

# Progressive Scan Interline Transfer CCD Camera with Analog Output

## 6612-1000

The Cohu 6612-1000 is a full frame Progressive Scan CCD camera ideal for high speed "stop action" applications. The use of progressive scan increases vertical resolution and eliminates horizontal smear of moving objects. It is easily connected to standard frame grabbers or to a standard RS-170 monitor for system setup and test.

This camera utilizes square pixels in a 659 (H) x 494 (V) array. The 1/2" format sensor supports a wide variety of lenses and optical systems.

The 6612-1000 can be set to output in analog format at 30 frames per second (low speed), single channel or 60 frames per second (high speed), dual channel. The camera is controlled with internal switches or externally through the auxiliary connector.

In progressive scan mode, the camera operates in a 1/30-second rate and outputs the video through a single connector. In dual channel, interlaced mode, each channel outputs a field every 16.6 ms. This provides full frame progressive scan at 60 frames per second.

With Cohu's 6612-1000 Progressive Scan Camera, a new, full image is output from the camera every 1/60-second, making it ideal for machines to more quickly process and display information, or respond to programmed instructions.

Cohu offers the specifications, competitive pricing, custom configurations and configuration control that customers have come to rely upon. Call us for comprehensive video solutions to your imaging requirement and applications assistance. OEM inquiries are welcome.



*The specifications, features, and competitive pricing of the 6612-1000 make it ideal for applications requiring detailed video imaging of a fast moving subject.*

### APPLICATIONS AND FEATURES

<b>Microscopy</b>	Square pixels improve metrology and reduce image blurring due to relative motion at high magnifications.
<b>Laser Measurement</b>	In "snap shot mode," its full frame resolution at fast shutter speeds improves beam measurements.
<b>Machine Vision</b>	60 fps high resolution video output increases system productivity and reduces cost. Asynchronous shuttering supports wide range of in-line inspection systems.
<b>Barcode Scanning</b>	Using full frame image capture, 2-D and 3-D barcodes are crisp and clear. Inspection and scan rates can be run at 60 fps.
<b>X-Ray Imaging</b>	Full-frame blur-free image with square pixels improves measurement accuracy at twice the speed of RS-170 cameras.
<b>Traffic Management</b>	Collect full-resolution images of fast moving objects for storage and retrieval.

Designed and manufactured in the U.S.A.

**COHU**  
Cohu, Inc. / Electronics Division

# Operating Modes of the Cohu Model 6612-1000 Camera

The Cohu Model 6612-1000 Progressive Scan camera is designed to be used with an external image capture device (frame grabber) to capture dynamic events. Its various operating modes can be controlled by internal switches or externally through the auxiliary connector. Standard RS-170 or progressive scan output formats are supported at 30 frames per second (fps) via a single BNC connector, or at 60 fps using dual BNC connectors. Fast shuttering eliminates a strobe light in many applications. The asynchronous reset trigger will immediately acquire a full frame of video. External integration allows direct control over sensor exposure time. Pixel clock output can be added if desired. Request the Cohu frame grabber compatibility reference sheet from your representative or from the technical notes page at [www.cohu.com/cctv](http://www.cohu.com/cctv).

**Continuous Operation** The camera operates in a traditional CCD camera mode. It uses the internal clock to support all shutter and long-term integration capabilities in progressive scan or interlace modes.

- Crystal or phase lock loop (PLL) This operation allows the camera to genlock to standard RS-170 sync sources.
- Programmable high speed shutter, up to 1/10,000 second, and low speed shutter integration up to 16 frames

**Snap Shot Operation** This mode captures clear images of fast moving subjects.

- Capture initiated with external asynchronous TTL triggers
- Supports all high speed and low speed shutter settings

**External Integration** Extend the sensor exposure, from 16 ms to several seconds, for low light level applications.

- Allows direct low speed shutter control using an external pulse (duration of pulse determines exposure time)

**Video Control** Mode and gain settings are controlled either internally with switches and potentiometers or externally through the auxiliary connector.

- Video rates of 30 fps (single channel) or 60 fps (dual channel)
- Video amplifier gain (up to 28dB) and channel balance control
- Individual channel gamma control (0.45 to 1)
- Manual or automatic gain control
- Auto iris or DC iris lens control (for use with automatic lenses)

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## Shutter and Integration Modes of the Cohu Model 6612-1000 Camera

