

AMAZON2 SERIES



Tiny Form Factor GigE Camera

User Operation Manual

For GigE Cameras IMx-7xxG Models

USER MANUAL VERSION 1.00

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Legal Notice.

For Customers in U.S.A.

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

For customers in Europe

This apparatus has been certified to meet or exceed the standards for CE compliance per the Council Directives. Pertinent testing documentation is available for verification.

For customers in Canada

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

Pour utilisateurs au Canada

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

Life support applications

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

Before You Start

This manual should help you in the installation and setting up of the camera; and we recommend that you carefully follow the instructions described. To ensure that your warranty remains valid, please read the manual carefully before using the camera.

DO NOT disassemble, modify or repair the camera. There are no user serviceable parts inside and disassembling the camera may void the warranty. For prevention of fire or electric shock, DO NOT remove screws or covers from the camera.

Operation in a wet environment is NOT recommended and the camera SHOULD NOT be exposed to rain or moisture.

For prolong life and the protection of the camera's CCD, do not point the camera directly at the sun or a strong spotlight which may result in CCD blooming and permanent damage.

DO NOT operate the camera beyond the operation temperature range stated and AVOID usage in conditions exceeding 90% humidity.

DO NOT use an unregulated power supply source to prevent damage to the camera's circuits.

Use soft materials such as lens tissue or cotton tipped applicator with ethanol for CCD faceplate cleaning ONLY when necessary and AVOID contact with fingers or any hard object. Do not use solvent, abrasives or detergent when cleaning the camera body.

Warranty shall be voided for improper use of the camera or fault caused by the user or damage caused by other equipment due to negligence

Warranty

IMI TECH warrants the original components free of defects for one year from purchase date. This warranty covers failures and damage due to defect, which may occur during normal use. It does not cover damages or failure resulting from mishandling, abuse, misuse or modification. An RMA number must be obtained in advance for every repair or replacement.

Disclaimer

The information in this document has been carefully checked and is believed to be reliable. However, IMI TECH assumes no responsibility for inaccuracies. There is no legal obligation to document internal relationships in any functional module of its products, in either hardware or software

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1. Introduction

1.1. Overview

IMI TECH's Amazon2 Series is compliant with the GigE Vision standard and supports GenIcam Standard. Fairly new in the image processing industry, GigE is gaining more interest thanks to users who are familiar with the Ethernet interface and technology. This new interface is expected to lift the barriers of bandwidth limitation found in other interfaces such as FireWire and USB 2.0. It also resolves the limitation of cable length by supporting 100 meter distance with conventional CAT-5 cable. As GigE is a relatively new standard, we expect more and more customers to demand new and additional feature support. We also expect a growing desire for software interoperability due to GigE's excellent network interface capability. The very small form factor design has expanded implementation and broadened application areas by eliminating the limits that currently exist due to size and weight. A large selection of cameras is available and additional cameras are scheduled to be added to the Amazon2 **Series** as well. These will consist of various sensor sizes (1/4", 1/3" 1/2", 1/1.8") and resolution (VGA, XGA, SXGA, UXGA) both in color and black and white. The **Amazon2 Series** consist of the following models.

AMAZON2 SERIES	Model Name	CCD(Progressive)	Resolution	FPS at Max Resolution
Black & White	IMB-710G	1/4"	656 x 488	100
	IMB-711G	1/3"	656 x 484	91
	IMB-712G	1/2"	656 x 484	91
	IMB-715G	1/3"	1032 x 776	35
	IMB-716G	1/3"	1288 x 964	30
	IMB-717G	1/2"	1388 x 1040	20
	IMB-720G	1/1.8"	1624 x 1232	16
Color	IMC-710G	1/4"	652 x 484	100
	IMC-711G	1/3"	652 x 484	92
	IMC -712G	1/2"	652 x 484	91
	IMC -715G	1/3"	1032 x 772	35
	IMC -715G2	1/3"	1280 x 720	30
	IMC -716G	1/3"	1288 x 960	30
	IMC -717G	1/2"	1388 x 1036	20
	IMC -720G	1/1.8"	1624 x 1228	16

AMAZON2 SERIES' unique features include a lookup table and external trigger mode 0, 1, 2, 4, 5, 15, one-shot and multi-shot, a wide range of shutter speeds (1us~3600s), partial scan, and binning modes (2x2 for B&W). All of these features provide maximum flexibility for a wide variety of applications. **AMAZON2 SERIES** input signals are isolated optically to ensure quality images acquisition without the risk of noise degrading the input signal. Industrial screw lock cable support has been added for more reliable connectivity. **AMAZON2 SERIES's** firmware

can be upgraded via GigE and the latest versions are available through our website together with IMI TECH's SDK and demo applications.

1.2. Components

Component

Following components are either included in the camera or can be downloaded from the IMI website.



AMAZON2 SERIES
CAMERA UNIT



GigE™ Digital Imaging CD(Website)
Driver
Demo Software
Manuals



User Manual

Downloadable Software

Latest Update of Firmware and Demo Applications are available on our website.



<http://www.imi-tech.com>



1.3. Optional Accessories



Machine Vision Lens



1000/100/10Mbps Gigabit PCI Adapter



GigE Cable (CAT5e , CAT6)

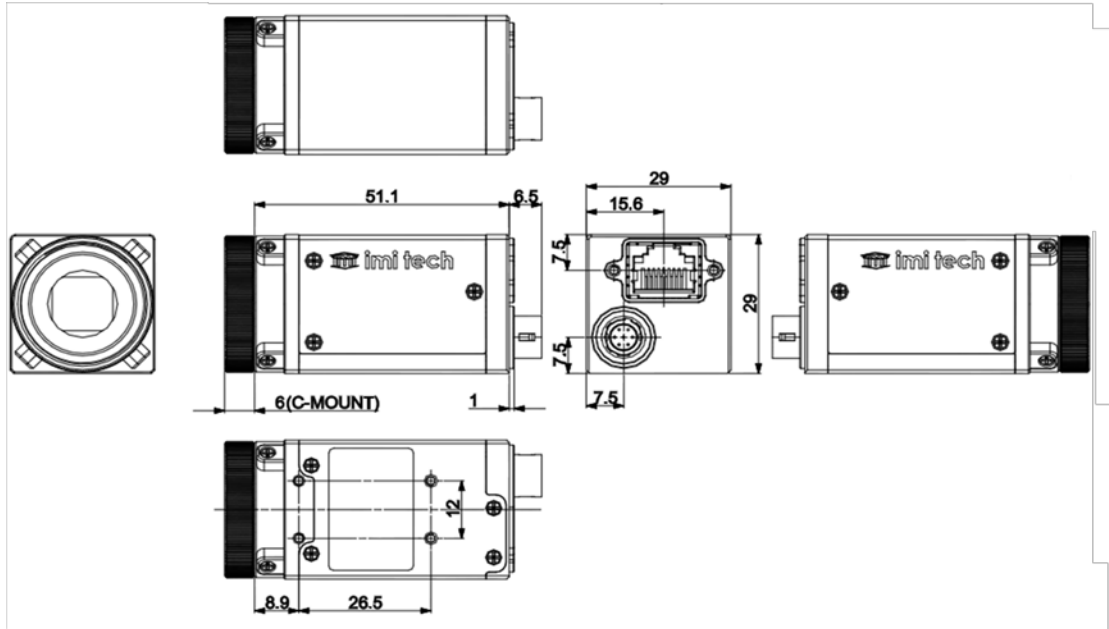


Tripod Plate

1.4. Dimension and Description

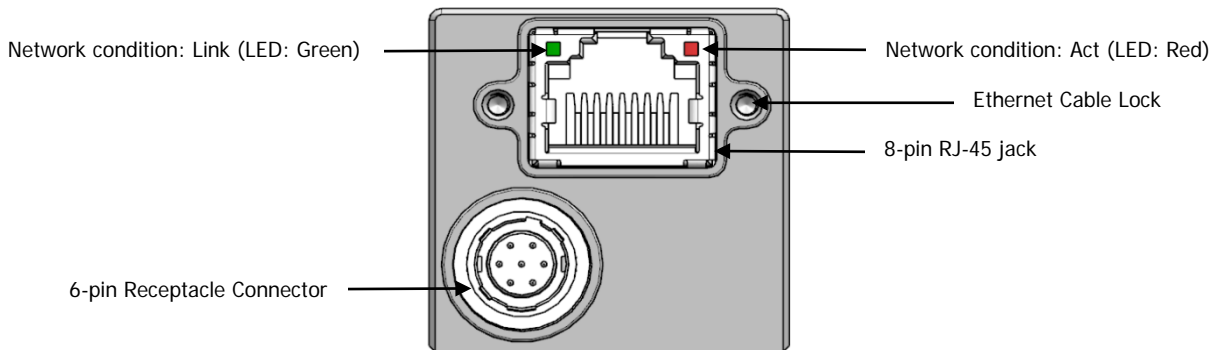
Camera Body Size : 29(w) x 29(H) x 51.1(D) mm

Camera Body Weight: approx. 58 gram



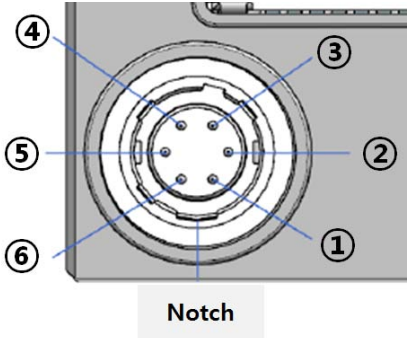
1.5. Camera Interface

The AMAZON2 series camera interfaces are located on the back of the camera (assuming the lens mount is up front) as per the following:



1.5.1. Trigger/Strobe/Power Connector Port

The External Trigger/Strobe/Power Connector provides access to multiple I/O signals and power.



Pin	Description	I/O
1	+12VDC Camera Power	P
2	Trigger In +	I
3	I/O GND	G
4	Strobe Out +	O
5	I/O GND	G
6	Camera Power GND	G

1.5.2. Status LED for Network Connection

When the Red LED is lit, it indicates that an active network connection is available.

When the Green LED is lit, it indicates that data is being transmitted via the network connection.

Remark: When the power is off, both the Red and Green LED are OFF.

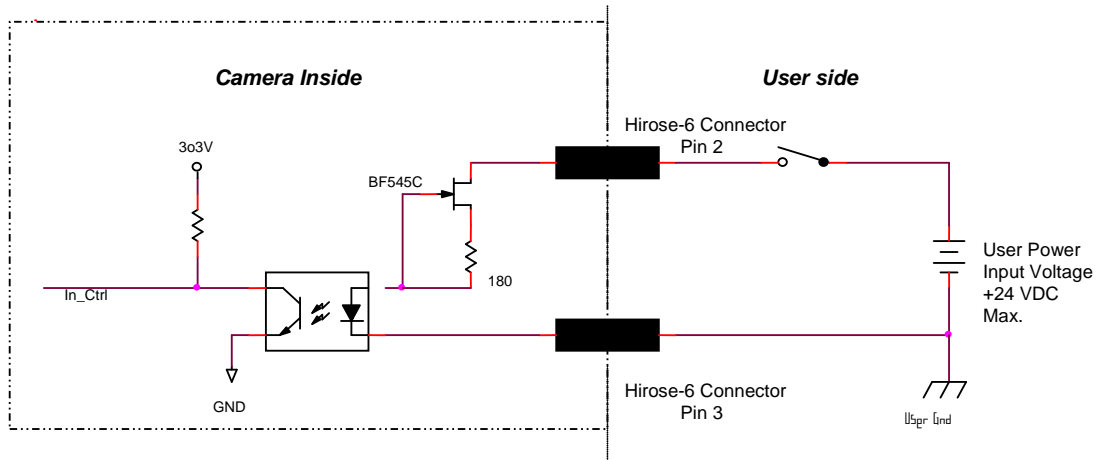
1.5.3. Camera Power Requirement

The Amazon2 Series cameras utilize a selection of power from the Ext. 6 pin Connector Port, which provides power to the camera. An input voltage range of 8V ~ 24V is accepted.

Amazon2 also provides PoE(Power over Ethernet), which complies with IEEE802.3af.

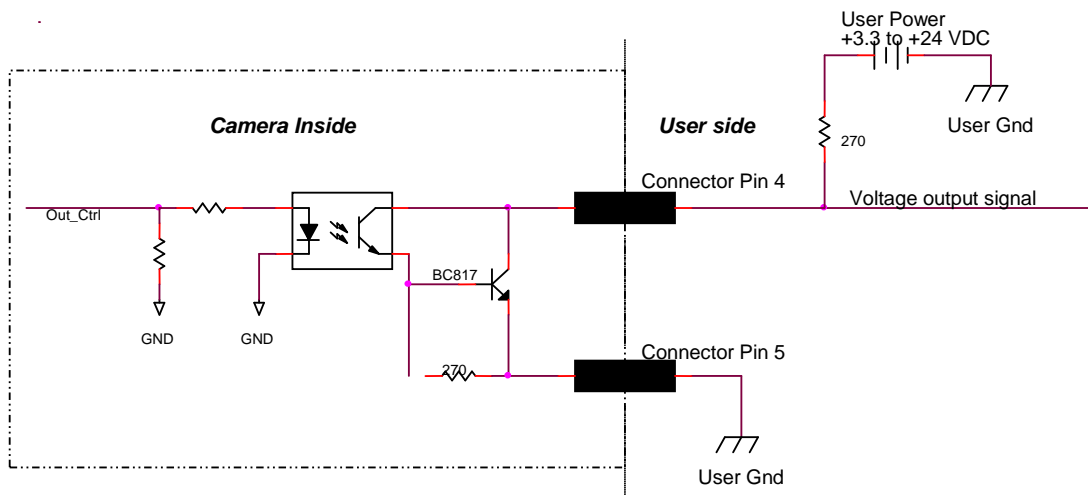
1.6. Electrical Operating Condition

Trigger



Voltage	Remark
+0 to +24 VDC	Recommended operating voltage
+0 to +1.4 VDC	Logical behavior "0" state
> +1.4 to +2.2 VDC	It might not work normally
> +2.2 VDC	Logical behavior "1" state
+24.0 VDC	Maximum operating voltage Camera might be broken over +24 VDC

Strobe



Voltage	Remark
< +3.3 VDC	It might not work normally
+3.3 to +24 VDC	Recommended operating voltage
+24.0 VDC	Maximum operating voltage Camera might be broken over +24 VDC

1.7. Pixel Data

The **AMAZON2** series complies with the AIA GigE Vision version 1.0 where data packets are transmitted by a Gigabit Ethernet interface.

<YUV (4: 2: 2) format >

U-(K+0)	Y-(K+0)	V-(K+0)	Y-(K+1)
U-(K+2)	Y-(K+2)	V-(K+2)	Y-(K+3)
U-(K+4)	Y-(K+4)	V-(K+4)	Y-(K+5)
U-(K+Pn-6)	Y-(K+Pn-6)	V-(K+Pn-6)	Y-(K+Pn-5)
U-(K+Pn-4)	Y-(K+Pn-4)	V-(K+Pn-4)	Y-(K+Pn-3)
U-(K+Pn-2)	Y-(K+Pn-2)	V-(K+Pn-2)	Y-(K+Pn-1)

<YUV (4: 1: 1) format >

U-(K+0)	Y-(K+0)	Y-(K+1)	V-(K+0)
Y-(K+2)	Y-(K+3)	U-(K+4)	Y-(K+4)
Y-(K+5)	V-(K+4)	V-(K+4)	Y-(K+5)
U-(K+Pn-8)	Y-(K+Pn-8)	Y-(K+Pn-7)	V-(K+Pn-8)
Y-(K+Pn-6)	Y-(K+Pn-5)	U-(K+Pn-4)	Y-(K+Pn-4)
Y-(K+Pn-3)	V-(K+Pn-4)	Y-(K+Pn-2)	Y-(K+Pn-1)

<Mono 8/GR8 Format>

Y-(K+0)	Y-(K+1)	Y-(K+2)	Y-(K+3)
Y-(K+4)	Y-(K+5)	Y-(K+6)	Y-(K+7)
Y-(K+Pn-8)	Y-(K+Pn-7)	Y-(K+Pn-6)	Y-(K+Pn-5)
Y-(K+Pn-4)	V-(K+Pn-3)	Y-(K+Pn-2)	Y-(K+Pn-1)

<Mono 12/ GR12 Format>

High Byte	Low Byte
-----------	----------

Y-(K+0)	Y-(K+1)
Y-(K+2)	Y-(K+3)
Y-(K+Pn-4)	Y-(K+Pn-3)
V-(K+Pn-2)	Y-(K+Pn-1)

Data Structure**<Y, R, G, B>**

Each component has 8 bits of data. The data type is "Unsigned Char"

	Signal Level (Decimal)	Data (Hexadecimal)
Highest	255	0xFF
	254	0xFE
	.	.
	.	.
	1	0x01
Lowest	0	0x00

<U, V>

Each component has 8 bits of data. The data type is "Straight Binary"

	Signal Level (Decimal)	Data (Hexadecimal)
Highest(+)	127	0xFF
	126	0xFE
	.	.
	.	.
	1	0x81
Lowest	0	0x80
	-1	0x7F
	.	.
	.	.
	-127	0x01
Lowest	-128	0x00

<Y(Mono16)>

Y component has 16 bits of data. The data type is "Unsigned Short (big-endian)"

Y	Signal Level (Decimal)	Data (Hexadecimal)
Highest	65535	0xFFFF
	65534	0xFFFE
	.	.
	.	.
	1	0x0001
Lowest	0	0x0000

1.8. Environmental Requirements

Operation Temperature: -5°C ~ +45°C / Storage Temperature: -30°C ~ +60°C

Avoid operation in an environment of high humidity of over 90% and allow sufficient airflow for prevention of heat buildup

2. Basic Installation

The **Amazon2** series operates in connection with a PC that is running an operation system such as MS Windows. Basic installation starts by installing the driver, connecting the camera and loading the demo application software. Please refer to the demo application software manual for details.

2.1. Recommended System Requirement

Requirements	Details and Description
Operating System	Windows XP, Window 7
CPU	Intel Core2quad or better spec
System Memory	2GB or more
Video Adapter	1280 x 1024 with 24 bit color or higher
Hard Disk Drive	40 GB or higher
Optical Drive	CDROM or DVDROM
Gigabit Ethernet Interface	On
Cable	Standard Gigabit Ethernet Cable (RJ45)
Power Supply	DC 8V ~ 24V.
Software	DirectX 9.0 or higher, IMI Tech Digital Imaging CD

Remark: Other software or hardware may be required for user specific applications.

