



Tau 2

Longwave Infrared Thermal Imaging Cameras

Key Features:

- Multiple models, including 640, 336 & 324
- Multiple lens options available: 7.5 – 100 mm
- Proven rugged, reliable thermal imaging for UAVs, UGVs & handheld devices
- Mechanical/Electrical commonality for all resolutions

New Features

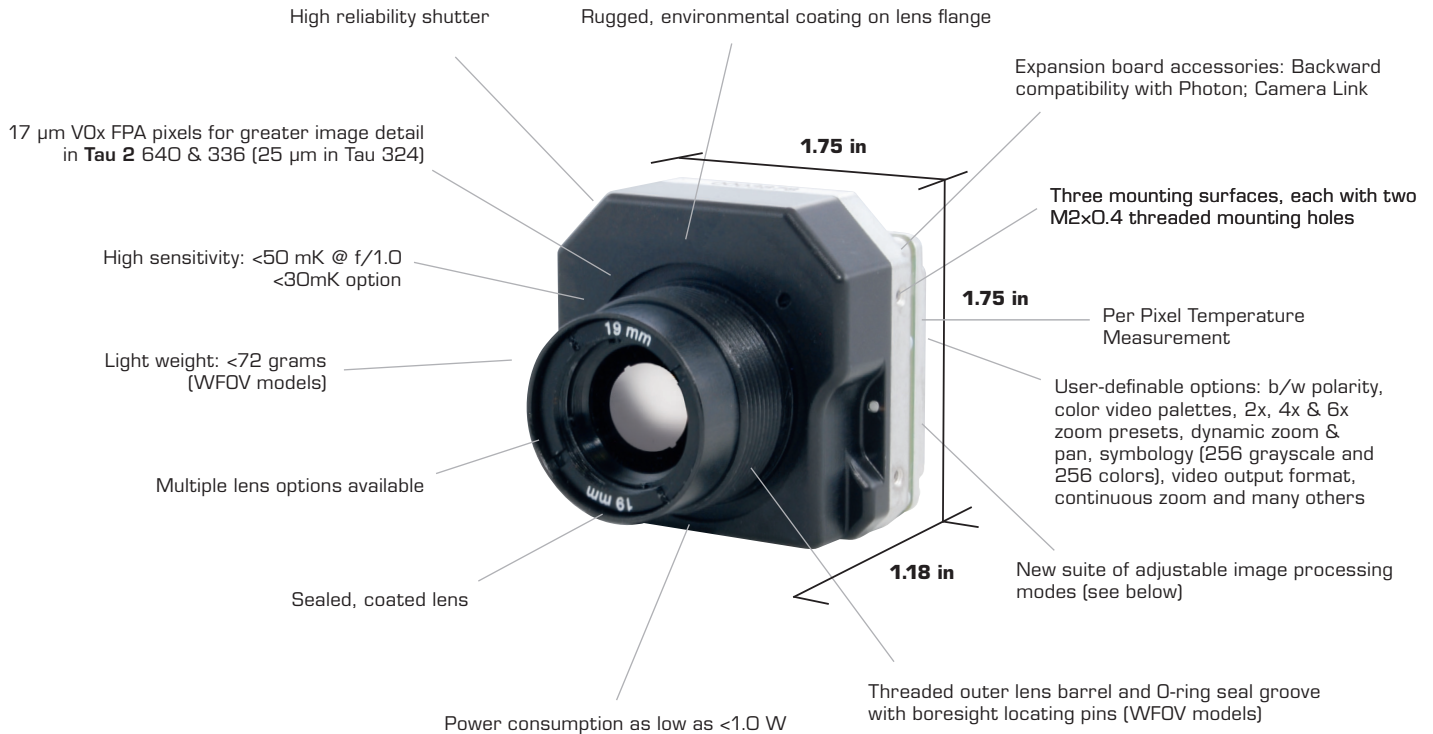
- 640x512 / 60 Hz frame rate
- Accurate temperature measurement for radiometry, analytics and telemetry
- New suite of adjustable image processing modes
- <30mK options

Versatile & Compatible

Loaded with Features, Ready for More

FLIR® Tau® 2 thermal imaging cameras offer an unmatched set of features and capabilities, making them well-suited to many demanding applications.

Improved electronics enable FLIR to implement new capabilities, including continuous digital zoom and radiometry. Since the electrical functions are common between the **Tau 2** 640, 336 and 324, integrators have direct compatibility between the different camera formats, and Tau 2 camera versions share many of the same lens options.



