

# AutoInspector Series

Ultra II & Supra  
Inline Automated Optical Inspection

the vision to improve your process



*MVP's high speed AutoInspectors identify assembly defects on PCBs and enable in-line process control. Inspections include paste, pre-solder, and post-solder SMT and mixed technology boards. The AutoInspector 1820 Ultra II provides highest performance in speed and inspection robustness. The AutoInspector 1820 Supra offers the most powerful and cost effective inspection solution for the medium volume, high mix market. High inspection speeds, low false call rates, and accurate process measurement maximize inspection effectiveness, increase throughput, and improve process control and yield.*



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## Total Defect Coverage

### *Post-Print Inspection*

Paste and glue for placement centroids (x and y), area, pad area coverage, shape, and overall translation and rotation of the board with respect to the screen printer. Available 3D volume and height inspection option.

### *Post-Placement Inspection*

Presence/absence, X, Y, and Theta offset measurement, and polarity.

### *Post-Solder Inspection*

SMT and PTH parts for presence/absence, placement offset, polarity, bridging, solder opens, insufficient and excess solder, billboards, tombstones, lifted and bent leads. OCR and OCV for wrong component detection and traceability.

## Flexibility and Modularity

The AutoInspector is a true multi-application platform and can be deployed anywhere in the assembly process, from post-print to post-wave inspection. With MVP's unique Quad-angle lighting, no hardware adjustments are necessary when changing the inspection application.

MVP AutoInspectors are designed for complete, seamless integration into the manufacturing process. These SMEMA compatible inspection systems can be operated in-line or off-line. Boards can be tracked sequentially or with barcode readers. All MVP products feature file sharing and Ethernet connectivity. The systems are modular, field-upgradeable, and scalable to meet various throughput requirements.

## Copy-Exact Capability

The Ultra II series is designed to meet the highest inter-machine repeatability standards. A solid unibody frame, 3-point-suspension design, ultra-high precision linear stage, quad speed digital cameras, and high resolution optics provide a copy-exact hardware platform that offers maximum program transferability and maximum equipment reliability. Comprehensive off-line programming capabilities and advanced library management tools enable centralized engineering support and multi-plant program roll-out.

## Speed and Resolution

Powerful image processing software and accurate high resolution imaging combine to provide the fastest inspection throughput with the highest resolution available. As a result, all typical throughput requirements of modern high volume manufacturing are met without sacrificing resolution. Typical optics configurations result in pixel sizes between 15 and 17 microns, ensuring high precision results on 0201 applications. MVP's powerful, intelligent algorithms, combined with high precision imaging, guarantee ultra-low false calls with maximum defect coverage.



*MVP's Flying Camera*

## Maximum Productivity

MVP offers the highest degree of system efficiency by minimizing programming time and by providing automated tools for maximum productivity. Complete point-and-click database generation, algorithm fine tuning, and the advantage of networked off-line programming make the AutoInspector extremely efficient, cost-effective, and user-friendly.

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# AutoInspector Series

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## ULTRA II TECHNICAL SPECIFICATIONS

