einfochips | The Solutions People

FPGA based UltraHD (4K) Camera Design

360 Mbps Onboard Recording

17 Simultaneous Video Streams

Video Enhancement Features

OPKG Firmware Upgrades

On-board VoD Server

Case Study

Executive Summary

The client is a niche high performance surveillance camera company based in Europe. Their market entry strategy revolved around a flagship UltraHD camera product for global markets. There was no single embedded platform capable of processing 4K resolution video. With limited expertise on Linux and 4K processing capabilities, the client was looking for an experienced engineering partner.

The solution required porting of multiple IP cores on an FPGA, and then using a DSP to encode and stream. The system also used an ARM processor to record and stream UltraHD (4K) content. Such a complex setup required expertise on ARM, FPGA and DSP platforms. As a turnkey solution partner, we delivered end-to-end hardware and software for the camera.

The architecture and design was completed to the expected performance. They are one of the first companies in the world to offer a 4Kx3K (UltraHD) resolution IP camera.

Client Profile

The client is a niche provider of IP surveillance cameras, with their HQ in Europe. They provide high performance surveillance solutions for road traffic, airports, casinos and stadiums.

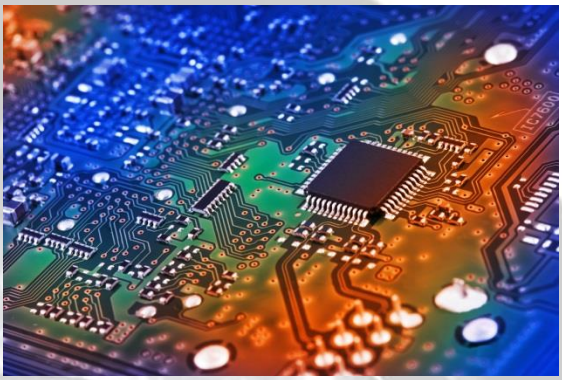
Business Challenge

The client planned to be the first company with an UltraHD IP camera. The challenge was two-fold. Limited expertise on FPGA, DSP and ARM technologies, and achieve maximum performance with limited product investments.

Solution

eInfochips proposed the architecture for 4K support with FPGA, DSP, and ARM components, in absence of a single-platform solution.

- **4K / 360 Mbps Recording** at **30 FPS**
- **Live555** for **17 Simultaneous Video Streams**
- **21 IPs integrated on Xilinx Kintex 7 FPGA**
- **TI DM8168 DSP and TI AM3894 ARM**
- **Trusense 12 MP** Sensor integration
- **2500+ Components on 12-layer PCB**
- **H.264 HD, MJPEG and AAC** Encoders
- **MP4** and **MKV** containers
- **Focus and Iris control** on Cannon Protocol
- **OPKG** for Firmware Upgrades
- **On-board Web Server** based on PHP
- Tools: **CCS, JTAG, Xilinx XDS2000, iMPACT**
- Tools: **Vivado and ISE Design for Xilinx**



Client Benefits

We delivered the production-ready electronic design, fully-functional IP camera firmware and the FPGA design code as a single point solution for the client.

The client addressed niche markets with their first product – an UltraHD surveillance camera – that was well ahead of competition.

We designed the first FPGA based UltraHD (4K) camera and positioned the client as a technology leader in the surveillance IP camera market

About eInfochips

eInfochips is a Product and Semiconductor Engineering Solutions company recognized for technology leadership by Gartner, Frost & Sullivan, NASSCOM and Zinnov. eInfochips has contributed to 500+ products for top global companies, with more than 10 million deployments across the world.

USA HQ 1230 Midas Way, Suite #200, Sunnyvale (CA) 94085 | (+1) 408 496 1882

INDIA HQ 11 A/B Chandra Colony, CG Road, Ellisbridge, Ahmedabad 380 006