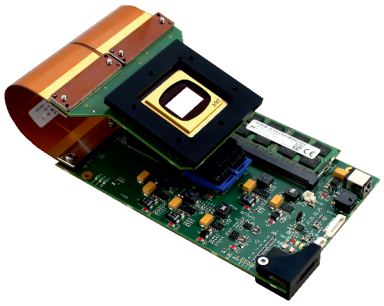
SuperSpeed V-Modules

Options: UV VIS NIR

High-Performance subsystem for Texas Instruments DLP® technology



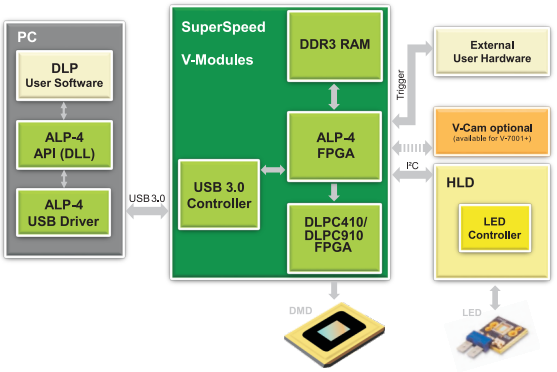
The DLP Digital Light Processing of Texas Instruments represents a proven technology of MEMS spatial light modulators also beyond standard front projection and DLP Cinema®. The general purpose DLP Discovery™ 4100 platform is different from the DLP standard projector hardware; it provides highest performance and flexibility within the DLP chipset family. The SuperSpeed V-Modules of ViALUX combine the USB 3.0 data transfer with the speed and steering capabilities of Discovery 4100 and represent the highest performance class of DLP catalog products available. ViALUX V-Modules offer unique flexibility in mirror control enabling a wide variety of new emerging applications. Outstanding pattern frequencies of 22727 global array updates per second are achieved taking advantage of the 50 Gbit/s bandwidth of the Discovery 4100 chipset.

The usable spectral range covers all wavelengths from 363 nm UV to 2500 nm NIR*. The Type A DMD package has efficient cooling options enabling up to 160 W sustained optical power illumination of the micromirror array.

All V-Modules enable a rapid launch into application development with DLP technology. The ViALUX controller boards come with completely configured high-speed FPGA logic and USB 3.0 controller firmware so that customers save time and costs for a dedicated hardware and firmware development. V-Modules are well suited for education, academic research, proof of concept, and also as OEM components for series production.

The high-performance Discovery 4100 chipset on the V-Modules is driven by the ALP-4.3 Controller Suite. The ViALUX proprietary FPGA design is the core of the well proven firmware and software interface. The USB 3.0 device driver supports all current Microsoft® Windows® operating systems and guarantees smooth integration with any type of PC. By addressing unique V-Module device numbers, multiple V-Modules can be controlled simultaneously from one application program.

The USB 3.0 SuperSpeed transfer is the key for streaming data into the on-board RAM (8 or 16 GByte) further enhanced by lossless on the fly compression. Low latency updates of the micromirror array enable feedback-loop operation via PC with ≤ 1.5 ms refresh cycle period. The V-Module software API, a DLL library, fits seamlessly into standard programming platforms like C++, C#, Visual Basic (.NET), Python, MATLAB, LabVIEW, and other development platforms and is fully compatible to all former ALP-4 versions.**



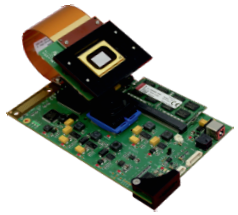
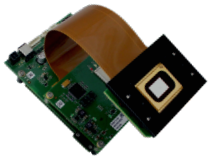
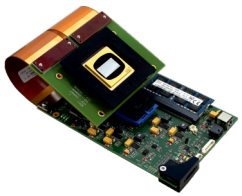
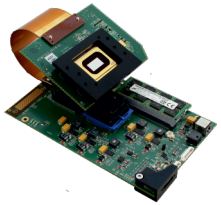
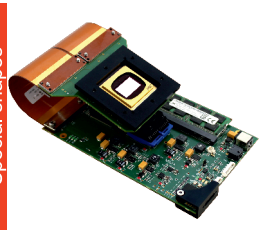
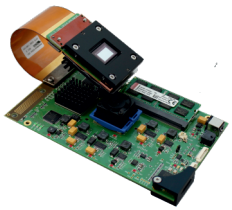
Six SuperSpeed V-Modules are available and three windows of the micromirror can be selected for use with visible, ultra-violet or near-infrared light.

