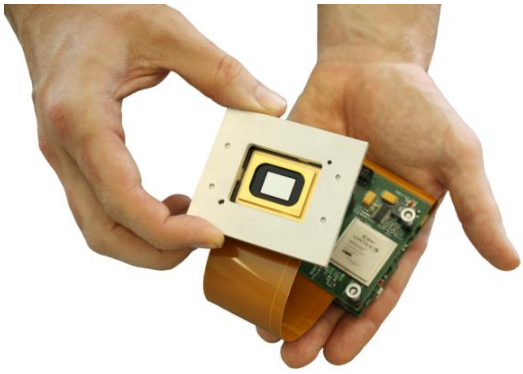
V4100
DLP® Board for system integration



V4100 board design

ViALUX has developed the V4100 as a universal DMD formatter board for Discovery™ 4100 chipsets that can be used in many products directly and without costly and time consuming developments. The ViALUX board is optimized to run the DMD at maximum speed and makes full use of the performance of the DLP® Discovery™ chipsets based upon the 400 MHz 2xLVDS interface. Small form factor, robust, connector-free design and reliable USB2.0 interface are main features of this ViALUX DLP® board. The product is suited for integration into 3rd party products as it is RoHS compliant and generates low electro-magnetic emissions.

V4100 architecture

The system configuration of the V4100 DLP® board is compatible to the Discovery™4100 Starter Kit boards. It includes the USB controller interfacing to the PC, one Virtex-5 FPGA for the ViALUX FPGA code (ALP-4 controller), one Virtex-5 FPGA for the Texas Instruments DDC4100 code (DMD controller), the SDRAM module for 32Gbit on-board memory, and the micro mirror device, a 0.7" XGA 2xLVDS DMD. Incoming data are buffered in the memory and the FPGA pair enables 24Gbit/s data rate from SDRAM to DMD.

V4100 DMD types

The V4100 board supports the latest DLP® Discovery™ 4100 XGA chipset with three micro mirror devices covering a wide spectral range.

- 0.7 XGA 2xLVDS DMD **VIS** for visible light 400 – 850 nm
- 0.7 XGA 2xLVDS DMD **NIR** for near infrared light 850 – 2 000 nm
- 0.7 XGA 2xLVDS DMD **UV** for near UV light 320 – 400 nm

The three DMD types have different cover window material and the table below shows selected transmittance values vs. wavelength λ for the *double pass* of light.

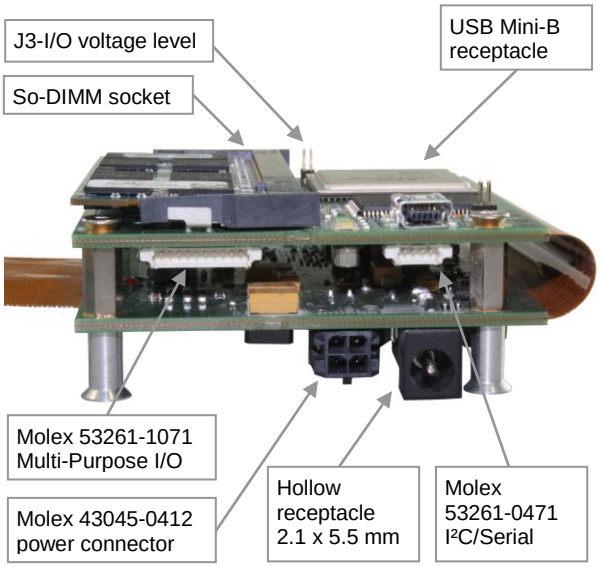
Double pass transmittance	λ=320 nm	λ=365 nm	λ=400 nm	λ=600 nm	λ=850 nm	λ=1 500 nm	λ=2 000 nm
.7 XGA **UV**	62%	94%	97%				
.7 XGA **VIS**			85%	98%	84%		
.7 XGA **NIR**					80%	97%	89%

The DMDs are mounted by an interposer spring array assembly and can be exchanged without soldering. The heat sink is on the back and may be integrated into the customers cooling system if needed at high illumination power levels.

V4100 control

The ALP-4 controller suite is a ViALUX software and firmware product designed for the Discovery™ 4100 platform; it supports both, the Texas Instruments Starter Kits and the V4100 boards of ViALUX. The PC connection is based upon the reliable, long-term proven and optimized USB2.0 device driver of ViALUX. Lossless, on-the-flight compression increases the effective USB transfer rate to reach up to 1.2 Gbit/s. The ViALUX USB driver is fully certified UIF compliant and is available for both, 32bit and 64bit Microsoft® Windows® 7 operating systems. Sequences of patterns are buffered in 32Gbit SDRAM on-board memory and transferred to the mirror array from there by FPGA operations with a 24 Gbit/s data rate. This allows DMD control with the outstanding 22 727 Hz global array switching rate. Other features are the precise triggering of the globally switching DMD array as well as the user-defined vertical scrolling of patterns stored in the on-board memory.

V4100 connections



The V4100 provides reliable locking sockets for power input, USB interface, SO-DIMM modules, and the Multi-purpose I/O for trigger and LED strobe. In addition, there is an ALP-4 embedded I²C interface implemented for control and monitoring functions. This includes the ViALUX high-power LED driver HLD and the corresponding LEDs connected. The ALP-4 software provides the interface for setting the LED current, monitoring the LED junction temperature and has additional capabilities to read other temperatures (FPGA, heat sink etc.). Customized use of this I²C bus is an option.

Specifications

DMD Types	0.7 XGA VIS, 0.7 XGA NIR, 0.7 XGA UV
Switching Rate	22 727 frames/s (binary patterns) or 291 Gray value patterns/s (8 Bit)
Memory	32 Gbit on-board SDRAM, holds 43 690 XGA patterns
PC Interface	USB2.0 with lossless on-the-flight compression
PC Device Driver	High-performance USB2.0 device driver for Windows 7 x32 und x64 systems
PC Transfer Rate	PC → V4100: up to 1 600 XGA frames/s depending upon data compressibility
SDK	Proven API library (DLL) with fully upwards compatible functionality
Dimensions	71x77 mm² control part, 44x90 mm² flexible part, 50x56 mm² DMD part
Weight	190 g
EMC	Open board: <30 dB emission levels @400 MHz and @800 MHz
Temperature	0°C … 65°C operating, -40°C … 80°C storage
Operating Relative Humidity	0% … 95% (non-condensing)

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