

## TAMARISK® INFRARED SOLUTIONS THAT FIT

For applications constrained by aggressive size, weight and power, DRS Technologies' Tamarisk® family of 17  $\mu\text{m}$  uncooled thermal imaging modules offer flexible solutions to ensure your projects' success. With DRS' patented microbolometer superstructure, Tamarisk® camera modules provide greater sensitivity and superior image quality at an affordable price. Regardless of lighting conditions, Tamarisk® modules produce crystal clear imagery during day, night and challenging environmental conditions such as smoke, dust, haze and fog.

- 17  $\mu\text{m}$  pixel pitch technology
- Resolutions of 320 x 240 or 640 x 480
- Analog and digital video outputs
- Image Contrast Enhancement (ICE)
- Integrated shutter for flat field correction
- 2-year warranty



# TAMARISK<sup>®</sup><sub>320</sub> THERMAL IMAGING CAMERA



## SYSTEM FEATURES

### FOCAL PLANE ARRAY

Detector Type	Uncooled VOx Microbolometer
Array Size	320 x 240
Pixel Pitch	17 μm
Spectral Band	8-14 μm
Sensitivity (NEΔT) @ f/1.0 @ Room Temperature	<50 mK

### VIDEO FORMAT

Frame Rates	60 fps, 9 fps
Analog Video	NTSC (480i); PAL (576i) Field switchable
Digital Video	14-bit/8-bit LVCMOS or Camera Link <sup>®</sup>
Automatic Gain and Level	User defined and persistent through power cycles
Digital Zoom and Pan	Region of Interest, E-zoom from 1X - 4X
Non-Uniformity Correction	1-point with shutter or through lens
Time to First Image	< 2.0 seconds

### MECHANICAL

Dimensions	See Configuration and Lens Data - Page 4
Camera Core Weight	See Configuration and Lens Data - Page 4

### POWER

Input Voltage	3 - 5.5 V Base configuration 5 - 18 V Base configuration with Feature Board
Power Dissipation (nominal)	< 1.0 W Base configuration < 1.1 W Base configuration with Feature Board
PoUSB (Power over USB)	Requires Feature Board

### FEATURES

Available Command Protocols	LVCMOS UART; RS-232; USB 2.0
Image Enhancement	Image Contrast Enhancement (ICE)
External Sync	Yes
Color	24-bit RGB output via Camera Link <sup>®</sup>
Image Control	Polarity: White Hot / Black Hot Orientation: Invert / Revert
Symbology	User selectable options include: Zoom, Polarity and Shutter Notification
Custom Lens Configuration	Storage for up to 5 LUTs

### ENVIRONMENTAL

Operating Temp Range	-40°C to +67°C (-40°F to +153°F)
Shock / Vibration	70 G (all axis) / 4.3 G (three axis)
EMC Radiation	FCC Class A digital device
Humidity	5 to 95%, non-condensing
Standards Compliance	ROHS and WEEE Compliant
Sealed lens/lens mount	IP 67

Camera Link is a registered trademark of the Automated Imaging Association.

## TAMARISK<sup>®</sup> APPLICATIONS



Medical Imaging



Traffic Monitoring (White Hot)

# TAMARISK<sup>®</sup><sub>640</sub> THERMAL IMAGING CAMERA



## SYSTEM FEATURES

### FOCAL PLANE ARRAY

Detector Type	Uncooled VOx Microbolometer
Array Format	640 x 480
Pixel Size	17 μm
Spectral Band	8 to 14 μm
Sensitivity (NEDT) f/1.0 @ Room Temperature	< 50 mK

### VIDEO FORMAT

Frame Rates	30 fps, 9 fps
Analog Video	NTSC (480i); PAL (576i) Field switchable
Digital Video	14/8-bit LVCMOS/Camera Link <sup>®</sup>
Automatic Gain and Level	User Defined, persistent through power cycles
Digital Zoom and Pan	Region of Interest; E-zoom from 1X - 4X
Non-Uniformity Correction	1-point with shutter or through lens
Time to First Image	< 2.5 seconds