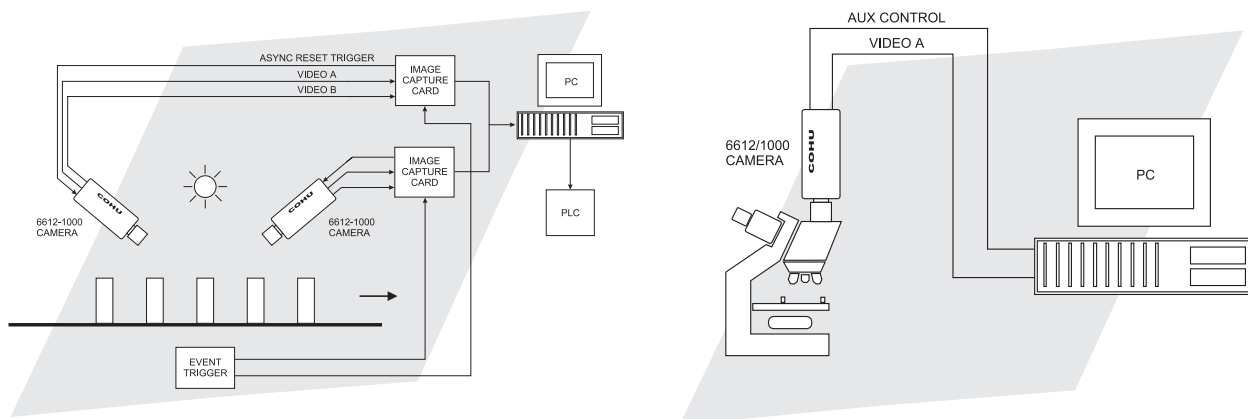
**No Shutter:** The sensor integrates over the full vertical interval (1/30 second in single channel mode or 1/60 second in dual channel mode).

**Programmable Shutter:** There are nine (including flickerless) shutter settings ranging from 1/60 second to 1/10,000 second.

**Flickerless:** When using 50 Hz fluorescent lighting, this 1/100-second shutter guarantees exposure to only one fluorescent light cycle.

**Programmable Integration:** There are eight settings ranging from two frames to 16 frames.

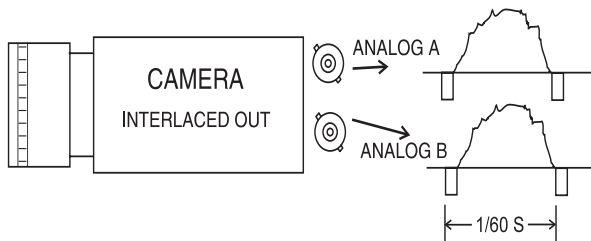
**External Integration:** Using an external pulse, the integration interval can be set to the desired integration level.



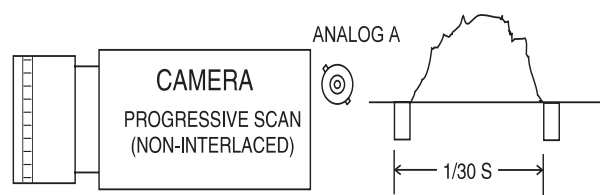
Full vertical resolution with no motion artifacts make the 6612-1000 an ideal camera for applications that involve imaging fast moving objects. The machine vision application, at left, shows two cameras operating from a common sync source. Optical measurement and inspection applications, as shown on the right, benefit from the use of a square pixel array because precise measurement accuracy is easier to accomplish. High speed motion artifacts (blurring) resulting from movement at high magnifications are eliminated.

## SPECIFICATIONS

Imager	Monochrome, 1/2" format, interline transfer square pixel array
Format	Selectable, interlaced, (RS-170) at 60 frames per second through two connectors (1 Vp-p), or non-interlaced at 30 frames per second through one connector (1 Vp-p)
Pixels	659 (H) X 494 (V)
Pixel Rate	12.2727 MHz
Resolution	480(H) x 480(V)TVL
Cell Size	9.9 $\mu\text{m}$ x 9.9 $\mu\text{m}$
Sync	Internal Crystal, internal PLL, async reset, direct H&V
Sensitivity	2850K at faceplate. Full video, no AGC: 4 lux; 80% video, AGC on: 0.15 lux
Gain	AGC/Manual adjustable up to 28dB. Internal, or external control via auxiliary connector
S/N Ratio	Greater than 56 dB (gain 0 dB, gamma 1, in a 0-6 MHz bandwidth)
Gamma	Adjustable .45 to 1.0
Integration	Switch or external selectable 8-step shutter, (1/60 sec. to 1/10,000), and 8-step integration (2-16 frames). External control of shutter mode, shutter speed, H&V, async reset and integration through the auxiliary connector
Lens Mount	C/CS
Lens Drive	Switch selectable auto iris drive (video), or DC iris drive. (DC level)
Weight	11 oz. (320 g) without lens
Power	12 VDC, 350 mA
Mount	1/4-20 female thread, top and bottom of housing in line with optical axis.
Humidity	Up to 95% relative humidity (non-condensing)
Vibration	Per Mil-STD-810 (E) Method 514.4. categories 1,8,10 (less lens)
Reliability	MTBF: 20,000 hours (less lens)
Shock	No damage to 30 g, 11 ms duration (less lens).
Altitude	Sea level to 3,000 meters/10,000 ft. (508 mm/20" Hg.)
Temperature	-4°F to 158°F (-20°C to 70°C)
Approvals	FCC Class "A" device

