

## INTRODUCTION

Digital Camera Modules for almost any machine-vision application – choose from the XCL Series to meet your needs

Joining the Sony XCL Series of Digital Camera Modules is the high-performance XCL-5000 boasting over 5,000,000 effective pixels. This camera module is ideal when your requirement is to capture ultra high-resolution images.

The XCL-5000 camera module incorporates a 2/3-type progressive scan CCD and has an incredible 2,456 x 2,058 effective pixels. It also supports up to 12-bit processing to output data quickly and efficiently. Rounding out the XCL Series are the XCL-U1000 (black and white) and XCL-U1000C (colour) cameras incorporating a 1/1.8-type progressive scan CCD with UXGA resolution and the XCL-V500 and XCL-X700 cameras featuring a 1/3-type progressive scan CCD that captures high-quality black and white images at a high frame rate.

All five of these cameras are equipped with the industry standard digital Camera Link™ interface, enabling the capture of high-speed, high-resolution images while simplifying connectivity to machine-vision systems by using a Camera Link cable. These cameras come in a compact and lightweight body allowing them to be integrated in almost any machine-vision system.

The Sony XCL Series of high-performance and feature-rich cameras is the ideal solution for today's machine-vision applications.



## XCL SERIES

Digital Camera Modules

XCL-5000

XCL-U1000 / XCL-U1000C

XCL-V500 / XCL-X700

[www.sonybiz.net/vision](http://www.sonybiz.net/vision)



## COMMON FEATURES

- Camera Link Interface
- C-mount Lens
- Partial Scanning
- High Shock and Vibration Resistance

## FEATURES

### XCL-5000



#### Black and White Digital Video Camera Module

- Ultra High-resolution Image Capture  
Extremely High Resolution Images (2,448 x 2,050 pixels), captures video at 15 fps
- 2/3-type Progressive Scanning CCD with Square Pixels
- Effective Picture Elements  
2,456(H) x 2,058(V)
- High Speed Image Output  
12-bit (default)/8-bit/10-bit processing (selectable)
- High Sensitivity  
F 5.6 at 400 lx
- Compact and Lightweight  
44 (W) x 44 (H) x 57.5 (D) mm (1 3/4 x 1 3/4 x 2 3/8 inches), 135 g (4.8 oz)
- External Trigger Shutter  
2 to 1/10,000 s
- Binning Function
- Built-in Real Time 3 x 3 Image Pre-Processing Filter

### XCL-U1000

### XCL-U1000C



#### Black and White Digital Video Camera Module

#### Colour Digital Video Camera Module

- High-resolution Image Capture  
UXGA image (1,600 x 1,200 pixels), captures video at 15 fps
- 1/1.8-type Progressive Scanning CCD with Square Pixels
- Effective Picture Elements  
1,628(H) x 1,236(V)
- High Sensitivity  
F 5.6 at 400 lx (XCL-U1000)  
F8 at 2,000 lx (XCL-U1000C)
- Monitor Output
- Compact and Lightweight  
56 (W) x 44 (H) x 95 (D) mm (2 1/4 x 1 3/4 x 3 3/4 inches), 250 g (9 oz)
- External Trigger Shutter  
1/15 to 1/10,000 s
- Binning Function (XCL-U1000)
- White Balance (XCL-U1000C)  
Auto/Manual/Preset (selectable)
- Matrix function for accurate colour reproduction (XCL-U1000C)

### XCL-V500

### XCL-X700



#### Black and White Digital Video Camera Module

#### Black and White Digital Video Camera Module

- High Scanning Rate  
VGA image (648 x 494 pixels), captures video at 60 fps (XCL-V500)  
XGA image (1,024 x 768 pixels), captures video at 30 fps (XCL-X700)
- 1/3-type Progressive Scanning CCD with Square Pixels
- Effective Picture Elements  
659 (H) x 494 (V) (XCL-V500)  
1034 (H) x 779 (V) (XCL-X700)
- High Sensitivity  
F 5.6 at 400 lx
- Compact and Lightweight  
29 (W) x 29 (H) x 30 (D) mm (1 1/8 x 1 1/8 x 1 1/8 inches), 55 g (2 oz)
- External Trigger Shutter  
1/4 to 1/100,000 s
- Synchronization Signal  
Internal/External (HD/VD)
- Binning Function

