VULQ1 Laser
STAMP
MARKING SYSTEMS

DATASHEET

Qiova

QiOVA :
OUR STORY, OUR VISION

Pioneers of Programmable Multibeam technology

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Since its inception in 2011, **QiOVA has been designing innovating laser processing solutions to help our customers produce in a more effective way.**

Our vision has 2 fundamental beliefs:

1. Laser is the production tool of the future. Thanks to its unmatched benefits such as high resolution, permanent, contact-less, consumable-less, laser light delivers a superior level of production added value with minimal ecological footprint.

2. Throughput is the main driver for broader industry adoption of laser tools. With the large choice of high-power industrial laser available today, the productivity bottleneck lies in the ability to deliver the light to the workpiece in the most efficient manner. Galvanometric scanners reached their speed; better tools are needed for emerging mass applications.

QiOVA's unique **Programmable Multibeam technology** makes sure our customers are always processing parts in the most optimized conditions.

VULQ1 modules and systems offer industrials the production tools needed to lead in the 4th industrial revolution.
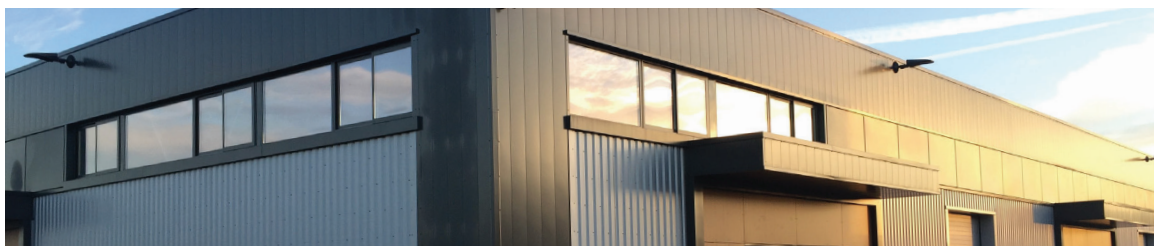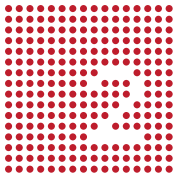
PROGRAMMABLE
MULTIBEAM LASER PROCESSING

Why use only one beam when you can have hundreds ?

VULQ1 Programmable Multibeam technology uses **software configurable Laser Light Tools to maximize throughput in precision material processing applications. VULQ1** generates up to hundreds laser beamlets on-demand, from one single laser beam.

The beamlets characteristics are individually and dynamically controlled by software - in position, profile and energy - to create the "Laser Light Tool" fitted to the process needs.

The many beamlets composing the "Laser Light Tool" are applied simultaneously to the material, scaling up process throughput with no compromise on quality.
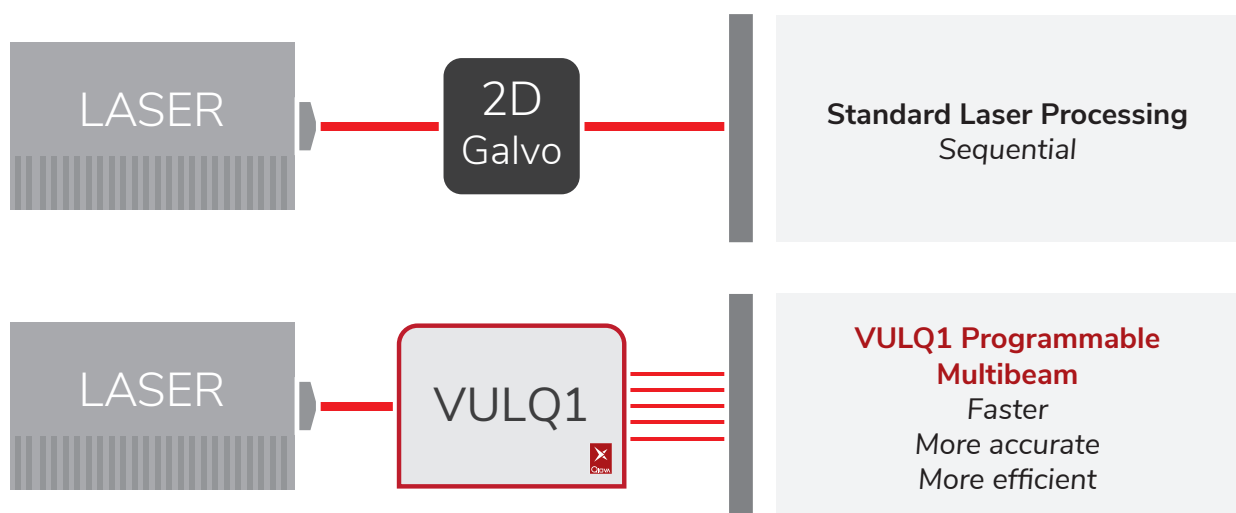
Figure 1: VULQ1 shaping the laser beam into a Laser Light Tool dedicated to datamatrix marking application.
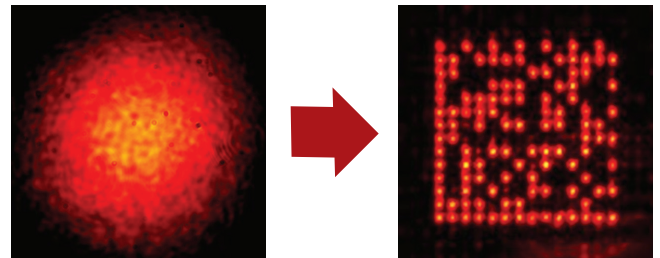
Throughput & efficiency x10 / Spatial resolution < 50µm

