# TAMARISK
thermal camera cores
by DRS Technologies

TAMARISK®
HIGH PERFORMANCE COMMERCIAL INFRARED CORES

For applications constrained by aggressive size, weight and power, Leonardo DRS' Tamarisk® family of 17 μm 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 μm pixel pitch Patented Microbolometer
- 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

LEONARDO DRS

TAMARISK 320
thermal camera cores
by DRS Technologies
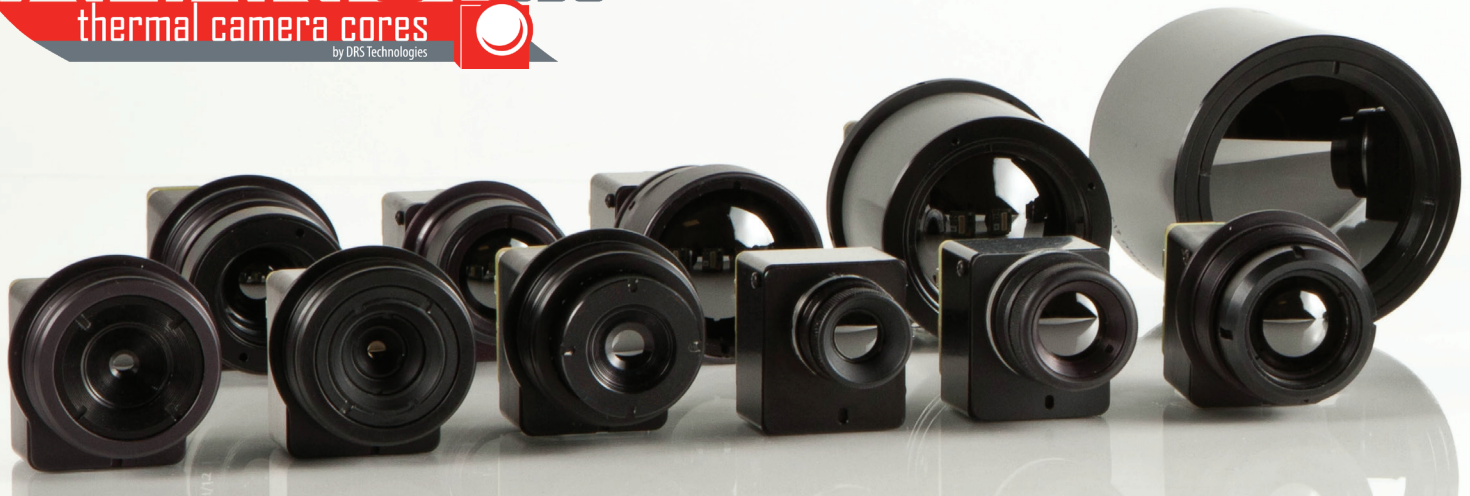
SYSTEM FEATURES

FOCAL PLANE ARRAY

Detector Type	Uncooled VOx Microbolometer
Array Size	320 x 240
Pixel Pitch	17 µm
Spectral Band	8-14 µm
Sensitivity (NEdT) @ 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®
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
Scene Dynamic Range	-40°C to +80°C

MECHANICAL

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

CONFIGURATIONS

Base	Detector, Bias Board, Processor Board
With Feature Board	Base with Feature Board (Back cover also available)

POWER

Input Voltage	3 - 5.5 V Base configuration 4.5 - 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 Contract Enhancement (ICE™)
External Sync	Yes
Color	24-bit RGB output via Camera Link®
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

