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# High-Resolution Area Cameras

**Full frame mega pixel CCD area cameras** | **CMOS area cameras** | **Line Scan cameras**
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**About high-resolution mega pixel area cameras**
We offer solid-state mega pixel cameras in both full frame monochrome and color or CMOS monochrome.

Full frame cameras have the advantage of 100% aperture, no dead area like those cameras that use interline transfer sensors. Interline transfer sensors use the "dead-zone" (lines between pixels) for image transfer and electronic shutter functions. This dead-zone manifests itself in lower sensitivity and missed optical information that can be critical in some applications. For our full frame cameras you need to use either pulsed lighting or a chopper/shutter in front of the camera, to obtain only incident lighting on the CCD during the integration time. Standard electro-optical interfaces and shutters are available that use the shutter signal emitted by the camera.

CMOS monochrome cameras come in resolutions of 1.3 and 2 mega pixels and offer excellent SNR: 63 dB, data output up to 12 bits, R.O.I capability, and frame rates of 60 fps up to 180 fps.

Our cameras are not end consumer products and are typically embedded as integrated parts in our customers' products. Our cameras are compatible with most standard CameraLink(r) frame grabbers.

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## Full frame cameras

Our 8 Mega pixel camera offers true 12 bit digital output of a monochrome image. The standard 3-shot color mode allows very high-resolution acquisition of color images by using color wheel or strobing LED light sources in red, green, and blue in succession for the final image.

The sensor used in this camera has very good sensitivity from the blue to near infrared. Combined with low noise and 100% aperture produces 12 true bits of image output.

Programmable settings allow the user to apply different integration times, gains and offsets.

**Applications:**
The performance and reliability of this camera make it well suited for the most demanding applications, such as film and document scanning, semiconductor and PCB inspection, DNA analysis, metrology, or X-ray imaging.

Below is an example of a complete system using this camera

This fast, flexible, and easy to control camera has a large format, which very closely approximates that of 35 mm film. The 8-mega-pixel resolution and high sensitivity progressive scan CCD make this versatile and accurate cameras ideal for applications such as photo finishing.

**Main Features**

- High resolution, large format progressive scan CCD sensors
- High sensitivity even in the near Infrared
- Compatible with black and white or 3-shot color imaging
- 12 bit or 3x12 bit image capture and storage
- High signal to noise ratio (> 66dB)
- Blooming protection
- Live video preview mode in black and white with pixel binning.
- Complete camera control through RS232 serial port
- 12 bit to 12 bit input LUT
- WINDOWS software (hardware settings, image grab, display and corrections)

3-Shot Color imaging using our mega pixel camera and color wheel

**Specification details on 8M and 8MC cameras**

| Product Name | Pixel Count | Pixel Size um | Fill Factor | Image Format | Color |
|---|---|---|---|---|---|
| 8 Mega-Pixel | 2300 x 3500 | 10 µm x 10 µm | 100% | 35mm(V) x 23mm(H) | No |
| 8Mega-pixel Color | 2300 x 3500 | 10 µm x 10 µm | 100% | 35mm(V) x 23mm(H) | Yes |

**Binning modes on 8M and 8MC cameras**

| Mode | Image Size (H x V) | Frame Readout Time | Line Readout Time | Max Frame Rate |
|---|---|---|---|---|
| No binning | 2300 x 3500 | 370 ms | 104 µs | 2.67 f/s |
| 2 x 2 pixel binning | 1150 x 1750 | 200 ms | 114 µs | 4.91 f/s |
| 4 x 4 pixel binning | 574 x 875 | 110 ms | 134 µs | 8.82 f/s |

## High-resolution CMOS cameras

These are very fast CMOS 1.3 and 2 mega pixel monochrome cameras using CameraLink(r) interface and data output in 8, 10 or 12 bits.

We integrate dedicated electronics into this camera, which results in excellent signal to noise ratio, allowing a cost effective camera solution with outstanding sensitivity, even at maximal speed.

The region of interest feature allows the end-user to implement infinite resolutions and to increase frame rate to: 48 fps at 1.3M, 60 fps at 1M, and 180 fps in VGA format for the 1M60 version (half speed for the 1M30).

**CMOS camera data sheets**

1M30/1M60 provide advanced features such as contrast expansion, Fixed Pattern Noise correction (FPN) and Look Up Table (LUT).

The programmable settings allow you to work at different integration times, gain and offset. An external trigger enables synchronization upon external events.

Note these important radiometric performances showing high sensitivity

and signal to noise ratio:

| Sensitivity at minimum gain | RMS noise at minimum gain |
|---|---|
| SEE = 0.4 Lux.s | NEE = 270 µLux.s |
| Signal / noise ratio: 63 dB | |
| Adjustable gain : 0 to 18dB, step of 3 dB | |

With the region of interest function (ROI) you can focus on portion of image and increase your frame rate. Size and location of the ROI are also programmable:

Examples of frame rate vs ROI size

| ROI Size H x V | 1M60 frame rate | 1M30 frame rate |
|---|---|---|
| 1312 X 1024 | 48 | 24 |
| 1024 x 1024 | 60 | 30 |
| 640 x 480 | 175 | 85 |

**Sensor specifications for 1.3-and 2 mega pixels cameras**

| Sensor Characteristics | | | | |
|---|---|---|---|---|
| CMOS Cameras | | | | |
| **Cameras** | **1M60** | **1M30** | **2M30** | **2M60** |
| Resolution (HxV) | 1312 x 1024 | 1312 x 1024 | 1936 x 1080 | 1936 x 1080 |
| Pixel Size (square) | 5 µm x 5 _m | 5 µm x 5 _m | 5 µm x 5 _m | 5 µm x 5 _m |
| Pixel Clock | 75 MHz | 37.5 MHz | 75 MHz | 2 x 75 MHz |
| Frame Rate | 48 fps | 24 fps | 30 fps | 60 fps |

**1.3 and 2 mega pixel Mechanical and Electrical Interface specifications**

| | |
|---|---|
| **Size (w x h x l)** | 45 x 45 x 45 mm3 |
| **Lens Mount** | C |
| **Sensor Alignment** | Better than ± 100 _m |
| **Power Supply** | Single 12 to 24 V |
| **Power Dissipation** | < 2 W |
| **Operation Temperature** | 0 to 55 (non condensing) °C |
| **Storage Temperature** | -40 to 70 (non condensing) °C |

**Contact us by phone at 847-255-4400 or by e-mail:**
**sales@hilltech.com**