Microview

ROSA-GE User Manual

RS-A361-GM/GC60, RS-A361-GM/GC100, RS-A363-GM/GC150,

RS-A1000-GM30, RS-A1300-GM/GC60,RS-A1500-GM60 NIR,

RS-A2300-GM/GC50, RS-A2300-GM/GC60,

RS-A5001-GM/GC14，RS-A10K-GM/GC7, RS-A14K-GC6

Version	V2.0.0.0
Date	2014.01.05

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§ Revision History

Version	Date	Date
V2.0.0.0	20150105	● Applied to Firmware 2.0
V1.0.0.2	20140623	● Add description for the shielded IO cable ● Minor modification
V1.0.0.1	20140522	● Integrate all models into one document

§1 Abstract

This chapter lists some general specifications of all the ROSA-GE models covered by this manual.

§1.1 About ROSA

All the ROSA-GE models comply with GigE Vision 1.2 specification and GeniCam 1.1. All the models have the same interface and IO connector, and the same definition to many main stream camera manufactures' , easy to use for customers.

The following table lists all the models by frame rate and resolution.

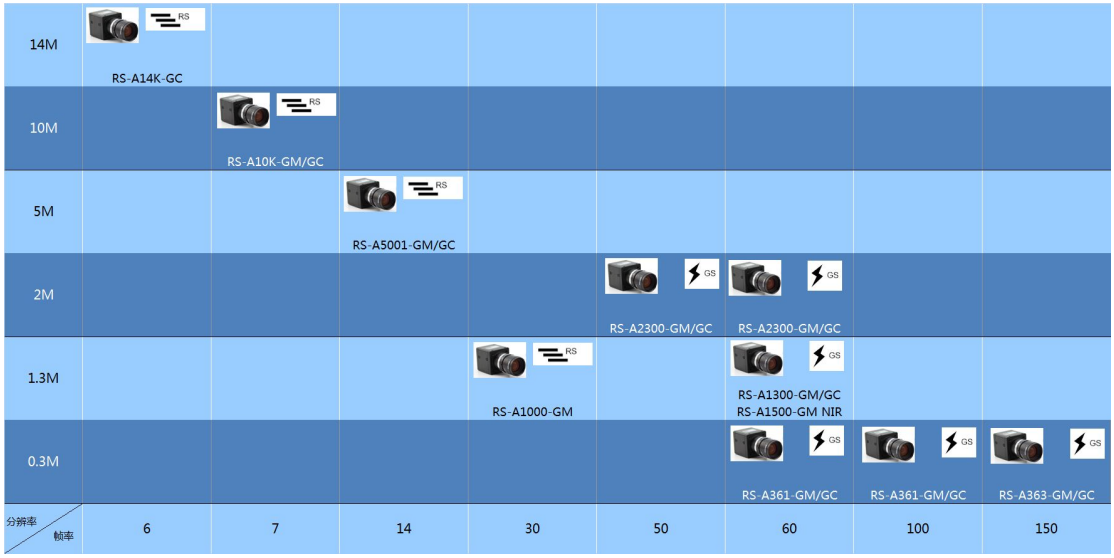


Fig 1-1 ROSA-GE Models

Models	Resolution	Frame Rate	Image Sensor	Pixel Size (um)	Shutter Type
RS-A361-GM/GC	752*480	60	Aptina MT9V024	6*6	Global
RS-A361-GM/GC	752*480	100	Aptina MT9V024	6*6	Global
RS-A363-GM/GC	752*480	150	e2v EV76C560	5.3*5.3	Global
RS-A1000-GM	1280*1024	30	Aptina MT9M001	5.2*5.2	Rolloing
RS-A1300-GM/GC	1280*1024	60	e2v EV76C560	5.3*5.3	Global
RS-A1500-GM NIR	1280*1024	60	e2v EV76C660	5.3*5.3	Rolling
RS-A2300-GM/GC	1600*1200	50	e2v EV76C570	4.5*4.5	Global
RS-A2300-GM/GC	1600*1200	60	e2v EV76C570	4.5*4.5	Global
RS-A5001-GM/GC	2592*1944	14	Aptina MT9P031	2.2*2.2	Rolling
RS-A10K-GM/GC	3664*2748	7.3	Aptina MT9J003	1.67*1.67	Rolling
RS-A14K-GC	4384*3288	6.3	Aptina MT9F002	1.4*1.4	Rolling

Fig 1-2 General Information

§1.2 General Specifications

The following tables list all the general specifications of ROSA-GE models.

	RS-A361-GM/GC60	RS-A361-GM/GC100
Resolution	752*480	752*480
Sensor	Aptina MT9V024 Progressive Scan，Global Shutter	Aptina MT9V024 Progressive Scan，Global Shutter
Optical Size	1/3"	1/3"
Pixel Size	6um*6um	6um*6um
Frame Rate @Full Resolution	60Hz	100Hz
Type	Mono/Bayer Color	Mono/Bayer Color
Output	Gigabit Ethernet	Gigabit Ethernet
Data Type	Mono：Mono8/Mono10 Color：Bayer8/Bayer10 /Mono8/Mono10 /BGR8/RGB8 YUV444/YUV422/YUV411	Mono：Mono8/Mono10 Color：Bayer8/Bayer10 /Mono8/Mono10 /BGR8/RGB8 YUV444/YUV422/YUV411
Work Mode	External Trigger, Soft Trigger, Free Run	External Trigger, Soft Trigger, Free Run
Exposure Control	Timed, Programmable through API	Timed, Programmable through API
User IO	One opto input and one opto output	One opto input and one opto output
Power Consumption	3.5W	3.6W
Power Supply	12V DC	12V DC
Working Environment	Humidity<80%（non-condensing） Housing Temperature<50℃ Lowest Environment Temperature 0℃	Humidity<80%（non-condensing） Housing Temperature<50℃ Lowest Environment Temperature 0℃
Lens	C	C
Profile（L*W*H）	38mm*38mm*37.6mm （Does not include lens and RJ45）	38mm*38mm*37.6mm （Does not include lens and RJ45）
SDK/OS	GigEVision Compliant 3rd Party SDK OS Support Windows（xp/Vista/7/8） Windows Server 2003/2008 Windows CE Mac OS, Linux	GigEVision Compliant 3rd Party SDK OS Support Windows（xp/Vista/7/8） Windows Server 2003/2008 Windows CE Mac OS, Linux

Fig 1-3 RS-A361-GM/GC60，RS-A361-GM/GC100 Specifications

	RS-A363-GM/GC150	RS-A1000-GM30
Resolution	752*480	1280*1024
Sensor	e2v EV76C560 Progressive Scan，Global Shutter	Aptina MT9M001 Progressive Scan，Rolling Shutter
Optical Size	1/1.8”	1/2”
Pixel Size	5.3um*5.3um	5.2um*5.2um
Frame Rate @Full Resolution	150Hz	30Hz
Type	Mono/Bayer Color	Mono
Output	Gigabit Ethernet	Gigabit Ethernet
Data Type	Mono：Mono8/Mono10 Color：Bayer8/Bayer10 /Mono8/Mono10 /BGR8/RGB8 YUV444/YUV422/YUV411	Mono8/Mono10
Work Mode	External Trigger, Soft Trigger, Free Run	External Trigger, Soft Trigger, Free Run
Exposure Control	Timed, Programmable through API	Timed, Programmable through API
User IO	One opto input and one opto output	One opto input and one opto output
Power Consumption	3.7W	3.5W
Power Supply	12V DC （±10%）	12V DC
Working Environment	Humidity<80%（non-condensing） Housing Temperature<50℃ Lowest Environment Temperature 0℃	Humidity<80%（non-condensing） Housing Temperature<50℃ Lowest Environment Temperature 0℃
Lens	C	C
Profile （L*W*H）	38mm*38mm*37.6mm （Does not include lens and RJ45）	38mm*38mm*37.6mm （Does not include lens and RJ45）
SDK/OS	GigEVision Compliant 3rd Party SDK OS Support Windows（xp/Vista/7/8） Windows Server 2003/2008 Windows CE Mac OS, Linux	GigEVision Compliant 3rd Party SDK OS Support Windows（xp/Vista/7/8） Windows Server 2003/2008 Windows CE Mac OS, Linux

Fig 1-4　RS-A363-GM/GC150，RS-A1000-GM30Specifications

	RS-A1300-GM/GC60	RS-A1500-GM60 NIR
Resolution	1280*1024	1280*1024
Sensor	e2v EV76C560 Progressive Scan，Global Shutter	e2v EV76C660 Progressive Scan，Rolling Shutter
Optical Size	1/1.8”	1/1.8”
Pixel Size	5.3um*5.3um	5.3um*5.3um
Frame Rate @Full Resolution	60Hz	60Hz
Type	Mono/Bayer Color	Mono NIR（Peak QE@730nm）
Output	Gigabit Ethernet	Gigabit Ethernet
Data Type	Mono：Mono8/Mono10 Color：Bayer8/Bayer10 /Mono8/Mono10 /BGR8/RGB8 YUV444/YUV422/YUV411	Mono8/10
Work Mode	External Trigger, Soft Trigger, Free Run	External Trigger, Soft Trigger, Free Run
Exposure Control	Timed, Programmable through API	Timed, Programmable through API
User IO	One opto input and one opto output	One opto input and one opto output
Power Consumption	3.7W	3.7W
Power Supply	12V DC （±10%）	12V DC （±10%）
Working Environment	Humidity<80%（non-condensing） Housing Temperature<50℃ Lowest Environment Temperature 0℃	Humidity<80%（non-condensing） Housing Temperature<50℃ Lowest Environment Temperature 0℃
Lens	C	C
Profile （L*W*H）	38mm*38mm*37.6mm （Does not include lens and RJ45）	38mm*38mm*37.6mm （Does not include lens and RJ45）
SDK/OS	GigEVision Compliant 3rd Party SDK OS Support Windows（xp/Vista/7/8） Windows Server 2003/2008 Windows CE Mac OS, Linux	GigEVision Compliant 3rd Party SDK OS Support Windows（xp/Vista/7/8） Windows Server 2003/2008 Windows CE Mac OS, Linux

Fig 1-5 RS-A1300-GM/GC60,RS-A1500-GM60 NIRSpecifications

	RS-A2300-GM/GC50	RS-A2300-GM/GC60
Resolution	1600*1200	1600*1200
Sensor	e2v EV76C570 Progressive Scan，Global Shutter	e2v EV76C570 Progressive Scan，Global Shutter
Optical Size	1/1.8”	1/1.8”
Pixel Size	4.5um*4.5um	4.5um*4.5um
Frame Rate @Full Resolution	50Hz	60Hz
Type	Mono/Bayer Color	Mono/Bayer Color
Output	Gigabit Ethernet	Gigabit Ethernet
Data Type	Mono：Mono8/Mono10 Color：Bayer8/Bayer10 /Mono8/Mono10 /BGR8/RGB8 YUV444/YUV422/YUV411	Mono：Mono8/Mono10 Color：Bayer8/Bayer10 /Mono8/Mono10 /BGR8/RGB8 YUV444/YUV422/YUV411
Work Mode	External Trigger, Soft Trigger, Free Run	External Trigger, Soft Trigger, Free Run
Exposure Control	Timed, Programmable through API	Timed, Programmable through API
User IO	One opto input and one opto output	One opto input and one opto output
Power Consumption	3.8W	3.8W
Power Supply	12V DC （±10%）	12V DC （±10%）
Working Environment	Humidity<80%（non-condensing） Housing Temperature<50℃ Lowest Environment Temperature 0℃	Humidity<80%（non-condensing） Housing Temperature<50℃ Lowest Environment Temperature 0℃
Lens	C	C
Profile （L*W*H）	38mm*38mm*37.6mm （Does not include lens and RJ45）	38mm*38mm*37.6mm （Does not include lens and RJ45）
SDK/OS	GigEVision Compliant 3rd Party SDK OS Support Windows（xp/Vista/7/8） Windows Server 2003/2008 Windows CE Mac OS, Linux	GigEVision Compliant 3rd Party SDK OS Support Windows（xp/Vista/7/8） Windows Server 2003/2008 Windows CE Mac OS, Linux

Fig 1-6 RS-A2300-GM/GC50,RS-A2300-GM/GC60 Specifications

	RS-A5001-GM/GC14	RS-A10K-GM/GC7
Resolution	2592*1944	3664*2748
Sensor	Aptina MT9P031 Progressive Scan，Rolling Shutter	Aptina MT9J003 Progressive Scan，Rolling Shutter
Optical Size	1/2.5"	1/2.3"
Pixel Size	2.2um*2.2um	1.67um*1.67um
Frame Rate @Full Resolution	14Hz	7.3Hz
Type	Mono/Bayer Color	Mono/Bayer Color
Output	Gigabit Ethernet	Gigabit Ethernet
Data Type	Mono：Mono8/Mono12 Color：Bayer8/Bayer12 /Mono8/Mono12 /BGR8/RGB8 YUV444/YUV422/YUV411	Mono：Mono8/Mono12 Color：Bayer8/Bayer12 /Mono8/Mono12 /BGR8/RGB8 YUV444/YUV422/YUV411
Work Mode	External Trigger, Soft Trigger, Free Run	External Trigger, Soft Trigger, Free Run
Exposure Control	Timed, Programmable through API	Timed, Programmable through API
User IO	One opto input and one opto output	One opto input and one opto output
Power Consumption	3.5W	3.5W
Power Supply	12V DC	12V DC
Working Environment	Humidity<80%（non-condensing） Housing Temperature<50℃ Lowest Environment Temperature 0℃	Humidity<80%（non-condensing） Housing Temperature<50℃ Lowest Environment Temperature 0℃
Lens	C	C
Profile（L*W*H）	38mm*38mm*37.6mm （Does not include lens and RJ45）	38mm*38mm*37.6mm （Does not include lens and RJ45）
SDK/OS	GigEVision Compliant 3rd Party SDK OS Support Windows（xp/Vista/7/8） Windows Server 2003/2008 Windows CE Mac OS, Linux	GigEVision Compliant 3rd Party SDK OS Support Windows（xp/Vista/7/8） Windows Server 2003/2008 Windows CE Mac OS, Linux

Fig 1-7　RS-A5001-GM/GC14,RS-A10K-GM/GC7 Specifications

	RS-A14K-GC6
Resolution	4384*3288
Sensor	Aptina MT9F002 Progressive Scan，Rolling Shutter
Optical Size	1/2.3"
Pixel Size	1.4um*1.4um
Frame Rate @Full Resolution	6.3Hz
Type	Bayer Color
Output	Gigabit Ethernet
Data Type	Bayer8/Bayer12/Mono8/Mono12 /BGR8/RGB8 YUV444/YUV422/YUV411
Work Mode	External Trigger, Soft Trigger, Free Run
Exposure Control	Timed, Programmable through API
User IO	One opto input and one opto output
Power Consumption	3.5W
Power Supply	12V DC
Working Environment	Humidity<80%（non-condensing） Housing Temperature<50℃ Lowest Environment Temperature 0℃
Lens	C
Profile （L*W*H）	38mm*38mm*37.6mm （Does not include lens and RJ45）
SDK/OS	GigEVision Compliant 3rd Party SDK OS Support Windows（xp/Vista/7/8） Windows Server 2003/2008 Windows CE Mac OS, Linux

