

昊量光电

ir=ision[®]
Future built on light.

PRODUCT PORTFOLIO

DLP Light Engines for
Additive Manufacturing & 3D Metrology

November 2022



PRODUCT PORTFOLIO

OVERVIEW | ADDITIVE MANUFACTURING AND METROLOGY PRODUCT PLATFORMS



IKARUS II

The light weight – high performance optical module



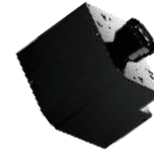
FIREBIRD

high intensity for industrial applications



PHOENIX

an industrial 4K UV Projector for 24/7 use



HELIOS

most powerful Light Engine for additive manufacturing



MERCURY

Designed for 3D metrology, scanning and mapping applications

Chipset	DLP6500	DLP9000	DLP670S	DLP9000	DLP6500
Micromirror array size	1920 x 1080	2560 x 1600	2560 x 1600	2560 x 1600	1440 x 1080
Display resolution			3840 x 2160 (XPR)		
Wavelengths	365 385 405nm	385 405 460nm	385 405nm	365 385 405nm	460nm
Image resolution	Full HD	2K	4K	2K	Full HD
Standard lenses (others on request)	50 84 100μ	2 75 84 162μ 40μ (in Firebird config.)	native: 35 to 100μ 4K: 23 to 65.3μ	6 31 100 150 162μ	I. 540 x 405mm II. 241 x 180mm III. 715 x 536mm
Optical output power (image plane)	up to 4W	up to 5W	up to 6.5W	up to 12W	up to 200mW
Contrast ratio	up to 1:300	up to 1:400	up to 1:175	up to 1:300	up to 1:300
Uniformity (lens-dependent)	up to 95% acc. to IEC61947	up to 95% acc. to IEC61947	up to 95% acc. to IEC61947	up to 95% acc. to IEC61947	up to 92% acc. to IEC61947



IKARUS II

A COMPACT, LIGHT-WEIGHT, YET HIGH PERFORMANCE MODULE FOR SLA



Ikarus II Full HD/1080p DLP projection module offers the benefits of a compact, light-weight, yet high-performance optical module with many options for customization.

HIGH PERFORMANCE OPTICAL MODULE

- ✓ Illumination uniformity is maximized across the full image area owing to on-axis, TIR-prism illumination of the DLP®
- ✓ Minimum optical distortion
- ✓ High transmission efficiency
- ✓ Maximum contrast values

A VARIETY OF CONFIGURATIONS TO ADDRESS APPLICATION SPECIFIC REQUIREMENTS

Ikarus II is available with a variety of screw-on lens types to accommodate different:

- ✓ Wavelengths
- ✓ Throw ratio
- ✓ Feature size
- ✓ Projection distance

CUSTOMIZATION

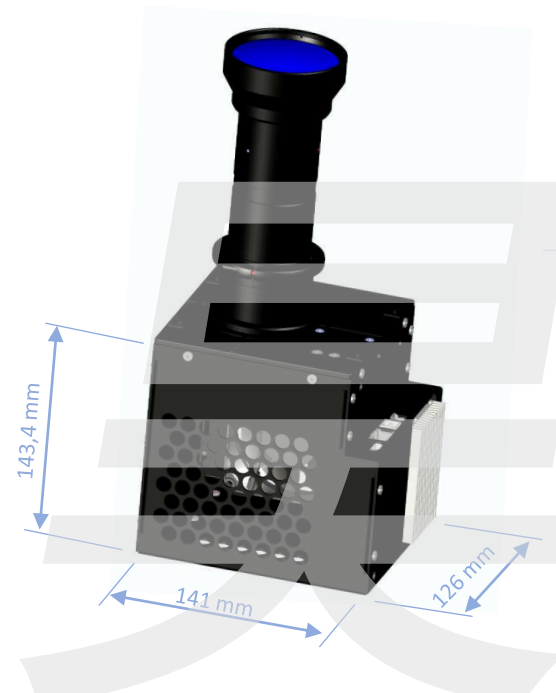
- ✓ Both off-the-shelf lenses as well as customized modifications are available with a short lead time through In-Vision in-house design and production lines.

Chipset	DLP6500
Array resolution	1920x1080
Wavelengths (LED)	365, 385 and 405nm
Standard lens	50, 84 and 100µm
Optical output power (image)	up to 4W (wavelength-dependent)
Contrast ratio	up to 1:300 ANSI
Uniformity	up to 95% acc. to IEC61947 (Lens-dependent)

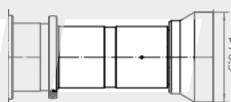
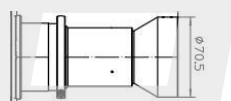
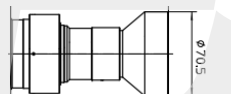


