execute UserSetLoad

### 6.2.3 Camera startup



When startup camera, write camera setting information from memory area into the RAM.

#### Setting Procedure

1. Set UserSet1 or Default on UserSetDefault

### 6.2.4 Camera initialization

In order to initialize camera setting, please follow the procedure as bellow.  
Write Defalut into UserSet1.

#### Setting Procedure

1. Set Default on UserSetSelector
2. Execute UserSetLoad
3. Set UserSet1 on UserSetSelector
4. Execute UserSetSave

## 6.3 GenICam command

### 6.3.1 DeviceControl

| Name                                | Description                                                                                                      |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------|
| DeviceType                          | Returns the device type.                                                                                         |
| DeviceScanType                      | Scan type of the sensor of the device.                                                                           |
| DeviceVendorName                    | Name of the manufacturer of the device.                                                                          |
| DeviceModelName                     | Model of the device.                                                                                             |
| DeviceFamilyName                    | Identifier of the product family of the device.                                                                  |
| DeviceManufacturerInfo              | Manufacturer information about the device.                                                                       |
| DeviceVersion                       | Version of the device.                                                                                           |
| DeviceFirmwareVersion               | Version of the firmware in the device.                                                                           |
| DeviceSerialNumber                  | Device's serial number. This string is a unique identifier of the device.                                        |
| DeviceUserID                        | User-programmable device identifier.                                                                             |
| DeviceSFNCVersionMajor              | Major version of the Standard Features Naming Convention that was used to create the device's GenICam XML.       |
| DeviceSFNCVersionMinor              | Minor version of the Standard Features Naming Convention that was used to create the device's GenICam XML.       |
| DeviceSFNCVersionSubMinor           | Sub minor version of Standard Features Naming Convention that was used to create the device's GenICam XML.       |
| DeviceManifestEntrySelector         | Selects the manifest entry to reference.                                                                         |
| DeviceManifestXMLMajorVersion       | Indicates the major version number of the GenICam XML file of the selected manifest entry.                       |
| DeviceManifestXMLMinorVersion       | Indicates the minor version number of the GenICam XML file of the selected manifest entry.                       |
| DeviceManifestXMLSubMinorVersion    | Indicates the sub minor version number of the GenICam XML file of the selected manifest entry.                   |
| DeviceManifestSchemaMajorVersion    | Indicates the major version number of the schema file of the selected manifest entry.                            |
| DeviceManifestSchemaMinorVersion    | Indicates the minor version number of the schema file of the selected manifest entry.                            |
| DeviceManifestSchemaSubMinorVersion | Indicates the sub minor version number of the schema file of the selected manifest entry.                        |
| DeviceTLType                        | Transport Layer type of the device.                                                                              |
| DeviceTLVersionMajor                | Major version of the Transport Layer of the device.                                                              |
| DeviceTLVersionMinor                | Minor version of the Transport Layer of the device.                                                              |
| DeviceTLVersionSubMinor             | Sub minor version of the Transport Layer of the device.                                                          |
| DeviceCharacterSet                  | Character set used by the strings of the device's bootstrap registers.                                           |
| DeviceReset                         | Resets the device to its power up state.                                                                         |
| DeviceRegistersEndianness           | Endianness of the registers of the device.                                                                       |
| DeviceTemperatureSelector           | Selects the location within the device, where the temperature will be measured.                                  |
| DeviceTemperature                   | Device temperature in degrees Celsius (C). It is measured at the location selected by DeviceTemperatureSelector. |

