



PCB Laser Marking Technology

**Why Depanel Automatically
Process Parameters and Control
Machine types, Technologies and System overview.**



Oct 12-13 2016

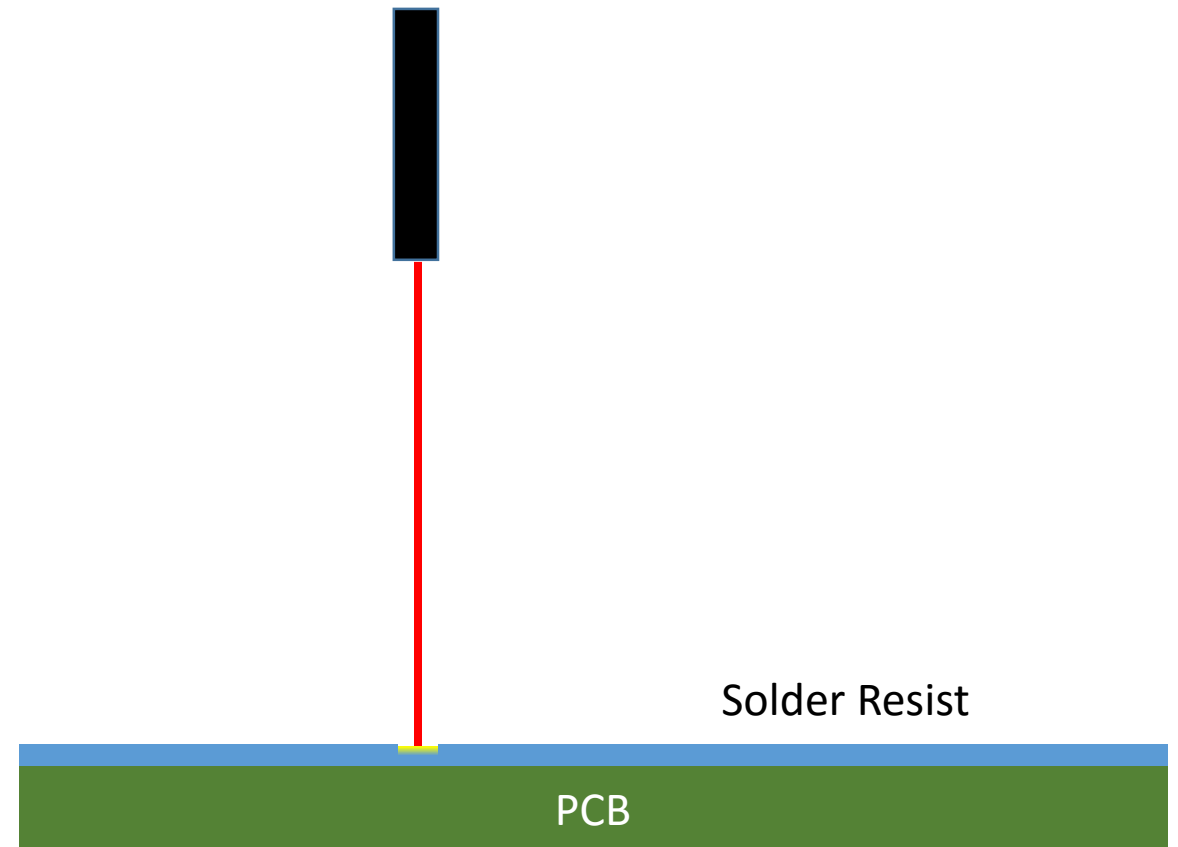
Machine Structure



- Conveyor System
 - With Flip Station
- Canopy Design
 - Class 4 – Safe with Class 1 Laser
- Laser Source
 - 30W CO2 w Z Axis adjustment
- Optics
 - Integrated with Source
- Positioning System
 - Galvanometer – 12000m/s Scan Speed.
- Integration Capability
 - MES or Stand Alone

