3D AOI

Equipment Advantage & Function Introduce

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- Part 2: Product Test
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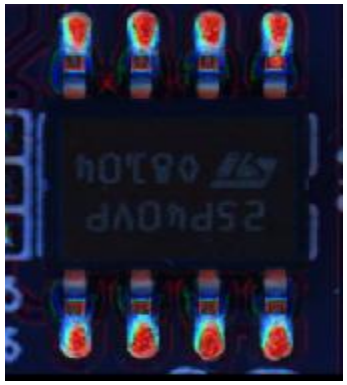
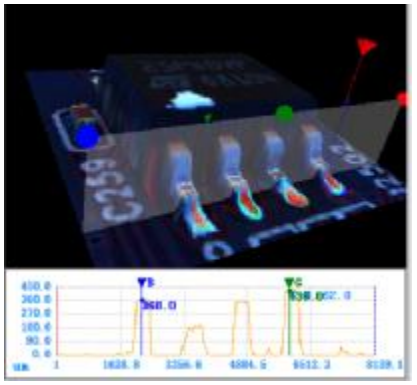
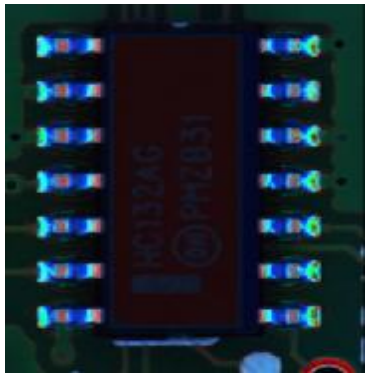
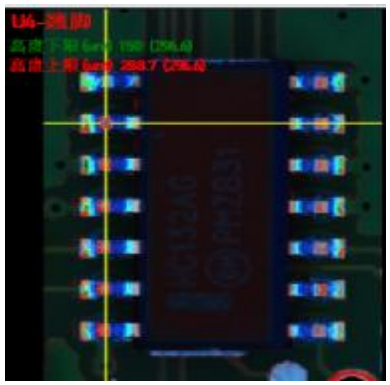
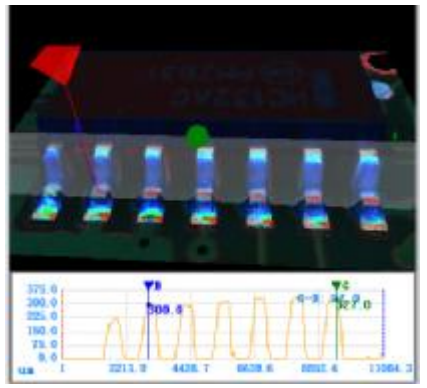
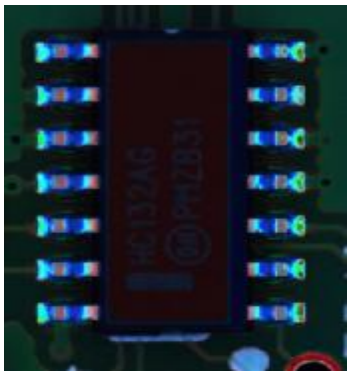
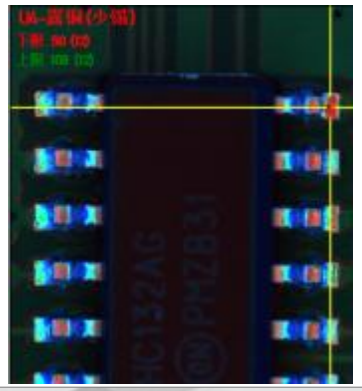
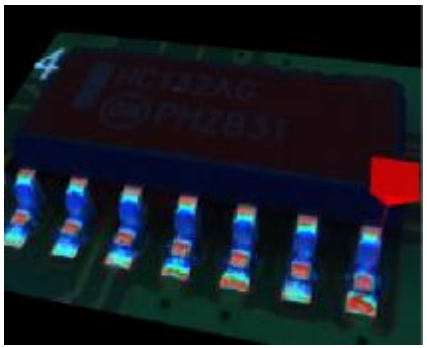
Specification & Principle Introduce

3D AOI Demonstration

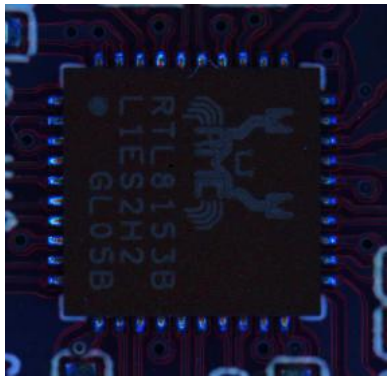
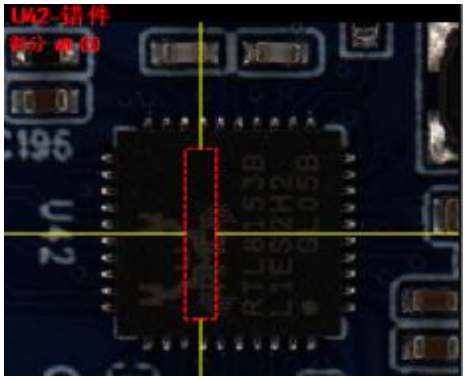
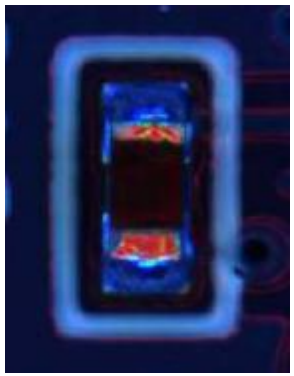
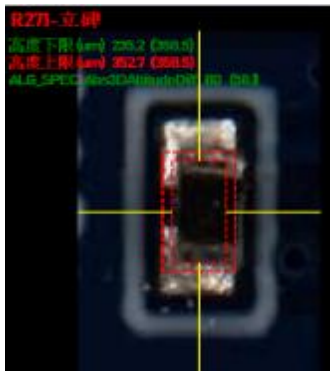
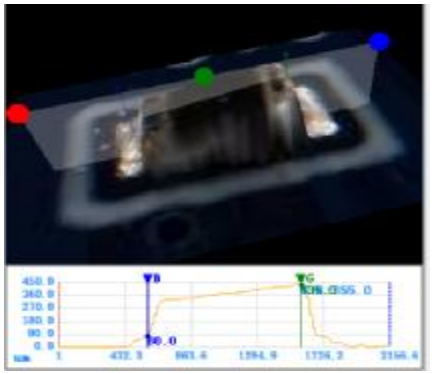
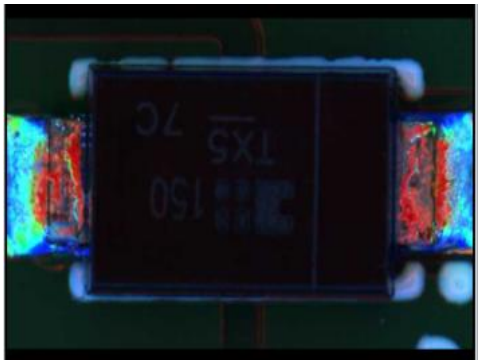
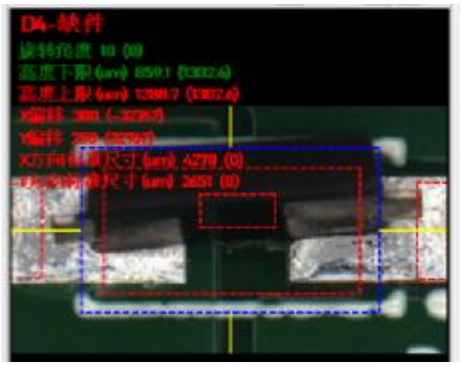
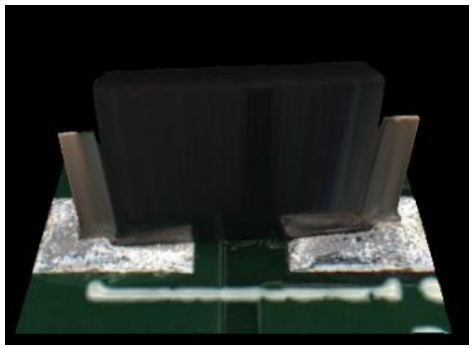
Specification & Principle Introduce

