

**The Diode Laser Source and the Spatial Light Modulator's Driver Electronics for  
Miniaturized Holographic 3D Imaging**

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(Abstract)

The purpose of this thesis is to develop a low-cost, high power laser diode/fiber illumination system and to design the driver electronics of the spatial light modulator (SLM) for holographic, three dimensional (3D) imaging. A miniaturized laser diode/fiber/polarizing illumination system capable of 15mW of output at a wavelength of 690nm is designed, fabricated, and tested. The size limitations of various commercially available SLM drivers are described and the design to overcome them is suggested. The design describes in detail the timing considerations of the hardware interface and the pseudocode of the software interface between the host computer and the SLM. Experiments carried out to study the spatial uniformity of the SLM and the distortion due to the beam splitter on the structured output from the LIM are explained.