Inspection Speed	<ul style="list-style-type: none"> <li>Acquisition speed 48 1.4 megapixel images/second with standard dual large format cameras.</li> <li>Up to 90 sq.cm. per second (14 sq. inches/second) inspection dependent on board layout and density.</li> </ul>
System Hardware	<ul style="list-style-type: none"> <li>Improved optics and lighting, and increased camera sensitivity for better performance.</li> <li>On the fly dual camera acquisition, start-stop support.</li> <li>Programmable LED strobe lighting.</li> <li>Adjustable pixel resolution from 15 to 21 micron/pixel.</li> <li>0201 Capable.</li> <li>High precision X/Y stage with 0.5 micron linear scales, closed loop linear servo motors for fast acceleration &amp; speed.</li> <li>Dual processor, Dell server PC computer, PCI image buffer boards.</li> <li>CD Rom, printer port, UPS, &amp; USB ports.</li> <li>10/100 Mbit Ethernet networking.</li> <li>Standard 17" LCD high resolution monitor.</li> <li>Copy-exact, inter-machine capability.</li> </ul>
System Software	<ul style="list-style-type: none"> <li>Linux OS.</li> <li>CAD-driven, library-based programming software.</li> <li>Proven, high performance, adaptable algorithms with highest detectability and low PPM false accept and false reject rates.</li> <li>Barcode Reading support.</li> <li>Full network integration (TCP/IP, NFS Protocol).</li> <li>Real-time SPC package.</li> <li>5th Generation proven inspection software.</li> <li>Multi-pass technology. Adjustable lighting intensity.</li> <li>Multi-panel support.</li> <li>MVP DPC compatible.</li> </ul>
Material Handling	<ul style="list-style-type: none"> <li>SMEMA interface.</li> <li>Flexible PLC control.</li> <li>Auto Board Clamp for precision registration.</li> <li>Configurable for inline or stand alone, hand/magazine load/unload.</li> </ul>
Physical Specification	<ul style="list-style-type: none"> <li>Inspection envelope 450mm x 500mm (18" x 20")</li> <li>Board handling envelope 500mm x 546mm (20" x 21.5")</li> <li>Footprint 1140mm x 1040 mm,</li> <li>Height 1470mm (45" x 41", height 58")</li> <li>Conveyor length 1140mm (45")</li> <li>Power 220 VAC, 50/60Hz, 10 Amperes</li> <li>Air 60 PSI, 1 CFM</li> <li>Weight 680 kgs (1500 lbs)</li> </ul>
Options	<ul style="list-style-type: none"> <li>Three camera module for highest throughput.</li> <li>Quad angle light for pre-reflow inspection.</li> <li>Z-Axis control for e-cap inspection &amp; OCR optimization.</li> <li>UV optics module for flux &amp; paste inspection.</li> <li>Laser height measurement and co-planarity measurement.</li> <li>Metrology optics module for 0201 process characterization.</li> <li>Color acquisition.</li> <li>AutoWidth adjust.</li> <li>OCR/OCV</li> <li>Knife edge lifter for thin board support.</li> <li>CAD translation software.</li> <li>Barcode support.</li> <li>3D paste scanning module.</li> <li>Three section conveyor for improved cycle time.</li> <li>Post -scanning registration for faster speed on multi-panel boards.</li> <li>Specialized material handling for ceramics.</li> </ul>