Equipment P/N	A510D		
Inspection Principle	Sine white projection PMP inspection		
Defect Inspections	Missing parts, offset, rotation, three-dimensional polarity, upside down, OCV , side standing, tombstone, poor soldering, etc.		
Industrial Camera	12M pixel	LED	Enhanced multi-angle, multi-zone, modulated RGB+W
X/Y Resolution	10um	Inspection Speed	FOV/0.55s（40*30mm）
Maximum inspection Hight	20mm	Z-axis Resolution	0.37μm
Gage R&R	<10%		
PCB Size	Monorail mode:50*50-460*460mm		
PCB Flow Direction	Left - Right OR Right - Left		
PCB Warpage	±5mm		
PCB Loading Height	900±40mm		
Splint edge margin	3mm		
Operating System Support	WINDOWS 10 (64 bit)		
CAD Import	CADX,Y, Part No., Package Type Import		
Operating Mode	Mouse + Keyboard		
Equipment Dimension	W1000*D1150*H1580mm		
Equipment Weight	1250KG		
Voltage	200-240V AC,50/60HZ		
Air Pressure	/		
Environment Temperature	5-40℃		
Environment Humidity	25%-80%		
Power-off Protection	Own UPS (power off protection)		

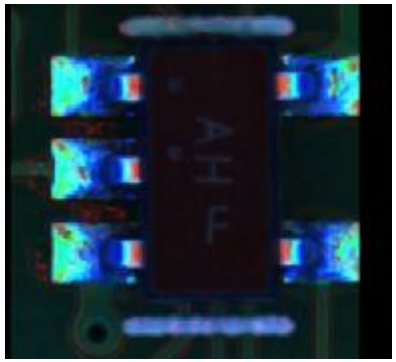
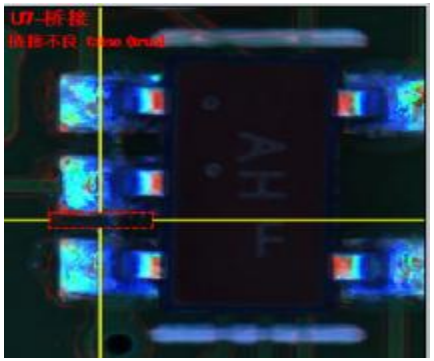
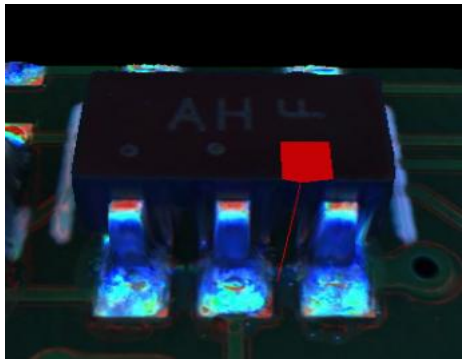
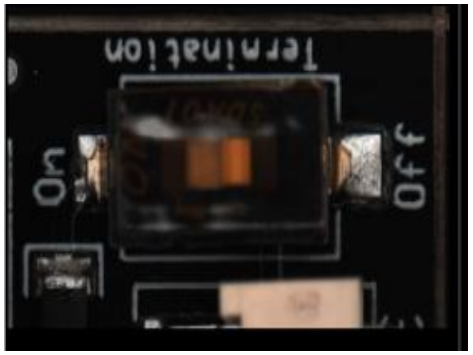
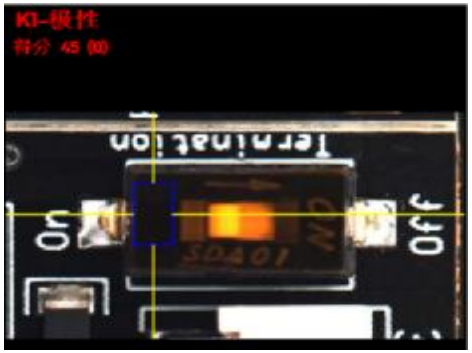
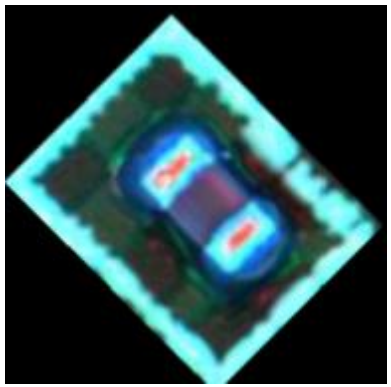
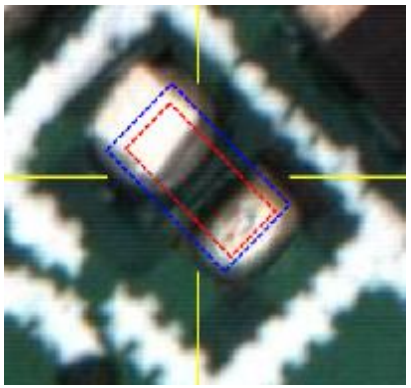
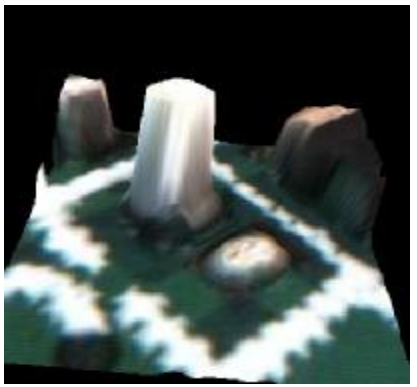
Product Test

Defect	Standard	Defective 2D image	Defective 3D image
IC Lead Lift			
IC Lead Lift			
IC Insufficient solder			

