SpectorBOX

Mek SpectorBOX Bottom Up and Top Down Modular AOI System

√	Optimized for THT Components- and Post Wave and Selective Soldering Inspections	*AOI Solution For Wave & Selective Soldering Of THT & SMT Components*
√	Bottom-up and/or Top-down Inspection	*Inspects PCB's From Below a Conveyer Belt or Chain*
√	Solder Frame Compatible	*Designed to Inspect PCB's Inside Solder Frames Directly From The Conveyer*
√	Ultra Slim Design Inspects Down To 280mm Above Factory Floor	*Save Production Space! Fits Below Existing Return and/or Feed Conveyers*
√	Modular Inspection Possibilities: Bottom, Top or Top + Bottom	*Possibility to Combine Two SpectorBOX Systems For Simultaneous Top+Bottom AOI*
√	Main Frame Compatibility	*Multiple 3rd Party Turn Key Solutions Readily Available. SpectorBOX Systems Fit Conveniently Inside these Main Frames*
√	Up to 18 Cameras	*Choose between 1 or 9 camera's per inspection side (up to 18 cameras in Top+Bottom configuration)*
√	In Z-Axis Moving Optical Head(s)	*Focus and Position Optimally For Varying PCB Distances Or Warpage (Applicable To Certain Models With Z-Axis)*
√	General Purpose I/O	*Configurable I/O to Be Controlled By Existing PCB Handling Systems*
√	Post Defect Classification and Reporting Scenarios	*Inspect your PCB's Automatically Now, Classify/Report Defects Later Whenever Convenient*

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1. Bottom Up Features:

The Mek SpectorBOX bottom up modular AOI is optimized for the inspection of THT solder joints and detection of solder bridges and solder balls. It is designed to inspect PCB's inside solder frames directly from the conveyor system. With it's totally newly developed mechanical platform, it is the only modular AOI in the market that can be equipped with 9 cameras: 1 top and 8 side cameras. The bottom up SpectorBOX is configurable with one of two different optical units: FDLz and FDAz.

	Angular Camera's	Z-Axis
FDLz	NO	YES
FDAz	YES	YES

Telecentric Lens   Conventiional Lens
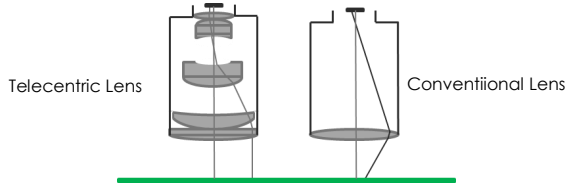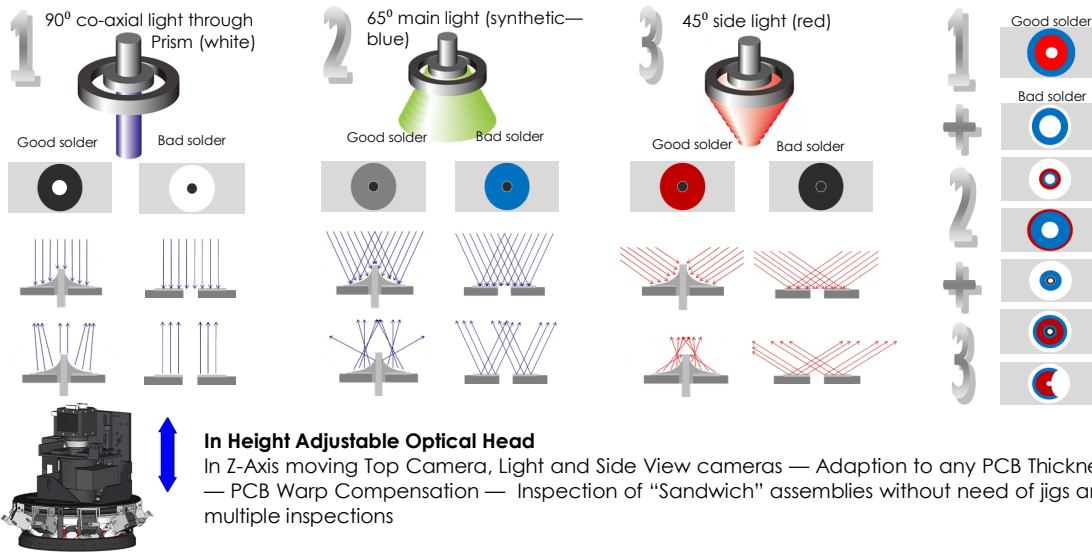
High grade Telecentric Lens
Parallel image over the whole sensor/lens Field of View — No parallax effect