### 6.3.2 ImageFormatControl

| Name                         | Description                                                                                                                                                                                                          |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SensorWidth                  | Effective width of the sensor in pixels.                                                                                                                                                                             |
| SensorHeight                 | Effective height of the sensor in pixels.                                                                                                                                                                            |
| SensorShutterMode            | Sets the shutter mode of the device.                                                                                                                                                                                 |
| WidthMax                     | Maximum width of the image (in pixels). The dimension is calculated after horizontal binning, decimation or any other function changing the horizontal dimension of the image.                                       |
| HeightMax                    | Maximum height of the image (in pixels). This dimension is calculated after vertical binning, decimation or any other function changing the vertical dimension of the image.                                         |
| RegionSelector               | Selects the Region of interest to control. The RegionSelector feature allows devices that are able to extract multiple regions out of an image, to configure the features of those individual regions independently. |
| ImageComponentSelector       | Selects a component to activate data streaming from.                                                                                                                                                                 |
| ImageComponentEnable         | Controls if the selected component streaming is active.                                                                                                                                                              |
| Width                        | Width of the image provided by the device (in pixels).                                                                                                                                                               |
| Height                       | Height of the image provided by the device (in pixels).                                                                                                                                                              |
| OffsetX                      | Horizontal offset from the origin to the region of interest (in pixels).                                                                                                                                             |
| OffsetY                      | Vertical offset from the origin to the region of interest (in pixels).                                                                                                                                               |
| PixelFormat                  | Format of the pixels provided by the device. It represents all the information provided by PixelCoding, PixelSize, PixelColorFilter combined in a single feature.                                                    |
| PixelFormatInfoSelector      | Select the pixel format for which the information will be returned.                                                                                                                                                  |
| PixelFormatInfoID            | Returns the value used by the streaming channels to identify the selected pixel format.                                                                                                                              |
| PixelSize                    | Total size in bits of a pixel of the image.                                                                                                                                                                          |
| PixelColorFilter             | Type of color filter that is applied to the image.                                                                                                                                                                   |
| TestPatternGeneratorSelector | Selects which test pattern generator is controlled by the TestPattern feature.                                                                                                                                       |
| TestPattern                  | Selects the type of test pattern that is generated by the device as image source.                                                                                                                                    |
| ReverseX                     | This feature is used to flip horizontally the image sent by the device. The AOI is applied after the flipping.                                                                                                       |
| ReverseY                     | This feature is used to flip vertically the image sent by the device. The AOI is applied after the flipping.                                                                                                         |

### 6.3.3 AcquisitionControl

| Name                 | Description                                                                                                                                                        |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AcquisitionMode      | Sets the acquisition mode of the device. It defines mainly the number of frames to capture during an acquisition and the way the acquisition stops.                |
| AcquisitionStart     | Starts the Acquisition of the device. The number of frames captured is specified by AcquisitionMode.                                                               |
| AcquisitionStop      | Stops the Acquisition of the device at the end of the current Frame. It is mainly used when AcquisitionMode is Continuous but can be used in any acquisition mode. |
| AcquisitionFrameRate | Controls the acquisition rate (in Hertz) at which the frames are captured.                                                                                         |
| TriggerSelector      | Selects the type of trigger to configure.                                                                                                                          |
| TriggerMode          | Controls if the selected trigger is active.                                                                                                                        |
| TriggerSoftware      | Generates an internal trigger. TriggerSource must be set to Software.                                                                                              |
| TriggerSource        | Specifies the internal signal or physical input Line to use as the trigger source. The selected trigger must have its TriggerMode set to On.                       |
| TriggerDelay         | Specifies the delay in microseconds (us) to apply after the trigger reception before activating it.                                                                |
| ExposureMode         | Sets the operation mode of the Exposure (or shutter).                                                                                                              |
| ExposureTimeSelector | Selects which exposure time is controlled by the ExposureTime feature. This allows for independent control over the exposure components.                           |
| ExposureTime         | Sets the Exposure time when ExposureMode is Timed and ExposureAuto is Off. This controls the duration where the photosensitive cells are exposed to light.         |

### 6.3.4 TransportLayerControl

| Name                          | Description                                                                                                                                                                                                                  |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CxpLinkConfigurationStatus    | This feature indicates the current and active link configuration used by the device.                                                                                                                                         |
| CxpLinkConfigurationPreferred | Provides the link configuration that allows the Transmitter device to operate in this default mode.                                                                                                                          |
| CxpLinkConfiguration          | This feature allows specifying the link configuration for the communication between the Receiver and Transmitter device.                                                                                                     |
| CxpConnectionSelector         | Selects the CoaXPress physical connection to control.                                                                                                                                                                        |
| CxpConnectionTestMode         | Enables the test mode for an individual physical connection of the device.                                                                                                                                                   |
| CxpConnectionTestErrorCount   | Reports the current connection error count for test packets received by the device on the connection selected by CxpConnectionSelector.                                                                                      |
| CxpConnectionTestPacketCount  | Reports the current count for test packets received by the device on the connection selected by CxpConnectionSelector.                                                                                                       |
| PayloadSize                   | Provides the number of bytes transferred for each image or chunk on the stream channel. This includes any end-of-line, end-of-frame statistics or other stamp data. This is the total size of data payload for a data block. |