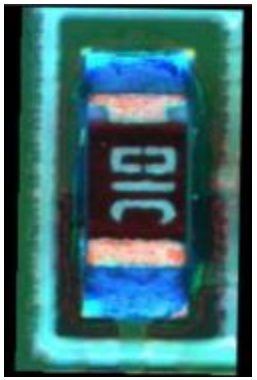
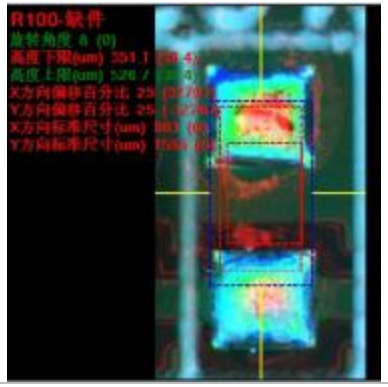
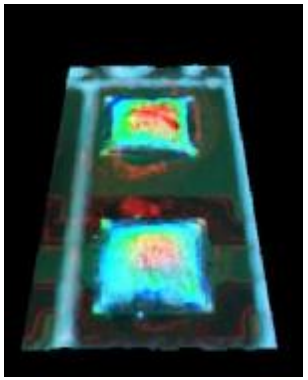
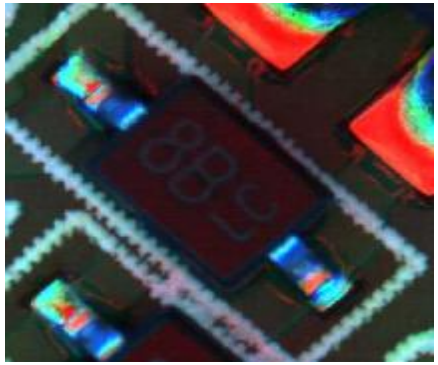
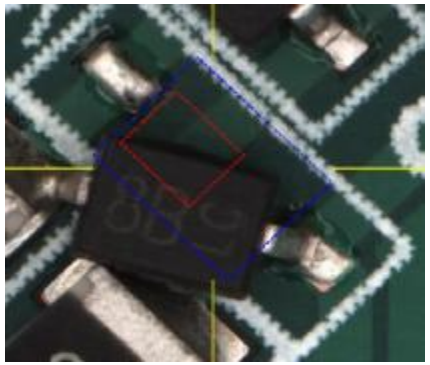
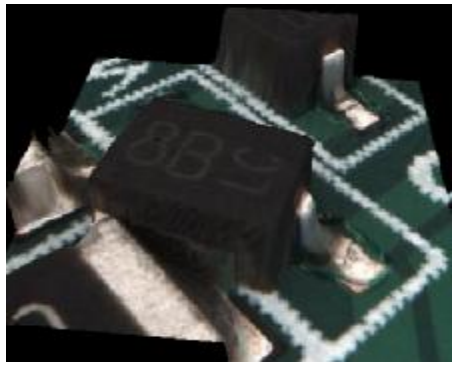
Product Test

Defect	Standard	Defective 2D image	Defective 3D image
Inverse QFN			
Side Mount			
Reverse Mount			

Product Test

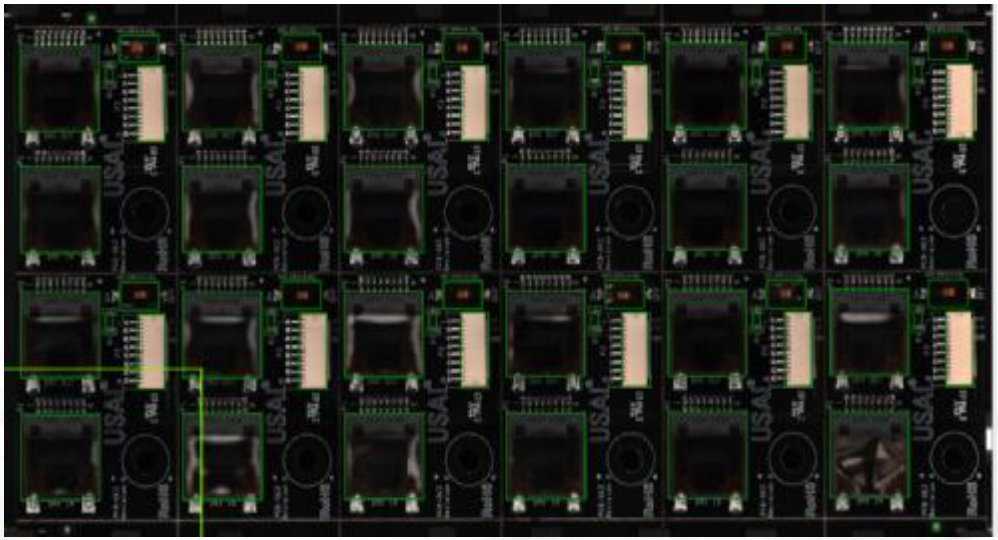
Defect	Standard	Defective 2D image	Defective 3D image
Bridging			
Reverse			
Vertical Mount			

Product Test

Defect	Standard	Defective 2D image	Defective 3D image
Missing			
Offset			

Product Test

PCB-263 Product Information



Item	PCB-263
PCB Size	195mm X102mm
Min. Size	1206
Max. Height	13mm
Module	12
FOV	24
Component Quantity	60
Testing Time	15.67s