Fig 1-8　RS-A14K-GC6 Specifications

§1.3 Spectral Response

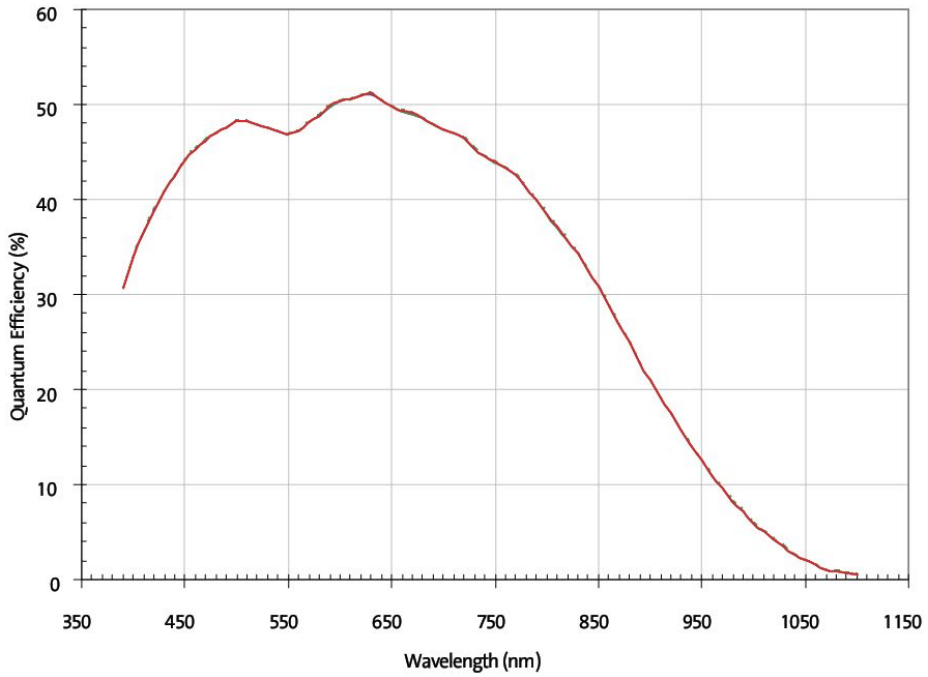


Fig 1-9 RS-A361-GM60/100

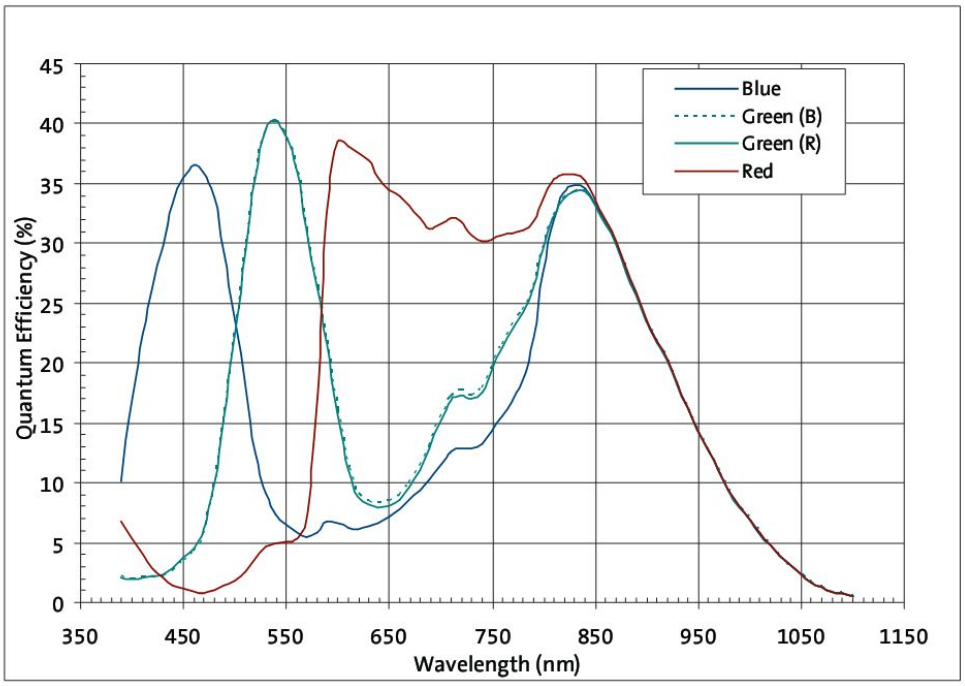


Fig 1-10 RS-A361-GC60/100

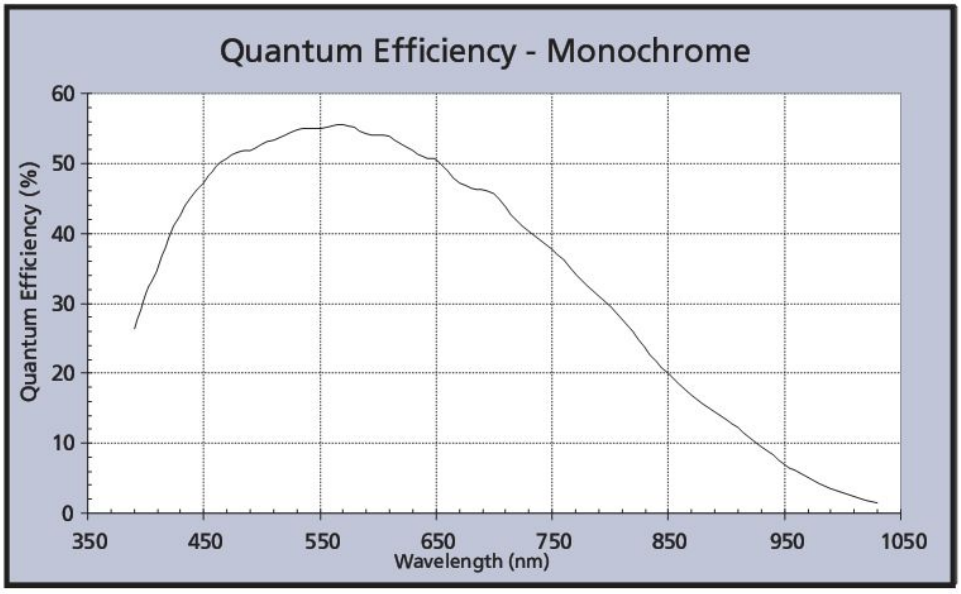


Fig 1-11　RS-A1000-GM30

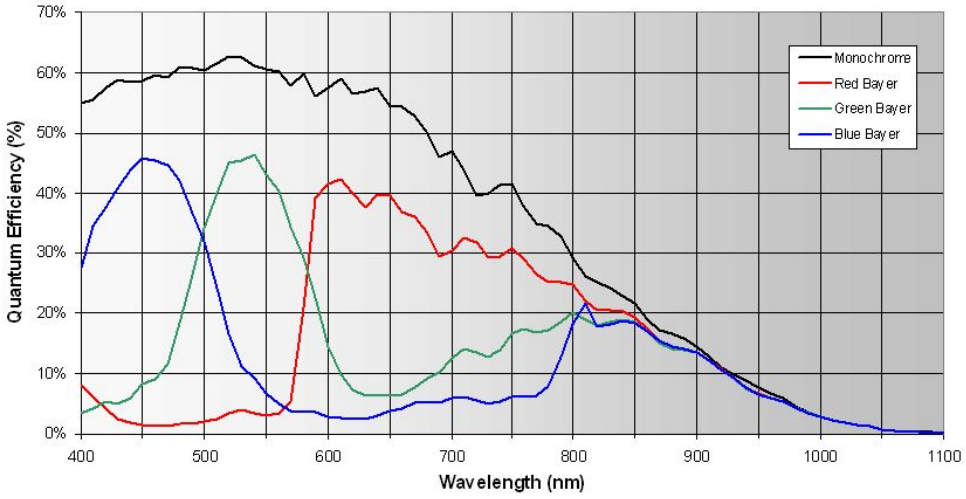


Fig 1-12　RS-A1300-GM/GC60，RS-A363-GM/GC150

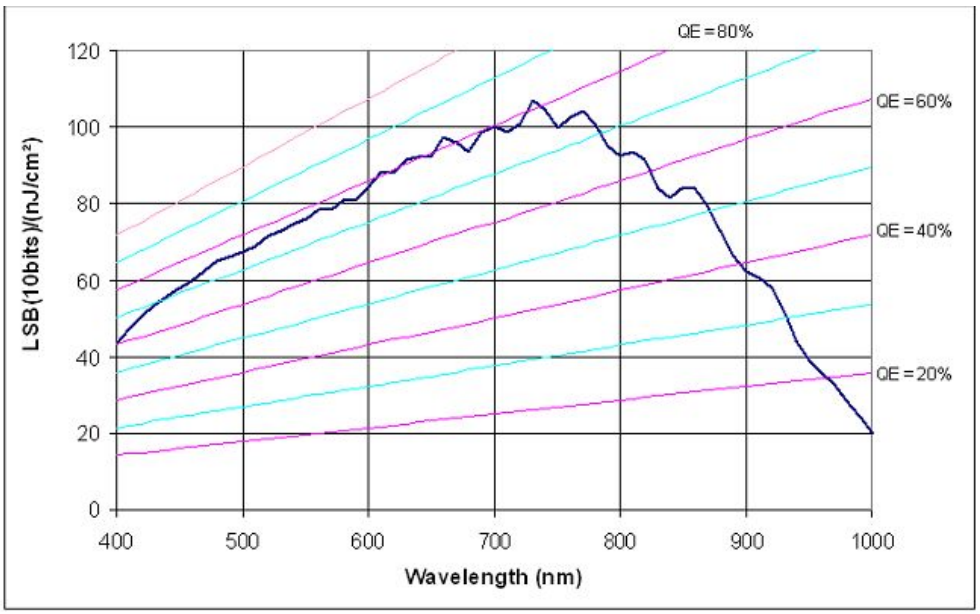


Fig 1-13 RS-A1500-GM60 NIR

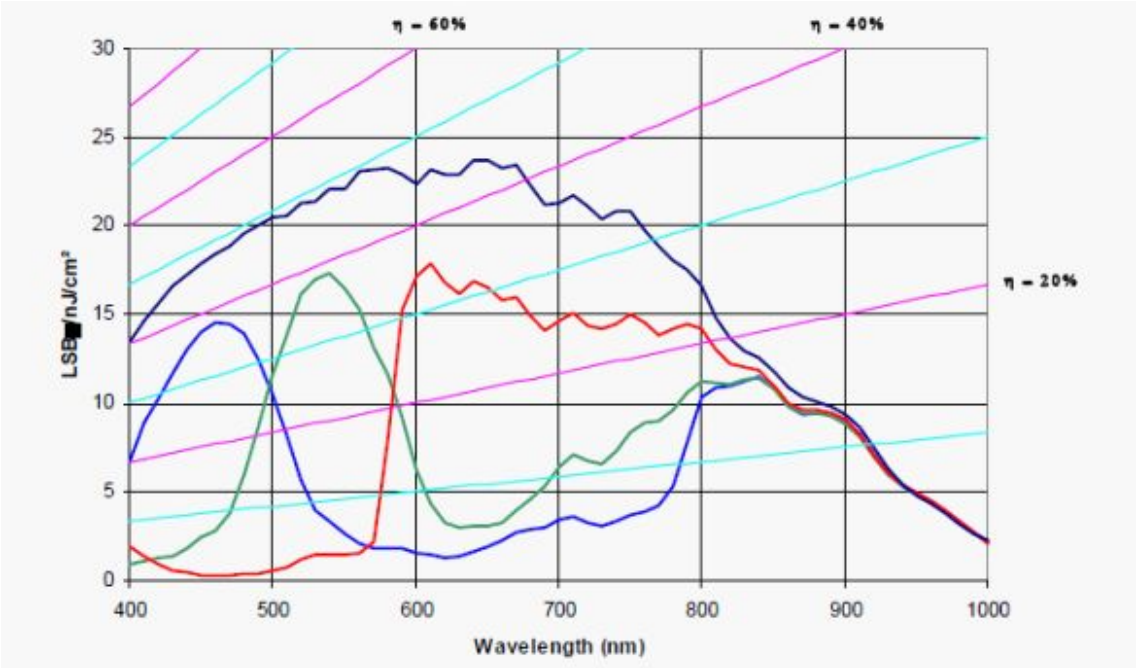


Fig 1-14 RS-A2300-GM/GC50/60

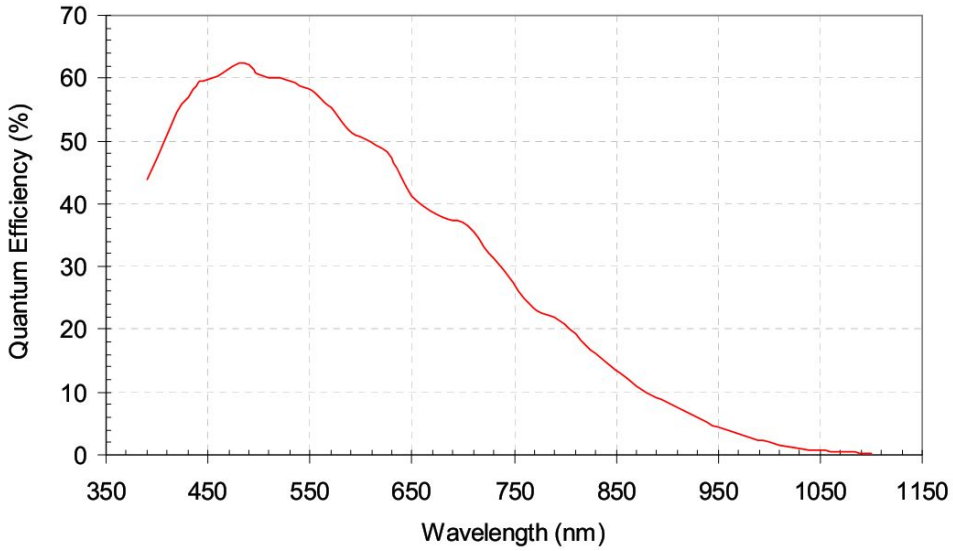


Fig 1-15 RS-A5001-GM14

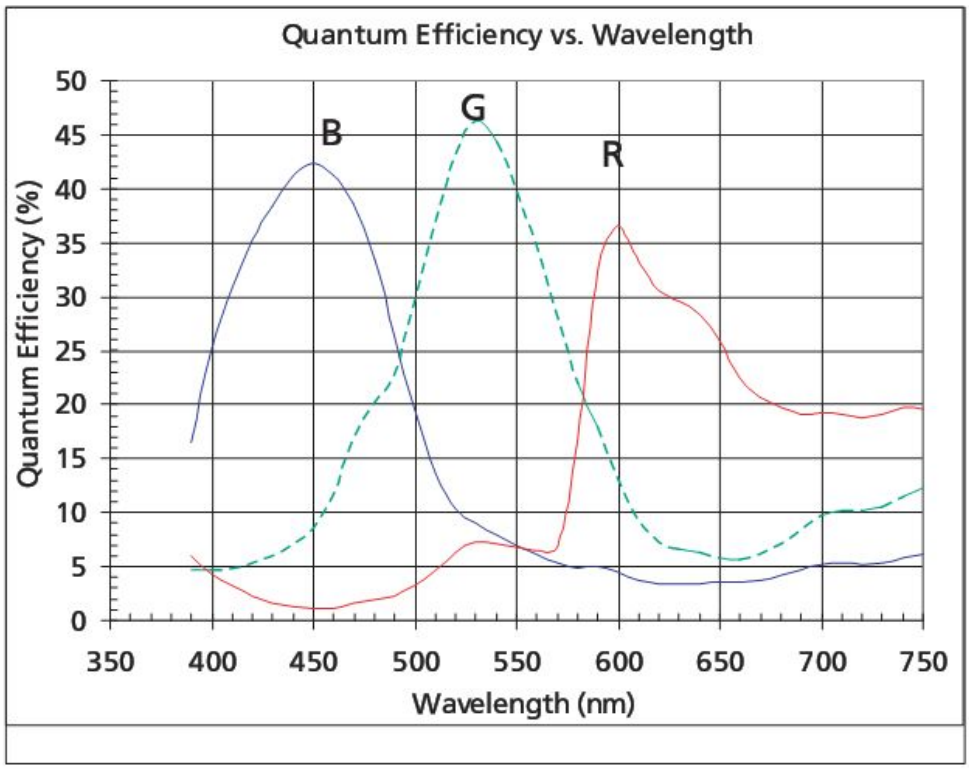


Fig 1-16 RS-A5001-GC14

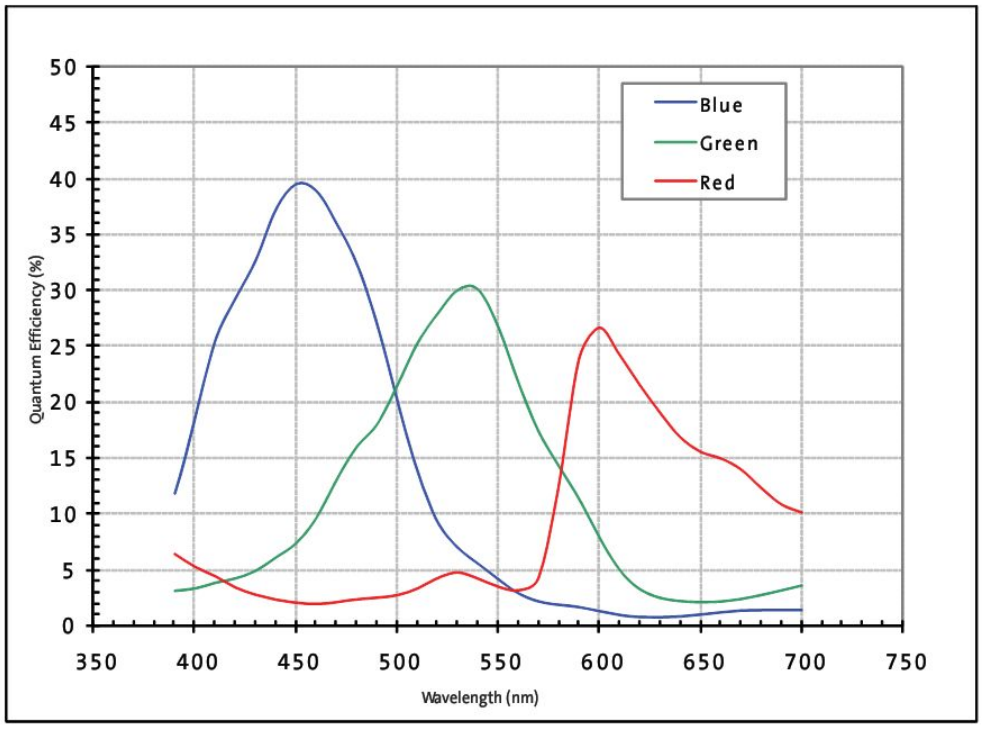


Fig 1-17 RS-A10K-GC7

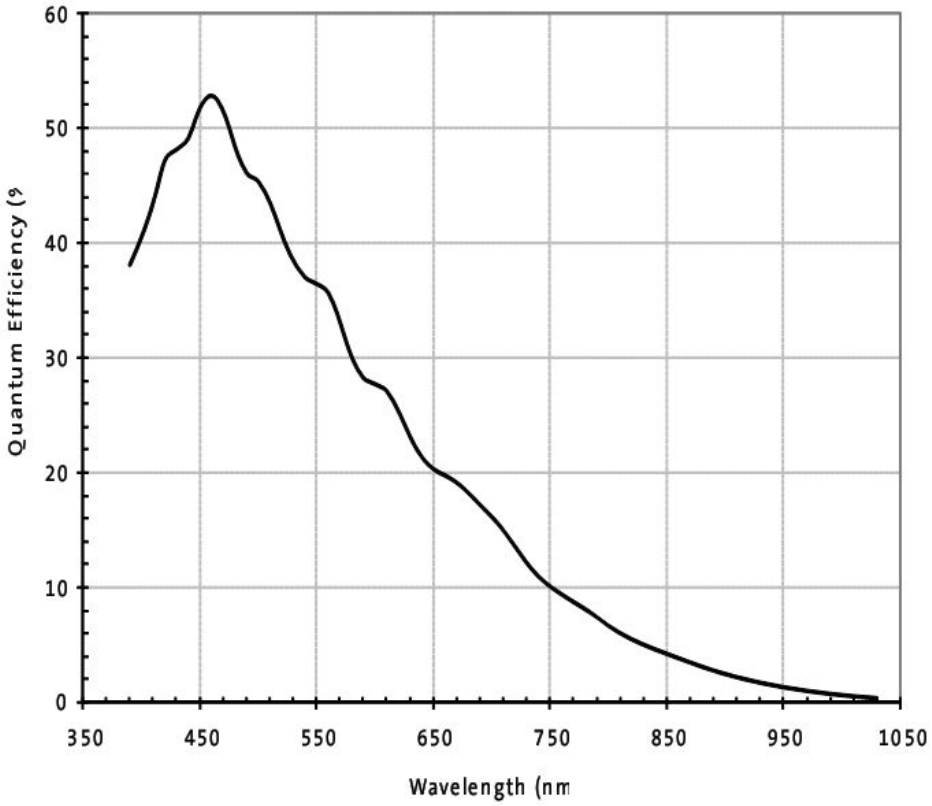


Fig 1-18 RS-A10K-GM7

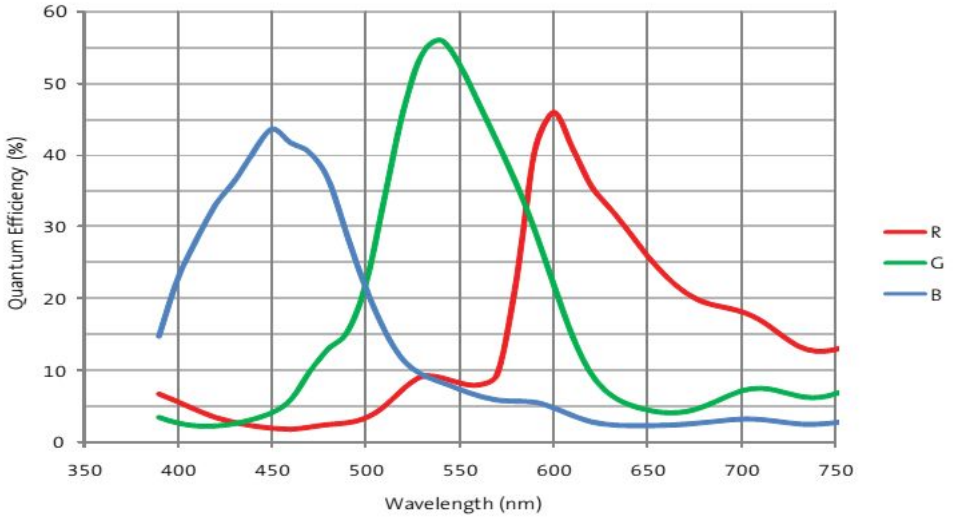


Fig 1-19 RS-A14K-GC6

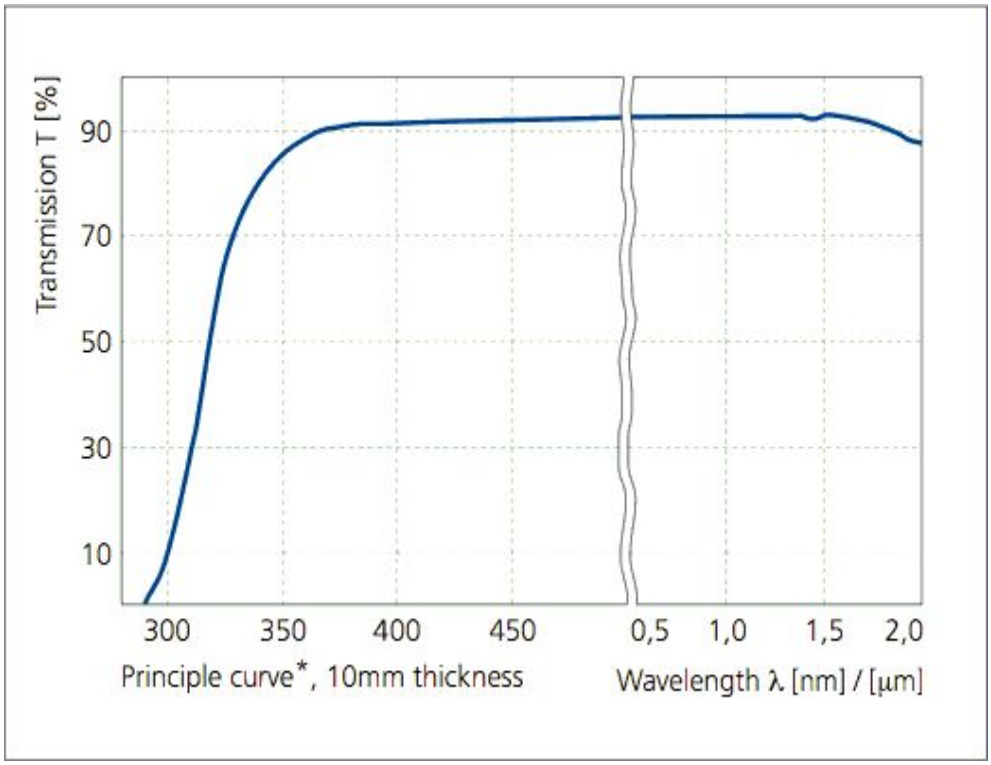


Fig 1-20 Optical Filter for Mono Models