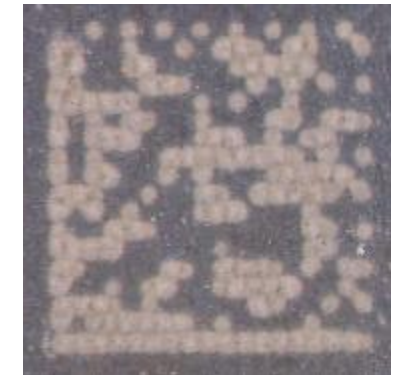
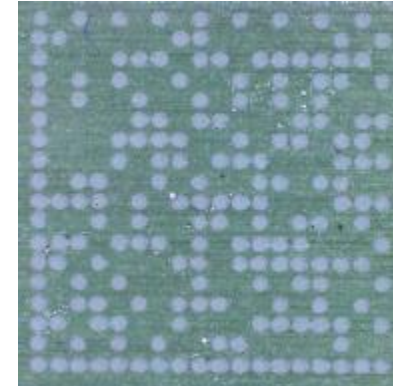
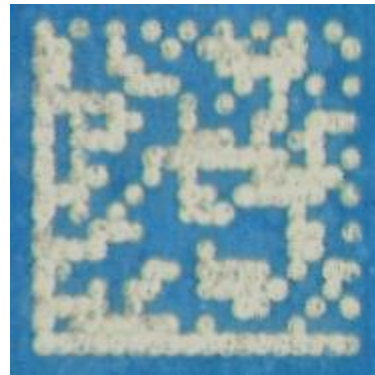
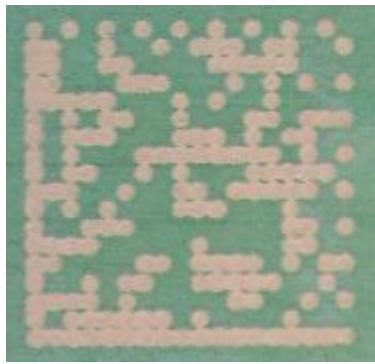
The Process

- Visible marks are created using a focused CO₂ laser beam
- Solder resist materials generally have good absorption over the far infrared wavelengths
- Upon laser irradiation, the solder resist layer will undergo thermal degradation and/or sublimation that is localized to the laser beam spot area
- This thermal degradation or sublimation results in a different color from the original color
- Further irradiation may increase the marking depth for better contrast but risk of thermal damage to the underlying features increases at the same time



Laser Marking on PCB soldermask

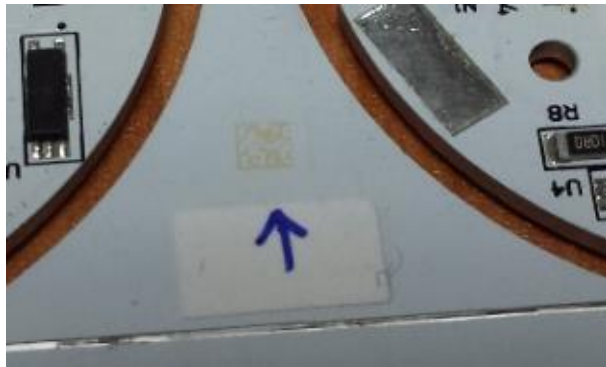
- PCB soldermask: typically thermoset plastic
- Thermal degradation of soldermask
- Depending on the material, it will appear slightly different in colour



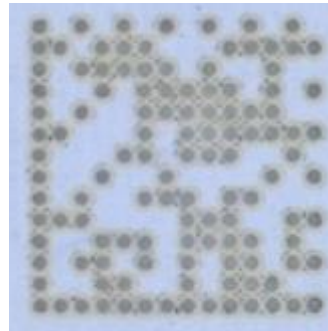
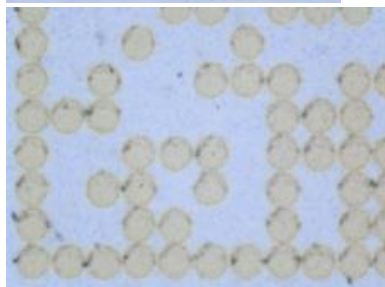
IC encapsulant



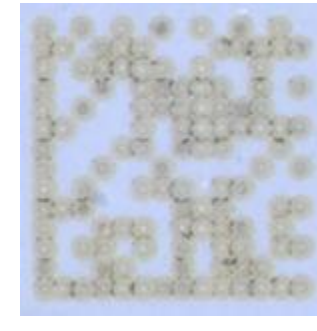
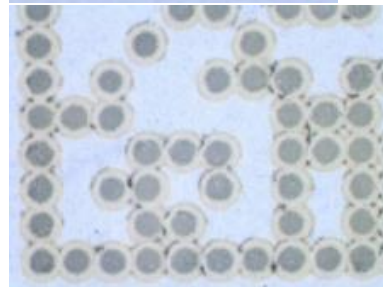
Laser Marking on white soldermasks