IKARUS II

A COMPACT, LIGHT-WEIGHT, YET HIGH PERFORMANCE MODULE FOR SLA



AVAILABLE PROJECTION LENS

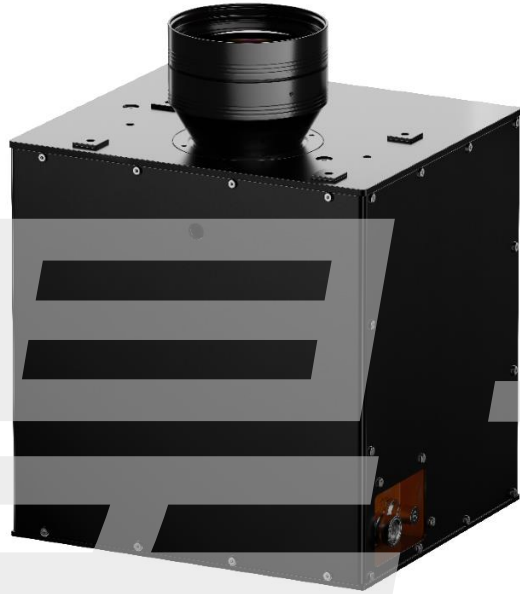
name	pixel pitch	wavelength	Image size	projection distance ¹
Topol	50μ	365 405nm	96 x 54mm	350mm 
Nihan	84μ	385nm	161 x 90mm	550mm 
Melzer	100μ	405nm	192 x 108mm	406mm 

¹ distance between mounting plate (reference surface) to image plane



FIREBIRD

HIGH-INTENSITY LIGHT ENGINE FOR HIGH-ACCURACY, INDUSTRIAL APPLICATIONS



The Firebird DLP® light engine module offers native WQXGA/2K (2560 × 1600) pixel resolution based on TI's DLP9000 advanced light control chipset. It offers performance as well as modularity to address a wide range of customer-specific requirements.

STABLE, HIGH INTENSITY LIGHT EMISSION

- ✓ The optical illumination and projection system are optimized for high-intensity light emission.
- ✓ The light engine module contains an optional, internal light intensity measurement module to continuously monitor irradiance and provide feedback for e.g. light-source ageing compensation.

HIGH PERFORMANCE OPTICAL MODULE

- A key component of the light engine is the **on-axis illumination system** using an RTIR/TIR prism. This enables:
- ✓ Low distortion,
 - ✓ Highly uniform light distribution across the whole projection area.

Chipset	DLP9000
Array resolution	2560x1600
Wavelengths (LED)	385, 405 and 460nm
Standard lenses	2, 75, 84 and 162µm
Optical output power (image)	up to 5W (wavelength-dependent)
Contrast ratio	up to 1:400 ANSI
Uniformity	up to 95% acc. to IEC61947 (Lens-dependent)

CUSTOMIZATION

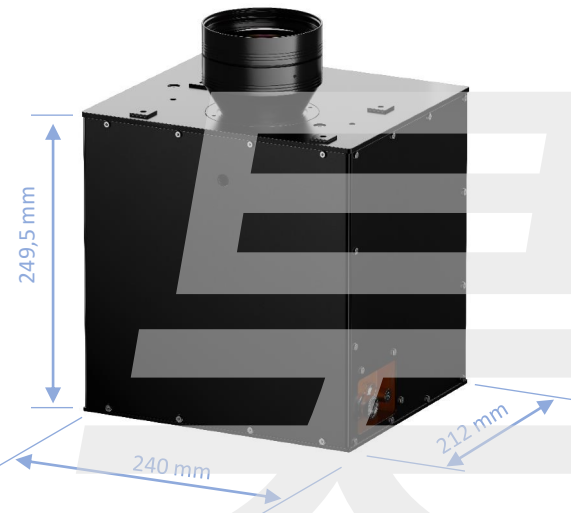
- ✓ Both, off-the-shelf lenses as well as customized modifications are available with a short lead time through In-Vision in-house design and production lines.
- ✓ Wavelengths from 365nm to 460nm.



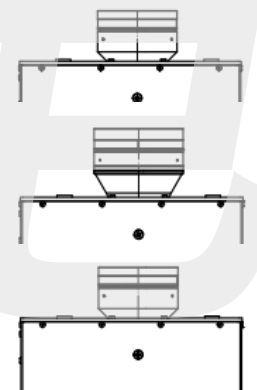
FIREBIRD

HIGH-INTENSITY LIGHT ENGINE FOR HIGH-ACCURACY, INDUSTRIAL APPLICATIONS

AVAILABLE PROJECTION LENS



name	pixel pitch	wavelength	Image size	projection distance ¹
Schedir	2 μ	385nm	5,12 x 3,2mm	158,53mm
Gars	75,75 μ	385 405nm	194 x 121mm	266mm
Weitra	84 μ	385 405nm	215 x 134mm	300mm
Litschau	162 μ	385 405nm	415 x 259mm	557 mm
Maja ²	40 μ	405nm	102 x 64mm	216,9 mm



¹ distance between mounting plate (reference surface) to image plane

²Lens available in the Firebee configuration



HELIOS

THE MOST POWERFUL UV LIGHT ENGINE FOR AM - APPLICATIONS



SUPERIOR OPTICAL PERFORMANCE

The most powerful system on the market

- ✓ High intensity light source
- ✓ On/Off contrast and uniformity: tailored prism geometry achieves superior homogeneity values (tested with 25 points of measurement)
- ✓ Coating of mirrors and other optical components tailored and optimized to wavelength to achieve highest intensity values
- ✓ Fused silica lens elements to achieve high transmission
- ✓ DMD Position x/y and tilt are configured with counter pressure mechanics that allow for precise configuration - optimal alignment of optics and mechanics to achieve superior MTF and distortion values