2.2. Hardware Installation

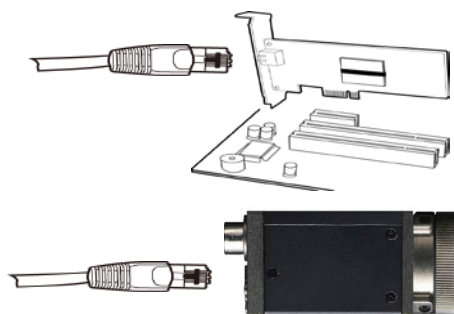
Basic camera installation is a very simple 3 step process as follows. (Also check the figure below)

Step 1. Locate the Gigabit Ethernet port on the computer.

(Note: Some computers would require the installation of a PCI/ PCI express Gigabit Ethernet interface).

Step 2. Plug one end of the GigE cable into the camera; and the other end of the cable into the computer's Gigabit Ethernet port.

Step 3. In not using PoE, plug 12VDC jack of 6-pin receptacle HIROSE Connector to power adaptor.



Basic
Hardware Installation
and
Camera Connection

2.3. Software Installation

Important! DO NOT CONNECT THE CAMERA BEFORE INSTALLING THE SOFTWARE!!

Insert the IMI Digital Imaging CD which would auto install the camera drivers and demo applications.

Or download the camera drivers and demo applications from the IMI website at www.imi-tech.com.

(For details of the application and driver please refer to the demo application manual)



IMI Digital Imaging CD(Website)

Driver

Neptune Demo Software

Neptune API Library

Manuals(Website)

NOTE: Software Installation should proceed Hardware Installation

3. AMAZON2 Series Camera Specifications

3.1. Black and White Cameras

3.1.1. IMB-720G Specification

Features (IMB-720G)		
Image Sensor	1/1.8" Interline CCD(ICX274AL)	
Effective Pixels	2,000,768 pixels 1624(H) x 1232(V)	
Picture Size	1624x1232	
Cell Size	4.40 um x 4.40 um	
Real Frame Rate	16 (1624x1232, Mono 8) 16 (1624x1232, Mono 12) 30 (800x600, 2x2 binning, Mono 8) 30 (800x600, 2x2 binning, Mono 12)	
Lens Mount	C-mount, CS-Mount	
Scanning System	Progressive Scan	
Binning	2x2	
ROI	Partial Scan (Unit: 4x4)	
Trigger	Edge	Rising Edge or Falling Edge (Photo coupler)
	Mode	0, 1, 2, 4, 5, 15
	Source	External Trigger(Photo-coupler) or Software Trigger
Strobe	Support Normal Mode or Trigger Mode(Photo-coupler)	
Memory Save/Load	9 Channels(0:factory, 1~4:feature, 5~8:mode/feature)	
One-shot/Multi-shot	1 ~ 65535 Shots	
Control Functions	Brightness, Sharpness, Gamma, Auto-Exposure, Shutter, Gain, User Defined LUT	
Digital Interface / Transfer Rate	1000BT, RJ45 / 1Gbps	
Gain	0 ~ 18 dB (Manual or Auto control)	
Shutter Speed	1 usec ~ 3600 sec (Manual or Auto control)	
Data Depth	12 bit	
S/N Ratio	56dB or better	
Supply Voltage& Power	Less than 3.0W @12 VDC via 6-pin connector Less than 3.2W @ PoE	
External Dimension / Weight	29(W) x 29(H) x 51.1(D) mm / Approx 58g	
Operation Temp/ Storage Temp	-5°C to 45°C / -30°C to 60°C	
Camera Specification	AIA GigE Vision version 1.0	

Remark: Camera specification described above may be changed without notice

3.1.2. IMB-717G Specification

Features (IMB-717G)		
Image Sensor	1/2" Interline CCD(ICX267AL)	
Effective Pixels	1,447,680 pixels 1392(H) x 1040(V)	
Picture Size	1388x1040	
Cell Size	4.65 um x 4.65 um	
Real Frame Rate	20 (1388x1040, Mono 8) 20 (1388x1040, Mono 12) 37 (688x516, 2x2 binning, Mono 8) 37 (688x516, 2x2 binning, Mono 12)	
Lens Mount	C-mount, CS-Mount	
Scanning System	Progressive Scan	
Binning	2x2	
ROI	Partial Scan (Unit: 4x4)	
Trigger	Edge	Rising Edge or Falling Edge (Photo coupler)
	Mode	0, 1, 2, 4, 5, 15
	Source	External Trigger(Photo-coupler) or Software Trigger
Strobe	Support Normal Mode or Trigger Mode(Photo-coupler)	
Memory Save/Load	9 Channels(0:factory, 1~4:feature, 5~8:mode/feature)	
One-shot/Multi-shot	1 ~ 65535 Shots	
Control Functions	Brightness, Sharpness, Gamma, Auto-Exposure, Shutter, Gain, User Defined LUT	
Digital Interface / Transfer Rate	1000BT, RJ45 / 1Gbps	
Gain	0 ~ 18 dB (Manual or Auto control)	
Shutter Speed	1 usec ~ 3600 sec (Manual or Auto control)	
Data Depth	12 bit	
S/N Ratio	56dB or better	
Supply Voltage& Power	Less than 3.0W @12 VDC via 6-pin connector Less than 3.2W @ PoE	
External Dimension / Weight	29(W) x 29(H) x 51.1(D) mm / Approx 58g	
Operation Temp/ Storage Temp	-5°C to 45°C / -30°C to 60°C	
Camera Specification	AIA GigE Vision version 1.0	

Remark: Camera specification described above may be changed without notice

3.1.3. IMB-716G Specification

Features (IMB-716G)		
Image Sensor Type	1/3" Interline CCD (ICX445AL)	
Effective pixels	1,251,936 pixels 1296(H) x 966(V)	
Picture Size	1288 x 964	
Cell Size(um)	3.75 um x3.75 um	
Real Frame Rate	30 (1288x964, Mono 8) 30 (1288x964, Mono 12) 55 (640X476, 2x2 binning, Mono 8) 55 (640X476, 2x2 binning, Mono 12)	
Lens Mount	C-mount, CS-Mount	
Scanning System	Progressive Scan	
Binning	2x2	
ROI	Partial Scan (Unit: 4x4)	
Trigger	Edge	Rising Edge or Falling Edge (Photo coupler)
	Mode	0, 1, 2, 4, 5, 15
	Source	External Trigger(Photo-coupler) or Software Trigger
Strobe	Support Normal Mode or Trigger Mode(Photo-coupler)	
Memory Save/Load	9 Channels(0:factory, 1~4:feature, 5~8:mode/feature)	
One-shot/Multi-shot	1 ~ 65535 Shots	
Control Functions	Brightness, Sharpness, Gamma, Auto-Exposure, Shutter, Gain, User Defined LUT	
Digital Interface / Transfer Rate	1000BT, RJ45 / 1Gbps	
Gain	0 ~ 18 dB (Manual or Auto control)	
Shutter Speed	1 usec ~ 3600 sec (Manual or Auto control)	
Data Depth	12 bit	
S/N Ratio	56dB or better	
Supply Voltage& Power	Less than 2.7W @12 VDC via 6-pin connector Less than 2.5W @ PoE	
External Dimension / Weight	29(W) x 29(H) x 51.1(D) mm / Approx 58g	
Operation Temp/ Storage Temp	-5°C to 45°C / -30°C to 60°C	
Camera Specification	AIA GigE Vision version 1.0	

Remark: Camera specification described above may be changed without notice

3.1.4. IMB-715G Specification

Features (IMB-715G)		
Image Sensor Type	1/3" Interline CCD (ICX204AL)	
Effective pixels	805,486 pixels 1034(H) x 779(V)	
Picture Size	1032 x 776	
Cell Size(um)	4.65 um x4.65 um	
Real Frame Rate	35 (1032x776, Mono8) 35 (1032x776, Mono12) 65 (512x384, 2x2 binning, Mono 8) 65 (512x384, 2x2 binning, Mono 12)	
Lens Mount	C-mount, CS-Mount	
Scanning System	Progressive Scan	
Binning	2x2	
ROI	Partial Scan (Unit: 4x4)	
Trigger	Edge	Rising Edge or Falling Edge (Photo coupler)
	Mode	0, 1, 2, 4, 5, 15
	Source	External Trigger(Photo-coupler) or Software Trigger
Strobe	Support Normal Mode or Trigger Mode(Photo-coupler)	
Memory Save/Load	9 Channels(0:factory, 1~4:feature, 5~8:mode/feature)	
One-shot/Multi-shot	1 ~ 65535 Shots	
Control Functions	Brightness, Sharpness, Gamma, Auto-Exposure, Shutter, Gain, User Defined LUT	
Digital Interface / Transfer Rate	1000BT, RJ45 / 1Gbps	
Gain	0 ~ 18 dB (Manual or Auto control)	
Shutter Speed	1 usec ~ 3600 sec (Manual or Auto control)	
Data Depth	12 bit	
S/N Ratio	56dB or better	
Supply Voltage& Power	Less than 2.7W @12 VDC via 6-pin connector Less than 2.5W @ PoE	
External Dimension / Weight	29(W) x 29(H) x 51.1(D) mm / Approx 58g	
Operation Temp/ Storage Temp	-5°C to 45°C / -30°C to 60°C	
Camera Specification	AIA GigE Vision version 1.0	

Remark: Camera specification described above may be changed without notice

3.1.5. IMB-712G Specification

Features (IMB-712G)		
Image Sensor Type	1/2" Interline CCD (ICX414AL)	
Effective pixels	325,546 pixels 656(H) x 488(V)	
Picture Size	656 x 484	
Cell Size(um)	9.9 um x9.9 um	
Real Frame Rate	91 (656x488, Mono8) 91 (656x488, Mono12) 166 (324x240, 2x2 binning, Mono 8) 166 (324x240, 2x2 binning, Mono 12)	
Lens Mount	C-mount, CS-Mount	
Scanning System	Progressive Scan	
Binning	2x2	
ROI	Partial Scan (Unit: 4x4)	
Trigger	Edge	Rising Edge or Falling Edge (Photo coupler)
	Mode	0, 1, 2, 4, 5, 15
	Source	External Trigger(Photo-coupler) or Software Trigger
Strobe	Support Normal Mode or Trigger Mode(Photo-coupler)	
Memory Save/Load	9 Channels(0:factory, 1~4:feature, 5~8:mode/feature)	
One-shot/Multi-shot	1 ~ 65535 Shots	
Control Functions	Brightness, Sharpness, Gamma, Auto-Exposure, Shutter, Gain, User Defined LUT	
Digital Interface / Transfer Rate	1000BT, RJ45 / 1Gbps	
Gain	0 ~ 18 dB (Manual or Auto control)	
Shutter Speed	1 usec ~ 3600 sec (Manual or Auto control)	
Data Depth	12 bit	
S/N Ratio	56dB or better	
Supply Voltage& Power	Less than 2.7W @12 VDC via 6-pin connector Less than 2.5W @ PoE	
External Dimension / Weight	29(W) x 29(H) x 51.1(D) mm / Approx 58g	
Operation Temp/ Storage Temp	-5°C to 45°C / -30°C to 60°C	
Camera Specification	AIA GigE Vision version 1.0	

Remark: Camera specification described above may be changed without notice

3.1.6. IMB-711G Specification

Features (IMB-711G)		
Image Sensor	1/3" Interline CCD (ICX424AL)	
Effective Pixels	325,546 pixels 659(H) x 494(V)	
Picture Size	656 x 488	
Cell Size	7.40 um x7.40 um	
Real Frame Rate	91 (656x488, Mono8) 91 (656x488, Mono12) 166 (324x240, 2x2 binning, Mono 8) 166 (324x240, 2x2 binning, Mono 12)	
Lens Mount	C-mount, CS-Mount	
Scanning System	Progressive Scan	
Binning	2x2	
ROI	Partial Scan (Unit: 4x4)	
Trigger	Edge	Rising Edge or Falling Edge (Photo coupler)
	Mode	0, 1, 2, 4, 5, 15
	Source	External Trigger(Photo-coupler) or Software Trigger
Strobe	Support Normal Mode or Trigger Mode(Photo-coupler)	
Memory Save/Load	9 Channels(0:factory, 1~4:feature, 5~8:mode/feature)	
One-shot/Multi-shot	1 ~ 65535 Shots	
Control Functions	Brightness, Sharpness, Gamma, Auto-Exposure, Shutter, Gain, User Defined LUT	
Digital Interface / Transfer Rate	1000BT, RJ45 / 1Gbps	
Gain	0 ~ 18 dB (Manual or Auto control)	
Shutter Speed	1 usec ~ 3600 sec (Manual or Auto control)	
Data Depth	12 bit	
S/N Ratio	56dB or better	
Supply Voltage& Power	Less than 2.7W @12 VDC via 6-pin connector Less than 2.5W @ PoE	
External Dimension / Weight	29(W) x 29(H) x 51.1(D) mm / Approx 58g	
Operation Temp/ Storage Temp	-5°C to 45°C / -30°C to 60°C	
Camera Specification	AIA GigE Vision version 1.0	

Remark: Camera specification described above may be changed without notice

3.1.7. IMB-710G Specification

Features (IMB-710G)		
Image Sensor	1/4" Interline CCD (ICX618ALA)	
Effective Pixels	325,546 pixels 659(H) x 494(V)	
Picture Size	656 x 488	
Cell Size	7.40 um x7.40 um	
Real Frame Rate	100 (656x488, Mono8) 100 (656x488, Mono12) 180 (324x240, 2x2 binning, Mono 8) 180 (324x240, 2x2 binning, Mono 12)	
Lens Mount	C-mount, CS-Mount	
Scanning System	Progressive Scan	
Binning	2x2	
ROI	Partial Scan (Unit: 4x4)	
Trigger	Edge	Rising Edge or Falling Edge (Photo coupler)
	Mode	0, 1, 2, 4, 5, 15
	Source	External Trigger(Photo-coupler) or Software Trigger
Strobe	Support Normal Mode or Trigger Mode(Photo-coupler)	
Memory Save/Load	9 Channels(0:factory, 1~4:feature, 5~8:mode/feature)	
One-shot/Multi-shot	1 ~ 65535 Shots	
Control Functions	Brightness, Sharpness, Gamma, Auto-Exposure, Shutter, Gain, User Defined LUT	
Digital Interface / Transfer Rate	1000BT, RJ45 / 1Gbps	
Gain	0 ~ 18 dB (Manual or Auto control)	
Shutter Speed	1 usec ~ 3600 sec (Manual or Auto control)	
Data Depth	12 bit	
S/N Ratio	56dB or better	
Supply Voltage& Power	Less than 2.7W @12 VDC via 6-pin connector Less than 2.5W @ PoE	
External Dimension / Weight	29(W) x 29(H) x 51.1(D) mm / Approx 58g	
Operation Temp/ Storage Temp	-5°C to 45°C / -30°C to 60°C	
Camera Specification	AIA GigE Vision version 1.0	

Remark: Camera specification described above may be changed without notice

3.2. Color Cameras

3.2.1. IMC-720G Specification

Features (IMC-720G)		
Image Sensor	1/1.8" Interline CCD(ICX274AQ)	
Effective Pixels	2,012,208 pixels 1628(H) x 1236(V)	
Picture Size	1624x1288	
Cell Size	4.4 um x 4.4 um	
Real Frame Rate	16 (1624x1288, GR8) 16 (1624x1288, GR12) 16 (1624x1288, YUV411) 16 (1624x1288, YUV422) 30 (800x600, 2x2 binning, GR8) 30 (800x600, 2x2 binning, GR12)	
Lens Mount	C-mount, CS-Mount	
Scanning System	Progressive System	
Binning	2x2	
ROI	Partial Scan (Unit: 4x4)	
Trigger	Edge	Rising Edge or Falling Edge (Photo coupler)
	Mode	0, 1, 2, 4, 5, 15
	Source	External Trigger(Photo-coupler) or Software Trigger
Strobe	Support Normal Mode or Trigger Mode(Photo-coupler)	
Memory Save/Load	9 Channels(0:factory, 1~4:feature, 5~8:mode/feature)	
One-shot/Multi-shot	1 ~ 65535 Shots	
Control Functions	Brightness, Sharpness, Gamma, Auto-Exposure, Shutter, Gain, Hue Saturation, Auto White Balance, User Defined LUT	
Digital Interface / Transfer Rate	1000BT, RJ45 / 1Gbps	
Gain	0 ~ 18 dB (Manual or Auto control)	
Shutter Speed	1 usec ~ 3600 sec (Manual or Auto control)	
Data Depth	12 bit	
S/N Ratio	56dB or better	
Supply Voltage& Power	Less than 3.0W @12 VDC via 6-pin connector Less than 3.2W @ PoE	
External Dimension / Weight	29(W) x 29(H) x 51.1(D) mm / Approx 58g	
Operation Temp/ Storage Temp	-5°C to 45°C / -30°C to 60°C	
Camera Specification	AIA GigE Vision version 1.0	

Remark: Camera specification described above may be changed without notice

3.2.2. IMC-717G Specification

Features (IMC-717G)		
Image Sensor	1/2" Interline CCD(ICX267AK)	
Effective Pixels	1,447,680 pixels 1392(H) x 1040(V)	
Picture Size	1388x1036	
Cell Size	4.65 um x 4.65 um	
Real Frame Rate	20 (1388x1036, GR8) 20 (1388x1036, GR12) 20 (1388x1036, YUV411) 20 (1388x1036, YUV422)	
Lens Mount	C-Mount, CS-Mount	
Scanning System	Progressive System	
Binning	Not support	
ROI	Partial Scan (Unit: 4x4)	
Trigger	Edge	Rising Edge or Falling Edge (Photo coupler)
	Mode	0, 1, 2, 4, 5, 15
	Source	External Trigger(Photo-coupler) or Software Trigger
Strobe	Support Normal Mode or Trigger Mode(Photo-coupler)	
Memory Save/Load	9 Channels(0:factory, 1~4:feature, 5~8:mode/feature)	
One-shot/Multi-shot	1 ~ 65535 Shots	
Control Functions	Brightness, Sharpness, Gamma, Auto-Exposure, Shutter, Gain, Hue Saturation, Auto White Balance, User Defined LUT	
Digital Interface / Transfer Rate	1000BT, RJ45 / 1Gbps	
Gain	0 ~ 18 dB (Manual or Auto control)	
Shutter Speed	1 usec ~ 3600 sec (Manual or Auto control)	
Data Depth	12 bit	
S/N Ratio	56dB or better	
Supply Voltage& Power	Less than 3.0W @12 VDC via 6-pin connector Less than 3.2W @ PoE	
External Dimension / Weight	29(W) x 29(H) x 51.1(D) mm / Approx 58g	
Operation Temp/ Storage Temp	-5°C to 45°C / -30°C to 60°C	
Camera Specification	AIA GigE Vision version 1.0	

