

# NEUTRINO® SWaP SERIES

HOT FPA Technology SWaP+C Optimized MWIR Camera Module

Made in the USA, and ITAR-free, the VGA-resolution Neutrino LC and newly-released SXGA-resolution Neutrino SX8 provide best-in-class MWIR imagery and data in a small, lightweight package. Based on Teledyne FLIR's High Operating Temperature (HOT) FPA technology and linear micro-cooler, SWaP series OEM camera modules are designed for ruggedized products requiring long life, low-power consumption, and quiet, low-vibration operation. Both are ideal for small gimbals and airframes, handheld devices, security cameras, targeting devices, and asset monitoring applications.

The Neutrino SWaP Series is simply the best technical solution available. With nearly off-the-shelf delivery, industry-leading two-year warranty, real price competitiveness and well-known product support and product reliability, it also offers the lowest risk solution. The Neutrino SWaP is an OEM camera module that is intended to be integrated into a higher level system.

## APPLICATIONS

UNMANNED AERIAL SYSTEMS (UAS)

COUNTER-UAS

AIRBORNE INTELLIGENCE,  
SURVEILLANCE, AND  
RECONNAISSANCE (ISR)

GROUND ISR & SECURITY

MILITARY DISMOUNT SYSTEMS

TARGETING



Neutrino LC



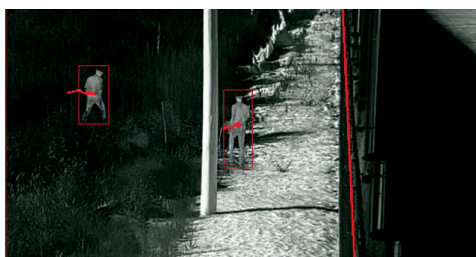
Neutrino SX8



### MULTIPLE RESOLUTION SWaP OPTIMIZED MWIR CAMERA CORES

VGA/15 $\mu$  and SXGA/8 $\mu$  High Operating Temperature (HOT) FPA based cameras in comparable SWaP envelope offers low power consumption, rugged construction and a wide operating temperature.

- Low power consumption with <8 or <12W cooldown and <4 or <8 W steady state @23°C
- Rugged construction and wide operational temperature range of -40°C to +71°C
- Quiet and low vibration operation



### DESIGNED FOR INTEGRATORS

Small, light, and powerful, the Neutrino SWaP Series camera modules come with common interfaces and support documentation/accessories to shorten time-to-market and reduce project risk.

- Built-in support for physical and protocol-level industry standards (e.g. USB2)
- Full suite of hardware accessories
- Classified under US Department of Commerce jurisdiction as EAR 6A003.b.4.a



### PERFORMANCE, RELIABILITY, AND SUPPORT

Best-in-class image quality, an industry-leading two-year warranty, superior SWaP performance, high reliability/lifetime, and Teledyne FLIR's well-known product support.

- Industry's most advanced SWaP+C optimized image processing
- Increased reliability and low-vibration FLIR linear micro-cooler
- Comprehensive product documentation
- Highly qualified Technical Services team available to support integration

For more information visit:  
[www.flir.com/neutrino](http://www.flir.com/neutrino)

[www.teledyneflir.com](http://www.teledyneflir.com)

Imagery for illustration purposes only. Specifications are subject to change without notice. ©2024 Teledyne FLIR LLC, Inc. All rights reserved.

