



Saki Corporation Technical Information

Company Information

History

- 1994 Established in Kanagawa, Japan.
- 1995 Started the development of automated optical inspection machine.
- 1996 Released the first automated optical inspection machine, "BF-1".
- 1997 Started overseas sales.
- 2001 Saki America Inc. was established in U.S.A.
- 2002 Saki Shanghai Co., Ltd. was established in China.
- 2003 Opened West Japan Sales Office in Kobe, Hyogo, Japan.
- 2004 Relocated Headquarters to Minato-ku, Tokyo, Japan. Saki Shanghai Co., Ltd. Shenzhen branch office opened.
- 2005 Saki Corporation Taiwan representative office was established in Taiwan.
- 2006 Saki Corporation Korea representative office was established in Korea. Saki Asia Pacific Pte, Ltd. was established in Singapore. Saki Europe GmbH was established in Germany.
- 2008 MacroScience Technology Ltd., the leading X-Ray inspection manufacturer became Saki's affiliate through share purchase.
- 2009 Relocated Headquarters to Shinagawa-ku, Tokyo, Japan.
- 2010 Released 3D inline X-Ray automated inspection machine, "BF-X1". Saki Asia Pacific (Thailand) Co., Ltd. was established in Thailand.
- 2011 Technology tie-up with Shimadzu Corporaiton to expand X-Ray business. Opened "Katsura Technology Center" in Kyoto, Japan.

Company Profile

- | | |
|--|---|
| Company Name | : Saki Corporation |
| Founded | : April 1994 |
| Capital Stock | : 281 million JPY |
| CEO | : Sakie (Jodie) Akiyama |
| Business Contents | : Development / manufacturing / sales of AOI (Automated Optical Inspection) machines for printed circuit boards and X-Ray automated inspection machines |
| Number of Employees | : 121 as of 30th of June, 2011 (Including all subsidiaries) |
| Headquarters | : Ogawa Building, 4-14-7, Nakanobu Shinagawa-ku, Tokyo, 142-0053, Japan
TEL +81-3-5788-6280
FAX +81-3-5788-6295 |
| Saki Corporation West Japan Office (Kobe) | : Hyogokenchomae Building 4F
5-12-26, Shimoyamatedori Chuo-ku, Kobe-shi, Hyogo 650-0011, Japan
TEL +81-78-367-7880
FAX +81-78-367-7882 |
| Saki Corporation Katsura Technology Center (Kyoto) | : Room 2104, South Tower, Kyodai Katsura Venture Plaza 1-39 Goryo-Ohara Nishi-kyo-ku, Kyoto-shi, Kyoto, 615-8245, Japan |

Office Locations



Benchtop High-Speed Automated Optical Inspection System

BF-Comet 10/18

10μm 18μm M-Size



Photo : BF-Comet10

BF-Comet is a benchtop automated optical inspection system, which has a 40mm clearance from a PCB for the top side and 60mm clearance for the bottom side. BF-Comet has two types: resolution 10μm and 18μm types. The 18μm type can inspect a PCB in approximately 13 seconds, and the 10μm type in approximately 18 seconds.

(PCB size supported: within 250 × 330 mm)

BF-Sirius

18μm L-Size



BF-Sirius is a benchtop automated optical inspection system, which has a 40mm clearance from a PCB for the top side and 60mm clearance for the bottom side. BF-Sirius has resolution 18μm, and can inspect a PCB in approximately 18 seconds.

(PCB size supported: within 460 × 500)

Inline High-Speed Automated Optical Inspection System

BF-Planet-XII

10μm M-Size



BF-Planet-XII is an inline automated optical inspection system, which supports inspection of M-size PCBs. BF-Planet-XII has resolution 10μm, and can inspect a PCB in approximately 18 seconds.

(PCB size supported: within 250 × 330 mm)

BF-Frontier II

18μm L-Size



BF-FrontierII is an inline automated optical inspection system, which supports inspection of L-size PCBs. BF-FrontierII has resolution 18μm, and can inspect a PCB in approximately 21 seconds.

(PCB size supported: within 460 × 500 mm)

BF-Noah









18μm XL-Size



BF-Noah is an inline automated optical inspection system, which supports inspection of XL-size PCBs. BF-Noah has resolution 18μm, and can inspect a PCB in approximately 36 seconds.

