3D Goggles

Based on Silicon Microdisplay

Project Code: HH 02-2
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Nowadays, many new designs of Liquefied Crystal Displays (LCD) have been researched and manufactured; they are able to perform a high quality and high resolution display. One kind of LCD displays that has been launched and researched is well known as Silicon microdisplay. A silicon microdisplay is so small that an optical magnification eyepiece is needed to view the images.

The system block diagram for 2 display panels

The silicon microdisplay used in our Final Year Project has an extremely small panel size, less than one inch in diagonal, but it is able to support a resolution of $688H \times 480V \times 3$ (about 1 million pixels). This meets the standard of SDTV.
Design and Implementation phase

The layout design of the final board

To achieve the project goal, we had designed a circuit control board to deliver the 3D VGA signal from computer to the SDTV panel provided. A MCU and a GAL program were constructed to control the signal flow, and also to control the analog to digital converter. The Final Product is shown in the bottom.

The Flow Chart of the Main Routine

The Final Product
The main goal of our Final Year Project was to build a complete set of 3D goggles (Head-mounted Displays) based on Silicon Microdisplay which can adapt to 3D VGA inputs. We completed the project successfully and achieved the goals. After all optimizations of the circuit board, our HMD was able to adapt the VGA signals with minimal power consumption from a personal computer.

<table>
<thead>
<tr>
<th></th>
<th>Our HMD</th>
<th>hi-Res900 3D</th>
<th>VFX3D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display type</td>
<td>LCOS</td>
<td>LCOS</td>
<td>LCD</td>
</tr>
<tr>
<td>Highest Resolution</td>
<td>640Hx480V</td>
<td>800Hx600V</td>
<td>1600Hx1200V</td>
</tr>
<tr>
<td>3D Resolution</td>
<td>688Hx480V</td>
<td>800Hx600V</td>
<td>640Hx480V</td>
</tr>
<tr>
<td>Weight</td>
<td>120g</td>
<td>800g</td>
<td>700g(headset)+180g(control box)</td>
</tr>
<tr>
<td>Power</td>
<td>1.75W from USB hub</td>
<td>6W DC input</td>
<td>8W DC input</td>
</tr>
</tbody>
</table>

Comparisons between our HMD and the products in market