04/24/2024 REV

## SPECIFICATIONS

Neutrino SX8		Neutrino LC
Sensor Technology	HOT MWIR	HOT MWIR
Sensor Size	1280 x 1024, 8µm pitch	640 x 512, 15 µm pitch
Spectral Band	3.4 to ≥ 5.1 µm Standard	3.4 to ≥ 5.1 µm Standard
Sensitivity (NEΔT)	< 38mK (50% well fill at T <sub>BB</sub> =30 °C flood mode)	< 25 mK (50% well fill at T <sub>BB</sub> =30 °C flood mode)
Frame Rate Options	1-60 Hz, configurable	1-60 Hz, configurable
Time to Image	<5 min @ 23 °C ambient (goal)	<4 min @ 23 °C ambient
PHYSICAL ATTRIBUTES		
Size (L x W x H)	7.9 x 5.3 x 6.1 cm (3.1 x 2.1 x 2.4")	7.4 x 4.6 x 6.1 cm (2.9 x 1.8 x 2.4")
f/number	f/4, f/3, & f/2.5 options	f/5.5 Standard, f/4, & f/2.5 options
Cold Aperture Height	19.4 mm from FPA	19.7 mm from FPA (f/5.5) & 19.4 (f/4 & f/2.5)
Weight	<420 grams (<15 oz)	<380 grams (<13.4 oz)
FPA CONTROL		
ROIC	ISC1601	ISC0403
Direct Injections, Snapshot, Progressive	Yes	Yes
Programmable Integration Time	Yes (0.01ms - 16ms) at 60Hz	Yes (0.01 ms - 16 ms) at 60Hz
Well Capacity	2.6 x 10 <sup>6</sup> electrons	7 x 10 <sup>6</sup> electrons
ROIC Modes	Free Run, Readout Priority, & Integration Priority	Free Run, Readout Priority, & Integration Priority
External Sync	Master or Slave	Master or Slave
IMAGE PROCESSING & DISPLAY CONTROLS		
NTSC/PAL	N/A	Yes (accessory board required)
Image Optimization/AGC	Linear, Histogram Equalization, DDE	Linear, Histogram Equalization, DDE
Invert/Revert	Yes	Yes
Color Palettes/LUTs	Yes, RGB888 mode	Yes, RGB888 mode
Symbology	Yes, RGB888 mode	Yes, RGB888 mode
Continuous Zoom	Yes, up to 8x	Yes, up to 8x
DIGITAL VIDEO		
Parallel (24-bit/16-bit/8-bit)	Yes	Yes
Camera Link	Yes	Yes (accessory board required)
USB	Yes	Yes
INTERFACING		
Primary Electrical Connector	80-pin SAMTEC, ST4-40-2.50-L-D-P-TR	80-pin Hirose, DF40C-80DS
Input Power	+5.0 VDC Camera, +12 VDC Cryocooler	+3.3 VDC Camera, +12 VDC Cryocooler
Power Dissipation	<12 W cooldown, <8 W steady state @ 23 °C	<8 W cooldown, <4 W steady state @ 23 °C
Communication	UART (115.2K baud)	USB or UART (921.6k baud)
Discrete I/O Control	Yes, three available	One discrete, custom configurable at factory
User Configurability via SDK & GUI	Yes	Yes
ENVIRONMENTAL		
Operating Temperature Range	-40 °C to +71 °C (-40 °F to +160 °F)	-40 °C to +71 °C (-40 °F to +160 °F)
Non-Operating Temperature Range	-57 °C to +80 °C (-70.6 °F to +176 °F)	-54 °C to +80 °C (-65 °F to +176 °F)
Operational Altitude	~12 km (40,000 ft)	~12 km (40,000 ft)
Humidity	Non-condensing between 5% - 95%	Non-condensing between 5% - 95%
Vibration	5.8 grms, 3-axis, 1 hr each	5.8 grms, 3-axis, 1 hr each
Shock (goal)	Lateral 190 g @ .55 ms Vertical 320 g @ .55 ms Axial 550 g @ .8 ms (goal)	Lateral 190 g @ .55 ms Vertical 320 g @ .55 ms Axial 550 g @ .8 ms

Specifications are subject to change without notice. For the most up-to-date specs, go to [www.flir.com/neutrino](http://www.flir.com/neutrino)

**SANTA BARBARA**  
Teledyne FLIR LLC, Inc.  
6769 Hollister Ave.  
Goleta, CA 93117  
PH: +1 805.690.6602

**EUROPE**  
Teledyne FLIR LLC, Inc.  
Luxemburgstraat 2  
2321 Meer  
Belgium  
PH: +32 (0) 3665 5106

Equipment described herein is subject to US export regulations and may require a license prior to export. Diversion contrary to US law is prohibited. Imagery for illustration purposes only. Specifications are subject to change without notice. ©2024 Teledyne FLIR LLC, Inc.

Approved for public release. Teledyne FLIR Approved [FLIRGTC-SBA-001]

All rights reserved. Revised 04/24/2024

21-0706-OEM-Neutrino SWaP Series-DATASHEET

For more information visit:  
[www.flir.com/neutrino](http://www.flir.com/neutrino)

[www.teledyneflir.com](http://www.teledyneflir.com)