(PCB size supported: within 500 × 660 mm)

Product Lineup

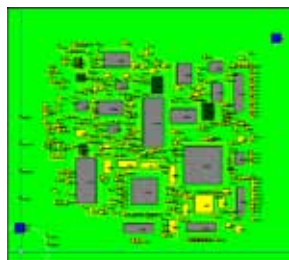
Model	BF-Comet10 BF-Comet18	BF-Sirius	BF-Planet-X II	BF-Frontier II	BF-Noah	BF-SPIder-L BF-SPIder-M	BF-Rigel	BF-X2
Image								
Recommended Inspection Process	After Reflow After Flow After Manual Mounting	After Reflow After Flow After Manual Mounting	Before Reflow After Reflow After Flow	Before Reflow After Reflow After Flow	Before Reflow After Reflow After Flow	After Solder Printing	After Applying Conformal Coating	In-line 3D X-ray Inspection
Inspectable PCB size	250 x 330mm	460 x 500mm	250 x 330mm	460 x 500mm	610 x 660mm *1 500 x 660mm *2	L : 460 x 500mm M : 250 x 330mm	250 x 330mm	460 x 510mm
Tact Time (Full size PCB)	10 : Approx. 18 sec. 18 : Approx. 13 sec.	Approx. 18 sec.	Approx. 18 sec.	Approx. 21 sec.	Approx. 36 sec.	-	Approx. 20 sec.	-
Scanning Time (Full size PCB)	10 : Approx. 11 sec. 18 : Approx. 7 sec.	Approx. 10 sec.	Approx. 9 sec.	Approx. 10 sec.	Approx. 14 sec.	L : Approx. 55 sec./183FOV M : Approx. 18 sec./60FOV	Approx. 14 sec.	2D: Approx. 0.33 sec./FOV 3D: Approx. 5 sec./FOV
PCB Load / Unload Time	-	-	Approx. 3 sec.	Approx. 3 sec.	Approx. 5 sec.	L : Approx. 5 sec. M : Approx. 3 sec.	-	Approx. 5 sec.
Resolution	10/18μm	18μm	10μm	18μm	18μm	Horizontal resolution: 12/18 μm Height resolution: 0.4 μm	18μm	5-25μm
Clearance								
Top	40mm	40mm	40mm	40mm	40mm	25mm	85mm	40mm
Bottom	60mm	60mm	40mm	40mm	40mm	25mm	60mm	40mm
Foot Print (WxD)	580 x 850mm	800 x 1280mm	600 x 915mm	850 x 1340mm	1750 x 990mm	L : 900 x 1374mm M : 700 x 1100mm	420 x 805mm	1800 x 2150mm

*1 Conveyable PCB Size
*2 Scannable PCB Size

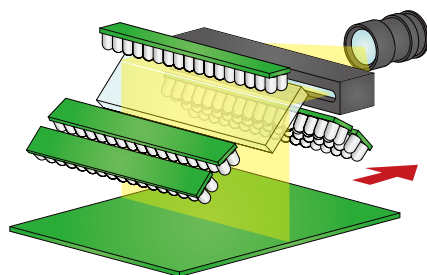
Line Scan Technology

Achieved high-speed inspection independent of the number of components

The line scan technology is a main feature of Saki Corporation. Using this technology, a whole PCB can be scanned in high-speed; a PCB of size A4 can be scanned in approximately 10 seconds. For the multi-field of view capturing, its tact time depends on the number of components, and this may cause drastically increase in inspection time. For the line scan technology, because a line sensor camera scans a whole PCB at once, the method does not depend on the number of components. A scanned image will be saved to the memory on the PC (feature "Full Memory"), and a PCB will be inspected on the memory. All components of any PCBs can be inspected in between 10 to 20 seconds.



Line Scanning



Line Scan Technology



Multi-field of View Capturing

Only the line scan technology enables you to inspect extra parts and save a whole image