Remark: Camera specification described above may be changed without notice

3.2.3. IMC-716G Specification

Features (IMC-716G)		
Image Sensor Type	1/3" Interline CCD (ICX445AQ)	
Effective pixels	1,251,936 pixels 1296(H) x 966(V)	
Picture Size	1288 x 964	
Cell Size(um)	3.75 um x3.75 um	
Real Frame Rate	30 (1288x960, Mono 8) 30 (1288x960, Mono 12) 55 (1288x960, YUV411) 55 (1288x960, YUV422)	
Lens Mount	C-Mount, CS-Mount	
Scanning System	Progressive System	
Binning	Not support	
ROI	Partial Scan (Unit: 4x4)	
Trigger	Edge	Rising Edge or Falling Edge (Photo coupler)
	Mode	0, 1, 2, 4, 5, 15
	Source	External Trigger(Photo-coupler) or Software Trigger
Strobe	Support Normal Mode or Trigger Mode(Photo-coupler)	
Memory Save/Load	9 Channels(0:factory, 1~4:feature, 5~8:mode/feature)	
One-shot/Multi-shot	1 ~ 65535 Shots	
Control Functions	Brightness, Sharpness, Gamma, Auto-Exposure, Shutter, Gain, Hue Saturation, Auto White Balance, User Defined LUT	
Digital Interface / Transfer Rate	1000BT, RJ45 / 1Gbps	
Gain	0 ~ 18 dB (Manual or Auto control)	
Shutter Speed	1 usec ~ 3600 sec (Manual or Auto control)	
Data Depth	12 bit	
S/N Ratio	56dB or better	
Supply Voltage& Power	Less than 2.7W @12 VDC via 6-pin connector Less than 2.5W @ PoE	
External Dimension / Weight	29(W) x 29(H) x 51.1(D) mm / Approx 58g	
Operation Temp/ Storage Temp	-5°C to 45°C / -30°C to 60°C	
Camera Specification	AIA GigE Vision version 1.0	

Remark: Camera specification described above may be changed without notice

3.2.4. IMC-715G2 Specification

Features (IMC-715G2)		
Image Sensor Type	1/3" Interline CCD (ICX692AQA)	
Effective pixels	948,328 pixels 1292(H) x 734(V)	
Picture Size	1280x720	
Cell Size(um)	4.08 um x4.08 um	
Real Frame Rate	30 (1280x720, GR8) 30 (1280x720, GR12) 30 (1280x720, YUV411) 30 (1280x720, YUV422)	
Lens Mount	C-Mount, CS-Mount	
Scanning System	Progressive System	
Binning	Not support	
ROI	Partial Scan (Unit: 4x4)	
Trigger	Edge	Rising Edge or Falling Edge (Photo coupler)
	Mode	0, 1, 2, 4, 5, 15
	Source	External Trigger(Photo-coupler) or Software Trigger
Strobe	Support Normal Mode or Trigger Mode(Photo-coupler)	
Memory Save/Load	9 Channels(0:factory, 1~4:feature, 5~8:mode/feature)	
One-shot/Multi-shot	1 ~ 65535 Shots	
Control Functions	Brightness, Sharpness, Gamma, Auto-Exposure, Shutter, Gain, Hue Saturation, Auto White Balance, User Defined LUT	
Digital Interface / Transfer Rate	1000BT, RJ45 / 1Gbps	
Gain	0 ~ 18 dB (Manual or Auto control)	
Shutter Speed	1 usec ~ 3600 sec (Manual or Auto control)	
Data Depth	12 bit	
S/N Ratio	56dB or better	
Supply Voltage& Power	Less than 2.7W @12 VDC via 6-pin connector Less than 2.5W @ PoE	
External Dimension / Weight	29(W) x 29(H) x 51.1(D) mm / Approx 58g	
Operation Temp/ Storage Temp	-5°C to 45°C / -30°C to 60°C	
Camera Specification	AIA GigE Vision version 1.0	

Remark: Camera specification described above may be changed without notice

3.2.5. IMC-715G Specification

Features (IMC-715G)		
Image Sensor Type	1/3" Interline CCD (ICX204AK)	
Effective pixels	805,486 pixels 1034(H) x 779(V)	
Picture Size	1028 x 772	
Cell Size(um)	4.65 um x4.65 um	
Real Frame Rate	35 (1028x772, GR8) 35 (1028x772, GR12) 35 (1028x772, YUV411) 35 (1028x772, YUV422)	
Lens Mount	C-Mount, CS-Mount	
Scanning System	Progressive System	
Binning	Not support	
ROI	Partial Scan (Unit: 4x4)	
Trigger	Edge	Rising Edge or Falling Edge (Photo coupler)
	Mode	0, 1, 2, 4, 5, 15
	Source	External Trigger(Photo-coupler) or Software Trigger
Strobe	Support Normal Mode or Trigger Mode(Photo-coupler)	
Memory Save/Load	9 Channels(0:factory, 1~4:feature, 5~8:mode/feature)	
One-shot/Multi-shot	1 ~ 65535 Shots	
Control Functions	Brightness, Sharpness, Gamma, Auto-Exposure, Shutter, Gain, Hue Saturation, Auto White Balance, User Defined LUT	
Digital Interface / Transfer Rate	1000BT, RJ45 / 1Gbps	
Gain	0 ~ 18 dB (Manual or Auto control)	
Shutter Speed	1 usec ~ 3600 sec (Manual or Auto control)	
Data Depth	12 bit	
S/N Ratio	56dB or better	
Supply Voltage& Power	Less than 2.7W @12 VDC via 6-pin connector Less than 2.5W @ PoE	
External Dimension / Weight	29(W) x 29(H) x 51.1(D) mm / Approx 58g	
Operation Temp/ Storage Temp	-5°C to 45°C / -30°C to 60°C	
Camera Specification	AIA GigE Vision version 1.0	

Remark: Camera specification described above may be changed without notice

3.2.6. IMC-712G Specification

Features (IMC-712G)		
Image Sensor Type	1/2" Interline CCD (ICX414AQ)	
Effective pixels	325,546 pixels 659(H) x 494(V)	
Picture Size	652 x 480	
Cell Size(um)	9.9 um x9.9 um	
Real Frame Rate	91 (652x484, GR8) 91 (652x484, GR12) 91 (652x484, YUV411) 91 (652x484, YUV422)	
Lens Mount	C-Mount, CS-Mount	
Scanning System	Progressive System	
Binning	Not support	
ROI	Partial Scan (Unit: 4x4)	
Trigger	Edge	Rising Edge or Falling Edge (Photo coupler)
	Mode	0, 1, 2, 4, 5, 15
	Source	External Trigger(Photo-coupler) or Software Trigger
Strobe	Support Normal Mode or Trigger Mode(Photo-coupler)	
Memory Save/Load	9 Channels(0:factory, 1~4:feature, 5~8:mode/feature)	
One-shot/Multi-shot	1 ~ 65535 Shots	
Control Functions	Brightness, Sharpness, Gamma, Auto-Exposure, Shutter, Gain, Hue Saturation, Auto White Balance, User Defined LUT	
Digital Interface / Transfer Rate	1000BT, RJ45 / 1Gbps	
Gain	0 ~ 18 dB (Manual or Auto control)	
Shutter Speed	1 usec ~ 3600 sec (Manual or Auto control)	
Data Depth	12 bit	
S/N Ratio	56dB or better	
Supply Voltage& Power	Less than 2.7W @12 VDC via 6-pin connector Less than 2.5W @ PoE	
External Dimension / Weight	29(W) x 29(H) x 51.1(D) mm / Approx 58g	
Operation Temp/ Storage Temp	-5°C to 45°C / -30°C to 60°C	
Camera Specification	AIA GigE Vision version 1.0	

Remark: Camera specification described above may be changed without notice

3.2.7. IMC-711G Specification

Features (IMC-711G)		
Image Sensor	1/3" Interline CCD (ICX424AQ)	
Effective Pixels	325,546 pixels 659(H) x 494(V)	
Picture Size	652 x 484	
Cell Size	7.40 um x7.40 um	
Real Frame Rate	92 (652x484, GR8) 92 (652x484, GR12) 91 (652x484, YUV411) 91 (652x484, YUV422)	
Lens Mount	C-mount, CS-Mount	
Scanning System	Progressive System	
Binning	Not support	
ROI	Partial Scan (Unit: 4x4)	
Trigger	Edge	Rising Edge or Falling Edge (Photo coupler)
	Mode	0, 1, 2, 4, 5, 15
	Source	External Trigger(Photo-coupler) or Software Trigger
Strobe	Support Normal Mode or Trigger Mode(Photo-coupler)	
Memory Save/Load	9 Channels(0:factory, 1~4:feature, 5~8:mode/feature)	
One-shot/Multi-shot	1 ~ 65535 Shots	
Control Functions	Brightness, Sharpness, Gamma, Auto-Exposure, Shutter, Gain, Hue Saturation, Auto White Balance, User Defined LUT	
Digital Interface / Transfer Rate	1000BT, RJ45 / 1Gbps	
Gain	0 ~ 18 dB (Manual or Auto control)	
Shutter Speed	1 usec ~ 3600 sec (Manual or Auto control)	
Data Depth	12 bit	
S/N Ratio	56dB or better	
Supply Voltage& Power	Less than 2.7W @12 VDC via 6-pin connector Less than 2.5W @ PoE	
External Dimension / Weight	29(W) x 29(H) x 51.1(D) mm / Approx 58g	
Operation Temp/ Storage Temp	-5°C to 45°C / -30°C to 60°C	
Camera Specification	AIA GigE Vision version 1.0	

Remark: Camera specification described above may be changed without notice

3.2.8. IMC-710G Specification

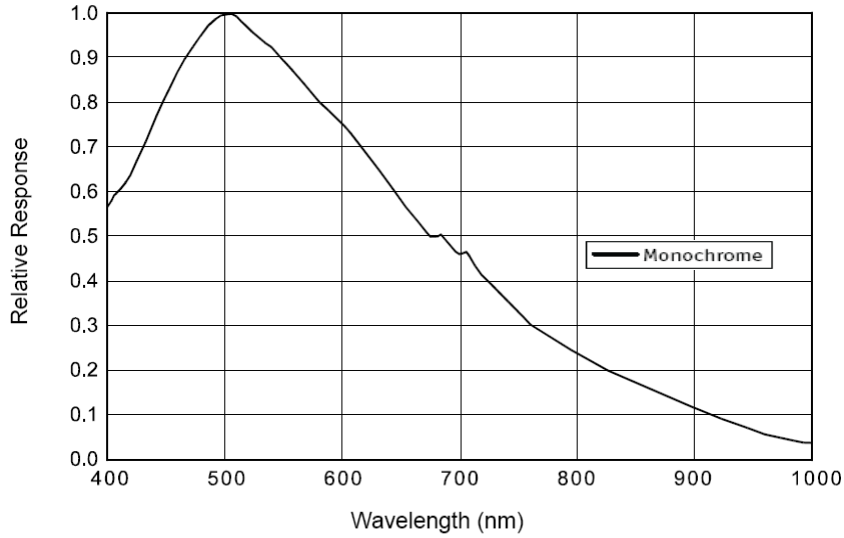
Features (IMC-710G)		
Image Sensor	1/4" Interline CCD (ICX618AQA)	
Effective Pixels	325,546 pixels 659(H) x 494(V)	
Picture Size	652 x 484	
Cell Size	5.60 um x 5.60 um	
Real Frame Rate	100 (652x484, GR8) 100 (652x484, GR12) 100 (652x484, YUV411) 100 (652x484, YUV422)	
Lens Mount	C-mount, CS-Mount	
Scanning System	Progressive System	
Binning	Not support	
ROI	Partial Scan (Unit: 4x4)	
Trigger	Edge	Rising Edge or Falling Edge (Photo coupler)
	Mode	0, 1, 2, 4, 5, 15
	Source	External Trigger(Photo-coupler) or Software Trigger
Strobe	Support Normal Mode or Trigger Mode(Photo-coupler)	
Memory Save/Load	9 Channels(0:factory, 1~4:feature, 5~8:mode/feature)	
One-shot/Multi-shot	1 ~ 65535 Shots	
Control Functions	Brightness, Sharpness, Gamma, Auto-Exposure, Shutter, Gain, Hue Saturation, Auto White Balance, User Defined LUT	
Digital Interface / Transfer Rate	1000BT, RJ45 / 1Gbps	
Gain	0 ~ 18 dB (Manual or Auto control)	
Shutter Speed	1 usec ~ 3600 sec (Manual or Auto control)	
Data Depth	12 bit	
S/N Ratio	56dB or better	
Supply Voltage& Power	Less than 2.7W @12 VDC via 6-pin connector Less than 2.5W @ PoE	
External Dimension / Weight	29(W) x 29(H) x 51.1(D) mm / Approx 58g	
Operation Temp/ Storage Temp	-5°C to 45°C / -30°C to 60°C	
Camera Specification	AIA GigE Vision version 1.0	

