Keysight Technologies
U5850 Series True*IR* Thermal Imagers

Data Sheet

ECN 2015 Impact Award Winner
Cooling and Thermal Management

KEYSIGHT TECHNOLOGIES
Unlocking Measurement Insights

Introduction

Find potential problems faster with the higher resolution and affordability of our True*IR* Series of thermal imagers. Only from Keysight[1] can you get a 320 x 240 fine resolution thermal imager with image logging and trending capability at a lower price than the typical 320 x 240 resolution thermal imager.

- Identify abnormalities faster with four times more in-camera fine resolution
- Stream, record and playback thermal images up to 8 frames per second with True**IR** Analysis and Reporting tool.
- Monitor temperature changes through image logging and temperature trending capabilities
- Ability to focus on objects as close as 10 cm away
- Compact, lightweight, ergonomic
- High temperature range (up to 1200 °C)
- Easy-to-use customizable color palette
- Configurable quick access buttons to easily change settings with one hand

Today's hottest imagers

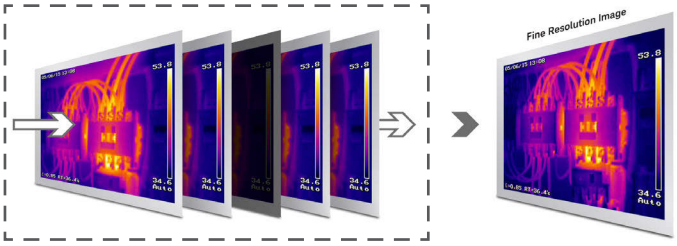
Confidently detect problems with four times better resolution

1. Keysight Technologies, Inc.

Detect Abnormalities Sooner with Higher Resolution Thermal Images Within the Camera

Get more details with fine resolution

Fine resolution is a technology that restores the details originally inherent to the object while enhancing the resolution, at the same time minimizing fuzziness and noise. It is accomplished by performing sophisticated calculations on continuous multi-frames of the image – evaluated for misalignment caused mainly by hand tremor. The firmware then detects and corrects the information between images through one feature pixel.



Continuous multi-frames of low resolution images

Four times more resolution, noise eliminated

With fine resolution,

- Get an effective 320 x 240 pixels of radiometric JPEG *IR* image which is clearer and sharper.
- See fine details on objects as close as 10 cm, especially when measuring temperature on small components which are close to each other.
- With four times digital zoom, magnify a thermal image of a far-away object to quickly identify anomalies and to reveal even finer details.
- These are essential for industrial, building inspection, electronics, as well as medical research.

Figure 1. Samples of IR images

Image logging and temperature trending

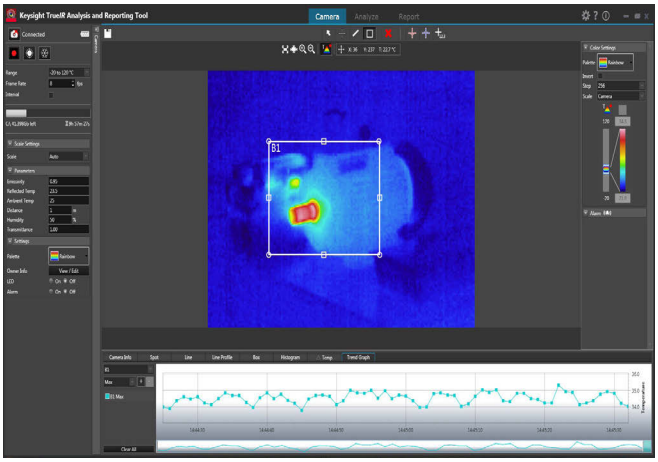
Image logging is a capability that enable users to monitor the performance of their object or DUT at a specified interval. Users performing temperature profiling of their design or performing equipment failure analysis will find this feature useful, especially with the easy to use True*IR* Analysis and Reporting tool.

With this PC software, users can import, analyze, edit and present their thermal images to their clients swiftly.

