TELEDYNE FLIR

BOSON®

High-Performance LWIR Thermal Camera Modules

www.flir.com/**boson**

SEE **FARTHER, FASTER** & MORE **CLEARLY**

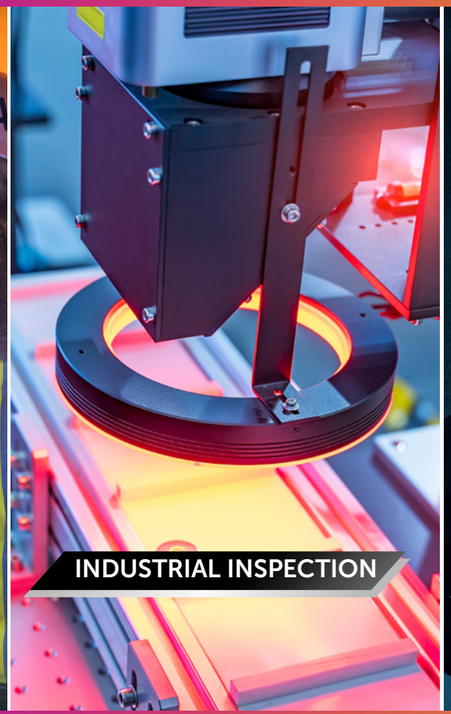
With nearly **sixty models** the ITAR-free Boson family represents the most **dynamic**, **highest-performing** uncooled thermal imaging technology in the Teledyne FLIR portfolio. The **small, lightweight, and low-power** OEM package features multiple configurations and onboard image processing for qualitative and quantitative thermal imaging applications.

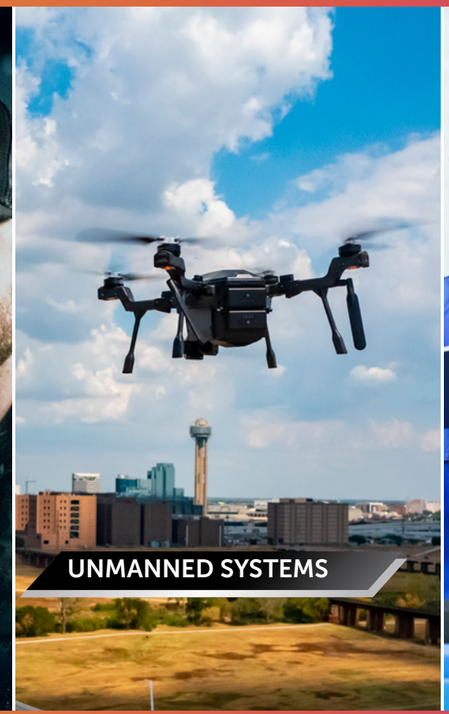
See what solution is best for you.

ABOUT TELEDYNE FLIR

Teledyne FLIR designs, develops, manufactures, markets, and distributes technologies that enhance perception and awareness. We bring innovative sensing solutions into daily life through our thermal imaging, visible-light imaging, video analytics, measurement and diagnostic, and advanced threat detection systems.

Teledyne FLIR offers a diversified portfolio that serves a number of applications in government & defense, industrial, and commercial markets. Our products help first responders and military personnel protect and save lives, promote efficiency within the trades, and innovate consumer-facing technologies. Teledyne FLIR strives to strengthen public safety and well-being, increase energy and time efficiency, and contribute to healthy and intelligent communities.





MEET THE BOSON FAMILY

BOSON+

High Performance, Uncooled, LWIR Thermal Camera Module

Made in the USA, and ITAR-free, the Boson+ sets the standard for longwave infrared (LWIR) OEM thermal camera performance and size, weight, and power (SWaP). It features an **industry-leading thermal sensitivity of less than or equal to (≤)20 mK** and an upgraded automatic gain control (AGC) filter delivering dramatically enhanced scene contrast and sharpness. **Lower video latency** enhances tracking, seeker performance, and decision support. Radiometry will be available in the third quarter of 2024 on 640 x 512 and 320 x 256 resolution models.