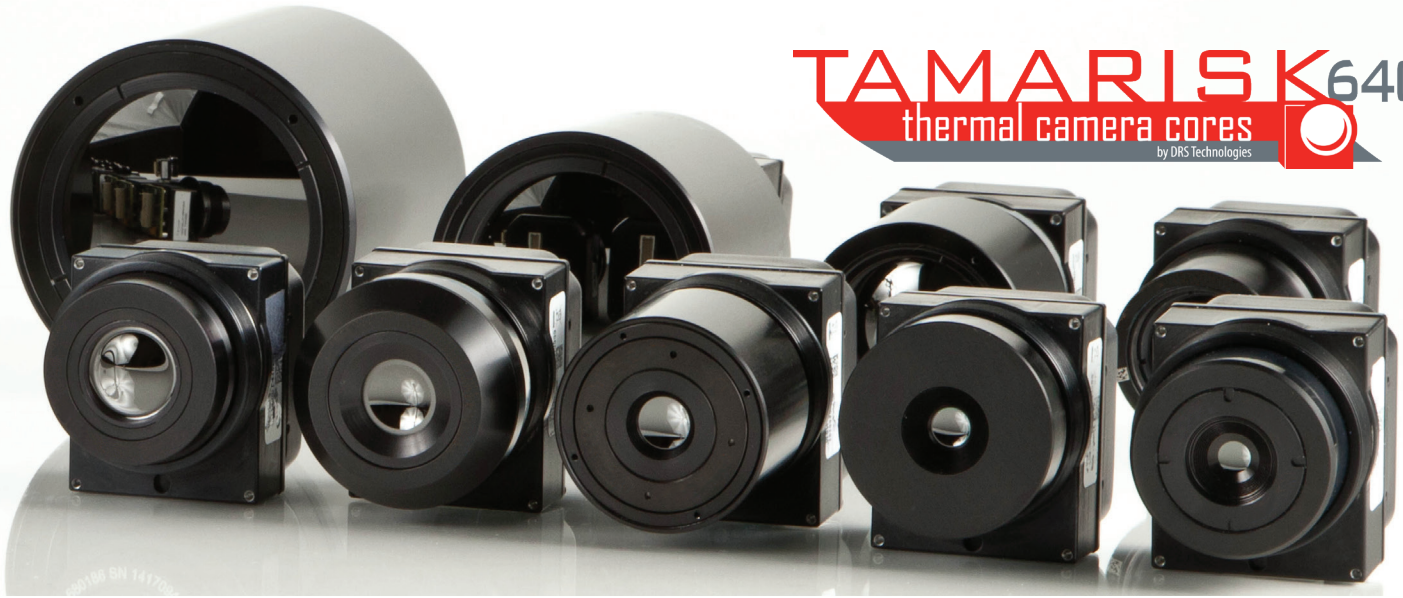|	
Operating Temp Range	-40°C to +80ºC
Shock / Vibration	70 G (all axis) / 4.3 grms (three axis)
EMC Radiation	FCC Class A digital device
Humidity	5 to 95%, non-condensing
Standards Compliance	ROHS and WEEE Compliant
Sealed lens/lens mount	IP 67

TAMARISK® APPLICATIONS

Medical Imaging

Traffic Monitoring (White Hot)

TAMARISK 640
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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®
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
Scene Dynamic Range	-40°C to +80°C

MECHANICAL

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

CONFIGURATIONS

Base	Detector, Bias Board, Processor Board
With Feature Board	Base with Feature Board (Back cover also available)

POWER

Input Voltage	3 - 5.5 V Base configuration 4.5 - 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®
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 +80ºC
Shock / Vibration	75 G (all axis) / 4.43 grms (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®320 CONFIGURATION AND LENS DATA