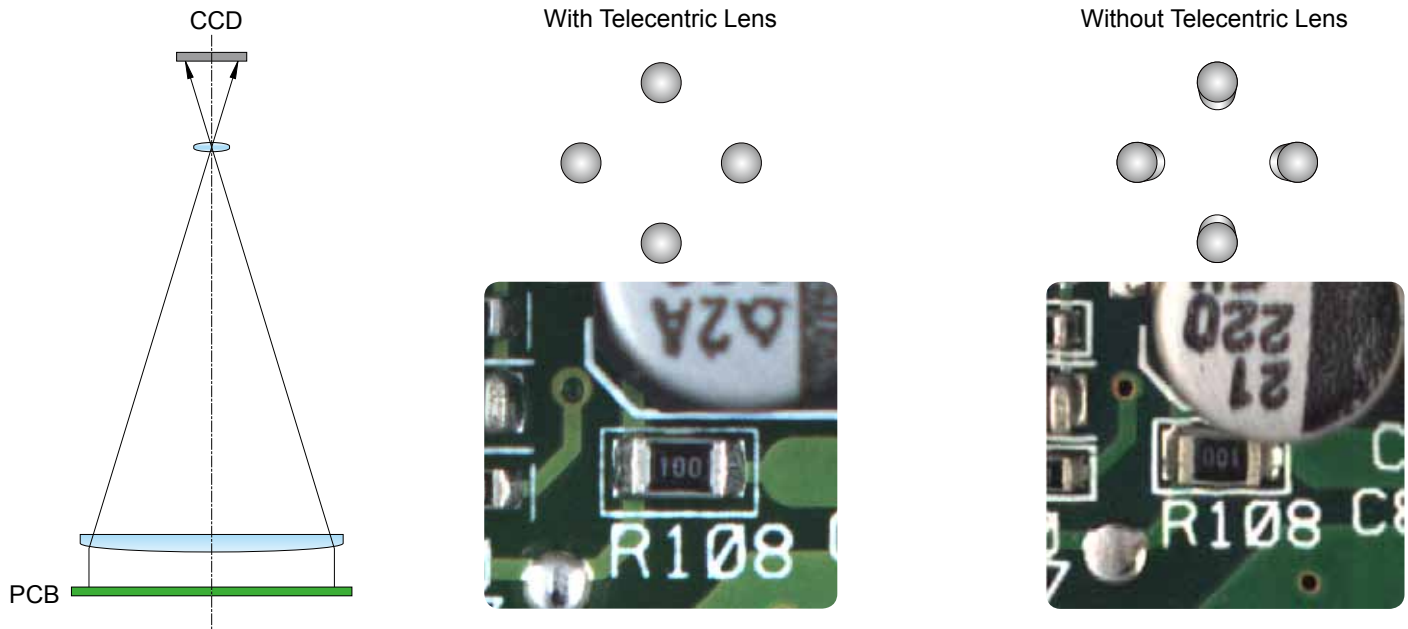


	PCB Size	Scan Speed
BF-Comet18	250 x 330mm	Approx. 7 sec.
BF-Planet-XII	250 x 330mm	Approx. 9 sec.
BF-Frontier II	460 x 500mm	Approx. 10 sec.

Telecentric Lens

Achieved assignment of inspection libraries regardless of where components are mounted

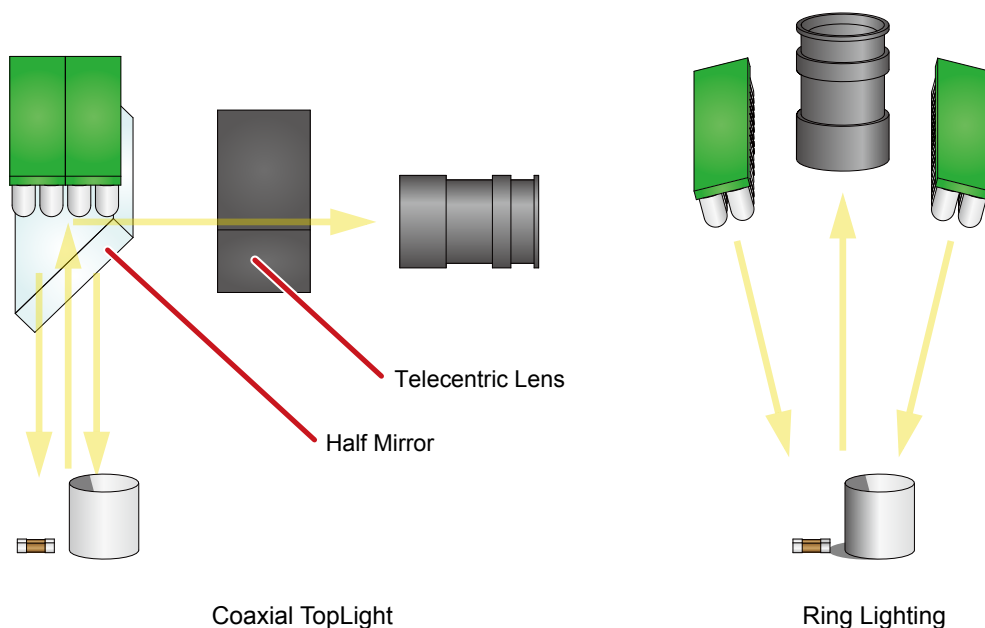
The major bottleneck of the line scanning is that it causes blind spots because of lens distortion. Saki adopts a unique optical system; Saki AOI systems have telecentric lens, which can correct optical distortion and enable you to see all components from above. If an image has optical distortion, there is a possibility that a library cannot be applied to same components. Because images captured through the telecentric lens do not have distortion, a same library can be applied to same components, and this can reduce time to create inspection data.



Coaxial TopLight

Achieved solder inspection by applying Saki original lights from above components