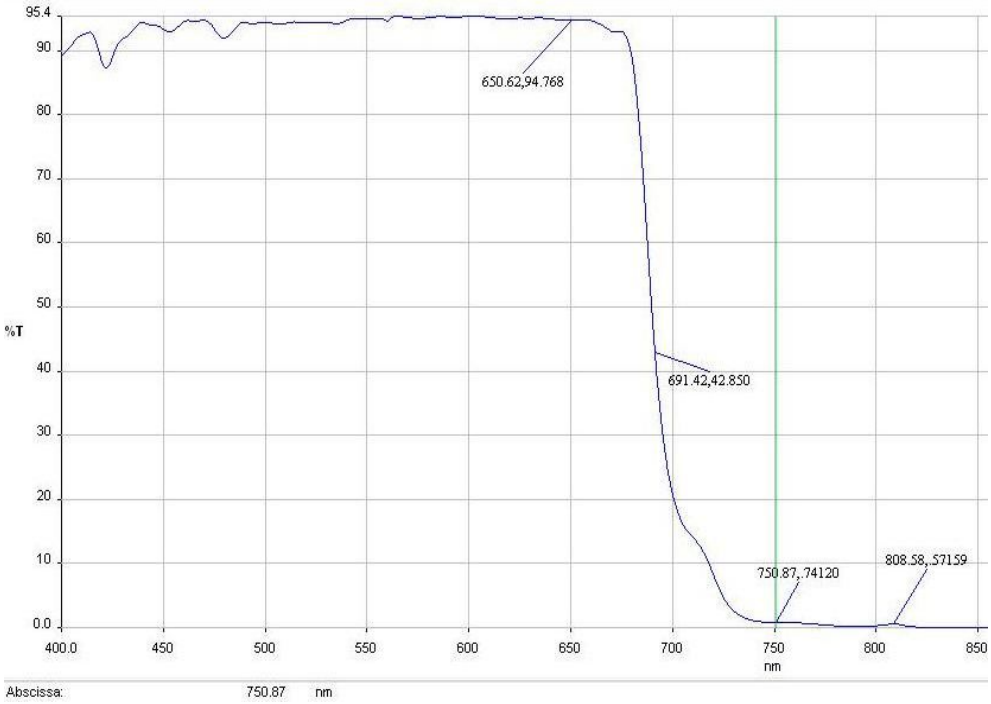


Fig 1-21 Optical Filter for Color Models

§1.4 Dimensions

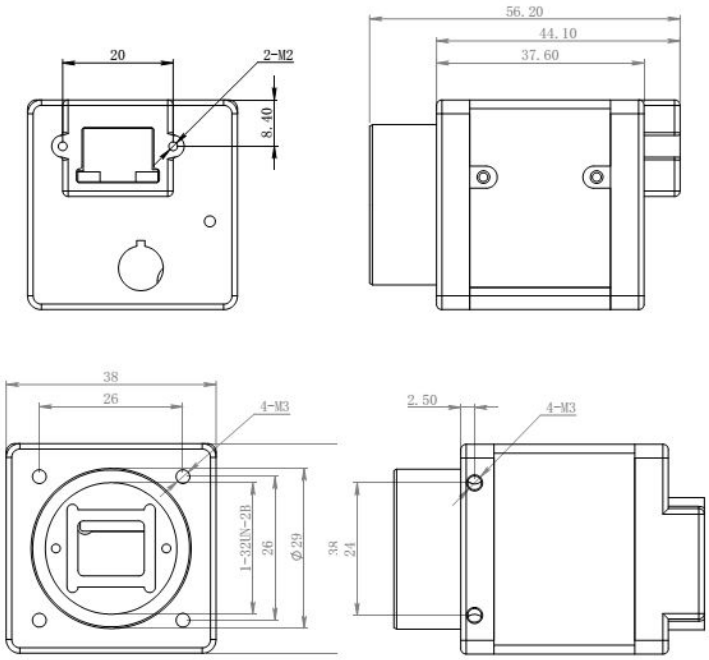


Fig 1-22 Dimensions for ROSA-GE

§2 Physical Interface

Ther are two physical connectors at the rear panel of cameras :

- RJ45 , 10M/100M/1000Mbps ethernet connector , the transfer rate is determined by the NIC configuration and the cable。 ROSA does not support POE, cameras cannot get power supply from RJ45。
- 6 place connector, used for the power supply and opto input and output。

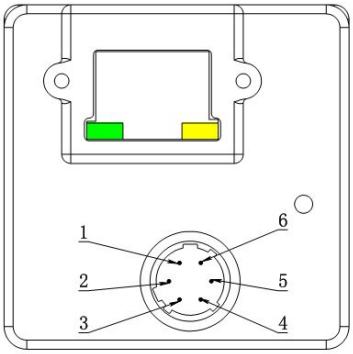


Fig 2-1 Physical Connectors

§2.1 RJ45

§2.1.1 LED on the RJ45

RJ45 has two leds, the definition is as follows:

- Left LED: Green, when the camera work under 1000M mode, this led is lighted; when work under 100M or 10M, this LED is dark.
- Right LED: Orange, when lighted, indicates that the camera works normally, and it will blink when transferring data.

