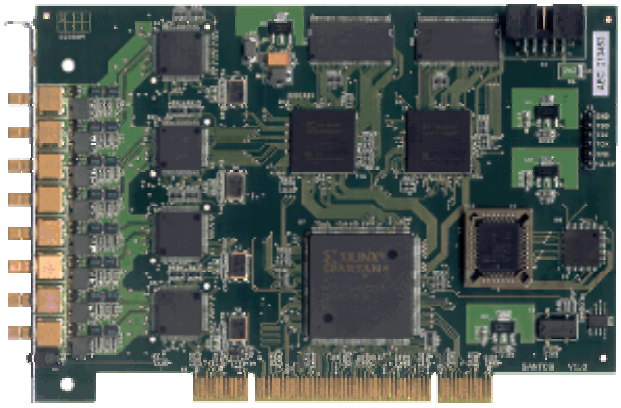
Santos High Performance Frame Grabber



Overview

Designed to get the most out of any S-Video/composite color or standard black and white camera, the *Ellips Santos* is a high performance PCI frame grabber, targeted at real-time industrial image processing applications.

The features are:

- High speed DMA transfers
- Simultaneous grabbing of 4 CVBS, YC or monochrome cameras
- 25 regions of interest per camera to reduce PCI bus load
- PAL (768 x 576), NTSC (640 x 480) and SECAM (768 x 576) support
- Supports RGB, YUV, grayscale and B/W output formats
- RGB and YUV color calibration
- No pixel drop due to onboard memory
- Supports both 5V PCI and 3.3V PCI environments (PCI 2.1 compliant)
- Windows (WDM) and VxWorks drivers available

Features

High speed DMA transfers

Several PCI grabbers have been available on the market for some time, but, depending on their architecture, most of them are not suited for real-time imaging processing applications:

- Some grabbers based on a PCI SVGA controller have an image port that allows write access to the video memory from an external access bus (typical bandwidth 45 MB/s).

  Although this method offers live video on the desktop without hogging the PCI bus, reading the image back from video memory to main memory suffers from slow memory access due to the nature of these SVGA controllers: typical write bandwidth from PCI to SVGA is up to 90 MB/s, whereas read bandwidth from SVGA to PCI is limited to approximately 7 MB/s. Therefore SVGA-controllers based PCI grabbers are generally not suited for real-time imaging applications.

- Some PCI grabbers employ efficient PCI burst transfers, but lack flexible transfer controller capabilities. Therefore, more data is sent over the PCI bus than is actually needed, thus slowing the system down. For example, when tracking moving objects, the region of interest changes for every video frame. This calls for changing the region of interest at field rate.

The *Ellips Santos* offers PCI bus master DMA, allowing burst transfers of up to 132 MB/s (depending on the quality of the main board) without tying up the main CPU, combined with a very flexible transfer controller.
The PCI interface supports scatter-gather DMA which allows an image buffer to be spread in memory.

Simultaneous grabbing of 4 CVBS, YC or monochrome cameras

The *Ellips Santos* has four independent input modules that can be connected to any combination of CVBS, YC or monochrome cameras. Each input module has its own DMA channel and doesn't need to be synchronized to the other input modules.

25 regions of interest per camera to reduce PCI bus load

In many image processing applications only a few areas of the entire image need to be captured. When tracking a moving object for example, only the region in which the object resides needs to be examined. For this purpose each of the four input modules can capture 25 regions of interest. These regions can be adjusted every field and can even overlap or have different output formats (RGB, YUV, grayscale or black and white). In this way PCI bandwidth is greatly reduced, allowing more frame grabbers to reside in the same system.

PAL (768 x 576), NTSC (640 x 480) and SECAM (768 x 576) support

The *Ellips Santos* supports all of the popular video standards: PAL (50 Hz), SECAM (50 Hz) and NTSC (60 Hz). Any combination of these video standards can be connected to the input modules. Every input module supports monochrome cameras as well.

Supports RGB, YUV, grayscale and B/W output formats

Each region of interest can be captured in a different output format. Supported formats are RGB (16 and 24 bits), YUV (16 and 32 bits), grayscale (8 and 10 bits) and black and white (1 bit).

RGB and YUV color calibration

Since colors decoded by cameras tend to drift slightly with temperature, color calibration is needed. To reduce processor load color calibration can be done onboard. The user can upload calibration tables for the red, green and blue components.

No pixel drop due to onboard memory

Each input module has enough memory for two frames or four fields. While capturing one frame buffer, the other buffer is transferred to main memory. Since the entire frame is allready stored in onboard memory, incidental PCI peak loads do not cause pixels to be dropped by a fifo overflow. Once a frame or field is captured it is guaranteed to be transferred to main memory completely.

Supports both 5V PCI and 3.3V PCI environments

Currently, all popular motherboards have only 5V PCI slots available. With the migration towards 3.3V PCI only motherboards in the near future, all PCI cards are required to support both signaling environments. The *Ellips Santos* supports both standards at 33MHz and 32 bit.

Specifications

Host Computer Interface

- High speed DMA burst transfer (up to 132MB/s)
- Programmable transfer controller
- Support for multiple boards in one system

Acquisition

- RS-170, CCIR, NTSC, PAL, SECAM, Y/C or monochrome inputs
- Resolutions: any size up to:
  - PAL, SECAM, CCIR native: 768x576
  - NTSC, EIA native: 640x480
- Output formats:
  - RGB24 (RGBR...)
  - RGB16 (5:6:5)
  - YUV16 (CCIR)
  - YUV32 (10:10:10)
  - 8 bit grayscale
  - 10 bit grayscale
  - Black and white

  Color calibration is supported on YUV and RGB modes.
- Sample rate square pixels: 14.75 MHz for PAL / SECAM; 12.27 MHz for NTSC
  Sample rate normal pixels: 13.50 MHz for PAL / SECAM; 13.50 MHz for NTSC
- Support for any combination of up to four composite, Y/C or monochrome video sources

Software support

- Supported platforms:
  - Windows 2000/XP (WDM driver):
    Microsoft Visual C 6.x
  - Real-time operating systems: VxWorks
    WindRiver Tornado 2.x

- Sample capture applications for Windows

Specifications subject to change without notice.
For more information, feel free to contact Ellips.

ELLIPS B.V.

Company address:
Urkhovenseweg 11
5641 KA Eindhoven
The Netherlands

Mail address:
P.O. Box 240
5600 AE Eindhoven
The Netherlands

Phone: +31-40-2456540
Fax: +31-40-2467183

Email: info@ellips.nl
http://www.ellips.nl