SIMPLEST HANDLING

It has never been easier to operate and maintain a DLP light engine

- ✓ LED interchangeability: LED can be easily replaced by customer (module cassette)
- ✓ Easy accessibility and modular system - fully built-in sub assemblies
- ✓ Preconfigured lens interchangeability at In-Vision 162 μ m (70 μ m and 50 μ m possible)
- ✓ Fully automated intensity measurement

HIGHEST QUALITY

Thorough testing makes sure only perfect products are being shipped

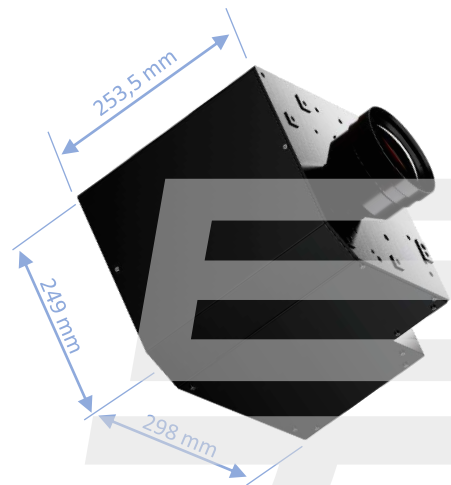
- ✓ Each engine undergoes extensive end of line testing with detailed test report
- ✓ 25 measurement points for contrast and uniformity
- ✓ Fully enclosed housing of the light path

Chipset	DLP9000
Array resolution	2560x1600
Wavelengths (LED)	365, 385 and 405nm
Standard lens	162 μ m (other lenses available on demand)
Optical output power (image)	up to 12W (wavelength-dependent)
Contrast ratio	up to 1:300 ANSI
Uniformity	up to 95% acc. to IEC61947 (Lens-dependent)



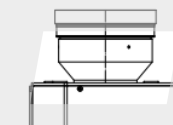
HELIOS

THE MOST POWERFUL UV LIGHT ENGINE FOR AM - APPLICATIONS



AVAILABLE PROJECTION LENS

name	pixel pitch	wavelength	Image size	projection distance ¹
Selen	162μ	385 405nm	414 x 259mm	535mm
Tellur	150μ	385 405nm	384 x 240mm	775mm
Antimon	100μ	385 405nm	256 x 160mm	
Silver	75μ	385 405nm	192 x 120mm	525 mm
Astat	31μ	365nm	79,36 x 49,6mm	641 mm
Bor	6μ	385nm	15,36 x 9,6mm	212 mm

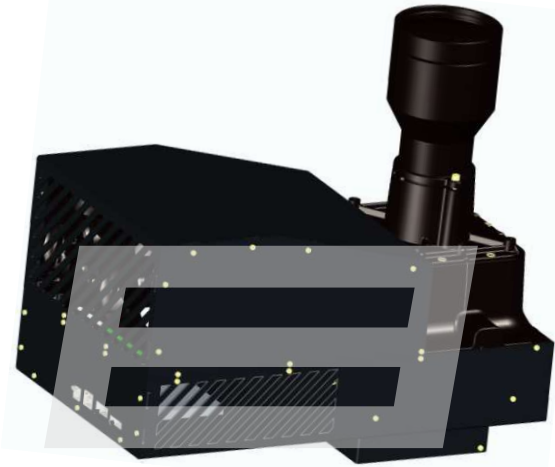


¹ distance between mounting plate (reference surface) to image plane



PHOENIX

FIRST 4K INDUSTRIAL LIGHT ENGINE



The Phoenix DLP® light engine module is based on TI's new 670S chipset and offers a 4K image resolution.

1:1 MAPPING | NO ARTEFACTS in comparison to pure video chips

- ✓ each pixel can be addressed
- ✓ no downscaling of input picture necessary, compared to DLP660TE video chip

THE BEST FROM 2 WORLDS our long-term experience in optics and electronics made it possible

- ✓ high resolution with outstanding performance
- ✓ small mechanical dimensions
- ✓ fine tuning of all optical and mechanical elements to get the most out of it
- ✓ optical light path in fully enclosed housing
- ✓ modular system – sub assemblies

Chipset	DLP670S video pattern mode
Display resolution	3840x2160 (XPR) ¹
Micromirror array size	2560x1600
Wavelengths (LED)	385 and 405nm
Image resolution	4K
Image size	195.84mm x 122.4 mm
Standard lens	native - 76.5 μm 4K - 50 μm (other lenses available on demand)
Optical output power (image)	up to 6.5W
Contrast ratio	up to 1:175 ANSI
Uniformity	up to 95% acc. to IEC61947 (Lens-dependent)

EASY HANDLING

- ✓ LED interchangeability
- ✓ air cooled – no external cooling devices are needed
- ✓ intensity sensor module integrated (optional) to guarantee continuously your set intensity value
- ✓ no adjustment in field necessary | lens is preadjusted according to your configuration
- ✓ compact design and low weight <3kg