§2.1.2 Cable Selection

Due to the high datarate, also for the quality of transferring and immune to EMI, we strongly recommend using the shield LAN cable, cat 5E or higher. The SSTP type shielded LAN cable is a very good choice. SSTP is a code for the shield method, every twisted signal pair is shielded by metal foil, and the 4 pairs are shielded by metal mesh. This type cable will shield the interference from outside and the crosstalk between the signal pairs.

The longer the cable and the higher bandwidth, the higher requirement for the quality of the cable. If the cable is not qualified, packets resend or packets missing will probably happen.

§2.2 IO Connector

The number of the IO connector is Hirose HR10A-7P-6S. The following table is the definition of IO connector, the "HR10A-7P-6S-OPEN-1M-02" is the accessory we supplied for ROSA-GE camera:

PIN Num	Definition	HR10A-7P-6S-OPEN-1M-02
1	12V	Orange
2	TRIG IN+	Yellow
3	NC	Pink
4	TRIG OUT+	Blue
5	TRIG IN- / TRIG OUT-	White
6	GND	Grey

Fig 2-2 Definition of IO Connector

§2.2.1 Connection of the Power Line

The DC input to ROSA is limited to 11V~13V, the recommended connection method is showed in next picture. For best performance, the shield ground of the IO connector should be connected to the AC-DC converter.

The shield ground is different from the power GND, they should not be connected together directly.

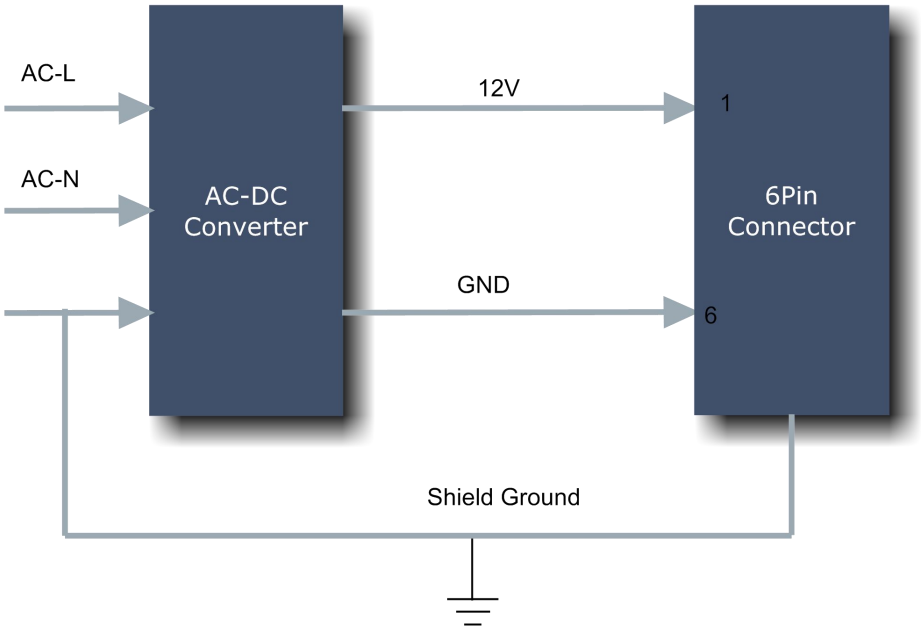


Fig 2-3 Connection Method for the Power Line

One thing should be noted here, every cable has inner resistance, if the power supply cable is too long, the DC drop on this line may make the DC power at the IO connector lower than the required 11V~13V, which will make the camera not workable. The phenomenon maybe that the RJ45 LED is not lighted. So do not use long power cable, locate the AC-DC converter near to the camera or use a low resistance cable. For best performance, use shielded cable or use the magnetic coil around the cable.

§2.2.2 Opto Trigger Input

The inner electronic schematic of the trigger input is showed as follows:

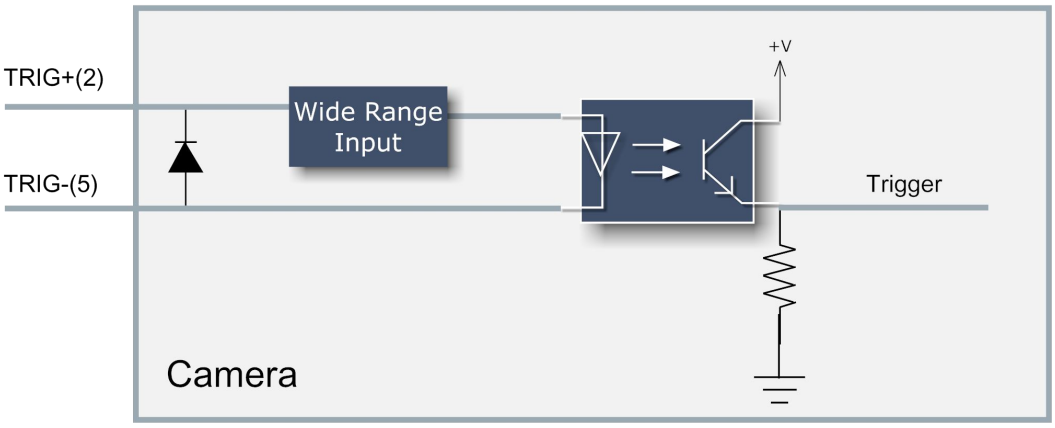


Fig 2-4 Opto Trigger Input

The acceptable level for the opto trigger input is 0~30V. There is a wide range input circuit inside, it make the camera suitable for wide range application. The next table shows reaction of the input circuit to the input level. Be sure to use a reliable level for the input signal.

Input Level	Note
0~24V	Recommended input range
<1.5V	Trigger is low
1.5V~3V	Unstable level, the trigger maybe low, maybe high
>3V	Trigger is high
30V	Maximum level, do not exceed it

Fig 2-5 Range of the Opto Input

§2.2.2.1 Connection Method-1

For signals like TTL or RS485/422, connect the trigger to camera like this:

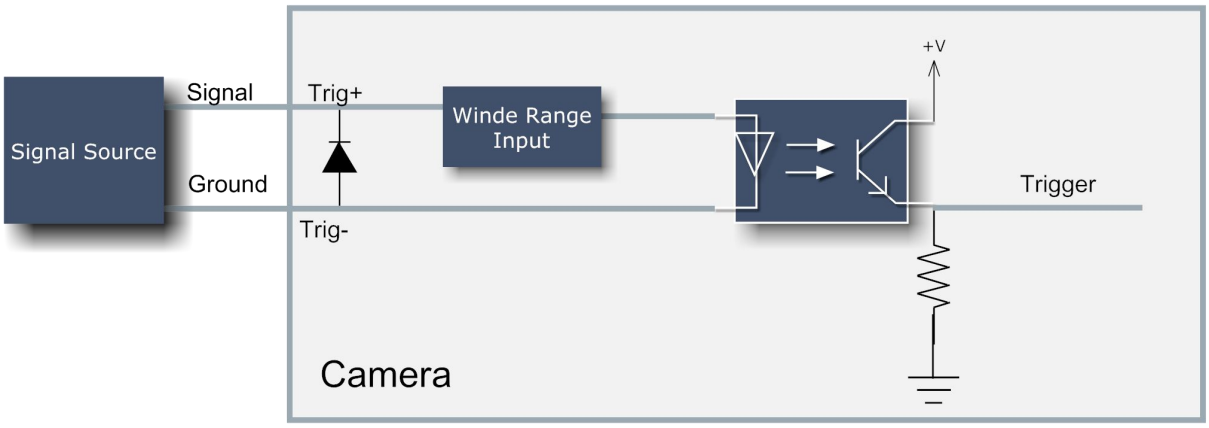


Fig 2-6 Connection Method-1

§2.2.2.2 Connection Method-2

For switch type signals, the opto, PLC etc, connect it like this:

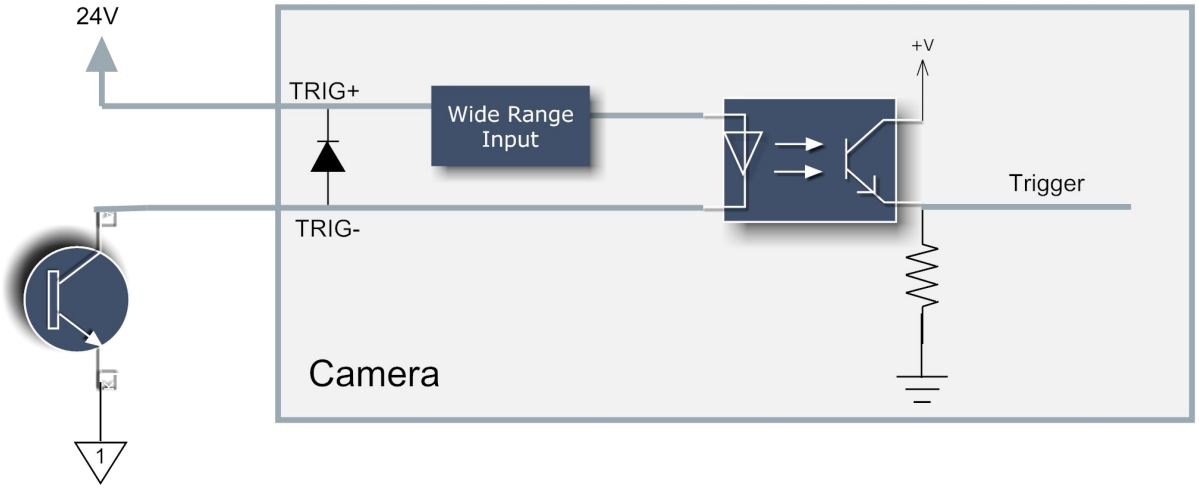


Fig 2-7 Connection Method-2

§2.2.2.3 Delay of the Trigger Signal

The main part of the input circuit is the opto coupler, it will induce an delay to the signal. The "Signal In" is the external input line, the "Signal Out" is the converted signal used by internal circuit, output of the opto coupler. From close to

open, there is a 2~4us delay inside the coupler; from open to close, there is a 7~60us delay.

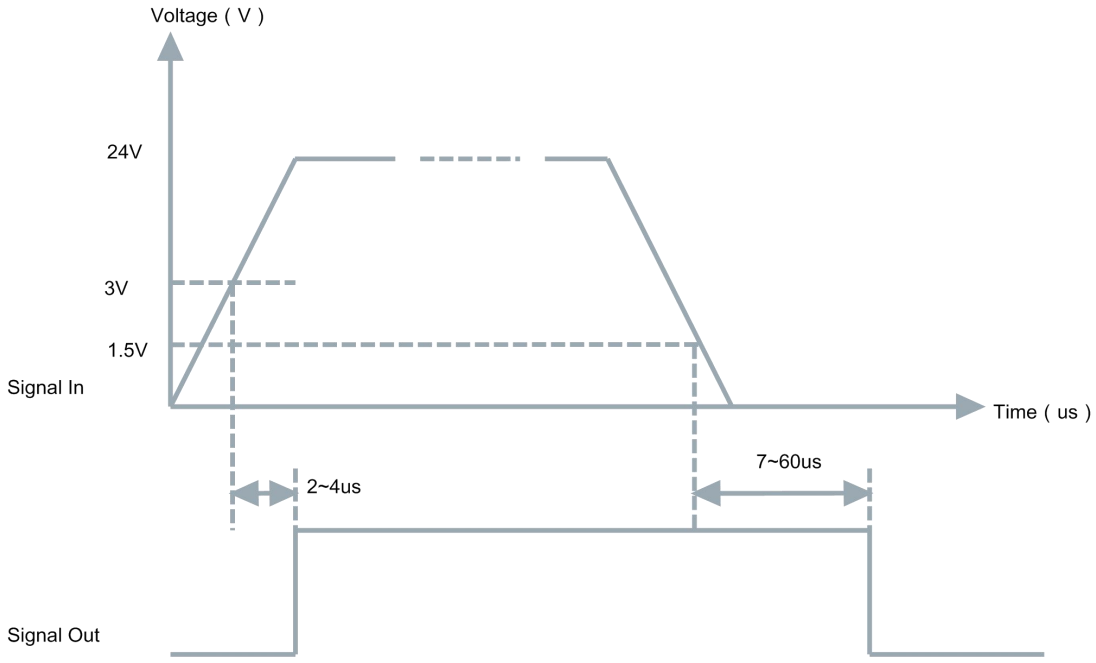


Fig 2-8 Delay Induced by Coupler

§2.2.3 Opto User Output

User can choose from one of some internal signals and route it to the opto user output. This signal has invert control, mask control. Pay attention to the connection method of the signal to the output coupler, when high, the opto coupler is close; when low, the opto coupler is open.

