

# STAR-07 RGB



## MULTI-COLOR INDUSTRIAL PATTERN PROJECTION

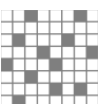
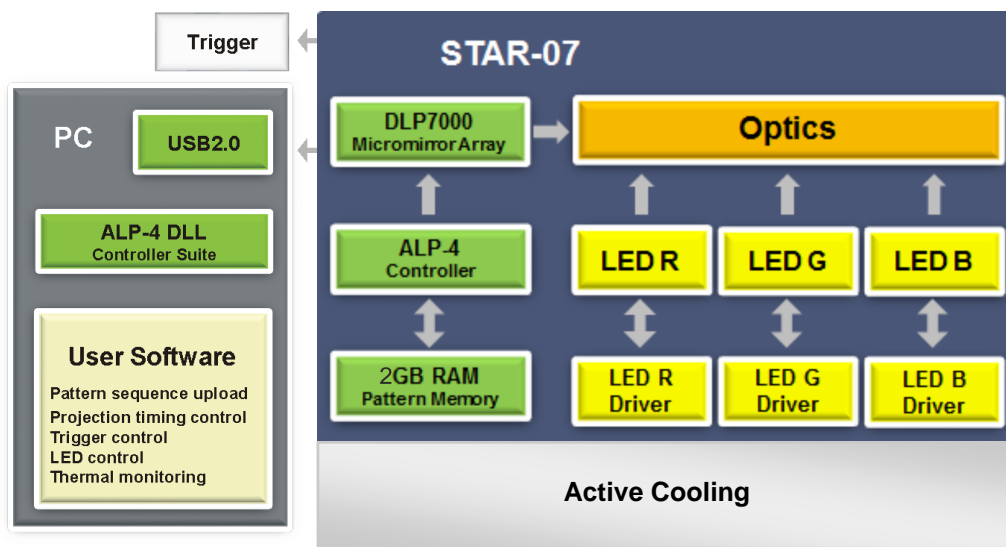


STAR-07 RGB is a high performance DLP® projector based upon the Texas Instruments micromirror technology and designed to serve in demanding industrial applications. Widely used in multimedia and digital cinema since more than one decade, the well proven DLP technology has become an important tool for industrial solutions as well. The heart of the STAR-07 projector is a 0.7” DLP chip that consists of an array of 1024x768 mirrors. These bi-stable mirrors flip into opposite tilt positions within microseconds to generate the desired patterns. STAR-07 RGB provides precise high-speed control for each individual mirror enabling outstanding flexibility and pattern frame rates of the projection output.

The STAR-07 RGB projector is equipped with three high-power LED light sources and an integrated cooling system. Typical use cases are 3D volumetric display, 3D measurement, augmented reality applications, and machine vision illumination. Beyond that, new emerging applications are well supported by an open SDK interface. STAR-07 RGB comes with two lens options, the standard projection lens with zoom capability and a wide angle lens with fixed focal length.

### SYSTEM CONTROL

The ViALUX ALP-4.2 Controller Suite is the central programming tool and provides all necessary features for advanced product development. Sequences of patterns are uploaded from PC to the on-board memory via USB2.0 transfer with lossless compression. The STAR-07 RGB is USB2.0 connected and realizes pattern upload, display, and synchronization. Three individual digital drivers for the three LED light sources give convenient access to power setting and temperature reading for thermal management of each single LED. In addition, each LED is gated by a programmable high-speed control line. An integrated trigger facility supports selectable voltage levels for external master or slave modes of control.



