SONY

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XCD Series

Digital Camera Modules

The new Sony XCD Series – with the IEEE1394b Interface and a number of resolutions and frame rates to choose from – selecting the right camera for your machine vision application has never been easier.

XCD-U100/XCD-U100CR   XCD-SX90/XCD-SX90CR   XCD-V60/XCD-V60CR

XCD-U100/XCD-U100CR
XCD-SX90/XCD-SX90CR
XCD-V60/XCD-V60CR

Sony, a renowned leader
in digital camera technology,
is introducing six new models to its
XCD Series: the XCD-U100/U100CR,
the XCD-SX90/SX90CR, and the
XCD-V60/V60CR.

Featuring outstanding picture quality, high-speed image capturing, and the digital 1394b interface, this new XCD Series is perfect for high-quality industrial and manufacturing solutions.

The XCD-U100/U100CR incorporates a 1/1.8 type IT CCD that captures extremely, high-quality, detailed images with an ultra high resolution of 1600 x 1200 (UXGA). The XCD-SX90/SX90CR employs a Sony unique CCD that achieves a frame rate of up to 30 fps at 1280 x 960 (SXGA) resolution. The XCD-V60/V60CR achieves up to 90 fps at VGA resolution, which is commonly used in many machine vision applications. With this wide range of new solutions – each with feature-rich benefits – it's never been easier to select the right camera for your specific machine vision applications.

The new XCD Series of cameras adopts the IEEE1394b interface that supports the IIDC protocol. By utilising this interface, users can transfer images to a host PC at speeds of up to 800 Mb/s. Moreover, because multiple cameras can be connected in a daisy-chain configuration, users can enjoy the benefits of simplified operation in a multi-camera system.

When these XCD cameras are daisy-chained, Bus Synchronisation and Broadcast Delivery are available. With Bus Synchronisation, users can capture images from different angles simultaneously simply by sending a single trigger from the host PC.

Broadcast Delivery allows users to capture images from multiple cameras using a software trigger instead of a hardware trigger, which helps to minimise the occurrence of false triggers. This function also enables users to change the settings of multiple cameras simultaneously.

Their compact design and rugged body enables the XCD Series to be integrated into a wide variety of industrial environments. In addition, the XCD Series incorporates other features such as partial scanning, binning, and a hardware LUT (Look Up Table).

The new XCD Series of cameras are ideal for industrial machine vision applications such as object recognition, inspection, measurement, alignment, and for microscopy applications in scientific research.

Excellent Picture Quality/High Frame Rates

The XCD-U100/XCD-U100CR features a UXGA CCD that provides the highest resolution out of all the new XCD cameras. This particular camera is ideal for applications that require the capture of ultra-high image detail. The XCD-SX90/XCD-SX90CR employs an exclusive Sony CCD and achieves up to 30 fps with SXGA image quality. For applications that require high-speed image capture at up to 90 fps, the XCD-V60/XCD-V60CR is the answer.

XCD-U100	XCD-U100CR	XCD-SX90	XCD-SX90CR	XCD-V60	XCD-V60CR
B&W	Colour	B&W	Colour	B&W	Colour
1/1.8 type progressive scan IT CCD		1/3 type progressive scan IT CCD			
1600 x 1200 (UXGA)		1280 x 960 (SXGA)		640 x 480 (VGA)	
15 fps		30 fps		90 fps	

Other Features

- Hardware LUT (Look Up Table) Built-in Real-time 3x3 Image Pre-processing Filter*[2]
- Low Power Consumption
  - XCD-U100/XCD-U100CR (3.0 W)
  - XCD-SX90/XCD-SX90CR (2.8 W)
  - XCD-V60/XCD-V60CR (2.8 W)

- Compact and Lightweight
  - 44 x 33 x 57.5 mm (W x H x D)
  - 140 g
- High shock and vibration resistance
- Meets IIDC Ver. 1.31 Specifications

*[2] Available with the XCD-U100, XCD-SX90, and XCD-V60.

Features

- ■ IEEE1394b Digital Interface
- ■ Daisy-Chain Configuration
- ■ Image Buffer
- ■ Low Power Consumption
- ■ Vertical and Horizontal Partial scanning

IEEE1394b Digital Interface

The new XCD Series employs the IEEE1394b interface which attains high data-transfer rates of up to 800 Mb/s. Since the XCD Series is backward compatible with IEEE1394a, these cameras can be easily integrated with legacy 1394a systems.

Daisy-Chain Configuration

The new XCD cameras are equipped with two IEEE1394b ports allowing multiple cameras to be daisy-chained and controlled from a single PC. A daisy-chain configuration with a large number of cameras*[1] is made possible by their EIAJ 12-pin connector, which allows external power to be supplied to the cameras.

