LaserTower™ Professional DUO

The LaserTower™ Professional DUO 3D Marking and Engraving System is an industrial-grade state-of-the-art material processing system that combines the benefits of both a Fiber laser and CO^2 Laser to process any material.

Fonon Corporation's LaserTower™ Professional DUO is a versatile 3D industrial-grade material processing system designed to perform under high-vibration, shock and dust conditions.

Each LaserTower™ Professional DUO is optimized per our customer's unique application. The system is designed with both a Fiber Laser and CO^2 Laser with wattages ranging from 20W to 100W. All Direct Parts Marking (DPM), including UDI/UID barcodes, logos and engravings are permanent, legible and non-removable across the largest range of materials. The LaserTower™ Professional incorporates Fonon's proprietary FiberScan™ C3 Software designed to specifically run on Windows 2000 Professional and Windows XP Professional.

The LaserTower™ Professional DUO is an industrial-grade, 3D Marking & Engraving System incorporating a programmable 8" Z-axis for focal height adjustments with 2 optical X'Y' axes and a portfolio of lens options that incrementally increases the range of the marking area from 2" x 2" to 9" x 9". The LaserTower™ Professional DUO is optimized for a Fiber Laser and Fantom SLAB CO^2 Laser, Scan Head, Industrial PC Controller and Power Supply. The DUO system incorporates the latest FiberScan™C3 Software designed to specifically run on Windows 2000 Professional and Windows XP Professional. The LaserTower™ Professional DUO processes the largest range of materials in the industry with special attention to highly-reflective metal applications.

High Tech Applications: The LaserTower™ series produce a wide variety of Permanent, Legible, Non-Removable Marks on a wide variety of materials.

Applications and Types of Marks		Materials	
ITO or Paint Removal	OCR Code Marking	Aluminum (Anodized/Polished/Cast)	Wood and Ceramics
Backlit Button Marking	"On-The-Fly" Marking	Stainless Steel and Mild Steel	Rubber and Silicon
Medical/Automotive Coding	Alphanumeric Marking	Titanium and Nickel	Marble and Stone
IC Chip Package Marking	Logos and Schematics	Copper and Brass	Composites and PVC
2D UDI/UID Barcoding	Sequential Serial Numbers	Carbide and Polycarbonate	Plastic and Graphite
Part Numbering	Lot Codes and Date Codes	Polypropylene	Fabrics and Leather
3D Engraving/Deep-Engraving	Ablation (Anodized, Painted or Coated)	Painted Metal Alloys	Acrylic and MDF
Surface Texturing		Chrome and Cast Iron	Galvanized Metals
			And More!

LaserTower™ Professional DUO Design: Main Features

- Maintenance-Free Direct Part Marking (DPM)
- Continuous operation under high-shock, vibration and dust conditions
- Long-term industrial-grade reliability with 50,000 hours MTBF
- Optimized for both a Fiber and CO^2 Laser
- Standard wall plug operation with high electrical efficiency
- Low voltage power source (110/220 VAC) 8 amps
- Laser "ON" magnetically locked front doors for operator safety
- Oversized chamber providing working area to support both lasers
- 8" Z-Axis Controller to accommodate a wide range of heights
- Class 4 Laser-Rated Safety Viewing Port
- PC-Based Controller, Flat Panel Monitor, Mouse and Keyboard
- Industrial-grade Extruded Frame with 19" Rack Mount Design
- Exhaust outlet for Fume Extractor
- 80 PSI Pneumatic activated front-sliding doors (optional)
- Side Doors for longer parts (optional)

☑ Fiber Laser: 20W-30W-50W Options

Fiber Lasers are a great leap forward in processing all metal and coated soft material applications. Our Fiber Lasers are easily integrated into industrial processes in comparison with conventional lasers due to:

- State of the art, Air-cooled, Ytterbium Q-switched Fiber Laser up to 2mJ for marking on virtually any material
- CW or Q-switched Fiber laser options with high-repetition rate
- Excellent TEM00 beam quality (M2 < 1.05)
- Exceptional High Reliability with more than 30,000 hours estimated maintenance-free operation
- Very high 50,000 hours MTBF (100,000 hours typical on diodes)
- Flexible cable-beam delivery system
- No water cooling required
- Optimized for Direct Part Marking (DPM) applications including UDI/UID Barcoding and 3D Deep Engraving
- Red diode pointer for easy application setup
- Fiber delivery up to 5 meters
- Warranty – 2 years on laser components with 5 years optional program

☑ Q-Switched Fiber Laser

The Q-switched Fiber Laser is maintenance-free. It delivers an excellent diffraction-limited (TEM00 beam quality M2 < 1.05) laser beam directly to the worksite via a metal sheathed single-mode fiber cable. These compact service-free Fiber Lasers are designed to operate under high-shock, vibration and dust conditions in relatively high humidity across wide operating temperature ranges. State-of-the-art air-cooled Ytterbium lasers have a very high MTBF of 50,000 hours (100,000 hours typical on diodes). There is no routine replacement of parts or materials scheduling requiring only a low voltage power source. Fiber-to-Fiber architecture provides a robust, monolithic design with no optics to align, no mechanics to stabilize. The laser is engineered for optimal power and density providing responsive performance for the most demanding applications.

☑ Fantom CO^2 SLAB Laser: 30W-100W Options

Fonon Corporation's proprietary Fantom CO^2 SLAB Lasers are a leap forward in laser technology. These CO^2 lasers are easily integrated into industrial processes in comparison with conventional lasers due to:

- Designed to operate under high shock, vibration & dust conditions
- Sealed off and RF Excited CO^2 SLAB laser
- CW or Pulsed CO^2 laser options
- Excellent TEM_{00} beam quality (M2 < 1.2)
- Exceptional Reliability with more than 10,000 hours maintenance-free operation
- Sealed dust-proof design
- No need for gas refill during the warranty period
- Flexible cable-beam delivery system
- No water cooling required
- Optimized for Direct Part Marking (DPM) applications including UID/UDI barcoding and engraving
- Red diode pointer for easy application setup (Optional)
- Warranty – 2 years on laser components with 5 years optional program

Fantom F30/F100 CO^2 SLAB Laser

Fantom F30/F100 CO^2 SLAB Lasers are completely sealed units requiring no gas connections producing a beam that processes material at an average power of 30W/100W respectively. These CO^2 lasers provide a low M2 (<1.2), high quality beam that allows smaller focus spot sizes and incorporates Fonon Technologies' proprietary fast-rising square wave pulsing technology with repetition rates up to 25 kHz with an output wavelength of 10.6 microns.

Scanning Head

The Scan Head is designed to quickly and precisely deflect and position laser beams with powers up to the kilowatt range. With apertures of 20mm and 25mm, small spot sizes are achieved along with large image fields. Very stable operating conditions as well as high long-term stability are provided by air cooling of the entrance aperture, electronics, and galvanometer scanners and supplemented by air cooling of the deflection mirrors. The compact housing is dust proof and water spray resistant.

Dynamic Performance Facility Requirements	
Repeatability:	**< 22 µrad Operating Temperature 25°C±10°C**
Offset Drift:	**< 25 µrad/k Typical Air Requirements Clean, Filtered air 20 l/min. at Δp <2bar**
Gain Drift:	**< 80 ppm/k**
Long Term Drift:	**< 0.3 mrad (Over 8 hours)**
Tracking Error:	**0.40 ms**
Optical Performance	
Focal Length:	**100 – 200MM Typical Scan Angle of Scanner 1 ±0.26 rad**
Zero Offset:	**< 5 mrad Typical Scan Angle of Scanner 2 ±0.40 rad**
Skew:	**< 1.5 mrad Typical Field Size – Ellipse 80mm x 130mm**
Nonlinearity:	**< 2.1 mrad Typical Field Size – Square 75mm x 75mm to 110 x 110mm**
Gain Error:	**< 5 mrad**

☑ PC-Based Controller

The PC-Based Controller is an industrial-grade PC in an open and upgradeable configuration incorporating the latest generation mother board and data storage devices. The controller also includes an advanced Scan Head Digital Control Board and optically isolated I/O card. The unit operates on Windows 2000 Professional and Windows XP Professional with optional field correction software for demanding applications.