Boson+ maintains the widely-deployed Boson mechanical, electrical, and optical interfaces enabling a **plug-and-play upgrade**. With customer-selectable **USB, CMOS, or MIPI video interfaces**, it is easier than ever to integrate Boson+ into a wider range of embedded processors from **Qualcomm, Ambarella, and more**. The user-friendly Boson SDK, GUI, and comprehensive product integration documentation further simplify OEM integration. Enhanced thermal performance and industry-leading reliability provide low-risk development, making Boson+ ideal for unmanned ground vehicles (UGV), unmanned aircraft systems (UAS), wearables, security applications, handhelds, and thermal sights.

BOSON

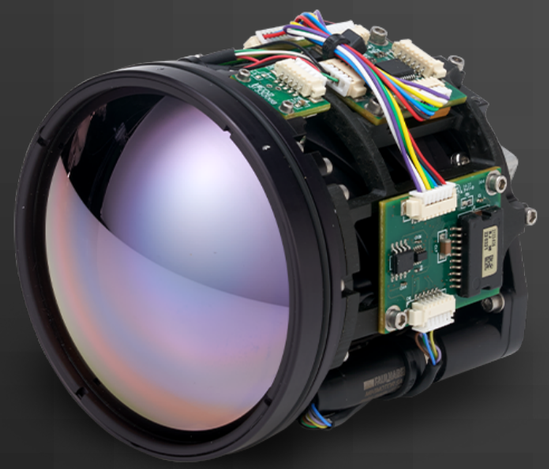
Uncooled, LWIR Thermal Camera Module

The ITAR-free Boson sets the standard for SWaP. Utilizing Teledyne FLIR's **advanced image processing** and several **industry-standard communication interfaces**, Boson enables applications from firefighting to unmanned aircraft systems (UAS), security, and automotive development kits, all for as little as **600 mW**.

The 12 µm uncooled detector comes in two resolutions – **640 × 512 or 320 × 256** – and multiple frame rate options. Radiometric models offer absolute **temperature measurement**. With multiple lens configurations, the easy-to-use Boson SDK, user-friendly GUI, and comprehensive integration documentation to further simplify integration into higher-level systems.

	BOSON+		BOSON	
Array Format	VGA - **640 x 512** VOx Microbolometer QVGA - **336 x 256** VOx Microbolometer			
Pixel Pixel	12 µm			
Thermal Spectral Band	Longwave infrared; 8 µm – 14 µm			
Thermal Sensitivity (NEdT)	Industrial: <20 mK Professional: <30 mK		Industrial: <40 mK, Professional: <50 mK Consumer: <60 mK	
Frame Rate Options	60 Hz baseline; 30 Hz runtime selectable			
Non-uniformity Correction (NUC)	Factory calibrated; updated FFCs with FLIR Silent Shutterless NUC (SSN™)			
Solar Protection	Yes, lens only		Integral	
Digital Zoom	1x to 8x zoom			
f/number	1.0			
Image Orientation	Adjustable (vertical flip and/or horizontal flip)			
Symbol Overlay	Re-writable each frame; alpha blending for translucent overlay			
RADIOMETRY				
Temperature Measurement	Available on select models in the fourth quarter of 2023		Yes, select models	
Scene Dynamic Range	**320 x 256**	**640 x 512**	**320 x 256**	**640 x 512**
	to 150 °C (high gain) to 350 °C (low gain)	up to 140 °C (high gain)	to 140 °C (high gain) to 500 °C (low gain)	
Temperature Accuracy	±5 °C accuracy or less, depending upon operating conditions			
LENS OPTIONS				
Array Format **Horizontal Field of View (HFOV); Effective Focal Length**	**320 x 256**	**640 x 512**	**320 x 256**	**640 x 512**
	92°; 2.3 mm	95°; 4.9 mm	92°; 2.3 mm	95°; 4.9 mm
	50°; 4.5 mm	50°; 9.2 mm	50°; 4.3 mm	50°; 8.7 mm
	50°; 4.3 mm	32°; 14 mm	34°; 6.3 mm	50°; 9.2 mm
	34°; 6.3 mm	24°; 18 mm	24°; 9.1 mm	32°; 13.6 mm
	24°; 9.1 mm	18°; 24 mm	16°; 14 mm	32°; 14 mm
	16°; 13.8 mm	12°; 36 mm	12°; 18 mm	24°; 18 mm
	12°; 18 mm	8°; 55 mm	6°; 36 mm	18°; 24 mm
	6°; 36 mm	6°; 73 mm	4°; 55 mm	12°; 36 mm
	4°; 55 mm			8°; 55 mm
	Available without lens			6°; 73 mm
PHYSICAL ATTRIBUTES				
Size	21 × 21 × 11 mm (0.83 x 0.83 x 0.43 in) without lens			
Weight	7.5 g (0.26 oz) without lens			
Precision Mounting Holes	Four tapped M16x0.35 (rear cover)			
INTERFACING				
Input Voltage	3.3 VDC			
Power Dissipation	320+ as low as 500 mW 640+ as low as 1000 mW		Varies by configuration; as low as 600 mW	
Video Channels	CMOS, MIPI or USB3		CMOS or USB2	
Peripheral Channels	I2C, SPI, SDIO			
Control Channels	UART, USB or I2C		UART or USB	
Configurable GPIO	Up to 11; user configurable			
ENVIRONMENTAL				
Operating Temperature Range	-40 °C to 80 °C (-40 °F to 176 °F)			
Non-Operating Temperature Range	-50 °C to 85 °C (-58 °F to 185 °F)			
Shock	1,500 g @ 0.4 msec			
Operational Altitude	12 km (max altitude of a commercial airliner or airborne platform)			

