

Q-Mark

A complete laser marking and deep engraving solution



Q-Mark

INDUSTRIAL LASER APPLICATIONS

WAVELENGTHS (nm)	1064	532	355
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Metals

Gold	✓	✓✓	-
Silver	✓	✓✓	-
Copper	✓	✓✓	-
Nickel	✓	✓✓	-
Aluminum	✓✓	✓✓	-
Iron	✓	✓✓	-
Chrome	✓	✓✓	-
Ni-Ti Alloy	✓	✓✓	-

Semiconductors

Silicon	-	✓	✓
Silica on Tin	-	-	✓
Silicon Nitride	-	-	✓
Germanium	-	✓	✓
Gallium Arsenide	-	-	✓
Gallium Nitride	-	-	✓
Gallium Phosphide	-	-	✓

Ceramics

Aluminum Oxide	-	-	✓
Aluminum Nitride	-	-	✓
Zirconium Oxide	-	-	✓
Titanium Oxide	-	-	✓
Tungsten Carbide	-	-	✓

Polymers

Teflon [®]	-	-	✓
PMMA	-	-	✓
ABS	-	-	✓
Polyimide (Kapton [®])	-	-	✓
Polyethylene	-	-	✓
Polycarbonate	-	-	✓
Polypropylene	-	-	✓
Acrylic	-	-	✓
Nylon	-	-	✓
Vinyl	-	-	✓

✓ Good ✓✓ Excellent

Q-MARK FEATURES & BENEFITS

Simple yet powerful WYSIWYG drawing editor

Interactive software operator screens

Easy integration with material handling systems

Available with wide range of laser power levels, wavelengths and mode qualities

Programmable laser output, marking speed and digital I/O interfaces

Alphanumeric and graphic marking

Built-in marking process simulator

Quantronix Q-Mark marking, engraving and deep engraving laser scanning systems are the ultimate tools with which to build a very flexible state-of-the-art material processing business at a modest cost. Quantronix has been manufacturing solid state laser systems for over 35 years and precisely understands the variables that matter most when heating, melting and vaporizing excellent thermal conductors, semiconductors and insulators. Q-Mark material processing workstations incorporate Quantronix own rugged laser systems that have been designed specifically to meet the demands of laser material processing. Available laser systems can be either arclamp pumped or diode laser pumped and deliver either infrared, green, or ultraviolet laser light, depending upon the materials to be processed and the precise result desired. A complete Q-Mark laser scanning system consists of a laser system, scan head with all drive electronics, a computer system, and all necessary software. Several standard workstation configurations are available from Quantronix. Alternatively, Control Systemation Inc. (Orlando, FL) can integrate a Q-Mark system into a fully automated custom workstation.

Quantronix has recognized, through years of close industry collaboration, that a marking system's software is the ultimate key to unlocking the productivity within every laser scanning system or workstation. All Q-Mark laser scanning system software is custom and created specifically for Q-mark workstations by Quantronix' software programmers working to incorporate user feedback to deliver all of the features and functions imaginable. Q-mark laser scanning systems also incorporate the highest quality scanners available, those from Cambridge Technology.

The Q-Mark's versatility reads like a . . .

DICTIONARY OF MATERIAL PROCESSING TERMS

A laser can either heat, melt, or vaporize materials, by controlling its power density.

Examples of industrial laser applications in which materials are HEATED are:

SURFACE ANNEALING

1. The ability to draw carbon and/or oxides from the base material to get a contrasting mark. 2. Marking by this process has the advantage of not disrupting the surface of the material. This is important in applications like medical implants or other applications where a smooth, undamaged surface is important as well as contrast.

SPECIALTY MARKING

1. Specialty marking is most commonly used for plastics but occasionally for other materials. 2. Contrast can occur naturally in some plastics by heat or coupling with a particular wavelength causing a chemical change in the plastic.

