F-311

PIMotion&Vision™—Integration of Vision System and Micro-/Nanopositioning

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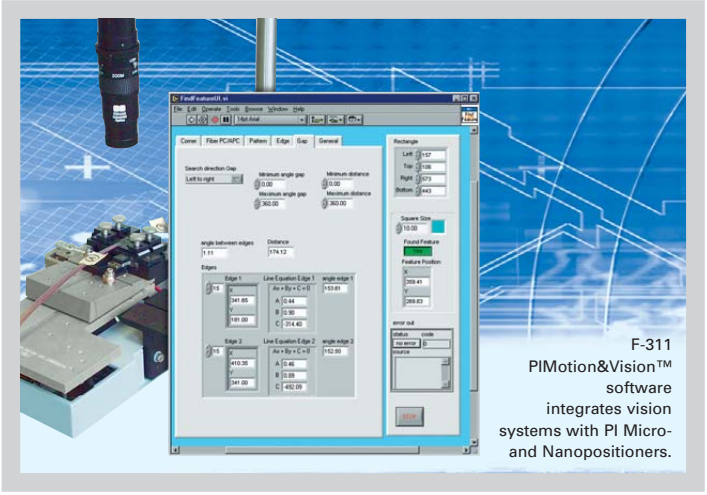


F-311 PIMotion&Vision™ software integrates vision systems with PI Micro- and Nanopositioners.

- **Vision System for Integration with PI Micro- and Nanopositioning Systems**
- **Controls up to Six DOF Motion with Sub-µm or Sub-nm (Sub-µrad) Resolution**
- **National Instruments Compatible Vision System**
- **Multi-Channel Vision for a Mix of Resolutions and/or 3D Observation**
- **Powerful LabView VIs for PIMotion&Vision**

PIMotion&Vision™ offers an integrated solution for difficult tasks such as automated positioning of optics, semi-conductor wafers, microsystems technology MEMS fabrication or alignment and scanning of samples under a microscope:

- Basic functions such as autofocus, edge and pattern recognition, and gap measurement.
- Intelligent automated procedures.
- Motion systems capable of carrying out the positioning or scanning required.

Application Examples

- Optical 6D alignments
- Autofocussing
- Gap measurements
- Pattern recognition in
  - Semiconductor industry
  - Biotechnology
  - Life science
  - MEMS Manufacturing/MST
  - Photonics

NI Framegrabber

The hardware for the F-311 PIMotion&Vision™ system consists of a National Instruments PCI bus framegrabber card. This fact guarantees a high degree of compatibility for further system integration. The framegrabber card supports a number of camera systems and is available with one or four channels.

Software Interface to Micro- and Nanopositioners

PIMotion&Vision™ offers a large number of LabView™ drivers for continuous monitoring and processing of the image information, including standard procedures for gap measurement, autofocus, aligning edges all the way to complex alignment routines in six degrees of freedom with up to 80 axes of motion, switching functions and read-in of analog signals (e.g. photometer signals for optical fiber alignment).

Motion is commanded using the PI General Command Set, which is supported by all PI multi-axis micropositioning and nanopositioning controllers.

The basic version contains all the drivers provided by PI; the Pro Version includes the full IMAQ development environment from National Instruments, making possible an even wider range of system integration and function development.

Notes

Optimal performance in transmitted-light applications can be obtained with the F-311.L10 illumination system, developed by PI. The light intensity is adjustable and the use of LEDs assure long lifetime. The unit can be powered directly from the PI controller, a feature which helps reduce the number of components.

