Introduction to LCoS SLM

Jasper Display Corp.

LCoS Spatial Light Modulator

Company Overview

Jasper Display Corp. was founded in 2010 to develop and manufacture liquid crystal on silicon (LCoS) micro-displays and display products based on LCoS technology. The investors purchased the assets of eLCOS micro-display Technology, Inc., thereby reducing development time for a new generation of LCoS products. Jasper Display Corp. hired the core team from eLCOS including Jasper’s Chief Technical Officer, Ed Hudson. Additionally Jasper has added key staff to the technical team to broaden the capabilities of the team.

JDC, a leading designer of SLM (Spatial Light Modulator) devices, has successfully developed and brought to the marketplace several new, very high speed Full HD (FHD) micro-displays and a micro-display controller, establishing a line of new LCoS products to support color-sequential single-micro-display products operated at FHD resolution and high frame rate. Jasper Display’s newest device expands that capability into the “UltraHD” resolution arena. Jasper Display Corp. currently operates from design and operations centers in Hsinchu, Taiwan (Company Headquarters, Liquid Crystal Engineering and Optics) and Santa Clara, USA (micro-displays and Drive Electronics) and has additional offices in Japan, Hong Kong, and Shanghai, China.

Jasper Display Corp.’s LCoS Technology

Jasper Display Corp. has a unique technical approach to liquid crystal on silicon micro-displays. Jasper’s LCoS technology combines a proven and effective digital hardware design with unique, highly efficient modulation methods to create images that combine the sharpness of digitally modulated displays with the smoothness of analog displays. The micro-display speed and modulation efficiency enable very fine control of high frame rate images in a projection system.

- Pixel Size: Small pixel (Picture Element) design (3.74 µm x 3.74 µm) is the basis of a platform which enables small displays with medium resolution and larger displays with high to very high resolution.
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- Digital Circuit Techniques: Enable high yield and outstanding performance, resulting in high pixel-plane update speeds and voltage levels consistent with mainstream LC electro-optic mode requirements.

- Efficient Architecture: A highly efficient and precise pulse width modulation system provides highly refined control over the liquid crystal modulation state.

- Optimized Modulation: JDC’s proprietary modulation techniques result in sharp images with superior gray scale performance and better overall color calibration.

- Performance: JDC’s digital pixel and backplane designs enable effective DC balance at a very high rate without image flicker, image sticking or other display artifacts exhibited by other technologies.

**LCoS SLM**

JDC LCoS SLMs, based on JDC’s On-Silicon technology for both amplitude and phase modulation, have an expanding role in several optical areas where light control on a pixel-by-pixel basis is critical for optimum system performance. JDC’s evaluation kits (SDK) targets diverse applications, ranging from consumer and mobile projectors, professional projectors, fringe projectors for 3D digitizers, diffractive optical elements for “structured light” applications, etc. JDC's SLM devices use an associated controller ASIC and evaluation modulation software.

JDC has introduced educational kits (EDK) which provide a training platform for university students to develop skills and spur innovations for future optoelectronic applications. Educational kits can be configured to do different electro-optical and photonic experiments, such as SLM Basic Property Test, Amplitude Modulation, Phase Modulation, Michelson Interferometer, Diffraction and interference, Spectrometers, Signal Processing, Phase Shifting Digital Holography, Talbot Images, and Wavefront Modulation. JDC LCoS devices feature extremely small pixels (3.74um pitch), high fill factor (90%), and all digital pixel drive with unique modulation scheme, low flicker noise, high frame rate and high spatial resolution. All of these characteristics make JDC LCoS devices the most attractive for applications such as adaptive optics, telecommunication, optical information processing, data storage and holography.

**Intellectual Property**

Jasper’s LCOS micro-display technology is protected from infringement by a number of already issued patents.
patents and pending patents. Additional micro-display related patent applications are pending. JDC is confident that its products do not infringe any enforceable patents.