### MECHANICAL

Dimensions	See Configuration and Lens Data - Page 5
Camera Core Weight	See Configuration and Lens Data - Page 5

### POWER

Input Voltage	5 - 5.5 V Base configuration 5 - 18 V Base configuration with Feature Board
Power Dissipation (nominal)	< 1.2 W Base configuration < 1.4 W Base configuration with Feature Board
PoUSB (Power over USB)	Requires Feature Board

### FEATURES

Available Command Protocols	LVCMOS UART; RS-232; USB 2.0
Image Enhancement	Image Contrast Enhancement (ICE)
External Sync	Yes
Color	24-bit RGB output via Camera Link <sup>®</sup>
Image Control	Polarity: White Hot / Black Hot Orientation: Invert / Revert
Symbology	User selectable options include: Zoom, Polarity and Shutter Notification
Custom Lens Configuration	Storage for up to 5 LUTs

### ENVIRONMENTAL

Operating Temp Range	-40 °C to +80°C
Shock / Vibration	75 G (all axis) / 4.43 G (all axis)
EMC Radiation	FCC Class A digital device
Humidity	5% and 95%, non-condensing
Standards Compliance	ROHS and WEEE
Sealed lens/lens mount	IP 67



Public Transportation (Black Hot)



Critical Infrastructure Security

# TAMARISK<sup>®</sup>320 CONFIGURATION AND LENS DATA

Product View	EFL f/# Focus Type <sup>1</sup>	FOV (H° x V°)	Weight <sup>2</sup> (Camera + Lens)	Dimensions <sup>3</sup> H x W x D ±0.5 mm	Range <sup>4</sup> Performance Man Det. / Rec. Veh Det. / Rec.
	No Lens	No Lens	29 g	34 x 30 x 30	No Lens
	7.5 mm f/1.2 MF	40° x 30°	35 g	28 x 24 x 35	370 m / 70 m 930 m / 180 m
	7.5 mm f/1.2 A	40° x 30°	45 g	32 x 27 x 38	370 m / 70 m 930 m / 180 m
	11 mm f/1.2 MF	27° x 20°	49 g	31 x 26 x 40	540 m / 100 m 1,360 m / 260 m
	21 mm f/1.2 MF	15° x 11°	51 g	34 x 29 x 40	990 m / 190 m 2,380 m / 490 m
	19 mm f/1.1 A	16° x 12°	65 g	36 x 35 x 41	990 m / 190 m 2,380 m / 490 m
	35 mm f/1.2 MF	9° x 6.7°	64 g	37 x 32 x 49	1,620 m / 320 m 3,750 m / 810 m
	35 mm f/1.2 A	9° x 6.7°	134 g	47 x 47 x 58	1,620 m / 320 m 3,750 m / 810 m



40° HFOV



27° HFOV



15° HFOV



9° HFOV

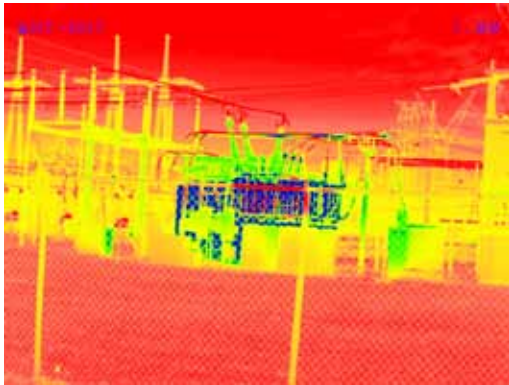
<sup>1</sup> Focus Type  
<sup>2</sup> Weight  
<sup>3</sup> Dimensions  
<sup>4</sup> Range Data