Unrivaled Image Processing and Temperature Measurement

- 60Hz Frame rate now available for all resolutions
- Adjustable image processing modes to increase contrast and detail
 - Second generation **DDE - Digital Detail Enhancement™** for clearer imagery and edge sharpening
 - **ACE - Active Contrast Enhancement™** to dynamically adjust scene contrast for relative scene temperature
 - **SSO - Smart Scene Optimization™** to enhance extremes in a bi-modal scene
 - **IBHEQ - Information Based HEQ™** automatically adjusts AGC for what matters most in a scene
 - **SSN - Silent Shutterless NUC™** for continuous image uniformity improvement
- FLIR's experience and reputation to provide accurate per pixel temperature data for:
 - Video Analytics & Telemetry
 - Radiometry
 - Adjustable isotherm thresholds to colorize temperatures of interest in the grayscale

Image Processing

Unrivaled Image Processing and
Temperature Measurement

Isotherm



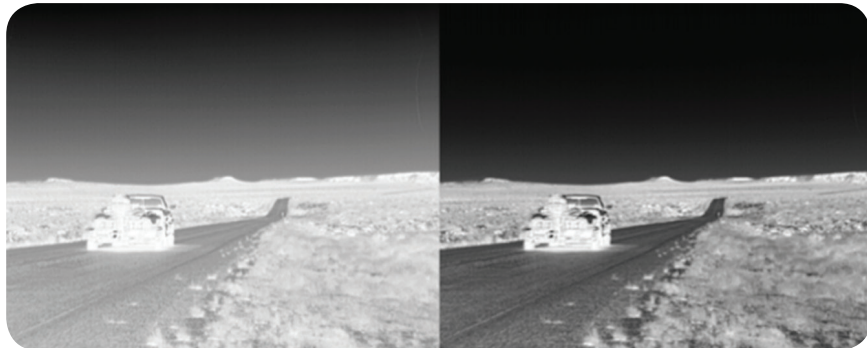
*Manually set isotherm thresholds
to colorize temperatures of interest
(mid-range) in the grey scale*

DDE



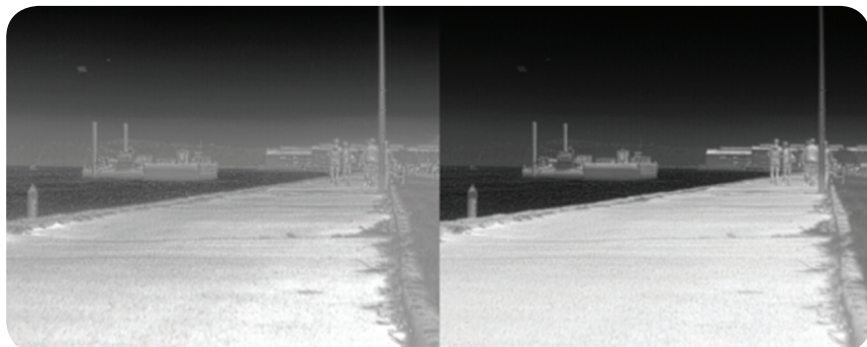
*Second Generation DDE - Digital Detail Enhancement™
for clearer imagery and edge sharpening*

ACE



*"ACE" - Active Contrast Enhancement™ to dynamically
adjust contrast for relative scene temperature*

IBHEQ



*"IBHEQ" - Information Based Histogram Equalization™
automatically adjusts AGC for what matters in a scene*

Tau 2

Lens Data



7.5 mm



9 mm



13 mm

		TAU 2 WIDE FIELD OF VIEW (WFOV) MODELS ¹		
		f/1.25 (Tau 2 640 = f/1.4)	f/1.25 (Tau 2 640 = f/1.4)	f/1.25
FOV³ (h x v)	Tau 2 640 (17μ 640 × 512)	90° × 69°	69° × 56°	45° × 37°
	Tau 2 336 (17μ 336 × 256)	45° × 35°	35° × 27°	25° × 19°
	Tau 2 324 (25μ 324 × 256)	63° × 50°	49° × 39°	35° × 28°
iFOV (mrads)	Tau 2 640 (17μ 640 × 512)	2.267	1.889	1.308
	Tau 2 336 (17μ 336 × 256)	2.267	1.889	1.308
	Tau 2 324 (25μ 324 × 256)	3.333	2.778	1.923
Minimum Focus Distance⁴	All	2.5 cm	3 cm	8 cm
Length⁵		19 mm	19 mm	19 mm
Diameter	All	29 mm	29 mm	29 mm
Weight (Camera + Lens)		<71 g	72 g	<70 g
Detection, Recognition, Identification (DRI)⁶		D = 210/235	D = 250/285	D = 390/440
	Typical/Best Conditions (range in meters)			
	Tau 2 640 & 336 - Man	R = 52/60 I = 26/30	R = 63/71 I = 31 /36	R = 95/112 I = 47/56
	Tau 2 640 & 336 - Vehicle	D = 580/730 R = 150/180 I = 58/92	D = 720/880 R = 175/220 I = 88/108	D = 1,080/1340 R = 275/340 I = 140/170
	Tau 2 324 - Man	D = 170/185 R = 42/43 I = 21/23	D = 205/230 R = 52/57 I = 26/28	D = 300/330 R = 74/82 I = 37/41
	Tau 2 324 - Vehicle	D = 480/570 R = 120/140 I = 60/72	D = 590/700 R = 150/175 I = 74/88	D = 840/1000 R = 215/250 I = 108/125