*[1] up to 62 cameras can be daisy-chained.
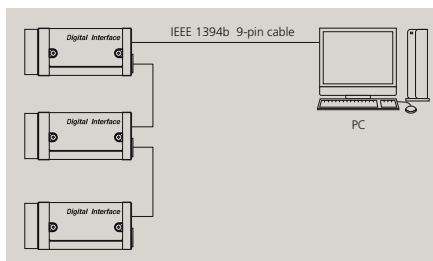
XCD Series

Bus Synchronisation

The new XCD Series also features a bus synchronisation function enabling users to simultaneously capture images from different angles with multiple cameras by sending a single trigger to all cameras from the host PC. This feature is not only useful for viewing images from different angles, but can be used to recreate a 3D image for more detailed inspection.
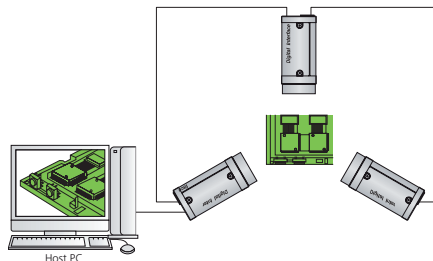
Bus Synchronisation (Reproduction of 3D Images)

Broadcast Delivery

The Broadcast Delivery function of the XCD Series can be used to send a software trigger to multiple cameras in a daisy-chain. This not only facilitates connections, but eliminates the need for using a hardware trigger which can produce false triggers due to noise. In addition, the broadcast delivery function can be used to simultaneously change camera settings such as shutter speed, exposure, white balance, gain, and more.

Image Buffer

The new XCD Series is equipped with an image buffer, which serves as temporary storage for captured images for later transmission or retransmission. This function allows users to maximise bandwidth in multiple-camera operations or reconfirm specific images as required.

Vertical and Horizontal Partial Scanning

By selecting a particular area of an image to be scanned, users of the XCD Series can reduce data size and increase frame rate to minimise processing time.

Vertical and Horizontal Binning*[2]

The Vertical binning feature of the XCD Series combines image data for every two lines vertically resulting in increased frame rates and reduced processing time. Horizontal binning combines image data for every two pixels horizontally to achieve greater sensitivity, faster capture speeds, and quicker processing.

*[2] Available with the XCD-U100, XCD-SX90 and XCD-V60.

Bulk Trigger Mode

The new XCD Series has a bulk trigger mode to allow the capture of up to 16 images in rapid succession using either a software or hardware trigger. This can be used to capture multiple images of an item at different shutter speeds. By doing so, specific areas of that item can be clearly seen without changing the lighting. Also this allows a composite image with a wide dynamic range to be reproduced.
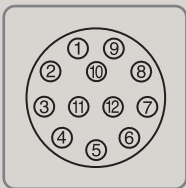

Slow Shutter Speed   High Shutter speed

Composite Image with Wide-D Technology
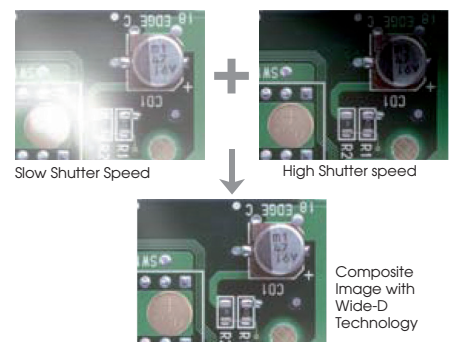
Bulk Trigger Mode (Composite Image)
(simulated images)