### 6.3.5 DigitalIOControl

| Name               | Description                                                                                                      |
|--------------------|------------------------------------------------------------------------------------------------------------------|
| LineSelector       | Selects the physical line (or pin) of the external device connector to configure.                                |
| LineMode           | Controls if the physical Line is used to Input or Output a signal.                                               |
| LineInverter       | Controls the inversion of the signal of the selected input or output Line.                                       |
| LineStatus         | Returns the current status of the selected input or output Line.                                                 |
| LineSource         | Selects which internal acquisition or I/O source signal to output on the selected Line. LineMode must be Output. |
| UserOutputSelector | Selects which bit of the User Output register will be set by UserOutputValue.                                    |
| UserOutputValue    | Sets the value of the bit selected by UserOutputSelector.                                                        |
| StrobeOutDelay     | Delay of StrobeOut signal when LineSource is set to StrobeOut (us).                                              |
| StrobeOutOnTime    | Duration of StrobeOut signal when LineSource is set to StrobeOut (us).                                           |
| TriggerOutDelay    | Delay of TriggerOut signal when LineSource is set to TriggerOut (us).                                            |
| TriggerOutOnTime   | Duration of TriggerOut signal when LineSource is set to TriggerOut (us).                                         |
| LineDebounceTime   | Sets the value of the input line debouncer time.                                                                 |

### 6.3.6 AnalogControl

| Name                  | Description                                                                                                                        |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------|
| GainSelector          | Selects which Gain is controlled by the various Gain features.                                                                     |
| Gain                  | Controls the selected gain as an absolute physical value. This is an amplification factor applied to the video signal.             |
| DigitalGainOffsetMode | DigitalGainOffsetMode is enabled.                                                                                                  |
| BlackLevelSelector    | Selects which Black Level is controlled by the various Black Level features.                                                       |
| BlackLevel            | Controls the black level as an absolute physical value. This represents a DC offset applied to the video signal.                   |
| BalanceRatioSelector  | Selects which Balance ratio to control.                                                                                            |
| BalanceRatio          | Controls ratio of the selected color component to a reference color component. It is used for white balancing.                     |
| BalanceWhiteAuto      | Controls the mode for automatic white balancing between the color channels. The white balancing ratios are automatically adjusted. |

### 6.3.7 LUTControl

| Name                      | Description                                                    |
|---------------------------|----------------------------------------------------------------|
| PixelCorrectionAllEnabled | Enable pixel correction for all pixels.                        |
| PixelCorrectionIndex      | Determine index of targeted pixel for pixel correction.        |
| PixelCorrectionX          | Determine x-coordinate of targeted pixel for pixel correction. |
| PixelCorrectionY          | Determine y-coordinate of targeted pixel for pixel correction. |
| PixelCorrectionEnabled    | Determine if targeted pixel is enabled for pixel correction.   |

### 6.3.8 UserSetControl

| Name            | Description                                                                               |
|-----------------|-------------------------------------------------------------------------------------------|
| UserSetSelector | Selects the feature User Set to load, save or configure.                                  |
| UserSetLoad     | Loads the User Set specified by UserSetSelector to the device and makes it active.        |
| UserSetSave     | Save the User Set specified by UserSetSelector to the non-volatile memory of the device.  |
| UserSetDefault  | Selects the feature User Set to load and make active by default when the device is reset. |

## 7 Revision History

| Rev | Date       | Changes                                                                                                                                                                                              | Note |
|-----|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 00  | 2015/06/01 | ● Released: Production model                                                                                                                                                                         |      |
| 01  | 2015/08/17 | ● Revised<br>Added shutter speed and ROI                                                                                                                                                             |      |
| 02  | 2015/12/10 | ● Revised<br>Added Formura of Frame rate                                                                                                                                                             |      |
| 03  | 2016/05/23 | ● Revised<br>Maximum framerate as 1 86fps, and CE certifications<br>Weight, Maximum and Typical Power consumption were described<br>Input Response Characteristics, Dimensions<br>Product model name |      |
| 04  | 2016/08/02 | ● Revised<br>CE certificated                                                                                                                                                                         |      |
| 05  | 2017/04/28 | ● Revised<br>New office information<br>Added Power pin connector information on 6Pin<br>Added frame rate of 2-Lane and 1-Lane                                                                        |      |
| 06  | 2017/07/03 | ● Revised<br>Change the name of company                                                                                                                                                              |      |
| 07  | 2017/09/07 | ● Revised<br>Add the camera mounting                                                                                                                                                                 |      |
| 08  | 2018/12/13 | ● Revised<br>Add GenICam commands                                                                                                                                                                    |      |
| 09  | 2021/01/15 | ● Revised<br>Revised the external power input through 6pin connector                                                                                                                                 |      |

Note: Product specifications would be changed without notification.

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