## SUPRA TECHNICAL SPECIFICATIONS

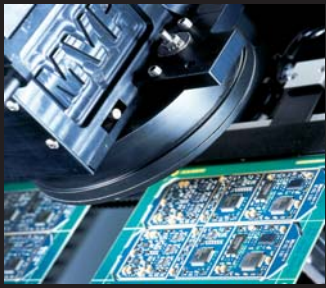
Inspection Speed	<ul style="list-style-type: none"> <li>Acquisition speed 24 1.4 megapixel images/second.</li> <li>Up to 45 sq.cm. per second (7 sq. inches/ second) inspection dependent on board layout and density.</li> </ul>
System Hardware	<ul style="list-style-type: none"> <li>Improved optics and lighting, and increased camera sensitivity for better performance.</li> <li>On the fly single camera acquisition.</li> <li>Programmable LED strobe lighting.</li> <li>Single lens. Adjustable pixel resolution from 15 to 24 micron per pixel.</li> <li>0201 Capable.</li> <li>High precision X/Y stage with 0.5 micron linear scales, closed loop linear servo motors for fast acceleration &amp; speed.</li> <li>Single processor, Dell server PC computer, PCI image buffer boards.</li> <li>CD Rom, printer port, UPS, &amp; USB ports.</li> <li>10/100 Mbit Ethernet networking.</li> <li>Standard 17" LCD high resolution monitor.</li> <li>Copy-exact, inter-machine capability.</li> </ul>
System Software	<ul style="list-style-type: none"> <li>Linux OS.</li> <li>CAD-driven, library-based programming software.</li> <li>Proven, high performance, adaptable algorithms with highest detectability and low PPM false accept and false reject rates.</li> <li>Barcode Reading support.</li> <li>Full network integration (TCP/IP, NFS Protocol).</li> <li>Real-time SPC package.</li> <li>5th Generation proven inspection software.</li> <li>Multi-pass technology. Adjustable lighting intensity.</li> <li>Multi-panel support.</li> <li>MVP DPC compatible.</li> </ul>
Material Handling	<ul style="list-style-type: none"> <li>SMEMA interface.</li> <li>Flexible PLC control.</li> <li>Auto Board Clamp for precision registration.</li> <li>Configurable for inline or stand alone, hand/magazine load/unload.</li> </ul>
Physical Specification	<ul style="list-style-type: none"> <li>Inspection envelope 450mm x 500mm (18" x 20")</li> <li>Board handling envelope 500mm x 546mm (20" x 21.5")</li> <li>Footprint 1140mm x 1040 mm,</li> <li>Height 1470mm (45" x 41", height 58")</li> <li>Conveyor length 1140mm (45")</li> <li>Power 220 VAC, 50/60Hz, 10 Amperes</li> <li>Air 60 PSI, 1 CFM</li> <li>Weight 635 kgs (1400 lbs)</li> </ul>
Options	<ul style="list-style-type: none"> <li>Quad angle light for pre-reflow inspection.</li> <li>Z-Axis control for e-cap inspection &amp; OCR optimization.</li> <li>Laser height measurement and co-planarity measurement.</li> <li>Color acquisition.</li> <li>AutoWidth adjust.</li> <li>OCR/OCV</li> <li>Knife edge lifter for thin board support.</li> <li>CAD translation software.</li> <li>Barcode support.</li> <li>3D paste scanning module.</li> <li>Post -scanning registration for faster speed on multi-panel boards.</li> <li>Specialized material handling for ceramics.</li> </ul>

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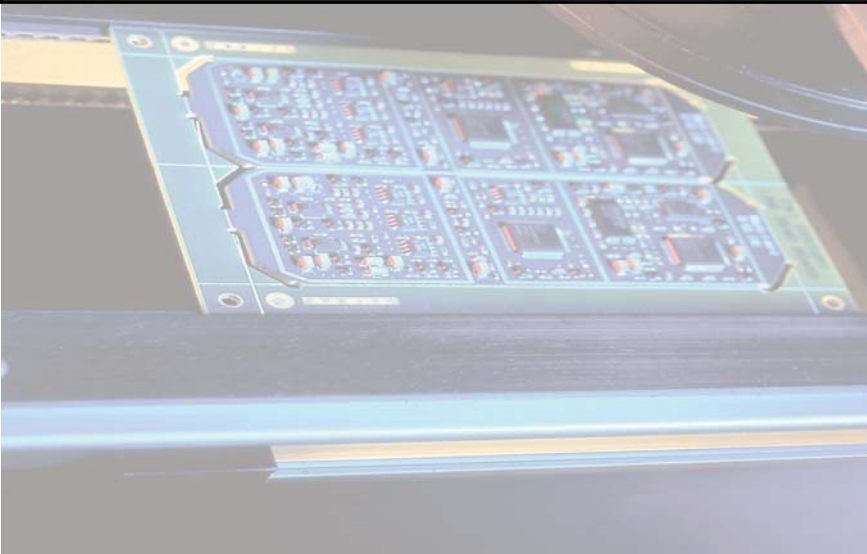




# AutoInspector Series

Supra M

Inline Automated Optical Inspection



## SUPRA M TECHNICAL SPECIFICATIONS

- Inspection Speed**
- Acquisition speed 20 1.4 megapixel images/second.
  - Up to 45 sq.cm. per second (7 sq. inches/second) inspection dependent on board layout and density.

- System Hardware**
- Improved optics and lighting, and increased camera sensitivity for better performance.
  - On they fly single camera acquisition.
  - Programmable LED strobe lighting.
  - Single lens. Adjustable pixel resolution from 15 to 24 micron per pixel.
  - 0201 capable.
  - High precision X/Y stage with 0.5 micron linear scales, closed loop linear servo motors for fast acceleration & speed.
  - Single processor, Dell server PC computer, PCI image buffer boards.
  - CD Rom, printer port, UPS, & USB ports.
  - 10/100 Mbit Ethernet networking.
  - Standard 17" LCD high resolution monitor.
  - Copy-exact, inter-machine capability.