PLUG AND PLAY

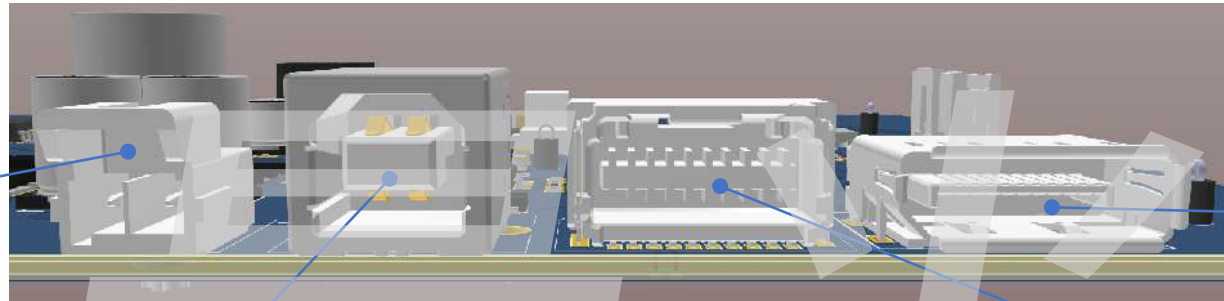
- ✓ 100% Quality inspection with transparent test reports for every unit
- ✓ 25 measurement points for contrast and uniformity
- ✓ EOL (end of line) - testing in our Test stands, specially designed by In-Vision to guarantee high performance.
- ✓ easy accessibility
- ✓ dimensions are tailored for stitching

¹XPR – Extended Pixel Resolution (Texas Instruments)



ELECTRONIC INTERFACE AND MODI FOR DLP670 & DLP9000

Details on data/video interface - how are signals delivered and triggered? Is continuous-scrolling operation possible?



Power supply
24V

Display port

USB Port

LED driver

- GUI tool for various Operating Systems
- Example of C code provided in the user manual

DLP controller

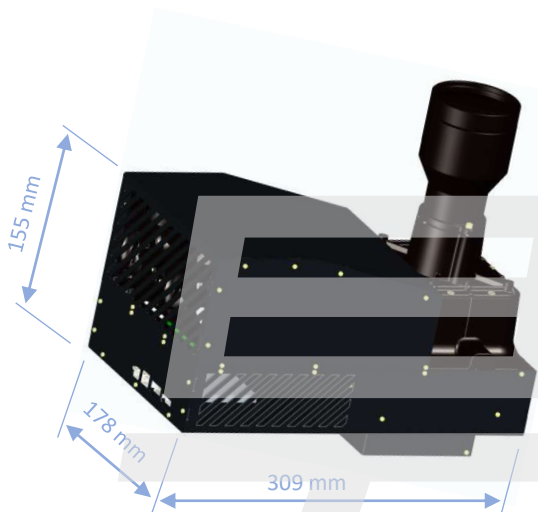
- DLP controller board compatible with TI Light Crafter Evaluation Module

GPIO-Signals: Triggering

- LED On/Off (in and out)
- DLP Triggers (in and out)
- 20 pins



PHOENIX FIRST 4K INDUSTRIAL LIGHT ENGINE



AVAILABLE PROJECTION LENS

name	pixel pitch	wavelength	Image size	projection distance ¹
Ankaa	Native 76.5μ	385 405 nm	196 x 122mm	363 mm
	4K 50μ			
Kolor	Native 100μ	385 405nm	256 x 160mm	451 mm
	4K 65.3μ			
Kolor	Native 76.5μ	405nm	196 x 122mm	610 mm
	4K 50μ			
Fulu	Native 35μ	385 405nm	89 x 56mm	363 mm
	4K 23μ			



¹ distance between mounting plate (reference surface) to image plane



MERCURY

HIGH END LIGHT ENGINE FOR HIGH END METROLOGY APPLICATIONS

Full HD/1080p DLP projection module – optimized for 3D-METROLOGY - offers the benefits of a compact, light-weight, yet high-performance optical module with many options for customization.

DESIGNED TO ENDURE HIGH G-FORCES

Optimized for industrial requirements

- ✓ stable structure
- ✓ DMD support was specially designed to ensure exact parallelism to the mounting plate of the Light Engine
- ✓ cooling design is optimized for extreme environmental conditions up to 50 ° C
- ✓ high optical quality over the entire depth of field

TOP QUALITY FOR HIGH END APPLICATIONS

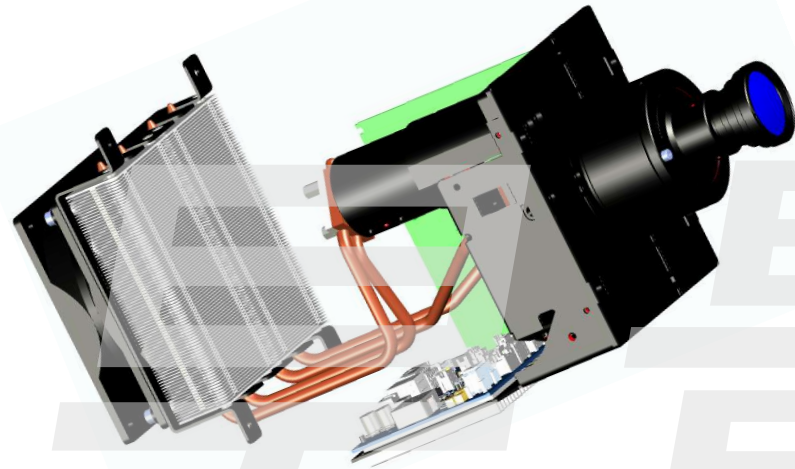
100% Quality Inspection before shipment

- ✓ measured values up to the maximum depth of field available during
- ✓ EOL (End of Line testing)
- ✓ intensity sensor module integrated (optional) to guarantee continuously the set intensity value