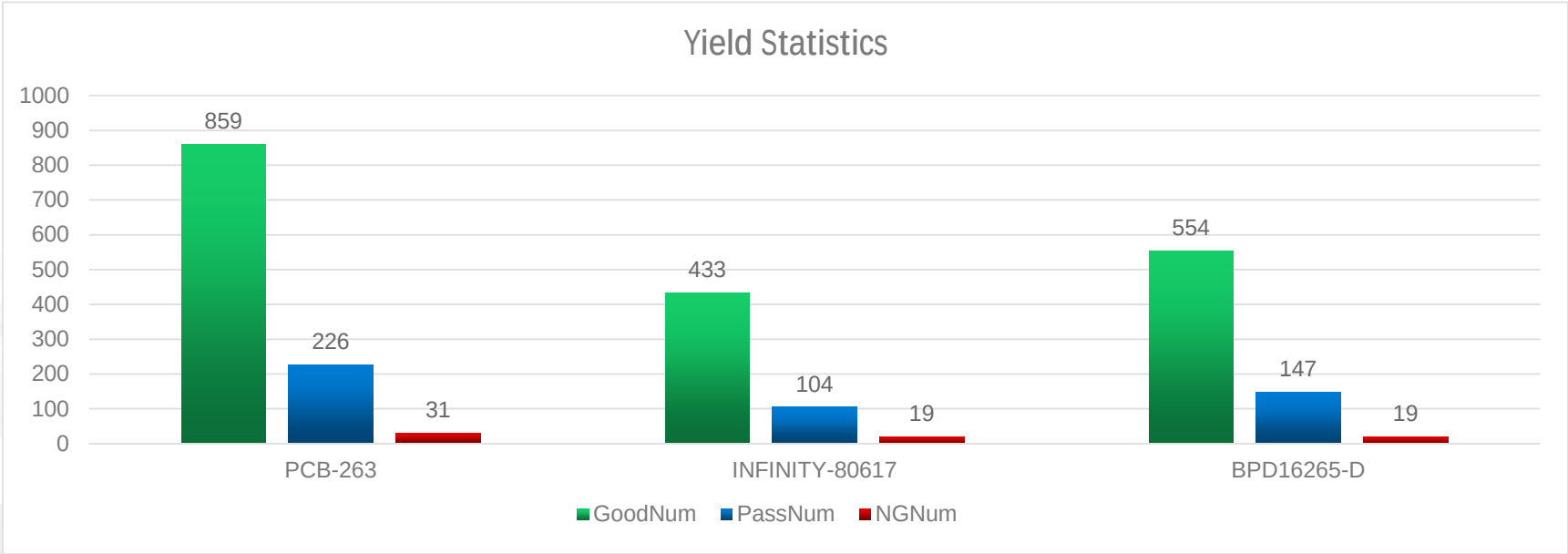
Product Test

Data Statistics

Job Inspection Report

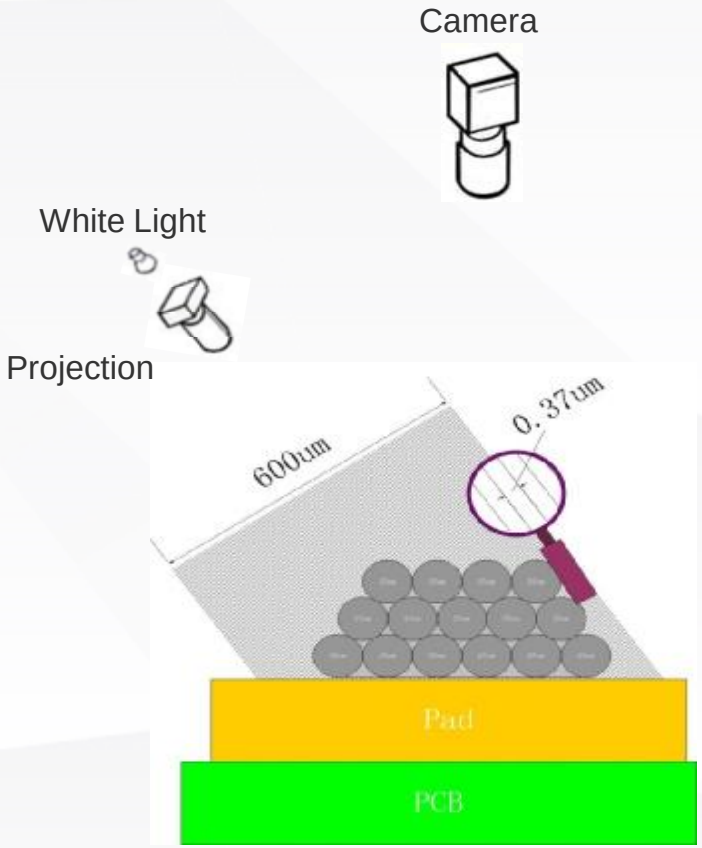
Reporting Period: 2022/7/4 8:12:00--2022/7/8 8:12:00 **Reporting Type: Panel**

JobName	Lineno	TotalNum	GoodNum	GoodRate	NGNum	NGRate	PassNum	PassRate	YieldRate
PCB-263	Lineno	1116	859	76.97%	31	2.78%	226	20.25%	97.22%
INFINITY-80617	Lineno	556	433	77.88%	19	3.42%	104	18.71%	96.58%
BPD16265-D	Lineno	720	554	76.94%	19	2.64%	147	20.41%	97.36%



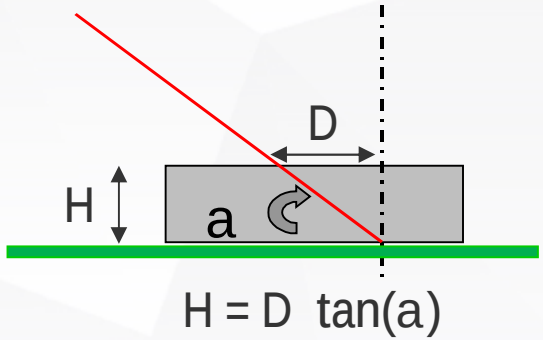
Specification & Principle Introduce

Sine White Projection PMP Inspection Technology Principle

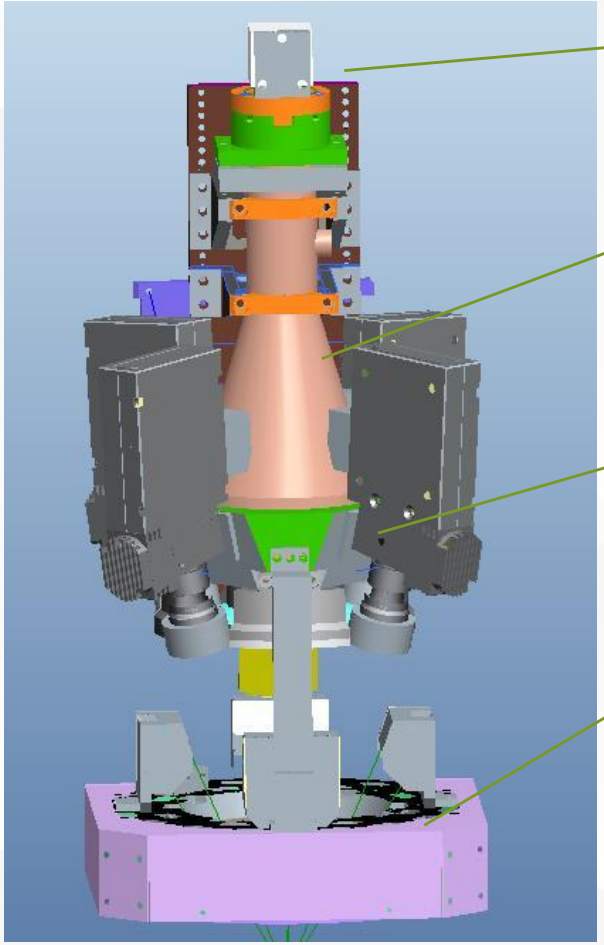


Using Phase Measurement Profilometry (PMP) technology to achieve three-dimensional measurement of precision printed solder paste, while ensuring high-speed measurement and significantly improving measurement accuracy.

Phase Measurement Profilometry (PMP), also known as Phase Shift Profilometry (PSP), is a method based on sinusoidal structured light grating projection. It involves capturing multiple deformed light field images through discrete phase shifts, then calculating the phase distribution using the multi-step phase shifting technique. Finally, high-precision height, area, and volume measurement results are obtained using geometric methods such as triangulation.



