

Embedded Camera Ethernet/Internet

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Communications Systems

Introduction

The Ethernet network is very standard and most companies have one. Many individuals have one at home too. It is therefore easy to install a network camera.

Many applications are possible. For example, it is possible to make alarms, smoke alarms with an infrared sensor, supervise of children from a distance, and others.

Objectives

During previous projects, the following points were produced :

- interface between a CMOS sensor and a FPGA from Altera
- interface with a Ethernet card and implementation of a Web server
- a card with FPGA 20k200 and connectors compatible with previous units

This project consists of connecting all previous components and producing a Web server of images. This system will link up Ethernet network and will be independent. The processor used will be the NIOS softcore from Altera.

Summary

In general, the most solutions are webcams. They are connected to a computer by the USB port. Software makes the interface with the Internet Network to simulate the Web server. The advantage of the system developed is that they are entirely independent.

The first part developed was the data interface with the camera. It has been improved and is now functional. A design has been conceived to assemble the camera with the Ethernet card.

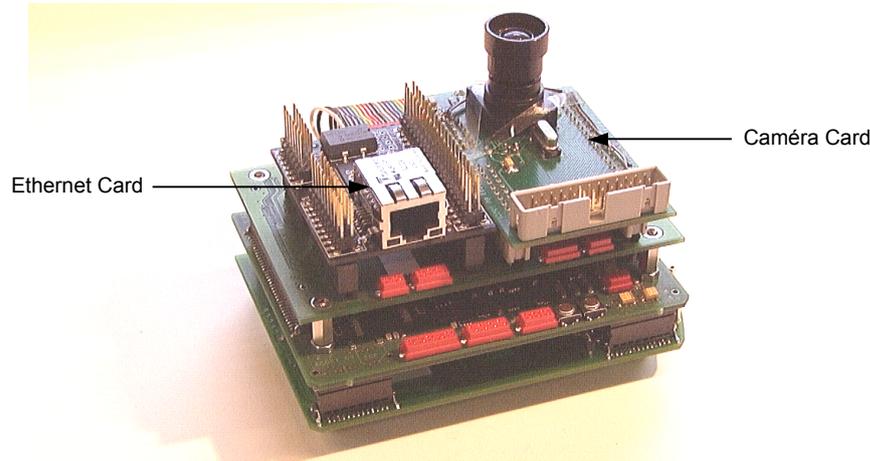


Figure : Embedded system

A Web server has been built on the basis of the example from Altera. The capture of images has been added. Then, a conversion has been created to render an image readable to any Internet browser. The server has been adapted to respond correctly to a dynamic image.

Finally, Web pages have been written to refresh pictures automatically. These scripts contain functions in Javascript code.

Continuation

One possible improvement was simply to change the sensor. The images would be of better quality with a high resolution sensor.

It is not possible to increase the network binary rate. The solution to increase the images rate is to decrease the size of these pictures. It is possible to do this by compression. The solution is to convert the pictures to a JPEG format.

Finally, it is possible to replace the Ethernet card with an Ethernet wireless card. These make it possible to pilot a robot through the Web server. It is imaginable to give commands (forward, backward, left, right, ...) and view the picture live.