☑ DSP Control Board

The PC Interface DSP Control Board provides synchronous, interference resistant control of the scan system and laser in real time. A high performance signal processor and the supplied DLL simplify programming under Windows. Software instructions are loaded alternately in two list buffers processed by the DSP and output as 16-bit control signals every 10µs to the scan system. The processor automatically performs vital steps such as micro-vectorization and image field correction. Laser control is synchronized with the scanner movements.

Interface:	PCI bus interface
Resolution:	16-bit positioning resolution
Output Period:	10 µs

☑ Precise, Maintenance Free Z-Axis Controller

The Z-Axis Controller with an 8” vertical capability accommodates a variety of field replaceable lenses. Made of stainless-steel construction with contact free home and positioning sensor along with a life lubricated preloaded linear slide with dust protected way cover.

☑ Precise, F-Theta Lens Options

100mm - 160mm - 254mm - 330mm

☑ Touch Screen Interface

☑ IR Laser Beam Red Diode Pointer

☑ Light Barriers (option)

☑ Dual Push Buttons for Safe Operation (option)

☑ Auto Focus Laser Height Sensor with Controller and Software

- Small-spot, Definite-Reflective Type
- 50 µm Spot Diameter
- Maximum Detection range of 150 mm
- High-speed Response and Digital Display
- High-Power Mode with 16-Bit High Accuracy
- Reading on Transparent and Solid Surfaces

☑ Host Communication/Database Interface

☑ Vision System Recognition/Alignment System

☑ **Frame Design:** Rigid, light aluminum extrusion providing excellent protection of equipment corners and rigid, stiff design for long term stability.

☑ **Skins Design:** New modern 3 layer laminate: Aluminum, plastic, aluminum. Powder coated for industrial durability providing excellent protection for laser radiation according to CDRH requirements.

☑ **Transparent Protective Window:** CDRH rated yellow transparent laser rated acrylic window for visualization of lasing processes and easier alignment.

☑ Equipment and Facility Specifications

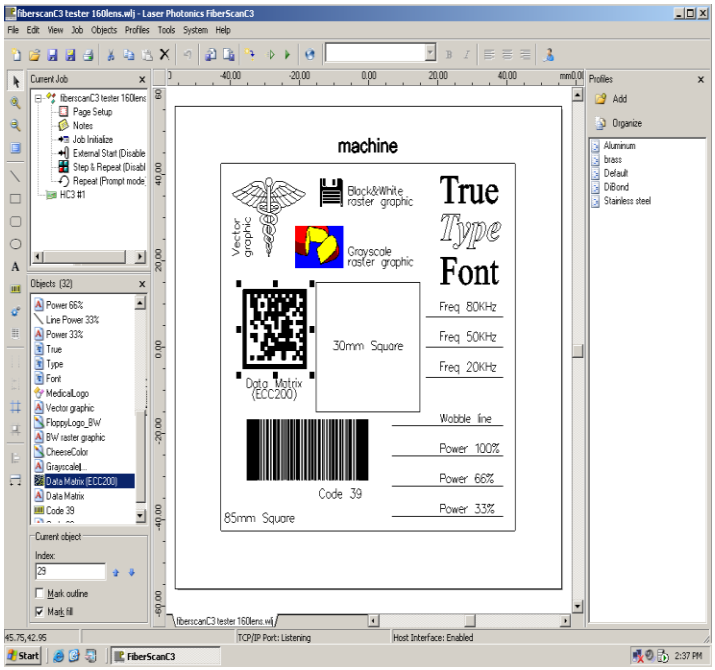
Maximum Material Size	[15 inches (W) x 19 inches (D) x 10 inches (H)]: Fiber Laser Processing Area [15 inches (W) x 19 inches (D) x 10 inches (H)]: CO^2- Laser Processing Area [30 inches (W) x 19 inches (D) x 10 inches (H)]: Total Working Area
Laser Equipment	Fiber Laser: LPQ 20-1.0, LPQ 30-1.0, LPQ 50-1.0, CO^2 Laser – Fantom F30, Fantom F100
Mode of operation	Q-Switched or CW (Fiber laser); Pulsed or CW (CO^2 laser)
Programmable Z-Axis	4" or 8" Travel
Maximum Material Weight	120 lbs
System Dimensions	See envelope drawings below
Weight	375 pounds
Operating Temperature	+18 to +25° C
Relative Humidity	40 – 80% non-condensing
Electrical Requirements	120 volt 8 amps
Clean Dry Air* (If Required and equipped)*	80 PSI