Examples of industrial laser applications in which materials are MELTED are:

THERMAL MARKING

1. Thermal Marking is the ability to control heat by using different laser parameters (i.e. Marking speed, pulse frequency, power and focus) applied to certain materials resulting in color variations.

Examples of industrial laser applications in which materials are VAPORIZED are:

ABLATION

1. Ablation refers to the process of removing a coating, paint, or other surface treatment from a base material to create a contrast without damaging the base material. 2. This is typically done with anodized aluminum or painted steel. 3. The optimum situation is to find a laser whose wavelength is well-absorbed by the coating, but highly reflected by the base material

DEEP ENGRAVING

1. A vaporization process similar to the engraving process above but typically in excess of .005" deep. 2. Ability to mark 3-dimensional graphics using an optional software package. 3. Creates extremely high quality 3-D marks at significant depths in a fraction of the time of mechanical methods.

INTERNAL MARKING

1. Images are created not on the surface but in the volume of a transparent material. 2. The high intensity in the focus of a laser beam gives rise to non-linear absorption phenomena within transparent material. 3. As a result, microscopic cracks are generated on a narrowly localized spot, which makes the spot look white due to light scattering.

SURFACE ENGRAVING

1. Vaporization of base material sufficient to produce depth required, typically from .0001" to .005". 2. Engrave marking is a vaporization process identical to that described in surface etching marking.

SURFACE ETCHING/MARKING

1. The ability to change the surface finish of a metal thus altering its reflectivity, in turn enhancing contrast. 2. Penetration depth is typically no more than 0.0001" deep. 3. This process is probably the most common form of laser marking. 4. This technique has the considerable advantage of speed.

2 STEP Q-Mark Software marking process

STEP 1.

Place the desired object to be marked into the Drawing Editor.

These objects may be almost anything including:

- All characters and True Type fonts
- Virtually any image
- Barcodes or ID matrices

JUST A FEW HIGHLIGHTS OF THE DRAWING EDITOR:

Quickly create objects and mark work pieces with no programming

WYSIWYG Drawing Editor

Edit object properties

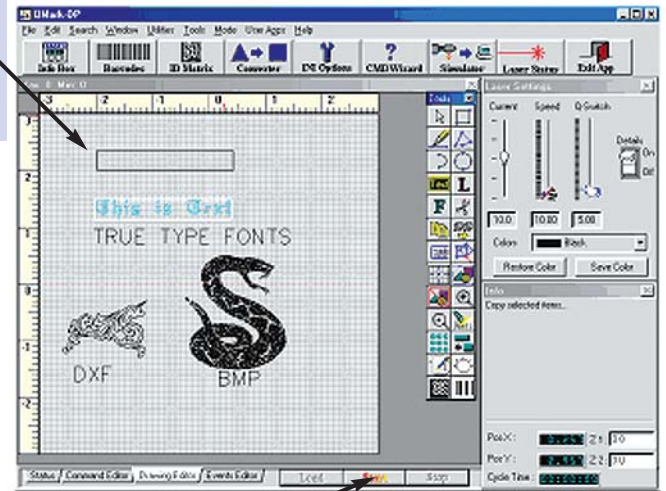
Multiple object grouping/ungrouping

Readily create arrays of objects

Zoom in, zoom out and panning

Grid and rulers for easy referencing

Select looping of object mark



STEP 2.

Click "Start" to mark.

Advanced built in software tools for professional marking results.