# PIN ASSIGNMENT

## XCL-5000 12-pin connector

Pin No.	
1	GND
2	+12V DC
3	GND
4	NC
5	GND
6	NC
7	NC
8	GND
9	NC
10	DVAL Output, Exposure pulse output, GND (selectable)
11	Trigger pulse input
12	GND

## XCL-U1000/XCL-U1000C

12-pin connector		15-pin connector		6-pin connector	
Pin No.		Pin No.		Pin No.	
1	GND	1	R output	1	TXD
2	+12V DC	2	G output	2	RXD
3	GND	3	B output	3	GND
4	NC	4	NC	4	NC
5	GND	5	GND	5	NC
6	NC	6	GND	6	NC
7	NC	7	GND		
8	GND	8	GND		
9	NC	9	NC		
10	Exposure pulse output	10	GND		
11	Trigger pulse input	11	NC		
12	GND	12	NC		
		13	HD output		
		14	VD output		
		15	NC		

## XCL-5000/XCL-U1000/XCL-U1000C 26-pin connector (Digital IF)

Pin No.		Pin No.	
1	INNER_SHIELD (GND)	14	INNER_SHIELD (GND)
2	X0- output (signal)	15	X0+ output (signal)
3	X1- output (signal)	16	X1+ output (signal)
4	X2- output (signal)	17	X2+ output (signal)
5	XCLK- output (signal)	18	XCLK+ output (signal)
6	X3- output (signal)	19	X3+ output (signal)
7	SerTC+ (signal)	20	SerTC- (signal)
8	SerTFG- (signal)	21	SerTFG+ (signal)
9	TRIG- input (signal)	22	TRIG+ input (signal)
10	NC	23	NC
11	NC	24	NC
12	NC	25	NC
13	INNER_SHIELD (GND)	26	INNER_SHIELD (GND)

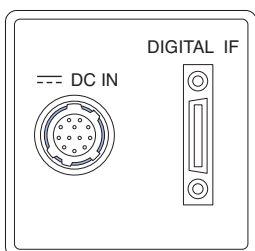
## XCL-V500/XCL-X700 26-pin connector (Digital IF)

Pin No.		Pin No.	
1	INNER_SHIELD (GND)	14	INNER_SHIELD (GND)
2	X0- output (signal)	15	X0+ output (signal)
3	X1- output (signal)	16	X1+ output (signal)
4	X2- output (signal)	17	X2+ output (signal)
5	XCLK- output (signal)	18	XCLK+ output (signal)
6	X3- output (signal)	19	X3+ output (signal)
7	SerTC+ (signal)	20	SerTC- (signal)
8	SerTFG- (signal)	21	SerTFG+ (signal)
9	TRIG- input (signal)	22	TRIG+ input (signal)
10	HD (+) input (signal)	23	HD (-) input (signal)
11	VD (-) input (signal)	24	VD (+) input (signal)
12	CLOCK (+)input (signal)	25	CLOCK (-) input (signal)
13	INNER_SHIELD (GND)	26	INNER_SHIELD (GND)