ZOOM WITH BOSON+ CZ

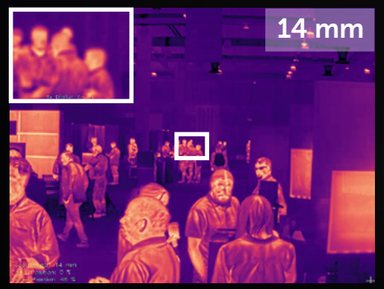


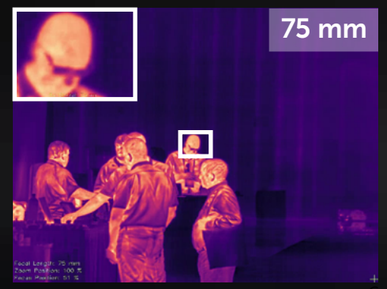
BOSON+ CZ

High Performance, Uncooled, LWIR Thermal Camera Module with 5x Continuous Zoom

Made in the USA, and ITAR-free, the **Boson+ CZ 14-75** combines the Boson+ thermal camera module and 5x continuous zoom (CZ) lens offering a high–performance imaging solution. With **≤20 mK thermal sensitivity** and an upgraded automatic gain control (AGC) filter Boson+ CZ delivers dramatically enhanced scene contrast and sharpness. The high-performance lens and control electronics maintain focus through zoom and provide real-time thermal gradient compensation as well as flexibility for user-defined command syntax and expansion for additional features.

The Boson+ camera module and **14 to 75 mm** CZ lens are designed for each other, providing optimal performance and a single system warranty only achievable from a single source. The factory-integrated system lowers development and manufacturing risk and improves time-to-market, making the reliable Boson+ CZ 14-75 ideal for unmanned aerial vehicles, perimeter surveillance, light armored vehicle situational awareness and targeting, and soldier sighting systems.