The line out signal can be chosen from:

- Flash：Flash signal comes from image sensor for synchronizing the bulb
- Trigger In：The signal is the debounced external trigger in
- Frame Trig :The delayed、pulse width controlled signal for the image sensor

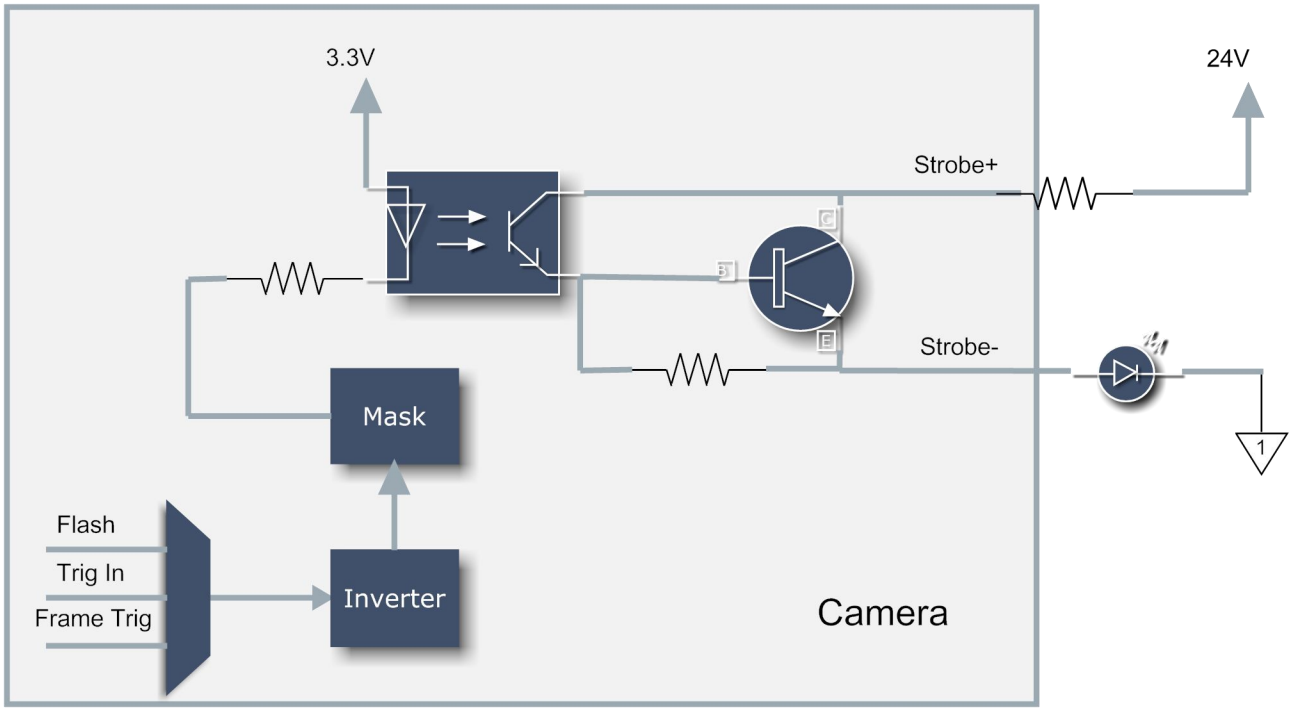


Fig 2-9 Output Signal Control

Pay attention to the open and close time of the opto coupler（§2.2.2.3） when use the opto trigger output. If the pulse width is not big enough to open the coupler, or the pulse period is less than the coupler’s close time plus open time, the output signal will not work normally.

The maximum output current of opto output signal is 20mA, and the maximum voltage is 30V, an external resistor maybe needed. Calculate the value of the resistor as follows(v is the drop across the bulb):

$$R \geq \frac{V_{DD} - 1.5 - v}{0.02}\Omega \ , \ V_{DD} < 30V$$

§2.2.5 Warning

Opto trigger in and opto trigger out use the same common pin, this will not make user input and output totally isolated.

§3 Software Environment

This chapter describe the driver and runtime environment, refer to the SDK’s user manual for more info.

§3.1 SDK and Driver

The SDK for ROSA-GE camera support following OS:

- Windows XP SP2/SP3
- Windows Vista SP1
- Windows 7
- Windows Server 2003 SP2
- Windows Server 2008
- Windows 8 / 8.1
- Windows CE 6.0
- Linux (Red Hat / Ubuntu / OpenSUSE) *
- Mac OS 10.9.4*

*Contact Microview for further support。

The Demo program and source code for operating the camera are available after the installation of the SDK.

The drivers can be installed by run the EbDriverTool.exe from start menu/Microview/MVGESDK32(64)/Tool, there are two type drivers:

- Manufacture Driver -- NIC’s driver
- eBUS Universal Pro Driver -- High performance driver for all NIC

We recommend using eBUS Universal Pro driver for low CPU usage and high performance of data transferring.

For SDK later than 20140509, it will install the eBUS driver for all the NICs automatically, use the EbDriverTool.exe to modify the installation manually.

§3.2 Download and Update SDK

The following download link is the SDK for Windows OS, for other OS support, contact Microview.

http://www.microview.com.cn/download/drivers/MVGESDK_V1.1.1.1_BIT32.zip

http://www.microview.com.cn/download/drivers/MVGESDK_V1.1.1.1_BIT64.zip

There is a “MVGESDKUpdate.exe” under the installed directory, if the PC has internet connection, run it to update to the most updated version.

§3.3 Third Party SDK and Driver

ROSA-GE cameras can work with 3rd party SDK and drivers that compliant to GigE Vision specification. The following 3rd party SDK and drivers have been verified that can work with ROSA-GE cameras:

- Pleora eBUS SDK 2.0 and higher
- NI Labview 2011 and higher

- Cognex VisionPro 8.1 and higher
- JAI SDK 1.3 and higher
- Dalsa Sapera Camera SDK 7.30 and higher

§3.4 Compatibility Concerns

There maybe compatibility problems if different manufactures' SDKs are installed on one PC, or multiple different manufactures' services are enabled for one NIC. We recommend the following operating sequence if want to use other manufacture's SDK and driver:

- Uninstall all other manufactures' GigE Vision SDK and drivers
- Install Microview's SDK and drivers
- Operate the ROSA-GE cameras and get familiar with it
- Uninstall Microview's SDK and install other manufacture's
- Make sure only one suit SDK and driver is installed

§4 Function of Camera

§4.1 Work Mode

All models have two work mode: free run and external synchronization.

§4.1.1 Global Shutter(GS) and Electronic Rolling Shutter(ERS)

For a sensor with global shutter, all the pixels will start and end exposure coincidentally. After the exposure sequence, image will be output from the top-left corner of the sensor, during the output sequence, all the pixel will not react to light. Model with GS is suitable to snapshot fast moving object. The next pic shows the exposure and readout sequence of GS sensor.

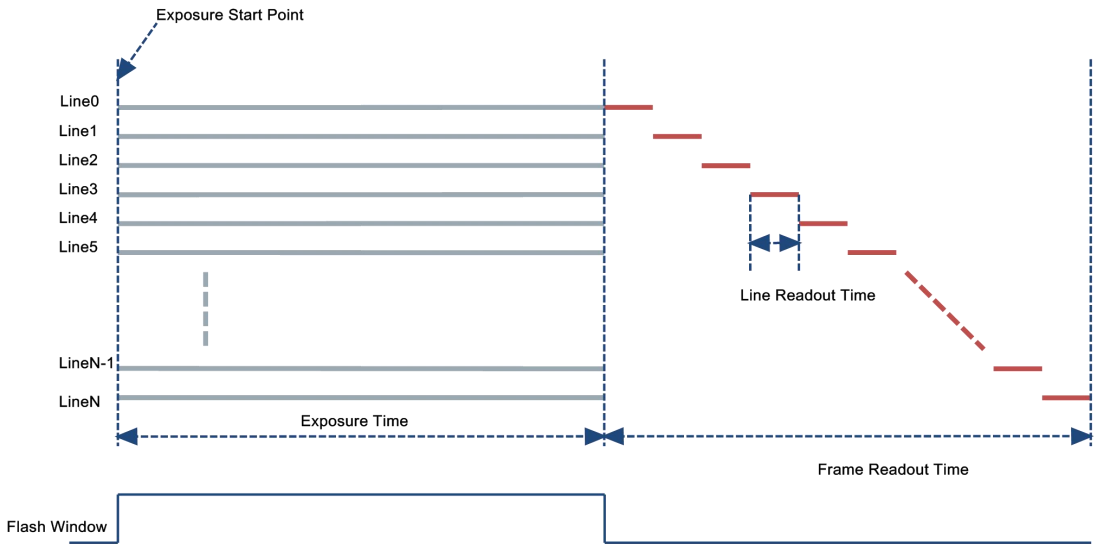


Fig 4-1 Exposure-Read of GS Sensor

Sensor with electronic rolling shutter works in another way. When get a external trigger signal, it will start exposing from the first line, when reaching the exposure time, the line will be readout. The exposure sequence is in a row by row manner, ie not all the pixels expose at the same time, so the image will be distorted if the object move quickly during the exposure sequence.

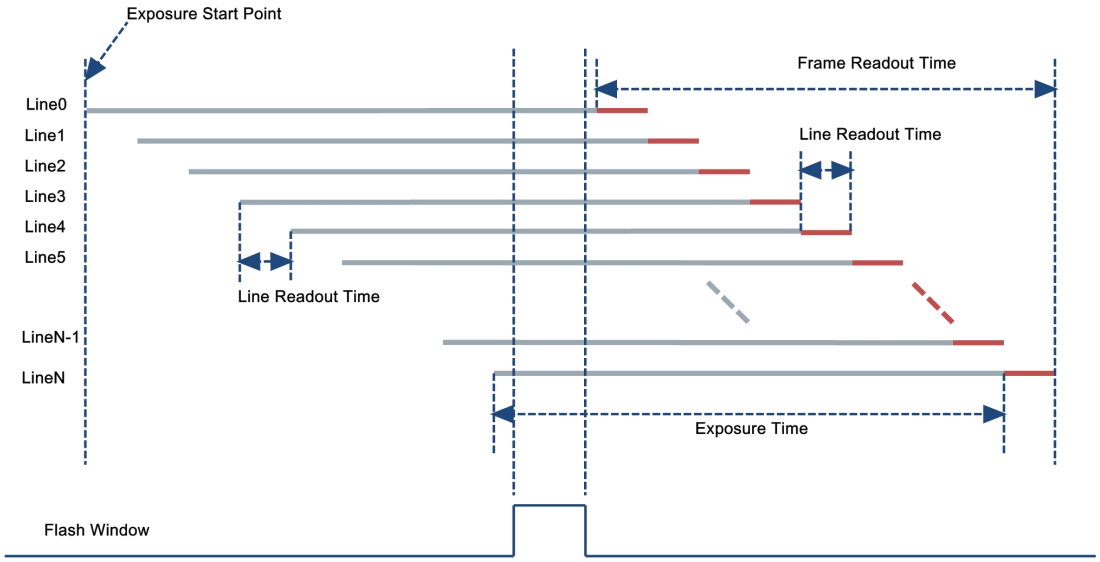


Fig 4-2 Exposure-Read of ERS Sensor

§4.1.2 Trigger Control

When working under asynchronous mode, the image sensor can accept trigger signal to start the exposure and readout sequence. The next pic shows how the external trigger signals is handled by camera:

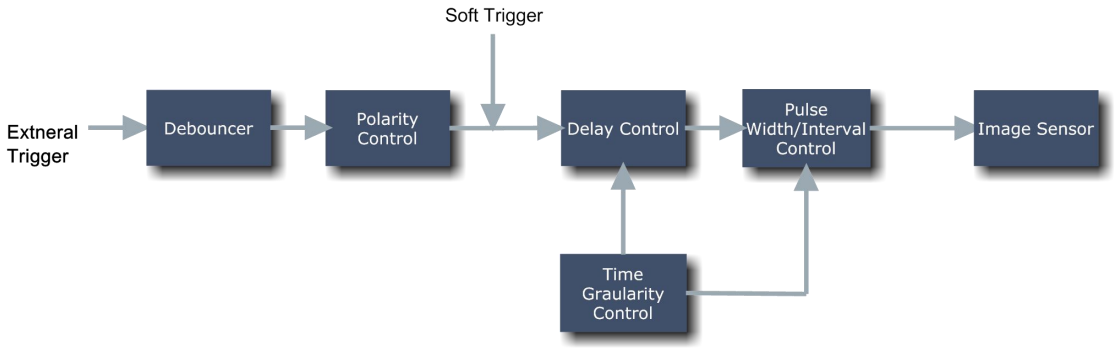


Fig 4-3 Processing Sequence of the External Trigger Signal

§4.1.2.1 去抖动

The debouncer can help to filter the invalid noisy、glitchy external signal, the debouncer value is the minimum duration time of an external signal to be high or low. Setting the debouncer value to the maximum possible width of the invalid signal will help to mask out all the invalid signals. Otherwise, a too small debouncer value will let the invalid signal pass and a too large value will reject some valid signals.

Due the valid window, a delay equals the debouncer value is induced to the input signal, but the width of the signal will not be changed.

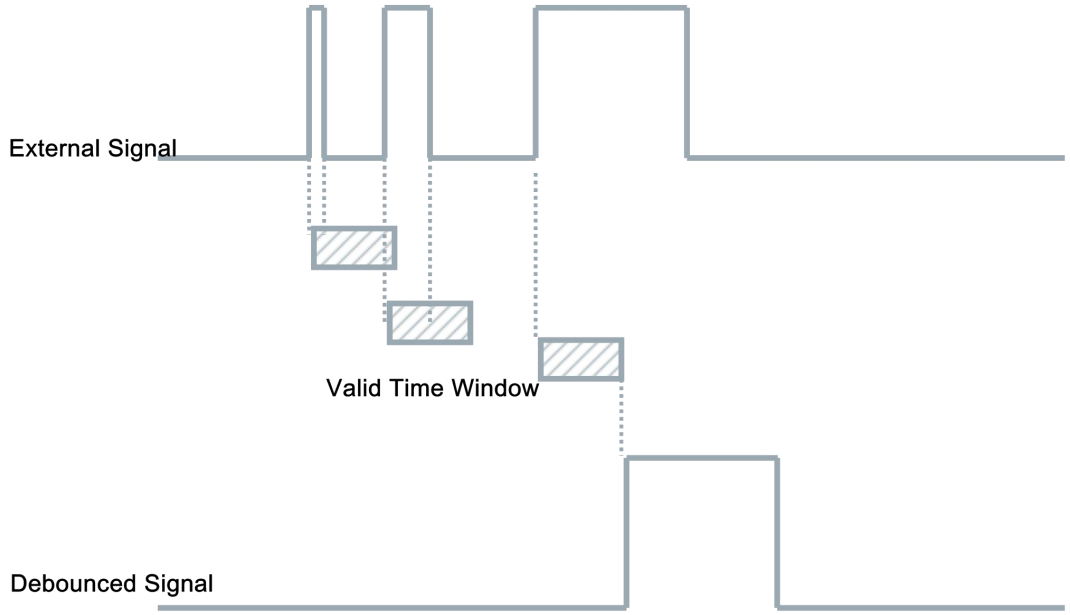


Fig 4-4 Debouncer Illustration

§4.1.2.2 Polarity Control

The active edge of the external trigger signal can be selected through camera API, either rising edge or falling edge can be used to synchronize the image sensor.

§4.1.2.3 Time Granularity Control

4 level time granularity(1us, 10us, 100us, 1000us) can be selected for the delay、pulse width control for some internal signals: the internal trigger and flash.

For example, if the pulse width is set to 20, and the time granularity is set to 10us, then the actual width is 200us. The following parameters can take advantage of this:

- Delay of external trigger

- Internal trigger pulse width
- Interval of multiple trigger
- Flash pulse width
- Delay of flash

§4.1.2.4 Delay, Pulse Width, Interval, Multiple Trig

ROSA-GE cameras can capture multiple images when triggered once from external trigger or software trigger. The delay to the debounced trigger, the pulse width and the interval between internal triggers can be set through API. The next pic shows 3 times trigger when receive one external trigger.

