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Find the *L-3 / Titan / VisiCom VigraVision* at our website: *Click HERE*



VigraVision - PCI

Image Capture Real-Time Processing and Display

Special Features

- Single-slot PCI module combines video acquisition, real-time processing, and display
- State-of-the-art reconfigurable computing architecture (FPGA-based) offers greater than 25 times the performance typical of traditional DSP solutions for image processing, depending on the application
- Scalable processing options: VigraVision® PCI can be configured to meet a wide range of real-time image processing requirements
- Image acquisition includes a variety of video sources - color/ monochrome, analog/digital, and frame scan/line scan up to 40 MHz sampling rate
- True color image display with non-destructive graphics overlay
- Graphics display resolutions up to 1600 x 1200 with flicker free refresh up to 85 Hz
- Eliminates need for separate display board
- VigraVision Toolbox™ API provides developers and system integrators seamless integration of VigraVision's hardware features into their applications
- Imaging functions/operations optimized for real-time image processing
- Support for SolarisTM and Windows 95/NT/98TM
- Available in two configurations: VigraVision PRO with real-time image processing, VigraVision STD as a versatile frame grabber with graphics overlay and display driver

Titan Systems Corporation's VisiCom Products Division develops real-time image processing solutions integrating acquisition, processing, and display capabilities. Our product solutions have incorporated state-of-the-art image processing technology, ranging from general purpose digital signal processors to the most current implementation of reconfigurable computing technology, Field Programmable Gate Arrays (FPGAs). Our solutions have evolved from VME designs to the PCI architecture to serve the needs of vision system developers and system integrators who need the performance and versatility inherent in our designs.

VigraVision-PCI
VisiComs' VigraVision PRO product combines the real-time performance of our FPGA Imaging Extensions with off-the-shelf components for acquisition and display, as well as a comprehensive, easy-to-use API. Our approach to product development includes continuing development of more sophisticated image processing functions, and providing support for the latest developments in camera/video technologies. VisiCom is committed to providing the best that technology offers in terms of performance and flexibility at a price and total cost of ownership lower than our competition.

Applications
VisiCom's principal customers are OEMs and System Integrators providing vision systems that meet the demands of the Machine Vision, Medical Imaging, and Surveillance market segments and related industries. Some of the specific applications include:

- **Semiconductor Manufacturing:** Wafer Inspection and Alignment, Semiconductor Packaging, Electronics Assembly and Test
- **Industrial Inspection:** Web Inspection
- **Medical/Image-Guided Surgery:** Laser Surgery, Endoscopy, Microscopy, SEM and Fluoroscopy
- **Security:** Cargo and Luggage Automated Inspection
- **Surveillance:** Unmanned Aerial Vehicles, Automated Traffic Monitoring
- **Scientific:** Electron Microscopy

In addition to the VigraVision product line, VisiCom provides custom solutions designed to meet user-specific configuration and performance requirements. Working with VisiCom allows customers to add value with real-time image processing in their products while avoiding the risks involved in developing that technology. VisiCom's extensive experience is available to rapidly produce real-time image processing solutions for integration into higher-level products.

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VigraVision-PC PRO Architecture Integrates Image Capture, Real-Time Processing and Display On A Single PCI Board

Real-Time Image Processing
Real-time image processing consists of the acquisition, processing and display of image and graphics data at the video frame rate. Traditional approaches to image processing have utilized separate boards for acquisition, processing and display, depending on the system bus for transfer of up to 30 MB/sec of data between the three functions. The VigraVision architecture integrates all three functions on a single board that does not depend on scarce system resources to achieve real-time capability. Since this architecture provides the ability to drive a wide variety of display devices, the expense of a separate video board is not required. The re-configurability of FPGA technology allows the characteristics of VigraVision-PCI to change dynamically, providing a significant benefit and cost-savings for OEMs. The flexibility of FPGA technology allows rapid implementation of customer-specific, real-time image processing functions.

Real-Time Functions
Examples of Real-time functions accessible through the VigraVision Toolbox API include:

Spatial Filtering - Laplacian Edge Enhancement: Omni-directional operation that highlights all edges in an image, regardless of orientation. This 3x3 convolution operates on the luminance component of standard video.

Frame Averaging (IIR filter) w/ 3x3 Convolution: An operation designed to reduce or eliminate random noise patterns in an image. The numbers of frames averaged is a user-defined parameter. Both luminance and chrominance components are averaged. Convolution is performed on the luminance component only.

Motion Detection/Isolation: An image differencing operation used to discern movement of objects between multiple images of the same scene or that were acquired at different times. This implementation results in the replacement of non-moving objects in one color, and the display of moving objects in a chosen color.