A = Athermalized, MF = Manual Focus  
Weights provided above are for the Base configuration. Add 6 grams for Base configuration with Feature Board.  
Sizes provided above are for the Base configuration. Add 7.5 mm to the depth for Base configuration with Feature Board.  
50% probability of detection and recognition on a clear day, other factors apply

## TAMARISK<sup>®</sup>640 CONFIGURATION AND LENS DATA



44° HFOV










25° HFOV



17° HFOV

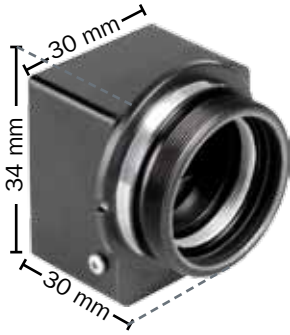


9° HFOV

Dimensions <sup>3</sup> H x W x D ±0.5 mm	Weight <sup>2</sup> (Camera + Lens)	FOV (H° x V°) IFOV (mrads)	EFL f/# Focus Type <sup>1</sup>	Product View
46 x 40 x 31	65g	No Lens	No Lens	
46 x 40 x 51	110 g	44° x 33° 1.19	14.25mm f/1.2 A	
46 x 40 x 40	90 g	37.5° x 28° 1.018	16.7mm f/1.25 A	
46 x 40 x 52	115 g	24.8° x 18.6° 0.680	25mm f/1.2 A	
50 x 47 x 59	165 g	17.6° x 13.2° 0.486	35mm f/1.2 A	
58 x 58 x 86	295 g	12.4° x 9.3° 0.340	50mm f/1.2 A	
73 x 73 x 106	525 g	9.6° x 7.2° 0.262	65mm f/1.2 A	

# MECHANICS OF THE TAMARISK®

## TAMARISK®<sub>320</sub>



### BASE

- Detector, Bias Board, Processor Board
- LVCMOS UART, 14/8 Bit Digital Video (LVCMOS or Camera Link®)
- Input Voltage 3.0V - 5.5 V

### BASE + FEATURE BOARD

- Detector, Bias Board, Processor Board, Feature Board
- USB 2.0, RS-232, 14/8 Bit Digital Video (Camera Link®), Analog Video (NTSC, PAL)
- Input Voltage 5.0V - 18V

### BASE + FEATURE BOARD + BACK COVER

- Detector, Bias Board, Processor Board, Feature Board, Back Cover
- USB 2.0, RS-232, 14/8 Bit Digital Video (Camera Link®), Analog Video (NTSC, PAL)
- Input Voltage 5.0V - 18V

## TAMARISK®<sub>640</sub>

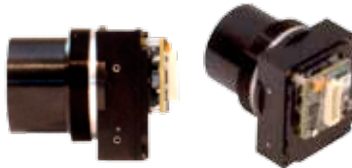
### BASE

- Detector, Bias Board, Processor Board
- LVCMOS UART, 14/8 Bit Digital Video (LVCMOS or Camera Link®)
- Input Voltage 5.0 V - 5.5 V



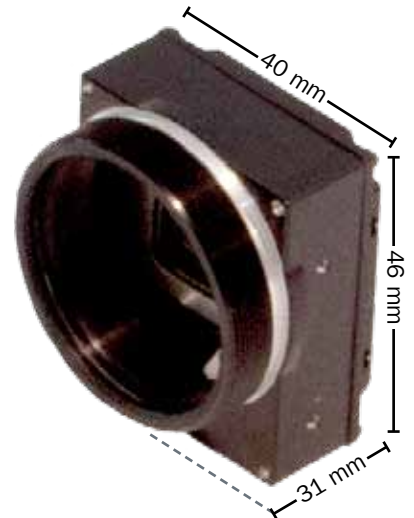
### BASE + FEATURE BOARD

- Detector, Bias Board, Processor Board, Feature Board
- USB 2.0, RS-232, 14/8 Bit Digital Video (Camera Link®), Analog Video (NTSC, PAL)
- Input Voltage 5.0 V - 18 V



### BASE + FEATURE BOARD + BACK COVER

- Detector, Bias Board, Processor Board, Feature Board, Back Cover
- USB 2.0, RS-232, 14/8 Bit Digital Video (Camera Link®), Analog Video (NTSC, PAL)
- Input Voltage 5.0 V - 18 V



## TAMARISK® IMAGE ENHANCEMENT SELECTIONS



### AGC

Firefighter is visible with minimal contrast. Background of scene is washed out and nothing is visible through the window.