Large pixel image capturing sensor
18,8µ² pixel size — smooth and detailed image with great dynamic range — Japanese built

Omnidirectional multi angle, multi color LED lighting
3D color profile of solder meniscus — accurate defect decision by the software algorithms — Detect all visual defects of THT solder joints and easily detect bridges and solder balls

1 90⁰ co-axial light through Prism (white)
Good solder   Bad solder

2 65⁰ main light (synthetic— blue)
Good solder   Bad solder

3 45⁰ side light (red)
Good solder   Bad solder

Good solder
Bad solder

1 + 2 + 3

In Height Adjustable Optical Head
In Z-Axis moving Top Camera, Light and Side View cameras — Adaption to any PCB Thickness — PCB Warp Compensation — Inspection of "Sandwich" assemblies without need of jigs and multiple inspections

**8x Angular Side Sensors (Only available for FDA and FDAz models)**
Simultaneously operating, multiplexed side view sensors with CameraLink interface — 45/45 arrangement — Triple use: Active automatic inspection, classification and repair — clear 9 angles defect review — high magnification 50x (10µm/pixel) — Full Color — Auto highlight — Large sensor pixels — 9 view images also in backup database
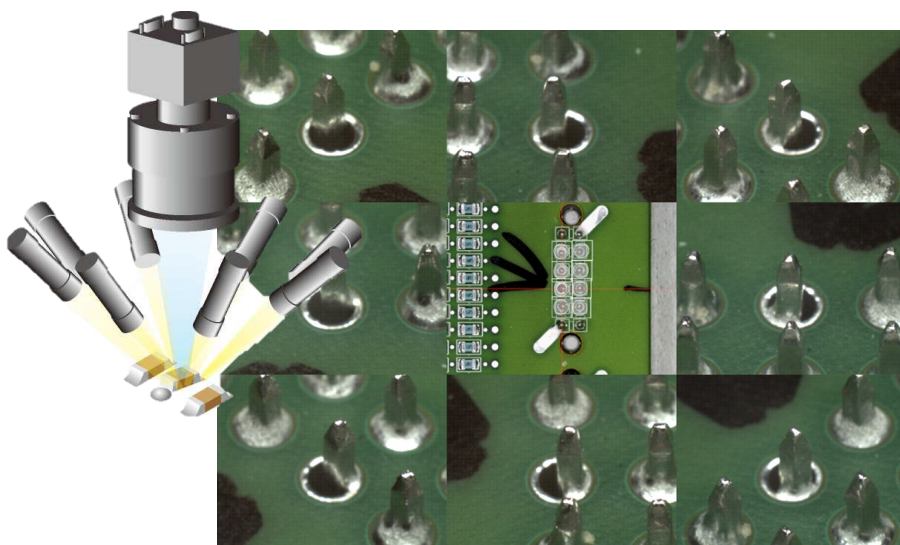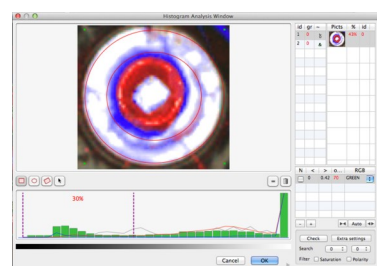
Powerful algorithms for solder bridge detection
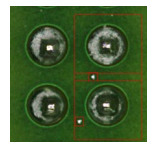
Dedicated algorithms for solder balls detection
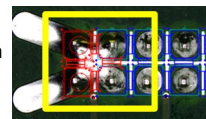
Histogram Analysis algorithms
Condition based decision — Tolerances can be set tightly — Close to zero false alarms

