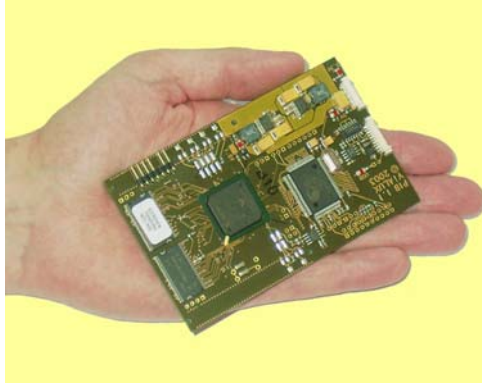


## Accessory Light modulator Package (ALP)

The rapid launch into DMD technology

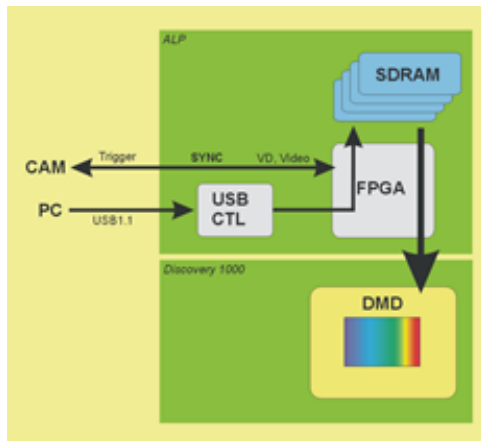
### Overview



The Digital Micromirror Device (DMD) developed and produced by Texas Instruments Inc. (TI) stimulated new approaches in photonics. Recently, TI introduced the *DMD Discovery™ 1100* general purpose chipset to support new business areas in addition to the mainstream application of DMD technology in digital projection. Based on this *DMD Discovery™ 1100* platform ViALUX developed the *ALP* parallel interface controller for high speed DMD operation. *ALP* is specially designed for use in optical metrology and is widely open for other applications. When used with the *DMD Discovery™ 1100 Controller Board* (shipped

with the package), *ALP* is a turnkey tool providing free, direct and fast access to any single micromirror. The new product is characterized by its high flexibility for customized solutions. A user friendly application programming interface (API) eliminates the need for any hardware and logic design and the customer will benefit from significantly reduced development time and costs for his own products and a shorter time to market.

### Principle of operation



The key part of the *ALP* parallel interface board is a Virtex-II FPGA linking the on-board SDRAM image memory with the DMD data lines. The user-PC is connected via a USB controller. XGA pattern sequences are loaded into the SDRAM and are then transferred to the DMD by specially designed high speed FPGA logic. Once loaded, the XGA frames can be selected for DMD transfer, repeated or displayed in an endless loop. Triggering is provided in both directions, either the DMD runs in master or in slave mode. Trigger input can be also a composite video signal for example. The DMD access is organized in sequences of XGA frames. The *ALP* supports both binary pattern sequences transferred to the DMD and

the display of time average grey level picture sequences. Data formats can be freely chosen for the sequences in the range of 1...16 bits. The *ALP-API* allows the user to allocate, load and display XGA frame sequences of different kind and length and loading of data via the USB interface can be done parallel to the DMD display of SDRAM data.

### Advantages

For the first time there is a DMD driver electronics optimized for use in optical engineering. The small footprint enables for *compact systems* and the USB interface will support *mobile solutions*. A significant property is the *perfect linearity* of the time average output recorded by a *synchronised camera*. The convenient application programming interface will lead to *short development time* and reduce costs considerably.

## ALP product specifications

### General

(DMD Discovery™ 1100 board included 250 g)  
 dimensions: 162 x 71 x 32 mm  
 power supply: 5 V @ 2.0 A  
 electric power consumption: 10 W  
 operating temperature: 25 ... 45 °C  
 storage temperature: -40 ... 80 °C

### DMD

DMD chip: 0.7" DMD, 12°, double data rate  
 mirrors: 1024 x 768 (XGA)  
 pitch: 13.7 µm  
 angle: ±12°  
 overall efficiency: 68% for visible light, UV or IR on demand

### Synchronisation

ALP master mode: trigger high during picture display, pre-trigger supported, trigger and pre-trigger are programmable  
 ALP slave mode: camera VD or composite video or any other trigger source, trigger delay supported for retarded start of frame display, trigger and delay are programmable

### ALP sequence display

min. ON time: 20 µs  
 max. ON time (no motion): 10 s  
 XGA frame sequence format: 1 ... 16 bit

Table 1: max. XGA frame rate versus sequence bit depth

# of bits	display rate frames/s
1	6918
2	3334
3	2215
4	1451
5	936
6	557
7	308
8	162

Table 2: XGA frame capacity of SDRAM versus sequence bit depth (min. and max. configurations)

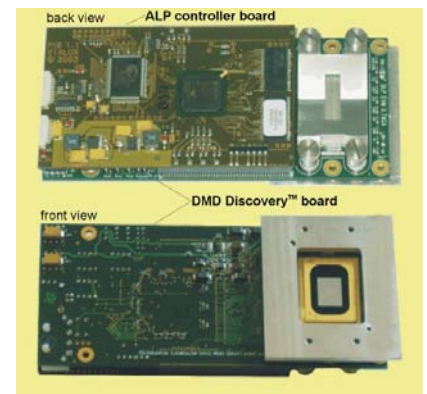
# of bits	# of frames (512 Mbit)	# of frames (2 Gbit)
1	682	2730
2	341	1365
3	227	910
4	170	682
5	136	546
6	113	455
7	97	390
8	85	341

### What ViALUX delivers with the ALP package

- ALP controller board with on-board RAM
- DMD Discovery™ 1100 board with 0,7" XGA DMD
- ALP connection board for standard USB cable and power input
- USB driver for ALP (MS Windows® 2000 / XP)
- ALP demonstration program
- ALP Application Programming Interface (API) with VC++ libraries (DLL)
- ALP user's manual and API programming samples

### Requirements

no special hardware requirements, ALP works on any PC or laptop with USB adapter and Windows® 2000 / XP operating system



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