### ICE Low

Firefighter and background are clearly visible with added contrast and edge enhancement. No visibility through the window.



### ICE High

Maximum edge enhancement brings out details of firefighter and reveals elements in the distant background through the window.

**AGC** Automatic Gain Control adjusts the image gain to the optimal range.

**ICE Low** Provides moderate levels of contrast and edge enhancement.

**ICE High** Additional local area contrast and edge enhancement to enrich background and foreground content.

## TAMARISK® CUSTOM LENS CALIBRATION

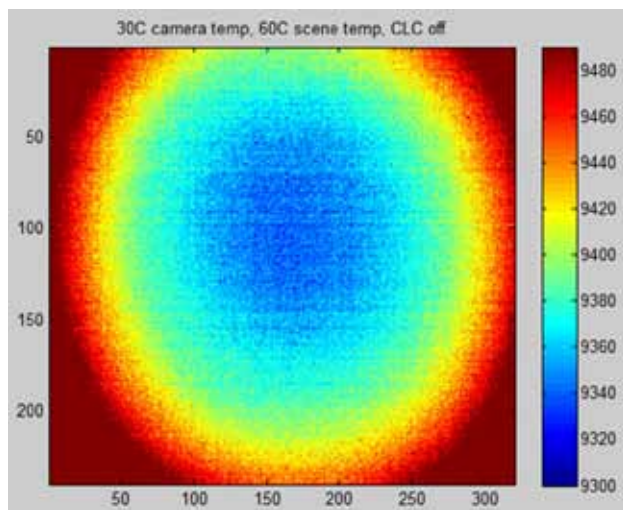
Available for all cameras

**Applications:** Adapting custom lenses to the Tamarisk® core; correcting for iso-thermal changes when embedding a Tamarisk® core in a system housing.

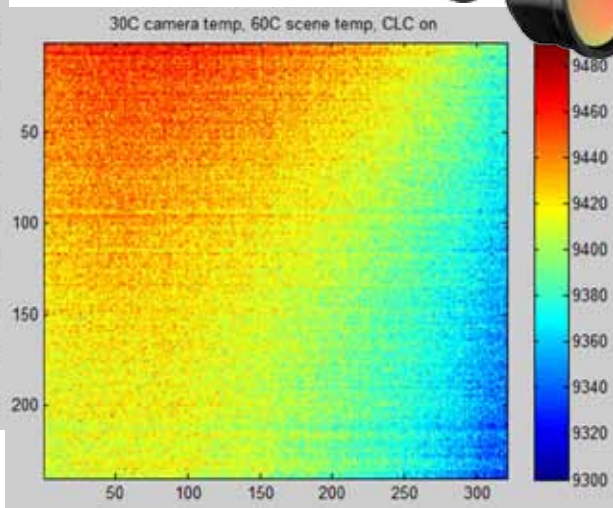
**Flexibility:** Enables custom lens solutions to work with the Tamarisk® core.

**Simplicity:** 2-pt calibration process. Takes less than five minutes.

**Performance:** Improves image uniformity.



Before



After

Custom Lens Calibration was used to adapt a 35 mm EFL lens to a core previously calibrated with a 7.5 mm EFL lens.