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2. Top Down Features:

The Mek SpectorBOX Top Down modular AOI is optimized for the inspection of THT components to find any visual defect like prsence/absence, wrong polarity, colour, type, bent pins etc. It has a top clearance of 130mm (5.12") so inspection can be done even when the tallest components are placed. It is designed to inspect PCB's inside solder frames directly from the conveyor system. The SpectorBOX Top Down module can be equipped with one top camera and 8 wide field of view side camera's. Available optical units are FWz and FWAz.

	Angular Camera's	Z-Axis
FWz	NO	YES
FWAz	YES	YES
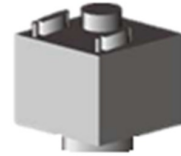
Large pixel image capturing sensor
18,8µ^2 pixel size — smooth and detailed image with great dynamic range — Japanese built
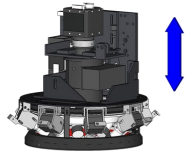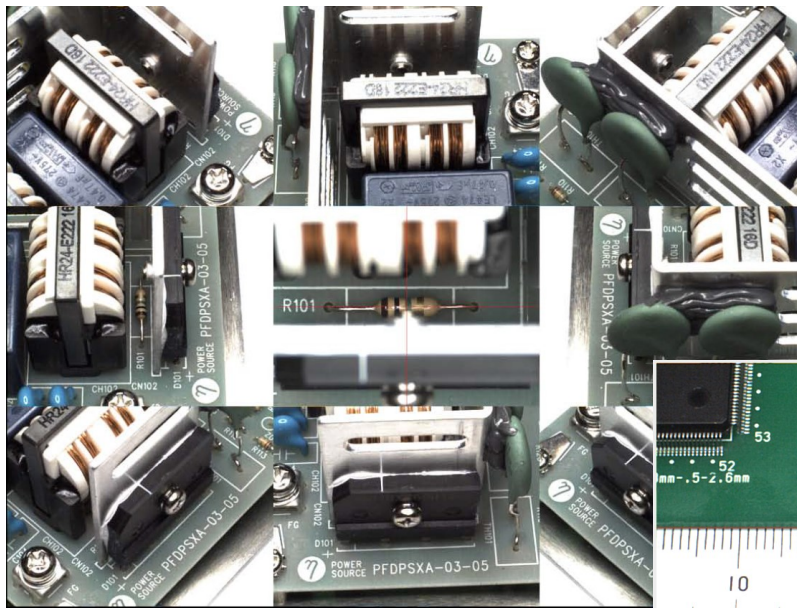
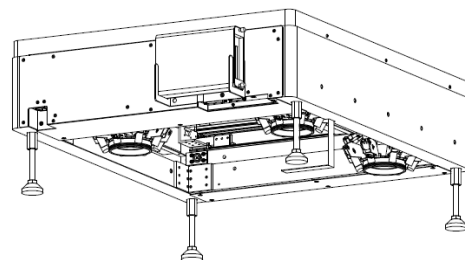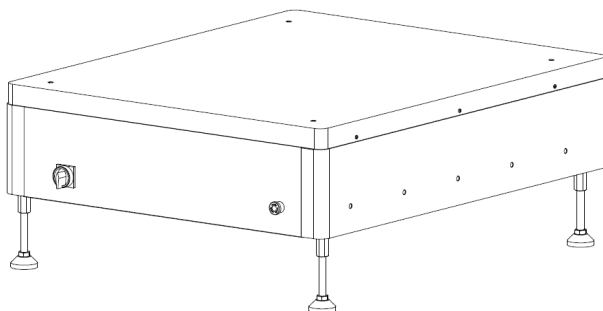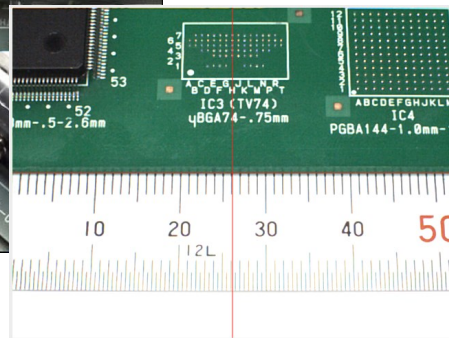**In Height Adjustable Optical Head**
In Z-Axis moving Top Camera, Light and Side View cameras — Adaption to any PCB Thickness — PCB Warp Compensation — Reliable text and/or polarity inspection on tall components — Inspection of "Sandwich" assemblies without need of jigs and multiple inspections

