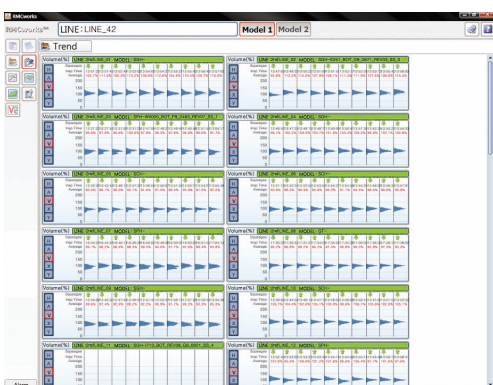
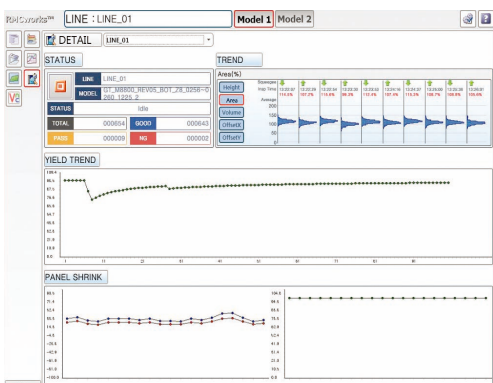


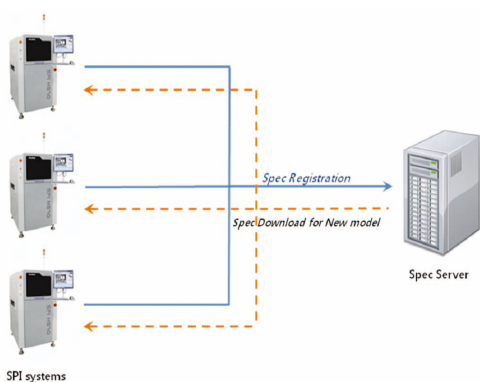
Machine Status Monitoring



Production Trend Monitoring



Printing Process Status Monitoring



Inspection Spec Server

## Remote Control of Multiple Lines with RMCworks

It costs highly to post process analysis technicians for each production line. RMCworks provides solution that one technical manager monitors multiple lines at remote to save manpower and enables to control all lines consistently and systematically. It displays intuitively main index and trend of printing process for each machine as well as machine status in real time. Remote technician calls field operator when any actions are required to the machine, which leads to save in manpower of field operators.

**Machine Status Monitoring :** It displays current machine status whether machine is in operation, waiting after detecting defects or stopped.

**Production Yield Monitoring :** The most important factor, yield status and trend, for production manager are displayed in various ways.

**Printing Process Status Monitoring :** It displays height, area, volume and offset trend of solder paste by histogram.

**PCB Shrink Status Monitoring :** It displays PCB shrink rate by line graphs.

**Remote Control :** It enables to control the machine at remote site as if controlling the machine at production line.

**Alarming :** Alarm window is created to notify remote technician when the machine detects defect PCB.

## Systematic Process Management by Inspection Spec Server

Tolerance is the judgment factor between Good and Bad PCB, which is always required to be adjusted during every Job change, it should be managed by each part for more strict process management. However, it requires much effort and time for users to remember all tolerance values and apply them during every job change. Inspection spec server reduces work loads of users by managing tolerance for each part and required common tolerance for the inspection at the main server. Main function is that database of the server manages all tolerance values registered or modified by SPI systems which are connected through LAN, and each SPI system requests tolerance values to the server when there is a job change which would set tolerance for every part of the PCB automatically.