☑ Operations & Maintenance Manual (in English) includes:

- Service Information
- General Description
- Laser Safety Manual
- Schematics (Appendix A)
- Software Manual (Appendix B)
- Operation Description -
- I/O Description
- Troubleshoot Guide
- Scan head manual
- Control Board Manual

☑ FiberScan C3™ Software

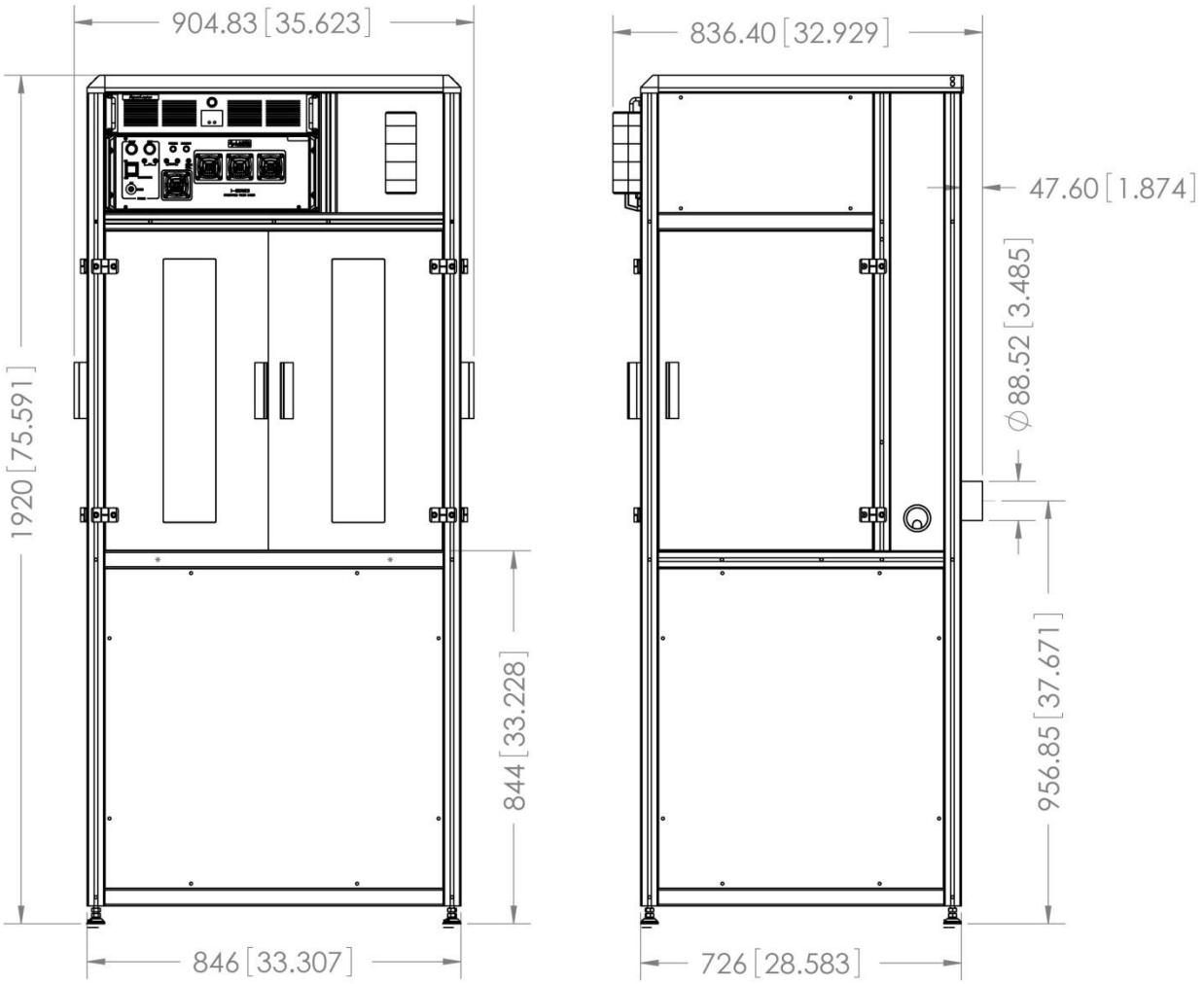
FiberScan C3™ software is a high performance, multi-threaded laser marking solution designed to specifically run on Windows 2000 Professional and Windows XP Professional. The user-friendly software entails a fully integrated driver, remote diagnostic capabilities for worldwide support and multiple hardware interfaces for the ability to execute any CO_2 or Fiber Laser marking system. File links to several internal databases make the FiberScan C3™ program flexible and powerful.