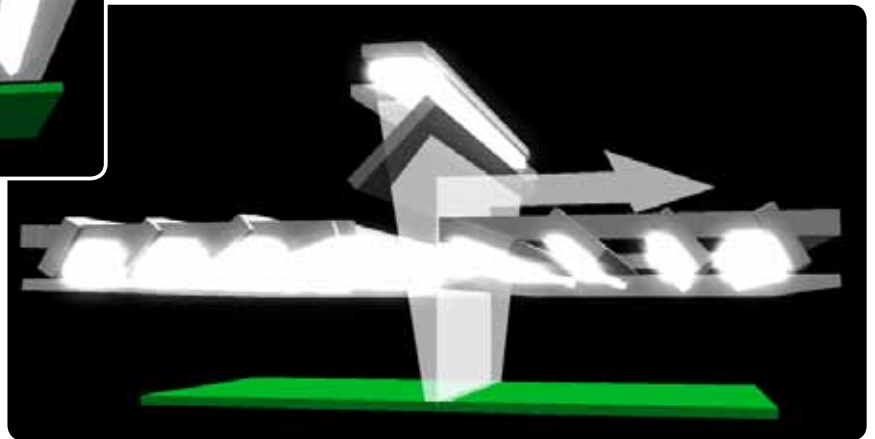
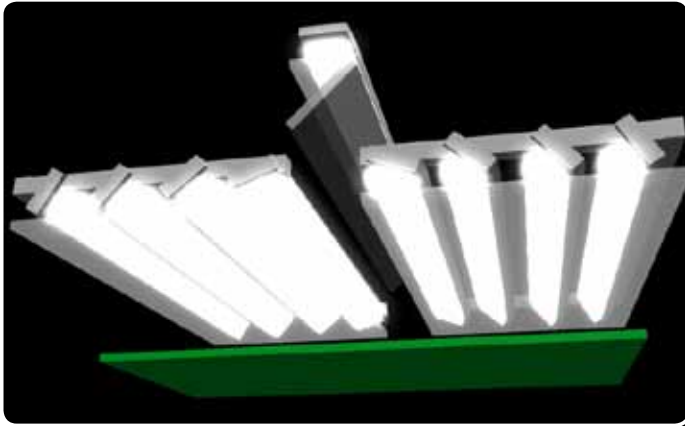
The coaxial TopLight is a lighting emitted from above components. This lighting is available for solder inspection because there are differences in light reflection between when solder forms fillet and when it does not. The general optical system cannot easily inspect components, such as chips, that are shadowed by large tantalum capacitors or variant components; however, our coaxial TopLight enables you to easily inspect components right by large ones.



Multi Lighting Technology

Achieved high-accuracy solder inspection and character recognition inspection

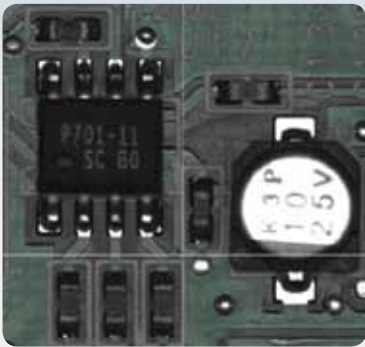
The lighting unit that captures an image required for inspections has approximately 3000 LEDs used for lighting. Using Saki's original LED control alternative scanning technology, lighting is blinked several thousand times per second, and then 3 types of images, Top, Side, and Low, are captured at the same time. You can select a lighting with which defects can be easily found.



Scan Images

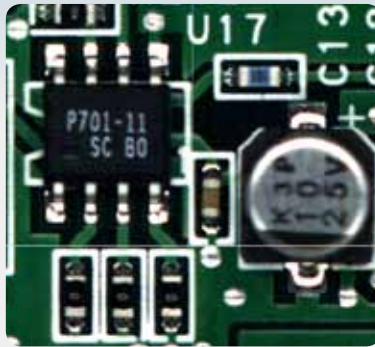
【TopLight】

Available for solder inspection



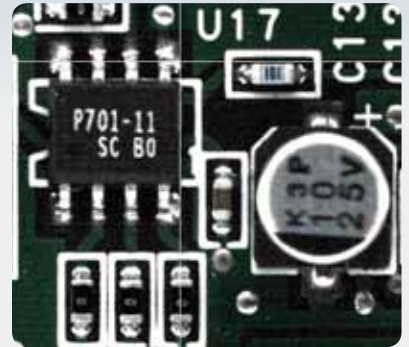
【SideLight】

Available for inspection using colors (e.g. missing and copper inspections)



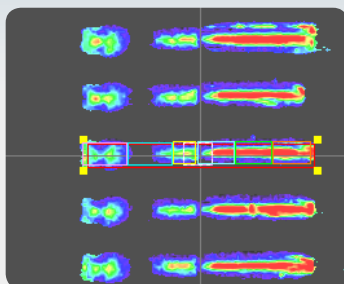
【LowLight】

Available for character recognition and polarity inspections



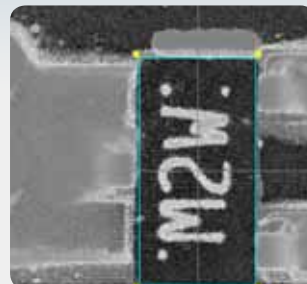
【SPECT Lighting】

Available for fillet and lifted lead inspections



【OK/NGColors Lighting】

Available for character recognition, missing and polarity inspections

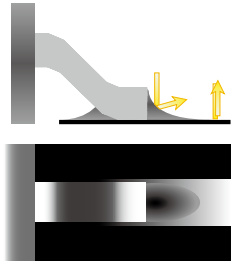


Inspection Algorithm : Black/White

Inspects solder by calculating a percentage of specified brightness

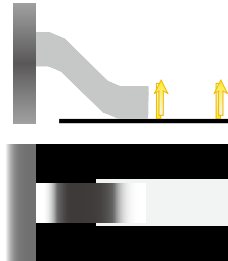
Black/White is the algorithm to calculate a percentage of an area that specified brightness covers to an inspection window area. You can use this algorithm to inspect whether solder is mounted or not and to inspect components using brightness. For example, if the package of a component is black and its mounting place is white, you can use Black/White to inspect whether the component is missing or not.