Specification & Principle Introduce



High-speed CoaXPress camera

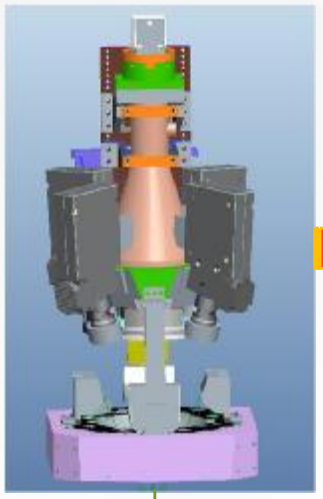
High Depth of Field Telecentric Lens

Self-developed Multi-frequency Proje ction Head (4 or 8 channels)

Self-developed Multi-angle Multi-zone RGB+W Light Source

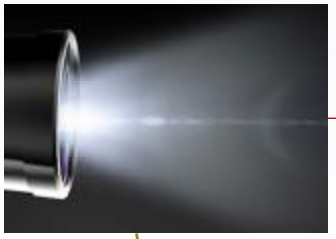
Specification & Principle Introduce

PSLM Technology

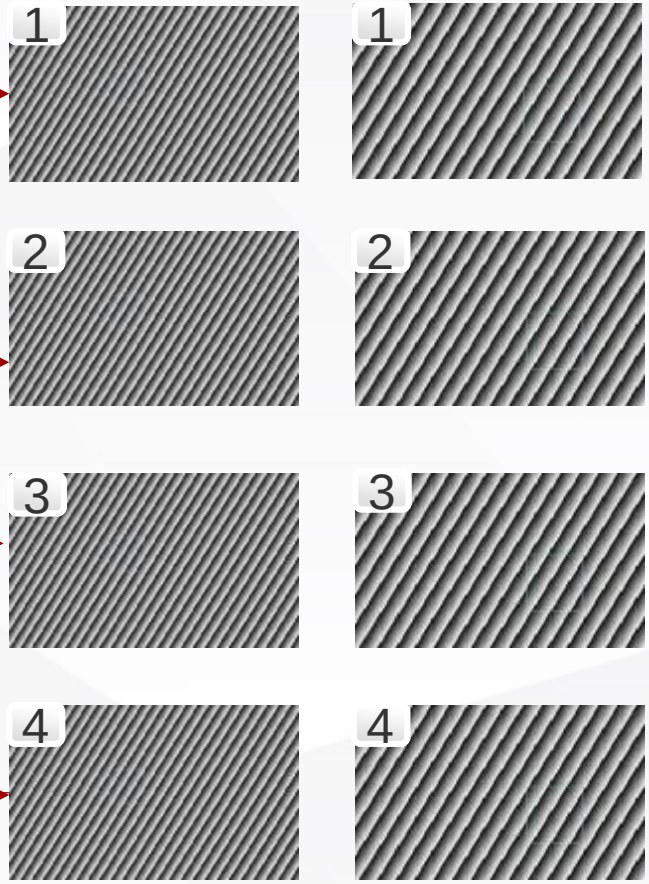


Main Inspector Structure

Projector Head

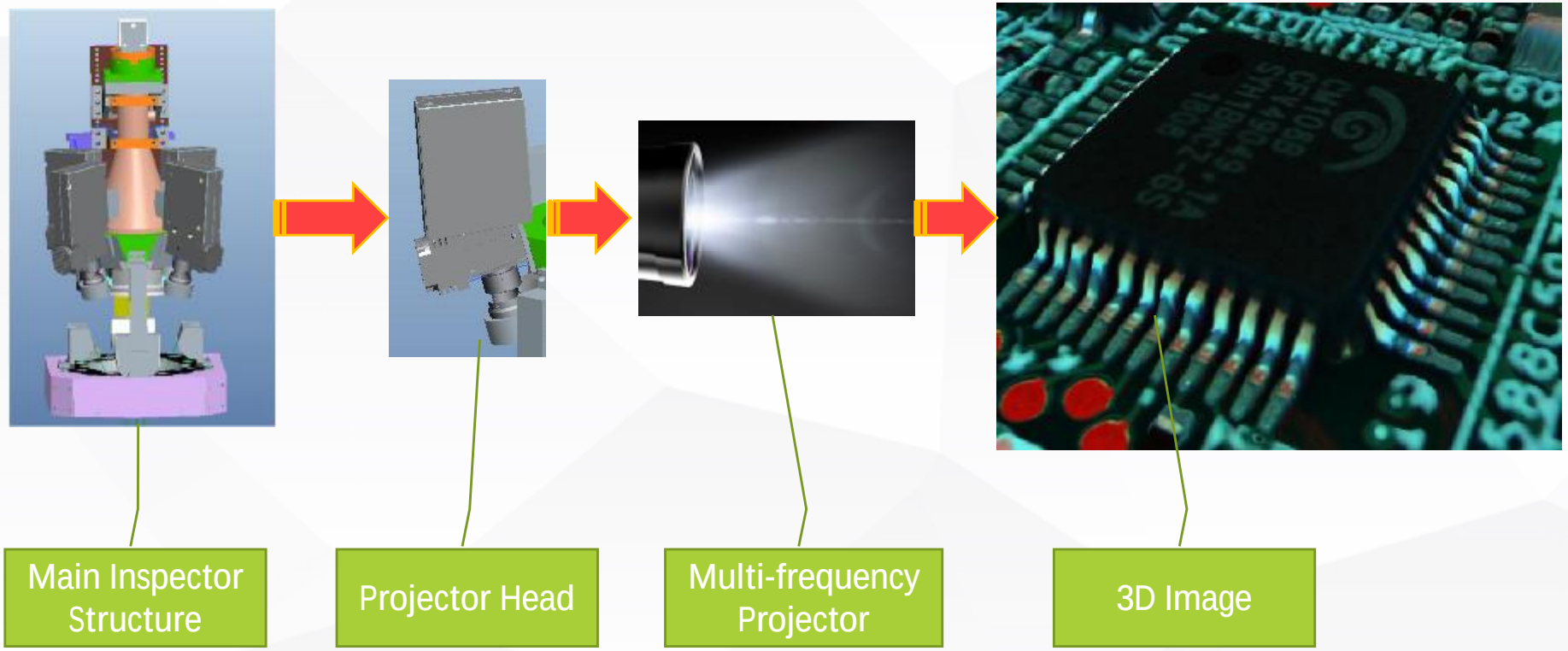


Multi-frequency Projector



Specification & Principle Introduce

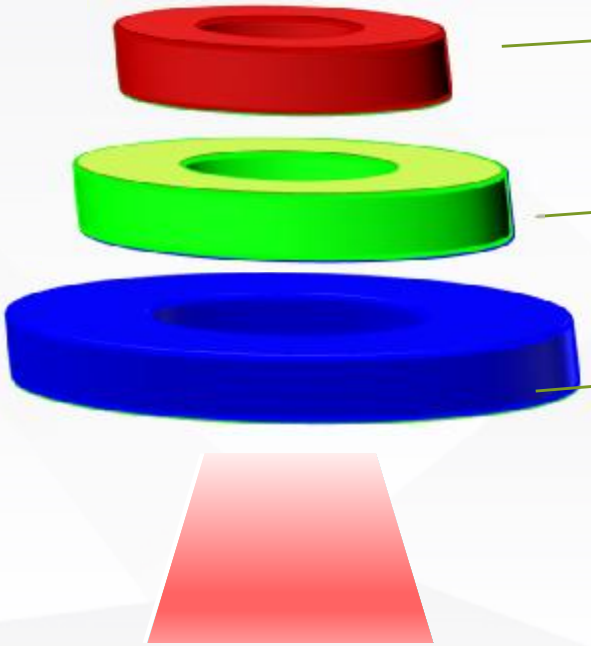
PSLM Technology



Specification & Principle Introduce

Enhanced RGB+W 2D LED

- Sinic-Tek 3DAOI utilizes a self-developed enhanced multi-angle, multi-zone, and modulatable RGB+W 2D light source design. It is suitable for inspecting components, solder joints, and text in various scenarios.



