XCL-S Series

Digital Video Camera Module

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XCL-S900 (1/1-type CCD, 9M, 18 fps, monochrome)
XCL-S900C (1/1-type CCD, 9M, 18 fps, color)
XCL-S600 (1/1-type CCD, 6M, 27 fps, monochrome)
XCL-S600C (1/1-type CCD, 6M, 27 fps, color)

CAMERA Link®

EXview HAD CCD II™

INTRODUCTION

In response to customer demand, Sony is proud to introduce a new top-of-the-line XCL CameraLink Camera Series in monochrome and color. With their superb resolution and high frame rates, these new cameras deliver a level of exceptional picture quality that analog cameras cannot achieve.

The new XCL-S Series cameras incorporate a 1/1-type EXview HAD CCD II™ sensor which provides extremely high sensitivity. In addition to inheriting many convenient functions from Sony's XCL Series, such as Bulk Trigger and Sequential Trigger modes, these new cameras also incorporate some unique features including Shading Correction, Defect Correction, and Temperature Readout.

These new advanced features and benefits make XCL-S Series cameras ideal when the highest inspection quality is demanded for display panels, semiconductors, solar panels, PCBs (Printed Circuit Boards), and pharmaceutical applications.

	XCL-S900	XCL-S900C	XCL-S600	XCL-S600C
Imager sensor	1/1-type CCD			
Monochrome / Color	Monochrome	Color	Monochrome	Color
Effective pixels (H x V)	3,388 x 2,712		2,758 x 2,208	
Cell size (µm)	3.69 x 3.69		4.54 x 4.54	
Output pixels (H x V, Full resolution)	3,388 x 2,712		2,758 x 2,208	
Frame rate	18 fps		27 fps	

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KEY FEATURES

Near-infrared Sensitivity

Utilizing Sony's EXview HAD CCD II technology enables XCL-S Series cameras to capture clear images in NIR (near-infrared) wavelengths. When used with an infrared strobe, each camera produces outstanding picture quality especially in low light and NIR inspection applications.

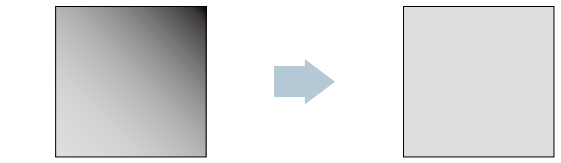
High Frame Rate Image Transfer

XCL-S Series cameras feature a high readout rate of uncompressed images for smooth and clear results. The XCL-S600 and XCL-S600C achieve 27 frames per second (fps), and the XCL-S900 and XCL-S900C achieve 18 fps when four-channel output is selected. This enables these cameras to capture fast-moving objects without sacrificing image quality.

Shading Correction

With embedded shading correction, XCL-S Series cameras minimize the uneven image intensity often caused by lighting and/or the lens. Their internal hardware processing reduces the need for external image correction that is normally performed via a frame grabber board and PC. This handy function reduces the processing load of the PC, and simplifies the processing task. In addition, these cameras are equipped with rich optional lighting settings to capture clear images in varying lighting conditions.*

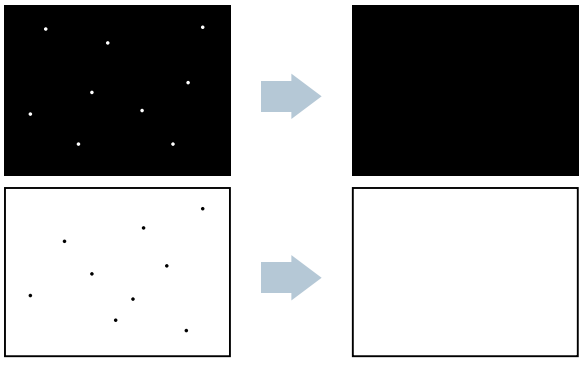
* XCL-S600 and XCL-S600C: 10 settings; XCL-S900 and XCL-S900C: 6 settings.



Shading correction OFF　　Shading correction ON

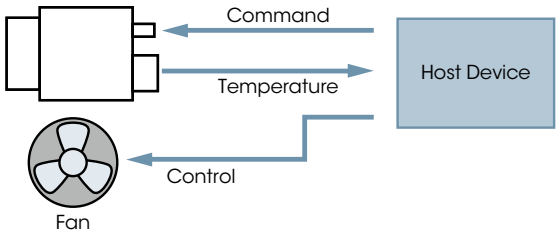
Defect Correction

XCL-S Series cameras can automatically minimize defective pixels (e.g., white and black dots) within the entire imaging area directly inside the camera. This feature helps simplify image processing.



Temperature Readout

Each camera comes with an internal temperature sensor. The host device can receive temperature information by issuing a command. This eliminates the need for a separate sensor, and simplifies system configuration.