【TopLight Image】



Lights hit on the slope are not reflected right above.

The slope (soldering) looks dark.

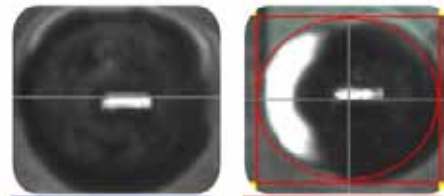


Lights hit on the flat are reflected right above.

If solder is not mounted, the land or pad looks bright.



Perfect for DIP inspection
Can inspect color codes on components and polarities for connectors

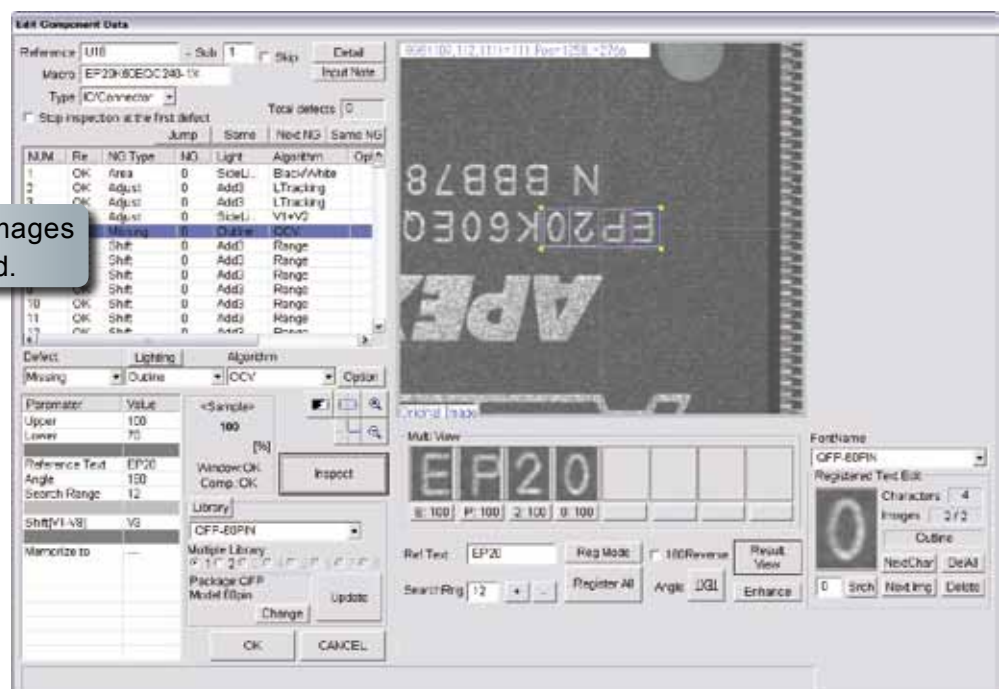


Inspection Algorithm : OCV (Optical Character Verification)

Inspects characters accurately by matching characters

OCV is the algorithm to inspect characters on components. The algorithm matches registered characters to characters on a component for each one, and calculates a rate of the matching. For the previous multiplier inspections, when multipliers on components are different even if their sizes are the same, operators have to create libraries for each multiplier. Now, the function, Macro Skip, enables you to share same libraries between components with different multipliers.

Several different character images can be saved and matched.



Inspection Solution : THD Window Creator / FUJIYAMA only for flow soldering inspections

For inspections of the flow process, operators had to manually create inspection windows one by one because component coordinate data is not used. This inefficiency was a major problem in creating inspection data. Using our technology, we have developed THD Window Creator with which inspection windows can be automatically created, and also developed an algorithm, FUJIYAMA, which can be used only for flow soldering inspection. These developments can speed up data creation and improve inspection ability.

■ THD Window Creator

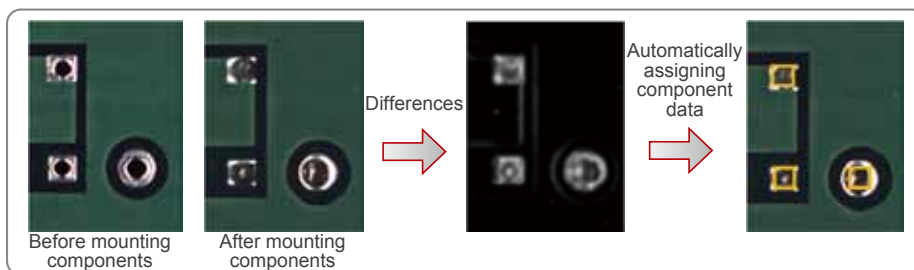
Automatically creates inspection windows

THD Window Creator detects differences in images between bare PCBs and PCBs with components mounted, and then automatically creates inspection windows at the detected positions. This can greatly reduce your loads on creating inspection data. After the automatic window creation, you can use edit tools with a high degree of freedom, such as library assignment and grouping of several inspection windows.