The properties of the display sequences, e.g. bit depth, picture time, trigger mode, repetitions can be freely defined to meet the respective application requirements. The ALP-4.2 firmware streams patterns from on-board SDRAM memory to the DLP7000 micro mirror array where the input pattern is one-to-one mapped to the mirrors. The patterns are updated in the global reset mode; that means all mirrors are switching simultaneously within a few microseconds. Grey value patterns are generated by controlled ON-time for each mirror yielding exact grey value linearity. The maximum global array switching rate is 22 727 fps. Multiple STAR-07 RGB devices can be run in parallel, conveniently controlled from the same application program and precisely synchronized by the trigger facility. The ALP-4.2 API is well proven and the DLL is compatible to C++, VBasic, .NET, LabView, and other development platforms. Microsoft® operating systems are supported up to the most recent Windows® versions both, 32-bit and 64-bit. The ALP-4 USB2.0 driver is robust, validated, UIF compliant and 24/7 proven in industrial and medical use cases.

## OPTICAL AND THERMAL DESIGN



The red, green, and blue light output of each LED is combined and fed into the homogenizer (light tunnel) by means of a dichroic mirror system. The output color of STAR-07 can be RGB switched with the full frame rate. A common copper heat sink with an active cooler is included for the thermal management of the LED light sources. The temperature monitoring facility of ALP-4.2 provides all the information needed to guarantee safe LED operation within the specified limits.

For detailed information on absolute maximum ratings refer to the LED type printed on the device label and the corresponding data sheets

<https://www.luminus.com/products/color/monochromatic-cob> of the LED manufacturer.

## SPECIFICATION

### LEDs

	RED	GREEN	BLUE
Typical dominant wavelength	613 nm	525 nm	460 nm
Spectral bandwidth FWHM	19 nm	34 nm	20 nm
STAR-07 RGB output *	400 lm 1 750 mW	850 lm 1 550 mW	140 lm 2 550 mW

\* Typical value for continuous projection, pulse operation may yield higher output

### LENS OPTIONS

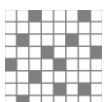
STAR-07 RGB	Length L Diameter D Mass M	Distortion	Working distance D Throw ratio TR
Standard lens Part No.: 9052	L = 40 mm D = 35 mm M = 120 g	0.2 %	D > 0.4 m TR = 1.8 ... 2.1
Wide angle lens Part No.: 9591	L = 91 mm D = 81 mm M = 580 g	5.5 %	D > 0.5 m TR = 0.9

### FRAME RATES PER COLOR

DMD array (AOI)	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 512
Bit depth	8-bit	7-bit	6-bit	5-bit	1-bit	1-bit
Frame rate	290 fps	569 fps	1 091 fps	2 016 fps	22 727 fps	30 300 fps