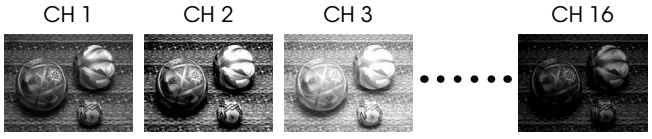
Sensitivity Control

The XCL-S Series is equipped with a saturation signal control function to allow the amount of saturation signal charge on the CCD to be increased or decreased via software commands. For example when capturing dark objects, the user can increase the amount of saturation signal charge – this elevates the camera's sensitivity to improve the picture quality instead of using a long exposure time.* On the other hand, by decreasing the amount of saturation signal charge, the level of smear can be reduced or improved.

* If the saturation signal charge amount exceeds the maximum that can be transferred into the vertical and horizontal registers, a transfer error will occur (e.g., smear).

User Set

In addition to factory default settings, up to 16 camera parameters – including brightness, gamma, shutter, gain, and trigger mode – can be preset to suit each particular scene.

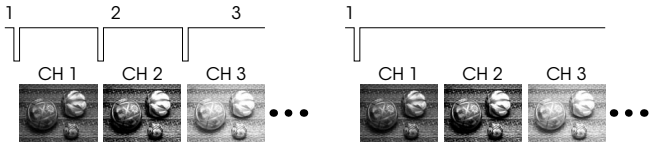


Bulk Trigger Mode & Sequential Trigger Mode

These new XCL-S Series cameras feature advanced Bulk Trigger and Sequential Trigger modes in addition to a conventional trigger mode. Each camera can store up to 16 different camera setups (e.g., exposure, and gain).

Bulk Trigger mode allows these cameras to capture up to 16 images in rapid succession using a single software or hardware trigger.

Sequential Trigger mode allows each camera to capture a single image using successive setups stored in the user set with each software or hardware trigger.



Sequential Trigger mode Bulk Trigger mode

Look-up Table (LUT)

Each XCL-S Series camera supports a look-up table which transforms the input luminance signal into the required digital output. It supports factory presets – Linear, Negative, Binarization, and Linear Interpolation – as well as a User-defined LUT (input: 12 bits, output: 12 bits).

Trigger Noise Filtering

With a trigger line filter, these cameras can specify a valid pulse width for the trigger. This helps avoid unexpected image capture caused, for example, by triggers from insignificant noise.

Pulse Train Generator

XCL-S Series cameras are capable of outputting any rectangular wave from one of the general-purpose outputs. This pulse train can be programmed for frequencies from 0.5 Hz up to 100 KHz in 1 µs steps to control external devices such as LED lights, simplifying overall system configuration.

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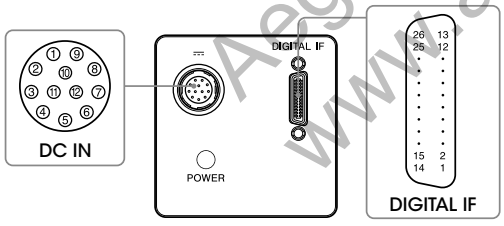
PIN ASSIGNMENTS



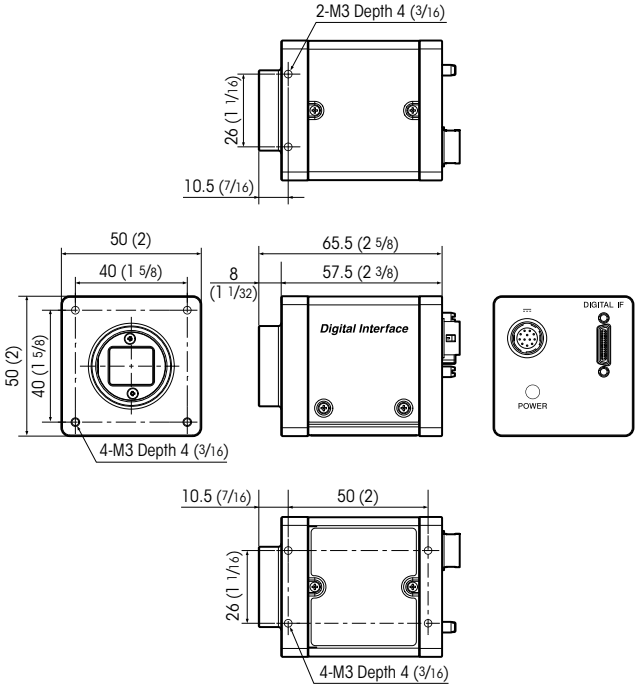
DC IN (DC power input) connector (12-pin)

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	Ground	5	GPO2 (ISO-)	9	GPO4 (ISO)
2	DC +12 V	6	GPO2 (ISO+)	10	GPI4 (ISO+)
3	ISO Ground	7	GPI3 / GPO3	11	GPI2
4	GPI1 / GPO1	8	GPI4 (ISO-)	12	ISO Ground

DIGITAL IF (Interface) connector (26-pin)