## Specifications

	SPI HS70	SPI HS70L	SPI HS70D (Dual Lane)		
<b>Measurement</b>	Measuring Principle	Shadow free Dual Laser Optical Triangulation			
	Inspection Type	Height, Area, Volume, Offset, Bridge, Shape, Warpage, PCB shrink			
		RSC VI		RSC VI Accu	
	X-Y Resolution	18×9 μm	13×7 μm		
	Height Resolution	0.1 μm	0.06 μm		
	Max. Paste Height & Size	1000 μm / 20×20 mm	1000 μm / 20×20 mm		
	Min. Paste Size & Pitch	150×150 μm / 100 μm	100×100 μm / 70 μm		
	Inspection Speed	80 sq.cm/sec	40 sq.cm/sec		
	Height Accuracy	2 μm, on a certification target	1.5 μm, on a certification target		
	Height Repeatability	3 Sigma < 1 μm, on a certification target			
	Area Repeatability	3 Sigma < 1%, on a certification target			
	Volume Repeatability	3 Sigma < 1%, on a certification target			
	Gage R&R	<< 5 %			
<b>Board Specification</b>	Maximum & Minimum Board Size	430×350 mm / 80×80 mm	610×610 mm / 100×100 mm	350×315 mm / 80×80 mm	
	Maximum Board Weight	2.0 kg *Special conveyor for heavy weight (Option)			
	Maximum Board Warp	±5 mm			
	Board Thickness	0.4 to 4 mm	0.4 to 10 mm	0.4 to 4 mm	
	Board Edge Clearance (TOP/Bottom)	2.5/4 mm	3.5/5 mm	2.5/4 mm	
	Underside Clearance	23 mm			
<b>System Dimensions</b>	Dimensions (W×D×H)	970 x 1195 x 1535 mm	1170 x 1335 x 1535 mm	920 x 1415 x 1510 mm	
	Weight	800 kg	950 kg	900 kg	
	Conveyor Height	890 – 965 mm [SMEMA]			
	Load, Unload Time	3.0 sec			
	Conveyor Speed Range	300 mm/sec ~ 800 mm/sec			
	Flow Direction	Left→Right or Right→Left (Automatic)			
	Conveyor Reference Side	Front or Rear : Factory Setting(Selectable when ordering)			
	Conveyor Width Adjusting	Auto Adjustable			
	<b>Hardware System</b>	X-Y-Z robot	Sensor head move in X-Y-Z axis		
		Computer	Pentium IV Quad Core, 8GB Memory, MS-Windows XP Professional 64bit		
Console		20.5" LCD wide, Mouse, Keyboard			
Power Supplies		Electric – AC 220V, 50/60 Hz, Pneumatic – 5Kg/sq.cm			
Conveyor		Single Lane 1 stage conveyor, Dual Lane 3 stage conveyor(option)			
<b>Software System</b>	Inspection Program	SPIworksPro			
	Offline Teaching	EPM-SPI			
	SPC & Process Monitoring	SPCworksPro			
	Remote Machine Control	RMCworks			
	Defect Analyzer	AnalyzerPro			
	System Diagnosis	SPImanager			
<b>Interface</b>	Up/down stream Interface	SMEMA II, SV70 (option)			
<b>Options</b>	Repair Station	Intelligent Rack Type / Lifting Conveyor Type Stand alone PC with AnalyzerPro			
	External Barcode system (1D or 1D+2D)	Top/Bottom side recognition			
	Sensor embeded Barcode system (1D+2D)	Topside recognition			
	HDD RAID system	HDD Mirroring system			

# PARMI

**PARMI CO., LTD.**

Daeduk Atomic Valley 461-63  
Jeonmin-dong, Yuseong-gu, Daejeon, 305-811, KOREA

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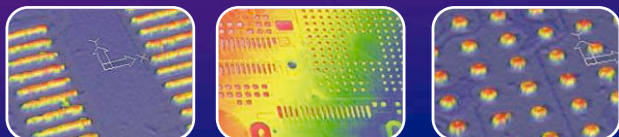
TEL. +82-42-478-9900

FAX. +82-42-478-9905

# SPI HS70™

3D solder paste inspection system

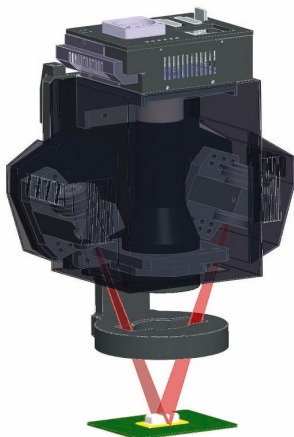
Innovating printing process  
Realizing zero false-call & escape rate  
Enhancing yield dramatically