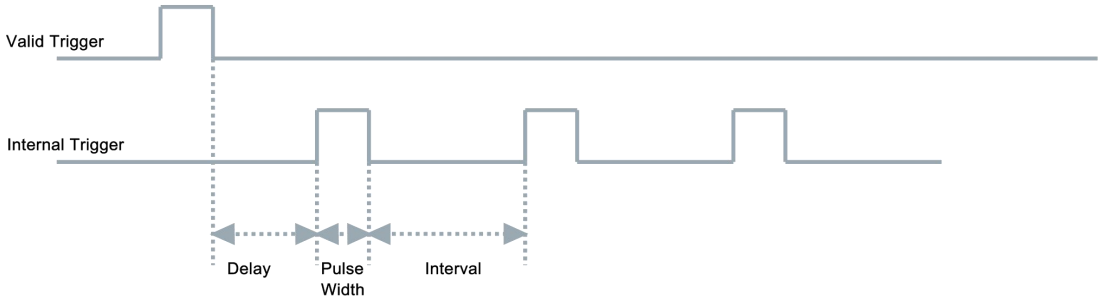


Fig 4-5 Illustration of Multiple Trig

If the multiple trigger interval is less than "exposure+readout", some triggers will be missed, the final images captured will be less than the multiple trigger number.

§4.1.2.5 Software Trigger

In addition to the external trigger, user can use software to trigger the image sensor. The software trigger signal is sent from PC to camera through ethernet

packets, so the delay is not fixed and may vary with the CPU load, OS type, NIC, driver performance etc.

§4.2 Data Type

§4.2.1 Definition of Different Data Type

- Bayer：This is the raw data output from most color image sensor, all the color data type, for example the RGB, YUV, all come from this type of data, so we introduce this type first and you should get a basic knowledge of it. There is a filter known as the Bayer filter exist on the surface of color image sensor, through this filter, only one color can reach the pixel under it. The pattern repeats every 2x2 region. The naming of the pattern comes from the first and the second pixel: GR, RG, BG, GB.

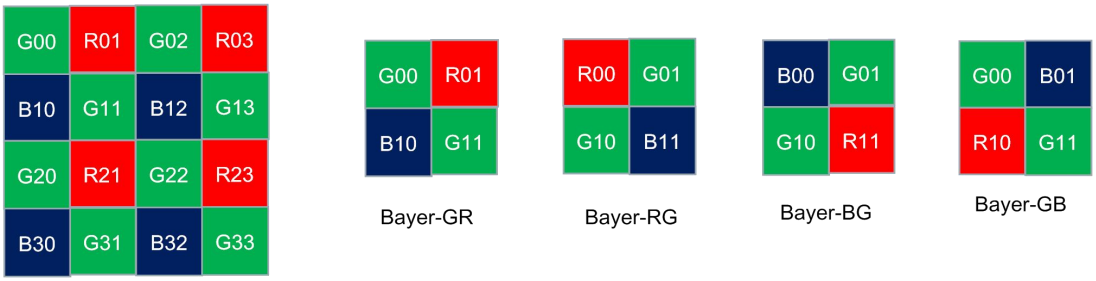


Fig 5-6 Bayer Data

- Mono

The mono type data only has the gray scale value, no color info in it. For the color type model, the mono data comes from the R/G/B data.

- RGB

Only the color models have this type of data, and it comes from the interpolation of the bayer data, ROSA-GE camera only support 8 bit width RGB data. There are two arrangement methods of the R, G, B channels, R-G-B or B-G-R, the value of individual channel is the same, only the arrangement sequence is different. Different OS or PC can take advantage of such division.

- YUV

This type of data is calculated from RGB through a matrix multiply operation, and the matrix is standard. Y represents the luminance, and the color info embeds in the U, V channels. There are many different subsample methods to the U, V channel: YUV444, YUV422, YUV411, the next table illustrates the data types supported by different models.

型号	Bayer8	Bayer10	Bayer12	Mono8	Mono10	Mono12	BGR8/RGB8	YUV444/422/411
RS-A361-GC60/100	√	√		√	√		√	√
RS-A361-GM60/100				√	√			
RS-A363-GC150	√	√		√	√		√	√
RS-A363-GM150				√	√			
RS-A1000-GM30				√	√			
RS-A1300-GC60	√	√		√	√		√	√
RS-A1300-GM60				√	√			
RS-A1500-GM60 NIR				√	√			
RS-A2300-GC50/60	√	√		√	√		√	√
RS-A2300-GM50/60				√	√			
RS-A5001-GC14	√		√	√		√	√	√
RS-A5001-GM14				√		√		
RS-A10K-GC7	√		√	√		√	√	√
RS-A10K-GM7				√		√		
RS-A14K-GC7	√		√	√		√	√	√

Fig 4-7 Data Types Supported

§4.2.2 Bayer8

Bayer8 is 8bit bayer type data and it originates from 10bit or 12bit raw data through LUT or slide window. The arrangement of the bayer8 data is as follows, Bytex represents the number of data in byte, Px is the number of pixel.

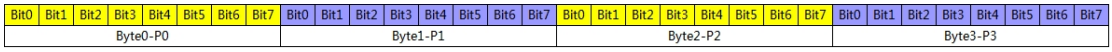


Fig 4-8 Bayer8 Data Arrangement

§4.2.3 Bayer10 , Bayer10-P

Bayer10 and Bayer10-P(Bayer10 Packed) are the 10 bit bayer data, the Bayer10-P is a bandwith saving arrangement of the 10 bit bayer data, it packed 2 pixel data into 3 bytes while the unpacked way will cost 4 bytes, this will save 25% bandwidth.

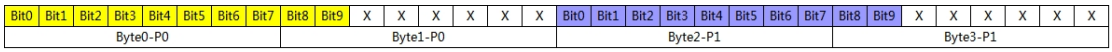


Fig 4-9 Bayer10 Data

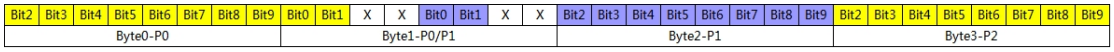


Fig 4-10 Bayer10-P Data

§4.2.4 Bayer12 , Bayer12-P

Similar to Bayer10 and Bayer10-P, every pixel will occupy 2 bytes when in Bayer12 mode and 2 pixels occupy 3 bytes.

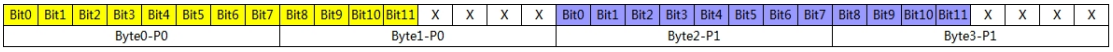


Fig 4-11 Bayer12 Data

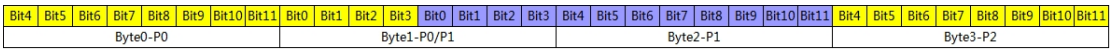


Fig 4-12 Bayer12-P Data

§4.2.5 Mono Data

Either the mono model or the color model has mono data, and also 8bit, 10bit, 12bit width variants, the arrangement method is the same with the corresponding bayer data.

§4.2.6 BGR8-P / RGB8-P

Color model has 24bit RGB data, every pixel occupy 3 bytes for the 3 channels, the unpacked RGB consumes 4 bytes for one pixel.

Fig 4-13 BGR8-P Data

Fig 4-14 RGB8-P Data

§4.2.7 YUV444-P

The YUV444-P is 24bit width, every pixel has its own 8 bit Y, U, V data.

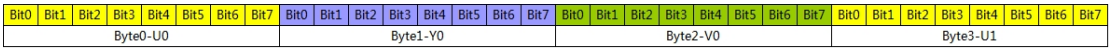


Fig 4-15 YUV444-P Data

§4.2.8 YUV422-P

Different from YUV444, when in YUV422, every consequent two pixels share the same U and Y data, and has its own Y data, this saves 33% bandwidth.

Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7
Byte0-U0								Byte1-Y0								Byte2-V0								Byte3-Y1							
Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7
Byte4-U2								Byte5-Y2								Byte6-V2								Byte7-Y3							

Fig 4-16　YUV422-P(UYVY) Data

§4.2.9 YUV411-P

If subsampling the U, V data in a 4:1 manner from YUV444, every consequent 4 pixel share one U, V, this is the YUV411 type, saves 50% bandwidth compare to YUV444. The next pic shows the data arrangement of YUV411, for pixel 0~3, every pixel has a Y value, Y0~Y3, while they all use pixel0’ s U, V.

Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7
Byte0-U0								Byte1-Y0								Byte2-Y1								Byte3-V0							
Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7
Byte4-Y2								Byte5-Y3								Byte6-U4								Byte7-Y4							

Fig 4-17　YUV411-P(UYYVYY) Data

§4.3 Image Data Processing

User can take advantage of the multiple on board image processing modules in ROSA-GE camera. The next pic shows the image processing flow for both color and mono models.

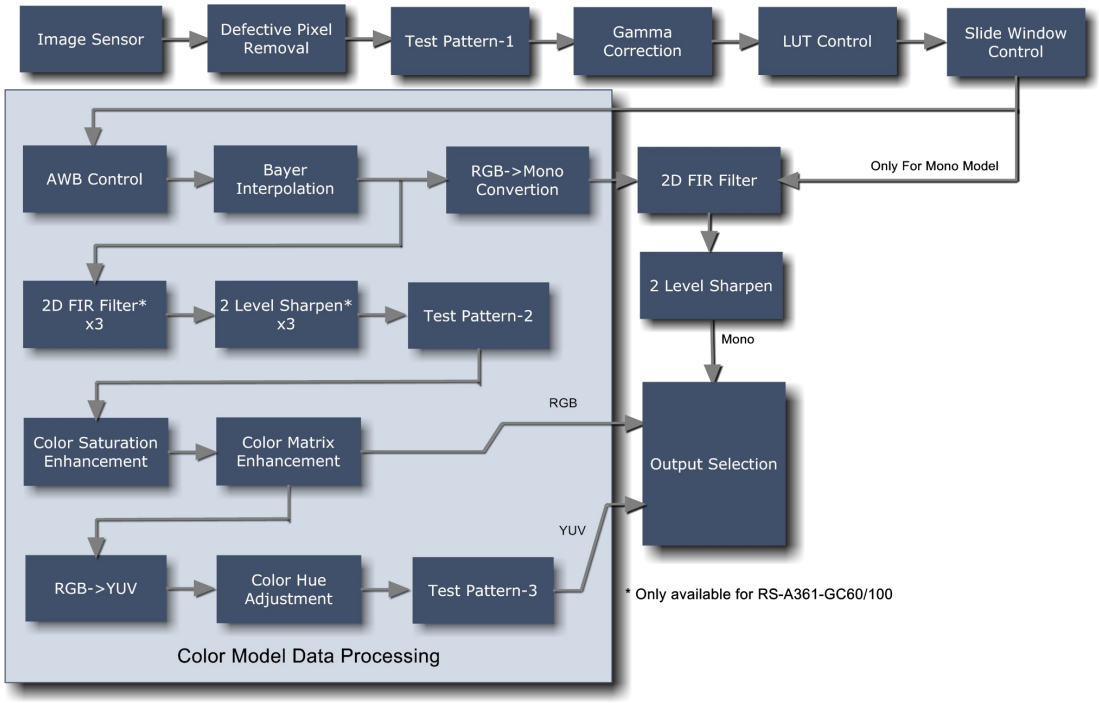


Fig 4-18 Image Processing Flow

§4.3.1 Defect Pixel Removal

Every image sensor has some abnormal pixels, the response of those pixels is not on the same level compared to others, they are the defect pixels. This phenomenon cannot be avoided, this apply to every manufacture, exists in the manufacturing process. Those defect pixels are either too white or too dark.

During the manufacturing of the camera, all the defect pixels are detected and the location of them are stored in the on board flash, the defect pixel will be filtered out by using the neighbor pixels.

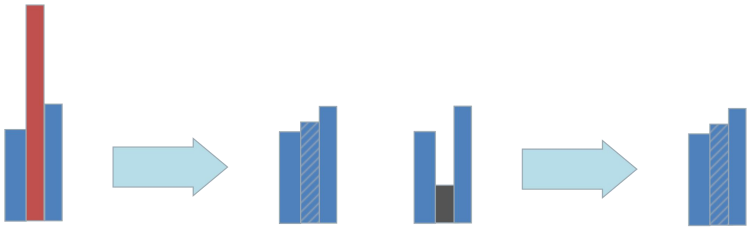


Fig 4-19 Defect Pixel Removal

§4.3.2 TestPattern

There are 3 places in the image processing flow where the testpattern can be inserted into. TestPattern-1 is diagonal fixed or moving gray scale, for 10 bit models, the following patterns are supported:

- 8 bit fixed diagonal gray scale
- 8 bit moving diagonal gray scale
- 10 bit fixed diagonal gray scale
- 10 bit moving diagonal gray scale

12 bit models support following patterns:

- 8 bit fixed diagonal gray scale
- 8 bit moving diagonal gray scale
- 12 bit fixed diagonal gray scale
- 12 bit moving diagonal gray scale

Color models also have TestPattern-2 and TestPattern-3 options. TestPattern-2 is RGB moving diagonal grey scale and TestPattern-3 is YUV format color bar.

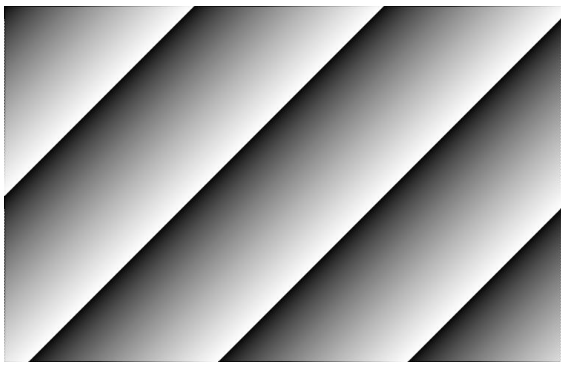


Fig 4-20 TestPattern-1 8bit Diagonal Gray Scale

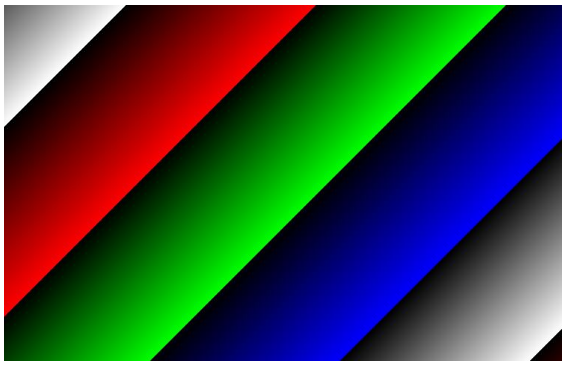


Fig 4-21 TestPattern-2 RGB Moving Diagonal Grey Scale

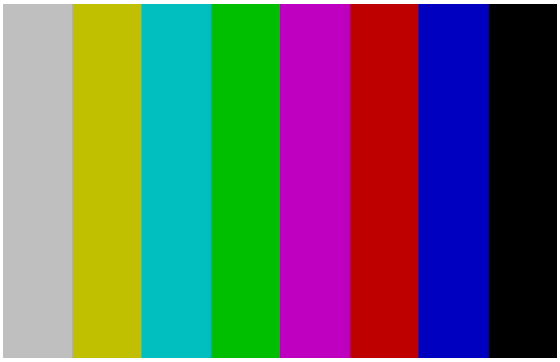


Fig 4-22 TestPattern-3 YUV Color Bar

§4.3.3 Gamma Correction

Gamma correction is used to correct the nonlinearity response of monitor or human eye, the adjustment range is from 0.5 to 2.5, the data is calculated as follows:

$$Y_{out} = X_{\max} * (\frac{X_{in}}{X_{\max}})^{\frac{1}{\gamma}}$$

X_{in} is the uncorrected data input, and $X_{\max}$ is the maximum value (1023 for 10 bit model and 4095 for 12 bit model) , γ is the correction value, can be set by user through API.

