

VIDEO AND DISPLAY CONTROLLER USING FPGA

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ABSTRACT

This document describes the implementation of video and display system using FPGA. The system captures video using CMOS image sensor camera to be processed and displayed on the monitor through the VGA port. The digital data from the camera consists of YCrCb colour space was processed and then converted to RGB colour space to be displayed on a VGA monitor. The processor and the VGA controller architecture were described using VHDL. The system was implemented on a Xilinx Virtex 4 FPGA..

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CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

Video capturing and display is commonly used in surveillance and machine intelligence. Recently, surveillance systems with image recording functions become vital device both in private and public places [16]. The key components of this system are video camera, controller and display. The camera and the display operate in two different video color models, YCrCb and RGB. YCrCb and RGB are two most popular color models used in video and image processing [15]. YCrCb, is a scale and offset version of the YUV color space that commonly used in video system, including cameras. In other word, YCrCb is the digital version of YUV. It consist of luminance (Y) information, chrominance red (Cr) and chrominance blue (Cb) information. The RGB is the common choice for computer graphics because color display user red, green and blue to create desired color often displayed on CRT or LCD monitor [15]. The camera has output in form of YUV. To be able to process the signal in FPGA, the camera output signal is converted to YCrCb color space. Video signals with a microprocessor processing is not a good choice because a CPU is usually too slow for video processing.