Remark: Camera specification described above may be changed without notice

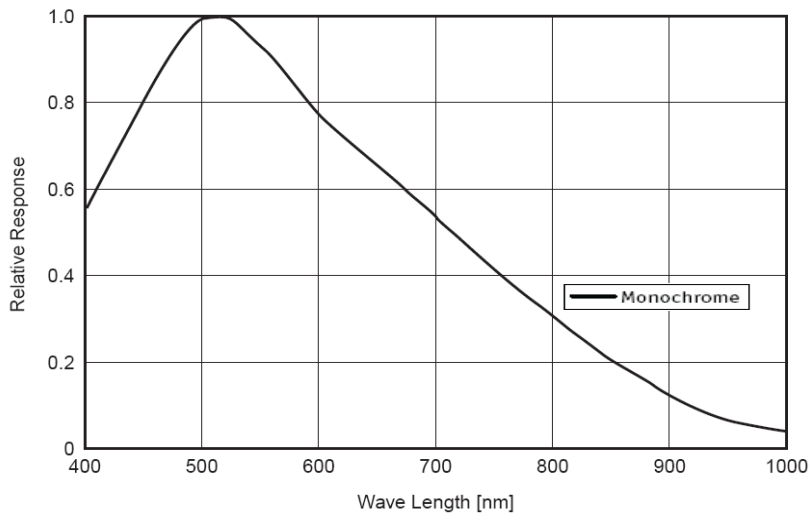
3.3. Spectral Sensitivity

Excludes lens and light source characteristics

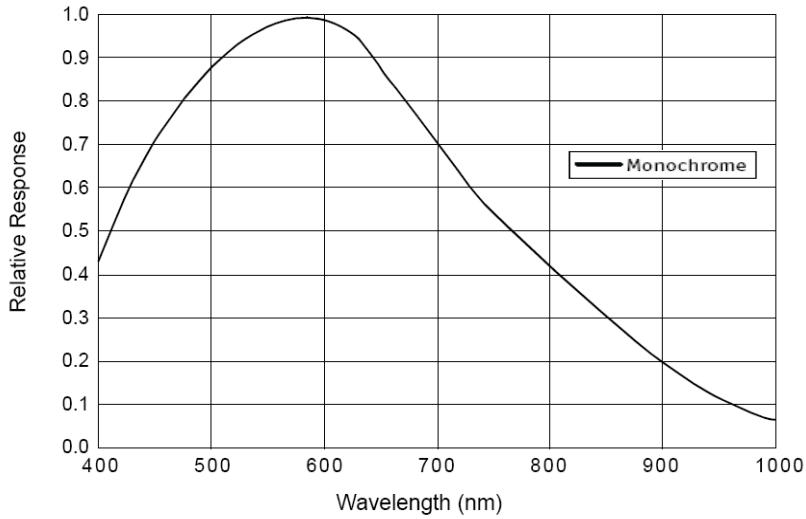
3.3.1. Amazon2 Series B&W Cameras



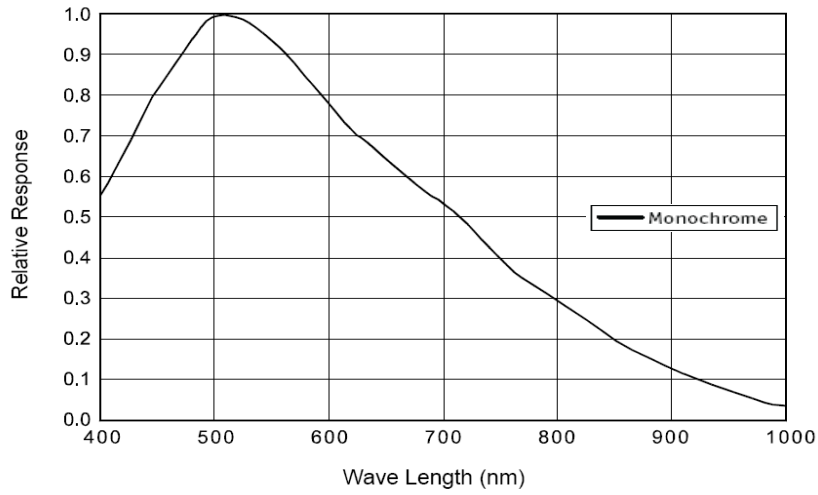
Spectral Response for IMB-720G



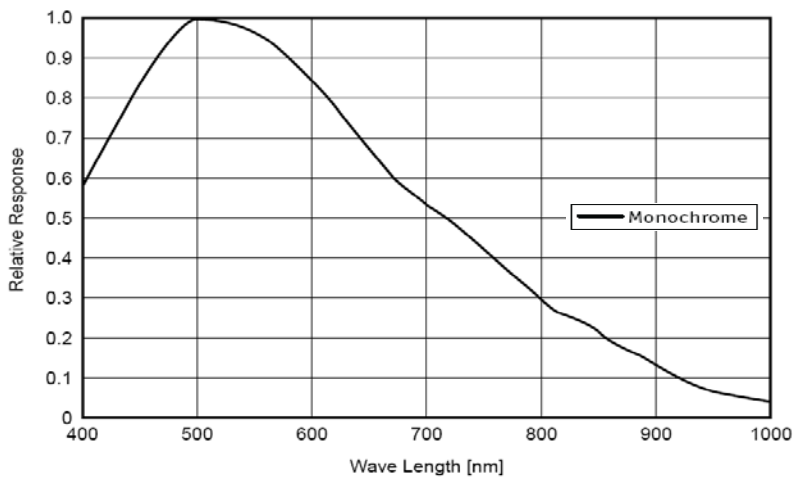
Spectral Response for IMB-717G



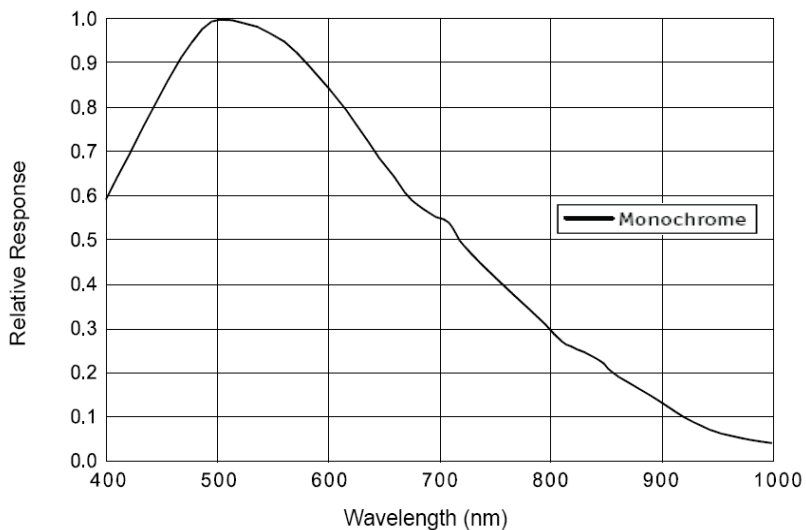
Spectral Response for IMB-716G



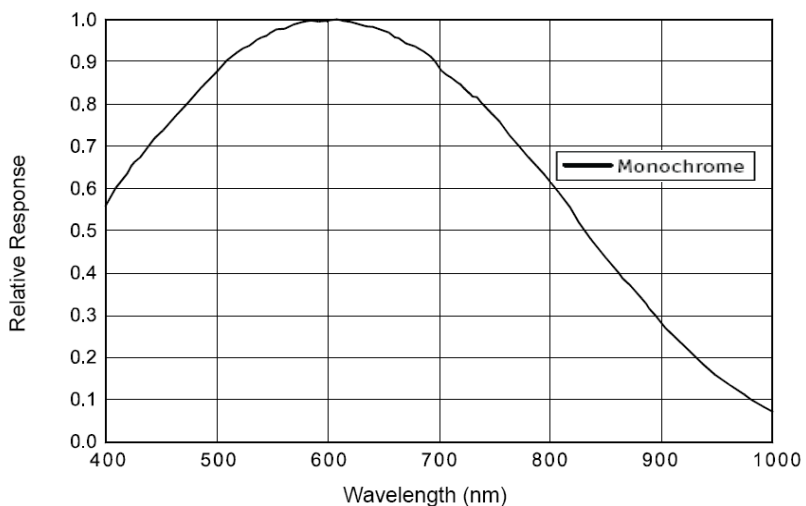
Spectral Response for IMB-715G



Spectral Response for IMB-712G

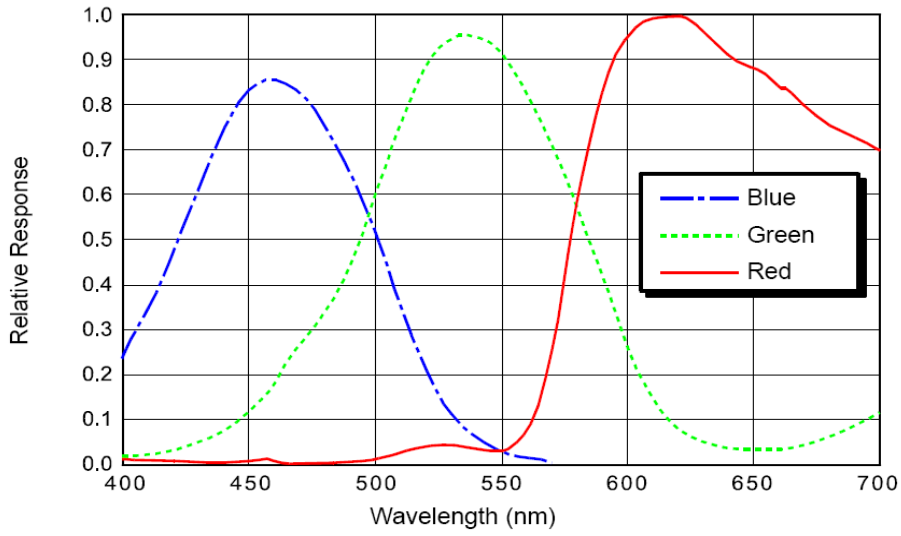


Spectral Response for IMB-711G

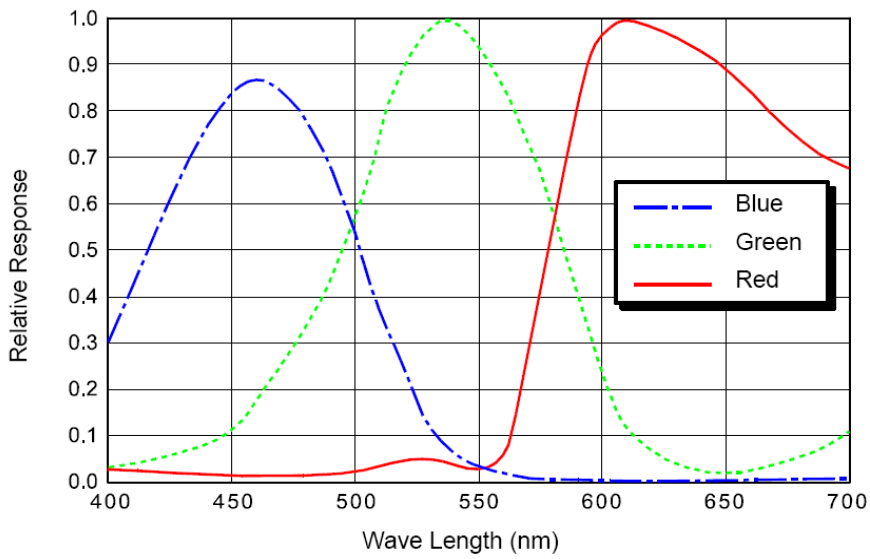


Spectral Response for IMB-710G

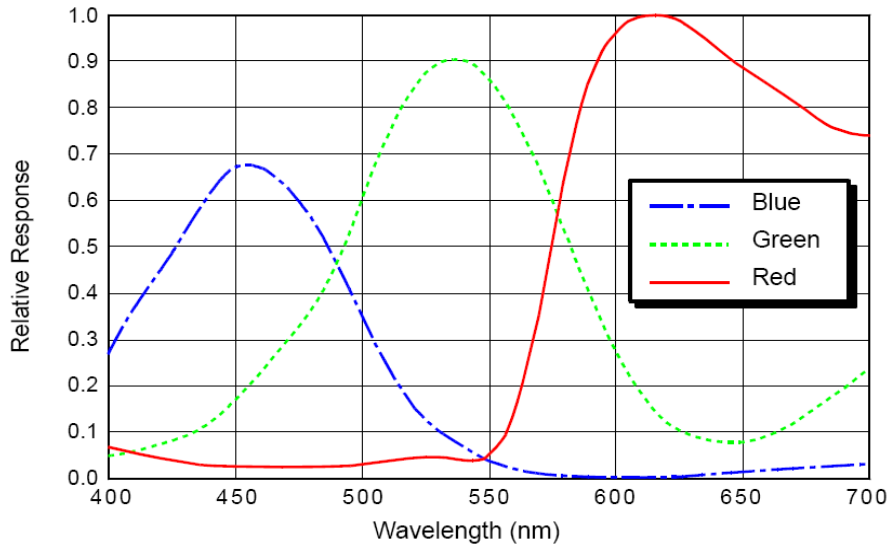
3.3.2. Amazon2 Series Color Cameras



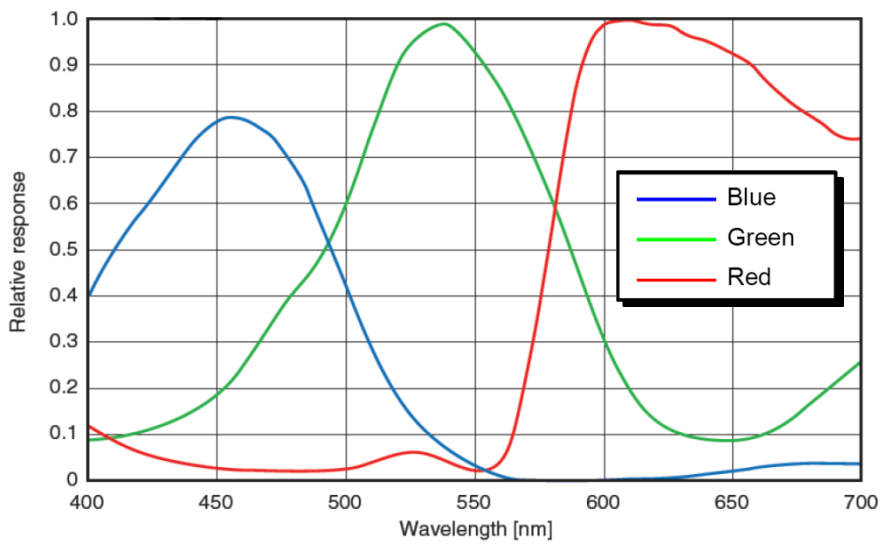
Spectral Sensitivity for IMC-720G



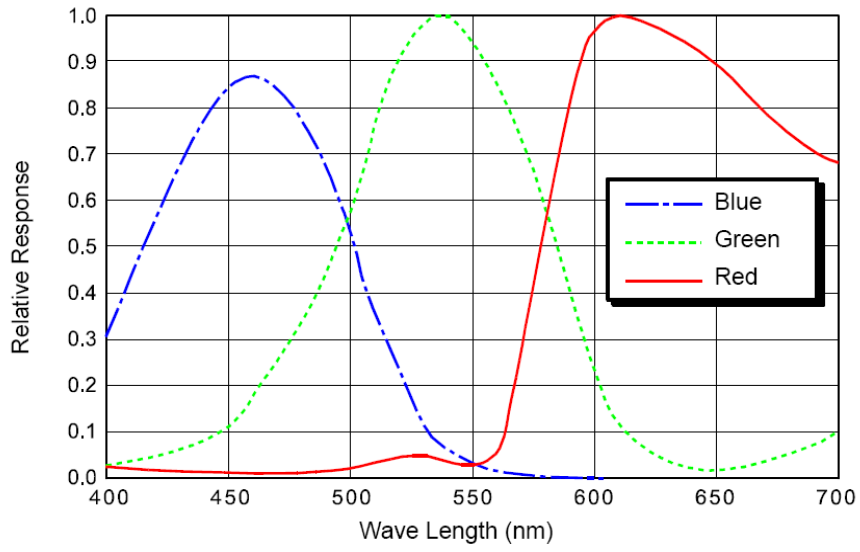
Spectral Sensitivity for IMC-717G



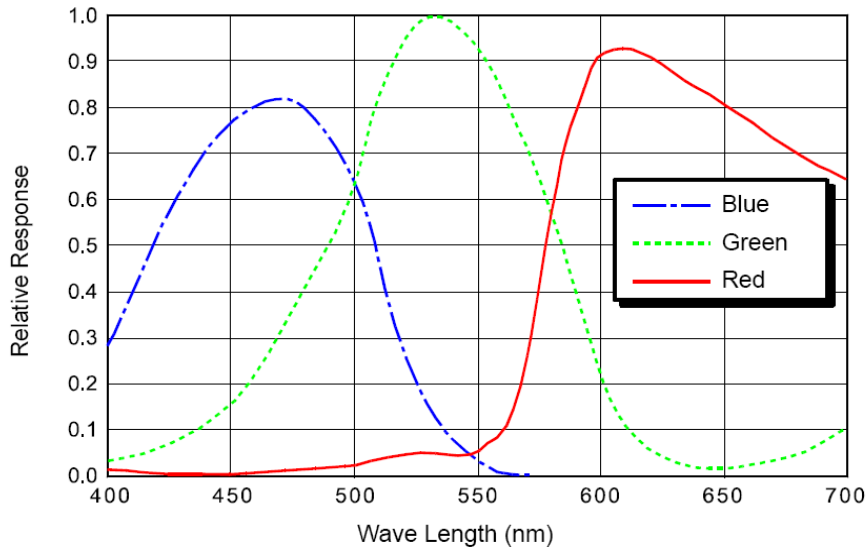
Spectral Sensitivity for IMC-716G



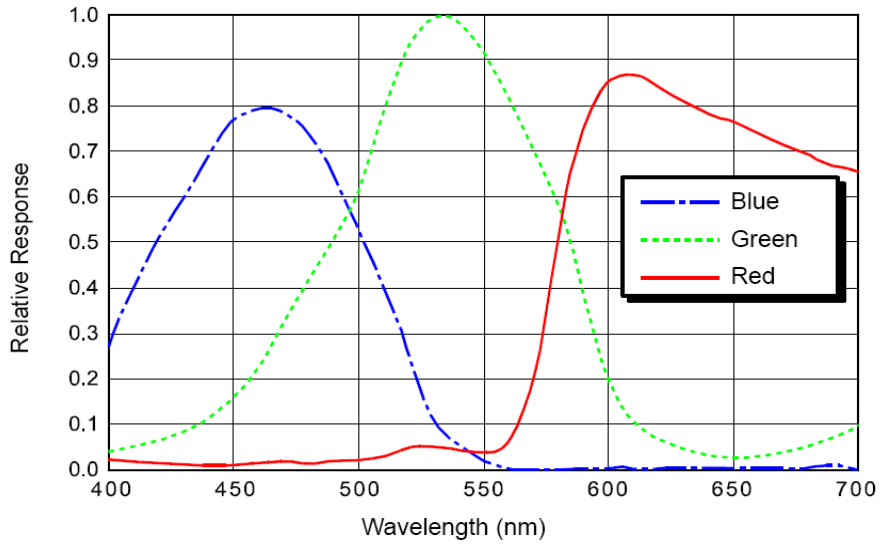
Spectral Sensitivity for IMC-715G2



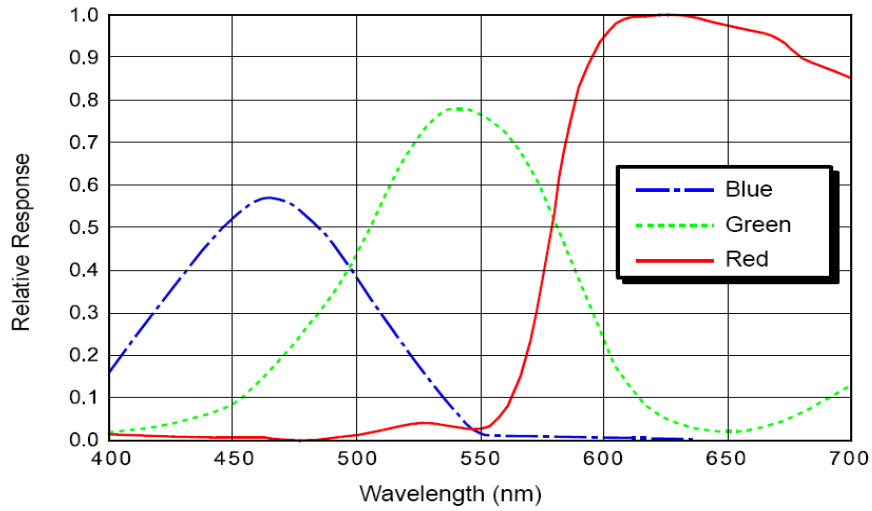
Spectral Sensitivity for IMC-715G



Spectral Sensitivity for IMC-712G



Spectral Sensitivity for IMC-711G



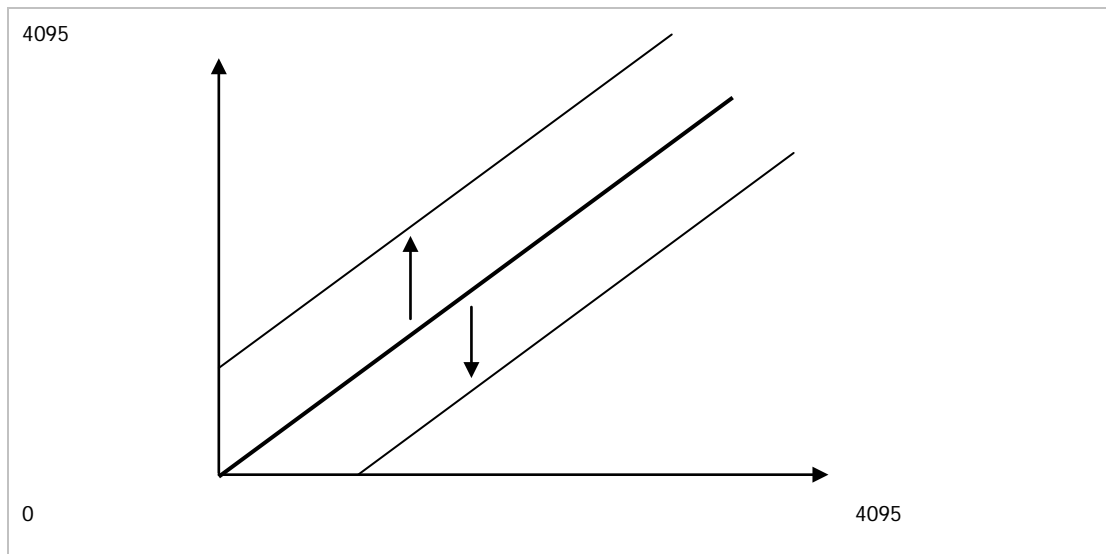
Spectral Sensitivity for IMC-710G

4. Basic Operation and Features

The Amazon2 Series employs a progressive scan CCD sensor which provides features according to each model. Basic functions and features are similar while each camera has its own specific function support. The Amazon2 Series fully supports the GigE Vision Standard with regard to registers, video format, mode of operation and control.

4.1. Brightness

Brightness of the camera can be controlled by changing the black level in the camera. The user can determine the setting of the camera and control it using the status control register. Adjust the brightness if the appropriate gradation cannot be obtained due to blurring of the black portions of the image. The parameters of Brightness are changed inside the camera. For brightness, the parameters are shifted by the black level.



