Tau 2

Longwave Infrared Thermal Imaging Cameras

Key Features:

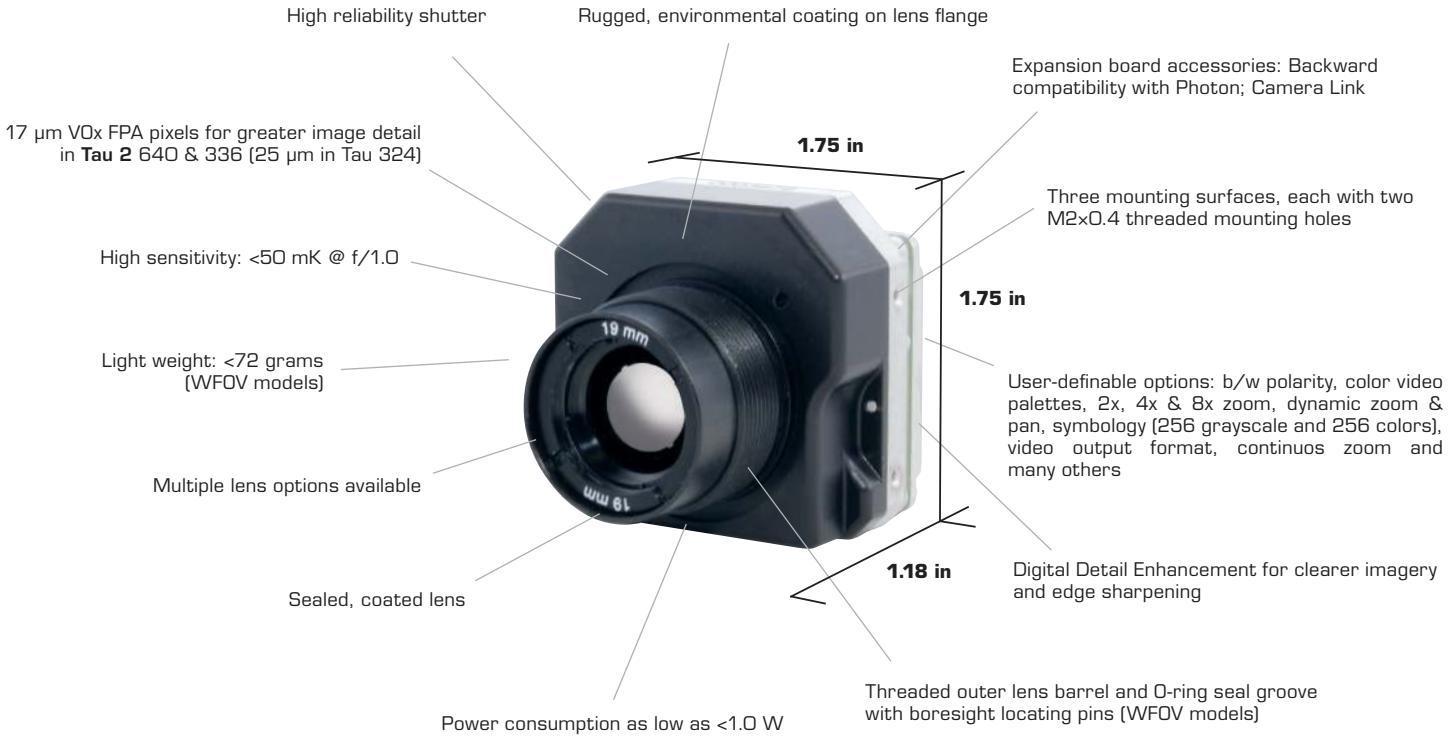
- Multiple models, including 640, 336 & 324
- Multiple lens options available: 7.5 – 100 mm
- Proven rugged, reliable thermal imaging for UAVs, UGVs & handheld devices

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.



FLIR Uncooled Cores Platforms and Applications

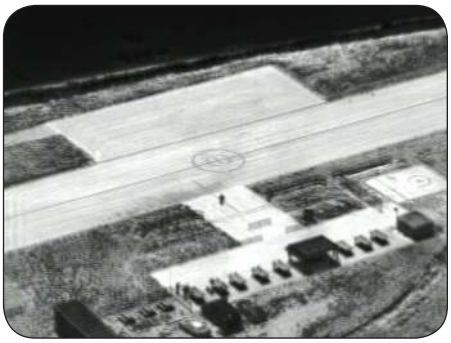
Tens of thousands of FLIR uncooled cores are fielded in:

- Unmanned vehicles
- Driving vision enhancement
- Unattended ground systems
- Thermal sights
- Handheld imagers for firefighting
- Security and surveillance

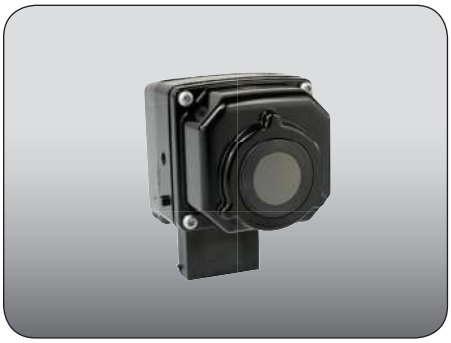
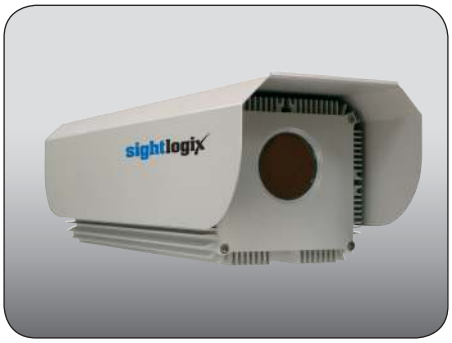
Product Applications