RGB light available in each layer

Each layer of the light source can be independently modulated.

Each Field of View (FOV) has multiple combinations of light sources.

Specification & Principle Introduce

Enhanced RGB+W 2D LED

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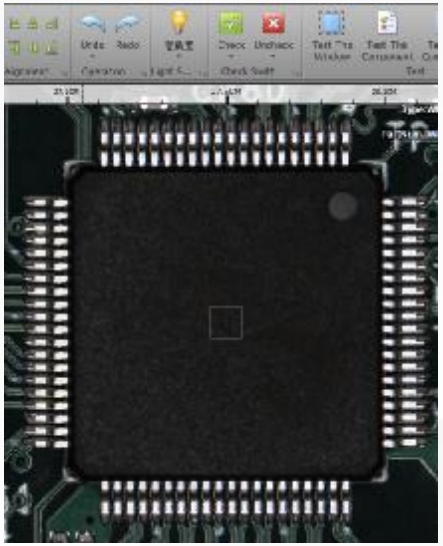
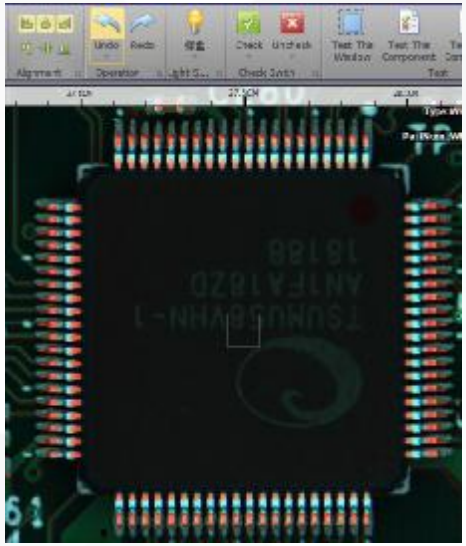
Low angle light

Text



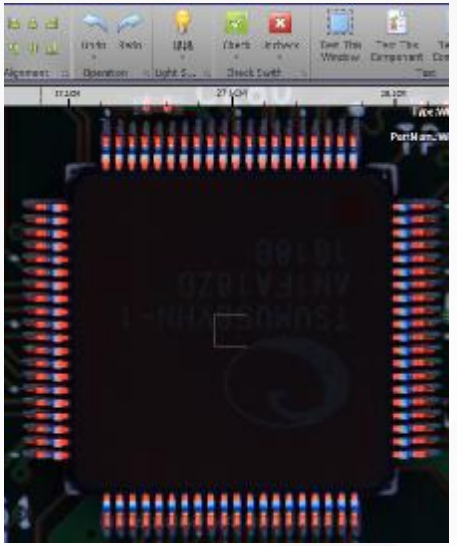
High angle light

PIN



Pad light

Gold-finger



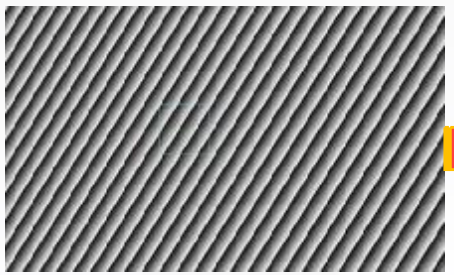
Solder joint light

Solder joint

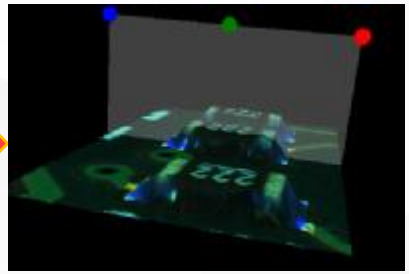
Specification & Principle Introduce

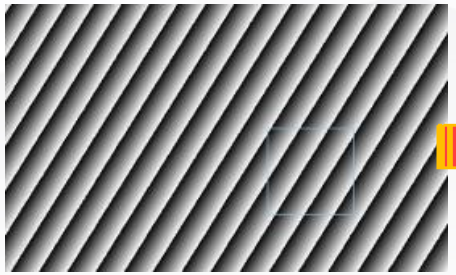
PSLM PMP

1. Utilizes cutting-edge PSLM technology from Germany.
2. Software modulation of grating width and period meets high precision and wide range requi rements.
3. Software-controlled structured light grating with no mechanical parts and no wear.
4. Multi-frequency gratings avoid limitations of traditional moiré techniques.
5. Programmable structured light grating achieves high measurement accuracy with minimal p hase shifting error.