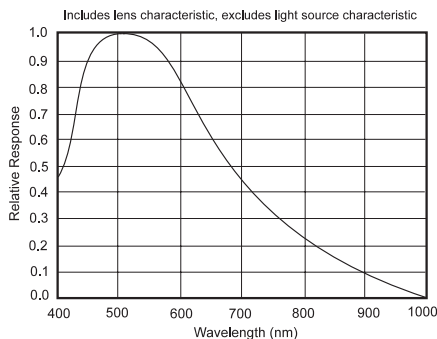


*This illustration shows 60 fps through two connectors. It requires an external frame store device and internal or external sync. This application will capture an image of a fast moving object with high resolution.*

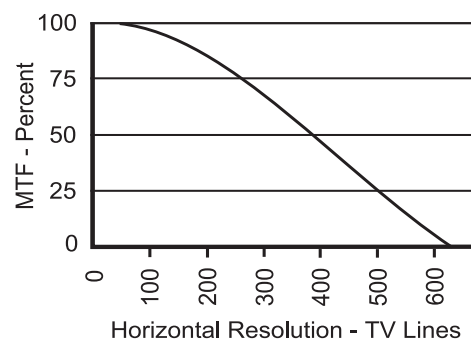


*This illustration shows 30 fps in the progressive scan mode, with output through one connector. Sync is internal or external. Fields are combined internally for full vertical resolution.*

### Spectral Response

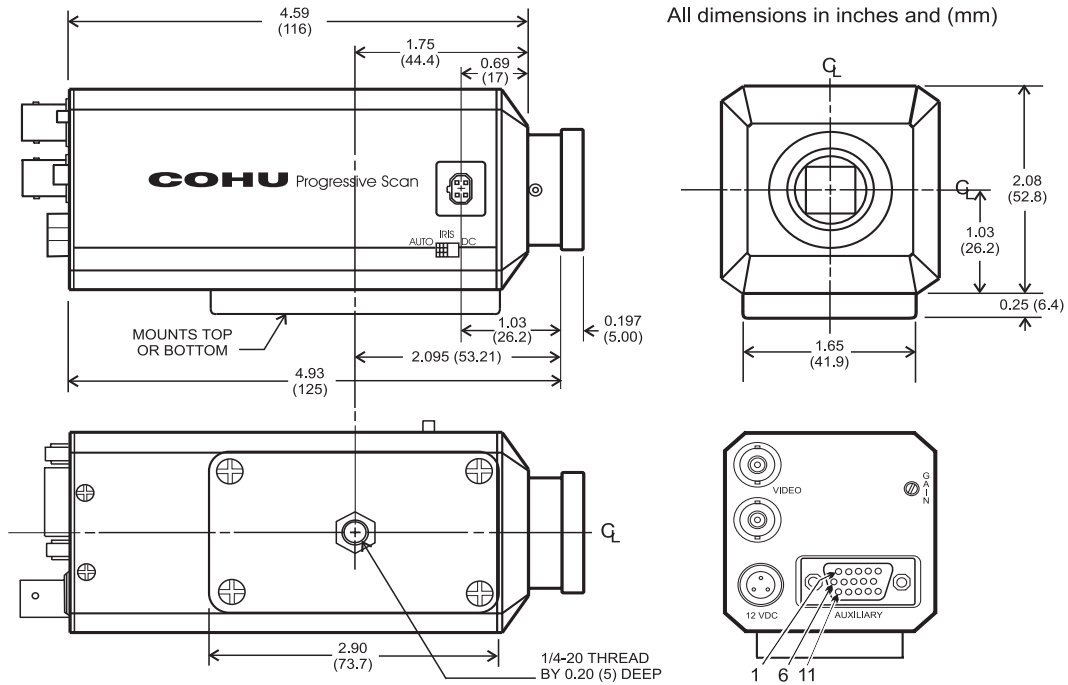


### Modulation Transfer Function



## DIMENSIONS

All dimensions in inches and (mm)



### AUX. CONNECTOR PIN CONFIGURATION

1 - 5 Shutter/Integrate Control Inputs	11 Write Enable Pulse Out
6 Internal/External Sync Select In	12 Async Reset Pulse In
7 Integrate (external) Control In	13 Vertical Trigger In
8 Remote Gain Control In	14 Digital Ground
9 Normal/Async Select In	15 Horizontal Trigger In
10 Progressive (30)/Interlaced (60) Select In	

## ORDERING INFORMATION

### Ordering Information

6612-1000/0000 Monochrome progressive scan camera with auxiliary connector, power connector, and lens connector.

#### Accessories

8368-4 115 VAC/60 Hz to 12 VDC power supply

#### Lenses

This camera is designed to support a wide variety of lenses. Contact your Cohu representative for a complete list.

Cohu reserves the right to change specifications without notice.

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