

# Modular Concept





Associated price list: Allied Vision Price List Cameras V2021-Jan-01



## Modular Concept at a glance

#### Benefits

When ordering an Allied Vision camera, the Modular Concept provides a system of hardware options for camera mount, housing design, angled head, sensor surface, optical filter, interface connector, and board level.

Benefits of the Modular Concept options include:

- No customizing effort
- Pre-configured options
- Quick delivery times
- Transparent pricing.

#### Ordering conditions



Please contact the Allied Vision Sales team for availability, minimum order quantities, and lead time:

www.alliedvision.com/en/contact.

### Copyright and trademarks

All text, pictures, and graphics are protected by copyright and other laws protecting intellectual property. All content is subject to change without notice. All trademarks, logos, and brands cited in this document are property and/or copyright material of their respective owners. Use of these trademarks, logos, and brands does not imply endorsement.

Copyright © 2021 Allied Vision Technologies GmbH. All rights reserved.



## Contact us

### Website

General www.alliedvision.com/en/contact

Distribution partners www.alliedvision.com/en/about-us/where-we-are

### Email

General info@alliedvision.com

Support support@alliedvision.com

### Headquarters

Allied Vision Technologies GmbH Taschenweg 2a 07646 Stadtroda, Germany T// +49 36428 677-0 F// +49 36428 677-28

### Sales Offices

Europe, Middle East, and Africa North and South America

Asia-Pacific China T// +49 36428 677-230 Toll-free: +1 877 USA 1394 T// +1 978 225 2030 California: +1 408 721 1965 T// +65 6634 9027 T// +86 21 64861133



## Contents

Modular Concept at a glance Copyright and trademarks	
Contact us	3
Document history and conventions	5
Camera options	9 0 1 3 4 5
M12-Mount adapter set 17	7
Housing options: angled head housing and standard housing 18	8
Housing color and style 18	8
Spectral transmission of filters       19         300 to 1000 nm       19         Type IRBP 1450 nm (IR bandpass filter)       20	9
Removed Cover Glass for Manta	

Board level camera options	22
Benefits of board level cameras	
Ordering a board level camera step by step	22
CE, FCC, and ICES	22
Ordering a Manta board level camera	23

4



## Document history and conventions

## Document history

Version	Date	Document updates
V11.9.0	2021-Jan-01	Guppy PRO: Removed options for Guppy PRO family.
		Manta: Added options for new G-1620, G-2040, and G-2460 models.
		Stingray: Removed options for Stingray family.
V11.8.1	2020-Oct-01	Prosilica GT: Removed option for EF-Mount, Birger.
V11.8.0	2020-Oct-01	Obsolete document version
		Bonito PRO: Removed options for discontinued X-1250 and X-1250B NIR models.
		Mako U: Removed options for discontinued Mako U family.
		Manta: Removed options for discontinued G-223B NIR model.
		Prosilica GT Large Format: Removed options for discontinued GT4090, GT4090NIR, GT4096, and GT4096NIR models.
V11.7.0	2020-Apr-01	Prosilica GT: Removed options for discontinued GT3300 models. Removed sensor glass options for GT1910 and GT2300 models.
		Prosilica GT Large Format: Removed discontinued GT4905, GT4907, and GT6600 models and related sensor options.
V11.6.0	2019-Dec-16	Prosilica GT Large Format: Added new GT4400, GT5400, and GT6400 models with TFL and C-Mount options.
		Applied editorial changes.
V11.5.1	2019-Sep-26	Prosilica GT and GT Large Format: Updated prices for ON Semiconductor KAI sensor options.
		Prosilica GT and GT Large Format: Added notes for discontinuations.
V11.5.0	2019-Oct-01	Obsolete document version
		Prosilica GT and GT LF: Added IR Pass filter options.
V11.4.0	2019-Jul-01	Prosilica GT: Removed several taped cover glass options.
		Spectral transmission and filters: Replaced the transmission curve graphic.
		Changes in Taped Cover Glass options.
V11.3.0	2019-Apr-01	Editorial changes.
V11.2.0	2019-Jan-01	Various editorial changes.

