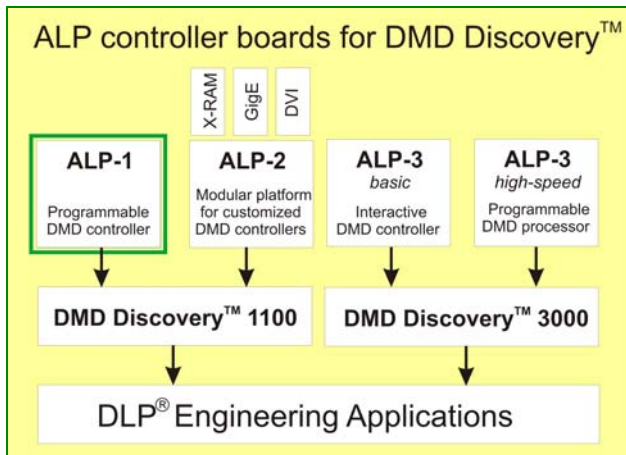


ALP-1 for DMD Discovery™ 1100

Accessory Light modulator Package

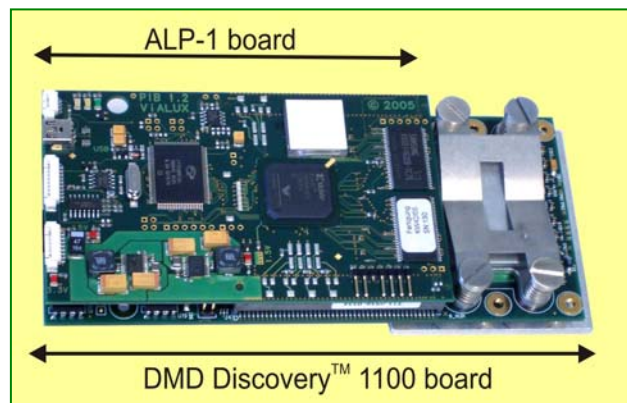
Overview



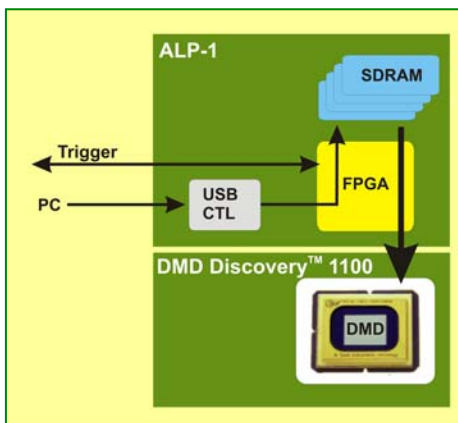
The Digital Light Processing™ of Texas Instruments Inc., represents a proven technology for projection and display applications of the digital micro-mirror device DMD. In addition, the general purpose chipset DMD Discovery™ is a platform for scientists and engineers to develop new engineering applications using Digital Light Processing™. Meanwhile, a variety of DMD components and accessories were made available. The ALP controller boards are accessories for DMD Discovery™ to reach the DMD performance instantly. They provide direct access to the DMD without the need of a dedicated hardware and software development. The ALP line of boards supports the use of the DMD Discovery™ 1100 and 3000 models with high flexibility.

ALP-1

The *ALP-1* parallel interface controller has been designed for high speed DMD operation supporting both, binary and gray-scale display of XGA patterns of different type. *ALP-1* is connected to the DMD Discovery™ 1100 board using the parallel interface. The PC-to-ALP link is USB 2.0 based. 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-1* parallel interface board is a Virtex-II FPGA linking the 2 Gigabit on-board SDRAM memory with the DMD data lines. Data input is through the USB 2.0 controller. XGA pattern sequences are loaded into the SDRAM and are 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 *ALP-1* runs in master or slave mode. Trigger input can be a composite video signal, for example. The DMD access is organized in sequences of XGA frames. The *ALP-1* API allows the user to allocate, load, and display XGA frame sequences of different kind and length, and loading of data via the USB 2.0 interface can be done parallel to the DMD display of SDRAM data.

Application

The ALP-1 architecture serves for a variety of different applications using the same hardware platform. The major design step for a new application is to transform the required operation of the mirror array into a sequence of patterns that can be stored in the on-board SDRAM. Some selected samples are to illustrate the ease of use:

- a sequence of 2,730 pre-defined binary XGA patterns can be displayed at 8,000 fps
- a sequence of gray value patterns can be generated using the precisely linear pulse-width modulation technique (PWM) of ALP-1
- fast scanning operations are carried out with clusters of ON-mirrors in pre-loaded binary patterns
- light levels can be precisely controlled by pre-loaded random patterns of ON-mirrors
- fast and precise color mixing can be achieved by switching ON mirror-columns in a spectrum

Specifications

General

dimensions:	ALP-1:	114 x 71 x 8 mm
	DMD Discovery™ 1100 + ALP-1:	162 x 71 x 32 mm
power supply:	5 V @ 2.0 A (via DMD Discovery™ 1100 board)	
electric power consumption:	10 W max.	
operating temperature:	25 ... 45 °C	
storage temperature:	-40 ... 80 °C	

Synchronization

ALP-1 master mode:	TTL trigger, pre-trigger supported, trigger programmable
ALP-1 slave mode:	TTL trigger or composite cam signal, programmable trigger delay

Mirror control

min. ON time:	20 µs
max. ON time w/o any motion:	10 s
max. full XGA frame rate:	8,000 fps

Variable gray value generation

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

Bits per frame	Switching rate [frames per s]
1	8,000
2	3,334
3	2,215
4	1,451
5	936
6	557
7	308
8	162

Table 2: XGA frame capacity of SDRAM versus sequence bit

Bits per frame	On-board memory capacity [frames]
1	2730
2	1365
3	910
4	682
5	546
6	455
7	390
8	341

Delivery package

- ALP-1 parallel interface controller board for Discovery™ 1100
- Connection board and cable for USB 2.0 and trigger interface
- Microsoft® Windows® 2000/XP driver for plug & play ALP-1 operation
- Application Programming Interface (API-DLL)
- Header and library files for API
- API Users Guide

Requirements

no special hardware requirements, ALP-1 works with any PC or laptop with USB 2.0 adapter and Microsoft Windows® 2000 / XP operating system

Contact: Roland Höfling, ViALUX GmbH, Reichenhainer Str. 88, 09126 Chemnitz, Germany
Tel: +49 371 5397 1443, Fax: +49 371 5397 1417, E-mail: hoefling@vialux.de, www.vialux.de
For details on DMD Discovery™ see also www.dmddiscovery.com