8x Angular Side Sensors (Only available for the FWAz model)
Simultaneously operating, multiplexed side view sensors with CameraLink interface — 45/45 arrangement — Triple use: Active automatic inspection, classification and repair — clear 9 angles defect review — Full Color — Auto high-light — Large sensor pixels — 9 view images also in backup database

Large Side Camera Field of View

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Bottom Up   FDL

	SpectorBOX FDLz 550	
Maximum PCB Size	550x520mm (21.7" x 20.5")	
Characteristics		
Product type	Automatic Optical Inspector	
Camera movement	X+Y Direction	
PCB movement	Stationary	
Parts inspection	Soldering, Bridges, Solder Balls	
Imaging principle	Synthetic Imaging, Spectral Analysis, Greyscale limits	
Imaging parameters	Brightness, Hue, Saturation via Filters	
Specifications		
Main Camera type	Digital with CameraLink	
Main Camera Field Of View/ Resolution	36x20mm/18.75μm or 19.2x10.8mm/10μ	
Lens	Telecentric lens with built in prism for DOAL Lighting	
Lighting system	Omnidirectional Triple LED rings: Side, Main, Line Sourced DOAL Diffused On Axis Lighting (Coaxial))	
Minimum inspection object size	80μ (3.15 mils)	
Positioning accuracy	Pixel related Feedback Loop	
Component clearance	+40mm (1.57")	
Side Cameras	No side cameras	
Z-Axis movement range	60mm (2.4")	
Movement speed	720mm/s	
Inspection capacity typical	1500cps/min	
Mains	100-240 Vac / 150W	
Interfacing		
Control PC type	Apple MacMini (or higher) with Mac OSX and Thunderbolt interface	
Control interface	USB	
Data interface	CameraLink	
Communication	General Purpose I/O, RS232	
General		
Operating temperature	15-30 degr C (59-86 degr F)	
Operating humidity	15-80 % RH	
External size	W750 x D842 x H256 (29.5" x 33.2" x 10.1")	W900 x D1056 x H251 (35.5" x 41.6" x 9.9")
Weight	50kg (110lbs)	100kg (220lbs)

