

## Product

The Trixel® by TriLite Technologies is an AR/VR/MR enabling laser beam scanner. Trixel's® core technology is backed by a strong IP portfolio focused on reducing size, weight and cost of display units.

With the selection and mastery of the laser technology for the Trixel® in combination with its unique software solution, TriLite Technologies enables the smallest form factor laser beam scanner for projectors in AR / VR / MR and other applications.

The Trixel® offers a higher image brightness, a larger color spectrum, use of only one lens and a larger, in particular also a configurable Field of View (FOV) compared to conventional matrix-based micro displays.

TriLite Technologies Trixel® - core advantages in summary:

- **Smaller size**
- **Less weight**
- **Higher brightness**
- **Larger color gamut**
- **Use of only one lens**
- **Larger Field of View (FOV) than other systems**
- **Configurable Field of View (FOV) via proprietary software**

The Trixel® product portfolio sets new standards for laser-based display technologies and also allows for specific customer adaptations.

## Company & Know-How

TriLite Technologies is an image display company based in Vienna, Austria, and Palo Alto, California, developing patented ultra-small RGB laser beam scanners to be used in AR/MR/VR Head-Mounted-Devices, Head-Up-Displays, and other projections such as Pico or Smart Home applications.

TriLite Technologies benefits in particular from their deep technological know-how, underpinned by our own patents and strong partnerships. This fact gets expressed through:

- **Deep inhouse knowledge of light module, MEMS mirror & optic combiner technologies**
- **Strong patent portfolio including proprietary laser beam scanner assembly & driving technologies**
- **Strong relationships with all necessary component suppliers**



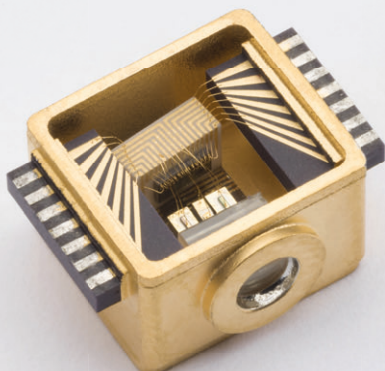
## Customization & Services

As a result of the in-depth specialist knowledge and international setup, TriLite Technologies particularly distinguishes itself by our ability to act as a global one-stop shop for your laser-beam scanner requirements.

As such, TriLite Technologies is the only company worldwide who has the know-how and capability to design, integrate and manufacture any customer specific setup of light module, MEMS mirrors and optical combiners from prototyping to mass production.

The entire spectrum of Trixel's® flexibility for customization as well as the required range of consultancy service from TriLite Technologies includes:

- **Laser die bonding, wire bonding, active lens alignment, hermetic sealing**
- **Laser module packaging**
- **MEMS mirror selection based on individual laser settings**
- **Opto-mechanic MEMS design**
- **Active MEMS mirror alignment**
- **Laser & MEMS driving electronics**
- **Video input interface**
- **Design of optical combiners in cooperation with leading suppliers from waveguides to holographic reflectors**
- **Prepare production including Q&A**