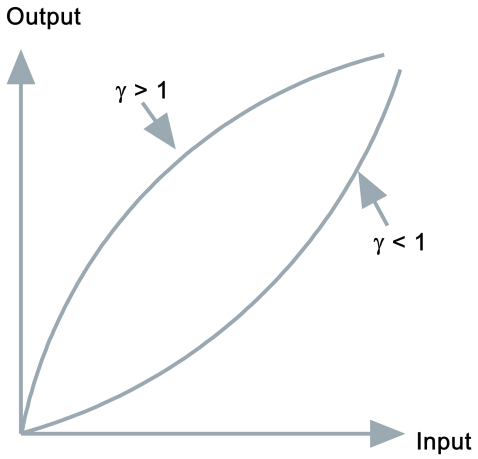


Fig 4-23 Gamma Correction Curve

§4.3.4 LUT (Lookup Table)

All models have one 12 bit input and 12 bit output LUT, user can modify every individual value in the LUT, either the 12 bit model or the 10 bit model.

For 12 bit model, the gray scale range is 0~4095, it use all the 12 bit, and the output data is also 12 bit; while for the 10 bit model, the gray value range from 0 to 1023, the most least 2 bit of the input is left to be zero, when fill the LUT manually, only the 0, 4, 8, ... 4092 is valid. The least 2 bits of the output are invalid for 10 bit -10 bit conversion.

When the LUT is disabled, the output equals the input ,like below:

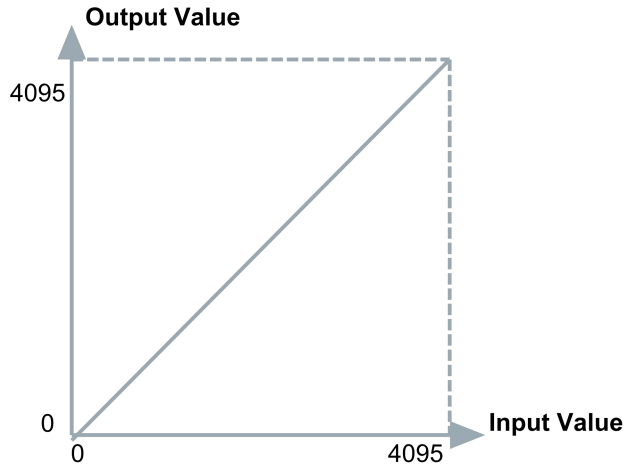


Fig 4-24 LUT is Disabled

User can fill the LUT with customized curve, the curve showed below is one typical curve that make the dark area of the image to be brighter than before.

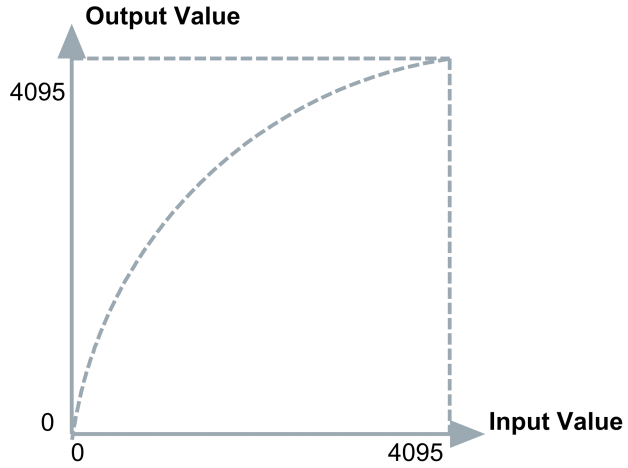


Fig 4-25 LUT Curve that Lighten the Dark Area

User can also use the LUT to perform 12 bit - 8bit convertion.

There are up to 2 LUT can be stored in flash, it can be loaded at power up through user set control.

§4.3.5 Slide Window

Slide window processing is a simple LUT, it cut a specific range of the scale from

the full range, 0~4095 or 0~1023. When cut 10 bit or 12 bit data to 8 bit, 10 bit model has 3 types and 12 bit has 5 types.

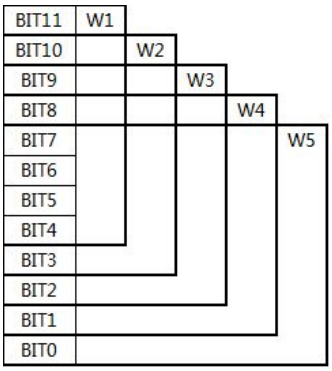


Fig 4-25 Slide Window Processing

The next pic is the comparison of slide window and LUT to convert 12 bit to 8 bit. The LUT compact 0~4095 to 0~255, while the slide window processing is one kind of subsampling, as for the W2, the input range is from 0~4095, all the value higher than 2048 will be converted to 255, from 0~2047 is subsampled by 8:1.

The following pseudo code shows how W2 is performed.

```
//RawIn is input data , 12Bit , RawOut is output data , 8Bit
    if(RawIn & 0x800)
        RawOut = 255;
    else
        RawOut = (RawIn >> 3)&0xff;
```

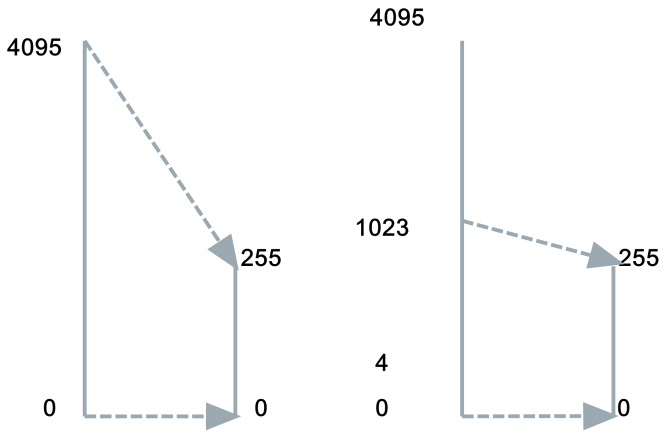


Fig 4-26 LUT and Slide Window

§4.3.6 White Balance

All color models come with white balance function which take place before the bayer interpolation, so this balance function will effect on all the color data outputs. Camera can calculate the balance factors and user can also set those manually. The factors can be stored in user set.

Two steps needed to do the white balance, first, set the ROI for white balance, second step, camera start to do white balance once. The balance factors will be applied to the bayer data to achive R:G:B=1:1:1.

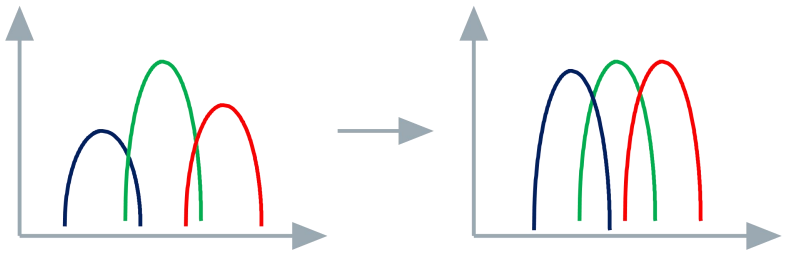


Fig 4-27 White Balance

To achieve a good balance result, do not make the image with too dark or over exposure region.

§4.3.7 Bayer Interpolation

As discussed previously, in the bayer format, every pixel only has one channel of the R, G, B data, the interpolation operation creates the other two channels data.

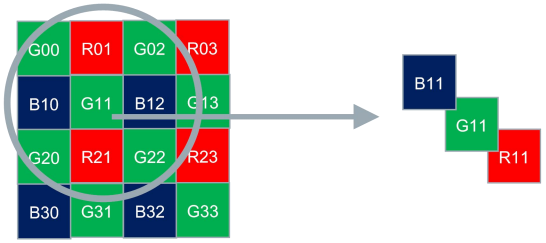


Fig 4-28 Bayer Interpolation

If the image is flipped horizontally or vertically, the bayer pattern maybe changed.

§4.3.8 RGB-Mono Conversion

Mono data can be got from the R, G ,B data through the next formula:

$$Y_{mono} = \frac{R}{4} + \frac{G}{2} + \frac{B}{4}$$

§4.3.9 2D Filter

There one 2D filtering module in camera, the filtering mode can be selected between 3*3 gaussian and median filter.

For color models except RS-A361-GC60, the filter is only applied to mono data, RS-A361-GC60 can use the filter on R, G, B channels.

The gaussian filter work well with the random white noise, for example the noise caused by temperature, but it will make the edge blurring, enable the sharpen filter can improve it.

§4.3.10 Sharpness

ROSA-GE support sharpness filter to reduce blurring at image edges, the

sharpness filter has two levels. The sharpness filter will induce more noise.

All the models place the sharpness filter after 2D filter, RS-A361-GC60 can use the filter on R, G, B channels.

§4.3.11 Image Enhancement

Hue and saturation adjustment are applicable to color models only, and hue adjustment only affects the YUV data and saturation only affects the R, G, B data, since YUV comes from RGB, so the saturation is also effective to YUV. Bayer data cannot take the advantage of this image enhancement functionality.

Range of saturation is 0~511, value applied to image data is 0~4; hue' s adjustment range is 0~63, and the actual adjustment value is -32°~32°.

User can enable or disable the hue and saturation adjustment.

§4.3.12 Color Matrix

Color matrix transformation is only applicable to RGB data of color models. The objective of it is to correct to the color distortion caused by lighting. The factors of the matrix is user adjustable:

$$\begin{bmatrix} R' \\ G' \\ B' \end{bmatrix} = \begin{bmatrix} R \\ G \\ B \end{bmatrix} * \begin{bmatrix} g00, g01, g02 \\ g10, g11, g12 \\ g20, g21, g22 \end{bmatrix} + \begin{bmatrix} ofst0 \\ ofst1 \\ ofst2 \end{bmatrix}$$

The R, G, B is the input data，R', G', B' is the corrected data，$g00 \sim g22$ are the adjustment factors，$ofst0 \sim ofst2$ are the offset values.

The gain value that user can be set range from 0 to 511, the corresponding abs

matrix factors are -4~4, that is $(x-256)/4$; and the offset that user can set is 0~511, the matrix offset value is -256~255, that is $x-256$; x is the value users set through API.

The color matrix function can be enabled or disabled by API.

§4.3.13 RGB->YUV

Conversion from RGB color space to YUV space is done by a matrix, and the factors are standard.

$$\begin{bmatrix} Y \\ U \\ V \end{bmatrix} = \begin{bmatrix} 0.299 & 0.587 & 0.114 \\ -0.169 & -0.332 & 0.5 \\ 0.5 & -0.419 & -0.081 \end{bmatrix} * \begin{bmatrix} R \\ G \\ B \end{bmatrix} + \begin{bmatrix} 0 \\ 128 \\ 128 \end{bmatrix}$$

§4.4 Exposure Time Adjustment

User can choose to set the exposure time by Raw or by Abs way. The raw time is related to image sensor, generally it is counted by row time; the abs exposure time is counted by "us". User can set the integration time in either way, the camera will convert raw time to abs time and vice versa.

§4.5 Frame Rate Adjustment

This function is only applicable to free run mode for all models, can not use this function under trigger mode.

User can set the capturing frame rate through API, the value is in Hertz. When the bandwidth exceed 1Gbps, for example transferring the RGB or YUV data for

some models, the data rate maybe 2 times or even more than the Gigbit ethernet can handle, lower the frame rate will solve the bad frames or frame buffer overflow problem.

The frame rate adjustment will not change the image intensity.

§4.6 Temperature

The housing temperature cannot be higher than 50℃, otherwise may damage it. User can read the internal temperature through API, the internal temperature is 25℃ higher than the housing, never let it over than 75℃.

§4.7 Parameters Set

Parameters set is a group of values that used to run the camera, there are 3 types of parameters set: factory set, user set and default set.

The factory set is a group of parameters, they are stored in no-volatile flash memory and cannot be changed bu user. It is the parameter set that user can always turn back to.

User set is a group of parameters that user has made customized adjustment to the camera; there are three groups that user can store in the flash memory.

Default set is the one which the camera will load from flash at power up, it can be anyone of the factory set, three user sets.

The pseudo code shows how to load and save parameter set.

```
//Load factory set
Camera.UserSet.LoadFactory.Execute();
```

```
//Modify parameters
Camera.ExposureTime.SetValue(100);
//Save current parameters to user set1
Camera.UserSet.Save(USER_SET1);
//Choose user set 1 as the power up working parameter set
Camera.UserSet.SetDefault(USER_SET1);
```

The two LUTs are stored in flash also, but they are not in the user set group, the user set only has the ID of LUT. After powered up, the camera will load the corresponding LUT according to the ID stored in the default user set.

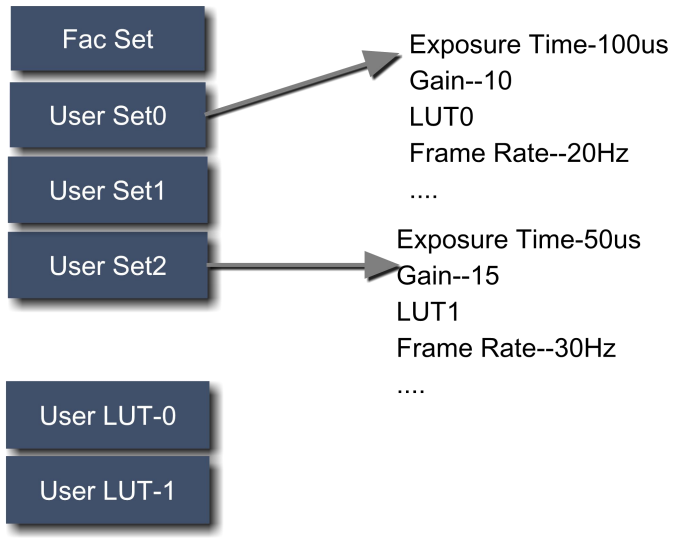


Fig 4-29 User Set and LUT

§4.8 User Flash Region

There are up to 256 bytes inside that can be used as user flash region, user can store any data in it, the ID, the encrypt code etc. The data is stored in flash, will not lost at power down.