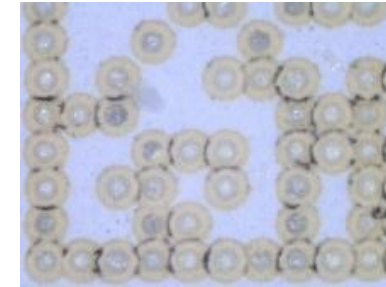
Not through mark: Marking has poor contrast



Mark through soldermask: **Metal base**



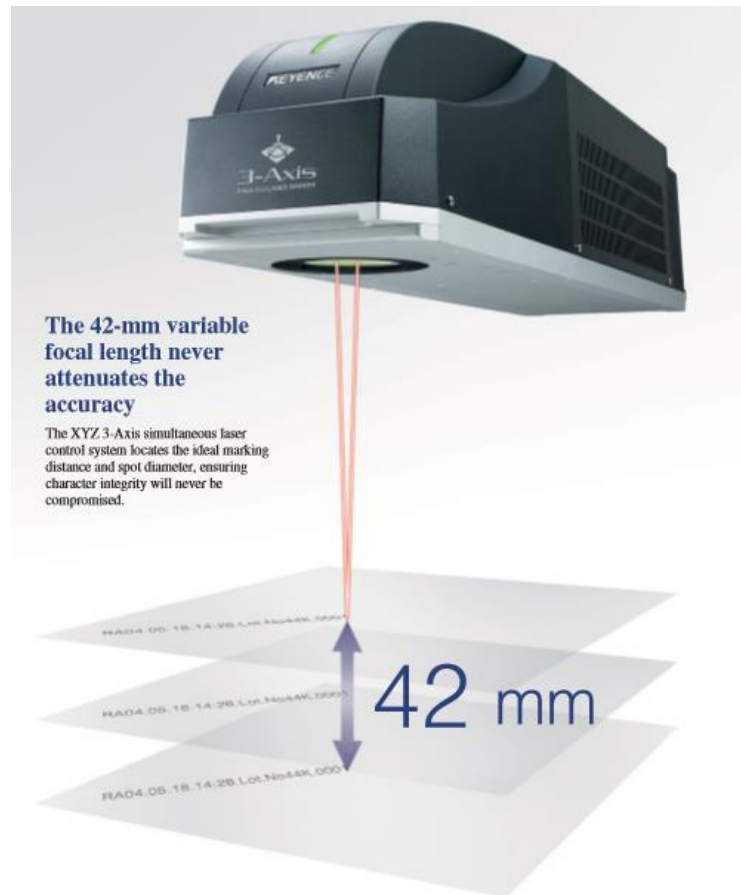
Mark through soldermask: **PCB base**



The Laser System - Outline



World's only 3 Axis [X, Y, Z] Laser

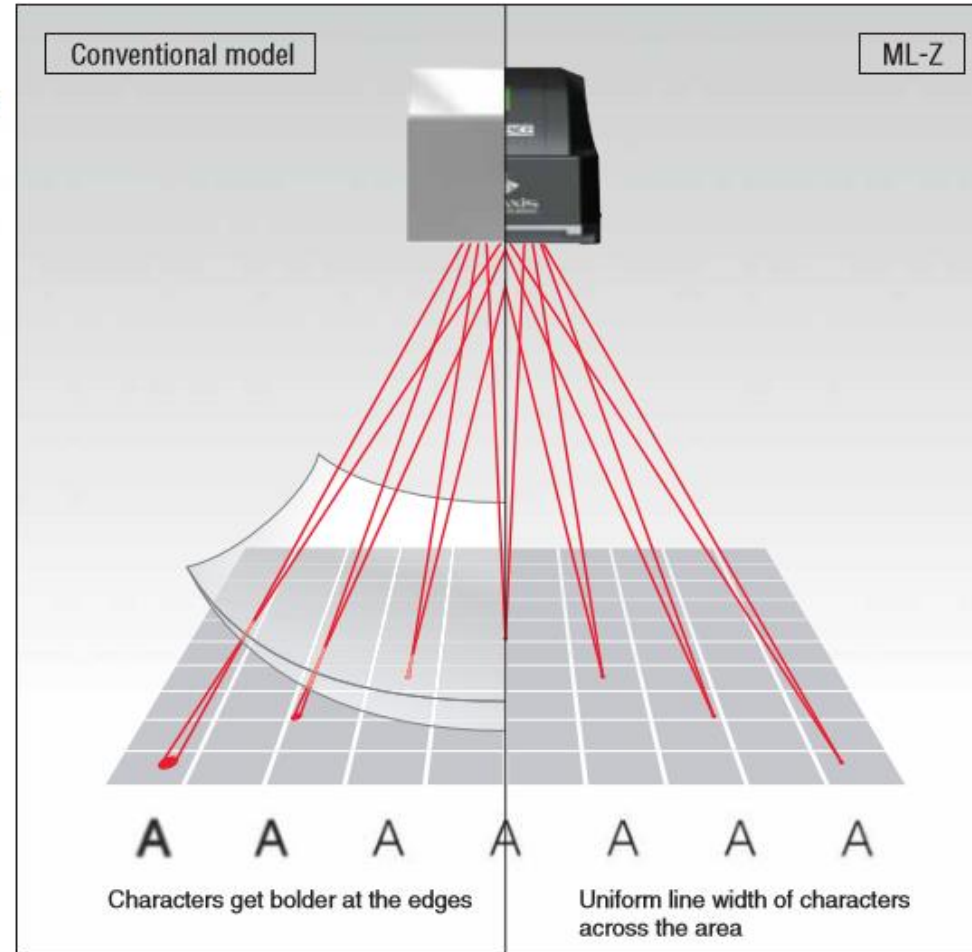
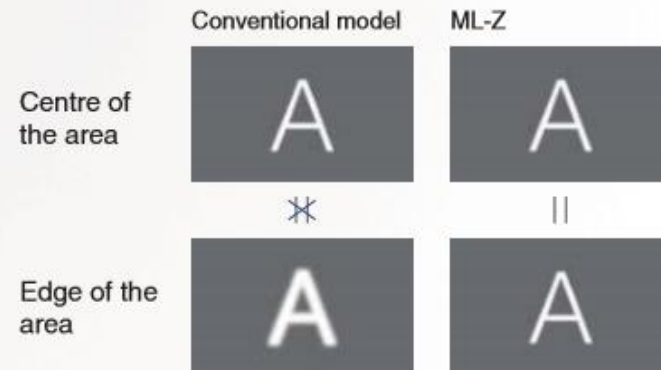


Integrated System from World Leader Keyence. Ultra high speed scanning speed, Z axis focal length control and consistent spot size.

The Laser System – Consistency.

Spot diameter is kept uniform over the entire area

Conventionally, the spot size at the centre and the edge of the marking area were different due to the artificial plane created by the $f\theta$ lens. ML-Z has solved this problem with 3-Axis laser control. High accuracy marking on a flat surface is guaranteed because of the uniform spot size.

