

## LightWise LW-1.3-G-1394

1.3 Megapixel Global Shutter  
FireWire Camera



### Features

- Low Noise Progressive Scan 1.3 Megapixel Monochrome Image Sensor
- IEEE-1394 IIDC DCAM Specification Version 1.3 Compliant Interface
- High Frame Rate: 27 fps (1280x1024)
- Ultra High Quality Smooth Digital Zoom and Pan for any Region of Interest. Fully controllable by host computer
- 2 1394 ports allows Cascading of cameras in remote installations
- Arbitrary Region of Interest
- Multiple Trigger Modes including true Global Full-Frame Shutter
- Programmable I/Os for lighting and synchronization control
- On-board 16Mbyte Multi-Image Buffer
- 1 Million gate Onboard FPGA and Programmable “Smart” architecture enables custom configurations
- Compatible with a wide range of 3<sup>rd</sup> Party Software Application
- Soft-load Firmware-Upgradeable from Host Computer
- C-Mount Included
- API Specification and SDK Available
- Single 1394 Cable for Image, Power and

The new LightWise area scan smart cameras combine advanced digital processing technology and the FireWire™ standard to give a low-cost, high performance solution to machine vision applications. These compact cameras shorten the typical integration time associated with vision systems and offer flexibility for OEM solutions. Fully compliant with the IEEE-1394 IIDC DCAM Specification Version 1.3, these cameras can be used with any compatible programs or other 3rd Party Software. Frame Rates up to 27 fps at full resolution and 90+ fps for VGA resolution. The LW-1.3-G provides a true full frame global shutter capability for high speed motion critical applications. The cameras now include the ISG High Quality Digital Pan and Zoom Processor, which allows computer controlled, pixel accurate ROI panning and multi-tap filter based digital zoom for the ultimate flexibility in your application. All camera controls are done via the 1394 interface, which includes a fully programmable image processing pipeline and dynamic range/gamma control LUT for any desired response curve. An on-board image buffer for up to 9 monochrome images is also featured in these cameras, as well as a wide range of triggering and strobe control capabilities. These cameras come packaged with driver software and a user's manual.

## Sensor Specifications

| Parameter                  | Specification   | Remarks   |
|----------------------------|---|---|
| Pixel architecture         | 4-transistor active pixel sensor  | Allows for rolling and synchronous shutter  |
| Pixel size                 | 6.7 $\mu\text{m}$ x 6.7 $\mu\text{m}$   | The resolution and pixel size results in a 2/3 <sup>rd</sup> optical format                               |
| Resolution                 | 1280 x 1024   |   |
| Pixel rate                 | 40 MHz  |   |
| Full frame rate            | $\pm 30$ frames/second  | Depending on blanking time (assumed 3.5 $\mu\text{s}$ )   |
| Shutter types              | - Rolling<br>- Snapshot   | - Continuous imaging.<br>- Triggered synchronous shutter with integration and readout separate in time    |
| FPN (on chip corrected)    | 0.2-0.5% RMS<br>< 0.1% RMS  | Synchronous (snapshot) shutter<br>Rolling curtain shutter   |
| PRNU                       | 10% p/p   | 2% RMS  |
| Conversion gain            | 20 $\mu\text{V}/\text{electron}$  | Rolling curtain shutter   |
| Sensitivity                | 2.7 $\text{V}/\text{Lux}\cdot\text{sec}$<br>... $\text{V}\cdot\text{m}^2/\text{W}\cdot\text{s}$ | White light / visible band only<br>(180 lx = 1 $\text{W}/\text{m}^2$ )                                    |
| Peak QE * FF               | About 30-35%<br>QE*FF   | Peak QE*FF = 30.. 35 %  |
| Average SR*FF              |   | Over the visible range  |
| Average QE*FF              |   |   |
| Optical cross talk         | 8-16%   | Cross talk to the nearest neighbor  |
| Dark current               | 200-500 $\text{pA}/\text{cm}^2$<br>at RT<br>or $\pm 750$ e-/s                                   | Auto saturation time in the order of 30 to 60 s depending on the shutter mode                             |
| Noise electrons [e-]       | 40-60<br>20-30  | Synchronous shutter<br>Rolling curtain shutter  |
| Saturation charge [e-]     | 60000   | Thus S/N ratio in the order of:<br>60000:50 = 1200 synchronous shutter<br>60000:25 = 2400 rolling shutter |
| Spectral sensitivity range | 400 – 1000 nm   | QE at wavelengths shorter than 400 nm has to be verified.   |
| Parasitic sensitivity      | < 1%  | i.e. sensitivity to light during the periods that the synchronous shutter is off                          |