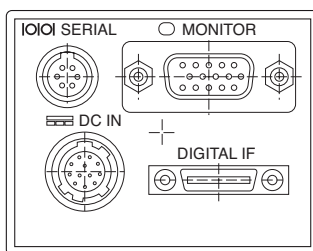
## XCL-V500/XCL-X700 12-pin connector

Pin No.	Restart/Reset	External Trigger Shutter	Pin No.	Camera Sync Signal Output	Pin No.	External Sync Mode (HD/VD)
1	GND	GND	1	GND	1	GND
2	+12V DC	+12V DC	2	+12V DC	2	+12V DC
3	-	-	3	-	3	-
4	CLOCK (+) input (signal)	CLOCK (+) input (signal)	4	CLOCK (+) input (signal)	4	CLOCK (+) input(signal)
5	HD input (GND)	HD input (GND)	5	HD output (GND)	5	HD input (GND)
6	HD input (signal)	HD input (signal)	6	HD output (signal)	6	HD input (signal)
7	RE-SET	VD input (signal)	7	VD output (signal)	7	VD input (signal)
8	-	-	8	-	8	-
9	CLOCK (-) input (signal)	CLOCK (-) input (signal)	9	CLOCK (-) input (signal)	9	CLOCK (-) input (signal)
10	-	WEN output (signal)	10	-	10	-
11	-	Trigger pulse input (signal)	11	-	11	-
12	RE-SET (GND)	VD input (GND)	12	VD output (GND)	12	VD Input (GND)

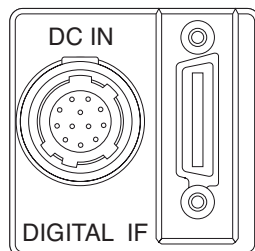
# PIN ASSIGNMENT



XCL-5000



XCL-U1000/XCL-U1000C



XCL-V500/XCL-X700

# REAR PANEL

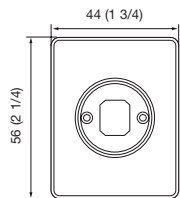


XCL-5000

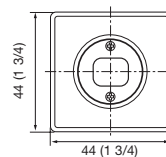
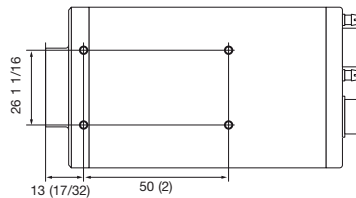
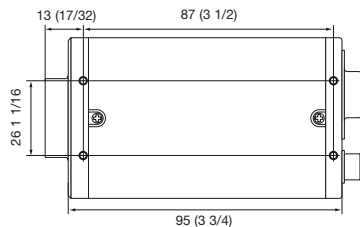
# SPECIFICATIONS