Specifications

	XCD-U100	XCD-U100CR	XCD-SX90	XCD-SX90CR	XCD-V60	XCD-V60CR
Image device	1/1.8 type progressive scan IT CCD		1/3 type progressive scan IT CCD			
Standard picture size (H x V)	1600 x 1200 (UXGA)		1280 x 960 (SXGA)		640 x 480 (VGA)	
Cell size	4.4 x 4.4 μm		3.75 x 3.75 μm		7.4 x 7.4 μm	
Resolution depth	Mono 8: 8 bits/pixel Mono 16: 10 bits/pixel	Raw 8: 8 bits/pixel Raw 16: 10 bits/pixel	Mono 8: 8 bits/pixel Mono 16: 10 bits/pixel	Raw 8: 8 bits/pixel Raw 16: 10 bits/pixel	Mono 8: 8 bits/pixel Mono 16: 10 bits/pixel	Raw 8: 8 bits/pixel Raw 16: 10 bits/pixel
Lens mount	C mount					
Digital interface	IEEE1394b-2002 x2, bilingual (screw lock possible)					
Transfer rate	800 / 400 / 200 / 100 Mb/s					
Max. Frame rate (at full resolution)	15 fps		30 fps		90 fps	
Gain control	Manual 0 to 24 dB, Auto gain	Manual 0 to 18 dB, Auto gain	Manual 0 to 24 dB, Auto gain	Manual 0 to 18 dB, Auto gain	Manual 0 to 24 dB, Auto gain	Manual 0 to 18 dB, Auto gain
Shutter speed	1/100,000 to 16s, Auto shutter					
External trigger shutter	Trigger start (Mode 0), Trigger start and exposure duration (Mode 1), Programmable trigger (via the IEEE1394 bus), Trigger inhibit setting, Trigger/Strobe delay setting, Single/Bulk trigger mode					
Image memory	16 MB					
Memory channel	15 channels for parameter settings					
Broadcast delivery	Camera setting, Software trigger via IEEE1394 bus					
Readout features	Partial Scanning, Binning, LUT, 3x3 filter	Partial Scanning, LUT, Bayer Pattern Arrangement, AWB	Partial Scanning, Binning, LUT, 3x3 filter	Partial Scanning, LUT, Bayer Pattern Arrangement, AWB	Partial Scanning, Binning, LUT, 3x3 filter	Partial Scanning, LUT, Bayer Pattern Arrangement, AWB
Power requirements	DC 8 to 30 V (via IEEE1394b 9-pin cable or 12-pin camera cable)					
Power consumption	3.0 W (Typ.)		2.8 W (Typ.)		2.8 W (Typ.)	
Dimensions (W x H x D)	44 x 33 x 57.5 mm (not including protruding parts)					
Mass	140 g					
Operating temperature	-5 to 45 °C (23 to 113 °F)					
Storage temperature	-30 to 60 °C (-22 to 140 °F)					
Operating humidity	20 to 80% (no condensation)					
Storage humidity	20 to 95% (no condensation)					
Vibration resistance	10 G (20 to 200 Hz)					
Shock resistance	70 G					
Supplied accessories	Lens mount cap, Operating instructions					

Pin Assignment

12-pin EIAJ connector

Pin No.	
1	DC IN (Ground)
2	DC IN
3	ISO GND
4	Strobe OUT (Isolated)
5	GPIO OUT 1- (Isolated)
6	GPIO OUT 1+ (Isolated)
7	GPIO IN 1+ (Isolated)
8	GPIO OUT 2- (Isolated)
9	GPIO OUT 2+ (Isolated)
10	GPIO IN 2+ (Isolated)
11	Trigger IN
12	ISO GND

Optional Accessories
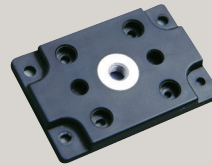
Tripod Adaptor

VCT-ST70I

Isolated type
Mass: Approx. 14 g
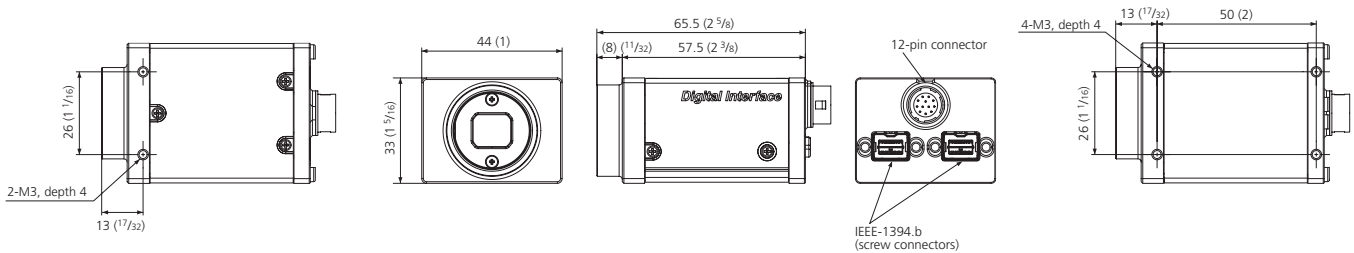Dimensions: 40 x 6 x 59 mm (W x H x D)

Camera Adaptors

DC-700CE

Cables

CCXC-12P02N CCXC-12P05N
CCXC-12P10N CCXC-12P25N

Dimensions (mm)

4-M3, depth 4
13 (17/32) 50 (2)
26 (1 1/16)
44 (1)
33 (5/16)
65.5 (2 5/8)
(8) (11/32) 57.5 (2 3/8)
12-pin connector
Digital Interface
26 (1 1/16)
2-M3, depth 4
13 (17/32)
IEEE-1394.b
(screw connectors)

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