BOSON+ CZ 14-75	
Array Format	640 x 512
Pixel Pitch	12 µm
Thermal Spectral Range	Longwave infrared; 8 µm – 14 µm
Thermal Sensitivity	≤20 mK
Full Frame Rate, Slow Frame Rate	60 Hz baseline; 30 Hz runtime selectable
Non-uniformity Correction (NUC)	Factory calibrated; updated FFCs with FLIR Silent Shutterless NUC (SSN™)
Solar Protection	Yes, lens only
Digital Zoom	1x to 8x zoom
Symbol Overlay	Re-writable each frame; alpha blending for translucent overlay
IMAGING & OPTICAL	
f number	1.2
Image Orientation	Adjustable (vertical flip and/or horizontal flip)
Focal Length	NFOV = 75mm +4% / -0% WFOV = 14mm +0% / -4%
Lens Window Transmittance	HEAR L1: >/= 84% for band 8-12 mm DLC L1: >/= 78% for band 8-12 mm
NFOV/WFOV Co-boresight location	<0.15 mm
Boresight Drift Through Zoom	<0.10 mm
Boresight Repeatability	</= 0.025 mm
Parfocality	At 20 °C the lens shall stay in focus through zoom within 1/4-wave at 10.6µm
Minimum Focus Distance	NFOV > 18 m WFOV > 3 m
Distortion	WFOV <6%; NFOV < 1%
Relative Illumination	RI falloff < 10%; Flux change through zoom <4%
FOV Change Time	<1.5 sec
Focus Change Time	<0.5 sec
PHYSICAL ATTRIBUTES	
Size	101 (l) x 77 (w) x 77 (h) mm (3.97 x 3.03 x 3.03 in)
Weight	390 g (13.75 oz)
INTERFACING	
Power Supply	Nominal voltage 12V +/- 1V
Serial Communication	The following serial communications shall be set: RS232, 38400 baud, 1 stop bit, 8 data bits, no parity
Peripheral Channels	I2C, SPI, SDIO
Video Channels	CMOS, MIPI or USB3
Control Channels	UART, USB or I2C
ENVIRONMENTAL	
Operational Temparature	-40 °C to 70 °C (-40 °F to 158 °F)
Non Operating Temperature Range	-40 °C to 80 °C (-40 °F to 176 °F)
Focus Over Temperature	Maintain focus from -35 °C to 70 °C (-31 °F to 158 °F)
IP Rating [at front of lens]	IP67
Protection and Anti-Reflection Coatings	Lens elements shall be coated with anti-reflection coatings subject to adhesion,moderate abrasion, and humidity per durability requirements of MIL-PRF-13830
DLC Option	With DLC front coating, lens to withstand humidity, severe abrasion, and salt fog exposure
ESS Thermal	Lens assembly to be subjected to -35 °C to +70 °C temperature extremes with a maximum of 5 °C/min ramp rate and a minimum dwell of 60 min at each temperature extreme
ESS Vibration	Random vibration, from 10 Hz to 500 Hz with the following vibration profile along the optical axis for a minimum of 10 minutes: at 10 Hz, 0.01 G2/Hz at 50 Hz, 0.01 G2/Hz at 80 Hz, 0.04 G2/Hz at 350 Hz, 0.04 G2/Hz at 500 Hz, 0.01 G2/Hz
Shock	9G with 11msec half-sine pulse, minimum 3 pulses for each of 3 axes
Design and Construction	Lens assembly to meet MIL-STD-1472 and MIL-HDBK-1686
Operational Altitude	12 km (max altitude of a commercial airliner or airborne platform)

THERMAL INTEGRATION MADE EASY

Integrating thermal camera modules is now easier with our library of **how-to-videos**, **application notes**, and our comprehensive support center with product **drawings, datasheets**, and more!

OPTICS

The simple optical interface accommodates integrator-designed optics and the industry's widest variety of lens options available.