Library of barcodes and ID matrices

Large database includes:

- Barcodes - Code 128, Code 39, Code 2 of 5
- ID Matrices - DataMatrix and PDF417
- Customizable barcodes and ID Matrices

File import/export/conversions include but are not limited to:

- Paint, Illustrator, Photoshop, Auto CAD, Corel Draw, HP plotter formats

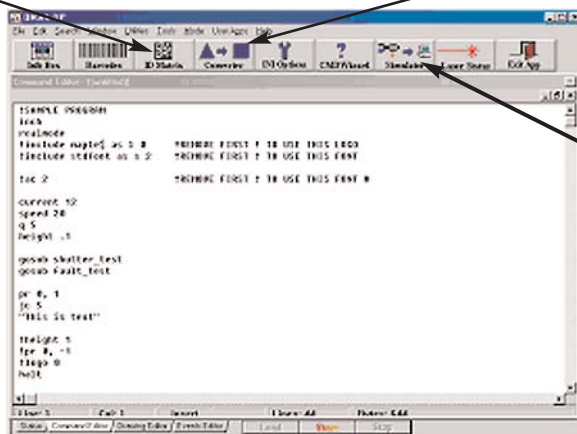
Programming:

- Simple yet powerful text based program editor
- Create programs step-by-step with help tool
- Choose to eliminate programming with Drawing Editor file or import Drawing Editor to build more advanced programs
- Easily access loop/branch/subroutines commands

Marking Process Simulator

Automation support features include but are not limited to:

- Host communication using virtually any interface
- Automatic S/N marking
- Configurable date code text
- Input marking text by means of serial port, text file or keyboard
- Digital input/output
- Start and Stop marking via internal/external input
- Programmable delay for part loading and unloading



Q-Mark product matrix



LAMP PUMPED LASER SYSTEMS

Infrared Q-Mark Laser with lens for 6"x6" marking field

TEMoo Lasers:		Input Power (kW)	Layout
CW Power	Q-switched (@ 10 kHz)		
12 watts	10 watts	6	A
20 watts	15 watts	6	A
25 watts	20 watts	6	A
30 watts	25 watts	10	A
Low order mode: $M^2 < 7$		Input Power (kW)	Layout
CW Power	Q-switched (@ 10 kHz)		
20 watts	15 watts	6	A
30 watts	25 watts	6	A
50 watts	40 watts	6	A
70 watts	60 watts	6	A
Multimode:		Input Power (kW)	Layout
CW Power	Q-switched (@ 10 kHz)		
30 watts	25 watts	6	A
60 watts	50 watts	6	A
85 watts	70 watts	6	A
120 watts	100 watts	6	A

Infrared Q-Mark Deep Engraving

Multimode:		Input Power (kW)	Layout
CW Power	Q-switched (@ 10 kHz)		
110 watts	90 watts	6	C

Green Q-Mark Laser with lens for 5.9" x 5.9" marking field

TEMoo Lasers:		Input Power (kW)	Layout
Q-switched (@ 10 kHz)			
	8 watts	6	B
Low order mode: $M^2 < 7$		Input Power (kW)	Layout
Q-switched (@ 10 kHz)			
	15 watts	6	B
	25 watts	6	B
	35 watts	10	B
Multimode:		Input Power (kW)	Layout
Q-switched (@ 10 kHz)			
	20 watts	6	B
	40 watts	6	B
	60 watts	10	B

UV Q-Mark Laser with lens for 3.9" x 3.9" marking field

TEMoo Lasers:		Input Power (kW)	Layout
Q-switched (@ 6 kHz)			
	3 watts	6	B
Low order mode: $M^2 < 7$		Input Power (kW)	Layout
	6 watts	6	B