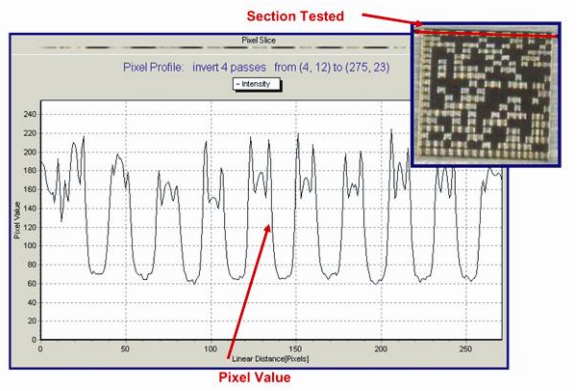
These databases include a materials application system and a fixture database. The materials application system allows a user to define a laser process, give the process a unique name and subsequently link the process to graphic programs. A process can include multiple passes using different values for power, frequency and speed on each laser pass. The database can contain and manage many thousands of different process 'recipes'.

The fixture database allows the user to control fixture offsets and define step and repeat processes. Just like the material database, any WLJ job can use any fixture defined in the fixture database. The link sallow all appropriate graphic and process information to be automatically loaded when the operator selects the lasing file. At any time the operator can change the links, for example a lasing job that is normally marked on stainless steel, can be marked on brass by selecting the brass process file prior to executing the job program file. Operators don't have the need to remember fonts and logos for a particular job because FiberScan C3™ automatically performs all required graphic loading. FiberScan C3™ does not require users to learn any programming languages or special codes and provides all of the flexible and graphic controls that users are accustomed to such as radial marking, aspect control, character spacing, angular rotations and full justification.