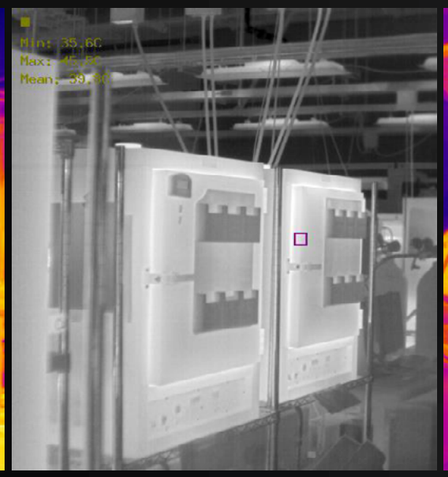
INTERFACES

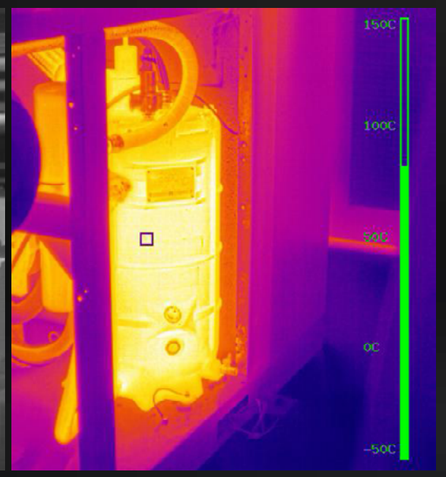
Commercial interfaces including MIPI (Boson+ only), USB and, CMOS, are all available with the Boson family.

SUPPORT

When developers need assistance, our highly qualified Technical Services team are available to support integration wherever you need it.

Please visit **www.flir.com/TIME** to access integration support material.

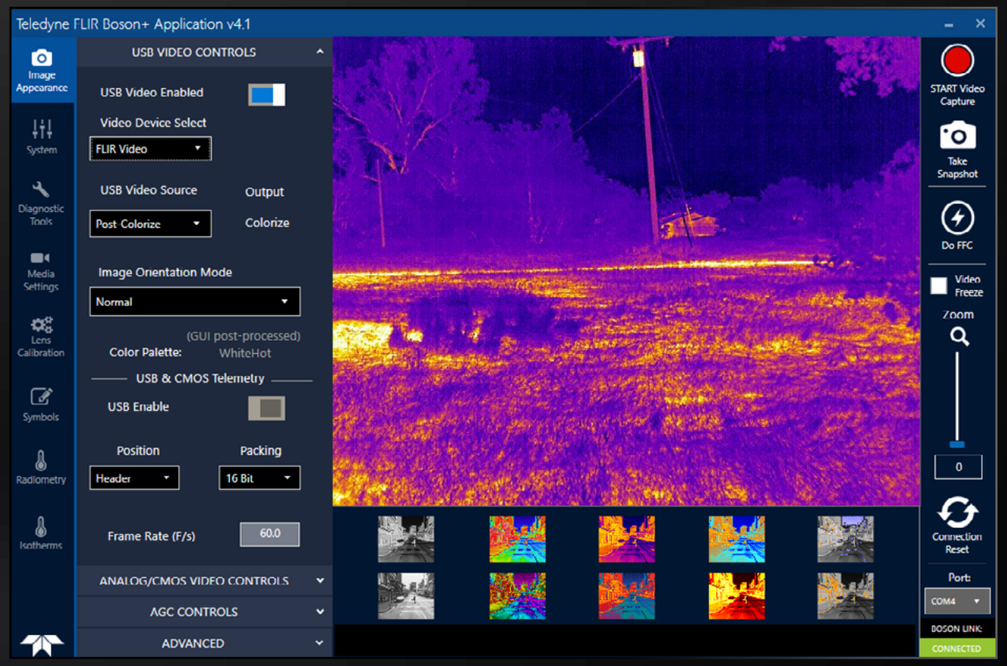




SIMPLIFY & STREAMLINE DEVELOPMENT

The Boson GUI provides developers key command capabilities that simplify and streamline development and testing with the Boson thermal camera modules. Integrators with the original Boson models require GUI 3.X & older, while Boson+ models require GUI 4.0 & newer.

- Operates on Windows 10 64-Bit or newer
- Isotherms with colorization bar and highly-configurable settings
- Spot meter with statistics and temperature bar
- External sync with additional sensors to enable data fusion
- Radiometry settings including t-linear, environmental parameters, emissivity, and more.



BOSON **ACCESSORIES**

Boson VPC (PN: 500-0869-00)
The USB Video Power Connector (VPC) kit turns the Neutrino LC camera into a webcam. Power, digital video, and comm are all via USB2. The kit includes a USB-A to USB-C cable.

Boson USB/Analog VPC Kit (PN: 421-0062-00)
The Boson video/power/control (VPC) is an accessory that adapts the native high-density electrical connector to a simpler USB-C interface. The Kit includes a VPC adapter, as well as a biurcated cable with USB-A (power/control) and BNC (video) connectors.