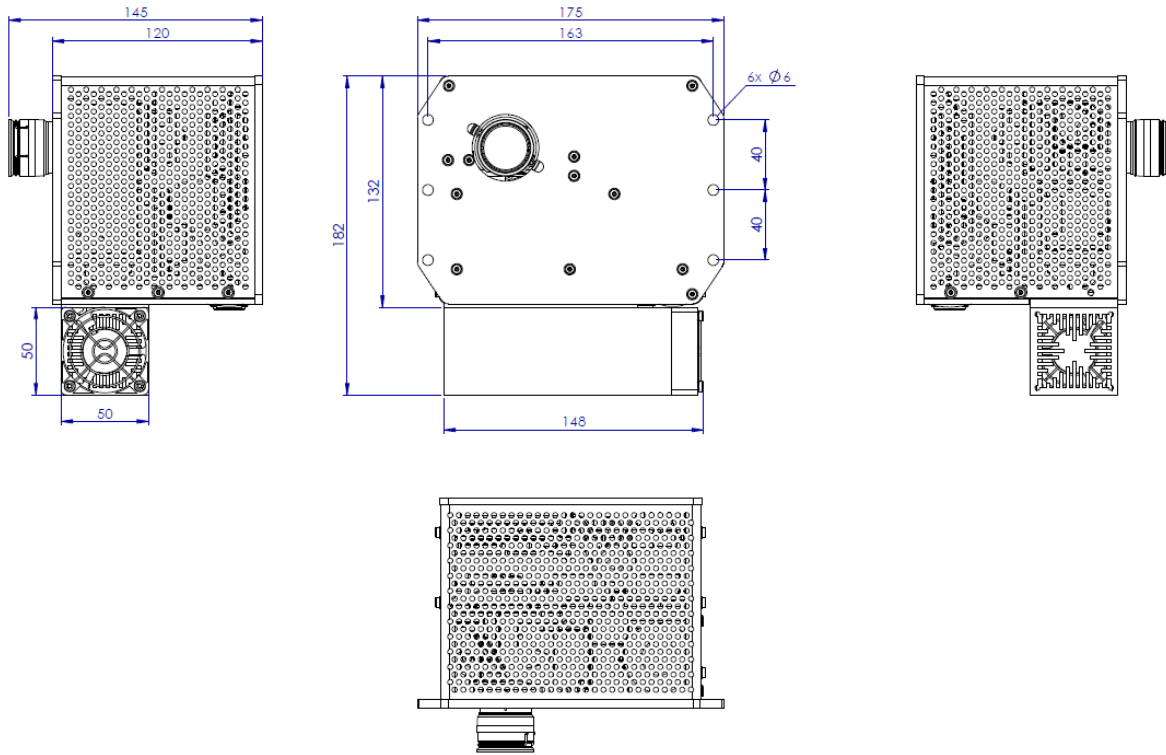
### GENERAL

Weight (without lens)	Input power	Operating temperature	Storage temperature	Regulations	LED lifetime
3200 g	DC 12-24V 150 W	10°C to 40°C non-condensing	-10°C to 50°C non-condensing	CE FCC Class A	>10.000 h (ON time)

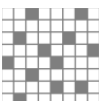
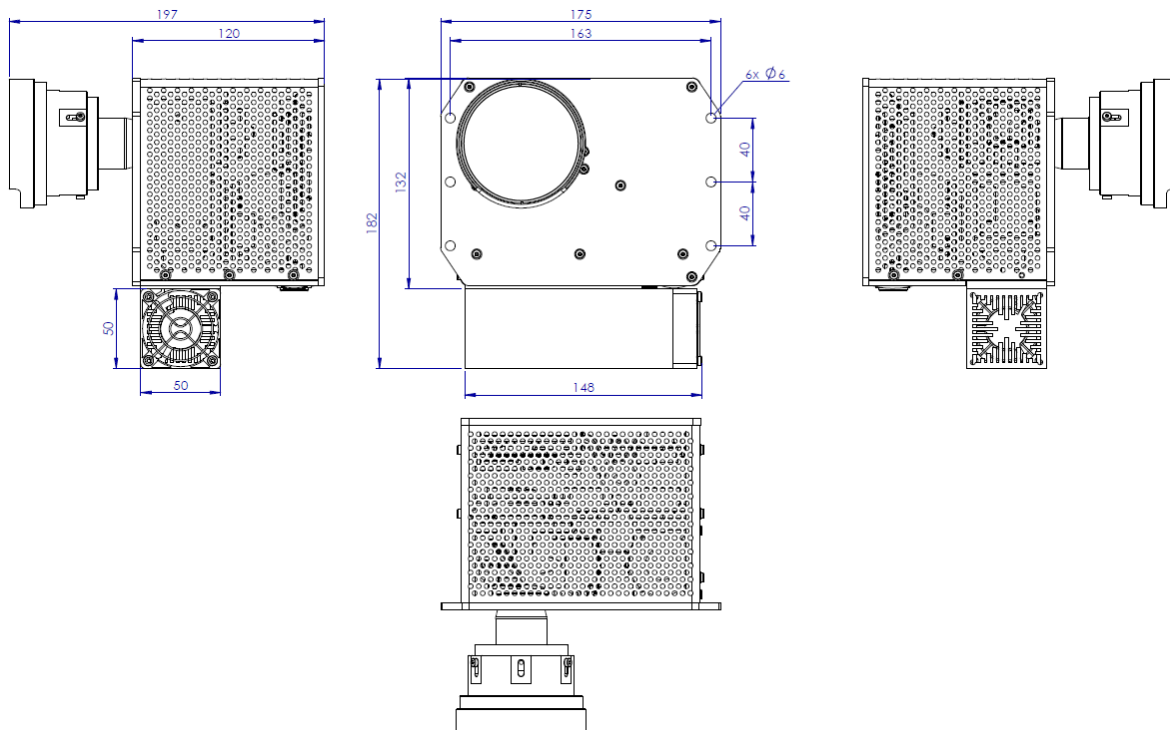


