Mirtec AOI
and SPI systems
## Product overview

**Mirtec AOI and SPI systems**

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MV-3 – Desktop AOI

The MV-3 desktop AOI system provides the same approved features as the inline AOI systems from MIRTEC.

With an attractive price-performance ratio this system is especially suitable for companies with a high product mix and small batches.

With top camera and four side cameras, telecentric lens, 6-phase lighting as well as diverse software options the MV-3 provides the same comfortable handling as an inline system.

MV-6 – 2D-Inline AOI

The MV-6 is the economical entry into the fully automatic inspection, usable as an island or inline solution – with the same approved features as in the AOI systems from MIRTEC.

Furthermore, the MV-6 stands out due to its compact design. The version MV-6 EM has a width of 90 cm only which saves valuable space in the production line.

Optionally the MV-6 as well as the MV-3 can be equipped with a 3D laser measurement system.

With this 3D laser i.e. the coplanarity of a BGA component can be checked and hence a conclusion is possible about its (not visible) solder joints.

Furthermore, the laser offers a line scanner for a 100% secure check of lifted leads.
3D AOI systems
MV-9, MV-6 OMNI and MV-7 OMNI

2D inspection and 3D measurement with only one head – an unbeatable combination

The MV-9, MV-6 OMNI and MV-7 OMNI series from Mirtec utilize a 15 MP, MV-7 OMNI and the MV-9 alternatively a 25 Megapixel camera and optionally four 10 MP side cameras. For the 3D measurement all these systems are using the 4-way-Multi-Frequency 3D Moiré technology.

The MV-9 is equipped with 2 linear motor systems; the MV-6 and MV-7 OMNI are using a very stable servo motor drive.

With simultaneous 2D/3D tests in one head highest inspection depth is achieved and falls calls are very much reduced.

All three systems are equipped with the high speed camera technology CoaXPress. In combination with the cameras from MIRTEC's own production this technology enables an increase of about 25% compared with camera link which expresses itself in 107 cm²/sec.. With Z-ROT and multi-threading the speed of the MV-9 can be further increased.
The AOI systems from MIRTEC are working with an in-house developed 10, 15 or 25 Mega Pixel Digital Colour Camera Technology and high resolution telecentric lens.

Furthermore, all AOI systems are equipped with the 6 or 8 phase colour lighting. This technology provides an ultimate inspection performance and reduced false calls rates. The optional Side Viewer® Camera System provides with the four colour cameras, arranged in an angle of 37° to the top camera, valuable information also about components with covered leads. Thus, also the inspection of complex components is possible.

Main features

Inspection performance

- High resolution Digital Colour Camera Technology with telecentric lens
- Inspection speed up to 107 cm²/sec.
- MIRTEC's innovative Quad Angle Lighting System provides enhanced solder joint and solder bridge inspection capability
- Optional Side Viewer® Camera System for a spatial test of complex components
- Three stage (MV-6 single stage) conveyor system with automatic board support for maximum throughput of the line.
- Precision motion control systems provide absolute reproducibility and repeatability.
- Powerful OCV function.

Software Architecture

- Comprehensive Package Type Library provides simple “drag and drop” component programming
- Auto Teaching Tool (ATT) Software for an automatic import of CAD pick and place data
- Global Component Library provides “Automatic Programming” of previously taught components
- Off Line Teach Tool (OLTT) software option
- Optional offline management software to monitor the AOI system from an external workstation
- High-performance repair station and SPC software
Optional - Side Viewer® Camera System

- Four laterally arranged colour cameras for a spatial check of complex components
- Secure detection of lifted leads and lifted components
- Even “covered” pins of i.e. J-ledged devices can be tested

Innovative Quad Angle® Lighting System

- The angled light source is divided into four segments
- All four segments can be switched on and off independently from each other
- Provides a secure inspection of shadowed components

Telecentric Lens

- Non-distortion during image magnification because depth and height issues are eliminated
- All objects are always displayed with the same angle and distance
- No compensation required for the image edge
In-house developed camera systems with a resolution of 10, 15 and 25 Megapixels

- Absolutely spectacular image quality
- Improved inspection speed with larger field of view (FOV)
- Excellent inspection performance for 01005 components with a resolution of 10 μm/Pixel

Lifted Lead Inspection mode

- New lifted lead inspection techniques with colour (global patent on process)
- Absolutely secure inspection results for Chip/IC lifted lead defects

8 Phase Lighting (RGB, yellow and 2x white)
Detailed detection of lifted leads and solder joints

- Perfect for CSP material component inspection
- Extremely precise images
Integrated software tools

Integrated SPC-Software (standard)
- Software for statistical process control
- Enables a continuous monitoring of the process quality
- For a continuous optimization of the manufacturing process
- Enables the generation of test protocols.

Integrated repair software (standard)
- Software for verification and repair of defects
- Overview image of the PCB with all detected failures.
- Detail images of the particular failures with coloured marks on the failure including failure description.
- User friendly handling by comparison of initial and target images.