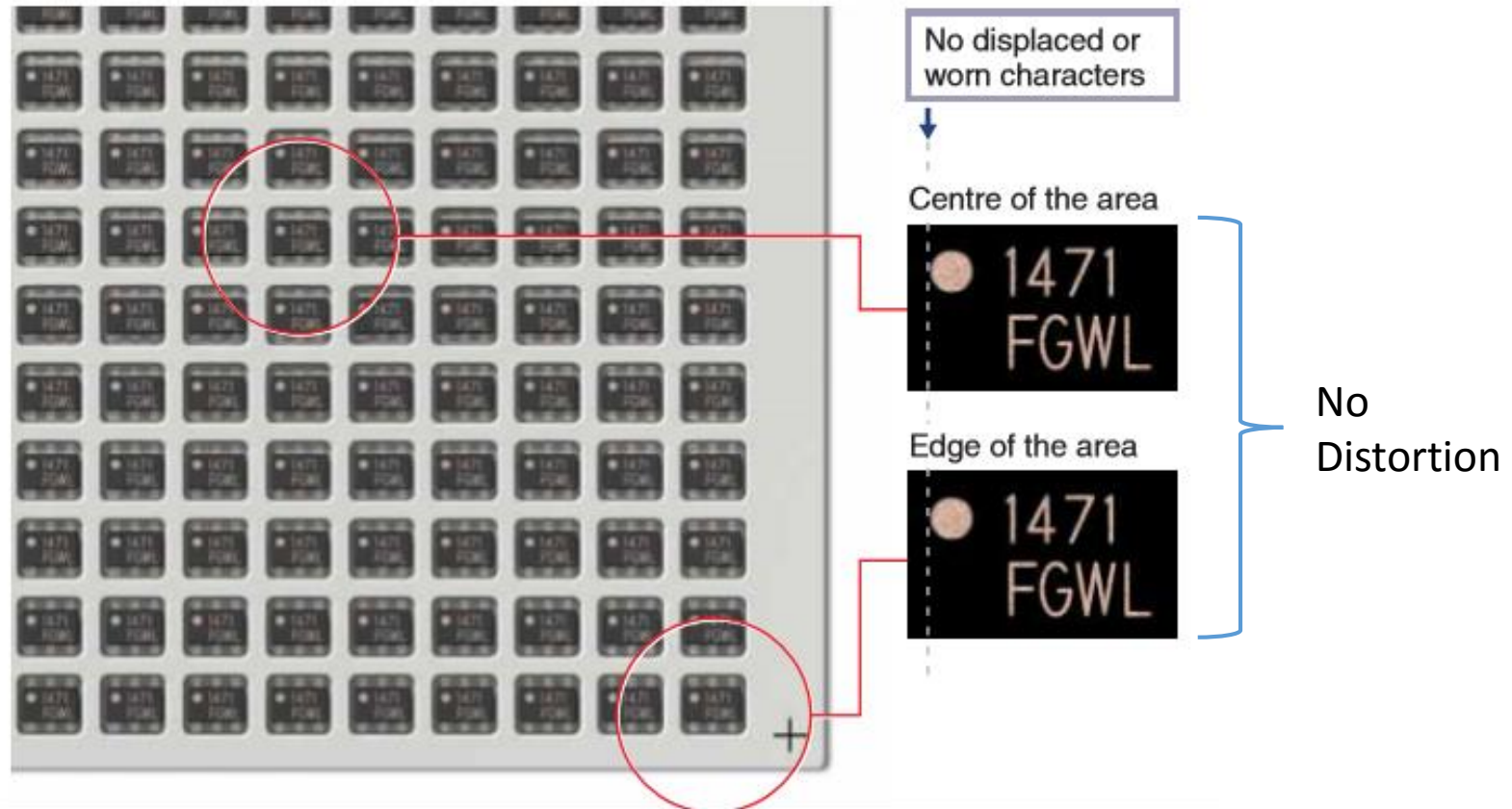
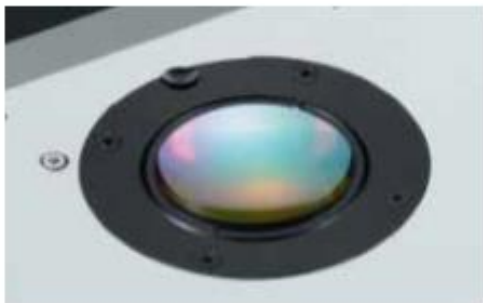


The Laser System – Spot Size.

Thin laser beam

Best for electronic components

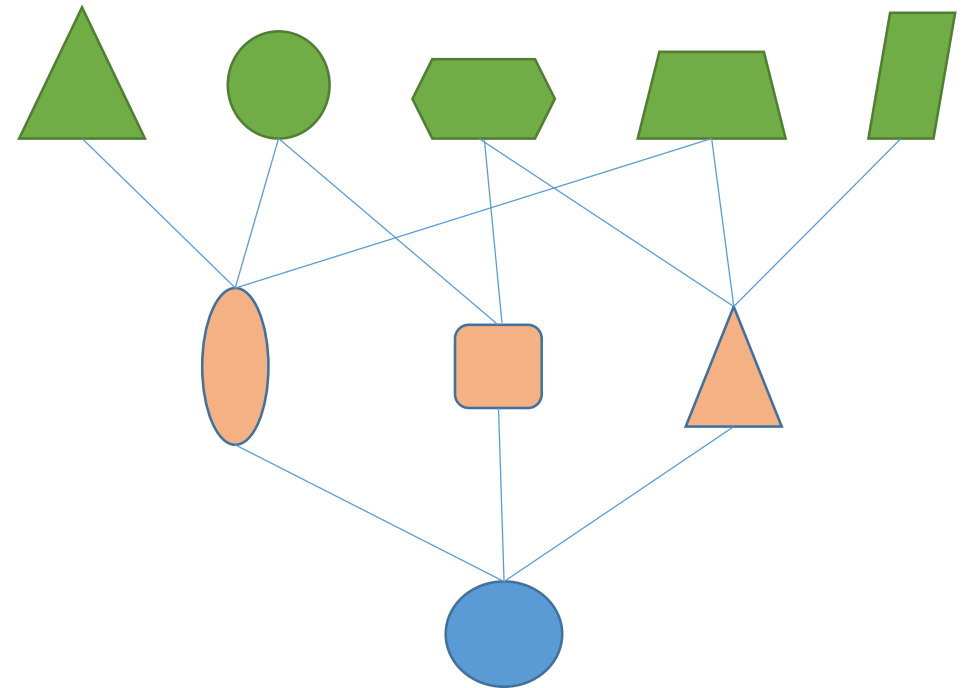
The thin laser beam is best for marking in narrow spaces such as on electronic components. The 3-Axis laser control corrects distortion and displacement that may be caused by a slight misalignment that occurred during installation. The thin laser beam enables uniform and precisely positioned marking not only at the centre but also at the edges of the marking area.