V-7001	**VIS/UV**	with 0.7" XGA DMD for visible or ultra-violet light (DLP7000VIS/DLP7000UV)
V-7001+	**VIS/UV**	with 0.7" XGA DMD for visible or ultra-violet light (DLP7000VIS/DLP7000UV)
V-6501	**VIS**	with 0.65" 1080p DMD for visible light only (DLP6500VIS)
V-9501	**VIS/UV**	with 0.95" 1080p DMD for visible or ultra-violet light (DLP9500VIS/DLP9500UV)
V-9001	**VIS/UV**	with 0.9" WQXGA DMD for visible or ultra-violet light (DLP9000XVIS, DLP9000XUV)
V-650L	**NIR**	with 0.65" NIR WXGA DMD for near-infrared light (DLP650LNIR)

Depending on the chipset, the SuperSpeed V-Modules differ in the main board and the DMD extension board, which is connected with one or two flex cables as required for data exchange.
The V-7001+ module additionally has an image sensor option to couple up to two cameras. Its DMD extension board is permanently connected to the main board based on a rigid flex PCB.

* All models can be used up to 2500 nm with reduced efficacy.

SuperSpeed V-Modules specifications

	V-7001	V-7001+	V-9501 | V-9501c	V-6501	V-9001 | V-9001c | V-9001t	V-650L
		Camera option 	Special shapes 		Special shapes 	
Chipset	DLP7000 & DLPC410	DLP7000 & DLPC410	DLP9500 & DLPC410	DLP6500 & DLPC910	DLP9000X & DLPC910	DLP650LNIR & DLPC410
Type A DMD	0.7" XGA	0.7" XGA	0.95" 1080p	0.65" 1080p	0.9" WQXGA	0.65" WXGA
Window Options	VIS, UV	VIS, UV	VIS, UV	VIS	VIS, UV	NIR
Micromirror Array	1 024 x 768	1 024 x 768	1 920 x 1 080	1 920 x 1 080	2 560 x 1 600	1 280 x 800
Micromirror Pitch	13.7 µm	13.7 µm	10.8 µm	7.6 µm	7.6 µm	10.8 µm
Active Mirror Array Area	14.0 x 10.5 mm²	14.0 x 10.5 mm²	20.7 x 11.7 mm²	14.5 x 8.2 mm²	19.4 x 12.1 mm²	13.8 x 8.6 mm²
Control Board Dimensions	162 x 99 mm²	120 x 97 mm²	162 x 99 mm²	162 x 99 mm²	162 x 99 mm²	162 x 99 mm²
DMD Board Dimensions	67 x 50 mm²	48 x 66 mm²	102 x 83 mm²	101 x 78 mm²	95 x 88 mm²	63 x 47 mm²
Flexible Cable Length	105 / 283 / 573 mm	44 x 139 mm	105 / 283 / 573 mm	105 / 283 / 573 mm	105 / (283) mm	105 mm
RAM Capacity on Board	64 Gbit / 128 Gbit	64 Gbit / 128 Gbit	64 Gbit / 128 Gbit	64 Gbit / 128 Gbit	64 Gbit / 128 Gbit	64 Gbit / 128 Gbit
Binary Patterns on Board	87 381 / 174 762	87 381 / 174 762	31 068 / 62 137	31 068 / 62 137	16 777 / 33 554	55 924 / 111 848
On-board RAM bandwidth[1]	8 533$^{1/3}$ MB/s	8 533$^{1/3}$ MB/s	8 533$^{1/3}$ MB/s	8 533$^{1/3}$ MB/s	8 533$^{1/3}$ MB/s	8 533$^{1/3}$ MB/s
RAM bandwidth needed by DMD[2]	2 235 MB/s	2 235 MB/s	4 880 MB/s	2 817 MB/s	6 650 MB/s	1 377 MB/s
Hardware Trigger	master / slave	master / slave	master / slave	master / slave	master / slave	master / slave
Controller Suite	ALP-4.3	ALP-4.4	ALP-4.3	ALP-4.3	ALP-4.3	ALP-4.3
Max. Switching Rate 1bit B/W	22 727 Hz	22 727 Hz	17 857 Hz	10 309 Hz	12 987 Hz	10 752 Hz
Max. Switching Rate 6bit Gray	1 091 Hz	1 091 Hz	987 Hz	871 Hz	1 013 Hz	856 Hz
Max. Switching Rate 8bit Gray	290 Hz	290 Hz	266 Hz	266 Hz	303 Hz	258 Hz
Max. Switching Rate 12bit Gray	18 Hz	18 Hz	17 Hz	17 Hz	20 Hz	17 Hz
PC Interface	USB 3.0	USB 3.0	USB 3.0	USB 3.0	USB 3.0	USB 3.0
PC Transfer Rate[3]	2 800 - 5 300 fps	2 800 - 5 300 fps	1 000 - 2 500 fps	1 000 - 2 500 fps	600 - 1 500 fps	900 - 2 300 fps
Camera Port	-	2x	-	-	-	-
Camera Cable Length	-	600 / 250 mm	-	-	-	-
Image Sensor (on request)	-	IMX174 (IMX 422|426|536)	-	-	-	-
Controller Suite (Camera Option)	-	DLS-API	-	-	-	-

[1] Ideal value, will be reduced by overhead for refresh and access time.
[2] With maximal switching rate.
[3] Typical value, can vary depending upon data compression ratio and PC.