Inquiry Register

Address	Name	Field	Bit	Description
F0F00500h	BRIGHTN ESS_INQ	Presence_Inq	[0]	Presence of this feature
		Abs_Control_Inq	[1]	Capability of control with absolute value
		-	[2]	Reserved
		One_Push_Inq	[3]	One push auto mode (Controlled automatically by camera only once)
		ReadOut_Inq	[4]	Capability of reading the value of this feature
		ON/OFF_Inq	[5]	Capability of switching this feature ON and OFF
		Auto_Inq	[6]	Auto Mode (Controlled automatically by camera)
		Manual_Inq	[7]	Manual Mode (Controlled by user)
		Min_Value	[8..19]	Minimum value for this feature control
Max_Value	[20..31]	Maximum value for this feature control		

Status Control Register

Address	Name	Field	Bit	Description
F0F00800h	BRIGHTNESS	Presence_Inq	[0]	Presence of this feature 0: N/A, 1: Available
		Abs_Control	[1]	Absolute value control 0: Control with value in Value field

				1: Control with value in Absolute value CSR if this bit =1, value in Value filed is ignored
		-	[2..4]	Reserved
		One_Push	[5]	Write '1': begin to work (Self cleared after the operation) Read : Value='1' in operation Value = '0' not in operation If A_M_Mode=1, this bit is ignored
		ON/OFF	[6]	Write: ON or OFF this feature Read: read a status 0: OFF, 1: ON If this bit=0, other fields will be read only.
		A_M_Mode	[7]	Write: Set the mode Read: Read a current mode 0: Manual, 1: Auto
		-	[8..19]	Reserved
		Value	[20..31]	Minimum value for this feature control

4.2. Auto Exposure Control

The automatic shutter/gain mode is based on a feedback loop which calculates the average pixel luminance. Then the average is compared with the exposure reference value, adjusting shutter and gain accordingly. This feature is similar to "Contrast Control"

Inquiry Register

Address	Name	Field	Bit	Description
F0F00504h	AUTO_EX POSURE_ INQ	Presence_Inq	[0]	Presence of this feature
		Abs_Control_Inq	[1]	Capability of control with absolute value
		-	[2]	Reserved
		One_Push_Inq	[3]	One push auto mode (Controlled automatically by camera only once)
		ReadOut_Inq	[4]	Capability of reading the value of this feature
		ON/OFF_Inq	[5]	Capability of switching this feature ON and OFF
		Auto_Inq	[6]	Automode (Controlled automatically by camera)
		Manual_Inq	[7]	Manual mode (Controlled by user)
		Min_Value	[8..19]	Minimum value for this feature control
Max_Value	[20..31]	Maximum value for this feature control		

Status Control Register

Address	Name	Field	Bit	Description
F0F00804h	AUTO_EX POSURE	Presence_Inq	[0]	Presence of this feature 0: N/A, 1: Available
		Abs_Control	[1]	Absolute value control 0: Control with value in the Value field 1: Control with value in the Absolute value CSR If this bit = 1, value in the Value field is ignored.
		-	[2..4]	Reserved
		One_Push	[5]	Write '1': begin to work (Self cleared after operation) Read: Value='1' in operation Value='0' not in operation If A_M_Mode =1, this bit is ignored
		ON_OFF	[6]	Write: ON or OFF this feature, Read: read a status

				0: OFF, 1: ON If this bit=0, other fields will be read only.
		A_M_Mode	[7]	Write: set the mode, Read: read a current mode 0: Manual, 1: Auto
		-	[8..19]	Reserved
		Value	[20..31]	Value: Write the value in Auto mode, this filed is ignored. If "ReadOut" capability is not available, read value Has no meaning

4.3. Sharpness

The sharpness control feature may be used to compensate low-pass effects caused, for instance, by the special color interpolation. If you do not prefer such signal manipulation, you may switch it OFF. For sharpness control inquiry and status register, follow the same definition as "BRIGHTNESS"

4.4. White Balance

Color models have the white balance feature which can be controlled automatically or manually. U/R(Red/Green) and V/B (Green/Blue) alter the degree to which Red and Blue CCD component pixels are weighed to form composite pixels. In manual mode you can adjust the white balance by altering the Blue (U/V) and Red Value (V/R). One Push and Auto White Balance are supportable for Color models.

Inquiry Register

Address	Name	Field	Bit	Description
F0F0050Ch	WHITE_B	Presence_Inq	[0]	Presence of this feature
		AL_INQ	Abs_Control_Inq	[1]
		-	[2]	Reserved
		One_Push_Inq	[3]	One push auto mode (Controlled automatically by camera only once)
		ReadOut_Inq	[4]	Capability of reading the value of this feature
		ON/Off_Inq	[5]	Capability of switching this feature ON and OFF
		Auto_Inq	[6]	Auto mode (Controlled automatically by camera)
		Manual_Inq	[7]	Manual mode (Controlled by user)
		Min_Value	[8..19]	Minimum value for this feature control
		Max_Value	[20..31]	Maximum value for this feature control

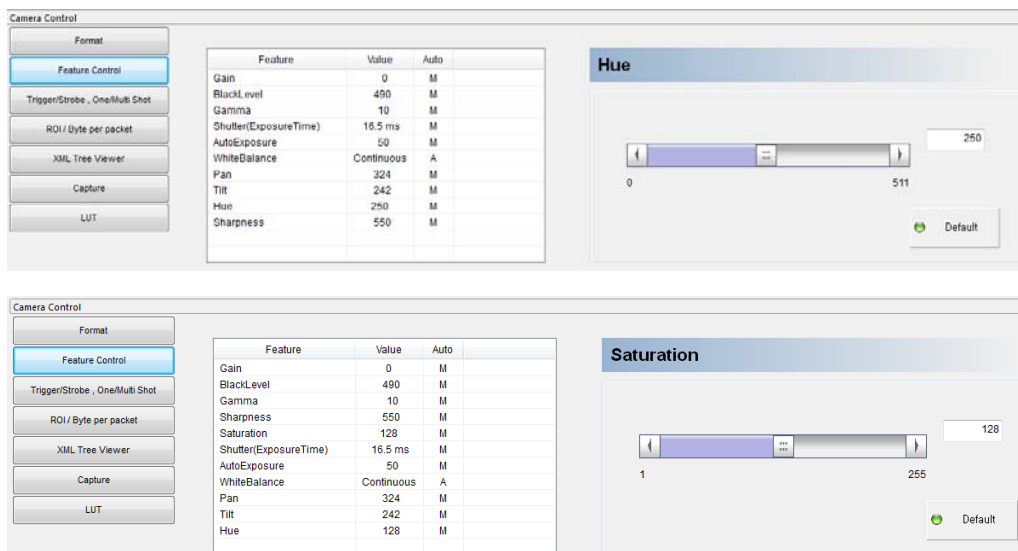
Status Control Register

Address	Name	Field	Bit	Description
F0F0080Ch	WHITE_B ALANCE	Presence_Inq	[0]	Presence of this feature. 0: N/A, 1: Available
		Abs_Control	[1]	Absolute value control 0: Control with value in the Value field 1: Control with value in the Absolute value CSR If this bit = 1, value in the Value field is ignored.

-	[2..4]	Reserved
One_Push	[5]	Write '1' :begin to work (Self cleared after operation) Read: Value='1' in operation Value='0' not in operation If A_M_Mode =1, this bit is ignored
ON_OFF	[6]	Write: ON or OFF this feature, Read: read a status 0: OFF, 1: ON If this bit=0, other fields will be read only.
A_M_Mode	[7]	Write: set the mode, Read: read a current mode 0: Manual, 1: Auto
-	[8..19]	U Value / B_Value. Write the value in AUTO mode, this field is ignored. If "ReadOut" capability is not available,, read value has no meaning.
Value	[20..31]	V Value / R_Value Write the value in AUTO mode, this field is ignored. If "ReadOut" capability is not available, read value has no meaning

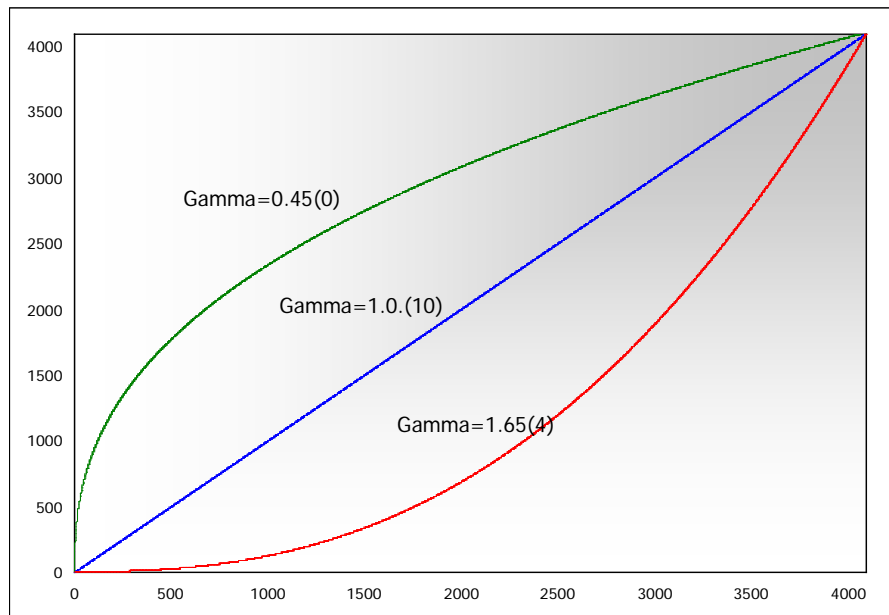
4.5. Hue & Saturation

Color models support Hue & Saturation(Only Color model) control which changes the color phase of the picture.



4.6. Gamma

Gamma control defines the function between incoming light level and output picture level. Factory default setting for Gamma is set to 1.0. Gamma value is adjustable in the range of 0.45 ~ 1.65 as per the table below. For Gamma control inquiry and status register, follow the same definition as "BRIGHTNESS"



Gamma Range Table

Gamma Value	0	1	2	3	4
Gamma	0.45	0.65	1.0	1.45	1.65

4.7. Shutter

Shutter is defined as the integration time of the incoming light where both the Manual and Auto Shutter are supported. The shutter range varies from 1us ~ 3600 sec. For Shutter control inquiry and status register, follow the same definition as "BRIGHTNESS"

Shutter Speed Value & Range

ShutterValue (Y)	Increment Step	Shutter Speed Time : T	
		Exposure Time	Range
1~500	1us	$T = Y \text{ us}$	1us ~ 500us
501~1000	10us	$T = (Y-500)*10+500 \text{ us}$	510us ~ 5500us
1001~1705	100us	$T = (Y-1000)*100+5500 \text{ us}$	5.6ms ~ 76ms
1706 ~ 2399	1ms	$T = (Y-1705)+76 \text{ ms}$	77ms ~ 770ms
2400~2902	10ms	$T = (Y-2399)*10+770 \text{ ms}$	780ms ~ 5800ms
2903~3304	100ms	$T = (Y-2902)*100+5800 \text{ ms}$	5.9s ~ 46s
3305~3508	1s	$T = (Y-3304)*1000+46000 \text{ ms}$	47s ~ 250s
3509~3843	10s	$T = (Y-3508)*10 + 250 \text{ s}$	260s ~ 3600s

Shutter Speed Example

Example Shutter Speed Table					
Shutter	Exposure Time	Shutter	Exposure Time	Shutter	Exposure Time
1	1us	1729	100ms	3378	2 min
10	10us	1829	200ms	3438	3 min
100	100us	2129	500ms	3513	5 min
500	500us	2422	1s	3525	7min
550	1ms	2522	2s	3543	10 min
650	2ms	2822	5s	3603	20 min
950	5ms	2944	10s	3663	30 min
1045	10ms	3044	20s	3723	40 min
1145	20ms	3318	60s	3783	50 min
1445	50ms	3323	65s	3843	60 min

4.8. Gain

Gain refers to the amount of the CCD output signal amplification where gain and shutter have similar effect on the image. Manual and Automatic gain mode are supported and manual adjustment is possible for the following range. For Gain control inquiry and status register, follow the same definition as "BRIGHTNESS"

Camera Type	Step Range	Range in dB	Increment Length
Monochrome Camera	0 ~ 511	0 ~ 18	approx. 0.0359 dB/step
Color Camera	0 ~ 511	0 ~ 18	approx. 0.0359 dB/step
Auto Gain	0 ~ 300		

4.9. Trigger & Strobe

The Amazon2 Series supports an external trigger by receiving input through the external trigger port. The falling edge and rising edge can be detected as a trigger according to the modes it supports; as per the following table. The user can control the trigger and the strobe timing. The Amazon2 Series can also be used with a software trigger that issues a trigger signal via software command. However, Software trigger is supportable for only the trigger mode 0, 15.

4.9.1. Supported Trigger

Trigger	Edge	Rising Edge or Falling Edge
	Mode	0, 1, 2, 4, 5, 15
	Method	Photo-coupler
	Source	External or Software Trigger

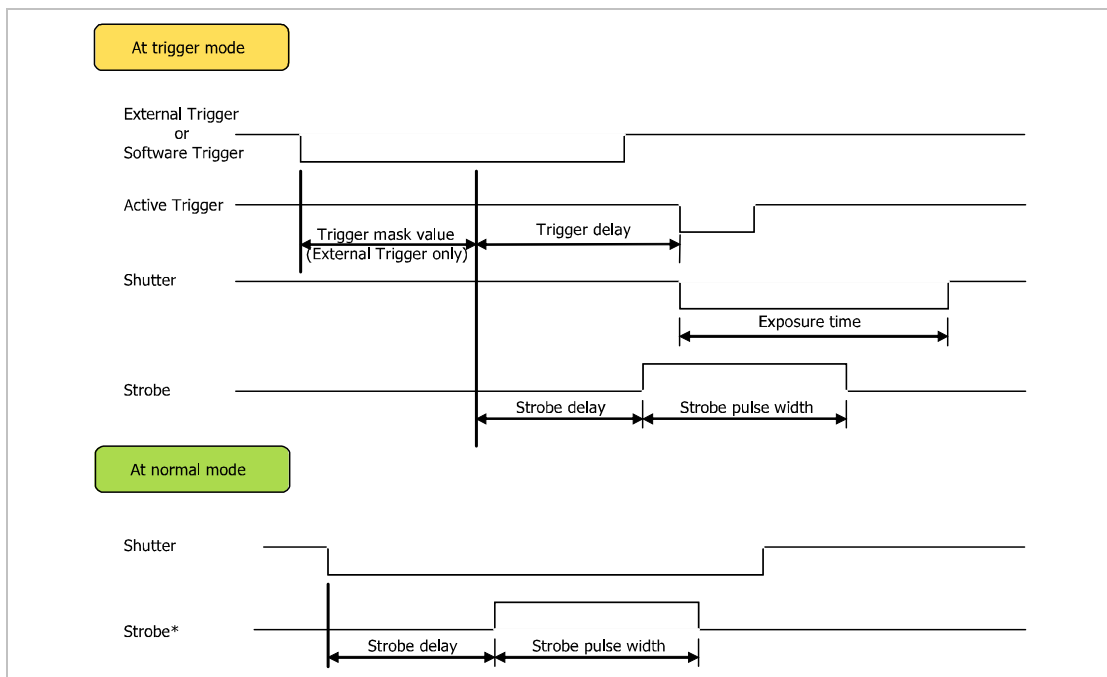
Inquiry Register

Address	Name	Field	Bit	Description
F0F00530h	TRIGGER_INQ	Presence_Inq	[0]	Presence of this feature
		Abs_Control_Inq	[1]	Capability of control with absolute value
		-	[2..3]	Reserved
		ReadOut_Inq	[4]	Capability of reading the value of this feature
		ON/OFF_Inq	[5]	Capability of switching this feature ON and OFF
		Polarity_Inq	[6]	Capability of changing polarity of trigger input
			[7..15]	Reserved
		Trigger_Mode0_Inq	[16]	Presence of Trigger Mode0
		Trigger_Mode1_Inq	[17]	Presence of Trigger Mode1
		Trigger_Mode2_Inq	[18]	Presence of Trigger Mode2
		Trigger_Mode3_Inq	[19]	Presence of Trigger Mode3
	[20..31]	Reserved		

Status Control Register

Address	Name	Field	Bit	Description
F0F00830h	TRIGGER_MODE	Presence_Inq	0	Presence of this feature 0: N/A, 1: Available
		Abs_Control	[1]	Absolute value control 0: Control with value in the Value field 1: Control with value in the Absolute value CSR If this bit = 1, value in the Value field is ignored.
		-	[2..5]	Reserved
		ON_OFF	[6]	Write: ON or OFF this feature Read: read a status 0: OFF, 1: ON If this bit=0, other fields will be read only.
		Trigger_Polarity	[7]	If Polarity_Inq is "1",Write to change polarity of the trigger input Read to get polarity of trigger input If Polarity_Inq is "0",Read only.(0: Low active input, 1: High active input)
		-	[8..11]	Reserved
		Trigger_Mode	[12..15]	Trigger mode.(Trigger_Mode_0-15)
		-	[16..19]	Reserved
-	Parameter	[20..31]	Parameter for trigger function, if required.	

4.9.2. Trigger and Strobe Signal Relation



Trigger overlapping function : max trigger frame rate speed up to normal mode frame rate.

At trigger mode 0 :

$$\text{Trigger max frame rate} = \frac{1}{1/\text{fps} + \text{trigger_delay}(0x0f00834) + \text{trigger_noise_filter}(0x2f10110) + 200 \text{ usec}}$$

If trigger delay = 0 and trigger noise filter is disabled, trigger max frame rate speeds up to frame rate at normal mode

Caution:
If the next trigger pulse interval is less than $(1/\text{fps} + \text{trigger_delay}(0x0f00834) + \text{trigger_noise_filter}(0x2f10110) + 200 \text{ usec})$, this trigger pulse may be lost.

At other trigger mode : equal to the previous frame rate.

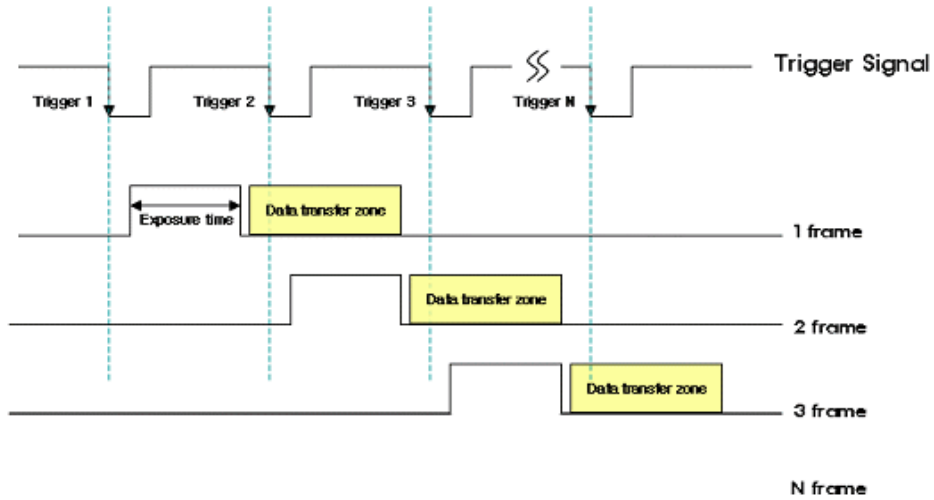
$$\text{Trigger max frame rate} = \frac{1}{1/\text{fps} + \text{shutter_time}(0x0f0081c) + \text{trigger_delay}(0x0f00834) + \text{trigger_noise_filter}(0x2f10110)}$$

If trigger interval is less than $(1/\text{fps} + \text{shutter_time})$, bar noise may be detected.

