



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

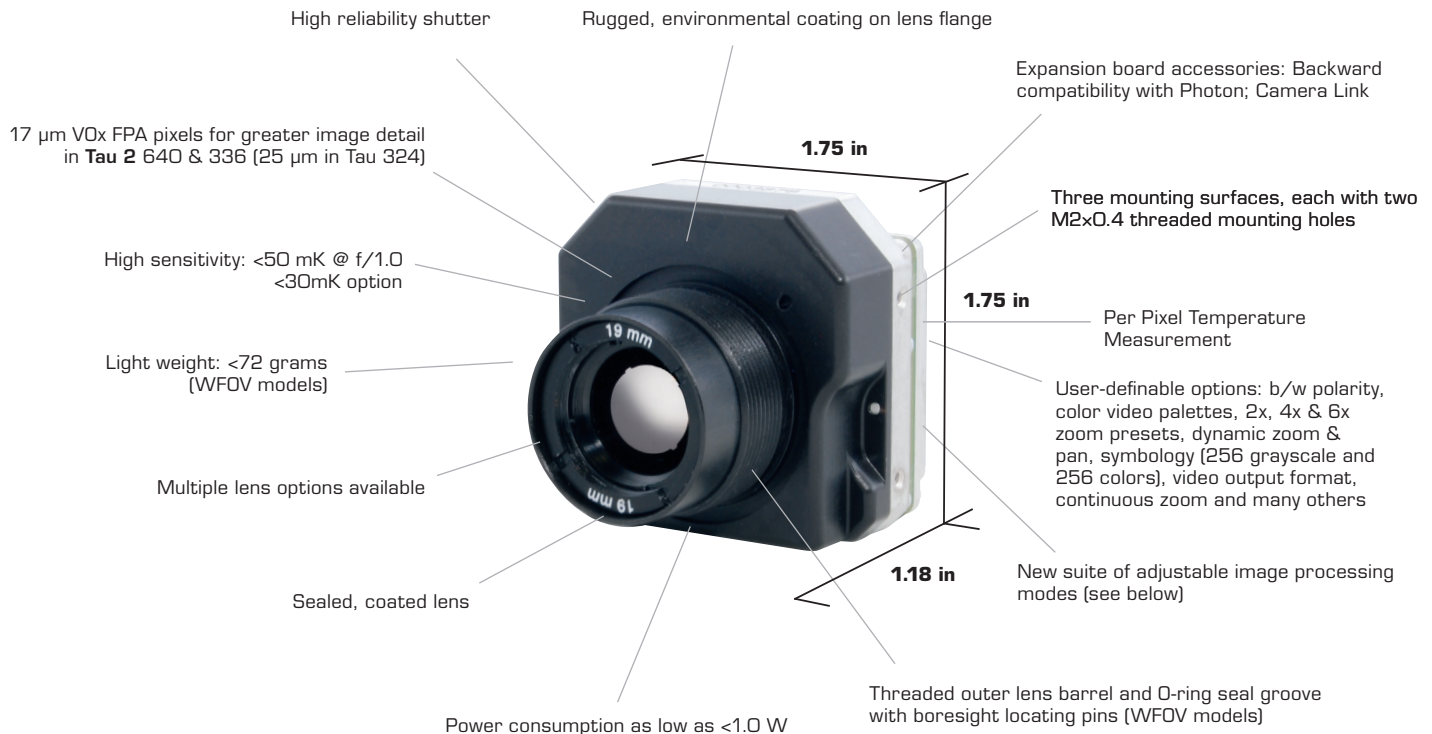
- 640x512 / 60 Hz frame rate
- Accurate temperature measurement for radiometry, analytics and telemetry
- New suite of adjustable image processing modes
- <30mK options

