MarkStar™ Hand-Held Portable

The MarkStar™ and MarkStar™ Professional are hand-held 3D Fiber Laser Marking Systems designed for true portability into the field or warehouse operating off a 12V/24V DC power source.

MarkStar™

MarkStar™ Professional

Fonon Corporation's MarkStar™ and MarkStar™ Professional are portable-hand-held 3D marking systems designed to perform under high-vibration, shock and dust conditions.

All Direct Parts Marking (DPM), including UDI/UID barcodes, logos and engravings are permanent, legible and non-removable with special attention to highly-reflective metals. The MarkStar™ series is maintenance-free and designed for rugged use in the field with a MTBF of 50,000 hours.

The MarkStar™ Portable Series produce a wide variety of Permanent, Legible, Non-Removable Marks on a wide variety of materials.			
Applications and Types of Marks		**Materials**	
2D UDI/UID Barcodes Sequential Serial Numbers Lot Codes and Date Codes Medical/Automotive Coding IC Chip Package Marking Part Numbering Surface Annealing/Etching	OCR Code Marking Alphanumeric Marking Logos and Schematics Ablation: (Anodized/Painted/Coated) Complex graphics/pictures Paint removal	Aluminum: (Anodized/Polished/Cast) Stainless Steel and Mild Steel Titanium and Nickel Copper and Brass Polycarbonate/Polypropylene Painted Metal Alloys	Coated Plastic/Plastic Rubber and Silicon Nylon/Valox Multi-Coated Materials Galvanized Metals Chrome and Cast Iron

MarkStar™ Series Hand-Held Portable Main Features:

- Maintenance-Free Direct Part Marking (DPM)
- Continuous operation under high-shock, vibration and dust conditions
- 12V/24V DC power source – 110V/220V AC power source
- 10W Fiber laser (MarkStar™) – 20W Fiber laser (MarkStar™ Professional)
- Scan Head with 100mm F-Theta Lens (2” x 2” marking area)
- Wide range of pulse durations, high-repetition rates and peak powers
- Class 4 laser-rated safety viewing port
- Laser “ON” locked footpad contacts for operator safety
- Mini-Exhaust Ventilator
- Operating Temperature Range: 0 to 50 degrees C
- Flexible 3 Meter Optical Fiber Cable
- Weight: 35 pounds

The MarkStar™ Professional Features: Industrial-Grade

The MarkStar™ Professional is an industrial-grade hand-held portable marking system incorporating a 20W Q-Switched Fiber Laser.

- **DoubleFast™ high-speed 20W Pulse Fiber Laser**
- **FiberScan™ C3 Software (Windows 2000 Professional and XP Professional)**
- **USB based removable Dongle with FiberScan™ C3 software/application marking file**
- **USB port to operate Windows 7 (laptop required)**
- **Red Diode Pointer**
- **Custom options: larger chamber with 160mm lens (4" x 4" marking area)**

The MarkStar™ Features: Commercial-Grade

The MarkStar™ is a commercial-grade hand-held portable marking system incorporating a 10W Q-Switched Pulse Fiber Laser.

- **FiberScan™ C3 LG Software**
- **USB port to operate Windows 7 or FiberScan™ C3 LG Software (laptop required)**

☑ Fiber Laser: 10W (MarkStar™) - 20W (MarkStar™ Professional)

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 with high-repetition rate**
- **Excellent TEM00 beam quality (M2 < 1.05)**
- **Exceptional High Long-Term Reliability (50,000 MTBF)**
- **No water cooling required**
- **Warranty – 2 years on laser components with 5 years optional program available**

☑ *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.

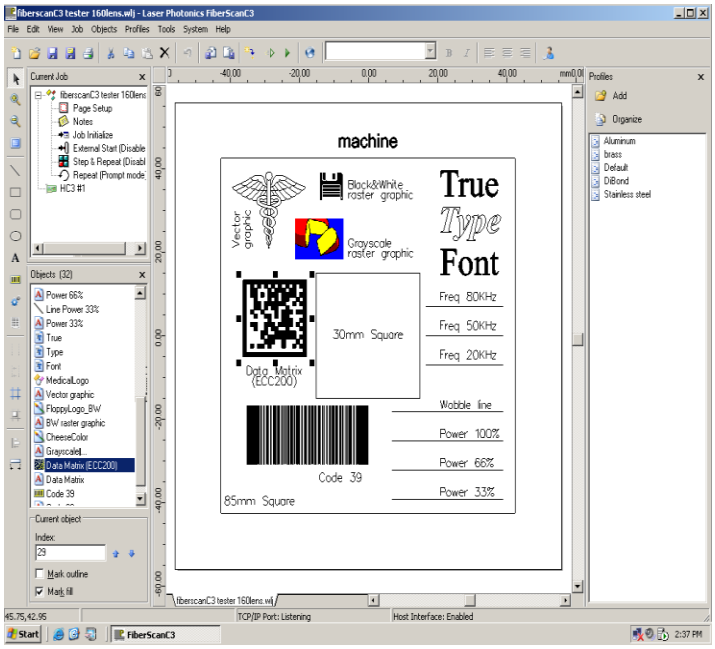
Scanning Head

The Scan Head is designed to quickly and precisely deflect and position the laser beam. 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

☑ FiberScan C3™ Software (MarkStar™ Professional Only)

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 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.

☑ FiberScan C3™ LG Version Software (MarkStar™ Only)

FiberScan C3™ LG Software is a multi-threaded laser marking software incorporating the following functions:

- **Complete Hatch Functions: ring-like hatch, free angle hatch, intersecting hatch with adjustable margins supporting 3 levels of hatch and each level can be set with separate parameters**
- **Powerful Variable-Text Functions: date, time, serial number, keyboard entry, file list, COM & network communication, dynamic Files, EXCEL and txt file**
- **Imports Document Formats: PLT, DXF, AI, DST, BMP, JPG, GIF, TGA, PNG, TIF and TIFF**
- **Supports Common Barcodes: Code39, EAN, PDF417 and DATAMATRIX**
- **Various Types of Fonts: TrueType, SHX, JSF, DMF(Dot Matrix Font), One-Dimensional bar code and Two-Dimensional barcode**
- **Powerful Edit Functions: text, free curve, free graph, nodes, circular text, welding, intersecting, fitting, transformations, alignment, drawing/editing, Combined/Uncombined, Group/Ungroup and Undo/Redo**
- **The software can support 265 "pencils", when used to draw graphics, each can be set to different processing parameters**
- **Image Processing: Grayscale, White/Black, Invert, Dither, Brightness and Contrast**
- **User Management: Administrator, Draftsman and Operator**

Requirements beyond those listed above 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

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