Multibeam processing is like moving from pen-writing to digital printing

Standard Laser Processing
Sequential

VULQ1 Programmable Multibeam
Faster
More accurate
More efficient

VULQ1 LASER
STAMP MARKING SYSTEMS

VULQ1, the high-speed individual traceability enabler

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In our globalized world, with society looking for more transparency and accountability, industrials are under pressure to deliver quality product, in a transparent manner, at the best cost for value.

Individual product traceability is a fast-developing domain addressing accountability, customer satisfaction and profitability.

The data generated by individual product traceability serves the manufacturer, the consumer and everyone along the product value chain. Applications are many: tracking and tracing in the supply chain, anti-counterfeiting and brand protection, new marketing tools to develop customer engagement or brand image, and many more like real-time ecological footprint monitoring.

While individual product traceability, a unique identification mark connected to the physical product over its lifecycle, may be imposed by regulation, its implementation in high-speed production line is extremely challenging with standard tools and techniques.

VULQ1 Stamp marking solutions enable individual product identification in the many new situations where standard industrial marking solutions are challenged.
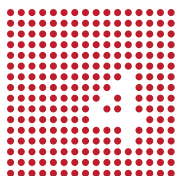
VULQ1 LASER
STAMP MARKING SYSTEMS

VULQ1, the high-speed individual traceability enabler

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VULQ1 Laser Stamp Marking system range is composed of 3 product lines:
- *VULQ1 FULL-STAMP Marking:* high-speed high-precision marking applications
- *VULQ1 PIXEL-STAMP Marking:* high speed marking on polymers, secured traceability
- *VULQ1 PIXEL-STAMP/GLASS Marking:* high-speed marking on hard and brittle materials

VULQ1 STAMP MARKING SYSTEMS

VULQ1 system	Model	Energy (µJ)	Power (W)	Pulse duration	Wavelength	Marking rate (Hz)		Materials
						Serialization	Lot	
FULL-STAMP	NIR	40000	8	ns	1064nm	10	2000	Metals, epoxy, coated materials
	VIS	40000	8	ns	532nm	20	2000	Polymers, films, multilayers
PIXEL-STAMP	NIR	5000	50	ns	1064nm	20	20	Metals, epoxy, coated materials
	VIS	2500	25	ns	532nm	20	20	Polymers, films, multilayers
PIXEL-STAMP/GLASS	NIR	450	18	ps	1030nm	20	20	Ceramics, glass

VULQ1 LASER
STAMP MARKING SYSTEMS

VULQ1, the high-speed individual traceability enabler

STAMP MARKING VS STANDARD LASER MARKING

Case #1 - Micro-datamatrix marking: DM20x20, 1mm size

Marking method	Line speed (m/min)	Serialization (codes/sec)	Lot marking (codes/sec)	Marking time (ms)	Comments
FULL-STAMP marking	**600**	**20**	**100**	**0,00001**	Round cells
Dotcode marking	100	10	10	100	Round cells
PIXEL-STAMP marking	**100**	**10**	**10**	**100**	**Square cells = higher quality Applicable on glass**
Raster marking	10	1	1	1000	Square cells - quality drops with line speed

Case #2 – QR code: 25x25, 14mm size

Marking method	Line speed (m/min)	Serialization (codes/sec)	Lot marking (codes/sec)	Marking time (ms)	Comments
FULL-STAMP marking	N/A	N/A	N/A	N/A	
Dotcode marking	N/A	N/A	N/A	N/A	
PIXEL-STAMP marking	**100**	**6**	**6**	**150**	**Square cells = higher quality Applicable on glass**
Raster marking	25	1.5	1.5	700	Square cells Quality drops with line speed