Table 1: Document history (Sheet 1 of 3)



Version	Date	Document updates
V11.1.0	2018-Oct-01	Guppy PRO: Removed Hirose power option.
		Stingray: Removed Hirose Power option.
		Spectral transmission of filters: Provided a new transmission graph.
V11.0.0	2018-Jul-01	Bonito PRO: Introduced newly developed camera family.
		Goldeye: Price adjustment of IRBP 1450 filter for Goldeye models.
		Mako G, Mako U: removed medical option for both camera families.
		Prosilica GT: Added CS-Mount option for GT2460.
		Editorial improvements: Organized defective pixel definitions by camera model.
V10.1.0	2018-Apr-01	Editorial improvements: corrected several minor errors, arranged camera families in alphabetical order.
V10.0.0	2018-Jan-01	Pike: All information related to Pike family have been removed.
		Prosilica GB, GE, GS, GX: All information related to Prosilica GB, GE, GS, and GX families have been removed.
		<b>Prosilica GT</b> : Added GT2460. Standard mount for GT1930L was changed from EF-Mount to EF-Mount PA. Removed TCG options for all GT20x0 models.
V10.0.0	2018-Jan-01	Manta: Added released models G-040 and G-158; removed G-609.
	(continued)	Sensor options: Updated sensor cover glass and quality options.
		Editorial improvements:
		<ul> <li>Adjusted defect pixel definition tables for better readability.</li> <li>Replaced the drawings of angled head models (since some of them were erroneous) with valid drawings from the Manta Technical Manual.</li> </ul>
		<ul> <li>Removed all statements concerning warranty, terms and conditions, and legal issues.</li> </ul>

Table 1: Document history (Sheet 2 of 3)





Version	Date	Document updates
V9.4.0	2017-Jul-31	Manta: Manta G-895 and Manta G-1236 models released: added options.
		Pearleye: All information to Pearleye has been removed. Camera has been discontinued, last-time-buy date: December 15, 2016.
		Prosilica GT Large Format: Added Prosilica GT4090, GT4096, GT5120 models.
		F-Mount adapter: All information about the F-Mount adapter has been removed. Component has been discontinued.
		Sensor options:
		<ul> <li>Improved information on Taped Cover Glass sensor options for</li> <li>Prosilica GT, GT Large Format, GX, and GE cameras</li> <li>Pike cameras.</li> </ul>
		<ul> <li>Added link to application note about handling cameras with Cover Glass sensor options.</li> <li>Corrected product codes for sensor options in availability list.</li> </ul>
V9.3.0	2016-Sep-02	Goldeye G/CL: Added image for Silver Design in Housing color and style on page 18.
		Manta: Added options for Manta G-319 and G-507 models.
		<ul> <li>Prosilica GT, Prosilica GT Large Format</li> <li>Removed CS-Mount option for GT1930 model.</li> <li>Corrected EF-Mount as standard version for GT1930L model.</li> <li>Stingray:</li> </ul>
		<ul> <li>Deleted Stingray Compact option (discontinued).</li> <li>Deleted Stingray GOF (glass optical fiber) option (discontinued).</li> <li>F-Mount adapter set: added information on camera pages.</li> </ul>
		Sensor options: Updated product codes, deleted discontinued products. See Removed Cover Glass for Manta on page 21.
V9.2.0	2016-Jun-28	M12-Mount adapter set: Updated information on camera pages and in M12-Mount adapter set on page 17.
		Sensor options         • Reworked information on sensor surface options on page 21.         • Reworked tables with defective pixel definitions and following pages.         Editorial updates:         • Added chapter Document history and conventions.         • Corrected typographical errors, inconsistencies, and terminology.
V9.1.2	2016-Mar-18	Up to this version no document history has been kept.
	cument history (	

Table 1: Document history (Sheet 3 of 3)



### Conventions used in the Modular Concept

#### Camera models and options

Options apply to all models of a camera family, unless otherwise stated.

### Typographical styles

To give this manual an easily understood layout and to emphasize important information, the following typographical styles and symbols are used.

Style	Function
Emphasis	Highlighting important things
Web addresses and references	Links to webpages and internal cross references

Table 2: Typographical styles

#### Symbols and notes



NOTICE

Material damage Precautions are described.



### Practical tip

Additional information helps to understand the information.