**DIMENSIONS [mm]**

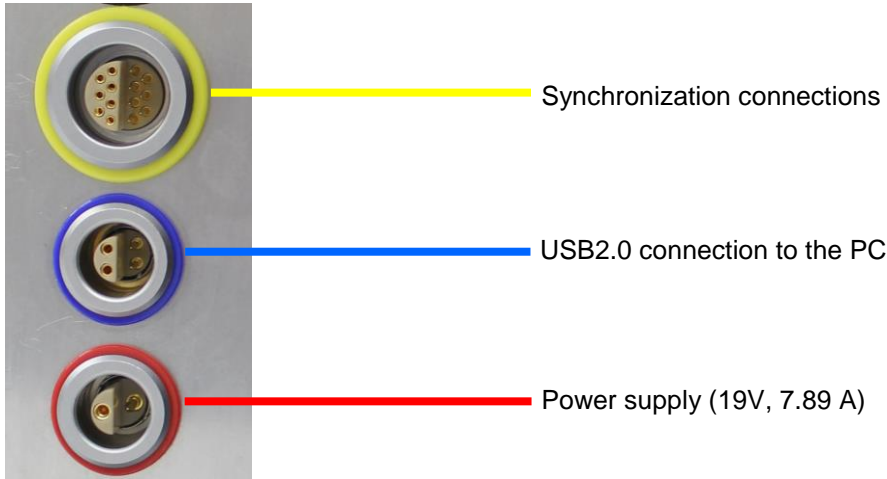
**STAR-07 RGB with standard lens**



**STAR-07 RGB with wide angle lens**



## CONNECTIONS



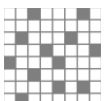
### SYNCHRONIZATION CONNECTIONS (yellow):

Pin	Signal	I/O	Limit	Description / usage
1		OC Out <sup>1</sup>	10mA	<i>reserved for future use</i>
2	STAR-07 Cascade	OC Out <sup>1</sup>	10mA	for serializing multiple STAR-07 projectors in a chain
3	Frame Trigger	OC Out <sup>1</sup>	10mA	outputs one pulse per frame, e.g. for synchronizing a slave camera; ALP API commands: <ul style="list-style-type: none"> <li>AlpSeqTiming (SynchDelay, SynchPulseWidth): relation to frame timing</li> <li>AlpDevControl (ALP_SYNCH_POLARITY)</li> </ul>
4		OC Out <sup>1</sup>	10mA	<i>reserved for future use</i>
5	Device Power GND	Out		from primary power supply
6	DC 5V +	Out	5V 200mA	galvanic isolated supply voltage, e.g. for driving opto couplers
7	V <sub>DD</sub> common	V <sub>DD</sub>	50V	common voltage of all trigger outputs
8		OC In <sup>1</sup>	3.3 – 24V	<i>reserved for future use</i>
9	Device Power V <sub>DD</sub>		V <sub>primary</sub> 1A	taken from primary STAR-07 projector power supply: 19V, not fused
10	DC 5V GND			galvanic isolated supply voltage, e.g. for driving opto couplers
11	V <sub>SS</sub> common	GND		common ground of all trigger inputs
12		OC In <sup>1</sup>	3.3 – 24V	<i>reserved for future use</i>
13	STAR-07 Cascade	OC In <sup>1</sup>	3.3 – 24V	for cascading multiple STAR-07 projectors in a chain
14	Frame Trigger	OC In <sup>1</sup>	3.3 – 24V	triggers next frame in sequence, e.g. for synchronization with a master camera ALP API commands: <ul style="list-style-type: none"> <li>AlpProjControl: ALP_PROJ_MODE=ALP_SLAVE</li> <li>AlpSeqTiming (TriggerInDelay): relation to frame timing</li> <li>AlpDevControl (ALP_TRIGGER_EDGE)</li> </ul>

