

Overview

Focus Robotics nDepth™ PCI vision system is an excellent solution for companies and individuals looking to add real-time depth perception to an existing PC platform. Operating at up to 30 frames per second for 752x480 images, the PCI nDepth™ vision system provides outstanding depth performance for demanding applications such as mobile robot navigation, people tracking, gesture recognition, targeting, 3D surface visualization and advanced human computer interaction.



nDepth™ Processor via PCI

At the center of the system is our 2 billion pixel disparities per second nDepth™ vision processor. This programmable hardware device (FPGA) handles all aspects of depth calculation, including real-time lens undistortion, camera rectification, correspondence searching, and advanced post filtering for error removal. And unlike software based depth perception, the nDepth™ processor uses virtually no PC CPU resources so your PC is free for higher level tasks. All output from the processor is sent via direct memory access (DMA) to the PC. The undistorted and rectified (calibrated) images, along with the depth image, can also be sent every frame if desired. Our use of programmable hardware allows for upgrades and expansion so you know you can always have the most advanced solution available. A PCI short card and PC/104+ card are available.

6cm Baseline Stereo Vision Camera

The PCI nDepth™ vision system includes a 6cm 752x480 stereo vision camera. Available with an automotive quality monochrome image sensor, the Focus Robotics stereo vision camera boasts >60dB of dynamic range and near IR enhanced performance for use with non-visible near IR illumination. Support for standard high resolution M12x0.5 uVideo lenses ensures you get the right optics for your applications needs. The stereo camera connects easily to the PCI card using one standard CAT5 cable up to 15 feet in length. The cable carries all necessary power, data, and control for the stereo camera. With progressive scan, global shutter and breakthrough low-noise imaging technology, this stereo camera is ideal for a wide variety of imaging applications in real-world environments.

Example Operating Range And Accuracy ¹

4.3mm Focal Length Lens:

- FOV : 55 degrees
- Disparities: 92
- Operating Range : 0.47m to 5.3m
- Range Resolution:
 - 0.47m +0.29cm/-0.29cm
 - 0.67m +0.6cm/-0.6cm
 - 1.35m +2.5cm/-2.4cm
 - 2.69m +10.3cm/-9.1cm
 - 5.38m +44.5cm/-34.6cm

8.0mm Focal Length Lens:

- FOV : 31 degrees
- Disparities: 92
- Operating Range : 0.87m to 10m
- Range Resolution:
 - 0.87m +0.6/-0.6cm.
 - 1.25m +1.2cm/-1.1cm
 - 2.5m +4.7cm/-4.4cm
 - 5.00m +19.3cm/-17.1cm
 - 10.00m +82.9cm/-64.4cm



¹ Calculated data. Results depend on texture and lighting.

PCI nDepth™ Vision System

nDepth™ Vision Processor Subsystem		
	Resolution	WVGA (752x480), 8bit disparity output
	Disparity Frame Rate	30 frames per second WVGA with 92 disparity levels.
	Disparity Search Range	Up to 64 today, up to 124 free upgrade available Q306.
	Camera Calibration	Processor rectifies and undistorts images in real-time
	Calibration Error	0.1 pixel RMS error
	Stereo Algorithm	Sum of Absolute Differences (SAD) with 9x9 block matching.
	Left/Right Check	Identifies places where correlation is contradictory
	Host Interface	Standard PCI 33, direct DMA access.
	Minimum Latency	16 scan lines.
	Processor Upgrades	Ability to upgrade processor functionality in the field.
6cm Baseline Stereo Vision Camera		
	Sensor	Two MT9V022, 752x480 1/3-inch Micron CMOS sensors.
	Frame Rate	Programmable up to 60 frames per second.
	Baseline	6cm baseline. Contact us for custom baselines.
	Image Format	8-bit monochrome: Near_IR enhanced performance for use with non-visible NIR illumination. Contact us about color.
	Dynamic Range	>60dB
	Shutter Type	Global shutter photodiode pixels; simultaneous integration and readout.
	Controls	Automatic/Manual exposure and gain control.
	Interface	LVDS on CAT5 cable up to 5 meters in length.
	Focus Lens Length	Uses standard high resolution M12x0.5 uVideo lenses.
	Power Supply	Supplied via CAT5 cable from PCI card.
	Power Consumption	<500mW at maximum data rate.
	Dimensions	4.25in x 1.5in x 1.25in
Host Software Subsystem		
	Drivers	Linux and Windows drivers provide access to the depth image and the undistorted and rectified (calibrated) images every frame.
	Demonstration Code	Includes OpenCV image processing library and open source samples. Linux driver is also open source.
	Control API	Includes programming interfaces for parameter control, and infield processor upgrades.

Availability and Pricing

The PCI nDepth™ Vision System is available now for immediate shipment. Estimated pricing for single unit quantities is \$1,500 USD for PCI Short Card version, and \$2,500 for PC/104+ version.

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