At trigger mode 0 :

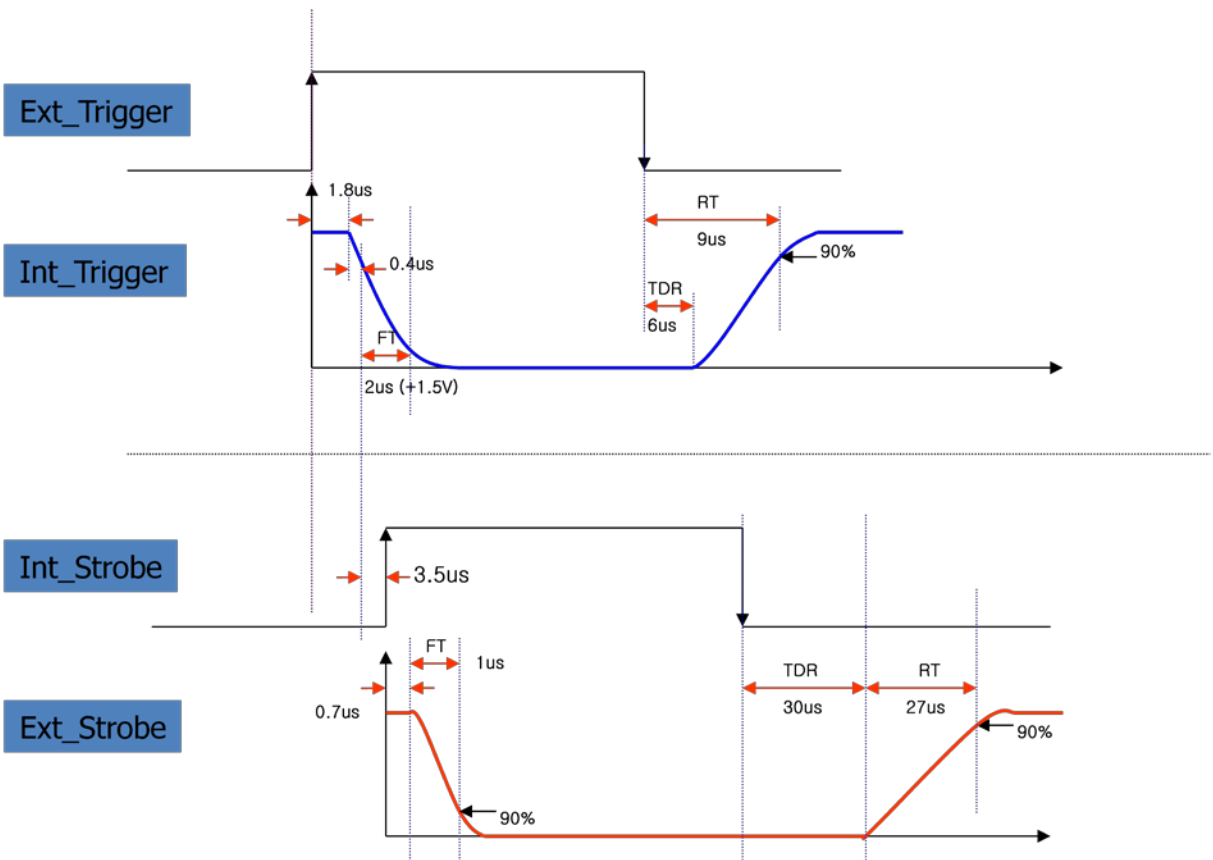
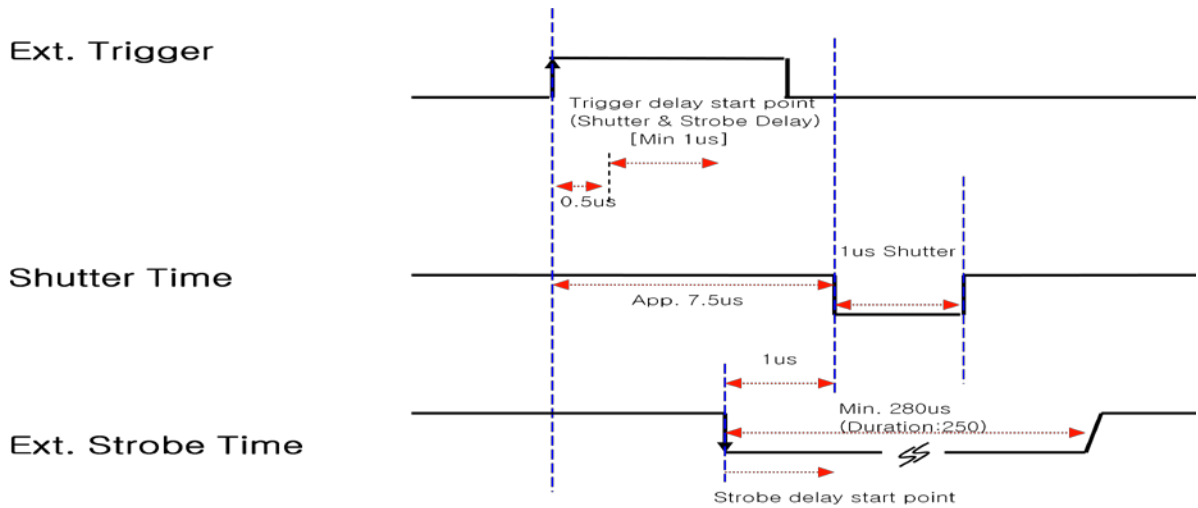
$$\text{Trigger max frame rate} = \frac{1}{1/\text{fps} + \text{trigger_delay}(0x0f00834) + \text{trigger_noise_filter}(0x2f10110) + 200 \text{ usec}}$$

If trigger delay = 0 and trigger noise filter is disabled, trigger max frame rate speeds up to frame rate at normal mode



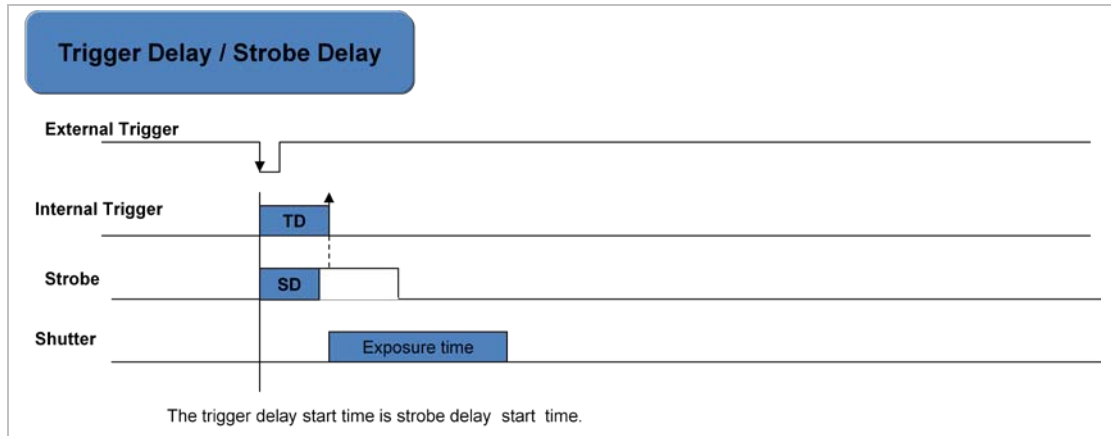
4.9.3. Timing Diagram for External Trigger and Shutter and Strobe

This diagram shows the necessary time related to each signal for External trigger and Shutter and Strobe.



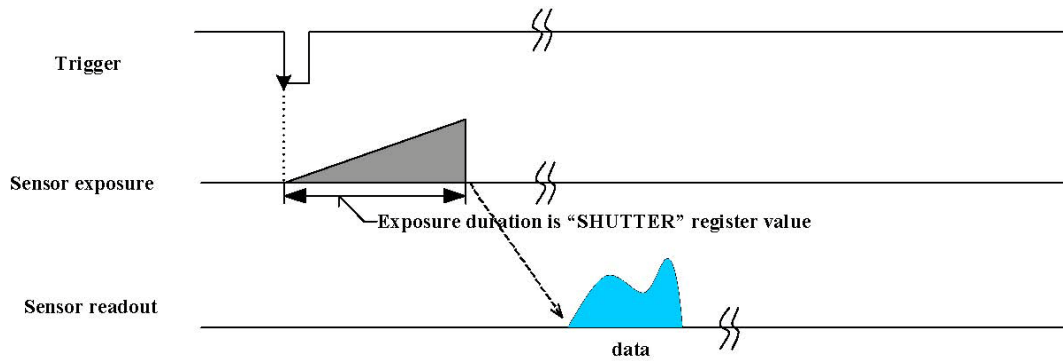
4.9.4. Trigger & Strobe delay

For Amazon2 series, the strobe signal starting point is almost the same as the exposure starting point



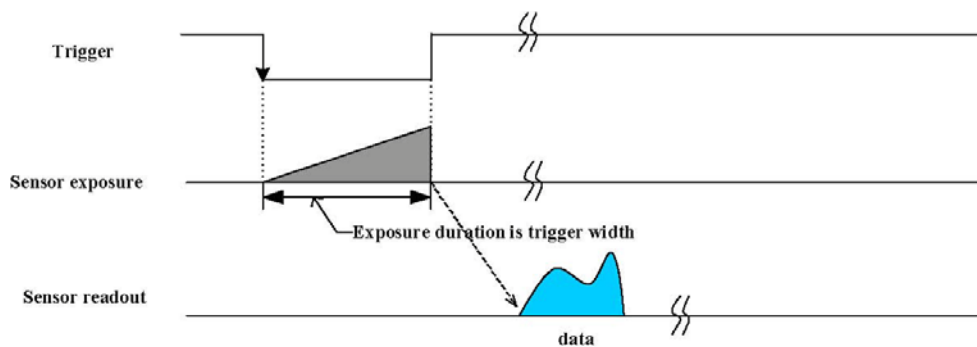
4.9.5. Trigger Mode 0

The camera starts the integration of the incoming light from the external trigger input falling edge. Integration time is described in the "Shutter" register. No parameter is needed. A Trigger delay is applied to mode 0 for H/W trigger. The Trigger in mode 0 is supported by both a H/W trigger and a S/W trigger.



4.9.6. Trigger Mode 1

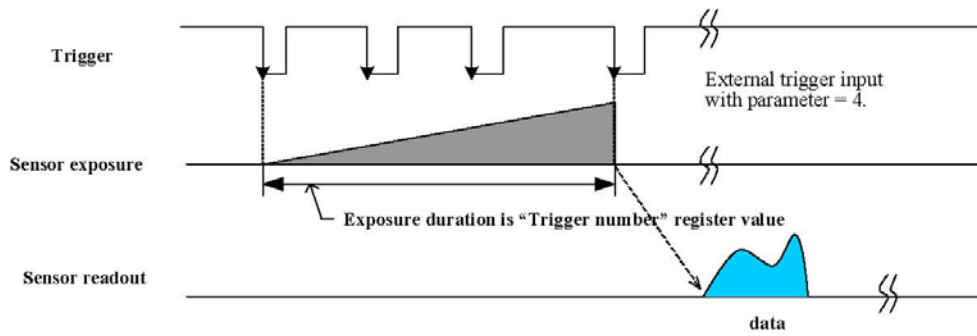
The camera starts integration of the incoming light from the external trigger input falling edge. Integration time is equal to the low state time of the external trigger input. No parameter is needed.



4.9.7. Trigger Mode 2

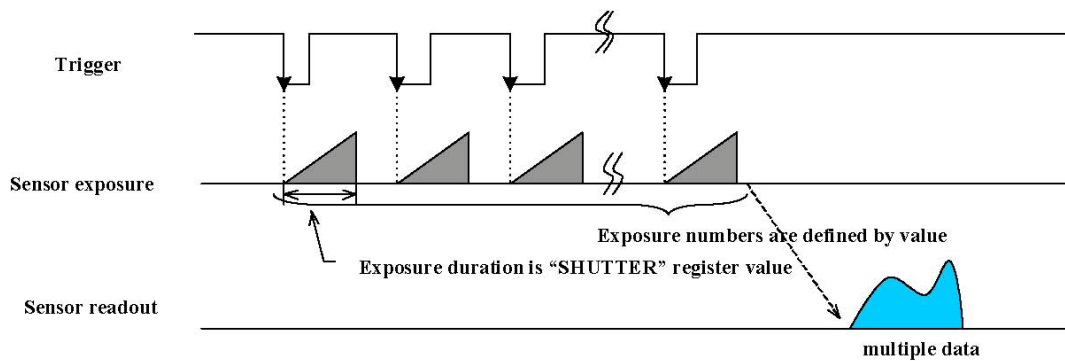
The camera starts integration of incoming light from the first external trigger input falling edge. At the N-th (parameter) external trigger input falling edge, integration will be stopped. A Parameter is required and shall be

two or more. (N >= 2)



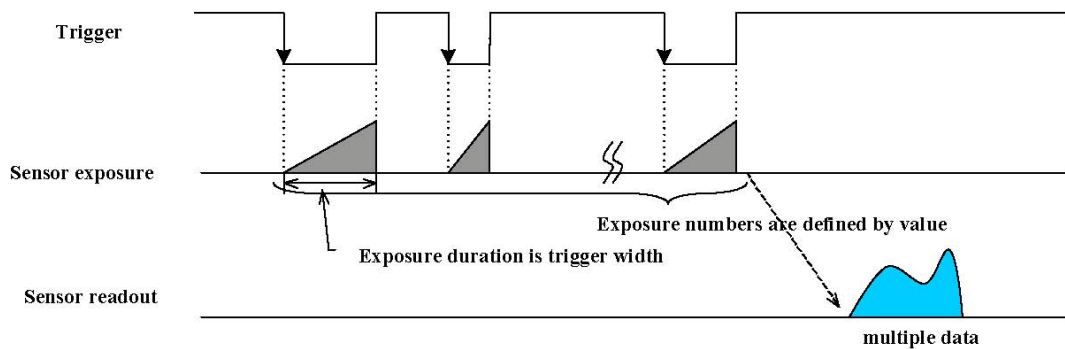
4.9.8. Trigger Mode 4

This mode is "multiple shutter preset mode". The camera starts integration of the incoming light from the first external trigger input falling edge and exposes the incoming light at shutter time. It repeats this sequence for the N-th (parameter) external trigger input falling edge; and then finishes integration. A parameter is required and shall be one or more. (N >= 1)



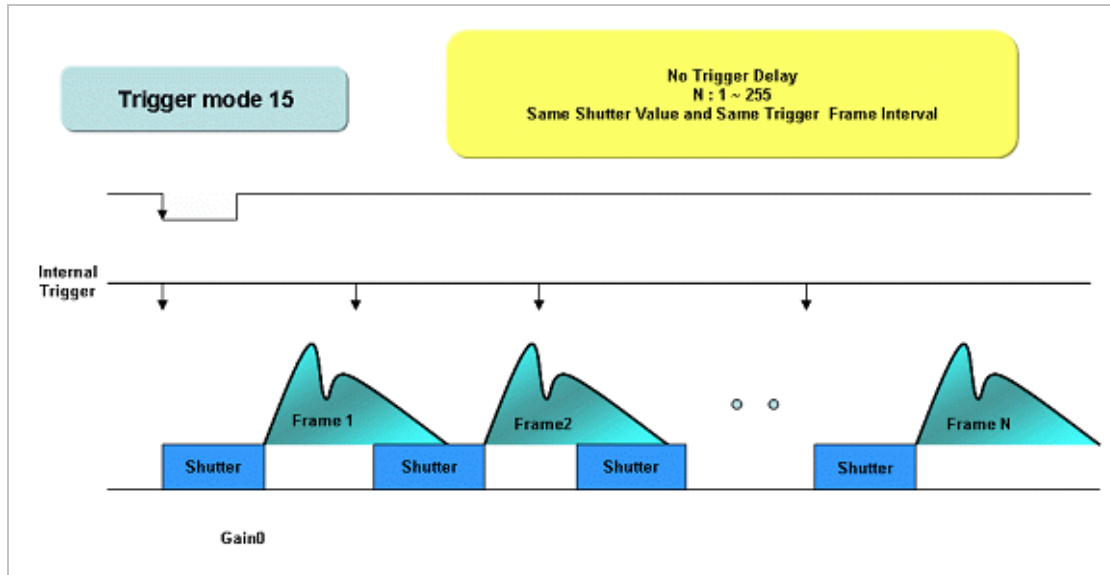
4.9.9. Trigger Mode 5

This mode is "multiple shutter pulse width mode". The camera starts the integration of the incoming light from the first external trigger input falling edge and exposes incoming light until the trigger is inactive. It repeats this sequence for the 'N'th (parameter) external trigger input falling edge and then finishes the integration. A Parameter is required and shall be one or more. (N >= 1)



4.9.10. Trigger Mode 15

Trigger mode 15 provides the new functions where the user may capture as many images as they want with a single external trigger signal. This mode is called 'One-trigger multi-frames'. For this Mode 15, the value of the shutter time should be fixed. Mode 15 is supported by both a H/W trigger and a S/W trigger.



				If Polarity_Inq is "0" Read only (0: low active output, 1: High active output)
		Delay_Value	[8..19]	Delay after start of exposure until the strobe signal asserts
		Duration_Value	[20..31]	Duration of the strobe signal A value 0 means dessert at the end of exposure function if required.
204h	Strobe_1_Cnt	Same definition to Strobe_0_Inq		
208h	Strobe_2_Cnt	Same definition to Strobe_1_Inq		
20Ch	Strobe_3_Cnt	Same definition to Strobe_2_Inq		
210h . . 2FFh	Reserved			

4.11. Trigger Delay Control

Based on external triggers, the users can delay image acquisition by the trigger delay control feature. The Amazon2 Series supports trigger delay control as per the following tables. **There is no support in software trigger mode.**

Trigger Delay Table

Mode	Value range	Trigger delay Time : T	
		DelayTime	Range
All Cameras	0 ~ 4000	T = Yus	0 usec ~ 4000 usec

Inquiry Register

Address	Name	Field	Bit	Description
F0F00534h	TRIGGER_DLY_IN Q	Presence_Inq	[0]	Presence of this feature
		Abs_Control_Inq	[1]	Capability of control with absolute value
		-	[2]	Reserved
		One_Push_Inq	[3]	One push auto mode (Controlled automatically by camera only once)
		ReadOut_Inq	[4]	Capability of reading the value of this feature
		ON/OFF_Inq	[5]	Capability of switching this feature ON and OFF
		Auto_Inq	[6]	Auto Mode (Controlled automatically by camera)
		Manual_Inq	[7]	Manual Mode (Controlled by user)
		Min_Value	[8..19]	Minimum value for this feature control
		Max_Value	[20..31]	Maximum value for this feature control

Status Control Register

Address	Name	Field	Bit	Description
F0F00834h	TRIGGER_DELAY	Presence_Inq	[0]	Presence of this feature 0: N/A 1: Available
		Abs_Control	[1]	Absolute value control 0: Control with value in Value field 1: Control with value in Absolute value CSR if this bit =1, value in Value filed is ignored
		-	[2..5]	Reserved
		ON/OFF	[6]	Write : ON or OFF this feature Read : read a status 0: OFF, 1:ON If this bit=0, other fields will be read only.
		-	[7..19]	Reserved
		Value	[20..31]	Minimum value for this feature control

4.11.1. Strobe Delay / Duration Table

The table shows the strobe index by increment step through the strobe delay time and the strobe duration time.