EASY DEPLOYMENT IN YOUR SCANNER HEAD

Plug & Play

- ✓ LED interchangeability
- ✓ air cooled – no external cooling devices are needed
- ✓ Interchangeable projection lenses – preconfigured Light Engine in ordered configuration

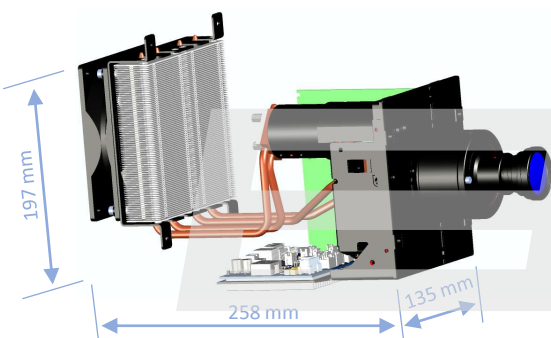


Chipset	DLP6500
Array resolution	1440x1080
Wavelengths (LED)	460nm
Standard lens	3 sizes – please refer to next page (other lenses available on demand)
Optical output power (image plane)	up to 200mW
Line Contrast (CTF)	> 70%
Uniformity	up to 92% acc. to IEC61947 (Lens-dependent)



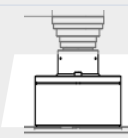
MERCURY

HIGH END LIGHT ENGINE FOR HIGH END METROLOGY APPLICATIONS



AVAILABLE PROJECTION LENS

name	depth of focus	wavelength	Image size	projection distance ¹
Fredy	210mm	460nm	540 x 405mm	803,5mm
Roger	90mm	460nm	241 x 180mm	803,5mm
Brian	300mm	460nm	715 x 536mm	803,5mm