#### Additional information

Web link or reference to an external source with more information is shown.



## Camera options Bonito PRO



Module	Standard	Options	Product code	
Lens mount	F-Mount	<ul> <li>F-Mount PA<sup>1</sup> (46.5 mm flange focal distance)</li> <li>M58-Mount (12.71 mm flange focal distance)</li> <li>M58-Mount PA<sup>1</sup> (46.5 mm flange focal distance)</li> <li>EF-Mount PA<sup>1</sup> (44.0 mm flange focal distance)</li> <li>M42-Mount PA<sup>1</sup> (45.46 mm flange focal distance)</li> <li>M42-Mount (45.46 mm flange focal distance)</li> </ul>	<ul> <li>Bonito PRO03</li> <li>Bonito PRO12</li> <li>Bonito PRO13</li> <li>Bonito PRO18</li> <li>Bonito PRO25</li> <li>Bonito PRO31</li> </ul>	
Optical filter	Monochrome models: No filter Color models: Type IRC30	<ul> <li>Type IRC30 (IR cut filter)</li> <li>B270 (ASG, Protection glass)</li> <li>Type Schneider 486 (IRC filter)</li> </ul>	<ul> <li>Bonito PRO06</li> <li>Bonito PRO19</li> <li>Bonito PRO22</li> </ul>	
		<sup>1</sup> Planarity adjusted		

Table 3: Bonito PRO camera options





Module	Standard	Options	Product code
Lens mount	C-Mount	<ul><li>F-Mount</li><li>M42-Mount</li></ul>	<ul><li>Goldeye G/CL SWIR F-Mount</li><li>Goldeye G/CL SWIR M42-Mount</li></ul>
Optical filter	No filter	<ul> <li>Type IRBP 1450 (IR bandpass filter), water absorption peak, see Type IRBP 1450 nm (IR bandpass filter) on page 20.</li> </ul>	Goldeye G/CL SWIR IRBP 1450
Housing design	Allied Vision standard design	• Silver design See Housing color and style on page 18.	Goldeye G/CL SWIR silver

Table 4: Goldeye G/CL camera options



#### **Further options**

Please contact Allied Vision Sales for further options: www.alliedvision.com/en/contact.





Module S	Standard	Options	Product code
Lens mount C	C-Mount	• CS-Mount For M12-Mount option, see M12-Mount adapter set on page 17.	Mako G CS-Mount
	Monochrome and NIR nodels: No filter	<ul> <li>B270 (ASG, Protection glass)</li> <li>Type IRC Hoya C-5000 (IR cut filter)</li> <li>Type IRC Jenofilt 217 (IR cut filter)</li> <li>Type IRP RG715 (IR pass filter)</li> <li>Type IRP RG830 (IR pass filter)</li> </ul> See Spectral transmission of filters on page 19.	<ul> <li>Mako G ASG</li> <li>Mako G IRC Hoya</li> <li>Mako G IRC Jenofilt</li> <li>Mako G IRP RG715</li> <li>Mako G IRP RG830</li> </ul>
	Color models: Гуре IRC Hoya C-5000	<ul> <li>B270 (ASG, Protection glass)</li> <li>Type IRC Jenofilt 217 (IR cut filter)</li> <li>Type IRP RG715 (IR pass filter)</li> <li>Type IRP RG830 (IR pass filter)</li> </ul> See Spectral transmission of filters on page 19.	<ul> <li>Mako G ASG</li> <li>Mako G IRC Jenofilt</li> <li>Mako G IRP RG715</li> <li>Mako G IRP RG830</li> </ul>

Table 5: Mako G camera options





### Manta: overview types A and B

#### Manta type A: G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504

Manta type B: G-040, G-158, G-223, G-235, G-282, G-283, G-319, G-419, G-505, G-507, G-895, G-917, G-1236, G-1620, G-2040, G-2460

Manta camera model	G-031B/C	G-032B/C	G-033B/C	G-040B/C	G-046B/C	G-125B/C	G-145B/C <sup>1</sup>	G-146B/C	G-158B/C	G-201B/C <sup>2</sup>	G-223B/C	G-235B/C	G-282B/C	G-283B/C	G-319B/C
Туре А	$\checkmark$	$\checkmark$	$\checkmark$	-	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	-	$\checkmark$	-	-	-	-	-
Туре В	-	-	-	$\checkmark$	-	-	-	-	$\checkmark$	-	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
Angled head	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	-	-	$\checkmark$						
Board level	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	-	-	$\checkmark$						

