INTRODUCTION

The use of projectors is very common nowadays. People use them as a visual aim for the sake of obtaining a wider screen image and for the ease of presenting information. However, using a projector may become a burdensome task sometimes. In the first place, it occupies lots of space as it is normally huge in size; the second place, it requires physical wiring with other equipment like computers or DVD players which is complicated and causes much annoyance to many people. In order to overcome these problems, one of the solutions is to build a pocket-sized micro-projector based on silicon display and at the same time embedded with wireless receiver module. On one hand, this projector is small enough to be portable. On the other hand, it accepts both wired and wireless media for signal input. As a result, our product will be more user-friendly and flexible. It is best suited for mobile business presentations and teaching purposes.

AIM AND OBJECTIVES

The aim of our project is to build a pocket-sized micro-projector based on silicon micro display with the ability to accept both wireless signal input and wired signal input including S-video, CVBS (composite) and PC (VGA 60Hz / 85Hz) input. The output resolution of the projector is VGA level (120Hz). The final product takes both adapter and dry batteries as the power source, the battery life can last for two hours.
METHODOLOGY
SYSTEM BLOCK DIAGRAM

DVD Players

Spy Camera

Personal Computer

Control Switches

Analog Devices AD9883A

Philips SAA7113H

Signal Selection

Analog Multiplexer

LCOS Display Panel

Trumption t0947XLS-GP Video Signal Processor

Hynix SD RAM

12V Power to Receiver, LED & Cooling Fan

Voltage Regulator (17V to 12V)

Battery 17V DC

Bulk Converter (17V to 5V)

Transformer 17V DC

5V Power to Projector Board

PROJECTOR

POWER SYSTEM

ANTENNA

Analog Devices AD9883A

LM117 Voltage Regulator

Tri-state Buffer

Hynix 16-bit SD RAM

MC34063A Bulk converter

Philips SAA7113H

AT89C4051 8-bit MCU

Trumption t-0947XLS-GP Output header to the 640x480 VGA panel
RESULTS

Output Data Signal Enhancement: Data signal waveform after tuning (PC input)

Indication of Blanking Time

Period of V Sync / Period of H Sync
= 8.315 x 10^{-3} s / 16.272 x 10^{-6} s
No. of H Sync per V Sync = 511
(> 480 due to Vertical Blanking)

No. of CLK in 1 H Sync period
= 16.2718 \mu s / 22.109 ns
= 735.9808
\sim 736 (> 640 due to Horizontal Blanking)

Frequency of H Sync in real case
= 120.268Hz \times 511
= 61.4571 kHz (which match with the accepted PC refresh rate 640x480@60Hz)

No. of real data in a row
= No. of CLK in 1 DE High pulse width
= 14.14905 \mu s / 22.109 ns
= 639.9198 (~640)
This is exactly the horizontal resolution of the output screen (i.e. 640 x 480@120Hz)

Output Image

Projector Output Image from Spy Camera Input
Projector Output Image from PC input