HH1b-07 Palm Projector

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PROJECT OVERVIEW

Projection devices have high product potential in the market. The applications vary from formal presentation, product promotion to entertainment game consoles, home theaters etc.

<table>
<thead>
<tr>
<th>Traditional Projector (Halogen Lamp)</th>
<th>LED Projector</th>
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<tbody>
<tr>
<td>Massive and bulky to carry</td>
<td>Easy and light to carry</td>
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<tr>
<td>High power consumption</td>
<td>Low power consumption</td>
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With the aid of a LED and the projection technology, the size and power consumption of the projector has been reduced significantly compared to a decade before.

Aim and objectives

Major objectives of the project include:

1. Understand the fundamentals of projection technology
2. Thoroughly grasp the knowledge of digital signal processing (DSP)
3. Implement the video board
4. Design the power circuit for the projector
5. Design the current source circuit for LED array
6. Implement other features (audio output and OSD control) to the projector
Hardware of the projector consists of video board, power board, LED driver and audio output.

Video board consists of all signal processing unit to handle the projection image.

By implementing a step-down switch regulator to the system, the power consumption of the video board can be reduced by 12.5%.

Audio board is another part of the projector that is very important for the use of entertainment.
LED current source driver

A LED current source driver is needed to driver the LED array.

Two driver boards have been introduced and their characteristics are compared.

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<tr>
<th></th>
<th>1A current source LED driver</th>
<th>1.5A current source LED driver</th>
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<tbody>
<tr>
<td>Power consumption (input/output)</td>
<td>5.46W/4.32W</td>
<td>11.3W/6.81W</td>
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<tr>
<td>Efficiency</td>
<td>79%</td>
<td>60%</td>
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<tr>
<td>Lumen of projector</td>
<td>4.21lm</td>
<td>5.0lm</td>
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SOFTWARE IMPLEMENTATION

By appropriate configuration of SRAM register, digital signal processing can be achieved.

Brightness and Contrast reference graph

\[ \text{RGBout} = \text{Contrast (RGB)} + \text{Brightness} \]