 $^1$  Including Manta G-145B/C, Manta G-145B/C 30 fps, Manta G-145B NIR  $^2$  Including Manta G-201B/C, Manta G-201B/C 30 fps

Table 6: Overview angled head, board level options for Manta type A and type B, part 1

Manta camera model	G-419B/C <sup>3</sup>	G-504B/C	G-505B/C	G-507B/C	G-895B/C	G-917B/C	G-1236B/C	G-1620B/C	G-2040B/C	G2460B/C
Туре А	-	$\checkmark$	-	-	-	-	-	-	-	-
Туре В	$\checkmark$	-	$\checkmark$							
Angled head	$\checkmark$	$\checkmark$	-	$\checkmark$	$\checkmark$	-	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
Board level	$\checkmark$	$\checkmark$	-	$\checkmark$	$\checkmark$	-	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$

<sup>3</sup>Including Manta G-419B/C, Manta G-419B NIR

Table 7: Overview angled head, board level options for Manta type A and type B, part 2





### Manta: options

Manta type A: G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504

Manta type B: G-040, G-158, G-223, G-235, G-282, G-283, G-319, G-419, G-505, G-507, G-895, G-917, G-1236, G-1620, G-2040, G-2460

Module	Standard	Options	Product code
Lens mount	C-Mount	• CS-Mount For M12-Mount option, see M12-Mount adapter set on page 17.	Manta G CS-Mount
Angled head	Standard housing	<ul> <li>W90 housing</li> <li>W90 S90 housing</li> <li>W270 housing</li> <li>W270 S90 housing</li> <li>See Housing options: angled head housing and standard housing on page 18 for possible options.</li> </ul>	<ul> <li>Manta G W90</li> <li>Manta G W90 S90</li> <li>Manta G W270</li> <li>Manta G W270 S90</li> </ul>
Optical filter	Monochrome models: Protection glass B270 (ASG) Color models: Type IRC Hoya C-5000	<ul> <li>B270 (ASG, Protection glass)</li> <li>Type IRC Jenofilt 217 (IR cut filter)</li> <li>Type IRC Hoya C-5000 (IR cut filter)</li> <li>Type IRP RG715 (IR pass filter)</li> <li>Type IRP RG830 (IR pass filter)</li> </ul> See Spectral transmission of filters on page 19.	<ul> <li>Manta G ASG</li> <li>Manta G IRC Jenofilt</li> <li>Manta G IRC Hoya</li> <li>Manta G IRP RG715</li> <li>Manta G IRP RG830</li> </ul>
	NIR models: No filter	See options above.	
Housing design	Allied Vision standard design	White medical design See Housing color and style on page 18.	Manta G medical
Sensor surface option	Fixed Cover Glass with microlens	<ul> <li>Only for Manta G-145B model.</li> <li>Before operation, remove the cover glass taped to the sensor. For instructions, see page 21.</li> <li>Removed Cover Glass with microlens</li> </ul>	• Manta G RCG <sup>1</sup>
Board level		See Ordering a Manta board level camera on page 23.	Manta G BL
		<sup>1</sup> Minimum order quantity of 10 pieces , G-1620, G-2040, G-2460	

Table 8: Manta camera options





Module	Standard	Options	Product code
Lens mount	C-Mount	CS-Mount	Prosilica GC01
Optical filter	Monochrome models: No filter Color models: Type IRC30	<ul> <li>Type IRC30 (IR cut filter)</li> <li>B270 (ASG, Protection glass)</li> </ul>	<ul><li>Prosilica GC06</li><li>Prosilica GC19</li></ul>

Table 9: Prosilica GC camera options



Prosilica GT



Prosilica GT1290, GT1380, GT1600, GT1920, GT1930, GT2000, GT2000NIR, GT2050, GT2050NIR, GT2450, GT2460, GT2750, GT3400 See next page for options on Prosilica GT Large Format.

