CapStone™ + SPOT ON™ Feature Upgrade

Industry's-first dynamic focus capability improves yield

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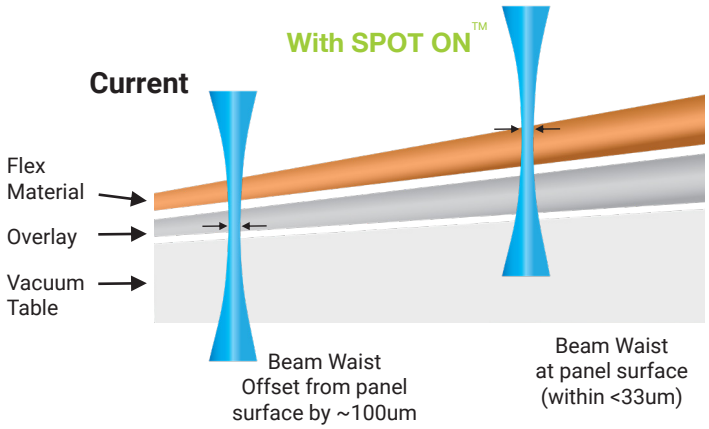
Increase via drilling operational performance with CapStone's SPOT ON™ feature upgrade:

- Higher Yield by reducing common via quality issues
- Reduced impact of fleet and lot variability
- Automated laser-to-camera focus offset



SPOT ON™ measures table, overlay, and material height fluctuations.

System automatically compensates for measured fluctuations.

Beam Location & Control

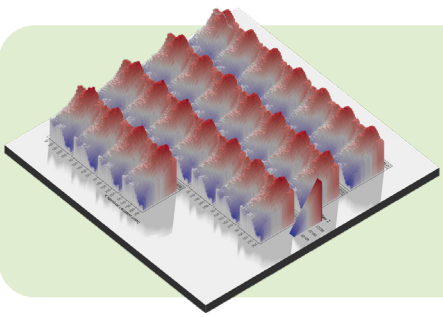
Automatically measure and validate spot size and focus during production.

Panel Z Mapping

Quickly and accurately measure surface height variations across the processing surface due to vacuum table, overlay and the material before processing.

Realtime Z Control

The system will automatically compensate for z-height fluctuations during production.

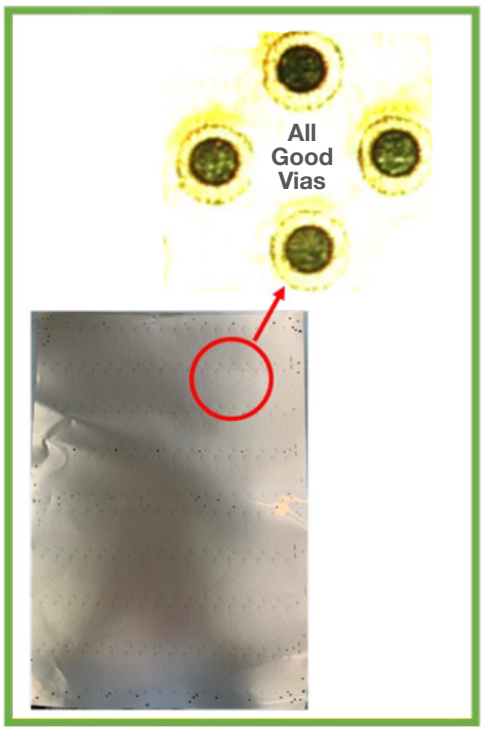


Exclusive Panel Mapping Capabilities

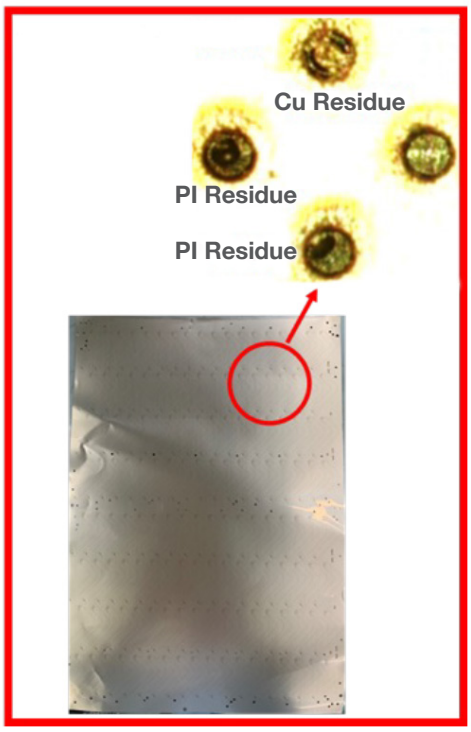
- Now you can increase yield by mapping the panels high and low spots
- Drill better vias and reduce failures caused by PI residue, top copper remain, and bottom copper melt or damage