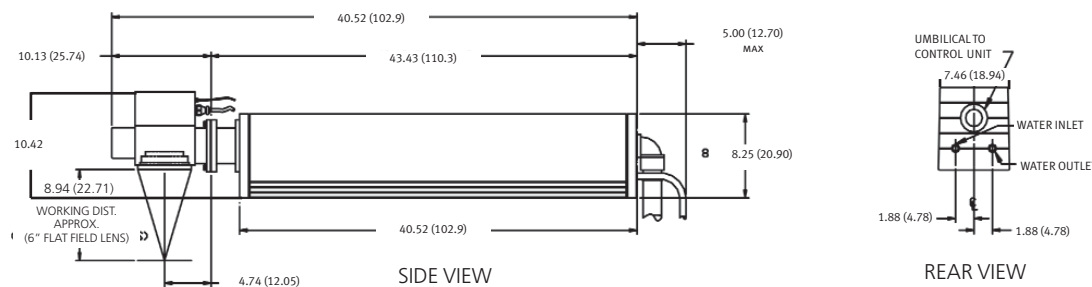
MECHANICAL & UTILITIES

Size	Optical Head (LxWxH) Layout A	1029 X 189.4 X 264.6 mm (40.52 X 7.46 X 10.42 in)
	Optical Head (LxWxH) Layout B	1490 X 295.3 X 269.7mm (58.66 X 11.62 X 10.62 in)
	Optical Head (LxWxH) Layout C	1258 X 189 X 274 mm (49.54 x 7.45 x 10.79 in)
	Power Supply A (LxWxH)	578 x 851 x 533 mm (22.75 x 33.5 x 21.0 in)
Weight	Optical Head	45 kg (100 lbs.)
	Power Supply	215 kg (475 lbs.)
Water	Service	2-6 GPM (8-20 l/min) @ 15-100 psi (1-7 kg/cm ²)
	Temperature	7-18°C (45-65°F)
Electrical Service		220 V +/- 10%, 3 phase, 35 A/phase @ 50/60 Hz , 400 V +/- 10%, 3 phase, 16 A/phase @ 50/60 Hz , or 220 V +/- 10%, 1 phase, 35 A/phase @ 50/60 Hz
Control Interface	Serial Interface	RS - 232
	Control Software	Windows based Laser Commander software
	User Interface	Full featured control panel, optional remote control box
Umbilical Length		4.57 m (15.0 ft)
Room Temperature	Operating Temperature Range	5-35°C (Specifications hold over 2°C temperature variation)

LAMP PUMPED LASER SYSTEMS

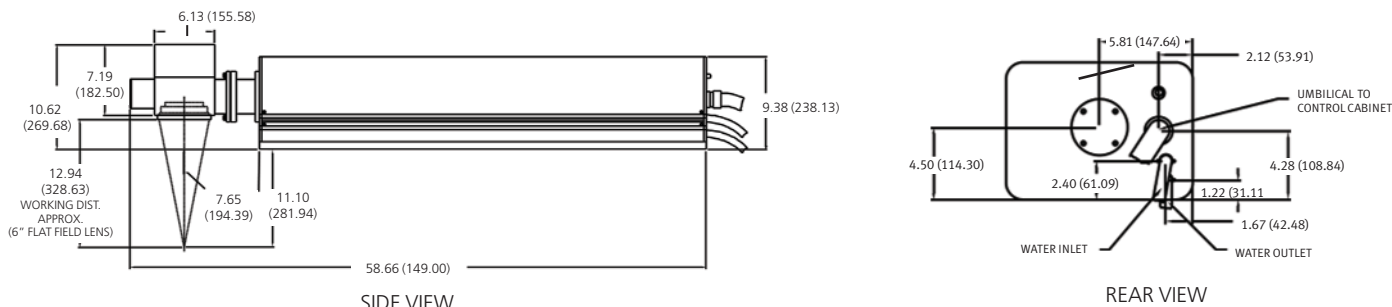
Q-MARK PHYSICAL LAYOUT A

All Dimensions are in Inches (cm)



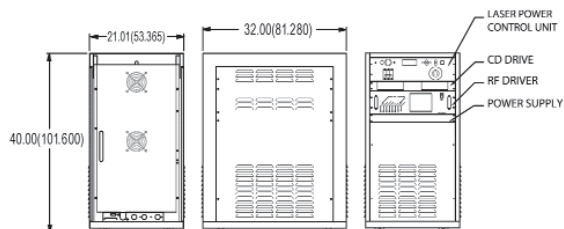
Q-MARK PHYSICAL LAYOUT B

All Dimensions are in Inches (cm)