2 Micron Spot Size Scan Speed 12M/s.

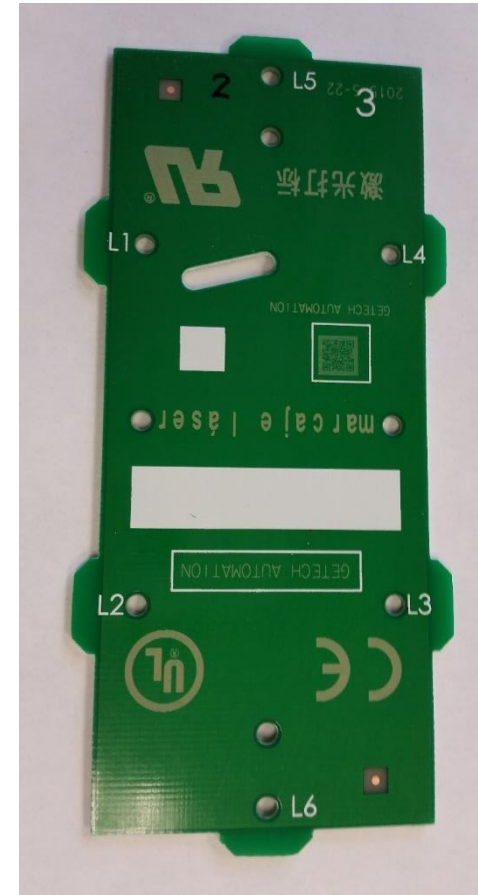
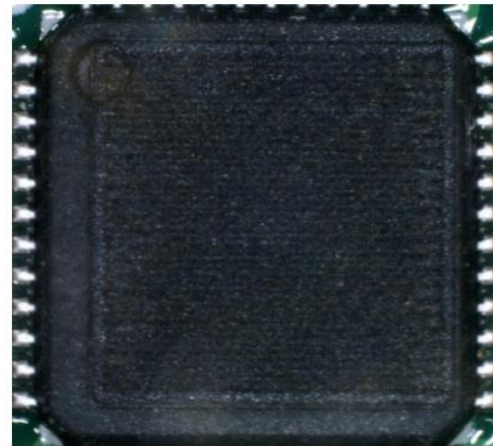
Data, Data, Data

- Traceability is complicated and creating unique ID's early in the process of manufacturing is essential.
- ID's can be downloaded from a central server system or machine generated and then scanned into a server system.
- In machine verification is essential.



Laser Marking Applications

- Traceability
 - Single Sided Marking
 - Double Sided Marking
- Component ID removal



Safety Considerations



Laser Light.

- 30W CO2 is a class 1 Laser Source
- GLMS is designed to meet a Class 4 enclosure, completely sealed against migrant light emissions.

Gases and Particulates

- Lasers create gaseous and particulate matter as a part of the process. Each is a source of risk and must be managed appropriately.
- Getech has partnered with BOFA for their expertise in both gas extract and filtration of noxious materials using activated Carbon technologies.

Video Demonstration

Flipper Conveyor

Dual Side Laser Marking
and Dual Outgoing PCB
Orientation

Fancort Industries – Laser Marking Solutions

Thank you for your time. Please contact
Michael Luciano with questions!!!

www.fancort.com