CapStone™ + SPOT ON™ Feature Upgrade
Upgrade Benefits

With SPOT ON™



Without SPOT ON™



Benefit	Feature	Specification
Higher Yield	Focus Calibration and Accuracy	• Automatic Calibration • Optical method • Accurate to ~10um • Customers do not have to do anything to assure Process Window is centered due to continual updating of focus calibration.
Improved Service Planning and Trouble Shooting	Spot Size and Quality	• Verified on a user defined basis • Data collected into easy-to-read SPC charts showing trends over time.
Higher Yield and Drilling Accuracy	Height Fluctuation Control	• System measures and retains height map on a per job basis • System auto-compensates during processing to maintain ideal focus position to within <30um across the work surface.

Ask an Expert! For facilities guidelines, requirements or more information, please contact your local ESI representative or visit www.esi.com.

CapStone™

Reduce Costs 20-30% Over the 5335.

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CapStone provides a laser-based FPC processing solution that utilizes a new generation of laser technology and laser control capabilities to simultaneously deliver high-quality, high-speed via drilling.

The CapStone™ UV-laser drilling system provides leading-edge FPC manufacturers with a high throughput laser-based solution for processing flexible circuit interconnects at higher levels of precision–even on thinner materials. Breakthrough productivity using laser and laser control technology optimized for FPC processing enables flex PCB manufacturers to extend their capabilities and cost-effectively address a wider range of requirements associated with high-volume flex processing at up to and beyond 30% more cost-effectively than the 5335.

Laser control maximizes blind via throughput and yields.

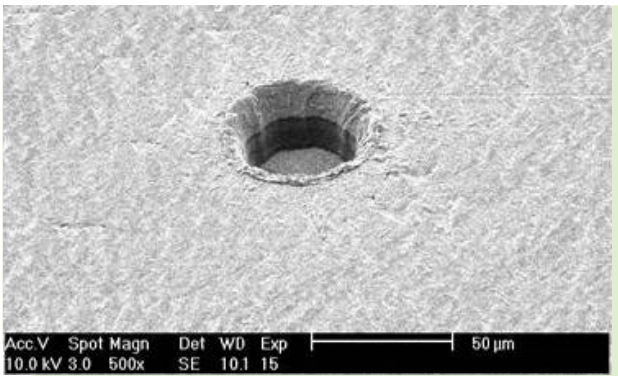
Dramatically increase your blind via processing speeds using ESI's new, patented DynaClean™ feature that turns your multi-pass blind via process into a single pass. Minimize heat effects with up to 10m/s via drilling process velocities using AcceleDrill™ beam positioning technology.

High-performance laser drives efficiency and lowers costs.

Highest UV nsec FPC drilling industry repetition rate with optimized laser characteristics delivers higher throughput and wider process windows. Laser designed and tested in high-volume 24/7 manufacturing environments to extend laser life and reduce maintenance requirements.

Process a wide range of current and next-generation materials.

CapStone applies ESI's decades of laser-material interaction expertise to provide higher performance. This enables FPC manufacturers to drill high-density designs with an increased yield—while limiting incidental damage.