Due to the nature of flash, it must be erased before writing anything to it, otherwise the new written data is invalid. Before any modification to the user flash region, read all the data out, modify it, then write back.

When write the first byte of the user region, address 0, all the 256 bytes will be erased first automatically, then program the modified data into flash.

The next region of pseudo codes shows how to modify the 5th byte of the user flash region:

```
//Read back all the 20 bytes in the user region, start address is 0
Camera.UserFlash.ReadBack(Usr_array , 0x0 , 20);
//Change byte number 5 to be 0x56
Usr_array[5]=0x56
//Write all the 20 bytes back to user flash region. Before the 0th byte is written back to flash, all the 256 bytes will be erased
Camera.UserFlash.Save(Usr_array , 0x0 , 20);
```

§4.9 Bandwidth

The bandwidth of current setting can be calculated as follows:

$$\frac{Height * Width * Bitdepth * FrameRate}{10^6} Mbps$$

For 8 bit data type, for example Mono8, Bayer8, the bit depth is 8 bit; for 10 bit data type which is transferred in packed mode, 12 bit should be used to calculate the bandwidth; refer to the table that list the bit depth that should be used in the calculation:

Data Type	Bit Depth
Bayer8/Mono8	8
Bayer10 Packed/Mono10 Packed	12
Bayer12 Packed/Bayer12 Packed	12
RGB8/BGR8/YUV444	24
YUV422-P	16
YUV411-P	12

Fig 4-30 Bit Depth of Data Types

Take RS-10K-GM7 in mono 12 packed for example, the bandwidth is:

$$\frac{3664*2748*7.3*12}{10^6} = 882Mbps$$

The next table is the bandwidth for all the occurrences, the yellow background cells indicate the excess to the tolerance of Gigbit Ethernet, and need to lower the frame rate.

型号	分辨率	帧率	Bayer8	Bayer10	Bayer12	Mono8	Mono10	Mono12	BGR8/RGB8 YUV444	YUV422	YUV411
型号	分辨率	帧率	数据带宽								
RS-A361-G*60	752*480	60	173.2608	259.8912		173.2608	259.8912		519.7824	346.5216	259.8912
RS-A361-G*100	752*480	100	288.768	433.152		288.768	433.152		866.304	577.536	433.152
RS-A363-G*150	752*480	150	433.152	649.728		433.152	649.728		1299.456	866.304	649.728
RS-A1000-GM30	1280*1024	30				314.5728	471.8592				
RS-A1300-G*60	1280*1024	60	629.1456	943.7184		629.1456	943.7184		1887.4368	1258.2912	943.7184
RS-A1500-GM60 NIR	1280*1024	60	629.1456	943.7184		629.1456	943.7184				
RS-A2300-G*50	1600*1200	50	768	1152		768	1152		2304	1536	1152
RS-A2300-G*60	1600*1200	60	921.6	1382.4		921.6	1382.4		2764.8	1843.2	1382.4
RS-A5001-G*14	2592*1944	14	564.350976		846.526464	564.350976		846.526464	1693.05293	1128.70195	846.526464
RS-A10K-G*7	3664*2748	7.3	588.010445		882.015667	588.010445		882.015667	1764.03133	1176.02089	882.0156672
RS-A14K-GC7	4384*3288	6.3	726.495437		1089.74316	726.495437		1089.74316	2179.48631	1452.99087	1089.743155

Fig 4-31 Bandwidth for All Occurences

§5 Installation

§5.1 Environment Requirements

- Housing temperature during working：0℃~50℃
- Humidity during working：20%~80% relative with no condensing
- Storage temperature：0℃ ~75℃
- Storage humidity：20%~80% relative, with no condensing

§5.2 Heat Dissipation

When the working environment is stable, the installed location, the air flow etc, the temperature of the camera will gradually to be stable in 1~1.5 hour, before this point, the camera is getting warmer and warmer. Be sure to keep the housing temperature of the camera to be less than 50℃. The temperature gap between the housing and the internal measure point is 25℃，so keep the temperature read by the API is less than 75℃。

The following recommendation can help to the heat dissipation management:

- Keep the environment temperature less than 30℃
- Install the camera on a metal or good heat conductor, it will help the dissipation
- Providing air flow over the camera is a good method of heat dissipation

§5.3 Cleanup of the Optical Filter

There is an optical filter locates in front of the image sensor, it can protect the image sensor from soiling by dirt or others. If the filter is dirty and need cleanup, you can loosen the screws from the lens adapter, then the filter can be taken out. Clean the filter with specialized optical cleaner which do not leave stain.

§5.4 Avoiding EMI and ESD

When working in industrial environment, the EMI(electromagnetic interference) and ESD(electrostatic discharge) are big concerns. Excessive EMI and ESD can bring big problems to camera, including image capturing error, false triggering.

Although ROSA-GE already integrates EMI and ESD design to give good performance and high reliability at industrial environment, microview still strongly recommends taking the following guidelines.

§5.4.1 Basic Protection Principles

In this section, some basic principles are introduced, do it at the first stage of system design:

- Always use shielded cable, either the LAN cable or the IO connector cable, this will give good protection over the EMI and give a good sink for ESD.
- Always use the proper length of cable that match the installation, do not use over long cable and avoid coiling the cable which will be a reception

antenna for EMI.

- Run the LAN cable parallelly to the IO cable and other cables, do not make cables crossing over each other.
- Keep enough distance from the high voltage, high current devices, for example the stepper moto.
- Connect all the grounds of devices together and connect to the protect ground at single point, generally it is the AC’ s ground.
- Add a magnet coil to the IO cable if necessary.

§5.4.2 Illustration of Installation

The next pic show one installation method, heat dissipation, EMI & ESD consideration, grounding are all considered.

- For better heat dissipation, install the camera on metal plane, this plane is installed on an insulator. All the grounds are routed to one point at AC outlet. Avoiding multiple grounding point which brings EMI problems.
- Make good connection between NIC and the PC chassis
- Ground connection point at the camera can be the RJ45 or the IO connector, both need shielded cable.

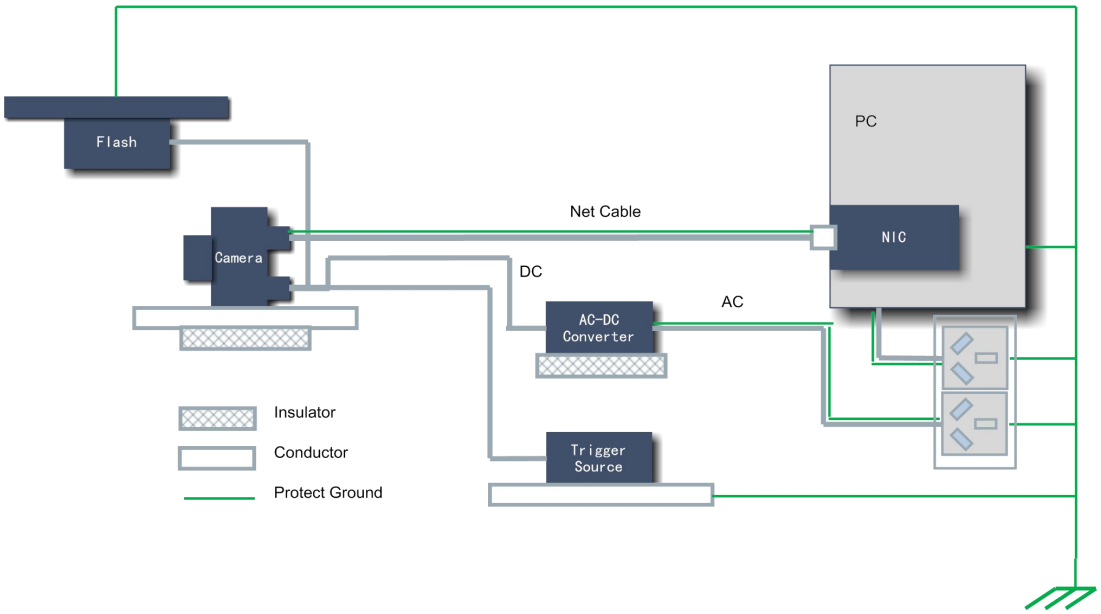


Fig 5-1 System Installation

§6 Troubleshooting

When encounter problems, check the following solutions for some failures before return it. If it cannot solve your problem, then fill the RMA sheet, and return it.

Q1：Only one LED on the RJ45 is lighted

A：Refer to §2.1.1 for the meaning of the LED，also check if the NIC is a gigabit one and if the cable is ok.

Q2：Both LED on RJ45 are not lighted

A：Check if the AC supply to camera is ok, if the power supply line is too long, the dc drop across the line may make the power arrive at camera does not fulfil the requirement of 11V~13V.

Q3：The capturing frame rate is lower than normal or does not capture images.

A：Check the following items:

1) Check if the driver is installed correctly, do not use the "Manufacture Drive"，use eBUS Universal Pro instead.

If the 3rd party SDK / driver is used, uninstalled it first, then install Microview's SDK and operate camera with the DEMO under the SDK

installation directory.

2) Check if the Windows OS firewall is closed. Remove any firewalls associated with the NIC. Removing Microsoft firewall is done as follows:

   a) Select the "Advanced" tab in the NIC proterties

   b) Press "Settings"

   c) Select the "Off" option

Fig 6-1 Turn Off the Firewall

3) Check the settings of the NIC for best performance:

   a) Open "Network Connections" window, ("Start" ->"Settings" ->" Network Connections")

   b) Select the network interface card that will be used for the GigE

Vision channel and double click on its icon.

c) Press" Properties"

d) Press the "Configure" button on the top right

e) Select the "Advanced" tab

f) In the "Advanced" window, select " Jumbo Frames" entry from the list and set it to the maximum value that is available(9K or 16K)

g) Select the "Performance Options" and press "Properties"

h) Select "Interrupt Moderation Rate" and set it to "Extreme"

i) Select "Receive Descriptors" and set it to the maximum possible value

j) Select "Flow Control" and set to "Generate & Respond"

k) Press "OK" to close the "Performance Options" window and press "OK" to close the NIC properties window.

Q4：Where are many packets resent or packets lost?

A：Generally, this phenomena is caused by the quality of the link, ie the cable quality, the transfer distance and the EMI. Use a shielded CAT5E or higher LAN cable.

Q5：Why there are bad images when the data type is RGB8 or YUV444, and the bottom of the image is disorder?

A: Refer to §4.9, this is caused by the actual bandwidth exceed 1Gbps too

much, use the frame control function to lower the rate.

Q6 :Why there are bad images when switch on/off the ISP modules, the gamma correction, the 2D filter etc?

A: The processing latency of different module is different, so when switch on or off the function, an error image may occur. Stop capturing when setting such kind of parameters.

§Appendix RMA

When you decide to return a damaged or out-of-work camera to us, be sure to get a RMA(Return Material Authorization) number first, then fill the RMA sheet carefully which helps us a lot to solve the problem.

ROSA-GE RMA Sheet

RMA Number : _____ Date : _____

Model Name	
Model SN	
Operation Mode	☐ Camera-PC Point to Point ☐ Camera-Switch/Hub-PC ☐ Else_____
Working Environment	NIC Number : _____ OS : _____ CPU Number : _____ Switch/Hub Number : _____ SDK Version and Driver : _____ Is there any strong EMI device around? : _____ Environment Temperature:_____
Describe the problem as detail as possible	
When does the problem happen?	☐ Start to capture image During normal capturing Special occasion : _____
Frequency of that problem	☐ Occasionally ☐ Every time Occasionally when_____ Every time when_____
Can it be recovered?	☐ Repower it will be ok ☐ Repowering will not work ☐ Restart the software will be ok ☐ Restart the PC will solve the problem ☐ Camera never work after powered off
Please give some description of the status	Resolution_____ Data Type_____ Exposure Time(RAW)_____ Work Mode_____ Frame Rate Setting_____ Else_____
If there is any log file, screen shot picture, bmp or raw image files saved, please send them to use together with this sheet.	

§Appendix2 ROSA-GE Accessories

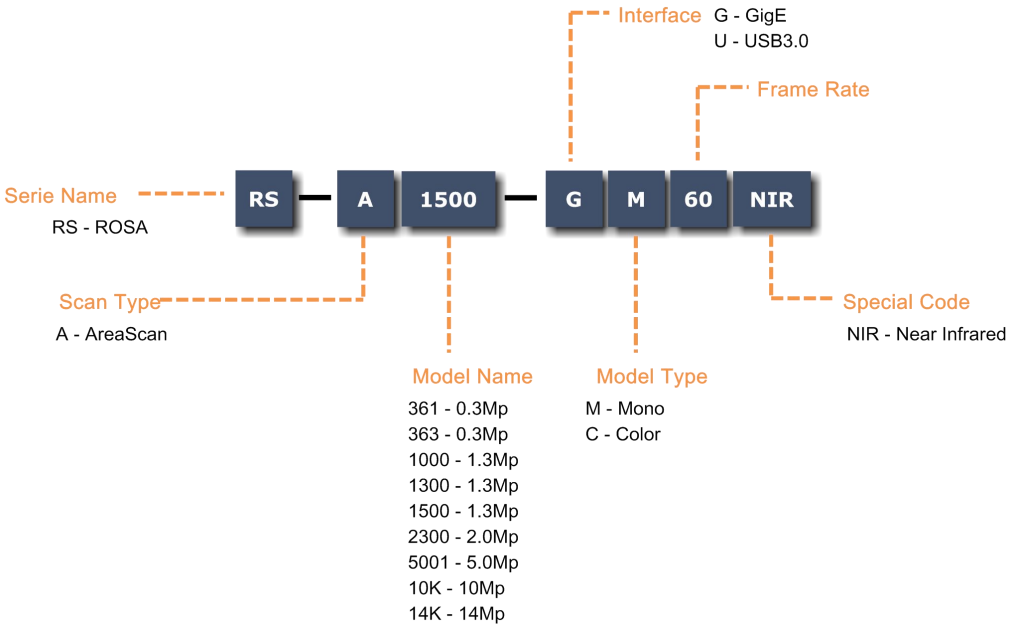
§A2.1 IO Cable

We provide the following IO cables:

Ordering Code	Name	Note
CAB_DZX_118	HR10A-7P-6S-OPEN-1M-02	● 1 meter length shielded cable ● Refer to §2.2 for pin definition
CAB_DZX_119	HR10A-7P-6S-OPEN-3M-02	● 3 meter length shielded cable ● Refer to §2.2 for pin definition
CAB_DZX_120	HR10A-7P-6S-OPEN-5M-02	● 5 meter length shielded cable ● Refer to §2.2 for pin definition
JGP-N-A073	N-A73	● Only the DC power supply with AD-DC adapter

§Appendix 3 Naming Convention

Naming convention for ROSA serial cameras：



IO cable naming convention：