FULL STAMP
MARKING SYSTEMS

High-throughput high-precision marking applications

+ UNIQUE FEATURES

- **One laser pulse = one datamatrix code**
- Outstanding marking rate: 2000 markings per second
- Optimal quality down to 200µm code size
- Intrinsic shallow marking properties: critical to safely mark sensitive devices like electronics components
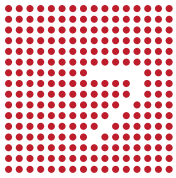
+ CUSTOMER BENEFITS

- Ideal for in line marking: straightforward integration, insensitive to speed and vibrations
- Perfect marking quality for any code size or line speed
- Compatible with standard industrial vision

FULL-STAMP MARKING HEAD

LASER

VULQ1
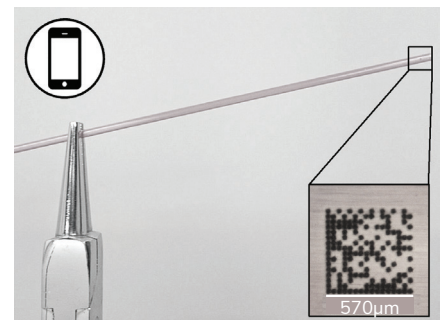
Pharmaceutical market
PVC Straw, 2mm diameter
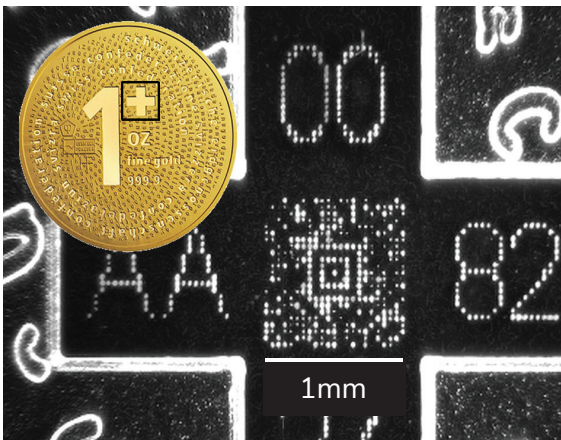*Batch marking 77000u/hour*

570µm

FULL STAMP
MARKING SYSTEMS

High-throughput high-precision marking applications
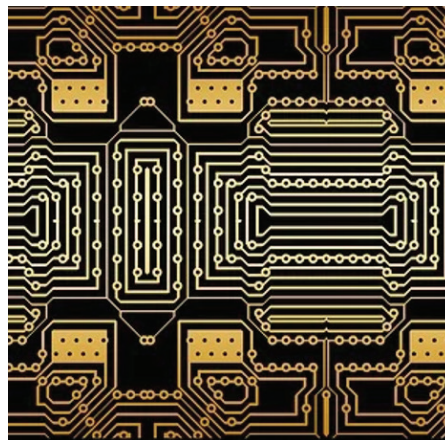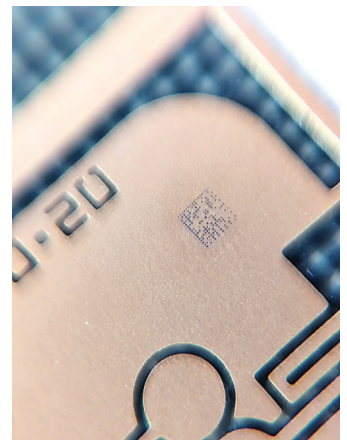
+ APPLICATIONS

- High speed micro-marking
- In-line serialization of small parts and components
- Discrete traceability on high-end products

1mm

Luxe / Gold bullion, gold 99,999%
Discrete authentication

Electronics / IC chip multilayered, copper
Individual traceability <10 ns (one pulse)

Bank
Bank note, Metalized PET
Roll-to-roll processing
Anticounterfeiting
2000 codes per second

Beverage
Wine caps, coated aluminium
Discrete traceability
Marking time <10 ns (one pulse)

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PIXEL STAMP
MARKING SYSTEMS

Superior speed for QR code marking applications

UNIQUE FEATURES

- **Dynamically configurable high-speed laser printing**
- Superior marking quality
- Gentle marking for sensitive materials

