

SI-640HF M & RGB MegaCamera™
VGA (640x480), 10-Bit, 80MHz
250/500 FPS Progressive Scan Digital Camera

Silicon Imaging Inc.



Silicon Imaging is proud to continue its innovation in high-speed digital video cameras. Driven by the growing demand for consumer Digital Still and High Definition video cameras, CMOS sensors are continuing to break technical barriers and surpass the performance characteristics of CCD's in many photonic, imaging and consumer applications. By utilizing a single highly integrated CMOS device, which incorporates large pixel sensing areas, timing generation, signal processing and high bandwidth outputs, Silicon Imaging has developed a very compact, low-power, ultra high speed digital camera system.

640 x 480 with 9.9um pixels – High Speed

The MegaCameraä SI-640HF utilizes a ½-inch optical format VGA resolution high-speed CMOS sensor with extra large 9.9um-square pixels. The large pixels collect more light in a shorter period time, allowing for higher frame rate operation and shorter exposures. It is capable of delivering superb images at a turbocharged 250 fps (500fps in field mode). The entire camera is only 45 x 52 x 50mm (33 x 40mm x 22mm in PCB); Making it the perfect solution for machine vision inspection, object tracking, golf swing analysis, and video special effects for use in movie production.

TrueSnap™ Full-Frame Shutter – No Blooming

Each pixel is, ideal for image processing, and can stop the motion of fast moving objects using an electronic freeze frame snapshot shutter. This snapshot shutter allows the all pixels to be integrated (exposed) in parallel; all pixels start integrating simultaneously and stop integrating simultaneously. The resulting charge on each pixel is sampled into pixel analog memories (one memory per pixel) and consequently, row by row, are digitized and read out-of-chip. Unlike CCD, which leak charge to adjacent pixels when the registers overflows (blooms), the SI-640HF provides inherent anti-blooming protection in each pixel, so that there is no blooming.

10-Bits Sampling – Sub-Pixel Accuracy

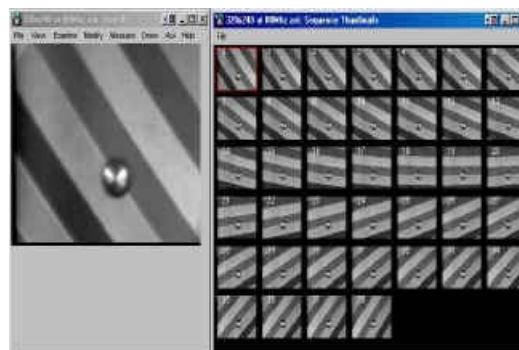
The SI-640HS MegaCameraä uses 10-Bit digitizers to sample the pixel data. Converting the pixel data directly to digital at the sensor head eliminates pixel-sampling jitter and enables accurate sub-pixel metrology, image analysis and improved live video reconstruction. A programmable clock which ranges from 20–80MHz allows for trade-offs in speed versus exposure time and lower noise.

250 FPS VGA & 500FPS Subsampling

For higher speed captures, the camera can operate in subsampling and windowing. In subsampling/field mode, every other row is skipped and reducing the readout time to achieve 500fps output. A region of interest can be readout by choosing start row and column and stop row and column. The resulting frame rate will increase based on the total number of rows in the imager. A small region of the imager can be readout at frame rates in excess of 200fps. The window size and position can be adaptively changed on frame-by-frame basis.

CameraLink Digital Interfaces

An industry standard forum has adopted Camera Link, for low cost connectivity and cabling of cameras and frame grabbers at very high speeds. The MegaCameras-CL utilizes the high speed CameraLink interface to output 12 bit data at 80MHz continuously to a frame grabber and directly into PC memory for further processing. The single cable includes image data, vertical and horizontal synch, Triggering and Serial communication. It is compatible with many popular frame grabber and image processing hardware devices, fiber-optics transceivers and Gigabit Ethernet modules for extended distance transmission.



FEATURES

- 640 x 480 Progressive Scan
- 1/2" Imaging Format , 9.9um Square Pixel
- 250 / 500fps Live Snap-Shot Capture
- Full-Frame Shutter –Triggered & Live
- Windowing at 2000fps (160 x120)
- 2x vertical Subsampling (odd/even field mode)
- 10 Bits per Pixel, 2–800MHz Sampling
- 20 ~ 80MHz Programmable Clock
- Programmable Gain, Exposure & Clock
- Auto Black Level column Calibration
- Monochrome & Color Bayer RGB Model
- Custom PCB Version
- Cameralink Interface

SI-640HF MegaCamera Specifications

Sensor

Active Pixels	640 H x 480V
Pixel Size (pitch)	9.9µm x 9.9µm
Optical Format	1/2" (6.83mm x 5.45mm)

CameraLink Frame Grabber Control:

Serial Communication	RS-232 Protocol 9600bps (57.6k)
Signaling	TX & RX (LVDS)