Effective Focal Length	Horizontal x Vertical FOV (H° x V°)	IFOV (mrads)	f/#	Weight[1] (with lens in grams)	Dimensions[2] H x W x D ±0.5 mm	Range[3] Performance Detection / Recognition (meters)	Focus Type
No Lens	No Lens	No Lens	No Lens	29	34 x 30 x 30	No Lens	No Lens
3.8 mm	90° x 67°	4.90	f/1.4	43	37 x 35 x 33	Man: 185 / 30 Vehicle: 480 / 85	Athermal
5.3 mm	60° x 45°	3.27	f/1.46	45	37 x 35 x 33	Man: 250 / 45 Vehicle: 635 / 115	Athermal
7.5 mm	40° x 30°	2.18	f/1.2	43	28 x 24 x 35	Man: 355 / 65 Vehicle: 900 / 170	Manual
7.5 mm	41.8° x 31.4°	2.28	f/1.4	59	37 x 35 x 43	Man: 335 / 60 Vehicle: 855 / 160	Athermal
11 mm	27° x 20°	1.47	f/1.2	49	31 x 26 x 40	Man: 505 / 90 Vehicle: 1,255 / 240	Manual
13 mm	24° x 18°	1.30	f/1.2	54	37 x 35 x 42	Man: 560 / 105 Vehicle: 1,395 / 270	Athermal
19 mm	16° x 12°	0.87	f/1.1	65	36 x 35 x 41	Man: 845 / 160 Vehicle: 2,055 / 415	Athermal
21 mm	15° x 11°	0.81	f/1.2	51	34 x 29 x 40	Man: 925 / 175 Vehicle: 2,235 / 455	Manual
35 mm	9° x 6.7°	0.49	f/1.2	64	37 x 32 x 49	Man: 1,450 / 285 Vehicle: 3,390 / 725	Manual
35 mm	9° x 6.7°	0.49	f/1.2	134	47 x 47 x 58	Man: 1,450 / 285 Vehicle: 3,390 / 725	Athermal
50 mm	6.2° x 4.6°	0.33	f/1.2	264	58 x 58 x 84	Man: 2,105 / 425 Vehicle: 4,740 / 1,070	Athermal
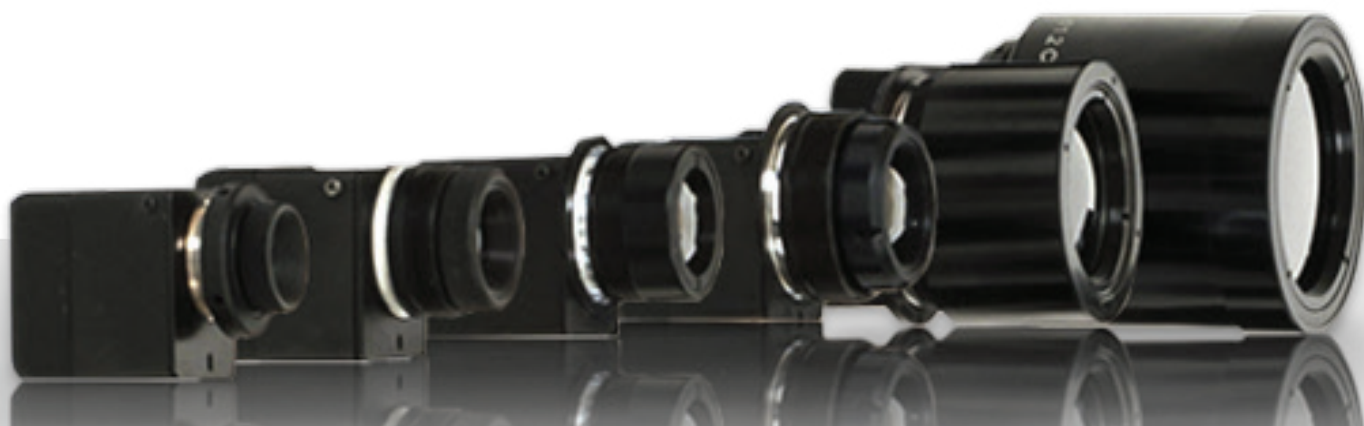
[1] Weight   Weights provided are for the Base configuration (see page 2 for description of base configuration). Add 6 grams for Base configuration with Feature Board. Add 3 grams for addition of retaining ring.
[2] Dimensions   Sizes provided are for the Base configuration (see page 2 for description of base configuration). Add 7.5 mm to the depth for Base configuration with Feature Board.
[3] Range Data   50% probability of detection and recognition on a clear day, other factors apply. The range data presented are not guaranteed performance metrics.

TAMARISK®$_{640}$ CONFIGURATION AND LENS DATA

Effective Focal Length	Horizontal x Vertical FOV (H° x V°)	IFOV (mrads)	f/#	Weight[1] (with lens in grams)	Dimensions[2] H x W x D ±0.5 mm	Range[3] Performance Detection / Recognition (meters)	Focus Type
No Lens	No Lens	No Lens	No Lens	65	46 x 40 x 31	No Lens	No Lens
7.5 mm	90° x 67°	2.45	f/1.4	100	46 x 40 x 39	Man: 335 / 60 Vehicle: 855 / 160	Athermal
9 mm	70° x 52°	1.8	f/1.4	105	46 x 40 x 46	Man: 390 / 75 Vehicle: 900 / 180	Athermal
12.8 mm	49.8° x 37°	1.35	f/1.4	110	46 x 46 x 50	Man: 550 / 100 Vehicle: 1.260 / 260	Athermal
14.25 mm	44° x 33°	1.19	f/1.4	110	46 x 40 x 51	Man: 640 / 120 Vehicle: 1,580 / 310	Athermal
16.7 mm	37.5° x 28°	1.01	f/1.25	90	46 x 40 x 40	Man: 745 / 140 Vehicle: 1,825 / 365	Athermal
25 mm	24.8° x 18.6°	0.68	f/1.2	115	46 x 40 x 52	Man: 1,030 / 195 Vehicle: 2,475 / 505	Athermal
35 mm	17.6° x 13.2°	0.48	f/1.2	165	50 x 47 x 59	Man: 1,450 / 285 Vehicle: 3,390 / 725	Athermal
50 mm	12.4° x 9.3°	0.34	f/1.2	295	58 x 58 x 86	Man: 2,105 / 425 Vehicle: 4,740 / 1,070	Athermal
65 mm	9.6° x 7.2°	0.26	f/1.2	525	73 x 73 x 106	Man: 2,730 / 565 Vehicle: 5,950 / 1,405	Athermal

