Company Presentation
LASER MACHINES FOR MATERIAL PROCESSING: PROTOTYPING AND VOLUME
UV/CO$_2$ LASER DRILLING MACHINE
SYSTEM OVERVIEW

Beam delivery (beam shaping, precise power control, etc.)

Digital galvos

F-theta lens CO₂

Digital galvos

F-theta lens UV

Coaxial camera

High peak CO₂

CO₂ Laser

UV Laser

20W UV

Linear motor driven XY tables
32” x 28” max. panel size
<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>NSI-UC2-3228</td>
</tr>
<tr>
<td>Platform</td>
<td>Dual laser beams (CO$_2$/UV)</td>
</tr>
<tr>
<td>Table configuration</td>
<td>PCB panel size: 32” x 28”, linear motor driven XY stage</td>
</tr>
<tr>
<td>Laser head</td>
<td>3.0kW high peak power CO$_2$ laser</td>
</tr>
<tr>
<td></td>
<td>20W high power UV laser</td>
</tr>
<tr>
<td>Scanning devices</td>
<td>XY high-speed digital galvo</td>
</tr>
<tr>
<td>Scan box</td>
<td>50mm x 50mm (Max.)</td>
</tr>
<tr>
<td>Alignment</td>
<td>Vision system</td>
</tr>
<tr>
<td>HMI</td>
<td>21.5” touch screen</td>
</tr>
<tr>
<td>Auxiliary equipment</td>
<td>Cooling units, vacuum motor, air dryer</td>
</tr>
</tbody>
</table>
FEATURED TECHNOLOGIES
BEAM SHAPING
BEAM SHAPING CONT’D

Laser Output
Gaussian

Input To F-Theta Lens
Airy Disk

Beam Shape at
Target Flat Top

Diffractive Beam Shaper Optics

Refractive Imaging Optics

\[ I \propto e^{-\left(\frac{r}{w_0}\right)^2} \]
Gaussian to Top Hat beam shaping
COAXIAL VISION SYSTEM
USER OPERATION
USER-FRIENDLY OPERATION

Designed and user-friendly and intuitive touch screen operation

One click jogging

One click motions
OPERATION CONT’D

Vision captured marks

Function tabs

Main operating buttons

Process info:

G-code program load/edit/save

Laser process mode selection
OPERATION CONT’D

PROJECTS guides you for easy operation (program conversion, recipe creation, automation setup, etc)

A tutor mode assists how to create new recipes and to modify the recipes without complexity
Concentric Circle
for precise depth controlled trepanning

Spiral
for high speed trepanning

Skiving
for skiving inner targets, milling, preliminary routing

HIGH SPEED GALVO MOTION CONTROLS
LINEAR MOTOR DRIVEN XY-TABLES

• XY tables supporting 32” x 28” panels
  - Table chuck with high vacuum design
  - Built in power meter
  - Panel clamps and table chuck for thin panels available
HIGH VELOCITY DEBRIS EXTRACTION

Laser debris removed by high-velocity vacuum with height adjustable nozzles.
LASER PROCESS SAMPLES
TOP DIAMETER: 1 MIL
ASPECT RATIO: 300% (DEPTH/TOP)
TOP DIAMETER: 2MIL
ASPECT RATIO: 150% (DEPTH/TOP)
TOP DIAMETER: 3MIL
ASPECT RATIO: 100% (DEPTH/TOP)
TOP DIAMETER: 4MIL
ASPECT RATIO: 75% (DEPTH/TOP)
TOP DIAMETER: 5MIL
ASPECT RATIO: 60% (DEPTH/TOP)
TOP DIAMETER: 6MIL
ASPECT RATIO: 50% (DEPTH/TOP)
PLATED HOLE SAMPLES
5MIL BLIND HOLES
DRILLED ON L29-30 (30 LAYERS PCB)
PLATED HOLE SAMPLES
3 MIL BLIND HOLES
DRILLED ON L29-30 (30 LAYERS PCB)
PLATED HOLE SAMPLES
1.5 MIL BLIND HOLES
DRILLED ON L29-30 (30 LAYERS PCB)
PLATED HOLE SAMPLES
1 MIL BLIND HOLES
DRILLED ON L29-30 (30 LAYERS PCB)
PRELIMINARY ROUTING SAMPLES
# PRODUCT ROADMAP

<table>
<thead>
<tr>
<th>Features</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-house software development</td>
<td>Ongoing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;50mm x 50mm scan box</td>
<td>Initiate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expanded service</td>
<td>Ongoing</td>
<td></td>
<td></td>
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<tr>
<td>Routing</td>
<td>Implement</td>
<td></td>
<td></td>
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<tr>
<td>Pico laser NPI</td>
<td>Product Release</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiber laser NPI</td>
<td>Product Release</td>
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