PARMI

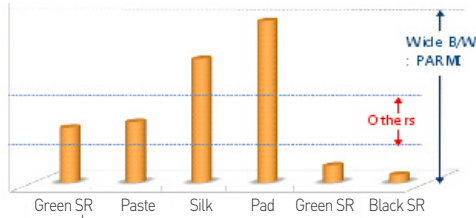


SPI HS70 system is optimized to enhance yield on solder paste printing process of real production line rather than off-line tests. Highly improved 3D measuring performance guarantees zero false-call and escape-rate on high speed and finest component placement production lines, together with various process analysis tools, it provides fast and accurate analysis and stabilization of printing process.

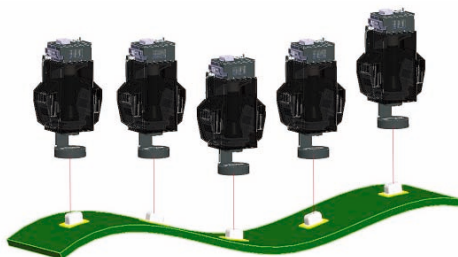


RSCVI Sensor Head

Light intensity to Camera



Comparison between Laser and Light Bandwidth



Real-Time Warp Tracking

## Real 3D with Superior Accuracy & Speed

SPI HS70 with RSCVI sensor head has distinct technological specialties which guarantee the best Gage R&R capability and measure with excellent reliability on 01005 chip, diameter of 150um CSP, and fine pitch leads parts. Printer process analysis and stabilization is ensured by high accuracy only, reliable Gage R&R capability would be one of necessary conditions but not only necessary sufficient condition for the process analysis and stabilization.

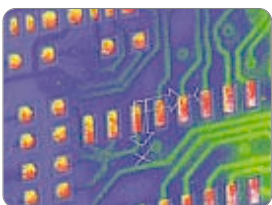
**Dual Laser Projection :** is standard which leads to one step higher measuring accuracy with no shadow effect.

**3D Data Generation at 10x10um Interval :** It enables to extract 4 times more data on the same area than with 20x20um resolution, which results an epoch-making improvement of measuring reliability on finest pads.

**High Adaptability to Diverse Panel Conditions :** The sensing technology with wide bandwidth manages perfectly on various brightness range and finishing conditions which show clear distinction with other technologies that could extract only solder paste shape.

**Sensor Head Tracks Panel Warp in Real Time :** The height of 3D sensor is always controlled dynamically to be in DOF (depth of focus) which leads consistent accuracy on warped PCBs.

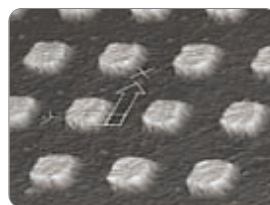
**80 cm<sup>2</sup>/sec :** It meets the cycle time of high speed production lines at 10x10um without loss of accuracy.



Paste, SR over trace



Paste, Silk, Pad



Paste, SR over epoxy

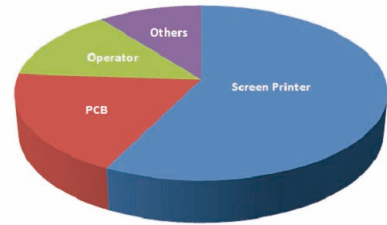


Paste over QFP pads



## Necessary Unique Features for Complete Process Control

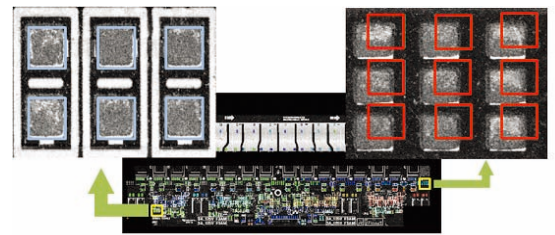
From experience, there are slight differences between each production line, the cause of printing process defects are not only from screen printers but it is actually contributed to defects on bare PCBs and misuse of screen printer by operators. SPI HS70 provides unique functions only by PARMi to control screen printing process more ideally.