TAMARISK 320
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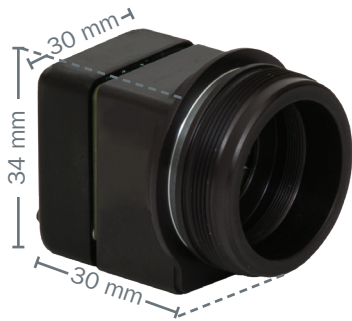
30 mm
34 mm
30 mm

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 4.5V - 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 4.5V - 18V

TAMARISK 640
### thermal camera cores
by DRS Technologies

BASE

- Detector, Bias Board, Processor Board
- LVCMOS UART, 14/8 Bit Digital Video (LVCMOS or Camera Link®)
- Input Voltage 3.0 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 4.5 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 4.5 V - 18 V

40 mm
46 mm
31 mm
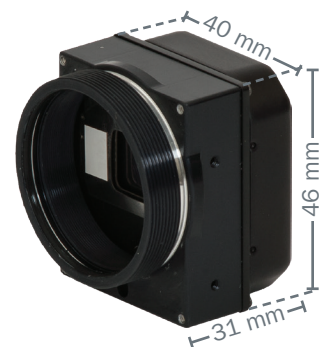
TAMARISK® IMAGE ENHANCEMENT SELECTIONS

AGC

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

ICE™ Level 1

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

ICE™ Level 7

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™ Level 1   Provides moderate levels of contrast and edge enhancement.

ICE™ Level 7   Additional local area contrast and edge enhancement to enrich background and foreground content.
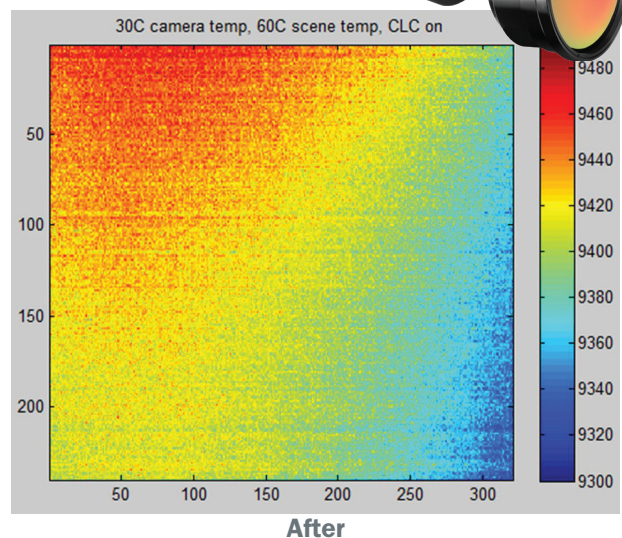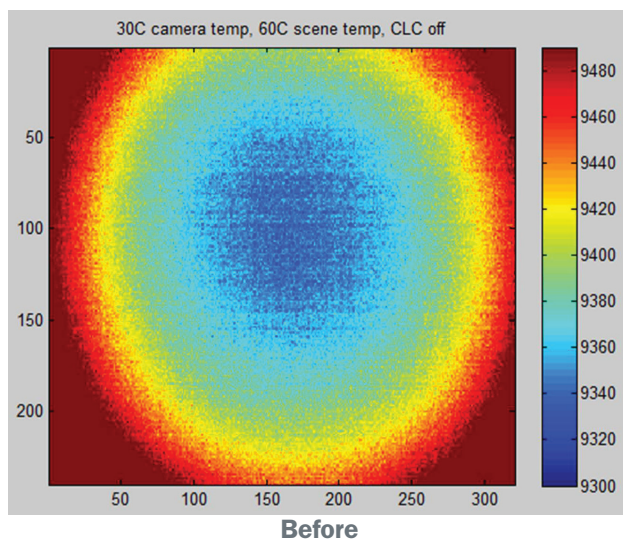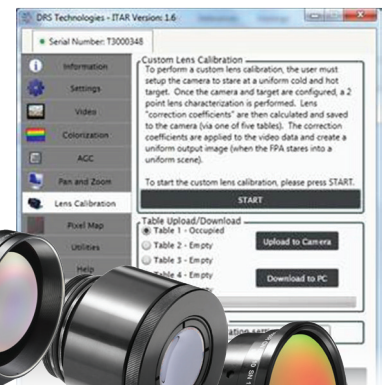
TAMARISK® CUSTOM LENS CALIBRATION UTILITY

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.

