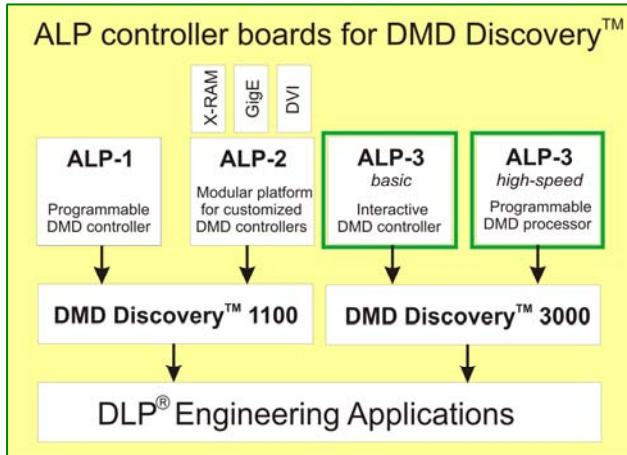


ALP-3 for DMD Discovery™ 3000

Accessory Light modulator Package

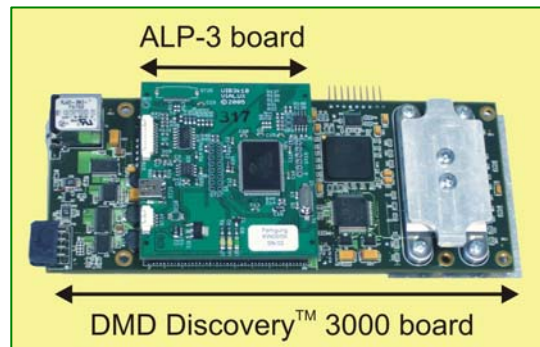
Overview



The Digital Light Processing™ of Texas Instruments Inc., represents a proven technology for projection and display applications of the digital micromirror 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™. 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.

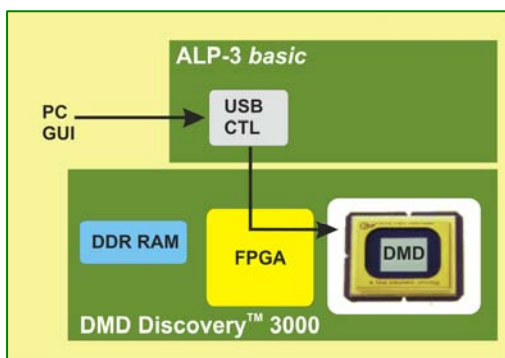
ALP-3

The *ALP-3* accessory package consists of a daughter board and the FPGA logic design for the Virtex-4 on the DMD Discovery™ 3000 board. *ALP-3* provides the same functions for DMD Discovery™ 3000 as *ALP-1* does for DMD Discovery™ 1100 and is fully compatible. The controller package supports both DMD Discovery™ 3000 DMD formats: XGA (1024x768) and SXGA+ (1400x1050). *ALP-3* is connected to the DMD Discovery™ 3000 board by the daughter board port. The PC-to-ALP link is USB 2.0 based. *ALP-3* is available in two versions, named *basic* and *high-speed*. Both models use exactly the same *ALP-3* board but differ significantly in supplied software and FPGA logic.



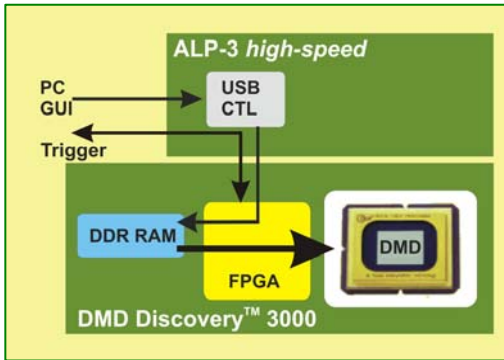
ALP-3 basic is designed to provide a PC link and convenient, interactive access to the DMD Discovery™ 3000 interface; it allows exploring the main DMD features by a comprehensive graphics user interface (GUI). The ***ALP-3 high-speed*** model adds the use of the on-board DDR RAM and takes advantage of the 200 MHz LVDS data interface to achieve the maximum switching speed of the DMD. The ***ALP-3 high-speed*** model supports the display of both, binary pattern sequences and time average gray level patterns.

ALP-3 *basic*: principle of operation



The most essential part of the *ALP-3 basic* board is the USB 2.0 controller that provides the link between the host PC and the Virtex-4 FPGA on the Discovery™ 3000 board. The data are directly transferred from the PC to the LVDS DMD bypassing the DDR RAM buffer. Data load and mirror reset operations are independent and can be controlled interactively by the GUI. The *ALP-3* GUI allows to assemble sequences of `LOAD`, `CLEAR` and `RESET` commands in an executable script file. Additional `CONTROL` commands are available to define the timing of a script execution and to implement loops and breaks. Customers are able to develop their own DMD control programs to verify the feasibility of their intended application.

ALP-3 *high-speed*: principle of operation



The key part for the *ALP-3 high-speed* controller is the Virtex-4 FPGA residing on the DMD Discovery™ 3000 board. The ALP-3 firmware upload configures the FPGA to serve as a high-performance link between the 1 Gbit on-board DDR RAM and the Discovery™ 3000 controller. The DMD access is organized in sequences of frames. Data input is through the USB 2.0 controller on the *ALP-3* board. Pattern sequences are loaded into the DDR RAM and are transferred to the DMD by high-speed FPGA logic. Once loaded, the frames can be selected for DMD transfer, repeated or displayed in an endless loop. Loading of data via the USB 2.0 interface can be done parallel to the DMD display of other sequences in the DDR RAM.

Triggering is provided in both directions, either the *ALP-3* runs in master or slave mode. The *ALP-3* API allows the user to allocate, load, and display XGA or SXGA+ frame sequences of different kind and length supporting both binary and grayscale patterns.

Specifications

XGA DMD (1024x768 pixel per frame)		
<i>Bits per pixel</i>	<i>Max. switching rate [frames per second]</i>	<i>RAM capacity [# of frames]</i>
1	13.333	1365
2	5.319	682
3	3.546	455
4	2.315	341
5	1.462	273
6	864	227
7	476	195
8	250	170

SXGA+ DMD (1400x1050 pixel per frame)		
<i>Bits per pixel</i>	<i>Max. switching rate [frames per second]</i>	<i>RAM capacity [# of frames]</i>
1	6.211	726
2	2.702	363
3	1.686	242
4	1.277	181
5	905	145
6	611	121
7	378	103
8	214	90

General

dimensions: ALP-3: 67 x 71 x 10 mm
DMD Discovery™ 3000 + ALP-3: 197 x 71 x 32 mm
power supply: 5 V (via DMD Discovery™ 3000 board)
operating temperature: 25 ... 45 °C
storage temperature: -40 ... 80 °C

Delivery package

- DMD Discovery™ 3000 Board or Starter kit (if required)
- ALP-3 controller board
- FPGA logic for ALP-3 *basic* or *high-speed* model
- ALP-3 graphic user interface software
- Connection board and cable for USB 2.0 and trigger interface
- Microsoft® Windows® XP/Pro driver for plug & play ALP-3 operation

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For details on DMD Discovery™ see also www.dmddiscovery.com