Module	Standard	Options	Product code
Lens mount	C-Mount	<ul> <li>CS-Mount</li> <li>F-Mount</li> <li>M42-Mount (45.46 mm flange focal distance)</li> </ul>	<ul> <li>Prosilica GT01</li> <li>Prosilica GT03</li> <li>Prosilica GT31</li> </ul>
Optical filter	Monochrome and NIR models: No filter Color models: Type IRC30	<ul> <li>Type IRC30 (IR cut filter)</li> <li>B270 (ASG, Protection glass)</li> <li>Type IRP RG780 (IR pass filter)</li> <li>Type IRP RG715 (IR pass filter)</li> </ul>	<ul> <li>Prosilica GT06</li> <li>Prosilica GT19</li> <li>Prosilica GT24</li> <li>Prosilica GT27</li> </ul>

Table 10: Prosilica GT camera options



## Prosilica GT Large Format



#### Prosilica GT1930L, GT4400, GT5120<sup>1</sup>, GT5400, GT6400

<sup>1</sup>Available as monochrome and NIR models only

Module	Standard	Options	Product code	
Lens mount	F-Mount GT1930L: EF-Mount PA <sup>2</sup>	<ul> <li>F-Mount PA<sup>2</sup> (46.5 mm flange focal distance)</li> <li>C-Mount<sup>3</sup> (17.53 mm flange focal distance)</li> <li>M58-Mount (12,71 mm flange focal distance)</li> <li>M58-Mount PA<sup>2</sup> (46.5 mm flange focal distance)</li> <li>EF-Mount PA<sup>2</sup> (45.46 mm flange focal distance)</li> <li>M42-Mount PA<sup>2</sup> (45.46 mm flange focal distance)</li> <li>M42-Mount (45.46 mm flange focal distance)</li> <li>TFL-Mount<sup>4</sup> (17.53 mm flange focal distance)</li> </ul>	<ul> <li>Prosilica GT03</li> <li>Prosilica GT07</li> <li>Prosilica GT12</li> <li>Prosilica GT13</li> <li>Prosilica GT25</li> <li>Prosilica GT25</li> <li>Prosilica GT31</li> <li>Prosilica GT40</li> </ul>	
Optical filter	Monochrome and NIR models: No filter Color models: Type IRC30	<ul> <li>Type IRC30 (IR cut filter)</li> <li>B270 (ASG, Protection glass)</li> <li>Type Schneider 486 (IR cut filter)</li> </ul>	<ul> <li>Prosilica GT06</li> <li>Prosilica GT19</li> <li>Prosilica GT22</li> </ul>	
	<sup>2</sup> Planarity adjusted	<sup>3</sup> GT4400 and GT5400 cameras only <sup>4</sup> GT4400, GT5400, and GT6400 cameras o	nly	

Table 11: Prosilica GT Large Format camera options



## M12-Mount adapter set

The M12-Mount adapter set (product code: E3000115) enables using M12-Mount (S-Mount) lenses with any CS-Mount or C-Mount camera.



#### NOTICE

#### Damage to the camera sensor or electronics

Observe your camera's maximum protrusion to avoid damage to the sensor and camera electronics. See the specifications in your camera's technical manual.

To use M12-Mount lenses:

- Order a CS-Mount or C-Mount camera.
- Order the M12-Mount adapter set.
- Attach the lens with the M12-Mount adapter to the camera, as shown in the functional drawings below.



Figure 1: M12-Mount lens adapted to CS-Mount or C-Mount with the M12-Mount adapter set



## Housing options: angled head housing and standard housing

The schematic drawings show the sensor position for the following camera families:

- Manta type A: all models
- Manta type B: only G-040, G-158, G-223, G-235, G-319, G-419, G-507, G-895, G-1236, G-1620, G-2040, G-2460



Figure 2: Sensor position of standard housing and angled head options

## Housing color and style

The Allied Vision standard housing is Allied Vision red with white company logo. In addition, for some camera models, you can order the following color or style options.



Figure 3: Housing color and style



## Spectral transmission of filters

### 300 to 1000 nm

The following curve shows typical transmissions for the named filters. Values may vary slightly by filter lot.