# TAMARISK® ACCESSORIES



## Product Documentation CD

User Manual, Mechanical ICD, Mechanical Drawing Source Files, Electrical ICD, Software ICD, Camera Control Software, Camera Control Software User's Guide and Application Notes

Tamarisk<sup>®</sup><sub>320</sub> Part #: 1013165  
Tamarisk<sup>®</sup><sub>640</sub> Part #: 1014851-100



## Custom Lens Calibration

Available for all cameras. Enables custom lens solutions to work with the Tamarisk<sup>®</sup> core. (See Page 7 for full description.)

Tamarisk<sup>®</sup><sub>320</sub> Part #: 1014868-100  
Tamarisk<sup>®</sup><sub>640</sub> Part #: 1015896-100



## Feature Board

Optional feature board provides power, RS-170 video-out, RS-232 and USB 2.0 serial command and control through a single 30-pin connector.

Part #: 1011339-001



## Breakout Box

For use with camera modules equipped with the optional Feature Board.

Part #: 1003785-001



## Tamarisk<sup>®</sup><sub>320</sub> Hardware/Software Developer's Kit (H/SDK)

IP Networked and ONVIF™ conformant. 14-bit and 8-bit streaming for analytics engines and imaging displays. Developed in conjunction with Leopard Imaging Inc.

Kit #: 1016704 Kit Documentation #: 1016706-100



## Camera Interface Cable Un-terminated

12" 30-pin cable terminated on one end

Part #: 1010590-001



## Camera Interface Cable Terminated

12" 30-pin cable terminated on both ends

Part #: 1002775-001



## Tamarisk<sup>®</sup><sub>320</sub> Tripod Mounting Bracket

Anodized aluminum with 1/4-20 thread in base

Part #: 1014554



## Tamarisk<sup>®</sup><sub>640</sub> Tripod Mounting Bracket

Anodized aluminum with 1/4-20 thread in base

Part #: 1017276-SP



## Tamarisk<sup>®</sup><sub>320</sub> Back Shell

Custom fit when a Feature Board is included

Part #: 1013744-SP



## Tamarisk<sup>®</sup><sub>640</sub> Back Shell

Custom fit when a Feature Board is included

Part #: 1014304-001

## CONFIGURE YOUR TAMARISK<sup>®</sup><sub>320</sub>

Part Number Format = 1003728 – [12 Digit Custom Configuration (see below)] – 500

12 Digit Custom Configuration: Use the table below to build your Tamarisk <sup>®</sup> <sub>320</sub>									
L	A	0	0	0	6	N	0	0	
Lens	Lens Type	Field of View	Feature Board	N/A	Frame Rate	Video Format	PAL Version	Temp. Range	
0 = No Lens	0 = Manual Focus	0 = 9°	0 = No Feature Board		9 = 9 Hz	N = NTSC	0 = N/A	0 = -40° C to 67° C	
L = Lens	A = Atherm	1 = 15° or 16° 2 = 27° 3 = 40°	1 = Feature Board		6 = 60 Hz	P = PAL	1 = PAL 525 M 2 = PAL 625 N 3 = PAL 625 B, D, G, H, I, N <sub>2</sub>		

## CONFIGURE YOUR TAMARISK<sup>®</sup><sub>640</sub>

Part Number Format = 1017460 – [5 Digit Custom Configuration (see below)] – 0000

5 Digit Custom Configuration: Use the table below to build your Tamarisk <sup>®</sup> <sub>640</sub>				
L	4	1	3	N
Lens	Lens FOV	Feature Board	Frame Rate	Video Format
0 = No Lens	0 = 9.6°	0 = No Feature Board	3 = 30 Hz	N = NTSC
L = Lens	1 = 12.4° 2 = 17.6° 3 = 24.8° 4 = 37.5° 5 = 44°	1 = Feature Board	9 = 9 Hz	1 = PAL 525 M 2 = PAL 625 N 3 = PAL 625 B, D, G, H, I, N <sub>2</sub>



Specifications subject to change without notice. The products described herein are subject to US Government Export Controls.