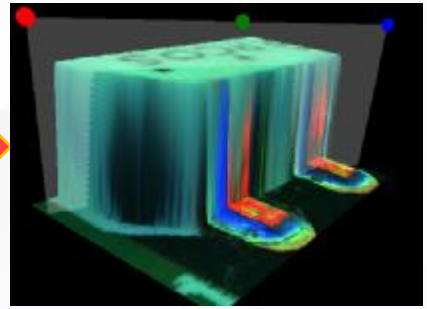


High-precision fine stripes





High dynamic range wide stripes



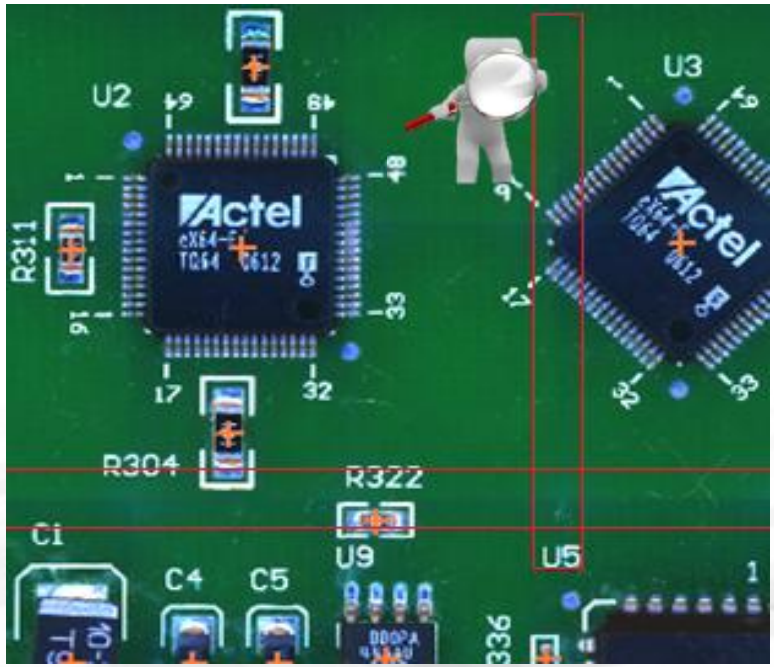
Higher-precision

Higher range

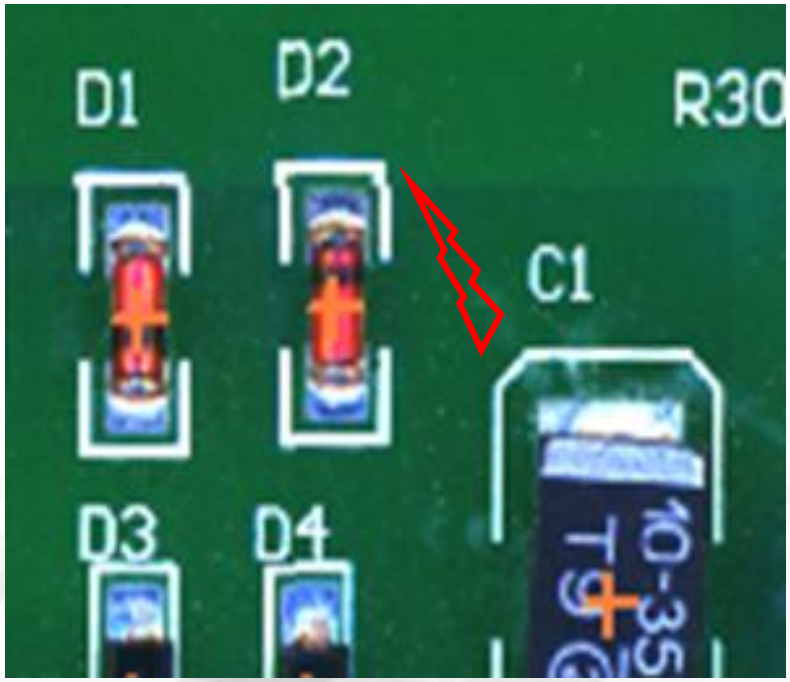
Special Function Introduce

AI-powered Seamless Image Stitching Technology

Sinic-Tek 3DAOI adopts innovative AI-powered seamless image stitching technology, achieving a level of seamlessness that is imperceptible to the human eye. This technology perfectly addresses issues encountered at the field-of-view (FOV) and FOV junctions in traditional AOI, such as image misalignment, color inconsistency, and image distortion. It enhances the positioning accuracy of the detection frame and reduces program debugging time.