	XCL-5000	XCL-U1000	XCL-U1000C	XCL-V500	XCL-X700
Image device	2/3-type PS IT CCD	1/1.8-type PS IT CCD	1/1.8-type PS IT CCD	1/3-type PS IT CCD	1/3-type PS IT CCD
Effective picture elements (HxV)	2456 x 2058	1628 x 1236	1628 x 1236	659 x 494	1034 x 779
Output image size	2448 x 2050 pixels	1,600 x 1,200 pixels	1,600 x 1,200 pixels	648 x 494 pixels	1,024 x 768 pixels
Cell size (HxV)	3.45 x 3.45 μm	4.4 x 4.4 μm	4.4 x 4.4 μm	7.4 x 7.4 μm	4.65 x 4.65 μm
Sensitivity	F5.6 at 400 lx	F5.6 at 400 lx	F8 at 2000 lx	F5.6 at 400 lx	F5.6 at 400 lx
Sync system	Internal	Internal	Internal	Internal/External (HD/VD)	Internal/External (HD/VD)
Lens mount	C mount	C mount	C mount	C mount	C mount
Frame rate	15 fps	15 fps	15 fps	60 fps	30 fps
Output data clock	80 MHz	36 MHz	36 MHz	24.55 MHz	29.5 MHz
Gain	0 to +18 dB	0 to +18 dB	0 to +18 dB	0 to +18 dB	0 to +18 dB
Gamma	MANUAL/OFF/DEFAULT (selectable)	ON/1 (fixed)	ON/1 (fixed)	1 (fixed)	1 (fixed)
Trigger shutter	2 to 1/10,000 s	1/15 to 1/10,000 s	1/15 to 1/10,000 s	1/4 to 1/100,000 s	1/4 to 1/100,000 s
Partial scan	Vertical ON/OFF	Vertical ON/OFF	Vertical ON/OFF	Vertical ON/OFF	Vertical ON/OFF
Binning Vertical	+2Line	+2Line	+2Line	+2Line	+2Line
Expansion signal output	DVAL/EXPOSURE/GND (selectable)	-	-	-	-
Minimum illumination	1 lx (Gain +18 dB, F1.4)	1 lx (Gain +18 dB, F1.4)	4 lx (Gain +18 dB, F1.4)	1 lx (Gain +18 dB, F1.4)	1 lx (Gain +18 dB, F1.4)
Video output	Digital (Camera Link)	Digital (Camera Link)	Digital (Camera Link)	Digital (Camera Link), RGB 8-bit	Digital (Camera Link)
Detail	ON/OFF	ON/OFF	ON/OFF	-	-
Matrix	-	-	ON/OFF	-	-
3x3 image filter	ON/OFF	-	-	-	-
White balance	-	-	Preset, Manual, AWB	-	-
Power requirements	DC12 V	DC12 V	DC12 V	DC12 V	DC12 V
Power consumption	3.6 W	5.5 W or less	5.5 W or less	2.0 W or less	2.2 W or less
Dimensions (WxHxD)	44 x 44 x 57.5 mm (1 3/4 x 1 3/4 x 2 3/8 inches)	44 x 56 x 95 mm (1 3/4 x 2 1/4 x 3 3/4 inches)	44 x 56 x 95 mm (1 3/4 x 2 1/4 x 3 3/4 inches)	29 x 29 x 30 mm (1 3/16 x 1 3/16 x 1 3/16 inches)	29 x 29 x 30 mm (1 3/16 x 1 3/16 x 1 3/16 inches)
Mass	135 g (4.8 oz)	250 g (9 oz)	250 g (9 oz)	55 g (2 oz)	55 g (2 oz)
Operating temperature	-5 to 45 °C (23 to 113 °F)	-5 to 45 °C (23 to 113 °F)	-5 to 45 °C (23 to 113 °F)	-5 to 45 °C (23 to 113 °F)	-5 to 45 °C (23 to 113 °F)
Storage temperature	30 to 60 °C (-22 to 140 °F)	30 to 60 °C (-22 to 140 °F)	30 to 60 °C (-22 to 140 °F)	30 to 60 °C (-22 to 140 °F)	30 to 60 °C (-22 to 140 °F)
Operating humidity	20 to 80 % (no condensation)	20 to 80 % (no condensation)	20 to 80 % (no condensation)	20 to 80 % (no condensation)	20 to 80 % (no condensation)
Storage humidity	20 to 95 % (no condensation)	20 to 95 % (no condensation)	20 to 95 % (no condensation)	20 to 95 % (no condensation)	20 to 95 % (no condensation)
Vibration resistance	10 G (20 Hz to 200 Hz)	10 G (20 Hz to 200 Hz)	10 G (20 Hz to 200 Hz)	10 G (20 Hz to 200 Hz)	10 G (20 Hz to 200 Hz)
Shock resistance	70 G	70 G	70 G	70 G	70 G
Supplied accessories	Lens mount cap (1), Operating instructions	Lens mount cap (1), Operating instructions	Lens mount cap (1), Operating instructions	Lens mount cap (1), Operating instructions	Lens mount cap (1), Operating instructions

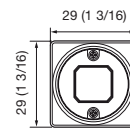
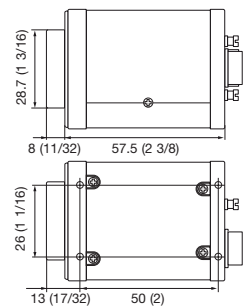
# DIMENSIONS



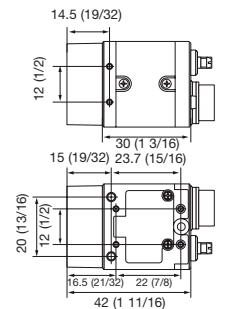
XCL-U1000/XCL-U1000C



XCL-5000



XCL-V500/XCL-X700



Unit: mm (inches)

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