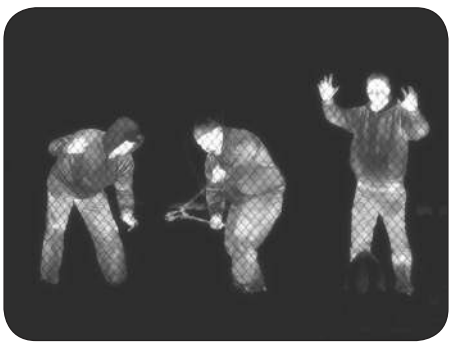
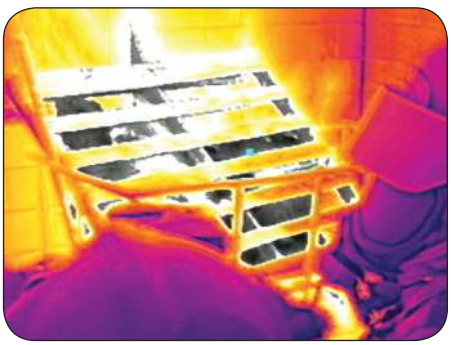




Small, light, and reliable, Tau 2 is the perfect thermal camera core for small unmanned systems used for airborne imagery, security, perimeter protection and more.

Easy integration, low power consumption, and specialized imaging capabilities combine to make Tau 2 for (left to right) driving enhancement, security and firefighting systems.

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] **Typical/Best Conditions** (range in meters)	**Tau 2** 640 & 336 - Man	D = 210/235 R = 52/60 I = 26/30	D = 250/285 R = 63/71 I = 31 /36	D = 390/440 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 x 0.5 inside thread. Outside thread is M29 x 0.5.

2 – NFOV lenses are M34 x 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	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 X = No Lens		F = Fast (60 H, 50 Hz) S = Slow (7.5 Hz, 8.3 Hz)	P = Performance	NL = No Logo *Also used for OEM ID*	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. See Applications Notes for specifics. 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 Hz (NTSC); 25 Hz (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 customer selectable parallel CMOS; 8-bit BT.656

OPERATION & CONTROL

Image Control	Invert, revert, continuous digital zoom, dynamic zoom & pan, 2x & 4x digital zoom (8x in **Tau 2** 640), polarity, false color or monochrome, isotherms, AGC, digital detail enhancement (DDE), image optimization (BPR, NUC & AGC'd video), settable splash screens
Camera Control	Serial commands, SDK & GUI, dynamic range switching
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

RADIOMETRIC FEATURES

Isotherms	See Product Spec
Spot Meter	Temperatures measured in central 4x4
Advanced Radiometry	Improved accuracy, moveable spot meter, re-sizable spot meter, T-Linear (digital output), linear in scene temperature (OEM part number required, additional charge)

PHYSICAL ATTRIBUTES

Size	1.75" x 1.75" x 1.18"
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)
Time to Image	<5 seconds (**Tau 2** 640); <4 seconds (**Tau 2** 336 and 324)

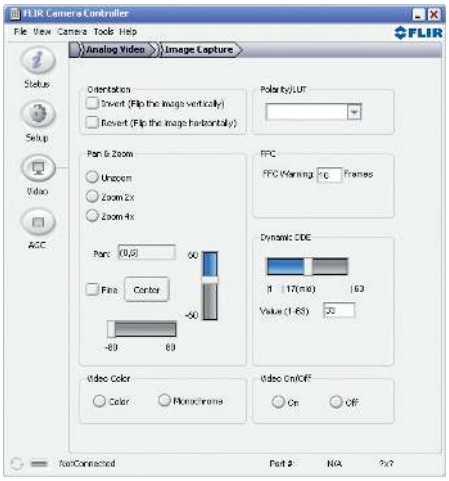
ENVIRONMENTAL

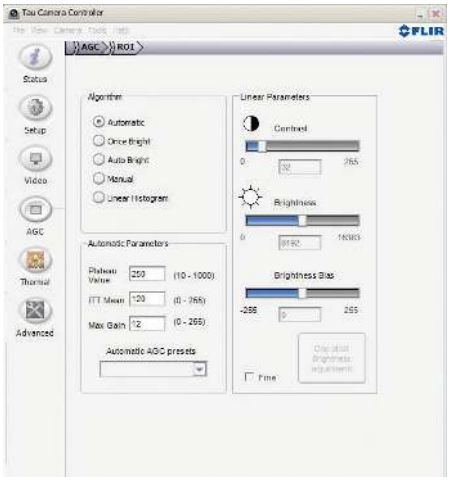
Operating Temperature Range	-40° C to +80° C external temp
Storage Temperature Range	-55° C to +95° C external temp
Scene Temp Range	High gain: -40°C to +160°; Low gain: -40°C to +550°
Shock	200 g shock pulse with 11 msec sawtooth
Temperature Shock	5°/min
Vibration	4.3 g 3 axes, 8 hours each
Humidity	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	•
Analog, BT .656. 8 bit & 14 bit LVDS or CMOS 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 autobaud	•
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	•
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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