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Optical data processing techniques need the development of information input devices, digital and analogue space modulators for a laser holographic memory system. An analogue space modulator, ASM is an input device for images or printed information, that is to say, a transducer of information from an incoherent system to a coherent system.

Described in the paper is the feasibility of an ASM constructed utilizing a longitudinal electrooptic light scattering effect in a field induced ferroelectric (FE) phase of an anti-ferroelectric (AFE) PLZT ceramics.^{1,2)} The ASM is a conventional four layer structure consisting of a 0.2 mm thick PLZT-7.6/70/30 ceramic plate, a polyvinyle carbazole photo-conductive thin film and $\text{In}_2\text{O}_3\text{-SnO}_2$ sputtered transparent electrodes as shown in figure 1.

The preliminary experiment revealed that transmitted light has enough coherency to make fringes in a Mach-Zehnder interferometry. Figure 2 shows a phtograph made from an image stored in the ASM by applying an electric voltage of about 120 volts for 0.1 sec.

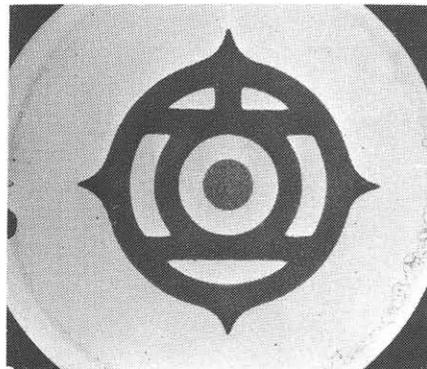
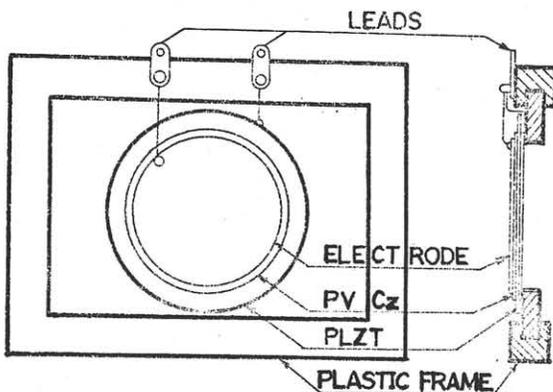


Figure 1. Illustration for a structure of the ASM. Figure 2. A photograph of an image stored in the ASM.
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In order to write an image clearly, it is necessary to erase the former image completely. Experiment to evaluate the most convenient method for an erasure resulted in deciding a method of simultaneous application of heat, a reverse electric field and light.^{3,4)} A heating current was applied for 0.1 sec. throughout a transparent electrode deposited on the direct surface of a PLZT ceramic plate (the opposite side of PVCz film).

Figure 3 a photograph of a reconstructed image from a hologram fixed with He - Ne laser beam. The contrast ratio of the displayed image was higher than 20 : 1. In conclusion, the present experiment shows potential applicability of the PLZT device to an ASM. High quality PLZT ceramic plates were acknowledged to Mr. I. Matsuyama and K. Miyauchi.

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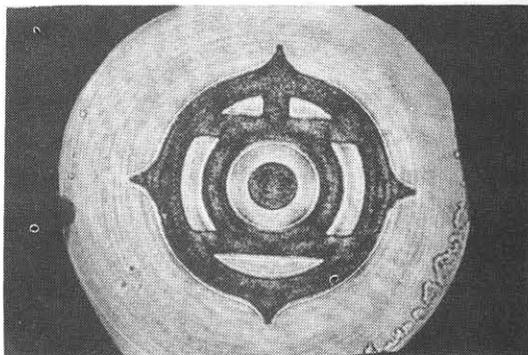


Figure 3. A photograph of a reconstructed image from a hologram fixed with He-Ne laser beam.