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Bottom Up   FDAz

	SpectorBOX FDAz 550	
Maximum PCB Size	550x520mm (21.7" x 20.5")	
Characteristics		
Product type	Automatic Optical Inspector	
Camera movement	X+Y Direction	
PCB movement	Stationary	
Parts inspection	Soldering, Bridges, Solder Balls	
Imaging principle	Synthetic Imaging, Spectral Analysis, Greyscale limits	
Imaging parameters	Brightness, Hue, Saturation via Filters	
Specifications		
Main Camera type	Digital with CameraLink	
Main Camera Field Of View/ Resolution	36x20mm/18.75µm or 19.2x10.8mm/10µ	
Lens	Telecentric lens with built in prism for DOAL Lighting	
Lighting system	Omnidirectional Triple LED rings: Side, Main, Line Sourced DOAL Diffused On Axis Light (Coaxial))	
Minimum inspection object size	80µ (3.15 mils)	
Positioning accuracy	Pixel related Feedback Loop	
Component clearance	+30mm (1.2")	
Side Cameras	8x Digital with CameraLink in 45/45 orientation	
Z-Axis movement range	60mm (2.4")	
Movement speed	720mm/s	
Inspection capacity typical	1500cps/min	
Mains	100-240 Vac / 150W	
Interfacing		
Control PC type	Apple MacMini (or higher) with Mac OSX and Thunderbolt interface	
Control interface	USB	
Data interface	CameraLink	
Communication	General Purpose I/O, RS232	
General		
Operating temperature	15-30 degr C (59-86 degr F)	
Operating humidity	15-80 % RH	
External size	W750 x D842 x H256 (29.5" x 33.2" x 10.1")	W900 x D1056 x H251 (35.5" x 41.6" x 9.9")
Weight	50kg (110lbs)	100kg (220lbs)

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Top Down   FWz

	SpectorBOX FDLz 550	
Maximum PCB Size	550x520mm (21.7" x 20.5")	
Characteristics		
Product type	Automatic Optical Inspector	
Camera movement	X+Y Direction	
PCB movement	Stationary	
Parts inspection	Presence/Absence, Type, Polarity, Colour, Text, Offset	
Imaging principle	Synthetic Imaging, Spectral Analysis, Greyscale limits	
Imaging parameters	Brightness, Hue, Saturation via Filters	
Specifications		
Main Camera type	Digital with CameraLink	
Main Camera Field Of View/	36x20mm/18.75µm or 19.2x10.8mm/10µ	
Lighting system	Omnidirectional Single Source White Light	
Minimum inspection object size	80µ (3.15 mils)	
Positioning accuracy	Pixel related Feedback Loop	
Component clearance	+130mm (5.12")	
Side Cameras	No side cameras	
Side Cameras Field of View	N/A	
Z-Axis movement range	60mm (2.4")	
Movement speed	720mm/s	
Inspection capacity typical	1500cps/min	
Mains	100-240 Vac / 150W	
Interfacing		
Control PC type	Apple MacMini (or higher) with Mac OSX and Thunderbolt interface	
Control interface	USB	
Data interface	CameraLink	
Communication	General Purpose I/O, RS232	
General		
Operating temperature	15-30 degr C (59-86 degr F)	
Operating humidity	15-80 % RH	
External size	W750 x D842 x H256 (29.5" x 33.2" x 10.1")	W900 x D1056 x H251 (35.5" x 41.6" x 9.9")
Weight	50kg (110lbs)	100kg (220lbs)

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Top Down   FWAz

	SpectorBOX FDAz 550	
Maximum PCB Size	550x520mm (21.7" x 20.5")	
Characteristics		
Product type	Automatic Optical Inspector	
Camera movement	X+Y Direction	
PCB movement	Stationary	
Parts inspection	Presence/Absence, Type, Polarity, Colour, Text, Offset	
Imaging principle	Synthetic Imaging, Spectral Analysis, Greyscale limits	
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Lighting system	Omnidirectional Single Source White Light	
Minimum inspection object size	80µ (3.15 mils)	
Positioning accuracy	Pixel related Feedback Loop	
Component clearance	+130mm (5.12")	
Side Cameras	8x Digital with CameraLink in 45/45 orientation	
Side Cameras Field of View	50x39mm (1.96x1.54")	
Z-Axis movement range	60mm (2.4")	
Movement speed	720mm/s	
Inspection capacity typical	1500cps/min	
Mains	100-240 Vac / 150W	
Interfacing		
Control PC type	Apple MacMini (or higher) with Mac OSX and Thunderbolt interface	
Control interface	USB	
Data interface	CameraLink	
Communication	General Purpose I/O, RS232	
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Top Down FWz/FWAz

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