- System Software**
- Linux OS.
  - CAD-driven, library-based programming software.
  - Proven, high performance, adaptable algorithms with highest detectability and low PPM false accept and false reject rates.
  - OCR/OCV
  - Barcode Reading support.
  - Full network integration (TCP/IP, NFS Protocol).
  - Real-time SPC package.
  - 5th Generation proven inspection software.
  - Multi-pass technology. Adjustable lighting intensity.
  - Multi-panel support.
  - MVP DPC compatible.

- Material Handling**
- SMEMA interface.
  - Flexible PLC control.
  - Auto Board Clamp for precision registration.
  - Configurable for inline or stand alone, hand/magazine load/unload.

- Physical Specification**
- Inspection envelope 406mm x 450mm (16" x 18")
  - Footprint 960mm x 965 mm
  - Height 2083mm
  - Conveyor Adjustable height 735mm to 965mm
  - Conveyor length 1m (997mm)
  - Power 220 VAC, 50/60Hz, 5 Amperes
  - Air 60 PSI, 1 CFM
  - Weight 635 kgs (1400 lbs)

- Options**
- Quad angle light for pre-reflow inspection.
  - Z-Axis control for e-cap inspection & OCR optimization.
  - Color acquisition.
  - Knife edge lifter for thin board support.
  - CAD translation software.

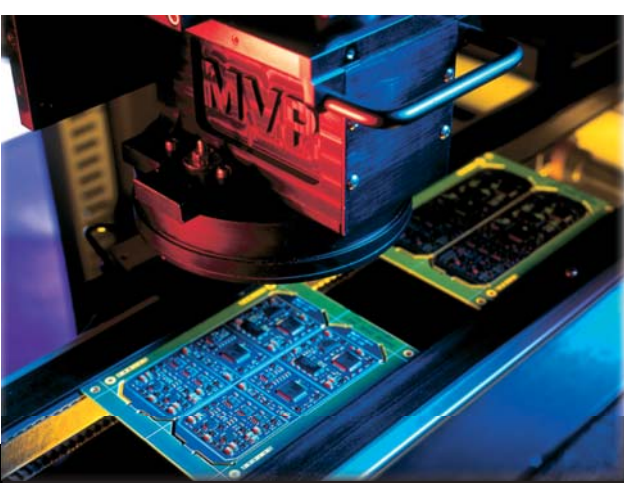
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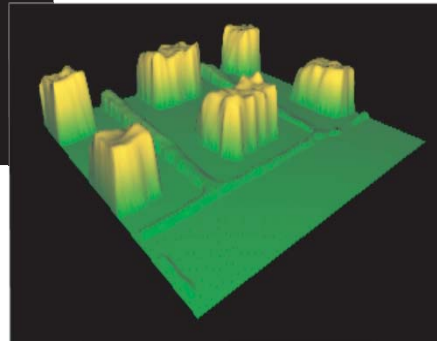
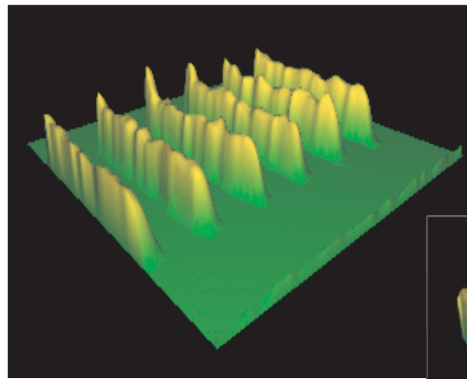




# AutoInspector Series

3 D Inspection

the vision to improve your process



*MVP has developed a new 3D inspection approach by integrating the latest available high-speed smart cameras into the existing design of the AutoInspector Series. Utilizing MVP's patented technology, components as small as 0201 and Micro-BGA can be inspected using this new 3D technology. The Ultra II and Supra can be delivered with this option to provide unsurpassed 2D/3D performance.*



# AutoInspector Series

3D inspection

## 3 D Inspection Capability

Provides an extension of the AutoInspector defect coverage by giving the user the flexibility to add 3D coverage for paste inspection for the entire board, selected areas of the board, as well as for a production sampling mode where the system inspects 3D based on a user-selected sampling rate. The modularity of the new 3D solution maximizes the flexibility of the AutoInspector series, and provides for easy field upgrades capable of 0201 and Micro-BGA inspection.