Extend Your Flex Processing Capabilities

- Highest productivity and yields for small blind vias and through vias in thin materials
- High-quality vias down to 25 µm
- Custom optimized laser for wide process window and high productivity

CapStone™ System Specifications

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Laser	
Type	355nm wavelength
Pulse Rate for Via Formation	300 kHz
Average Power	>11.4W @ 300 kHz

Type	Cross-axis with galvanometer (Laser beam moves in XY, part moves in Y axis)
Panel Size	533 mm x 635 mm
Accuracy	± 15um |M|+3s over entire panel area
Maximum Drilling Velocity	10,000 mm/s
Controller	ESI custom DSP-based controller

Main Stage	
Type	Cross axis
Motor Type	Brushless linear motors

Secondary Stage	
Type	XY Galvanometer
Controller	High-speed custom digital control

Tertiary Stage	
Type	XY Acousto Optical Deflectors
Controller	High-speed custom digital control

Laser Power Control	
Long Term Stability	±2.5% + 50 mW
Feedback	Closed Loop
Power Control	Precision Pulse™ real-time

Features:

Third Dynamics™, AcceleDrill™, and DynaClean™

Programmable Z Stage	
Resolution	1 µm
Maximum Average Velocity	>10 mm/s
Repeatability	± 10 µm
Travel	25 mm

Automatic Alignment and Illumination	
Coarse Camera Field of View	30 mm diagonal
Fine Camera Field of View	2 mm diagonal
Detection Device	CCD, monochrome
Illumination	LED

System Control Computer	
Type	IBM® PC compatible
Hard Drive	Dual 500GB in RAID1 configuration
Monitor	17” LCD flat panel
Input Devices	Keyboard and trackball

System Software	
Operating System	Microsoft Windows 7
Network Compatibility	TCP/IP, 10/100/1000 GBE
Toolpath Generation Software	esiCAM
Drill File Formats	DXF, ASCII, Excellon I and II, Sieb & Meier and Gerber

Automation Capability

Software, mechanical and electrical interfaces provide the capability to attach web and panel material handlers to the system.

Ask an Expert! For facilities guidelines, requirements or more information, please contact your local ESI representative or visit www.esi.com.

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Geode™ A

CO_2 Via Drilling For FCBGA(ABF) IC Substrate Manufacturing .

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The industry's most Innovative CO_2 via drilling system powered by quasi-continuous wave laser and AOD technology for maximum performance.

The Geode A laser drill combines special laser/optics configuration with precision pulse shaping and steering specifically designed for ABF materials. Geode's technology enables a greener manufacturing solution through 21% less floor space 72% less weight and up to 65% less power consumption than the competition. The combination of QCW laser and AOD technology also ensures highest throughput and lowest cost of ownership for our customers.

Throughput

Hypersonix

MKS expertise with acousto-optic devices (AOD) enables sound waves to modify laser energy for optimum throughput.

AcceleDrill

Geode uses AODs for spatial energy distribution and beam steering to maximize applications flexibility.

Accuracy

VDC

Via Density Compensation improves via diameter stability, accuracy and throughput.

BCT

The MKS beam characterization tool offers precision in-line laser/optical evaluation and control for improved calibration and via consistency.

Footprint

LiteDesign

Compact and lightweight system architecture allows for more installation flexibility and reduces production footprint.

UpTime

Easy-access design improves serviceability and decreases maintenance and service downtime.

LodeStone™

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Higher quality. More materials.
Your product never looked so good.

The LodeStone™ system is a more accurate and flexible processing alternative for the efficient cutting and drilling of flexible materials. Its short pulse-width femtosecond laser results in low levels of carbonization and minimal heat affected zones, delivering the exceptional accuracy and tight tolerances required by processors driving new solutions to market.

Femtosecond quality at nanosecond price and reliablity

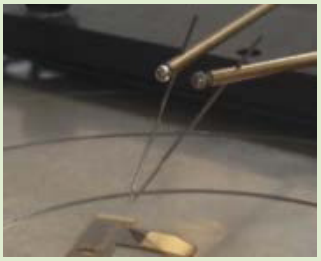
LodeStone uses an ESI-designed femtosecond laser with proprietary fiber technology to avoid costly laser components and historical issues with short pulse width laser reliability. With low upfront cost and high-quality, responsive ESI service support, LodeStone enables you to consistently output ultra-high quality product with minimal headaches and low cost.

Broader range of materials with high quality and productivity

It is well-known that ultra-short pulse lasers can avoid issues associated with poor laser energy absorption due to its cold ablation mechanism. Inefficient energy absorption is a major cause of poor quality and low throughput in many materials. LodeStone's femtosecond laser enables you to process a broader range of material with high quality and productivity.