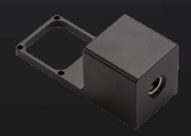
Boson VPC Cable (PN: 308-0271-00)
Biurcated cable with USB-A (power/control) and BNC (video) connectors.

Boson VPC w/Cables (PN: 421-0061-00)
Provides all output options on a single PCB and easy access to the full 80-pin camera interface for development. Includes a flex cable between the board and the camera and a wire harness to the cooler interface.

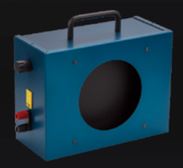
Boson Lens Focus Tool (PN: 261-2609-00)
A Boson lens focus tool is an accessory needed to change the focus of wide field of view lenses.

Boson Camera Link Accessory Kit (PN: 421-0063-00)
Expansion board for Boson cameras that matches the functionality of the VPC module, and enables the camera to be interfaced to a Camera Link frame grabber, allowing the capture of digital 16-bit video data. (Does not include Camera Link cable, frame grab board, or data capture software.)

Boson Development Board (PN: 250-0705-00)
A breakout board is available for Boson users and integrators that need easy access to the Boson I/O and interfaces. This board is designed for development purposes, and is not intended or rated for long-term reliability over temperature. Improvements from the original breakout board (SKU 250-0593-00) include exposing the data_valid signal for CMOS video, selection for the power input while using USB (USB or externally supplied power through banana plug), and external sync input/output.



Boson Tripod Mount Adapter (PN: 261-2608-00)
Black-anodized aluminum accessory that provisions for standard 1/4” x 20 tripod mounting.



12V 4” Blackbody for Gain Cal & Supplemental FFC (PN: 285-0029-02)
Teledyne FLIR offers 4-inch blackbody sources for customers that need a low-cost, uniform temperature source when using FLIR’s Alt Lens Cal software to field-calibrate lens-less Photon or Tau cameras with third-party lenses, or to take advantage of the Supplemental Flat Field Correction (FFC) option available in the Tau camera models.

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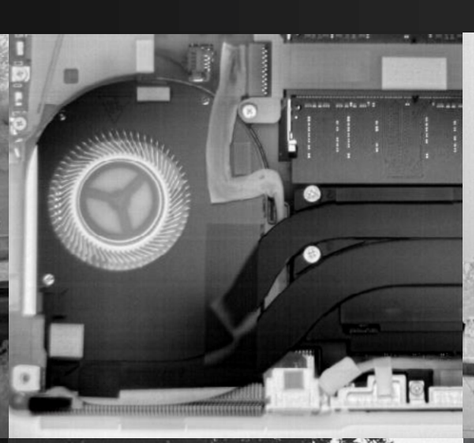
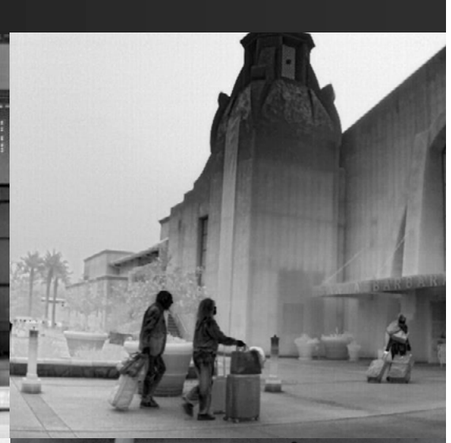


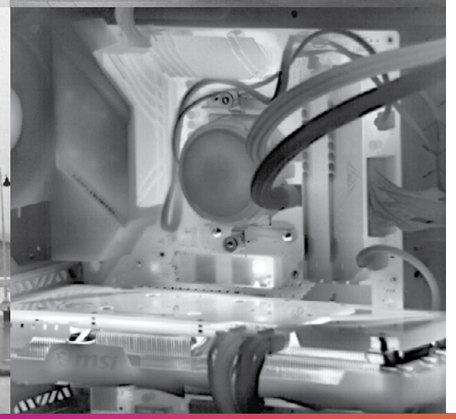

NOTES

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