Ordering Information

F-311.V01
PIMotion&Vision™ Basic Module, 1CH

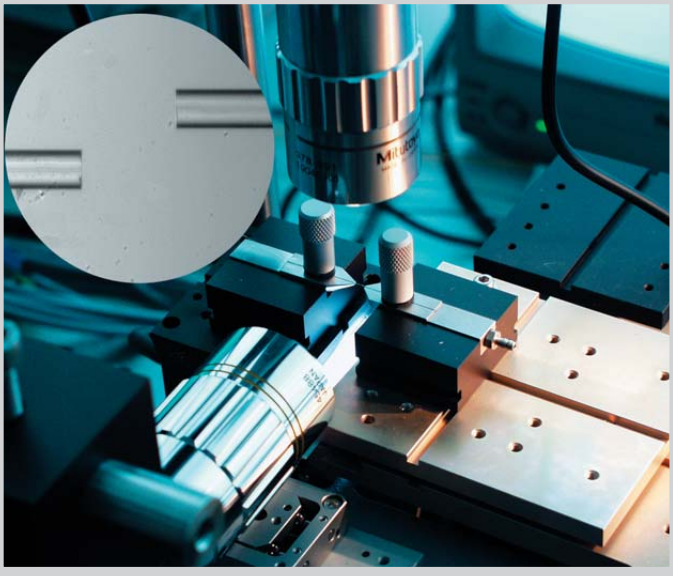
F-311.V04
PIMotion&Vision™ Basic Module, 4CH

F-311.V11
PIMotion&Vision™ Pro Module, 1CH

F-311.V14
PIMotion&Vision™ Pro Module, 4CH

F-311.V1U
PIMotion&Vision™ Upgrade to Pro Module

F-311.L10
PIMotion&Vision™ Illumination System

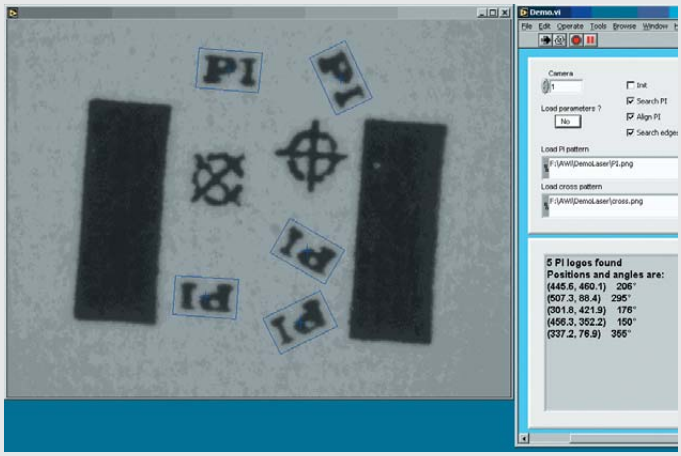


Optical fiber-alignment with F-206 6-axis-alignment system and P-611 NanoCube® 3D piezo nanopositioning / scanning system. Two cameras allow a 3-dimensional visual automated coarse alignment.

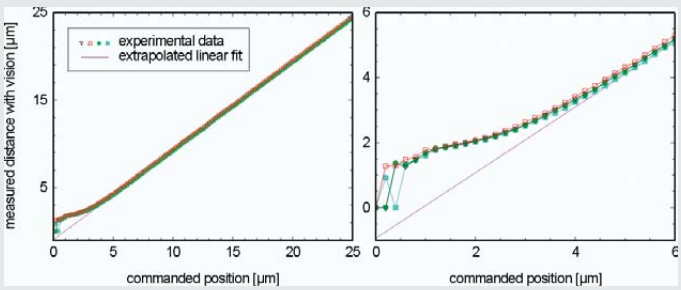
Piezo Actuators
Nanopositioning & Scanning Systems
Active Optics / Steering Mirrors
Tutorial: Piezo-electrics in Positioning
Capacitive Position Sensors
Piezo Drivers & Nano-positioning Controllers
Hexapods / Micropositioning
Photonics Alignment Solutions
Motion Controllers
Ceramic Linear Motors & Stages
Index

NI Compatible

Simple setup with a single camera, two M-111 stages in an XY configuration and an M-116 rotary platform (all controlled from a C-843 PCI card). This sample setup can be used for pattern recognition, as can be seen in the next graphics.



PIMotion&Vision™ sample pattern recognition task. The sample program searches for PI logos, counts and aligns them. The logos are 1 x 0.5 mm in size.



Gap measurement with PIMotion&Vision™ is linear down to 5 µm, and at separations down to 1 µm the values provided can be used with correction. Optical gap measurement then begins to be limited by refraction and optical imperfections. The reference measurements were made with a P-611 NanoCube® Piezo-NanoPositioning system.