

## Integrated Solutions: Interconnecting Ophir Products and Accessories

### *The Concept:*

Ophir customers often need to connect different optical components together to create an optimal setup to best meet their needs.

In order to do this, Ophir provides mutual interconnections between different Ophir products via adapters with various threads, designed to exactly fit required optical path distances for each device. This is an integrated solution, prealigned and ready to use.

Our line of Beam Profiler cameras and sensors of various formats can be connected to any beam splitter or attenuator in case the laser power needs to be reduced. If the beam size or wavelength does not fit the sensor format, beam expanding/reducing/wavelength transforming devices can also be fitted as shown in figure 1.



To get to the best configuration for your specific needs, try [Beam Profile Finder](#) - or contact your Ophir sales representative.

*Examples of device integration:*

Case 1: A 300 Watt ,1070nm CW laser beam is focused to 60  $\mu\text{m}$  spot. In this case, the NanoScan with Ge sensor can be used but the laser beam needs to be significantly attenuated, in order not to damage the slit or the sensor.

Solution 1: Use the NanoScan Ge in combination with the LBS-300s-NIR – Beam splitter/attenuator system. In this case, all the components are connected directly without any special adapters (Figure 2).

Solution 2: In case the customer prefers BeamGage software, SP920s beam profiler can be used. However, the image on the CCD would be very small and will cover just 15pixels of the CCD in X and Y axis. Thereby, it is recommended to install the X4 or X6 beam expander between of LBS-300s-NIR and SP920s camera (Figure 3).



Figure 2: NanoScan Ge, LBS-300s-NIR  
No adapters are required



Figure 3: SP920s, LBS-300s-NIR  
X4 expander with adapters SP90567+SPG01698  
Or  
X6 beam expander with adapters SP90567 + 4ea. SPG02067

Case 2: A High energy 1J ,1064 nm parallel laser beam of wide, 12mm diameter is operating at 15Hz and 7ns pulses. The beam is both wide and high energy. Thus, it needs significant attenuation and reduction to fit the standard Ophir 1/1.8" CCD format of SP920s beam profiler. For this purpose, we can use a combination of the SP920 beam profiler with the X4 Beam reducer and the LBS-100-YAG (Figure 4)



Figure 4: SP920s, X4Beam Reducer  
LBS-100 YAG with adapter SPZ17029

Case 3: The silicon beam profiler sensors operate in the wavelength range 350-1100nm. To measure shorter wavelengths such as 266nm, the UV image converter can be used. If we need to measure a 10Hz, 266nm laser with a beam diameter of 3.5mm and 30mJ energy, the energy density is much higher than the saturation intensity of the UV converter. Thus, in this case we attach a stackable beam splitter to the UV converter to reduce the intensity to the required level.



Figure 5: SP920s, 1X UV Image Converter, Beam splitter SPZ17015

Following table was summarized in order to find the correct adapter for each combination:

Adapters / spacers that are needed to connect various components together. When blank, no connection or not recommended to connect.

P/N		LBS-100	LBS-300s	LBS-400	Stackable beam splitters		
					SPZ17027 + SPZ17025	SPZ17015 + SPZ17025	SPZ17015 + SPZ17026
SPZ17022	4X beam expander		SP90567 + SPG01698		Direct connection		
SPZ17022+ SPZ17019	4X beam expander UV converter		Direct connection			Direct connection	
SPZ08257	6X beam expander		SP90567 + 4ea. SPG02067			SP90567+ 2ea. SPG02067	
SPZ08259	12X beam expander		SP90567 + 3ea. SPG02067			SP90567	
SPZ08260	22X beam expander		SP90567			SP90567	
SPZ17017	4X beam reducer	SPZ17029	SP90569	SP90570			SP90569
SPZ17024	4X beam reducer UV converter		SP90569	SP90570			SP90569
SPZ17023	1X UV converter		Direct connection				Direct connection
SP90320	L11059		SP90571	SP90439			
SP90553	WB-I			SP90572			
SP90405/415	Pyrocam IIIHR		Supplied with Pyrocam	SP90510			Supplied with Pyrocam
SP90404/414	Pyrocam IV		SP90573	SP90510			SP90573
PH00457/459/460/462/ 464/465/467/468/470	Nanoscan	Direct connection	Direct connection			Direct connection	
	All C-Mount thread cameras	Direct connection	Direct connection	SP90352		Direct connection	