POWER SUPPLY

All Dimensions are in Inches (cm)



Q-Mark product matrix



DIODE PUMPED LASER SYSTEMS

Infrared Q-Mark Laser with lens for 6"x6" marking field

TEMoo Lasers:		Input Power (kW)	Layout
CW Power	Q-switched (@ 10 kHz)		
10 watts	8 watts	1.2	D
20 watts	15 watts	1.2	D
Low order mode: $M^2 < 7$		Input Power (kW)	Layout
CW Power	Q-switched (@ 10 kHz)		
20 watts	15 watts	1.2	D
30 watts	25 watts	1.2	D
Multimode :		Input Power (kW)	Layout
CW Power	Q-switched (@ 10 kHz)		
25 watts	20 watts	1.2	D
50 watts	40 watts	1.2	D
100 watts	70 watts	1.2	D

Green Q-Mark Laser with lens for 5.9" x 5.9" marking field

TEMoo Lasers:		Input Power (kW)	Layout
	Q-switched (@ 10 kHz)		
	10 watts	1.2	D
Multimode:		Input Power (kW)	Layout
	Q-switched (@ 10 kHz)		
	10 watts	1.2	D
	20 watts	1.2	D
	40 watts	1.2	D

UV Q-Mark Laser with lens for 3.9" x 3.9" marking field

TEMoo Lasers:		Input Power (kW)	Layout
	Q-switched (@ 6 kHz)		
	3 watts	1.2	D
Multimode:		Input Power (kW)	Layout
	1.5 watts	1.2	D
	4 watts	1.2	D

Marking Lenses (square field size in inches)

Lens Configuration:		
	Field size (in)	Spot size (um)
1064 nm		
standard	6.0	15
optional	2.4	12
optional	3.9	18
optional	12.0	24
optional	3.9	12
optional	6.3	22
optional	8.7	33
optional	8.4	20
optional	9.6	34
optional	19.7	55
532 nm		
standard	5.9	18
optional	2	10
optional	3.1	20
optional	8.9	30
optional	13.8	15
optional	6.9	18
optional	19.7	30
355 nm		
standard	3.9	21
optional	3	10
optional	4.7	12
optional	15.7	30

Beam Expanders

Expander Configuration:	
	Expansion ratio
1064 nm	
standard	5
optional	3.75
optional	7.5
532 nm	
standard	4
optional	3
optional	5
optional	6
optional	8
optional	7.5
optional	10
355 nm	
standard	5
optional	3
optional	8

Options and Accessories for all wavelengths.

Q-Pointer	.....	Laser diode pointer alignment system
Dual computer	.....	Networking to host computer
I/O kit	.....	Includes standard one input/one output, max. 8in/8out
Footswitch kit	.....	Start laser program remotely
Extended umbilical	.....	Extended umbilical (25')
Exit. chiller (for lamp pumped systems)	.....	Chilling of secondary water
High ambient cab	.....	Cooled cabinet for high ambient conditions (45°C)
Scanhead extensions	.....	Scan head extensions (3")
Programmable dual aperture	.....	Intra-cavity dual aperture for LOM and TEM ₀₀

Workstations

CDRH	Class I	
CDRH	Class IV	All options may not be available to the Class IV workstation.

Workstation Options

Pneumatic Door *	48" Rotary Dial	Stackable Lights
Additional Doors *	Worklight	Conveyors
Powered Z-Axis	Digital Readouts	Vision System
Programmable Z-axis	Rotary Indexer	Viewing Camera
Manual Z-axis Digital Readout	4" Rotary Index	B/W Monitor
Two-Position Shuttle	6" Rotary Index	Color Monitor
Rotary Dial	Vacuum Exhaust System	Power Distribution Enclosure**
24" Rotary Dial	Fume Removal System	Special Paint
36" Rotary Dial	Safety Light Curtain	Vibratory Feeder Bowl

* not available on Class IV workstation

** Standard on all workstations except the Class IV