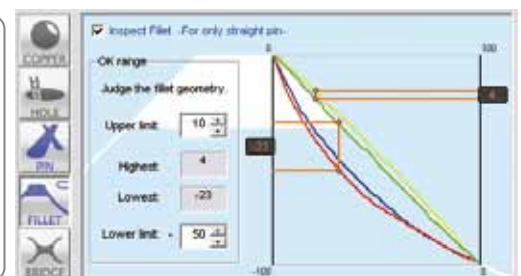
■ FUJIYAMA

Can inspect 5 items with one inspection window at the same time

Solder can be inspected from 4 directions, and the solder form can be displayed with a graph according to brightness. We have achieved the improvements in inspection accuracy and visibility and reduction of time in creating inspection data.



THD Window Creator



FUJIYAMA

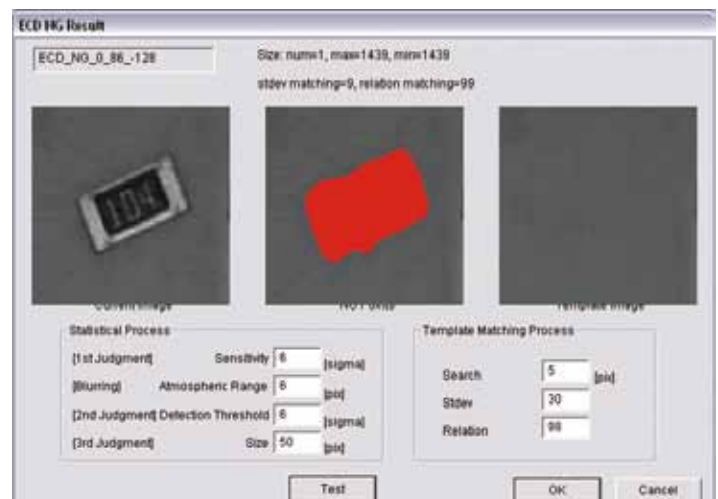
Inspection Solution : ECD2 (Extra Component Detection)

Detects unintended defects on a PCB compared to good-quality PCBs

ECD2 can inspect a whole PCB, and detect solder balls, foreign particles, and components that are fallen in unexpected areas on a PCB. It loads the images of approximately 10 good-quality PCBs as samples, and compares a PCB to inspect with a PCB image created from the samples. Then, ECD2 shows differences between the PCBs as NG on the screen. Data creation for ECD2 does not depend on individual skills because ECD2 creates inspection data from loaded samples. We have enhanced its detection accuracy by improving internal processing, and simplified the procedure for creating data by adopting wizards.

* Depending on PCB conditions or sizes of foreign particles to detected, ECD2 cannot detect differences. For more details, contact our sales representatives.

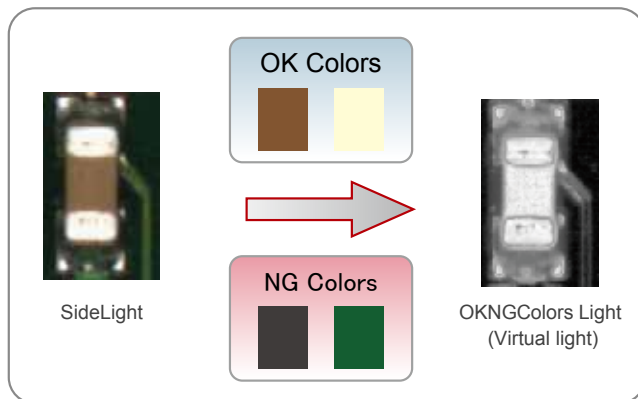
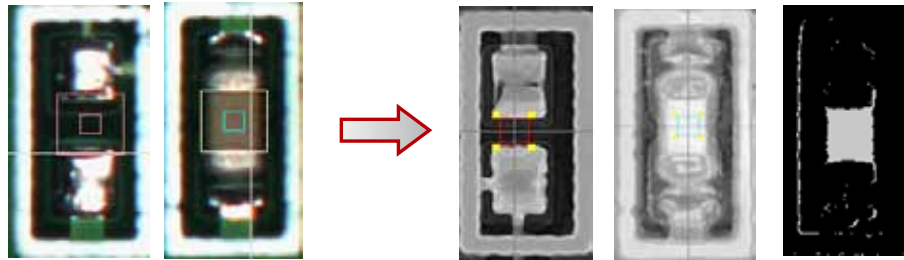
Perfect for detecting fallen chips and foreign particles



Inspection Solution : KPK (Key-colors Peak Keeping method)

Performs missing inspection with simple and easy settings

KPK enables you to perform missing inspection with simple settings. We recommend using KPK if you have no time to create data for test production, or you want to use only missing inspection before reflow or at the last processing, or to perform missing inspection only for some initial lots of mass production. After you create inspection data following a wizard, missing inspection data will be automatically created. You can see unmounted and mounted areas with the inspection data.