- 1 – All WFOV lenses are integrated directly into a common lens holder with an internal O-ring that furnishes an IP-67 rating at the front surface. All WFOV lenses are M24 × 0.5 inside thread. Outside thread is M29 × 0.5.
- 2 – NFOV lenses are M34 × 0.3 inside thread.
- 3 – Digital output used for FOV calculation.
- 4 – Minimum focus distance for WFOV cameras is measured with the lens unscrewed to the point just before the O-ring groove becomes visible; for NFOV cameras it is measured one complete revolution after the lens first engages the lens flange.
- 5 – Length is measured from the front, flat surface of the lens holder to the end of the lens.
- 6 – DRI values shown are nominal values and should be used as estimates only. Exact DRI calculations depend on a wide variety of conditions. For more information, please contact FLIR.

**19 mm****25 mm****35 mm****50 mm****60 mm****100 mm**TAU 2 NARROW FIELD OF VIEW (NFOV) MODELS²

19 mm		25 mm		35 mm		50 mm		60 mm		100 mm	
f/1.25		f/1.1		f/1.2		f/1.2		f/1.25		f/1.6	
32° x 26° 17° x 13° 24° x 19°		25° x 20° 13° x 10° 18° x 15°		18° x 14° 9.3° x 7.1° 13° x 10°		12.4° x 9.9° 6.5° x 5.0° 9.3° x 7.3°		10.4° x 8.3° 5.5° x 4.2° 7.7° x 6.1°		6.2° x 5.0° 3.3° x 2.5° 4.6° x 3.7°	
0.895 0.895 1.316		0.680 0.680 1.000		0.486 0.486 0.714		0.340 0.340 0.500		0.283 0.283 0.417		0.170 0.170 0.250	
16 cm		30 cm		60 cm		1.5 m		2.3 m		7 m	
19 mm 29 mm <70 g		30 mm 42 mm 112 g		39 mm 42 mm 150 g		62 mm 58 mm 280 g		62 mm 61 mm 200 g		110 mm 82 mm 479 g	
D = 570/640 R = 144/160 I = 72/80		D = 820/930 R = 210/230 I = 104/116		D = 1140/1280 R = 280/320 I = 142/160		D = 1500/1700 R = 380/430 I = 190/215		D = 1750/2000 R = 450/510 I = 225/255		D = 2450/2950 R = 650/750 I = 330/380	
D = 1,550/1950 R = 400/500 I = 200/250		D = 2200/2800 R = 580/710 I = 290/360		D = 3000/3850 R = 800/950 I = 200/295		D = 3900/5100 R = 1060/1320 I = 540/660		D = 4500/6000 R = 1240/1560 I = 640/780		D = 6000/8800 R = 1750/2300 I = 900/1160	
D = 450/490 R = 112/124 I = 56/62		D = 590/650 R = 148/165 I = 75/85		D = 800/880 R = 200/225 I = 105/112		D = 1125/1280 R = 290/320 I = 145/160		D = 1320/1500 R = 340/380 I = 170/190		D = 2075/2400 R = 540/600 I = 270/300	
D = 1,280/1500 R = 330/375 I = 165/190		D = 1650/1950 R = 430/500 I = 215/250		D = 2250/2700 R = 590/680 I = 290/340		D = 3100/3800 R = 810/970 I = 415/490		D = 3600/4600 R = 960/1160 I = 480/580		D = 5300/7100 R = 1500/1840 I = 760/920	

Tau 2 Part Number Configuration Guide (Ex: 46640019H-FP NLX)