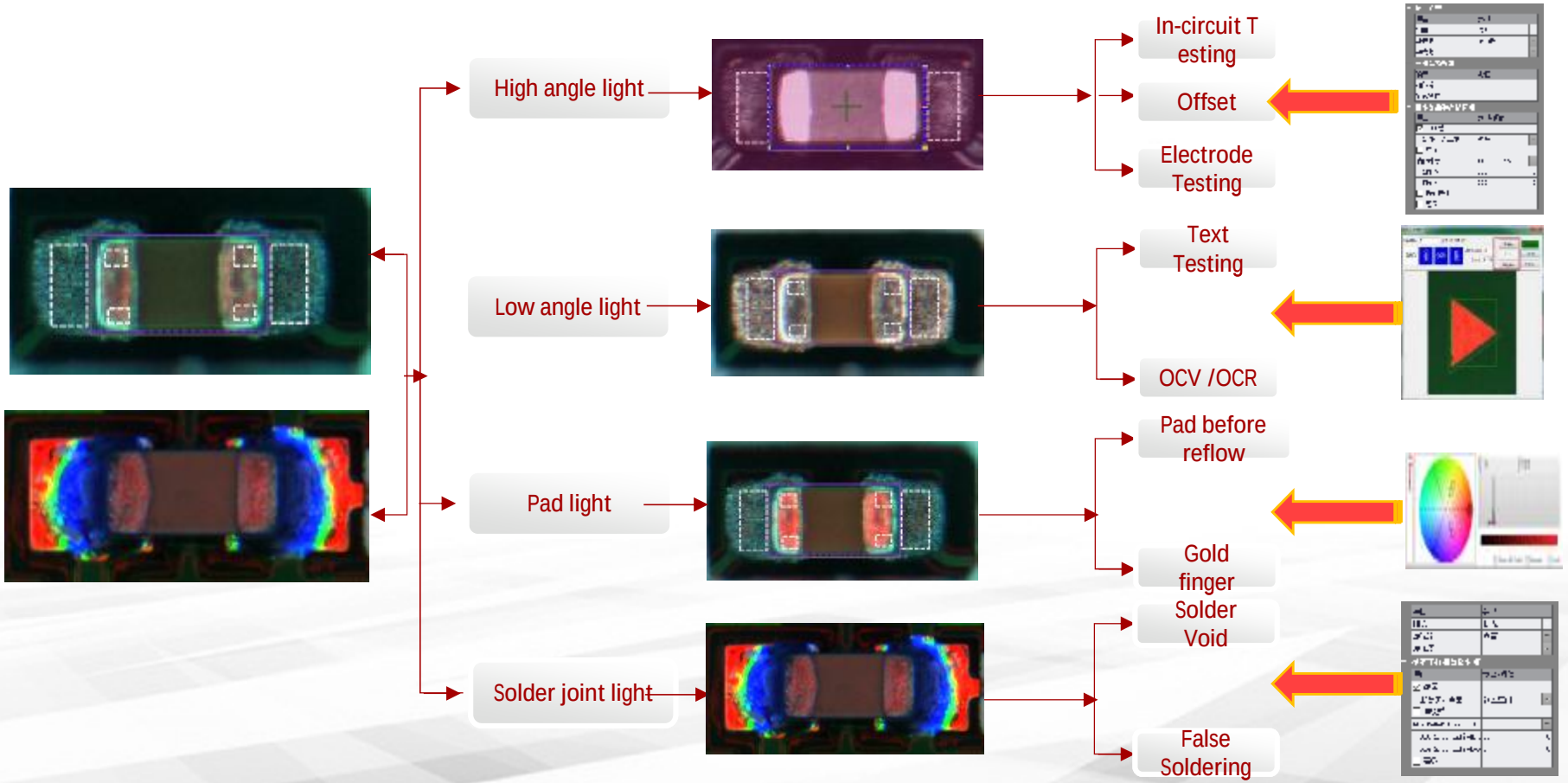
Traditional AOI



Distortion and color inconsistency

Special Function Introduce

Intelligent Program Editing



Special Function Introduce

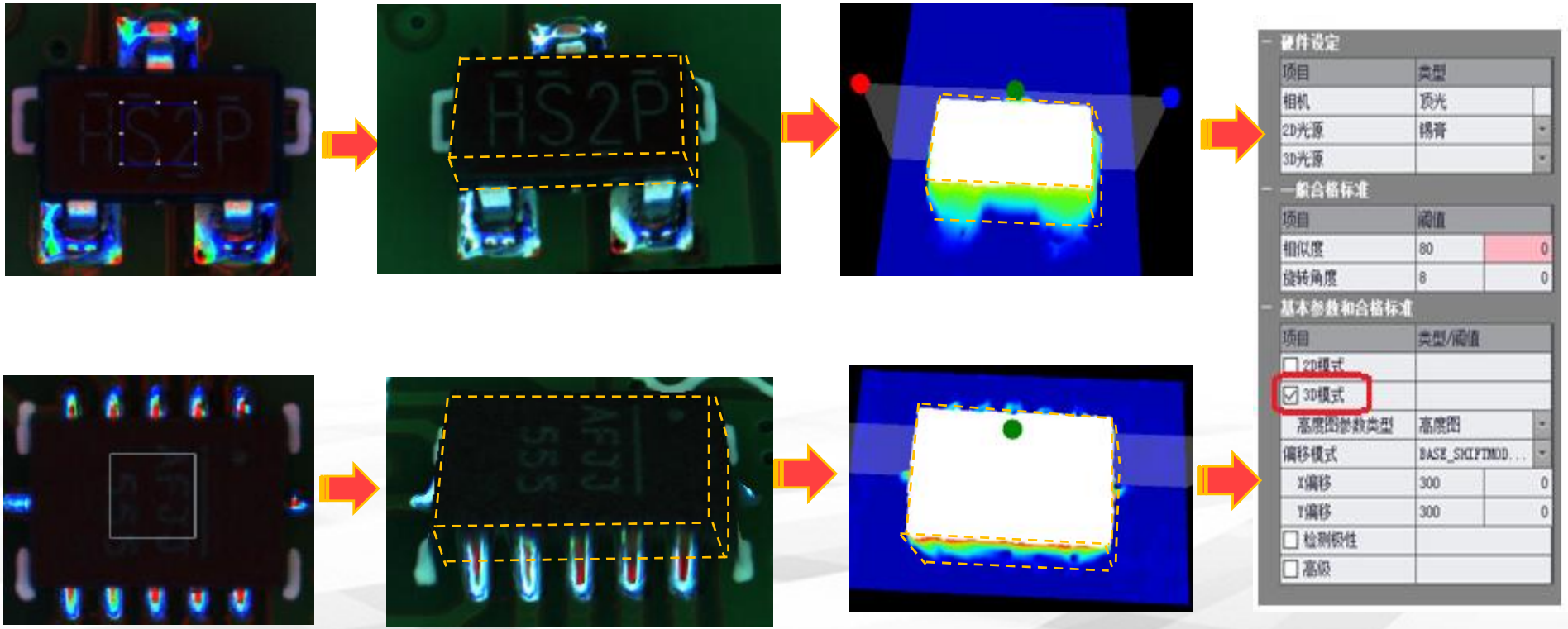
2D+3D Body Alignment Technology

FOV

3D Localization

3D Binarization

Algorithm Parameters

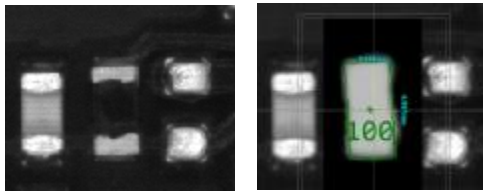
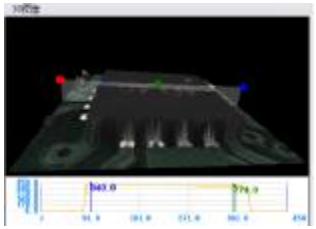
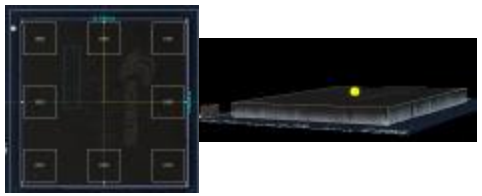
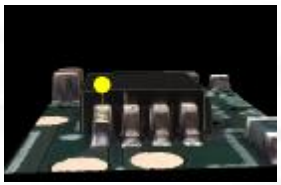
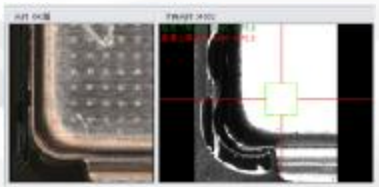


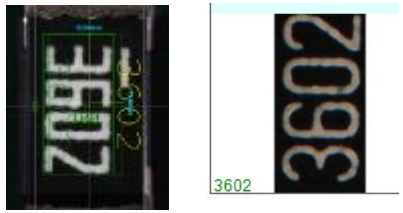
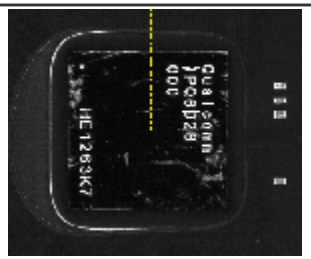
2D VS 3D: Function Comparison

No.	Item	Defect	2D AOI	3D AOI
1	Component	Missing	√	√
2		Offset	√	√
3		Side mount	○	√
4		Vertical mount	○	√
5		Reverse	√	√
6		Polar reverse	√	√
7		Wrong part	○	√
8		Floating height	×	√
9		Pad copper exposure	○	○
10		Error marking	√	√
11		Glass substrate OCV text recognition	○	√
12		Other part OCV text recognition	√	√
13		OCR text recognize to number, letter etc.	×	√
14		Part under BGA	×	√
15		Part under shielding frame	△	○

No.	Item	Defect	2D AOI	3D AOI
16	Solder paste	Solder ball	√	√
17		Solder bridging	√	√
18		No solder	√	√
19		Insufficient solder	√	√
20		Excessive solder	○	√
21		Cold solder	○	√
22		Open solder joint/solder void	△	√
23		False solder	△	√
24	Pin	Component lift-off	×	√
25		IC pin lift-off	×	√
26		IC pin bent	×	√
		√: Fully inspectable	10	24
		○: Detectable majority	7	2
		△: Detectable fraction	3	1
		×: Unable to check	6	/

3D Advantage

Accurately locates the positions of components of different colors.	3D	
Effectively detect QFN component float height and false soldering issue.	3D	
Effectively detect of BGA warpage by comparing the component's surface height.	3D	
Addresses the limitations of 2D inspections for IC pin lifting and similar issues.	3D	
Shielding cover floating height and false soldering.	3D	

OCR enable to recognize the text accurately, don't affected by printed thickness, text content, and don't need to adjust color	3D Unique Advantages	
Accurately locate glass substrate and the text can be clearly checked and visible.	3D Unique Advantages	
Be able to inspect white substrates, white components (unmarked resistors), and missing components.	3D	
Be able to inspect black substrates, black components (unmarked resistors), and missing components.	3D