Throw out your tooling

Can't achieve your customer's tight tolerances and high accuracies with your mechanical process anymore? Tired of long lead times and high prices for your mechanical punch tooling? LodeStone cuts overlay and flexible circuits with equivalent quality and reliability while enabling you to meet your customer's demanding lead time and quality requirements and avoiding costly tooling.



Depaneling high-reliability flexible circuits

The last step of FPC production requires depaneling the individual circuits. High-reliability circuits have historically required a mechanical process to avoid low-resistance paths caused by laser-induced debris and carbonization. LodeStone now enables a cost-effective process to avoid tooling expenses and achieve >1014 Ω finger-to-finger resistance in a wide range of FPC materials.

RedStone™

The Right Laser for the Right Application

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Reliability. Accuracy. Ease-of-use. All at a low cost of ownership.

The RedStone™ system delivers an optimized FPC manufacturing solution, pairing the appropriate laser and laser control capabilities to efficiently address applications that require more powerful processing capability or more repetitions and a lower cost-of-ownership. The RedStone system is engineered to deliver a robust process flow while delivering high yield, and is especially well suited to large-format UV laser processing of panels and roll-to-roll webs.

Reliability

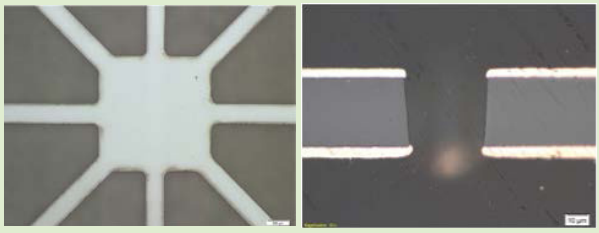
Rest assured that your RedStone system will stay productive with high uptime. RedStone shares over 90% of components in common with the flagship ESI models 5335™ and GemStone™ that are in high-volume 24/7 production at the world's top flex circuit manufacturers.

Accuracy

Don't sacrifice accuracy to meet your cost of ownership targets. The RedStone system benefits from the same accurate frame, precision engineering, and alignment and scaling mechanisms at ESI's top-tier flex drilling systems.

Depaneling

RedStone utilizes a high-repetition-rate / high-average-power laser that is well suited to applications such as through hole drilling and through cutting. The laser minimizes heat affected zones to deliver higher quality cutting with minimal risk of degradation to the material.



Ideal for applications requiring large process windows.

Large process window applications examples include through-cut routing, through via applications, and the removal of easily-ablated materials from a durable substrate. Applications such as these can best utilize the RedStone system's high-accuracy, high-throughput capabilities while ensuring high process yield.

RedStone XP™

Show Your Best Every Time

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Higher throughput. Industry-leading power monitoring and control. ESI quality.

The RedStone XP™ system adopts proven design innovations from our premier products to deliver the ideal FPC processing solution for job shops facing significant product mix uncertainty. Process blind and through vias, rout and skive coverlay and thin printed circuit boards at high speeds and yields using ESI's compound beam positioning and patented Precision Pulse™ technology. With the added assurance of energy traceability and closed-loop power control that Precision Pulse™ provides, RedStone XP is a low-risk investment.

Enhanced Productivity

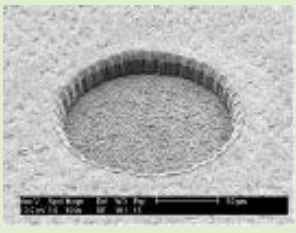
With RedStone's high frequency laser technology and the 5335's real-time power control capability, RedStone XP achieves high productivity at low cost for a larger range of applications.

High yields and high quality through Precision Pulse™ power control

Reduce your yield loss even for challenging depth-limited processes using ESI's industry-leading Precision Pulse™ power control. This feature continuously measures and adjusts the laser energy to the work surface material to ensure robust process quality every time.

Trusted yields, trusted partner

RedStone XP applies ESI's decades of laser-material interaction expertise to provide higher performance. This enables FPC manufacturers to drill high-density designs with an increased yield—while limiting incidental damage.



Confident processing of high-quality vias, with the best UV nsec routing on market

- High-quality blind vias
- High-power, high-frequency laser for maximum rout speed and quality