46 640 019 H - F P NL X

SHUTTER TYPE	RESOLUTION	LENS FOCAL LENGTH	LENS COATING	VIDEO SPEED	TAU TYPE	OEM INFO LOGO	EXPANSION CARD
46 = Standard 47 = Shutterless 66 = Standard <i>(640/60Hz only)</i> 67 = Shutterless <i>(640/60Hz only)</i>	640 (640 x 512) 336 (336 x 256) 324 (324 x 256)	001 = no lens 007 = 7.5 mm 009 = 9 mm 013 = 13 mm 019 = 19 mm 025 = 25 mm 035 = 35 mm 050 = 50 mm 060 = 60 mm 100 = 100 mm	H = Hard Carbon A = High Durability X = No Lens	F = Fast (60 Hz, 50 Hz) S = Slow (7.5 Hz, 8.3 Hz)	P = Performance	NL = No Logo <i>Also used for OEM ID</i>	X = No Card

Accessories

There are several Tau-specific accessories available. Individual components are also available; contact FLIR for details.



VPC Breakout Module



Tau 2 with VPC Module Installed

VPC Breakout Module

Provides video, power, and communications interface.

(FLIR p/n: 421-0039-00)



Tripod Adapter



Tau 2 Inverted with Tripod Adapter Installed

TRIPOD ADAPTER

Allows users to put Tau 2 on a standard tripod mount.

(FLIR p/n: 261-2071-00)



Photon Replicator Kit



Tau 2 with PRK installed

PHOTON REPLICATOR KIT

Gives users backward compatibility, including the ability to translate the 30-pin SAMTEC connector to a 15-pin D-sub connector.

(FLIR p/n: 421-0045-00)

Note: On the Tau 640 and Tau 2 640 cameras, the 15-pin cannot pass 14-bit digital data.



Photon Replicator Board



Tau 2 with PRB installed

PHOTON REPLICATOR BOARD

Part of the Photon Replicator Kit, this board gives users who do not require a 015-pin D-sub connector backward compatibility.

(FLIR p/n: 421-0040-00)



Camera link board



Tau 2 with Camera Link Board installed

CAMERA LINK EXPANSION BOARD

Furnishes 14-bit digital data with separate connectors for analog video, power and communication.[†]

(FLIR p/n: 421-0046-00)

† The Camera Link XP accessory provides access to Tau digital data. Portions of the base Camera Link specifications are not met. Camera control and power are not supported via the Camera Link connector. A modification to the Camera Link board can be made to enable camera control via Camera Link. The XP accessory furnishes a mini-USB port for easy access to power and communications. External frame sync is supported; contact FLIR for OEM details.



TAU LENS FOCUS TOOL

Lets users adjust the focus of 9 mm, 13 mm, and 19 mm lenses.

(FLIR p/n: 421-0037-00)



TAU LENS LOCKING RING

Lets users mount WFOV Tau cameras to a bulkhead.

(FLIR p/n: 421-0041-00)



NARROW FIELD OF VIEW LENS HOLDER AND CLAMP

(FLIR p/n: 261-1485-00)



4" BLACKBODY SOURCE FOR LENS CALIBRATION & SUPPLEMENTAL FFC

(FLIR p/n: 285-0029-02)

Specifications

SYSTEM OVERVIEW

System Type	Uncooled LWIR Thermal Imager
Tau 2 640	640 x 512 VOx Microbolometer
Tau 2 336	336 x 256 VOx Microbolometer
Tau 2 324	324 x 256 VOx Microbolometer
Pixel Size	17 µm (Tau 2 640, 336); 25 µm (Tau 2 324)
Spectral Band	7.5 - 13.5 µm
Performance	<50 mK @ f/1.0

OUTPUTS

Analog Video	Field-switchable between NTSC and PAL
Tau 2 640	30/60Hz (NTSC); 25Hz/60Hz (PAL); <9Hz option for export (factory set)
Tau 2 336, 324	30/60 Hz (NTSC); 25/50 Hz (PAL) ; <9Hz option for export (factory set)
Digital Video	8- or 14-bit serial LVDS; 8- or 14-bit parallel CMOS; 8-bit BT.656

OPERATION & CONTROL

Image Control	Invert, revert, continuous digital zoom, dynamic zoom & pan, digital zoom presets, polarity, false color or monochrome, isotherms, AGC, second generation digital detail enhancement (DDE), image optimization (BPR, NUC & AGC'd video), Active Contrast Enhancement (ACE, Information Based Histogram Equalization (IBHEG), Smart Scene Optimization (SSO), settable splash screens
Camera Control	Manual via SDK & GUI, dynamic range switching (Tau 2 324 only)
Signal Interface	Camera Link (Expansion Bus Accessory Module), discrete I/O controls available, RS-232 compatible (57,600 & 921,600 baud), external sync input/output, power reduction switch (removes analog video)
FFC Duration	<0.5 sec