CUSTOMER BENEFITS

- High-speed serialization on primary packaging
- Customer configurable security marking applications
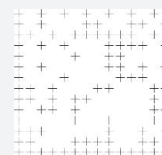- Compatible with standard industrial vision and smartphone reading
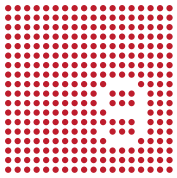
PIXEL-STAMP MARKING HEAD

LASER

VULQ1

2D Galvo

10mm

500µm
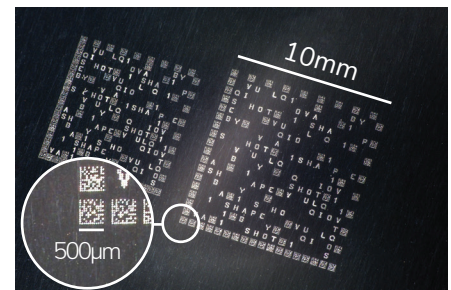
Software configurable multibeam pattern
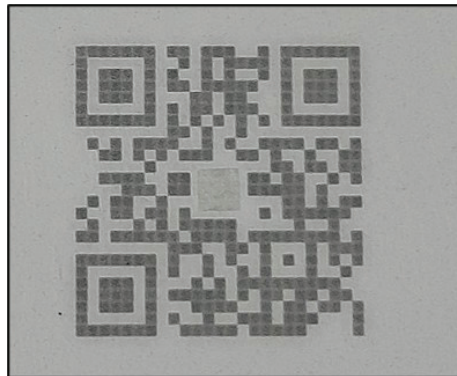
Position sequence

QIOVA

PIXEL STAMP
MARKING SYSTEMS

Superior speed for QR code marking applications

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APPLICATIONS

- Customer engagement on consumer products
- High-speed marking on polymers
- Secured traceability, overt/covert applications

Consumer goods / Fuse breaker - PA66
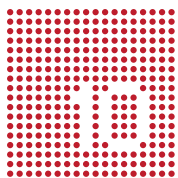Secured traceability / Marking time: QR code 250ms / Seal Vector 750ms

Food & beverage
Food packaging, painted cardboard, coated PET, metallized PET
Marking time <250ms

Beverage
HDPE caps
Customer engagement
25000 units/hour

PIXEL STAMP/GLASS
MARKING SYSTEMS

High-speed marking on hard and brittle materials

UNIQUE FEATURES

- **High-speed laser printing on the most challenging materials:** glass, ceramics
- On glass: no micro-cracks when cold marking, engineerable contrast down to semi-invisible

CUSTOMER BENEFITS

- High-speed serialization on hard and brittle primary packaging
- High-end product decoration or personalization
- Compatible with standard industrial vision

USP LASER — VULQ1 — 2D Galvo

Pharmaceutical market / Glass packages
Individual traceability
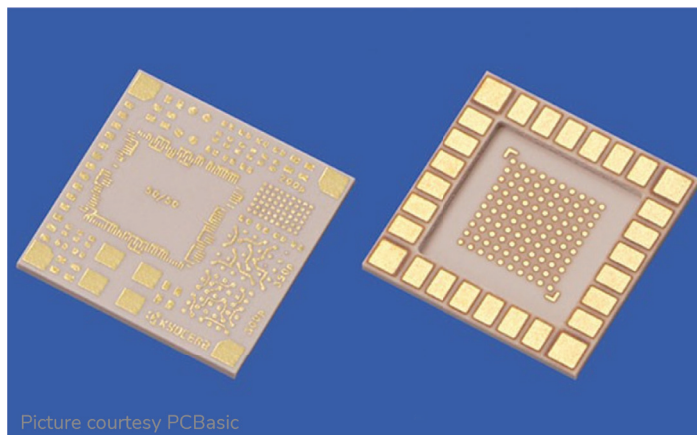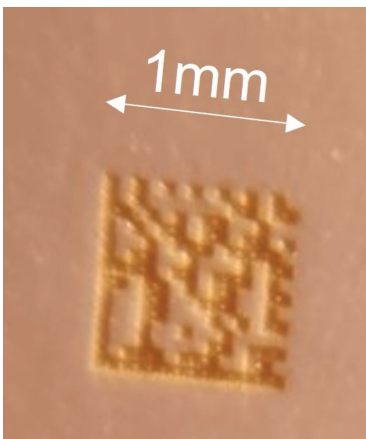*Marking time <100ms*