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



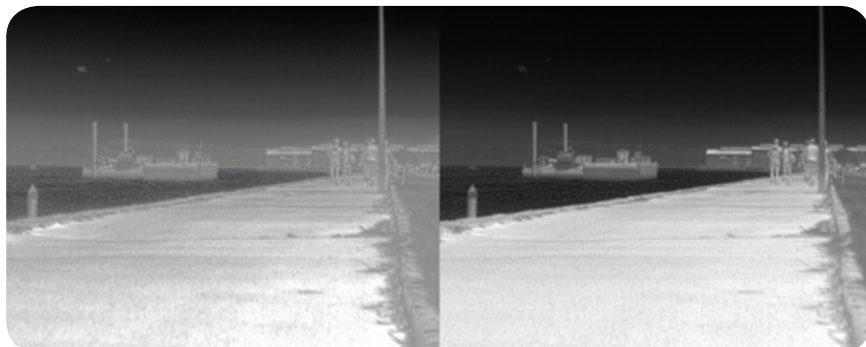
***Second Generation DDE – Digital Detail Enhancement™
for clearer imagery and edge sharpening***

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
FOV ³ (h x v)	Tau 2 640 (17μ 640 x 512)	90° x 69°	69° x 56°	45° x 37°
	Tau 2 336 (17μ 336 x 256)	45° x 35°	35° x 27°	25° x 19°
	Tau 2 324 (25μ 324 x 256)	63° x 50°	49° x 39°	35° x 28°
iFOV (mrads)	Tau 2 640 (17μ 640 x 512)	2.267	1.889	1.308
	Tau 2 336 (17μ 336 x 256)	2.267	1.889	1.308
	Tau 2 324 (25μ 324 x 256)	3.333	2.778	1.923
Minimum Focus Distance ⁴	All	2.5 cm	3 cm	8 cm
Length ⁵	All	19 mm	19 mm	19 mm
Diameter		29 mm	29 mm	29 mm
Weight (Camera + Lens)		<71 g	72 g	<70 g
Detection, Recognition, Identification (DRI) ⁶	Tau 2 640 & 336 - Man	D = 210/235	D = 250/285	D = 390/440
Typical/Best Conditions (range in meters)		R = 52/60	R = 63/71	R = 95/112
		I = 26/30	I = 31 /36	I = 47/56
	Tau 2 640 & 336 - Vehicle	D = 580/730	D = 720/880	D = 1,080/1340
R = 150/180		R = 175/220	R = 275/340	
I = 58/92		I = 88/108	I = 140/170	
Tau 2 324 - Man	D = 170/185	D = 205/230	D = 300/330	
	R = 42/43	R = 52/57	R = 74/82	
	I = 21/23	I = 26/28	I = 37/41	
Tau 2 324 - Vehicle	D = 480/570	D = 590/700	D = 840/1000	
	R = 120/140	R = 150/175	R = 215/250	
	I = 60/72	I = 74/88	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) MODELS ²			
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-FPNLX)

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

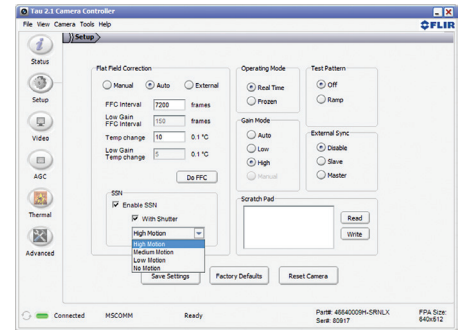
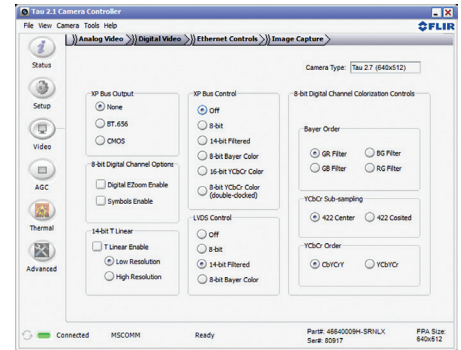
Capabilities

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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