¹ distance between mounting plate (reference surface) to image plane

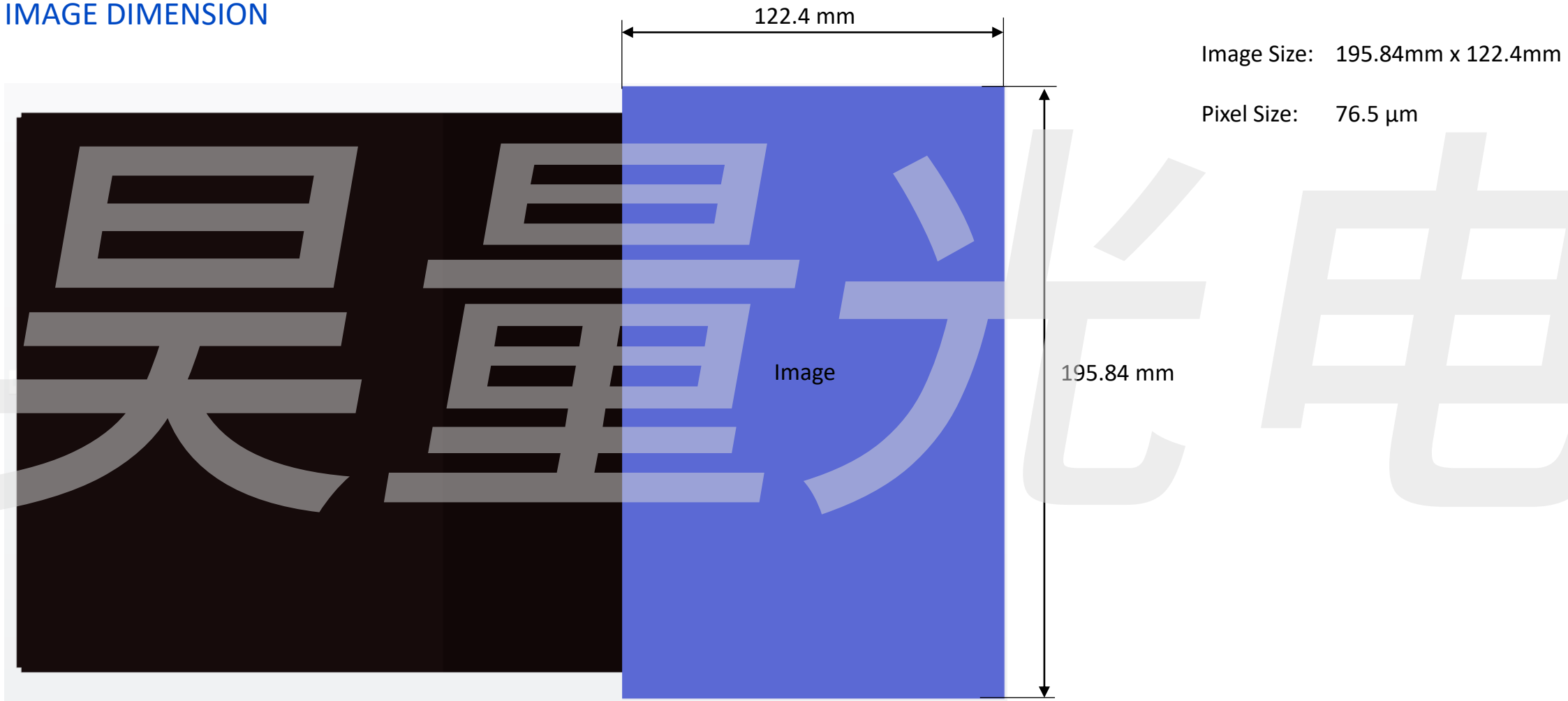


APPENDIX

DLP670S – Stitching

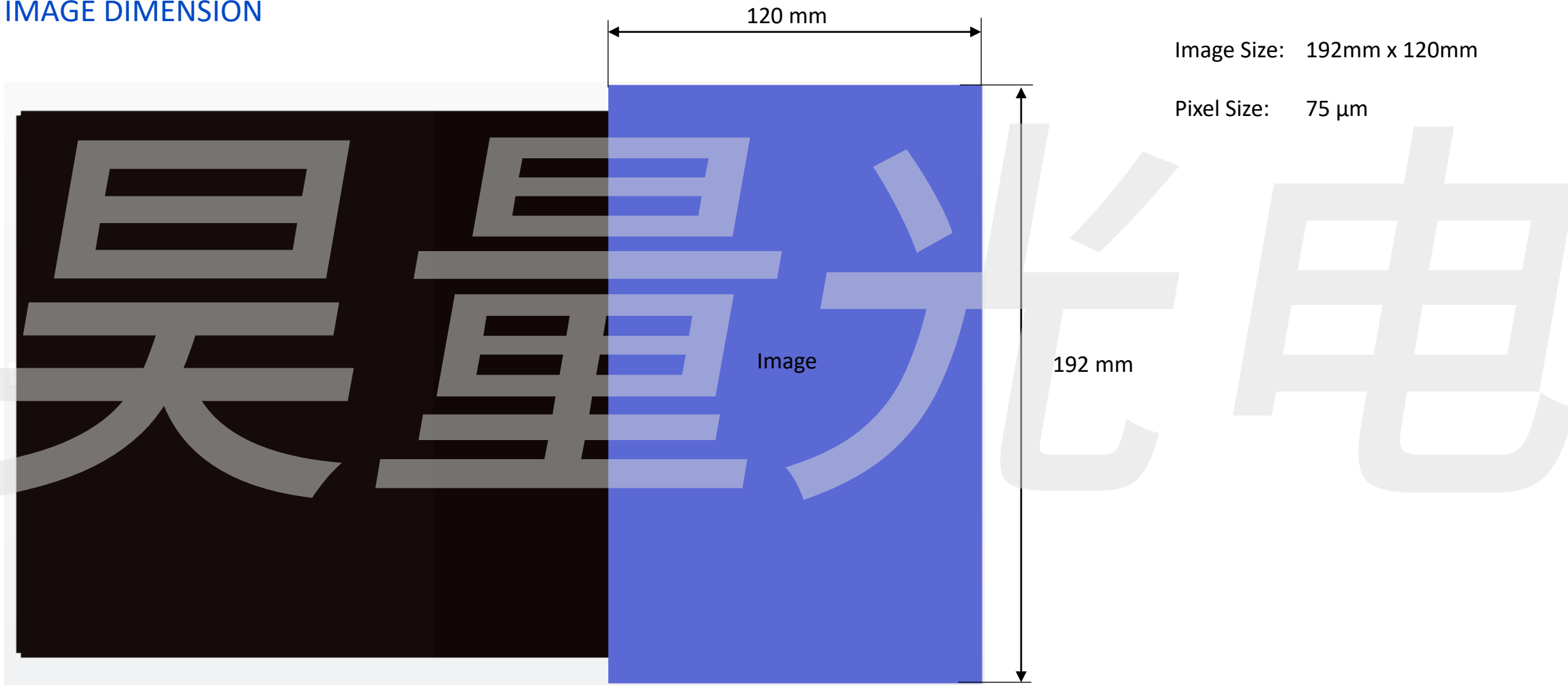
IN-VISION
DLP670S - STITCHING

IMAGE DIMENSION