Figure 4: Spectral transmission of filters 300 to 1000 nm (exemplary curves)



## Type IRBP 1450 nm (IR bandpass filter)

Allied Vision

The following curve shows the typical transmission for the Type IRBP 1450 nm filter. Values may vary slightly by filter lot.



<sup>1</sup>HW: Half width, spectral range for 50% of the maximum spectral transmission; in this case 40% from 80%

Figure 5: Spectral transmission of Type IRBP 1450 nm (IR bandpass filter, exemplary curve)



## Removed Cover Glass for Manta

Sensors without cover glass are suitable for several applications, to:

- Increase overall quantum efficiency
- Increase quantum efficiency in UV imaging
- · Attach fiber optic arrays directly to the sensor, for example in connection with an image intensifier
- Enable applications with laser beam profiling.

Manta G-145B RCG: Manta G-145B version with Removed Cover Glass (RCG) as sensor surface option. The cover glass is removed by Allied Vision before shipping.

### Handling of cameras with RCG sensor option



#### Handling of cameras with RCG sensor option

Before handling cameras with removed cover glass, read the following application note: www.alliedvision.com/fileadmin/content/documents/products/cameras/various/appnote/various/TCG-RCG\_Sensor-Handling.pdf.



## Board level camera options

The Modular Concept provides several options for board level cameras, for example, different lengths for the flex cables. The following pages describe how to order a Manta board level camera.

### Benefits of board level cameras

Board level cameras provide certain benefits to the end user, some of which (but not all) are listed below.

- Option to use the camera in applications where space is an issue.
- Due to the flex cable-attached sensor board (with optional lens mount) the sensor board can be oriented separate from the camera boards.
- Board level cameras share similar lens mounts and filters as housed models.

### Ordering a board level camera step by step



#### Ordering conditions

Please contact the Allied Vision Sales team for availability, minimum order quantities, and lead time: www.alliedvision.com/en/contact.

Follow the instructions and order your board level camera by components:

- 1. Interface type
- 2. Flex cable length
- 3. Lens mounting type (optional)
- 4. Interface cable and I/O cable (optional)

### CE, FCC, and ICES

Board level models are designed for integration and are delivered without housing. Because housing design is critical to the electromagnetic compatibility (EMC) of a camera, no CE, FCC, or ICES certification tests regarding electromagnetic interference have been performed for board level models. Users who design board level models into their systems should perform appropriate testing regarding EMC after the product design is completed.





### Ordering a Manta board level camera

Manta G-031, G-032, G-033, G-040, G-046, G-125, G-145, G-146, G-158, G-201, G-223, G-235, G-319, G-419, G-504, G-507, G-895, G-1236, G-1620, G-2040, G-2460

Step 1: Select the interface type	Step 2: Select the flex cable length	Step 3: Select the lens mount and fill	er
Basic camera	Flex cable	Lens mount:	C2-Mount
Sensor board, main board(s), I/O board, thermal conductive film, and cooling plate	Length Crdering flex cables Flex cables are not sold separately!	Each mounting type is equipped with: • Type IRC Hoya C-5000 or • Protection glass B270 (ASG)	NIR models NIR models are not equipped with filter or protection glass.
Interface type <ul> <li>Manta GBL</li> <li>Manta GBL PoE (Power over Ethernet)</li> </ul>	Flex cable Manta type A Flex cable 56 mm FC56 Hex cable 110 mm FC110 Flex cable 152 mm FC152 Flex cable 200 mm FC200	Mount     C-Mount     CS-Mount (M12 option available)	filter of protection glass.
	Flex cable Manta type B Flex cable 60 mm FC60 Flex cable 110 mm FC110 Flex cable 150 mm FC150 Flex cable 200 mm FC200	Filter Protection glass B270 (ASG) Type IRC Jenofilt 217 (IR cut filter) Type IRC Hoya C-5000 (IR cut filter) Type IRP RG715 (IR pass filter) Type IRP RG830 (IR pass filter) For filter details, see Spectral transmiss	Manta G IRP RG715 Manta G IRP RG830

Table 12: Ordering a Manta board level camera in (steps 1 to 3)



### Ordering a Manta board level camera





Table 13: Ordering a Manta board level camera (steps 4 and 5)