Available for launch of unexpected production

KPK uses the OKNGColors Lighting. OKNGColors is a virtual light, which shows that a specified area is close to either OK-color or NG-color groups. Using the light, KPK automatically registers a color when a component is not mounted as an NG one and a color when a component is mounted as an OK one, and inspects PCBs.

Optional System

【BF-Editor】

Off-line Teacher



BF-Editor can communicate with the entire series of Saki AOI systems, and enables you to create data offline. With "Full Memory", you can save a whole image of a PCB and create data offline using the saved image.

【BF-Monitor】

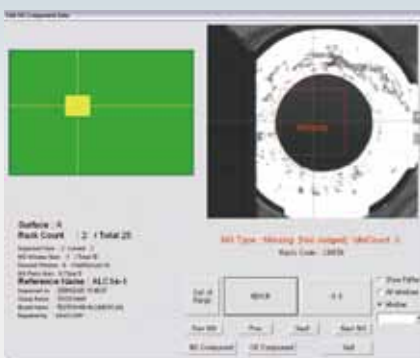
AOI Simultaneous Management System



BF-Monitor enables you to visually check detected defective areas in real-time. BF-Monitor collects detected defects from AOI systems operating in-line in real-time, therefore, you can evaluate quality remotely.

【BF-RP1】

Repair Terminal



BF-RP1 can communicate with the entire series of Saki AOI systems, and enables you to check defects. BF-RP1 shows location information, defect information and images, and prevents operators from overlooking defects.

【BF-View】

Real-time Process Managing System,



Using BF-View, you can analyze defect information of several systems (up to 32 lines). BF-View creates data of defects and false calls and saves it for 5 years. You can search the data on BF-View.

TO BE RENEWAL

BF-Editor Off-line Teacher

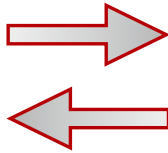
Enables tuning of libraries using past sample images



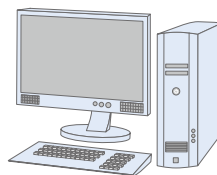
2. Debug defects
3. Check tuning results



1. BF-Editor acquires a sample image



4. BF-Editor updates libraries



BF-Editor

Library Tree

Enables you to manage data associating component names and library names with images, and to store libraries by package.



BF-Editor can raise operation rates of AOI systems.

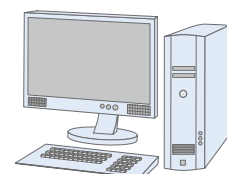
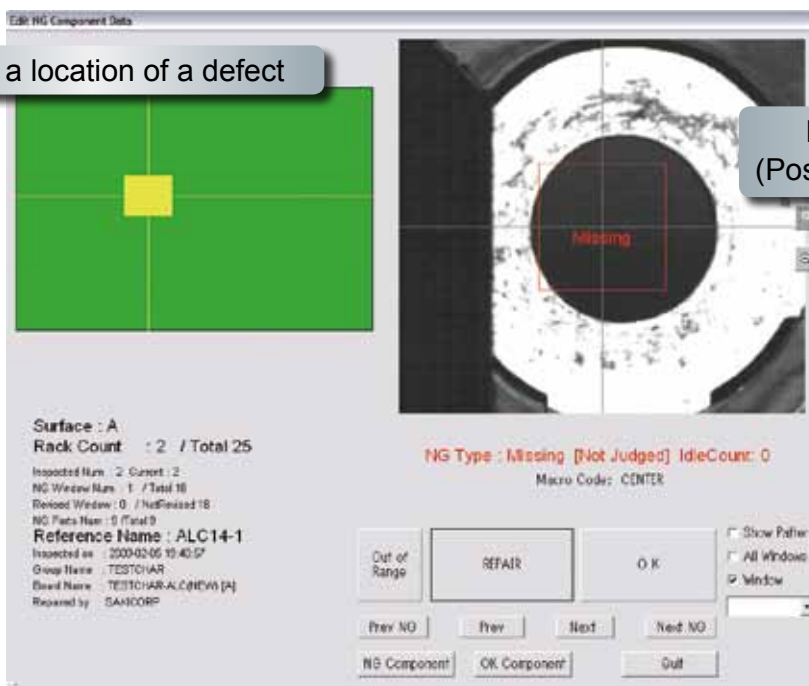
BF-RP1 Repair Terminal

Shows defect information and images and prevents operators from overlooking defects

BF-RP1 is a system that supports sure repair of defective components detected by AOI systems of the BF series. To surely match detected defects to an actual PCB, there are some managing ways:

1. Barcode
2. Management of the number of rack stages
3. Printer

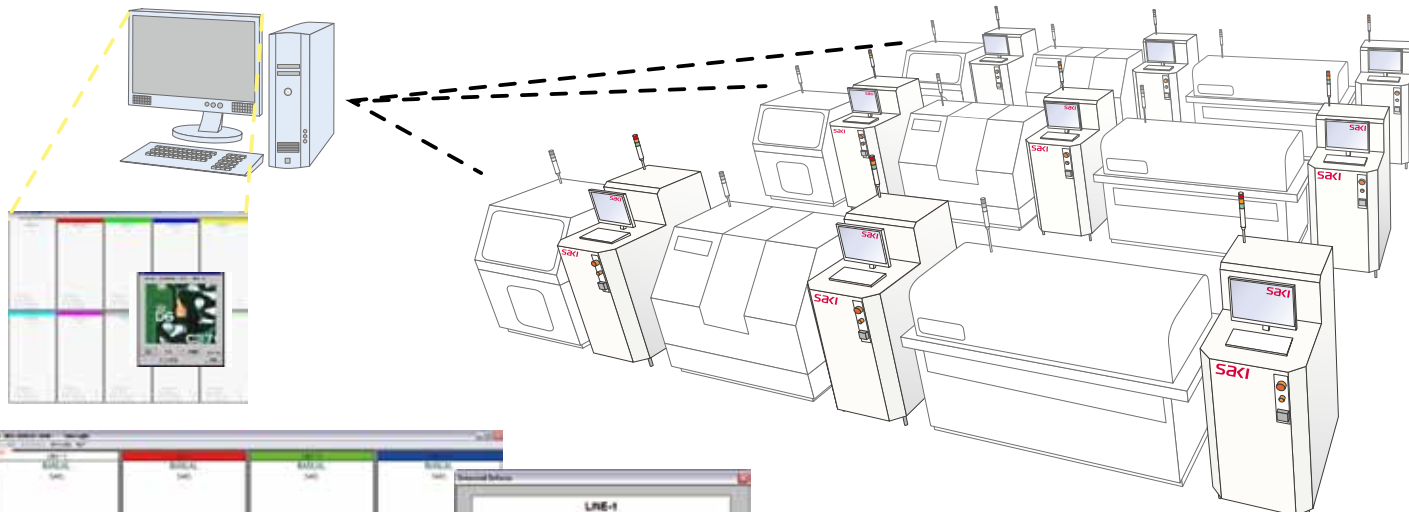
Shows a location of a defect



BF-RP1

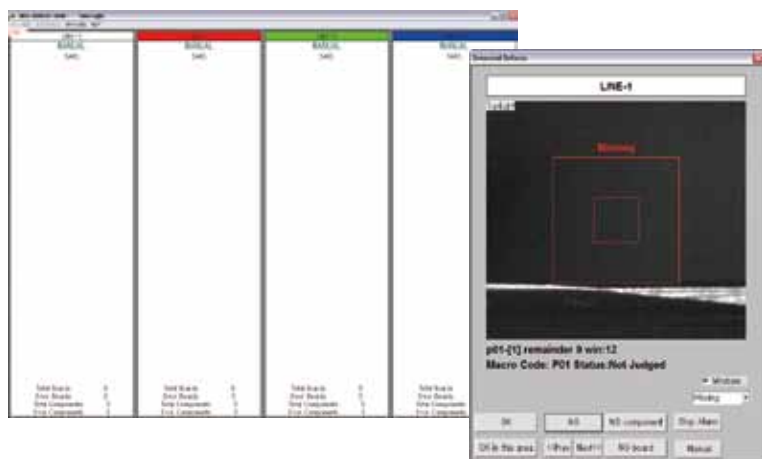
BF-Monitor Simultaneous Management of Inspection Systems

Enables you to remotely control several inspection systems with one terminal



Rechecking components intensively

BF-Monitor collects defects that in-line inspection systems detect in real time. You can evaluate the collected defects by remote control. BF-Monitor can show inspection results for several lines. This feature enables you to minimize man-hours of operators and production costs. You can enhance the quality of production lines by identifying actual defects and false calls from defect images shown in real time.



BF-View Real-time Process Managing

Monitors production quality and operating conditions of AOIs



Displays production volumes and both of the numbers of false calls and actual detects for each line

TO BE RENEWAL

Manages quality trends for each line



Shows percentages of false calls and actual defects for each defect and component type.

Code	Board Name	Location	Part Number	Image	AOI Judgement	OP Judgement	Operator	Date	Time
		1-1-1	1-1		Missing	Missing	BF-1	2006/01/26	15:04:49
		1-2-1	1-2		Missing	Missing	BF-1	2006/01/26	15:04:49
20090126150448	TESTCHAR2501-2-1	1-2			Polarity	Polarity	BF-1	2006/01/26	15:04:49
		1-3-1	1-3		Missing	Missing	BF-1	2006/01/26	15:04:49

You can easily output reports (monthly report, daily report, report for each lot and report for each PCB) from the database. With the reports, you can check component types, libraries, AOI judgments, OP judgments, time and repair histories.

www.sakicorp.com

SAKI Saki Corporation

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