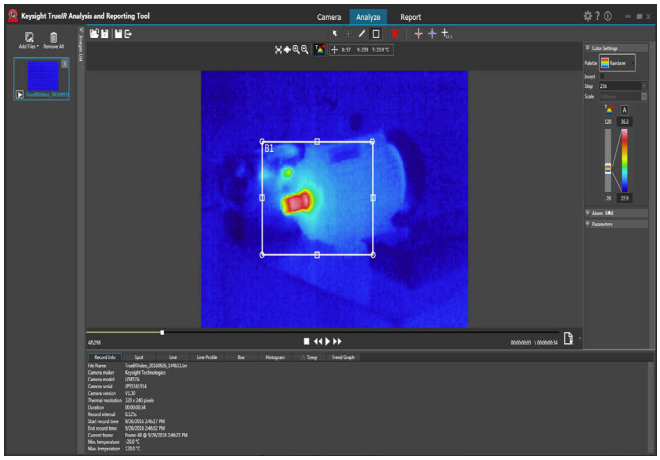
Stream, record, playback and analyze thermal images

With the enhanced True*IR* Analysis and Reporting Tool, users are able to stream live thermal images from a PC. This feature is especially useful for monitoring DUT's performance and perform equipment failure analysis. Now you can easily record thermal image up to 8 frames per second and simply playback the recorded video to perform detailed analysis and generate report.

True*IR* Analysis and Reporting Tool



Stream and record video up to 8 frames/s



Playback video and perform detailed analysis

Front and Back Panels

Front panel

Large 3.5 inch color LCD display

Navigation/Enter key

Light/Laser control key

View/Zoom key

Play/Delete key

Power On/Off key

Back/Exit key

Auto/Manual scale key

Quick access buttons to easily change settings or functions

Adjustable hand strap for better grip (for right-handed or left-handed use)

Back panel

Flash light

Laser pointer

Visible image camera

Infrared (IR) image camera lens (with shutter)

Focus adjustment ring

Camera trigger key

Video out port

DC power inlet

SD memory card slot

USB Mini-B port

Specification

Specifications are warranted in the temperature range of 0 to 40 °C and after 2 minutes of power up, unless otherwise noted. Supplemental characteristics — which are not warranted, but are descriptions of performance — are determined either by design or testing.

Performance specifications

Parameter	Specification		
	U5855A	**U5856A**	**U5857A**
Basic performance			
Temperature measurement range	–20 ~ 350 °C	–20 ~ 650 °C	–20 ~ 1200 °C
Range 1:	–20 to 120 °C	-20 to 120 °C	–20 to 120 °C
Range 2:	0 to 350 °C	23 to 650 °C*	0 to 350 °C
Range 3:	NA	NA	250 to 1200 °C **
		Note *: Lower limit temperature at 0°C, Guaranteed lower temperature at 23°C.	Note **: Lower limit temperature at 0°C, Guaranteed lower temperature at 250°C
Thermal sensitivity			
Range 1:	0.07 °C (at 30 °C)	0.07 °C (at 30 °C)	0.07 °C (at 30 °C)
Range 2:	0.1 °C (at 30 °C)	0.5 °C (at 30 °C)	0.1 °C (at 30 °C)
Range 3:	NA	NA	0.5 °C (at 250 °C)
Accuracy[1]	± 2 °C or ± 2% (whichever is greater) At 0 ~ 40 °C ambient temperature		
Detector type	Uncooled focal plane array (α-Si)		
Detector resolution	160 × 120		
Fine resolution (in-camera)	320 × 240 (IR pixels)		
Spectral range	8 to 14 µm		
Frame rate	9 Hz		
Field of view (FOV)	28 ° (H) × 21° (V)		
Spatial resolution (IFOV)	3.1 mrad; 2.1 mrad (with fine resolution)		
Focal distance	10 cm to infinity		
Focus mechanism	Manual focus		
Image processing and enhancement			
Correction parameters	Emissivity <ε>, reflected temperature <RT>, object distance <OD>, ambient temperature <AT>, relative humidity <Hum>, transmission <T>		
Emissivity correction	0.1 to 1.0		
	Predefined emissivity table		
Digital zoom	Zoom ratio: 4x continuous		
Color palette - Different color palette for different models:	Rainbow, Iron, Hot Iron, Iris, Grayscale, Inverted Grayscale, Custom	Rainbow, Lava, Iron, Hot Iron, Iris, Olive, Medical, Grayscale, Inverted Grayscale, Custom	Rainbow, Lava, Iron, Hot Iron, Iris, Olive, Medical, Grayscale, Inverted Grayscale, Custom
Camera mode	IR image, visible image, picture in picture, blend		
Measurements and alarm			
Measurements	Center spot, 3x movable spots, max/min tracking, delta temperature, 3x movable boxes (with min/max/avg)		
Color alarm Alarm zones Backgrounds	High/low temperature in all areas Above/below/inside/outside Hot white/Hot black		