Affine Transform Re-Sampling with Bilinear Interpolation: This operation allows the original image to be rotated/translated/skewed/scaled/reflected based upon parameters provided by the user. Bilinear interpolation produces smoother imagery than nearest-neighbor resampling.

Custom Solutions: In addition to the types of real-time image processing functions listed above, the VigraVision architecture allows custom solutions to be developed to meet special needs for additional image processing power and performance, such as radar scan conversion algorithms, convolutions of varying kernel size, color-space conversion, gamma correction, contrast stretch, motion stabilization, and video-mixing/synchronization.

Scalability

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For additional performance, the VigraVision-PCI can optionally be configured with components from several families of Xilinx FPGAs, enabling very intensive real-time image processing requirements to be satisfied.

VigraVision-PCI PRO - Integrated Acquisition, Processing and Display

Acquisition - Cameras and Other Image Sources
VigraVision-PCI PRO easily interfaces to a variety of standard and non-standard video cameras and other image sources to meet the demands of the Machine Vision, Medical Imaging, and Surveillance market applications. Devices and cameras from manufacturers such as Kodak, Dalsa, Cohu, Pulnix, Hitachi, Panasonic, and Sony are supported. Image sources include high-resolution cameras, line scan cameras, medical scanners, slow-scan cameras (such as scanning electron microscopes), frame reset cameras, single or multi-tap cameras, Xray detectors, and infrared detectors. Flexibility for interfacing to a wide variety of devices includes:

- NTSC/PAL, CCIR/RS-170 and S-Video cameras
- Digital acquisition - 16-bit channel - acquisition at up to 40 MB/sec with optional RS-422 and LVDS Digital Interfaces
- External trigger to initiate image capture
- Exposure (timer) output
- Programmable gain and offset

Real-Time Image Processing
In order to meet the demands of very intensive image processing applications, the VigraVision-PCI PRO provides:

- Dynamic Reconfiguration of the FPGA
- Up to 64 MB DRAM buffer memory (16 MB standard)
- FPGA reconfiguration from host computer

Graphics and Video Display

- S3 VIRGE/GX-2 accelerated graphics
- 4 MB SGRAM frame buffer memory (video and overlay)
- Non-destructive overlay (8 - 24-bit)
- Pan/Scroll/Zoom image buffer independent of overlay buffer
- Up to 1600 x 1200 x 16-bit graphics (overlay) resolution
- Video resolutions from 640 x 480 up to 1280 x 1024
- Video color depth from 8 bits per pixel to 24 bits per pixel (16 bits at 1280 x 1024)
- Refresh rates ranging from 60 Hz to 85 Hz
- Simultaneous NTSC/S-Video and RGB outputs - does not require a separate video board
- Multi-monitor capability under Windows 98 and Solaris, enables multiple displays per CPU

VigraVision-PCI STD Frame Grabber
VigraVision-PCI is also available without the FPGA and buffer memory to serve as a versatile frame grabber. The input and output architecture is identical to the VigraVision-PCI PRO: The image acquisition and analog camera interface flexibility is included as are the video outputs with graphic overlay capabilities. This implementation provides the image acquisition interface, the frame buffer, non-destructive graphics overlay, and the capability to drive NTSC/S-Video and RGB displays, all in a single PCI form factor.

Software

The VigraVision ToolboxTM (VTB) is a C-language image acquisition and processing library providing the API for OEM developers and system integrators to access the functionality of the VigraVision-PCI hardware.

Key Features

- Hardware initialization and register control
- Display control
- Image acquisition, camera control and configuration functions
- Image processing functions
- Frame buffer access
- Color space conversion

Software Environments

- VTB is compatible with Microsoft C/C++ and callable from Visual Basic 5.0
- Accessible to application software which has been linked with the VTB or accessed via

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Windows as a DLL
- VTB is supported in the following operating system environments:
  - Solaris
  - Windows 95
  - Windows NT
  - Windows 98
- (Inquire about support for other operating systems)

Mechanical and Environmental

- Size: Single PCI module
- Host Interface: PCI Local Bus, 32-bit
- Power consumption: +5 volts @ 2.5 amps maximum
- Operating Temperature: 0 to 50o C
- Storage Temperature: -20 to 85o C
- Relative Humidity: 0 to 90% (non-condensing)
- MTBF: 40,000 hours (calculated)

Ordering Information
Contact VisiCom Products Sales for part numbers and prices.

- VigraVision-PCI PRO
- VigraVision-PCI STD
- VigraVision-PCI STD with RS-422 Digital Interface
- VigraVision-PCI STD with LVDS Digital Interface

Note: Information herein is subject to change without notice. Capabilities may vary slightly with host platform and operating system.

For More Information
For additional information on this product, or any other VisiCom product or service, contact VisiCom's sales department via email at sales@visicom.com, by telephone at 800-621-8474 or 858-457-2111, or by fax at 858-597-7094.

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