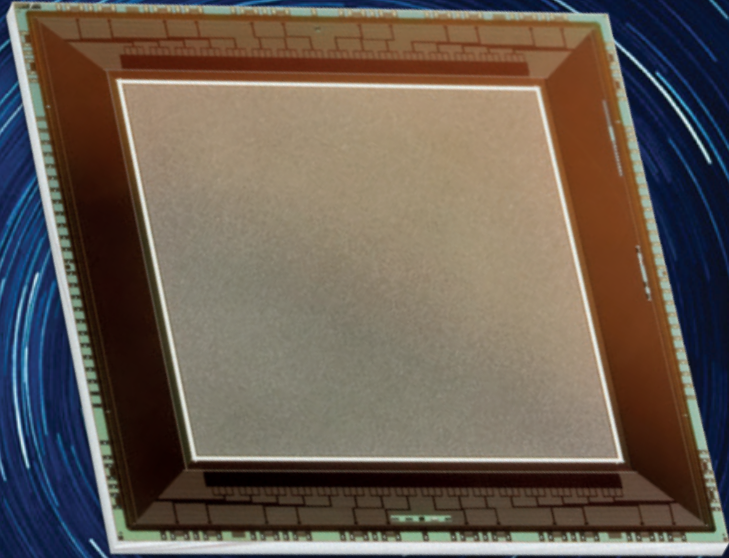




SaphiraQM

512 x 512 ROIC

The SaphiraQM detector is an evolution of the highly successful 320x256 Saphira detector and satisfies applications in the fields: wavefront sensing (for adaptive optics systems), fringe tracking, spectroscopy, rapid time-domain astronomy and astronomical imaging. The larger pixel count is vital for many modern instruments especially the 30m-class telescopes and many imaging applications. The architecture is designed to provide the minimum latency for pyramid wavefront sensors at an exceptional frame rate of 2500 frames per second.

The SaphiraQM detector is the result of a collaboration between the European Southern Observatory, Max Planck Institute, NRC Herzberg and the Leibniz Institute for Astrophysics Potsdam (AIP) to provide a large-area Saphira detector for the space and astronomy community.

The silicon ROIC has been designed specifically for HgCdTe avalanche photodiodes and incorporates special circuits to suppress persistence, crosstalk and self-luminescence (glow). The HgCdTe APD can achieve gains of over 300x at very low dark current in the infrared band 0.8 to 2.5 μ m.

The architecture retains the main features of Saphira with an emphasis on flexibility. There are options for multiple independent windows for resetting and readout. The readout mode and scan direction can be selected for the best noise reduction and image latency. The 64 parallel output buffers is key to achieving high frame rates.

Main features

- Photon counting performance at maximum avalanche gain
- Very high frame rate
- Flexible integration and readout modes
- Multiple independently resettable windows (to 1x64)
- Wavelength tuned to application

Key benefits

- Combination of high sensitivity and high frame rate

Technical specification

Physical Parameters

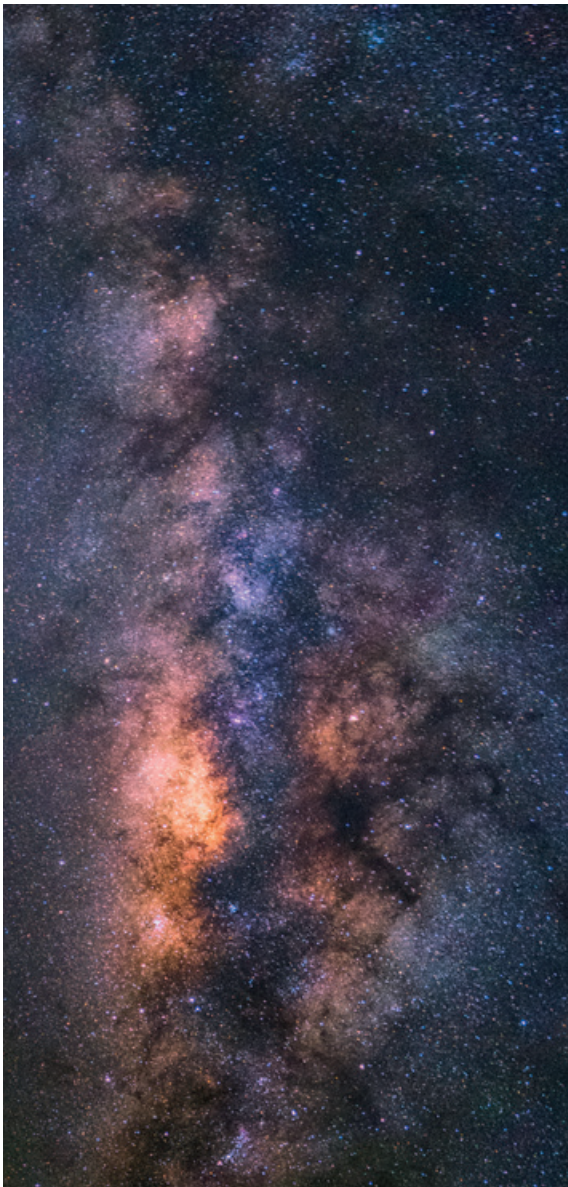
Active array	512x512
Pixel pitch	24um

ROIC operation

Scanning for low image lag	Symmetrical about centre row
Reset modes	Global or rolling
CDS modes	Rolling or Read-Reset-Read per row
Control and operation	Single serial interface and clock
Power consumption	80mW
Non-destructive readout	1 e- glow per 1000 frames
Number of outputs	2 or 64
Maximum frame rate	4k frames per second
Windowing	Multiple window options
Avalanche gain control	Single -ve power supply up to 18V

Infrared imaging

Infrared sensor	HgCdTe avalanche photodiodes
Waveband for full gain	0.8 to 2.5um (partial to 3.5um)
Typical read noise	0.5 e- at a typical gain of x80
Noise figure	<1.2
Maximum gain	300x
Operating temperature	40 to 140K



For more information:
ir.detectors@leonardo.com

Leonardo Electronics
First Avenue - Millbrook Industrial Estate - Southampton - Hampshire - SO15 0LG -
United Kingdom - T +44 (0) 2380 514100

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