30C camera temp, 60C scene temp, CLC off

Before

30C camera temp, 60C scene temp, CLC on

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

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 (Interface Cable(s) not included)
For use with camera modules equipped with the optional Feature Board.
Part #: 1003785-001

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®320 Tripod Mounting Bracket
Anodized aluminum with 1/4-20 thread in base
Part #: 1014554-001

Tamarisk®640 Tripod Mounting Bracket
Anodized aluminum with 1/4-20 thread in base
Part #: 1017276-SP

Tamarisk®320 Back Shell
Custom fit when a Feature Board is included
Part #: 1013744-SP

Tamarisk®640 Back Shell
Custom fit when a Feature Board is included
Part #: 1014304-001

Custom Lens Calibration
Available for all cameras. Enables custom lens solutions to work with the Tamarisk® core. (See Page 7 for full description.)
Tamarisk®320 Part #: 1014868-100
Tamarisk®640 Part #: 1015 00

*ACCESSORIES ARE EAR99 NO LICENSE REQUIRED

CONFIGURE YOUR TAMARISK®320

Part Number Format = 1003728 – [8 Digit Custom Configuration (see below)] – 3500

8 Digit Custom Configuration: Use the table below to build your Tamarisk®320

L	A	0	0	0	6	N	0
Lens	**Lens Type**	**Field of View / EFL**	**Feature Board**	**N/A**	**Frame Rate**	**Video Format**	**PAL Version**
0 = No Lens	0 = Manual Focus	0 = 9° A / 35mm	0 = No Feature Board		9 = 9 Hz	N = NTSC	0 = N/A
L = Lens	A = Atherm	1 = 15° MF or 16° A / 21 mm or 19 mm	1 = Feature Board		6 = 60 Hz	P = PAL	1 = PAL 525 M
		2 = 24° A or 27° MF / 13 mm or 11 mm					2 = PAL 625 N
		3 = 40°MF / 7.5 mm					3 = PAL 625 B, D, G, H, I, N$_2$
		6 = 6.2° A / 50 mm					
		7 = 90° A / 3.8 mm					
		A = 41.8°A / 7.5 mm					
		B = 60°A / 5.3 mm					

CONFIGURE YOUR TAMARISK®640

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

5 Digit Custom Configuration: Use the table below to build your Tamarisk®640

L	4	1	3	N
Lens	**Lens FOV / EFL**	**Feature Board**	**Frame Rate**	**Video Format**
0 = No Lens	0 = 9.6° / 65 mm	0 = No Feature Board	3 = 30 Hz	N = NTSC
L = Lens	1 = 12.4° / 50 mm	1 = Feature Board	9 = 9 Hz	1 = PAL 525 M
	2 = 17.6° / 35 mm			2 = PAL 625 N
	3 = 24.8° / 25 mm			3 = PAL 625 B, D, G, H, I, N$_2$
	4 = 37.5° / 16.7 mm			
	5 = 44° / 14.25 mm			
	6 = 90° / 7.5 mm			
	7 = 50° / 12.8 mm			
	8 = 70° / 9 mm			
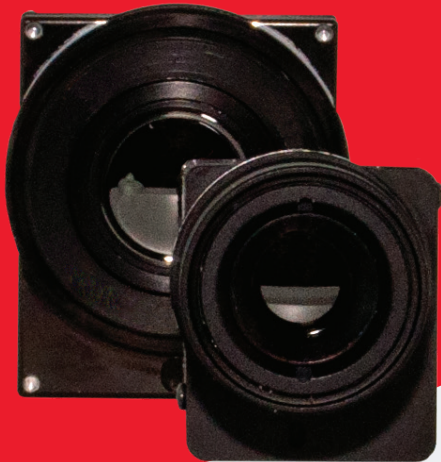
Specifications subject to change without notice.
The products described herein are subject to
US Government Export Controls.

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