1. Minimum distance with accuracy, 10 cm to 50 cm: ± 4 °C or ± 4%.

Supplemental characteristics

Parameter	Specification
Storage device	Supports up to 32 GB SDHC memory card with class 4 and above
Image storage format	
Thermal Image	Radiometric JPEG
Visible Image	JPEG
Image logging	Logs IR, visible or fusion images at a defined interval (7 to 3600 seconds)
State storage memory	Three user-configurable stored states
Tagging/annotation	3 photo tags, note tag, note tag from template (downloadable from the Keysight Technologies, Inc. web site)
I/O	USB 2.0 mass storage NTSC/PAL via video RCA cable
Language	English, French, German, Italian, Japanese, Korean, Portuguese, Russian, Spanish, Simplified Chinese, Traditional Chinese
Built-in quick start tutorial	Available

Product characteristics

Parameter	Specification
Power supply	
Power adapter	Line voltage range: 50/60 Hz, 100 – 240 VAC (Auto/Universal voltage), 1.2 A MAINS supply voltage fluctuations not to exceed ± 10% of the nominal voltage Output voltage: 12 VDC, 3 A Installation Category I (Isolated ELV supply source – connected to MAINS through an AC/DC power adapter)
Battery	Li-Ion rechargeable battery, 7.4 VDC, 2500 mAh Operating time: 4 hours
Display	3.5" TFT
Visible camera	3.1 MP
Built-in led torch	Available
Laser pointer	Class 2
Warm-up time	2 minutes
Operating environment	
Temperature	–15 °C to 50 °C
Humidity	Up to 95% RH at 40 °C
Storage compliance	
Temperature	–40 °C to 70 °C
Humidity	Up to 95% RH at 40 °C
Altitude	Up to 2000 m
Pollution degree	2
Safety compliance	Laser safety: IEC 60825-1/EN 60825-1 (Laser Class 2) IEC 61010-1/EN 61010-1
EMC compliance	IEC 61326-1/EN61326-1 CISPR11/EN55011, Group 1 Class A Canada: ICES/NMB-001: Issue 4, June 2006 Australia/New Zealand: AS/NZS CISPR 11
Shock	Tested to IEC 60068-2-27 Ed. 3.0
Vibration	Tested to IEC 60068-2-6
Tripod mount thread	ISO 1222:2010 Standard screw thread, 1/4 - 20 UNC
Drop test	2 m
Protection class	2
IP rating	IP 54
Dimensions (W × H × D)	95 × 250 × 85 mm
Weight	0.746 kg (with battery)
Calibration cycle	1 year