Pin No.	Signal	Pin.No.	Signal	Pin.No.	Signal
1	Ground	10	CC2+	19	X3+
2	X0–	11	CC3–	20	Ser TC–
3	X1–	12	CC4+	21	Ser TFG+
4	X2–	13	Ground	22	CC1+
5	XCLK–	14	Ground	23	CC2–
6	X3–	15	X0+	24	CC3+
7	Ser TC+	16	X1+	25	CC4–
8	Ser TFG–	17	X2+	26	Ground
9	CC1–	18	XCLK+		

DIMENSIONS

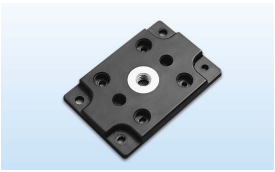


Unit: mm (inches)

SPECIFICATIONS

	XCL-S900	XCL-S900C	XCL-S600	XCL-S600C
Camera				
Image sensor	1/1-type progressive scan IT CCD			
Image sensor (Number of effective pixels, H x V)	3,388 x 2,712		2,758 x 2,208	
Cell size (H x V)	3.69 µm x 3.69 µm		4.54 µm x 4.54 µm	
Output pixels (H x V)	3,384 x 2,704		2,752 x 2,200	
Output pixels (H x V, Full resolution)	3,388 x 2,712		2,758 x 2,208	
Color filter	–	RGB color mosaic filter	–	RGB color mosaic filter
Frame rate	18 fps (4ch), 9 fps (2ch), 5 fps (1ch)		27 fps (4ch), 13 fps (2ch), 7.5 fps (1ch)	
Minimum illumination (50%)	0.5 lx (Iris: F1.4, Gain: +18 dB, Shutter: 1/18 s)	6 lx (Iris: F1.4, Gain: +18 dB, Shutter: 1/18 s)	0.5 lx (Iris: F1.4, Gain: +18 dB, Shutter: 1/27 s)	6 lx (Iris: F1.4, Gain: +18 dB, Shutter: 1/27 s)
Sensitivity	F8 (400 lx, Gain: 0 dB)	F8 (2000 lx, Gain: 0 dB)	F8 (400 lx, Gain: 0 dB)	F8 (2000 lx, Gain: 0 dB)
S/N ratio	More than 50 dB			
Gain	Auto, Manual: 0 dB to +18 dB			
Shutter speed	Auto, Manual: 2 s to 1/100,000 s			
White balance	–	One push WB, Manual	–	One push WB, Manual
Camera Features				
Readout modes	Normal, Binning (2 x 1, 1 x 2, 2 x 2), Partial scan	Normal, Partial scan	Normal, Binning (2 x 1, 1 x 2, 2 x 2), Partial scan	Normal, Partial scan
Readout features	Binnarization, Gamma (variable), Built-in test pattern, LUT, 3 x 3 filter	Binarization, Gamma (variable), Built-in test pattern, LUT, 3 x 3 filter, Color matrix	Binnarization, Gamma (variable), Built-in test pattern, LUT, 3 x 3 filter	Binarization, Gamma (variable), Built-in test pattern, LUT, 3 x 3 filter, Color matrix
Synchronization	Hardware trigger, Software trigger			
Trigger modes	Edge detection, Pulse width detection, Bulk Trigger, Sequential Trigger			
User Set	16 channels			
User memory	32 kbytes + 64 bytes x 16ch			
Other features	Shading correction, Defect correction, Temperature readout			
Interface				
Video data output	Digital monochrome 8, 10, 12-bit	Digital Raw, 8, 10, 12-bit, RGB Color (8 bit x 3)	Digital monochrome 8, 10, 12-bit	Digital Raw, 8, 10, 12-bit, RGB Color (8 bit x 3)
Digital interface	LVDS			
Camera specification	CameraLink® Version1.2			
Output data clock	4ch: - - - (1 tap), 84 MHz (2 tap) 2ch: 84 MHz (1 tap), 42 MHz (2 tap) 1ch: 27 MHz (1 tap), 27 MHz (2 tap)			
Digital input/output	IN (x2), OUT (x2), IN/OUT (x2)			
General				
Lens mount	C mount			
Power requirements	DC +12 V (+10.5 V to +15.0 V)			
Power consumption	6.0 W			
Operating temperature	-10°C to +45°C (14°F to +113°F)			
Performance guarantee temperature	0°C to 40°C (32°F to +104°F)			
Storage temperature	-30°C to +60°C (-22°F to +140°F)			
Operating humidity	20% to 80% (no condensation)			
Storage humidity	20% to 95% (no condensation)			
Vibration resistance	10 G (20 Hz to 200 Hz)			
Shock resistance	70 G			
Dimensions (W x H x D)	50 x 50 x 57.5 mm (2 x 2 x 2 3/8 inches) (excluding protrusions)			
Mass	181 g (5.4 oz)			
Regulations	UL60950-1, FCC Class A, CSA C22.2-No.1, IC Class A Digital Device, CE: EN61326 (Class A), AS EMC: EN61326, VCCI Class A, KCC			
Supplied accessories	Lens mount cap (1), Operating instructions (1)			

OPTIONAL ACCESSORIES



VCT-ST70I
Tripod Adaptor

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