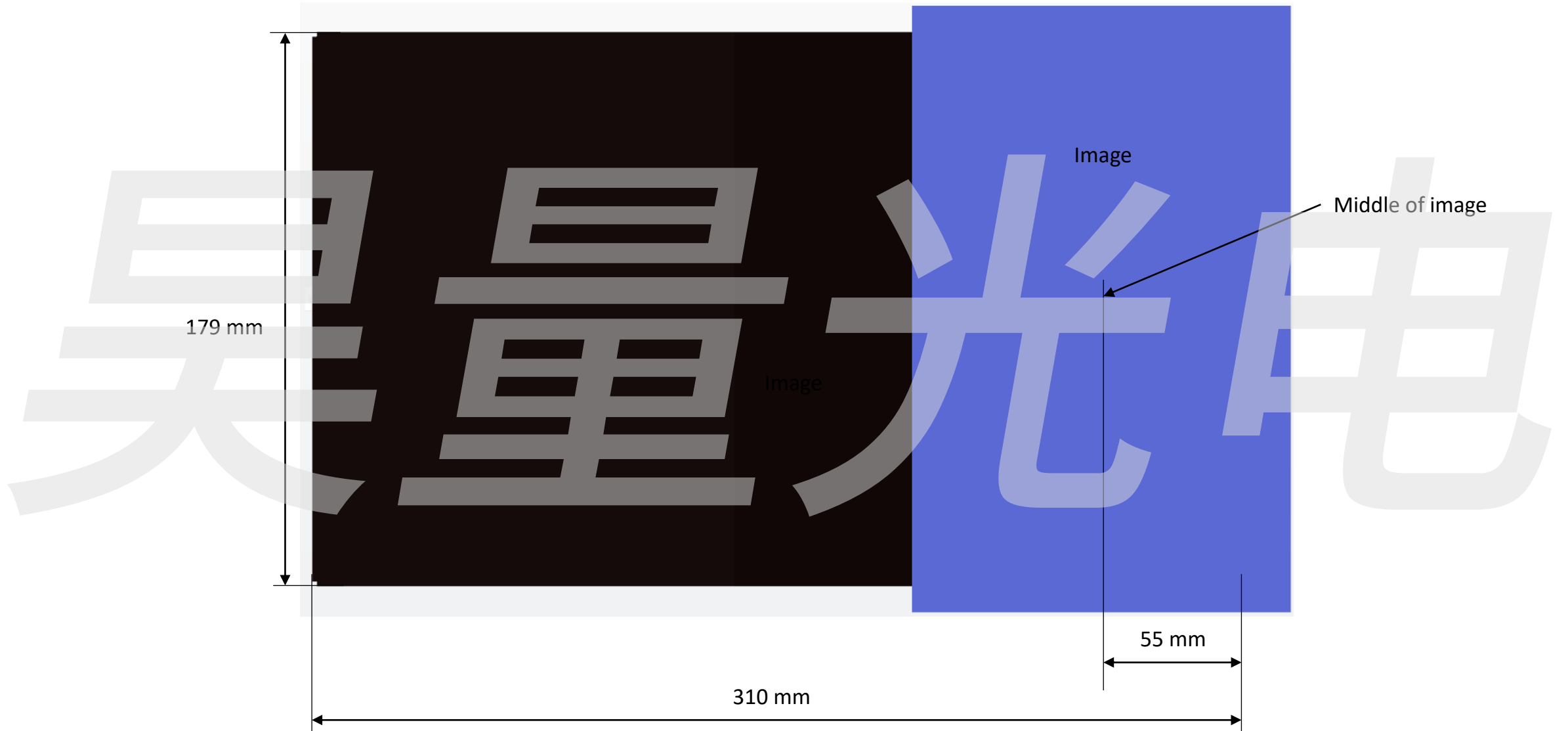
IN-VISION
DLP670S - STITCHING

IMAGE DIMENSION



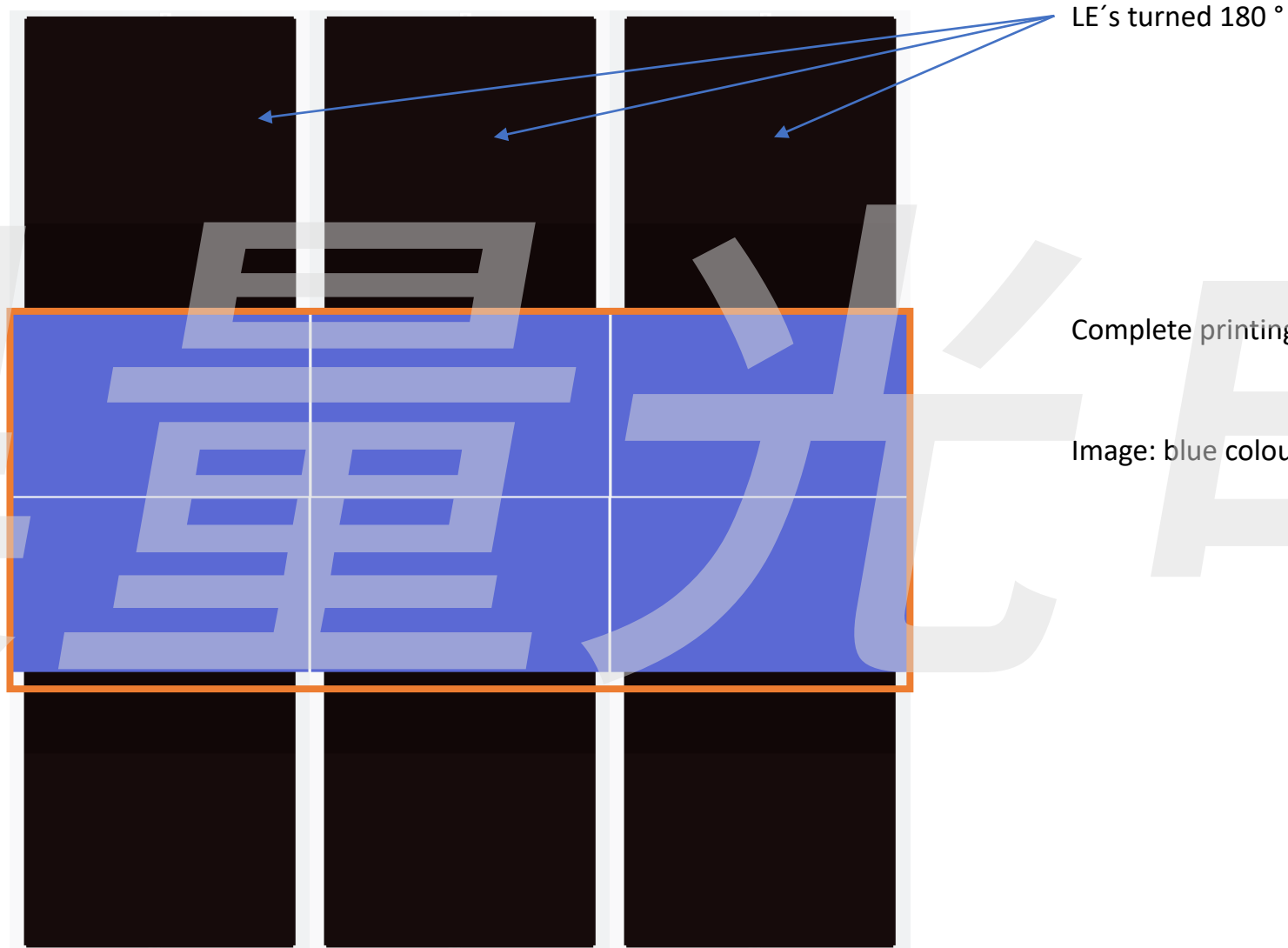
IN-VISION

DLP670S – STITCHING ESTIMATED LIGHT ENGINE DIMENSIONS



IN-VISION

DLP670S – POSSIBLE STITCHING OPTION 1



IN-VISION