<sup>1</sup> OC – Opto Couplers

	Min	Typical	Max
Input	5mA 3.3V	6mA 5V	8mA 24V
Output	-	8mA	10mA 50V / 150mW

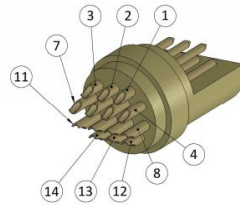
All input and output signals are driven by opto couplers permitting 250VDC isolation. Inputs are equipped with constant current regulators; therefore no further external resistors are required.



## STAR-07 INTERFACE CABLE



Lemo plug internal, soldering side

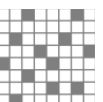


Lemo plug FFA.2C.314.CLAC

1	reserved 1 (OUT)	
2	STAR-07 Cascade (OUT)	white
3	Frame Trigger (OUT)	brown
4	reserved 2 (OUT)	
5	Device Power GND	
6	DC 5V VDD	
7	VDD common (all Outputs)	pink
8	reserved 3 (IN)	
9	Device Power V <sub>DD</sub>	
10	DC 5V GND	blue
11	VSS common (all Inputs)	yellow
12	reserved 4 (IN)	
13	STAR-07 Cascade (IN)	grey
14	Frame Trigger (IN)	green

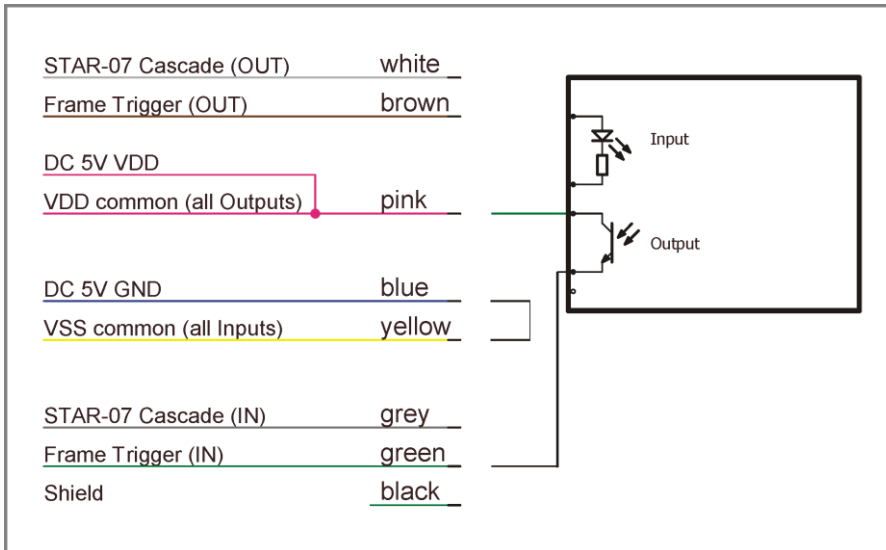
Lemo:  
FFA.2C.314.CLAC52Z  
Lemo: GMA.1B.045.DJ  
Lemo: 070 140

straight plug, 14-pin, cable collet 4.7-5.1mm for bend relief  
bend relief, 4.5-4.9mm, YELLOW  
Multiconductor shielded cable, 7x0.14mm<sup>2</sup>, max. 250V  
PVC, grey, outer diameter 5.0mm



### APPLICATION EXAMPLE 1

Driving STAR-07 frame trigger from external source



### APPLICATION EXAMPLE 2

Trigger external device frame by frame