Solder paste defect causes & analysis

**Measuring PCB Dimension Variation :** Measuring shrink and expansion of PCB to find out the original cause of the problem on PCB defects as well as it compensates positional offset of printed solder paste.

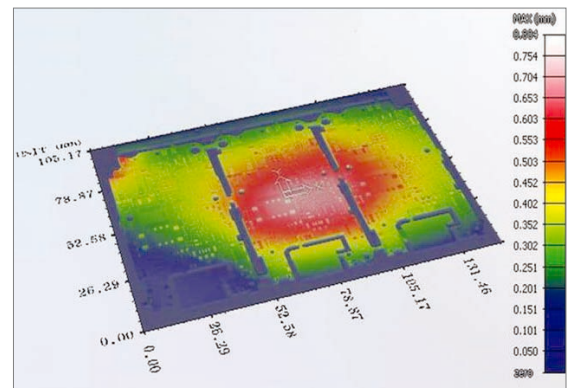
**Measuring PCB Warp :** PCB warp actually proves to largely affects on general printing, mounting and soldering process. Only PARMi provides warp measuring function prevents PCB defects when mounting parts.



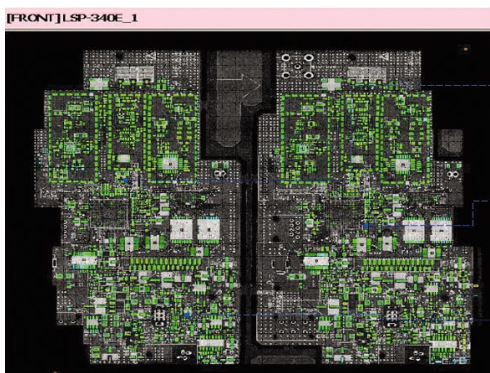
Positional Offset by Panel Shrink

**Intuitive Monitoring of Printing Status :** The main viewer of the system shows 2D & 3D images and measured values in colors for each pad in real time which enables to see printing status and debugging with parameters at a very short time. Each pad is colored according to measured value(height, area, volume and offset) which help to operator to see printer status by position and size of the pads, and also the pads are colored according to sigma and defect frequency.

**Tracing Defect PCBs and Operator Treatment :** The origin of a defect should be clearly checked whether it is from printing process by operator, SPI system or tolerance setting problem. For this, operator's work history and defect panel reviewer information are provided.



PCB Warp 3D image



Intuitive Monitoring of Printing Status

Panel	Barcode	Operator
1761	361S311874	ljb8
1760	361S311875	ljb8
1759	361S311877	ljb9
1758	361S311876	ljb9
1757	361S311872	anager
1756	361S311870	anager
1755	361S311869	anager
1754	Y96FM11107...	anager
1753	Y96FM11107...	anager
1752		
1751		

Tracing Defect PCBs



## Yield Enhancing with SPCworksPro

Main roles of SPI systems are 1) complete defect detection and 2) enhancement on yield by accurate analysis and stabilization of printing process. For the first role, the accuracy of SPI system should be guaranteed and for the second role, practical SPC tool should be provided. SPCworksPro of PARMi is no more based on textbook but it is live SPC considering actual field environment, designed to immediateness, intuitiveness and dimensional analysis of process detection be as standard. For immediateness, every process is connected with network so it can be connected from any terminals and all data are updated in real time. User interface is designed to be used and understand easily by managers and operators. Moreover, for dimensional analysis of the process, various functions are provided as following.