The increment step is different depending on the strobe index.

Strobe Delay Table			
Strobe Index (Y)	Increment Step	Strobe Delay Time	
		Delay Time	Range
0 ~ 3900	1 us	T=Y us	0 ~ 3900 us

Strobe Duration Table			
Strobe Index (Y)	Increment Step	Strobe Delay Time	
		Delay Time	Range
1 ~ 200	250 us	T=Y*250 us	250 us ~ 50 ms

Index and Time Table for Strobe Delay and Duration			
Delay Index (Y)	Strobe Delay Time	Duration Index (Y)	Strobe Duration Time
0	0 us	1	250 us
1	1 us	2	500 us
2	2 us	3	750 us
10	10 us	4	1 ms
100	100 us	10	2.5 ms
1000	1000 us	100	25 ms
3900	3900 us	200	50 ms

4.11.2. Color (Bayer) Patterns Conversions

Color sensors capture images through an optical low pass filter which is coated over the individual pixels in Bayer mosaic layout. Imaged data is transferred to the PC for color processing of the Bayer Pattern; which saves bandwidth and achieves higher frame rate and flexibility. Images can be processed in the computer by any of the following four different conversion algorithms.

Modes	Mode 0 GB/RG	Mode 1 BG/GR	Mode 2 RG/GB	Mode 3 GR/BG
Color(Bayer) Pattern				

5. Advanced Features

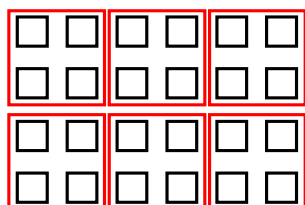
5.1. Binning Mode

Binning is defined as reading neighboring pixel from the CCD and combining them to create one pixel value. Binning has an advantage in the following situations as well as in various applications. Relative binning mode per camera model is described in each camera specification.

- Low Light Operation: Combining neighboring pixels increases the area of the unit pixel receiving light and may obtain a brighter picture in low light conditions with a possible noise reduction.
- High Frame Rate Operation: Vertical Binning accelerates the speed of the CCD data transfer rate by combining multiple vertical line per single horizontal line of the CCD; resulting in a significant gain in frame rate

5.1.1. Full Binning

Full binning mode can be obtained by combining both vertical and horizontal binning. First horizontal pixels are combined; followed by a vertical conjunction of these pixels. This would increase light sensitivity by a factor of 4 in case of 2 x 2 (Horizontal x Vertical) binning. However as described above, only vertical binning would result in a speed gain while horizontal binning gives no speed gain. Thus the speed gain result is similar to vertical binning. Resolution in this mode would be reduced both horizontally and vertically.



2x2 Full Binning
Example

5.2. Partial Scan

Cameras provide a certain resolution which is dictated by the image sensor. Often, a certain region may be of interest to the user. Partial scan mode provides the function to capture a certain region of interest (ROI) which can provide an advantage in data transfer speed, resulting in a faster operation. As described in binning mode, the speed gain would occur only if vertical resolution decreases. Partial scan is only supported by setting the following registers. Unit size of the partial scan is described in the camera specification, which the user must consider in setting the increment configuration.

IMAGE_POSITION & IMAGE_SIZE register

Left = Hposunit * n1

Top = Vposunit * m1

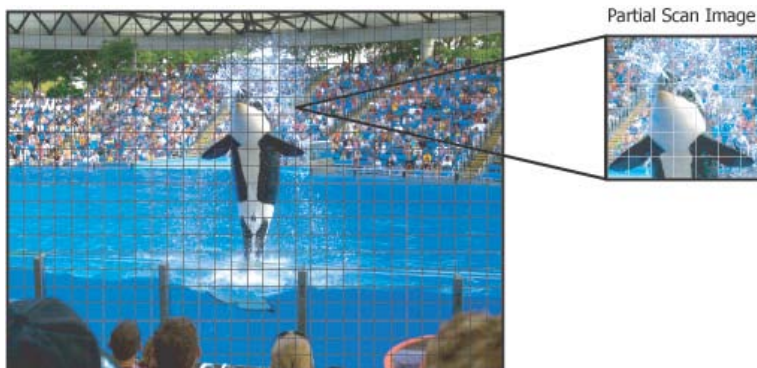
Width = Hunit * n2

Height = Vunit * m2

0 - 7	8 - 15	16 - 23	24 - 31
Left		Top	
0 - 7	8 - 15	16 - 23	24 - 31
Width		Height	

Left + Width < = Hmax
 Top + Height < = Vmax
 (n1,n2, m1, m2 are integers)

Initial Values	System Dependant
Read Values	Last Update Value
Write Effect	Stored



5.3. One-Shot and Multi-Shot

This camera supports One-Shot and Multi-Shot features. The camera should be in ISO disabled mode before the execution of these commands. If the camera is in ISO enabled mode, these commands are ignored.

One-Shot is used to grab only one frame. Multi-Shot is used to grab 1~65,535 frames.

Caution : One-Shot and Multi-Shots are not supported in trigger mode

One-Shot		Multi-Shot	
Address	F0F0061CH	Address	F0F0061CH
Data	80000000h	Data	4000nnnh

nnn is the number of output frames which can be any number between 0001h ~ FFFFh.(1~ 65,535)

Priority of the command execution is as follows. Continuous > One-Shot > Multi-Shot.

When a command with higher priority is being executed; the command with lower priority will be ignored

5.4. Time Stamp Register.

Time Stamp register is defined in GigE Vision specification as a standard register. Please refer to the GigE vision specification V1.0 for details.

The details and register settings are found in address 0x0944 ~0x94C.

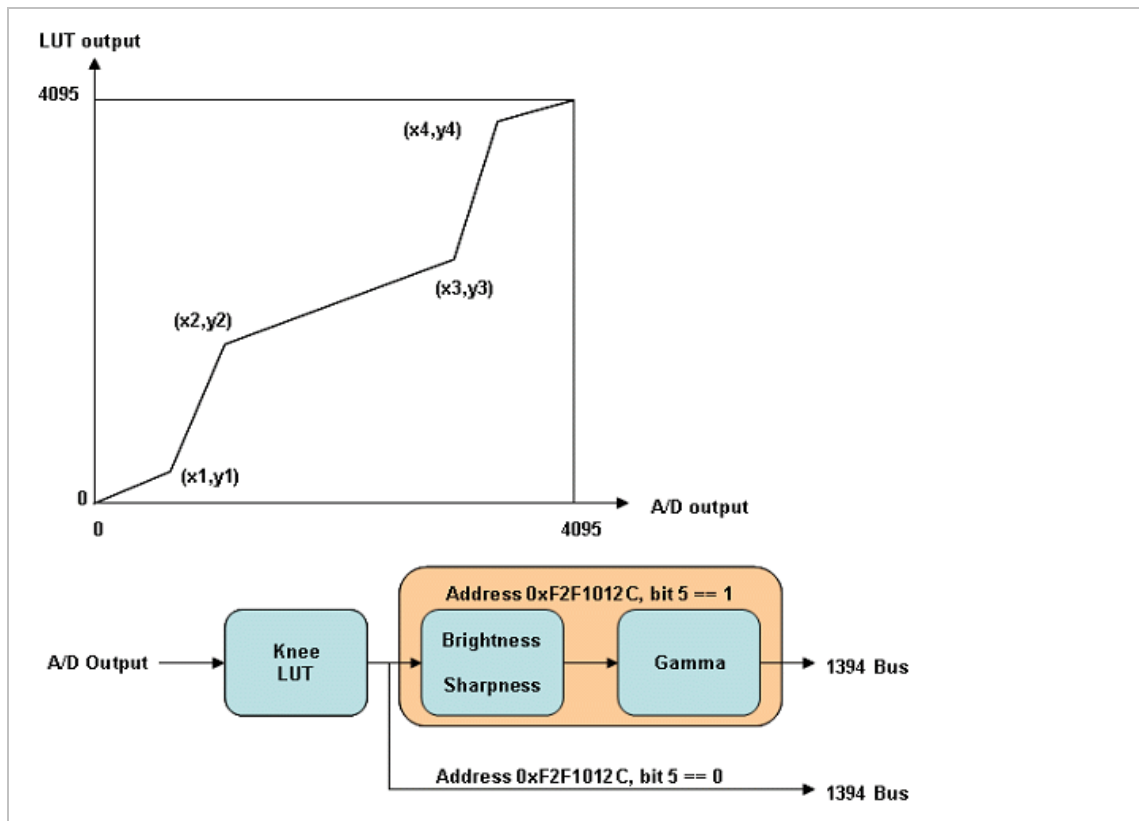
5.5. LUT (Lookup table)

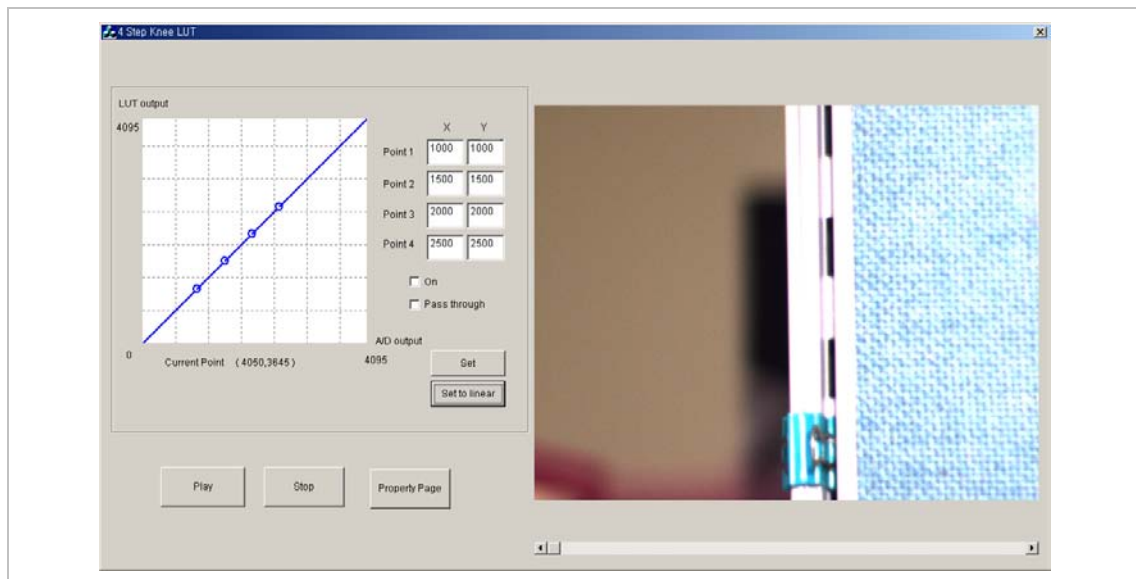
The Amazon2 series supports an LUT, which provides the user with an image comprised of the user's defined dynamic range. Through the LUT, the user can process the images from saturation to dark. The LUT can be used optionally with Brightness, Sharpness and Gamma. However, the LUT is applied prior to the features like Brightness, Sharpness and Gamma.

(Priority: LUT > Brightness, Sharpness and Gamma)

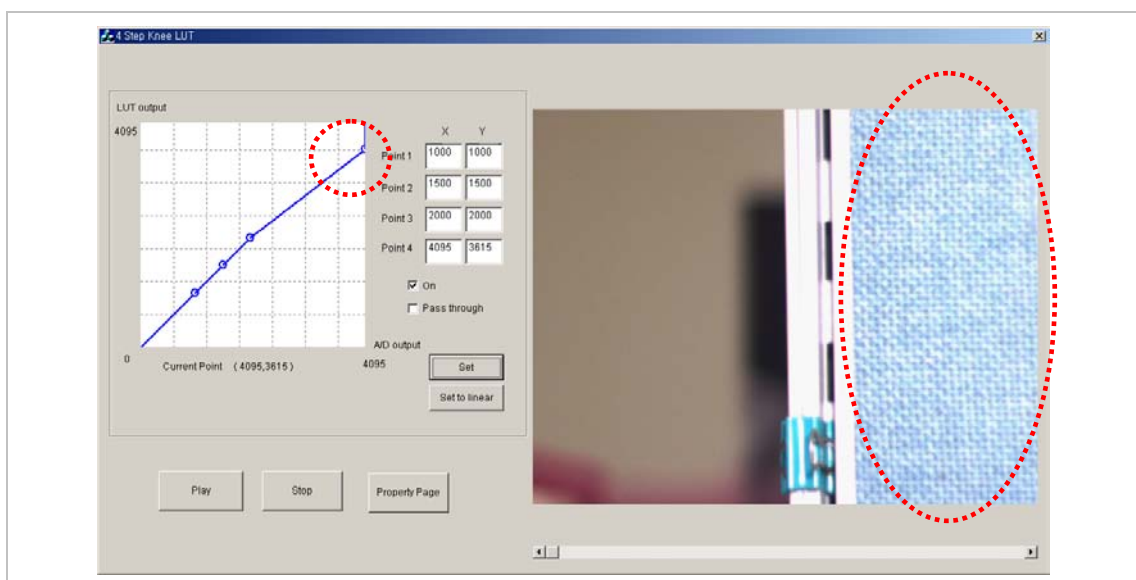
5.5.1. 4 step knee lookup table

The user can set the 4 points for the images, called the knee, and apply them to the LUT.





Before Image (before 4 points LUT)

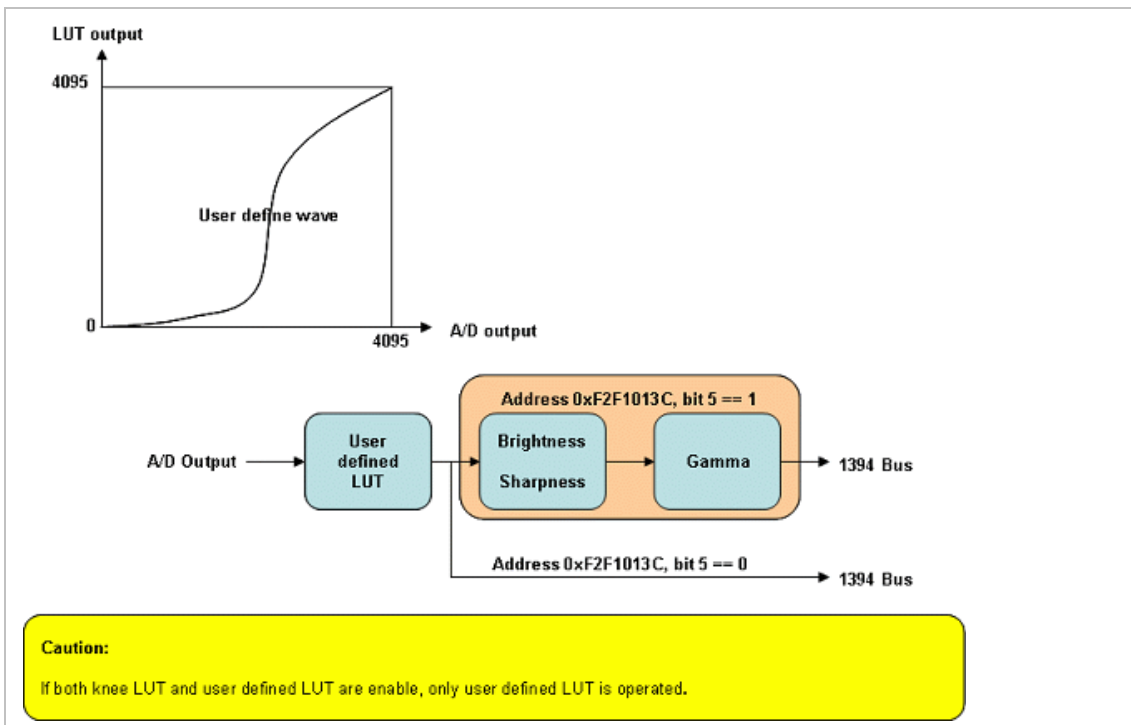


After Image (after 4 points LUT)

5.5.2. User defined lookup table

The user can set defined points (data file) for the images and apply them to the LUT. User's defined LUT running procedure is as follows. LUT index is N(0~15). The total index number of user's defined LUT is 16, but only one user defined LUT is used at a time.

Priority: User's defined LUT > 4 point LUT > Features (Brightness, Sharpness and Gamma)

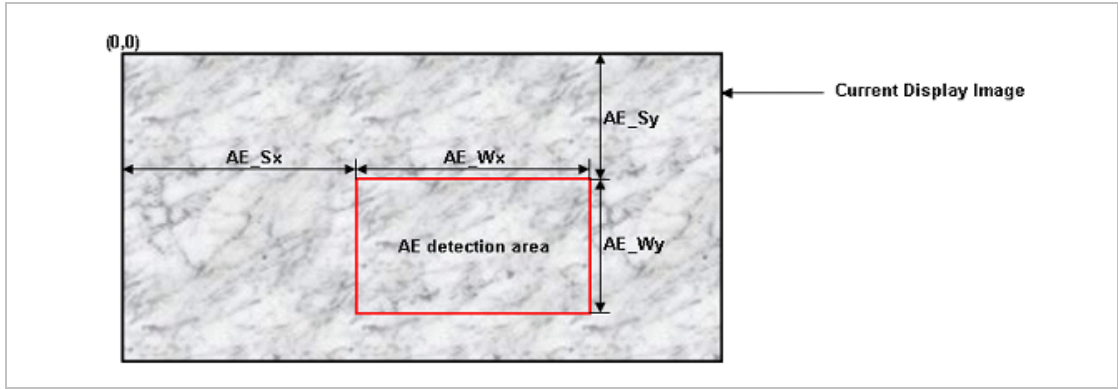


The user defined LUT save procedure is as follows:

1. Check the save ready bit (bit1) status of the LUT save control register (0xF2F10140). If bit 1 is 0, wait.
2. Write 1 at the LUT buffer address init bit (bit7) of the LUT save control register (0xF2F10140): 0xF2F10140 (<= 0x01000000).
3. Then write 4096 LUT data at the LUT data register (0xF2F10144).
4. Finally, write save command (bit0), LUT index (N: bit8-bit11) at the LUT save control register (0xF2F10140): 0xF2F10140 (<= 0x80N00000).

