

Ultra Lightweight Miniature High Performance Thermal Imaging Systems

# MIRICLE 110K

Powered by Thermoteknix

384 x 288 LITE



MIRICLE® is a registered trademark of Thermoteknix Systems Ltd



## MIRICLE LITE Ultra Lightweight Camera System for Weight-Critical Applications

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The MIRICLE LITE Thermal Imager is an ultra-lightweight and miniature system for low weight, mission critical applications. With a detector housing machined from Magnesium and a rear casing of lightweight moulded synthetic resin, the MIRICLE 110K LITE weighs a mere 160g (5.6 oz) with a 15mm lens fitted or is available with athermalized 14.25 mm lens. Miricle LITE thermal imagers are available with integral shutter or Miricle XTi shutterless Never-Blind technology.

Built in the world's smallest footprint, MIRICLE 110K cameras and cores are driven by Thermoteknix' ultra high performance 384 x 288 7-14 micron pitch long wave uncooled microbolometer detector engine, incorporating the very latest low power micro-electronics technology.

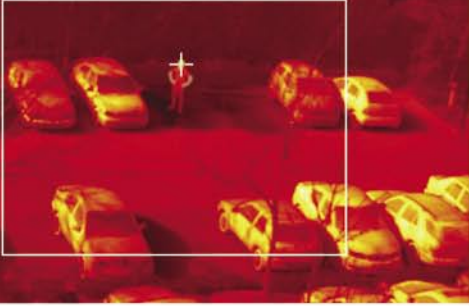
With 44% more pixels than 320 x 240 cameras, MIRICLE 110K products provide high performance thermal imaging in highly compact, lightweight, low power, rugged, modular designs. Powerful embedded software, a choice of analog video and digital video outputs and accessories put MIRICLE 110K ahead of the field. Available in a range of housings, configurations and options, MIRICLE 110K cameras and cores match flexibility with mechanical and electronic integration on a single platform. MIRICLE 110K camera systems are available for supply to global markets in a range of environmentally sealed housings or with interchangeable lens mounts for rapid lens changes in the field.

Thermoteknix patented MIRICLE camera 'Instant On' technology eliminates the time-to-image delay issue found in other thermal imaging cameras.

For Unmanned Aerial Vehicles and all Weight Critical Applications

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## PERFORMANCE MIRICLE 110K LITE

<b>FPA Detector</b>	Alpha Silicon uncooled micro-bolometer
<b>Array size</b>	384 x 288 (110,592 effective pixels)
<b>Spectral band</b>	7 - 14 $\mu$ m
<b>Pixel pitch</b>	35 $\mu$ m
<b>Optical Fill</b>	> 80 %
<b>NEDT</b>	$\leq 50$ mK @ 30 °C (f/1.0, 60Hz)
<b>IFoV (Instantaneous Field of View)</b>	1.09 mrad with standard 32mm f/1.0 lens
<b>Video Output Format</b>	Monochrome RS170/NTSC or CCIR/PAL
<b>Custom Frame Rate</b>	Up to 120 Hz available
<b>Dynamic Range</b>	14 bit
<b>Gain/Level Control</b>	Auto
<b>Time to image</b>	< 2 seconds
<b>Shutter</b>	Micro-compact. Auto NUC
<b>Power Input</b>	3.3 – 5 V
<b>Power Consumption - Nominal</b>	< 2.5 W (USB2/LVDS output) < 3.2 W (Analogue video)
<b>Environmental Properties</b>	
<b>Impact</b>	25G IEC 68-2-29
<b>Vibration</b>	2G IEC 68-2-6
<b>Operating ambient temperature</b>	-20 - +50°C
<b>Humidity (Operating/Storage)</b>	5 - 95% non condensing
<b>Size (with 15mm lens)</b>	45 x 52.5 x 80.5 mm 1.8 x 2.1 x 3.2 inches
<b>Weight (with 15mm lens)</b>	160g / 5.6 oz
<b>Connector</b>	Lemo/Miniature USB2/Ribbon cable depending on model
<b>Optional Extras</b>	
USB2 Digital / LVDS Digital / External motor drive (focus)	

## STANDARD SOFTWARE AND OPTIONAL PACKAGES

**MIRICLE ESSENTIALS Control Software (RS232 PC) - included with all units**  
 Functions: Freeze frame/live, Store digital frame (BMP), Black hot/White hot, Flip video: Left/Right, Up/Down

<b>OPTIONAL MIRICLE EXTRAS Control Software</b>	
<b>Video Output Format</b>	Black & White / Colour RS170/NTSC or CCIR/PAL
<b>Communication</b>	RS232
<b>Software Control</b>	Black hot/White hot Flip video: Left/Right, Up/Down Manual or Auto configurable NUC Zoom x2 x4 x8 around centre or offset
<b>Gain Modes</b>	Manual Auto with contrast adjustment
<b>Colour Palettes</b>	10

- OPTIONAL MIRICLE DEVELOPERS' Control Software**
- Engineering development technical support
  - Miricle diagnostic and debugging development software
  - User configuration profiles to download personality settings
  - Reticule overlay – standard and configurable
  - Text overlays with choice of fonts, fore and background colours
  - Area of interest measurement:  
Spots (8), Rectangles (4) with Auto Max/Min tracking,  
Line values (2), Profiles (2)  
Choice of tool colour
  - Real time image filtering:  
Edge detection/smoothing, Feature extraction,  
3 x 3 discrete convolution filtering  
5 x 5 discrete convolution filtering  
Median Filter
  - Bad Pixel Replacement Tools
  - Multiple Autogain modes with 1 or 2 configurable zones:  
Peak, Histogram, Standard Deviation, Span or White Compression

**OPTIONAL ACCESSORIES**  
 ThermoGRAM USB Digital Image Processing Software  
 ThermoGRAM PRO USB Real Time Digital Image Capture & Analysis Software

**LENSES**  
 Choice of multi-element Germanium lenses with electronic focus and mount options:

Focal Length	Aperture	IFoV	HFoV	VFoV	Diag
15mm	f/0.9	2.33 mrad	48.3°	37.0°	58.0°
32mm	f/1.0	1.09 mrad	23.7°	17.9°	29.4°
50mm	f/1.0	0.70 mrad	15.3°	11.5°	19.1°

Infrared detectors and cameras are subject to UK DTI export control and may require an export licence



Not all features present on all models. Specifications subject to change. MIRICLE is a registered trademark of Thermoteknix Systems Ltd.  
 Printed on environmentally friendly 100% chlorine free pulp