Extensive Quality Management

Process management function
Remote Debugging
- Debugging without interruption of the production
- One remote PC can control multiple machines
- Debugging of false calls with previous defect data
Quick and easy programming

- Extended component library for an easy „drag and drop“ programming
- Auto Teaching Tool (ATT) software for an automatic import of CAD pick and place data
- Optional offline programming

Component library

- Extended component library for an easy „drag and drop“ programming
- Global customer library for an automatic programming of already deposited components

Auto Teaching Tool (ATT) Software

- Automatic import of CAD pick and place data
- Programming without “Golden Board” possible
- Optional Offline Management software to control the AOI system from an external work station. With this software up to 8 AOI systems can be monitored
- High-performance repair station and SPC software for up to 8 AOI systems
Most defects that impact yields occur in the solder paste printing process. With a 100% solder paste inspection the process will be optimized and high yields maintained. Boards with failures will not be assembled but selected directly after the printing process.

The MIRTEC MS-11, MS-11E and MS-15 inline 3D SPI systems are using the shadow free Moiré phase shift image processing and an ultra-high resolution 15 or 25 Megapixel camera technology. This enables a high precision post-print 3D inspection in line speed - without false calls, no escapes and no shadows.

Main features

Inspection performance
- 15 or 25 Mega Pixel digital camera with telecentric lens
- Highest measurement accuracy and repeatability
- MS-11 and MS-11E: Servo motor drive
- MS-15: Linear motor drive
- High speed
- "Shadow Free" measurement of solder paste (topography)
- No PCB colour sensitivity
- Extremely simple programming and operation
- Robust inspection against warping

Software Architecture
- Supports integrated data base management for Remote SPC through a network server
- Remote Monitoring System displays "Real Time" status of the SPI system
- Offline Programming Tool-Software Option
- Supports Gerber format import (274X, 274D)
Moiré Technology for 3D measurement

Inspection principle
SPI systems from MIRTEC are using the shadow free phase shift Moiré analysis, as well as used in the 3D AOI systems from MIRTEC.

Shadow free measurement
The common problems in 3D measurement with single side light projection are shadow effect and reflections. Thus the measurement is inaccurate and unstable. Solder paste which is located in the shadowed area cannot be measured but only estimated.

Reflections
Some solder pastes may give much specular reflection. These reflections have a high influence in the measurement. The result will be inaccurate and require a sophisticated calculation of these data areas.

Mirtec provides a shadow free measurement, independent from reflections, using the phase shift image processing and lighting from two sides
Fast and easy programming

- Simple programming by using GerbPad software
- Gerber, CAD, and other SMT process data integration
- Less than 10 min. programming for 654 pads, no fine tuning necessary

Intuitive GUI

- Easy to use and all information available in one view

3D Viewer

- Changeable color map
- Zooming function
- Rotate / Move
- Change Viewpoint
- Load / Save 3D data
PCB warpage
- MS-11 and MS-15 provide stable and accurate measurement data against PCB warpage, as it refers to every pad’s surrounding area
- PCB warpage compensation ± 5mm

PCB colours and brightness
- White light projection through power LEDs and dual projection makes the inspection indifferent to change of colours and materials

Statistical process control (SPC)
- Promotes continuous process improvement by a clear failure detection and allocation
- Provides monitoring functions and trend analysis of diverse process variables, real-time inspection reports, batch- and order related.
- Communication/data exchange with printers, pick & place and AOI systems.
INTELLISYS®
Total Quality Management System

INTELLISYS® supports a continuous process optimization by exact localization of defects on inspected boards. INTELLISYS® is the basis for realization of the requirements of Industry 4.0.

INTELLISYS® includes the following software modules:

- Remote Repair
- Remote SPC
- Remote Debugging
- Intelli-Track
REMOTE REPAIR:
Verification and repair of missing PCB’s at an external work station.

REMOTE SPC
Statistical Process control for several AOI or SPI systems from an external work station. This enables amongst others a real time monitoring of the production line.

REMOTE DEBUGGING
Only one debug on one PC with transfer to several AOI systems.

INTELLI-TRACK
With INTELLI-TRACK the user can exactly analyse the source of defects and eliminate it.

Intelli-Track establishes a link between AOI and SPI, tracks precisely the causes of defects and enables trend analyses.

Data will be exchanged up- and downstream to the production flow and, based on the trend analysis, appropriate action can be taken before a failure will be produced.
Do you already know our further products?

Amongst others:

Diverse feeding solutions like tube feeder, JEDEC tray feeder and tape feeder for special machines
Taping machines, systems for separation and application of components and special parts
Dispenser, Die Attach Systems, systems for Heat Bonding and LCD Module Equipment
Solutions for identification like labels and label printers, label feeders, also with integrated printer (POD)

We are looking forward to your challenge!

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