## Approach to 3 D Inspection

Draws on an extensive history in this technology, including a patent on 3D inspection using orthogonal cameras. The design, established on a laser triangulation principle, is based on orthogonal laser sampling with software controlled sampling resolution and angled smart cameras. The 3D camera can be configured to provide optimized throughput scalability by adjusting the sampling resolution. Configuration options include 3D-only as well as integrated 2D/3D inspection. Warpage compensation is achieved with base-gray windows distributed across inspection area.

## Unsurpassed Flexibility with 2D/3D

Based on MVP's multiple-pass technology that enables the creation of separate inspection passes for the same program utilizing different sensors and/or different lighting. This technology also enables sampling under pass control for an inspection program. For example, every board coming down the line could be inspected 100% in 2D, and every nth board could be tested with an additional 3D inspection pass. The 2D/3D multi-pass approach also allows to inspect paste (fine pitch) and components in paste and the same time.

## 3 D TECHNICAL SPECIFICATIONS

**Image Acquisition Hardware**

- Integrated Orthogonal 2D camera and 3-D Laser Sensors to provide highest flexibility solution.
- Orthogonal 3D Laser for 3D Acquisition.
- Highest Speed 3D Camera Technology Available.
- Improved optics and lighting and increased camera sensitivity for better performance.
- Programmable LED Strobe Lighting for 2D Illumination.
- Large Format Camera Technology for 2D Acquisition.

**Standard Ultra II Configuration**

- On the fly dual camera and 3D acquisition, start-stop support.
- Acquisition speed of 48 1.4 megapixel images/second with standard dual large format cameras.
- Dual Camera/Dual Processor for Highest Acquisition Speed.
- Inspection envelope 350mm x 350mm (14" x 14").

**Standard Supra Configuration**

- On the fly single camera and 3D acquisition, start-stop support.
- Acquisition speed of 24 1.4 megapixel images/second with standard dual large format cameras.
- Single processor, Dell server PC computer, PCI image buffer boards.
- Inspection envelope 450mm x 420mm (18" x 16.5").

**3D Specification**

• Height Resolution	3µm-5µm
• Area Resolution	13µm -19µm per pixel
• Scan Direction Resolution	13µm -19µm per pixel
• Profiles Per Second	8928
• Points Per Profile	1536
• 3-D Points Per Second	13.7million
• Volume Repeatability	100µm <sup>3</sup> at 3σ
• Position Repeatability	3.6µm at 3σ
• FOV	1170mil (0402 Inspection) 770mil (0201 Inspection)
• Speed	
1170 FOV	7.75in <sup>2</sup> per second at 19µm
770 FOV	3.41in <sup>2</sup> per second at 13µm

**2D Specification**

- Adjustable Pixel Resolution 15 to 21µm Linear.
- 0201 Capable.
- FOV 880mil

**System Software**

- Proven, high performance, adaptable algorithms with highest detectability and low PPM false accept and false reject rates.
- Real-time SPC package.
- Multi-pass technology. Adjustable 2D lighting intensity.
- Multi-panel support.
- MVP DPC compatible.
- Gerber support available.
- Includes all software options of MVP 2D systems.
- Pseudo color 3D mapping feature.

**Physical Specification**

- Footprint 1140mm x 1040 mm
- Height 1470mm (45" x 41", height 58")
- Conveyor length 1140mm (45")
- Power 220 VAC, 50/60Hz, 10 Amperes
- Air 60 PSI, 1 CFM
- Weight 680 kgs (1500 lbs)

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