**Production Yield Graph :** It displays yield trend according to production rate by hourly, weekly and monthly.

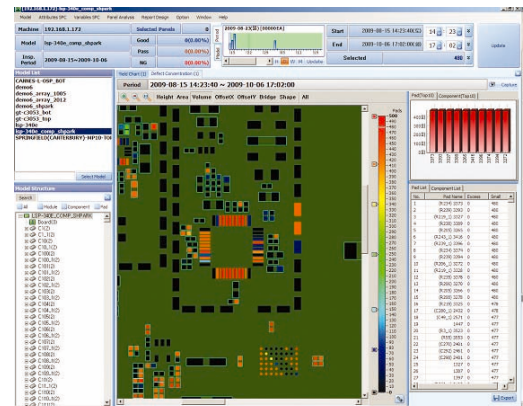
**Defect Type Analysis :** It displays whole defects by each defect type.

**Defect Frequency Analysis :** It displays pads with defect detected frequently in different colors and it enables to trace defects on PCBs by defect history display and barcode search function.

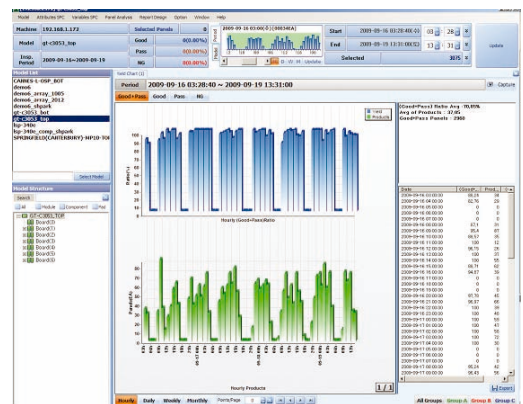
**Module Yield Statistics :** It creates production yield list on PCBs and produces yield statistics by hourly, daily and each shift.

**Variable Analysis :** X-bar & R, Sigma, Cp and CPK charts are provided for variable analysis.

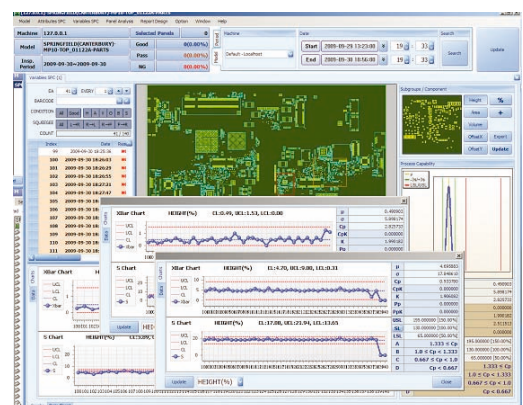
**Report :** Customized report form is automatically created and measured data are exported as a file to be imported to Minitab and Excel on request.



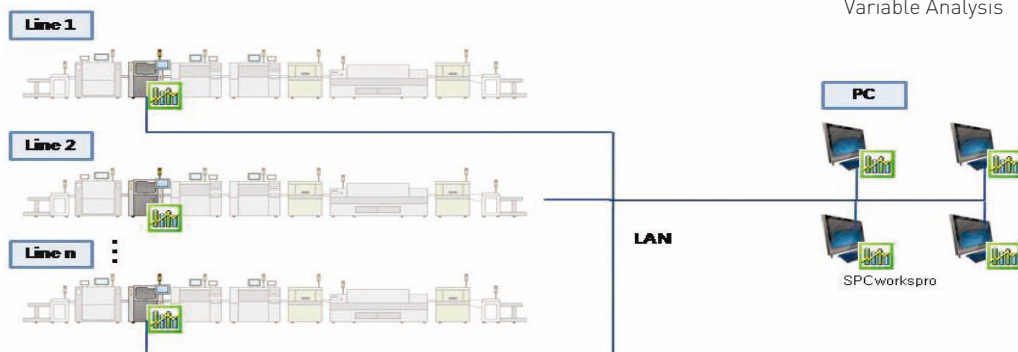
Defect Frequency Analysis



Production Yield Graph



Variable Analysis



Network based SPCworksPro