☑ LaserTower™ Professional System Dimensions: 375 lbs



☑ Application Research Center



Laser Photonics maintains an applications lab for processing customer samples and assisting with process development. Our applications lab has the latest testing equipment to analyze all of your application needs. For marking applications, we provide the highest quality analysis of each and every mark using our Mark Quality Assessment™ (MQA™) software. With our MQA™ software, we have the ability to guarantee and verify the accuracy and quality of our marks. The screen shot demonstrates how the MQA™ software reads the level of pixels in the material marked. The section in red has been analyzed with the MQA™ software. The high and low pixel values demonstrate the overall contrast of the mark. This procedure can be applied to various different marking processes and types generated by our Fiber Laser marking systems.

☑ Additional Available Technical Documents:

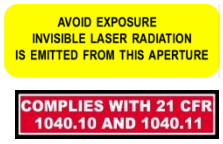
- Optional Lens Selection
- Working Distances For Different Lenses
- Full Spectrum Of Fiber Lasers Available
- Laser CCD Height Sensor Specifications
- Scan Head Drawings
- Mounting Hardware Drawings
- Component Dimensional Drawings
- IO Description
- Owners And Installation Manual
- In Line Fiber Laser Marking Kit

LaserTower™ Series Product Line

LaserTower™ Series Product Guide	LaserTower™ DeskTop	LaserTower™ Compact	LaserTower™ Professional	LaserTower™ Professional CM	LaserTower™ Professional RT	LaserTower™ Professional DUO	LaserTower™ Professional MegaCenter™
Q-Switched Fiber Laser							
0.5mJ @ 10kHz	☑	☑	☑	☑	☑	☑	☑
0.5mJ @ 20kHz	☑	☑	☑	☑	☑	☑	☑
1.0mJ @ 20kHz	☑	☑	☑	☑	☑	☑	☑
2.0mJ @ 20kHz			☑	☑	☑	☑	☑
CW Fiber Laser (50 Watts)							
50 Watts			☑	☑	☑	☑	☑
F-Theta Scanning Lenses							
100mm		☑	☑	☑	☑	☑	☑
160mm	☑	☑	☑	☑	☑	☑	☑
254mm		☑	☑	☑	☑	☑	☑
330mm		☑	☑	☑	☑	☑	
330mm with Beam Expander				☑	☑	☑	
420mm				☑	☑		
420mm with Beam Expander				☑	☑		

LaserTower™ Series Product Guide	LaserTower™ DeskTop	LaserTower™ Compact	LaserTower™ Professional	LaserTower™ Professional CM	LaserTower™ Professional RT	LaserTower™ Professional DUO	LaserTower™ Professional MegaCenter™
Z-Axis Controller							
Scissor Jack (Manual "Z" Axis)	☑						
Programmable 4" Z-Axis		☑	☑	☑	☑	☑	☑
Programmable 8" Z-Axis			☑	☑	☑	☑	☑
Rotary "C" Indexer					☑		

Requirements beyond those listed will be quoted upon request. Contact Laser Photonics office or visit our website www.laserphotonics.com if you need any assistance determining which capabilities best suit your needs.



Safety Considerations During Operation: 1064 nM wavelength laser light emitted from this laser system is invisible and may be harmful to the human eye. Proper laser safety eyewear must be worn during operation at all times.

21CFR 1040.10 Compliance: Fiber Lasers are a Class 4 laser as designated by the CDRH and meet the full requirements for a stand-alone laser system as defined by 21 CFR 1040.10 under the Radiation Control for Health and Safety Act of 1968. As an added level of security, a redundantly switched safety interlock system helps preven accidental exposure to excess laser radiation. Plus the system is equipped with an electrical power manual reset, a key-locked laser power switch and a remote interlock connector. Finally, the system has audible and vislbe emission indicators with five (5) scond emission delay settings. All these features, in combinaion, constitute the laser radiation safety syste which allows the LaserTower™ Series of equipment be used in a safe and secure manner.

Raising the Bar of Excellence

400 Rinehart Road Suite 1000 • Lake Mary, FL 32746• USA

Tel: 1-(407) 477-5618• FAX: 1-(407) 804-1002

www.laserphotonics.com