

HARDWARE BRIDGE FOR HIGH SPEED IMAGE SENSORS

Our Solution

Most image sensors produce image data at very high data rates, designers cannot easily interface such sensors with low-cost microcontrollers since most microcontroller run at much slower speed and they have limited internal memory. Moreover, random access of pixels is not possible because pixel values are sent row-after-row by the image sensor.

To overcome these problems, a digital-video-port (DVP) compatible bridge device, known as *iBRIDGE*, is designed to bridge any general-purpose image sensor with low-cost microcontrollers. It can be used in different embedded system applications such as pattern recognition, robotic vision, bio-medical imaging etc.

The main advantage of *iBRIDGE* is to provide a compact, ready-made and easy-to-use solution that enables interfacing of commercial general-purpose image sensors with simple microcontrollers that are low-cost and easy-to-program, thus helps to shorten the design/development cycle time and facilitates rapid system prototyping of imaging application. Most commercially available image sensors send image data at high speed and pixel values can only be accessed sequentially. Random access of pixels is not possible because pixel values are sent row-after-row.

On the other hand, commercial microcontrollers (such as. 8051, AVR, PIC) run at slower speed compared to the high data-rate of the image sensors and many embedded system applications need random access of pixel values. Also, commercial microcontrollers do not have sufficient internal memory to store a complete image.

In this invention, the design of a novel bridge is proposed to interface high speed image sensors in low power and low speed embedded systems. By using the proposed bridge, the image processor or microcontroller can capture and store an image in the bridge's internal memory. Then the pixel values can be accessed in random fashion through a parallel memory access interface at any required speed.

Advantages to our solution

The commercial high-speed image sensors may be interfaced with advanced MCUs. However, these microcontrollers contain many additional features (such as, six-layer advanced high-speed bus (AHB), peripheral DMA controller, USB 2.0 full speed device, configurable FPGA interface, etc.) that may not be required for simple imaging applications.

Besides, programming such microcontrollers and implementing the required protocols increase the design cycle time. The purpose of the proposed bridge hardware is to provide a compact, ready-made and easy-to-use solution that enables interfacing of commercial general-purpose image sensors with simple microcontrollers that are low-cost and easy-to-program. Thus, the bridge hardware helps to shorten the design/development cycle time and facilitates rapid system prototyping.

Applications

1. Embedded Systems
2. Robotics
3. Medical Imaging
4. Hobby Electronics

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