5.6. User defined AE

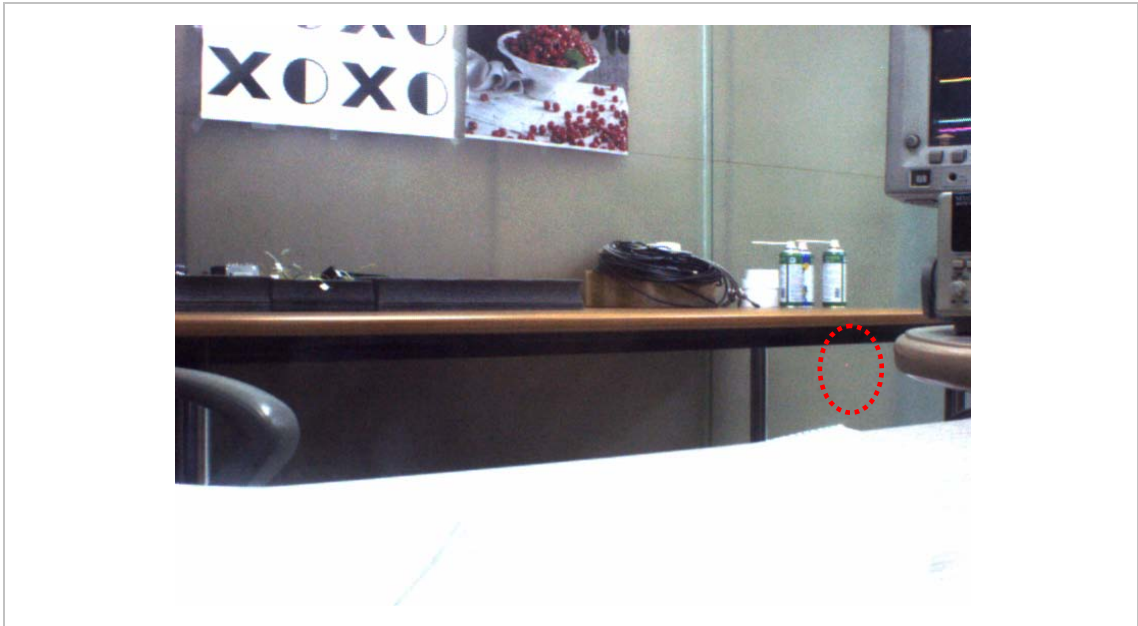
The user can get the interested area image by controlling the AE X-axis value and the AE Y-axis value for the specific area of any image that they want.



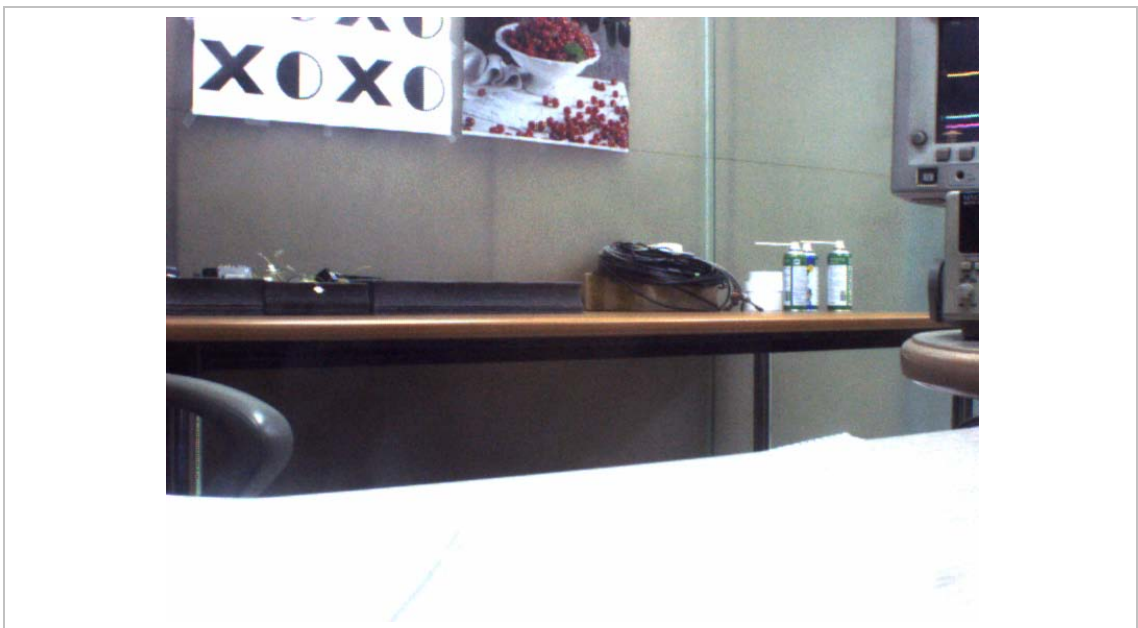
5.7. One Pixel Snow Noise Remove

This is to average the value of snow noise per pixel by using the neighboring pixel values. The operation scheme is as follows: If $((Pi-Pi-1) > \text{Threshold} * 16)$ and $((Pi-Pi+1) > (\text{Threshold} * 16))$, Pi is a bad pixel. Color cameras have no bad pixel remove function. This function is to increase the average values for the whole image and be automatically displayed. The images can be compensated by up to 50%. The address for this function is as listed below.

Address	Description (bit 0: msb)	Read/Write
0xF2F20150	<p>One Pixel Snow Noise Removal Bit 0: presence inquiry (read only) Bit 1 ~ Bit 5: reserved Bit 6: ON/OFF Bit 7: grid noise filter enable for GR8 mode at color camera (0:disable, 1:enable) Bit 8~Bit23: reserved Bit 24~Bit31: Threshold Value (T): If pixel difference value > Threshold Value, then replace with the near pixel average value</p> <p>One Pixel Snow Noise Removal Bit 0: presence inquiry (read only) Bit 1 ~ Bit 5: reserved Bit 6: ON/OFF Bit 7~Bit23: reserved Bit 24~Bit31: Threshold Value (T): If pixel difference value > Threshold Value, then replace with the near pixel average value</p>	Write only



Before snow noise image



After snow noise removal

5.8. PIO Control Register

The Programmed Input / Output provides a set of I/O ports which can be configured by the defined address. The PIO control register address, for strobe and trigger signal, is as follows.

Address	Description (bit 0: msb)	Read/Write
0xF2F21000	PIO output register Bit 30: Strobe GPIO output	Write only
0xF2F21004	PIO input register Bit 31: Trigger GPIO input	Read only
0xF2F21008	PIO GPIO enable register. Bit 30: Strobe pin GPIO selector (1: GPIO, 0: strobe)	Read/Write

6. User Defined Registers

User defined registers are IMI specific feature registers which IMI cameras are capable of implementing. The user can utilize extended features of the IMI specific register for an application.

6.1. User Defined Address

Address	Description(bit : msb*)	Read/Write
0xF2F10000	<p>A/D bit resolution Bit 28~Bit31 : A/D bit resolution Please refer to GigE Vision version 1.0 data depth register(address:0xF0F00630)</p> <p>12 Bit A/D_Resolution</p>	Read only
0xF2F10004	<p>Auto shutter-speed maximum/minimum value register. (32bit) In auto shutter mode, the shutter speed value is checked between the auto shutter-speed maximum value and the minimum value</p>	Read/Write
0xF2F10008	<p>Auto gain maximum/minimum value register. *(32bit) In auto gain mode, the gain value is checked between the auto gain maximum value and the minimum value.</p>	Read/Write

0xF2F10018	Mode control register Bit 30: SIO enable mode (0: IMI-TECH mode, 1: path through)	Read/Write
0xF2F10110	Trigger noise filter register (External trigger only) Bit 22~Bit 31: trigger masking range (M, unit: usec, range: 0~999)	Read/Write
0xF2F1011C	Power on default memory channel Bit 0 ~ Bit 3: power on initial memory channel	Read/Write
0xF2F10200	Camera version register Bit 16~Bit 31: camera version (ex: If reading value: 0x00003000, camera version is 3.000)	Read only
0xF2F10120	Bright Level for Iris Control Application Bit 24 ~ Bit 31: Bright Level for Image Capture	Read only
0xF2F10124	Test Pattern Bit 0: Vertical Grey Bar Bit 1: Bias Grey Bar	Read/Write
0xF2F1012C	4 step knee LUT run control register LUT knee 1st point register Bit 0: presence inquiry (read only) Bit 1: LUT regeneration command (self cleared) Bit 2~Bit4: reserved Bit 5: enable brightness, sharpness, gamma feature with knee function Bit 6: On/Off Bit 7: reserved Bit 8~Bit 19: X coordination of 1st knee point Bit 20~Bit31: Y coordination of 1st knee point	Read only
0xF2F10130	LUT knee 2nd point register Bit 0: presence inquiry (read only) Bit 1: LUT regeneration command (self cleared) Bit 2~Bit5: reserved Bit 6: reserved Bit 7: reserved Bit 8~Bit 19: X coordination of 2nd knee point Bit 20~Bit31: Y coordination of 2nd knee point	Read/Write
0xF2F10134	LUT knee 3rd point register Bit 0: presence inquiry (read only) Bit 1: LUT regeneration command (self cleared) Bit 2~Bit5: reserved Bit 6: reserved Bit 7: reserved Bit 8~Bit 19: X coordination of 3rd knee point Bit 20~Bit31: Y coordination of 3rd knee point	Read/Write
0xF2F10138	LUT knee 4th point register Bit 0: presence inquiry (read only) Bit 1: LUT regeneration command (self cleared) Bit 2~Bit5: reserved Bit 6: reserved Bit 7: reserved Bit 8~Bit 19: X coordination of 4th knee point Bit 20~Bit31: Y coordination of 4th knee point	Read/Write
0xF2F1013C	User defined LUT run control register Bit 0: presence inquiry (read only) Bit 1~Bit 4: reserved Bit 5: enable brightness, sharpness, gamma feature with user defined LUT function Bit 6: ON/OFF	Read/Write

	Bit 7~Bit 11: reserved Bit 12~Bit 15: run LUT index Bit 16~Bit 31: reserved	
0xF2F10140	LUT save control register Bit 0: save command Bit 1: save ready status(read only) Bit 2~Bit 6: reserved Bit 7: set LUT write buffer address to 0 Bit 8~Bit 11: save LUT index Bit 12~Bit 31: reserved	Read/Write
0xF2F10144	LUT data register (block write command) Save the first data at low word, then second data at high word Bit 0~Bit 3 : reserved Bit 4~Bit 15 : the second data Bit 16~Bit 19 : reserved Bit 20~Bit 31 : the first data	Write Only
0xF2F10160	User defined AE X-axis value Bit 0: presence inquiry (read only) Bit 1~Bit4 : reserved Bit 5: Make Command Bit 6: ON/OFF (1: current setting value, 0: current image size) Bit 7: reserved Bit 8~Bit 19: DAC or AE X-axis start position at current display image (AE_SX) Bit 20~Bit 31: DAC or AE X-axis width at current display image (AE_WX >= 4)	Read/Write
0xF2F10164	User defined AE Y-axis value Bit 0: presence inquiry (read only) Bit 1~Bit 4: reserved Bit 5: Make Command Bit 6: On/Off (1: current setting value, 0: current image size) Bit 7: reserved Bit 8~Bit 19: DAC or AE Y-axis start position at current display image (AE_SY) Bit 20~Bit 31: DAC or AE Y-axis width at current display image (AE_WY >= 4)	Read/Write
0xF2F10150	Snow noise remove threshold register Bit 0: presence inquiry (read only) Bit 1~Bit 5: reserved Bit6: ON/OFF Bit8: grid noise filter enable for GR8 mode at color camera (0: disable,1: enable) Bit 7~Bit23: reserved Bit 24~Bit31: Threshold Value (T): If pixel difference value > Threshold Value, the pixel is replaced with near pixel average value	Read/Write

Pixel compared threshold value bit map

0xF2F10154	<p>DAC Control register</p> <p>Bit 0: Presence inquiry (read only)</p> <p>Bit 4: Exposure feature value DAC output enable for calibration or test</p> <p>Bit 5: Exposure feature reference mode enable</p> <p>[Bit 4: Bit 5]</p> <p>00: DAC output = Frame Brightness</p> <p>01: DAC output = Frame Brightness – Auto_Exposure + 128</p> <p>10: DAC output = Frame Brightness – Auto_Exposure + 128</p> <p>10: DAC output = Auto_Exposure</p> <p>% Auto_Exposure : address 0xF0F0804 feature value</p> <p>Bit 6: DAC run/hold (1: run, 0: current value hold)</p> <p>Bit 9~Bit 15: # of frames for DAC average (valid value : 0,1,2,4,8,16,32,64)</p>	Read/Write
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*msb: most significant bit and bit 0 is msb.

*msb: 0 is the most significant bit

7. Video Formats and Modes

The Amazon2 series supports scalable image size for video modes which is similar to the Firewire IIDC 1.31 Format 7 Mode. Supported resolutions per cameras are listed in Section 7.1.

Color Depth	B/W	Color
8 Bit	Mono 8	GR8
12 Bit	Mono 12	GR12

An overview of these formats is as follows;

The Amazon2 Series supports scalable video size with the following base address:

Format 7 Mode 0: F1F0000h Format 7 Mode 1: F1F00100h

Offset	Name	Description
000h	MAX_IMAGE_SIZE_INQ	Maximum Horizontal / Vertical pixel number
004h	UNIT_SIZE_INQ	Horizontal and Vertical unit pixel number
008h	IMAGE_POSITION	Left / Top position of requested image region (pixel)
00Ch	IMAGE_SIZE	Width / Height of the requested image region (pixel)
010h	PIXEL_FORMAT_ID	Pixel Format Value
014h	COLOR_CODING_INQ	Inquiry register for color information setting
034h	PIXEL_NUMBER_INQ	Pixel number per frame
038h	TOTAL_BYTE_HI_INQ	Higher quadlet of total bytes of image data per frame

03Ch	TOTAL_BYTE_LO_INQ	Lower quadlet of total bytes of image data per frame
040h	PACKET_PARA_INQ	Unit (Minimum) bytes per packet Multiple by 4 Maximum bytes per packet Multiple by UnitBytePerPacket
044h	BYTE_PER_PACKET	Packet size, Recommended bytes per packet. If this value is zero, this field will be ignored.

NOTE: Frame rates may vary which may depend on size, color, maximum byte per packet, shutter and system performance.

7.1. Supported Video Modes by Camera Models

7.1.1. IMB-720G

Resolution	Remark
1624 x 1232	16 fps Max at Mono 8
1624 x 1232	16 fps Max at Mono 12
800 x 600	30 fps 2x2 binning (H&V Binning) at Mono 8
800 x 600	30 fps 2x2 binning (H&V Binning) at Mono 12

7.1.2. IMC-720G

Resolution	Remark
1624 x 1228	16 fps Max at GR8
1624 x 1228	16 fps Max at GR12
1624 x 1228	16 fps Max at YUV411
1624 x 1228	16 fps Max at YUV422
800 x 600	30 fps 2x2 binning at GR8 (H&V Binning)
800 x 600	30 fps 2x2 binning at GR12 (H&V Binning)

7.1.3. IMB-717G

Resolution	Remark
1388 x 1040	20 fps Max at Mono 8
1388 x 1040	20 fps Max at Mono 12
688 x 516	37 fps 2x2 binning (H&V Binning) at Mono 8
688 x 516	37 fps 2x2 binning (H&V Binning) at Mono 12

7.1.4. IMC-717G

Resolution	Remark
1388 x 1036	20 fps Max at GR8
1388 x 1036	20 fps Max at GR12
1388 x 1036	20 fps Max at YUV411
1388 x 1036	20 fps Max at YUV422

7.1.5. IMB-716G

Resolution	Remark
1288 x 964	30 fps Max at Mono 8
1288 x 964	30 fps Max at Mono 12
640x 476	55 fps 2x2 binning (H&V Binning) at Mono 8

640x 476	55 fps 2x2 binning (H&V Binning) at Mono 12
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7.1.6. IMC-716G

Resolution	Remark
1288 x 960	30 fps Max at GR8
1288 x 960	30 fps Max at Y411
640x 472	55 fps 2x2 binning (H&V Binning) at Mono 8
640x 472	55 fps 2x2 binning (H&V Binning) at Mono 12

7.1.7. IMC-715G2

Resolution	Remark
1280 x 720	30 fps Max at GR8
1280 x 720	30 fps Max at GR12
1280 x 720	30 fps Max at Y411
1280 x 720	30 fps Max at Y422

7.1.8. IMB-715G

Resolution	Remark
1032 x 776	36 fps Max at Mono 8
1032 x 776	35 fps Max at Mono 12
512x 384	65 fps 2x2 binning (H&V Binning) at Mono 8
512x 384	65 fps 2x2 binning (H&V Binning) at Mono 12

7.1.9. IMC-715G

Resolution	Remark
1028 x 772	35 fps Max at GR8
1028 x 772	35 fps Max at GR12
1028 x 772	35 fps Max at Y411
1028 x 772	35 fps Max at Y422

7.1.10. IMB-712G

Resolution	Remark
656 x 484	91 fps Max at Mono 8
656 x 484	91 fps Max at Mono 12
324x 236	166 fps 2x2 binning (H&V Binning) at Mono 8
324x 236	166 fps 2x2 binning (H&V Binning) at Mono 12

7.1.11. IMC-712G

Resolution	Remark
652 x 480	91 fps Max at GR8
652 x 480	91 fps Max at GR12
652 x 480	91 fps Max at Y411
652 x 480	91 fps Max at Y422

7.1.12. IMB-711G

Resolution	Remark
656 x 488	91 fps Max at Mono 8
656 x 488	91 fps Max at Mono 12
324x 240	166 fps 2x2 binning (H&V Binning) at Mono 8
324x 240	166 fps 2x2 binning (H&V Binning) at Mono 12

7.1.13. IMC-711G

Resolution	Remark
652 x 484	92 fps Max at GR8
652 x 484	92 fps Max at GR12
652 x 484	91 fps Max at Y411
652 x 484	91 fps Max at Y422

7.1.14. IMB-710G

Resolution	Remark
656 x 488	100 fps Max at Mono 8
656 x 488	100 fps Max at Mono 12
324x 240	180 fps 2x2 binning (H&V Binning) at Mono 8
324x 240	180 fps 2x2 binning (H&V Binning) at Mono 12

7.1.15. IMC-710G

Resolution	Remark
652 x 484	100 fps Max at GR8
652 x 484	100 fps Max at GR12
652 x 484	100 fps Max at Y411
652 x 484	100 fps Max at Y422

8. Firmware Update

You may download the latest firmware from the IMI website as follows:

<http://www.imi-tech.com>

When updating the firmware, please carefully follow the instruction provided on our website for firmware update. Also, ensure both power and GigE interface connection and DO NOT disconnect the cable in any case during the update.

9. Technical Support

IMI ensures the conformity of our product to be reliable and free from defects during manufacturing by testing all the cameras before release. However, unexpected problems and technical issues may come up due to the complexity of the product. In case you require technical support; contact the agent near you or contact IMI directly at the following locations:

Web Support by Bulletin Board : <http://www.imi-tech.com>

Support Team Email : support@imi-tech.com

Sales Team Email : world@imi-tech.com

Telephone Number : +82-31-423-9801

Fax Number : +82-31-423-9803

In North America

Support Team Email : support@imi-tech.com

Telephone Number : 1-760-942-9052

Fax Number : 1-760-942-6301

In case of an RMA, you must first contact IMI and obtain an RMA Number before sending the product to us. We are not responsible for any problems caused by not following the RMA procedure.