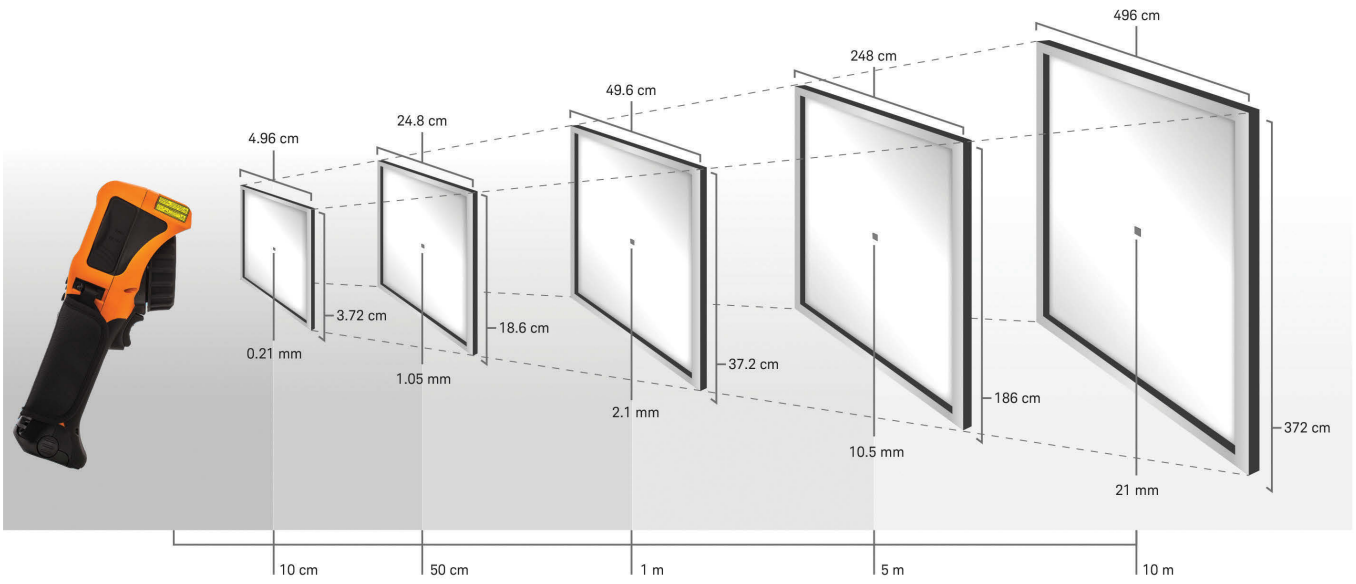


Figure 2. Relationship between the Field of View (FOV) and the distance to target

Ordering Information

Model number	Description
U5855A	True**IR** thermal imager, 350 degree Celsius
U5856A	True**IR** thermal imager, 650 degree Celsius
U5857A	True**IR** thermal imager, 1200 degree Celsius
Option number	**Description**
U5855A-100	U5855A True**IR** thermal imager with 2-bay charger and additional battery
U5856A-100	U5856A True**IR** thermal imager with 2-bay charger and additional battery
U5857A-100	U5857A True**IR** thermal imager with 2-bay charger and additional battery

U5855A U5856A U5857A

Standard shipped accessories

- Power adapter with power cord
- Rechargeable Li-Ion battery
- SD memory card
- Video RCA to RCA interface cable, 2 m
- USB standard-A to mini type-B interface cable, 1 m
- Hand strap
- Rugged, hard carrying case
- Quick start guide
- Certificate of calibration

Optional accessories

U5751A	Power adapter (with power cord)	
U5752A	Rechargeable Li-Ion battery	
U5753A	External battery charger (2-bay)	
U5761A	Video RCA to RCA interface cable, 2 m	
U5762A	USB standard-A to mini type-B interface cable, 1 m	
U5771A	Rugged carrying case, hard	
U5772A	Hand strap, adjustable for right-handed and left-handed use	

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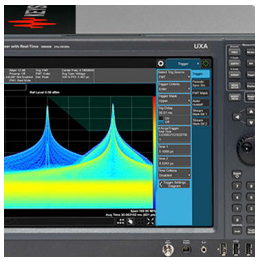

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