PHYSICAL ATTRIBUTES

Size	1.75" x 1.75" x 1.75" (less lens)
Mounting Interface	6 attach points in lens mount, M2 x 0.4 on 3 sides, 2 per side (sealable bulkhead mounting feature on lens barrel [M29 x 1.0], WFOV only)

POWER

Input Voltage	4.0 – 6.0 VDC
Primary Electrical Connector	50-pin Hirose
Power Dissipation	~ 1.0 W (Tau 2 324 & 336); <1.2 W (Tau 2 640); <1.3W (Tau 2 640/60Hz)
Time to Image	<5 seconds (Tau 2 640); <4 seconds (Tau 2 336 and 324)

ENVIRONMENTAL

Operating Temperature Range	-40° C to +80° C external temp
Storage Temperature Range	-55° C to +95° C external temp
Scene Temp Range	High gain: -40°C to +160°; Low gain: -40°C to +550°
Shock	200 g shock pulse with 11 msec sawtooth
Temperature Shock	5°/min
Vibration	4.3 g 3 axes, 8 hours each
Humidity	5 - 95% non-condensing
Operational Altitude	+40,000 feet
ROHS, REACH, and WEEE	Compliant

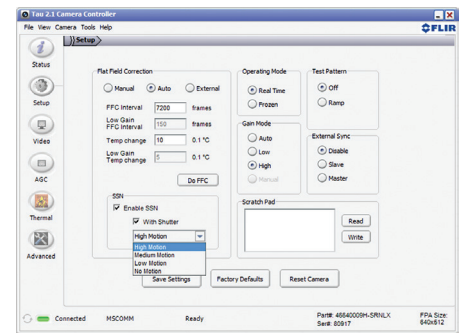
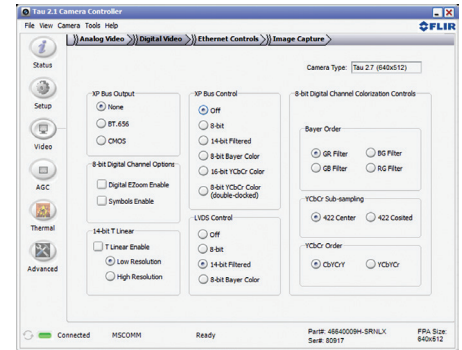
Capabilities

TAU 2

Tau 2 640, 336 & 324

Standard lens options	4 WFOV, 5 NFOV
WFOV lenses sealed to IP-67 at front surface	•
Threaded WFOV lens barrel for bulkhead mounting or external attachment options	•
Lens-less configuration offered	•
Ability to calibrate a second lens and store the calibration data in the camera via Advanced GUI function	•
Supplemental FFC feature allows users to calibrate out lens effects to improve image quality	•
Field-switchable between NTSC and PAL	•
CMOS, BT.656, 14-bit LVDS data output	•
Camera Link digital data accessory option	•
Accessories available for backward-compatibility with Photon cameras	•
Expansion board reference design for customers to develop custom interface electronics	•
High-speed serial communications up to 921K baud	•
Camera Control GUI	•
Camera power and communication over USB	•
Up to 500g shock tolerance	•
Eight discrete camera input functions available to OEMs (14-bit CMOS interface limits users to one discrete function)	•
Shutterless version available for OEM customers with volume constraints	•
Field-upgradeable software/firmware	•
Support for user-defined symbology	•
Relative temperature measurement	Tau 2 324 & 336
Provision to load custom start-up splash screens (10-camera minimum purchase required)	•
Optional SDK for access to Tau's complete feature set	•

TAU 2 GUI



Visit www.flir.com/cvs/cores/knowledgebase to browse the Tau Knowledge Base.

Visit www.flir.com/cvs/cores/tau640 to download the Tau GUI, connector pin-out definition, IDD interface, and User's Guide.



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Industry Canada Notice. This device is a subassembly designed for incorporation into other products in order to provide thermal imaging capability. It is not an end-product fit for consumer use. When incorporated into a host device, the end-product will generate, use, and radiate radio frequency energy that may cause radio interference. As such, the end-product incorporating this subassembly must be tested for compliance with the Interference-Causing Equipment Standard, Digital Apparatus, ICES-003, of Industry Canada before the product incorporating this device may be: manufactured or offered for sale or lease, imported, distributed, sold, or leased in Canada.

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