DLP670S – POSSIBLE STITCHING OPTION 2



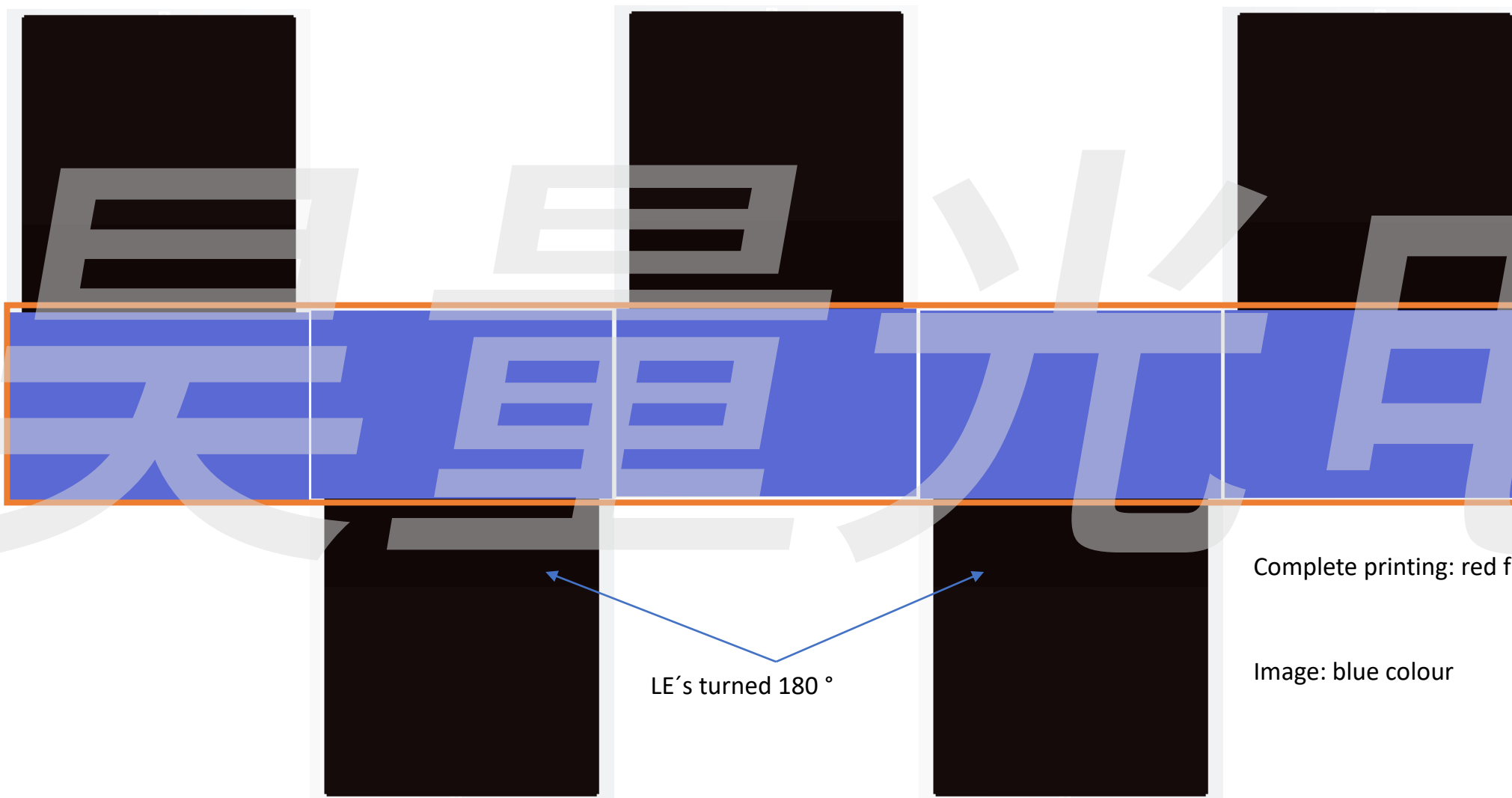
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Image: blue colour



IN-VISION

DLP670S – POSSIBLE STITCHING OPTION 3



Complete printing: red frame

Image: blue colour