Model		Basic	Customized
Variant		Basic	Minimum Maximum
<b>LASER BEAM SCANNER / PROJECTOR</b>			
DIMENSIONS	(IN MM / L X W X H)	25 X 14 X 9	14 X 6 X 5
WEIGHT	(IN G)	5.5	1.5
RESOLUTION	(IN PIXELS)	1280 X 720	1280 X 720
FIELD OF VIEW (FOV)	(HORIZONTAL X VERTICAL)	UP TO 40° X 30° CHANGEABLE BY DEVELOPER INTERFACE	UP TO 65° X 45°
REFRESH RATE	(IN HZ)	90	20000
LATENCY	(IN MS, AVERAGE)	5	< 1
TYPE OF PROJECTION	-	COLOR SIMULTANEOUS	COLOR SIMULTANEOUS
SCANNING MODE	-	RASTER SCAN & LISSAJOUS	RASTER SCAN & LISSAJOUS
POWER CONSUMPTION	(IN W, INCL. ALL COMPONENTS)	2.5 (TYPICAL)	0.1
OPERATING TEMPERATURE	(IN CELSIUS / MIN - MAX)	20 - 30	0 - 45
DISTANCE LIGHT MODULE & MEMS MIRROR	(IN MM)	12.5	3.0
DEVELOPER INTERFACE	-	PYTHON GUI / PYTHON SCRIPTS	PYTHON GUI / PYTHON SCRIPTS / MATLAB
OPERATING SYSTEM	-	WINDOWS / MACOS / LINUX	WINDOWS / MACOS / LINUX
<b>LIGHT MODULE</b>			
DIMENSIONS	(IN MM, L X W X H)	8.0 X 9.0 X 6.2	8.0 X 5.0 X 3.0
WEIGHT	(IN G)	2.0	0.5
LIGHT SOURCES	-	LASER DIODES	LASER DIODES INCL. VCSEL
WAVELENGTHS	(IN NM) R / G / B	635 / 520 / 455	635 / 520 / 455
OPTICAL POWER (PEAK)	(IN MW) R / G / B	20 / 10 / 10	5 / 10 / 10
LUMINOUS FLUX	(IN LM) PER COLOR	3.0 / 4.9 / 0.4	0.8 / 4.9 / 0.4
POWER CONSUMPTION	(IN W, ONLY LIGHT MODULE)	0.22 (WHITE IMAGE)	0.01
COLOR GAMUT	-	13% LARGER THAN RGB LED SOURCE AND 130% LARGER THAN SRGB	13% LARGER THAN RGB LED SOURCE AND 130% LARGER THAN SRGB
MICROLENS TYPE	-	OPTIMIZED FAC / SAC	OPTIMIZED CUSTOM LENS (E.G. FAC, SAC, FREEFORM LENS)
BEAM DIAMETER (IN MEMS PLANE)	(IN MM, 1/E²)	~ 0.6	≤ 0.6
DIVERGENCE ANGLE	(IN MRAD, 1/E², HALF ANGLE)	0.59 - 0.85	0.27
INTEGRATED PHOTODIODES	-	N/A	SEPARATED PHOTODIODES OR ASIC
<b>MEMS MIRROR</b>			
		<i>VALUES NOT COMBINABLE</i>	
TYPE	-	1X 2D MIRROR	1X 2D MIRROR OR 2X 1D MIRRORS
ACTUATION METHOD	-	ELECTROMAGNETIC / ELECTROSTATIC	ELECTROMAGNETIC / ELECTROSTATIC / PIEZOELECTRIC
DIMENSIONS	(IN MM, L X W X H)	8.5 X 5.5 X 2.1	7.0 X 5.0 X 1.5
DIMENSIONS WITH CAPS	(IN MM, L X W X H)	8.5 X 5.5 X 3.9	7.0 X 5.0 X 3.5
MIRROR DIAMETER	(IN MM, HORIZONTAL X VERTICAL)	1.1 X 1.0	0.5 X 0.5
WEIGHT	(IN G)	0.5	≤ 0.5
<b>MAIN BOARD</b>			
DIMENSIONS	(IN MM, L X W X H)	86 X 54 X 20	INTEGRATED INTO CUSTOMER PRODUCT'S MAIN BOARD
WEIGHT	(IN G)	46.0	BASED ON CUSTOMER PRODUCT'S MAIN BOARD
FPGA	-	ARTIX-7	E.G. SPARTAN / ATRIX / KINTEX / VIRTEX (ULTRASCALE / ULTRASCALE+)
RAM	(IN GB, DDR3)	1	1
STORAGE	(IN MB, FLASH)	32	32
<b>CONNECTION IN/OUTPUT</b>			
CONTROL & CONFIGURATION		USB	USB / USB-C
VIDEO		HDMI	HDMI / USB-C / SDI / MIPI / OPTICAL
CONNECTION MAIN BOARD TO PROJECTOR		FPC	FPC OR INTEGRATED IN CUSTOMER PRODUCT

## Realization of customer projects

Our cooperation model is characterized by aligning TriLite Technologies know-how and capabilities with customer-specific requirements. TriLite Technologies usually proceeds according to the following project flow:

- Discussion of Trixel's® technical data sheet and capabilities
- Align with specific customer requirements
- Execute common design workshop
- Align on customization and service amount
- Agree on commercial offer based on work packages
- Execute project for prototyping
- Finalize pilot phase
- Prepare mass production

Manufacturing be implemented either with TriLite Technologies as the end-to-end supplier or by customers directly through licensing agreements.