

STVision

Sommer Technology for Vision

Bergstraße 5 a
85410 Haag
Germany

TEL. 0049- 8167 – 8615
FAX 0049- 8167 – 957714
Mobil 0049- 178- 695 2889



Vision 3 / DCS1F Dispense Check System for FlipChip Bonders Jan 2005 STVision

The screenshot displays the STVision software interface. On the left, four camera images (Image 0 to Image 3) show the bonder's dispensing area. On the right, the 'Measurement Results' panel shows the following data:

Device is Reject			
Total#	9.00	REJ#	9.00
OK#	0.00	Yield%	0.00
Last Unit Result			
Check if leadframe is present		Check if leadframe is present	
OLIDetect	88.00	c1LIDetect	0.00
Cam0 Dispense on Source		Cam1 Dispense on Source	
c0source0	1939.43	c1source0	408.23
c0source1	2111.39	c1source1	420.89
c0source2	1889.03	c1source2	409.84
c0source3	1952.79	c1source3	440.93
c0source4	1939.87	c1source4	454.23
c0source5	1949.81	c1source5	437.92
c0source6	2052.25	c1source6	487.92
c0source7	2073.50	c1source7	485.21
c0source8	2335.76	c1source8	0.00
c0source9	2353.90	c1source9	0.00
c0source10	444.12	c1source10	0.00
c0source11	433.75	c1source11	0.00
c0source12	464.00	c1source12	0.00
c0source13	463.52	c1source13	0.00
c0source14	493.61	c1source14	0.00
c0source15	526.47	c1source15	0.00
Cam0 Dispense on Gate		Cam1 Dispense on Gate	
c0gate0	536.18	c1gate0	0.00
c0gate1	543.34	c1gate1	0.00
c0gate2	546.89	c1gate2	0.00
c0gate3	546.89	c1gate3	0.00
c0gate4	1866.13	c1gate4	0.00
c0gate5	2027.80	c1gate5	0.00
c0gate6	1962.61	c1gate6	0.00
c0gate7	2064.97	c1gate7	0.00
c0gate8	1944.23	c1gate8	0.00
c0gate9	2006.49	c1gate9	0.00
c0gate10	2007.81	c1gate10	0.00
c0gate11	1951.36	c1gate11	0.00
c0gate12	2210.96	c1gate12	0.00
c0gate13	2319.28	c1gate13	0.00
c0gate14	341.16	c1gate14	0.00
c0gate15	306.44	c1gate15	0.00
Cam0 DotCluster		Cam1 DotCluster	
c0MisDot	0.00	c1MisDot	0.00
c0dotmin	452.75	c1dotmin	417.83

Dispense of solder paste in small quantities is critical. Uneven dispense points may occur because of

- Air bubbles in the container,
- Air from changing the container,
- Uneven solder paste (old, not kept at the correct temperature),
- Block of the tool.

The process is getting even more critical with growing number of dots, which is typical for flip chip die attach, BGA, where the bumps must make contact to the dispense dot in the reflow.

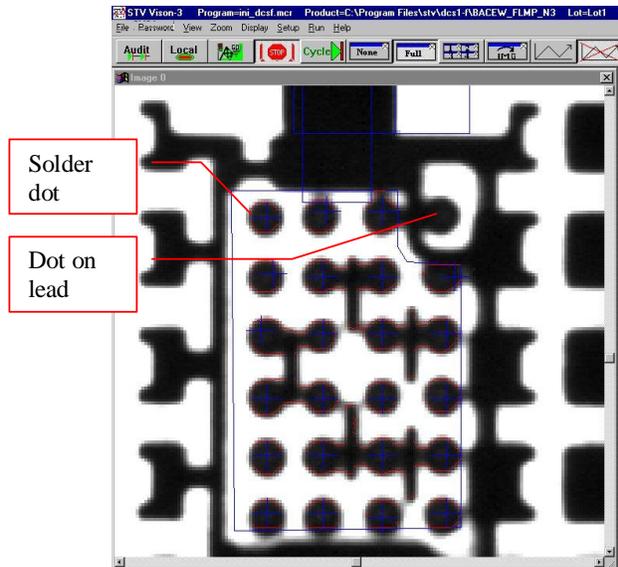
The STV system measures every single dot size exactly in its size and volume. It executes a cluster analysis and position measurement to find misalignment of the dispense tool. It find the defect solder dots directly in the bonder, after the dispense step, and before the die attach. It can instruct to skip bond, and saves expensive material and increases the yield.

Small BGA dot arrays must utilize this vision system for 100% quality in the production.

Operation Mode

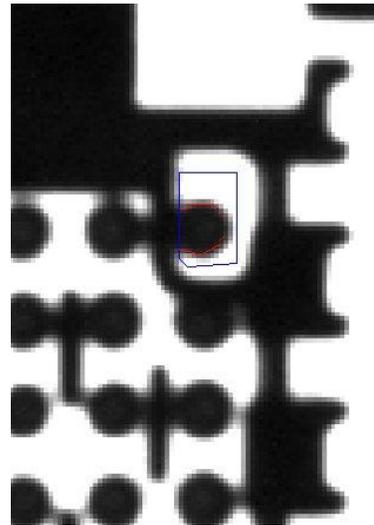
Two modules include high resolution array cameras, illumination, and all necessary optical components. These modules are easily moved into the indexer track, or removed for service and maintenance.

Each camera view is the whole leadframe width. Matrix frames are the number of solder dots, such as this:



The dots may have some flux material around. The system ignores the flux, and calculates each dot size, its densitometric volume, its position (centering to the pad) with reference to its "ideal" position (defined in the CAD cluster table).

Most critical is the dot on the individual lead. Here the bond area is extremely small, so a perfect alignment is critical:



Dispense Tool: This tool measures the total dispense size for the pad, and for the individual lead. This includes all dots. Any variation in the viscosity of the past, temperature etc. is recognized. This tool monitors the "global" dispense process, and generates an alarm if these parameters are out of spec.

Cluster Tool: This measures the exact size of every single dot on the pad, and analyze a cluster analysis of each location. It rejects individual defect dots, e.g. caused by blocks in the individual nozzle of the tool. The total dispense volume may even be ok, since the past of the missing dot may be added to the other dots.

Alignment tool: The system calculates the centering of all dots relative to the position of the pad. Misaligned tools are immediately recognized.

Technical Data

Camera	Parameter	Dimension
Resolution	1280 x 1024	Pixel
Image	50 x 40	Mm
Pixel size (configurable)	40	Micron
Accuracy dot size	<= 5	Micron
Min dot size	>= 80	Micron

# of dots	Not restricted	
# of die per image	<= 30	
Performance	7000	Cycles / sec
Interface to bonder	Custom	