PIXEL STAMP/GLASS
MARKING SYSTEMS
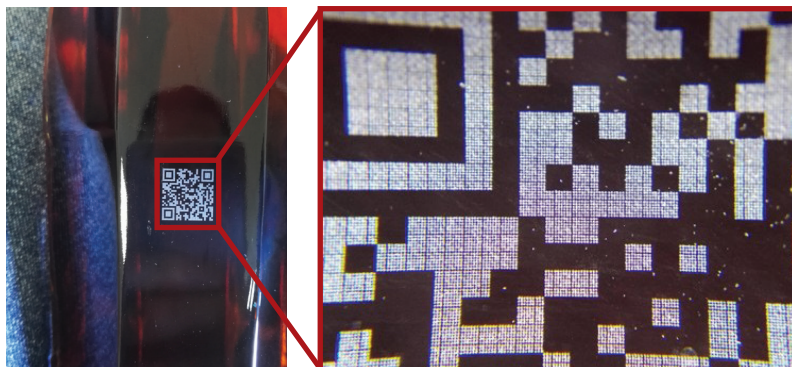
High-speed marking on hard and brittle materials

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APPLICATIONS

- High-speed marking on hard and brittle materials
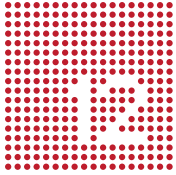- Anticounterfeiting with semi-invisible marking
- High-speed surface texturing

1mm

Picture courtesy PCBasic

Electronics market
Power electronics package,
zirconia ceramics
Individual traceability
Marking time <100ms

Beverage / High end liquors
Soda lime bottles
Customer engagement
Marking time <2s

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DRAWINGS
MARKING HEAD UNIT
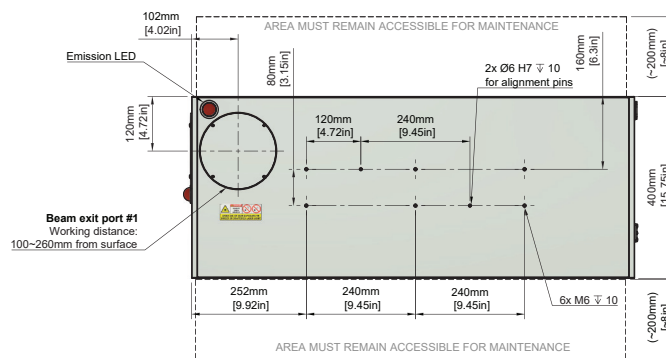
BOTTOM VIEW
Beam exit port #1 &
Mounting interface

102mm
[4.02in]

AREA MUST REMAIN ACCESSIBLE FOR MAINTENANCE

Emission LED

80mm
[3.15in]

2x Ø6 H7 ⌄ 10
for alignment pins

160mm
[6.3in]

(~200mm
[~8in])

120mm
[4.72in]

120mm
[4.72in]

240mm
[9.45in]

400mm
[15.75in]

Beam exit port #1
Working distance:
100~260mm from surface

252mm
[9.92in]

240mm
[9.45in]

240mm
[9.45in]

6x M6 ⌄ 10

(~200mm
[~8in])

AREA MUST REMAIN ACCESSIBLE FOR MAINTENANCE

AREA MUST REMAIN ACCESSIBLE FOR MAINTENANCE

min. ~900 mm
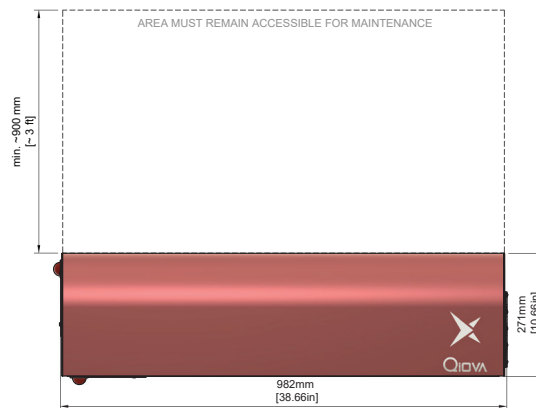[~ 3 ft]

Entire area shown in this view must remain
free ~200mm [~8in] above surface for power
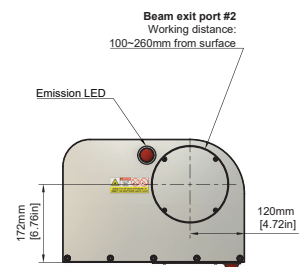& control cables, water cooling pipes and air cooling vents

Beam exit port #2
Working distance:
100~260mm from surface

Emission LED

271mm
[10.66in]

172mm
[6.76in]

120mm
[4.72in]

982mm
[38.66in]

REAR VIEW
Power & Control connections
+ cooling inlet and outlets

SIDE VIEW

FRONT VIEW
Beam exit port #2

Integrable in horizontal or vertical position

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