SM Fiber Launch Systems with Auto-Alignment Controller (Page 1 of 2)

NEW products

Fiber Launch System with NanoTrak™, Controller, 3-Axis Flexure Stage, and Accessories (Microscope Objective Not Included)

10% Discount for Complete Package

Features

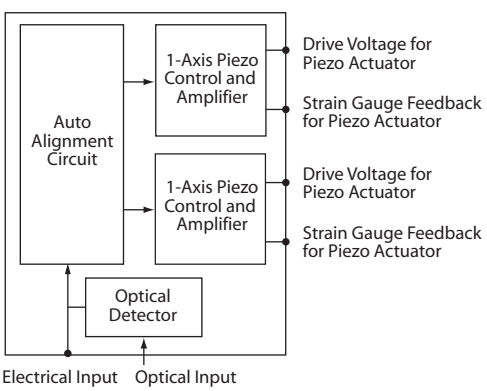
- 3-Axis Flexure Stage
  - Manual Differential Adjusters
  - Internal Piezo Actuators with Strain Gauge Sensors
- NanoTrak™ Auto-Alignment Controller
  - Integrated InGaAs or Si Detector
  - Two Inputs for Strain Gauge Feedback
  - Two Outputs to Drive Piezo Actuators
  - Advanced Alignment Optimization Algorithms
  - USB Interface

Introduction

The MAX371K1 and MAX371K2 are automated fiber launch systems that reduce the time it takes to optimize the coupling of light into a bare single mode fiber. The kits package a nanopositioning 3-axis flexure stage with a NanoTrak™ controller that optimizes the position of the fiber perpendicular to the optical axis using the internal piezo actuators in the stage. Also included are three stage accessories: an RMS-threaded optical mount (HCS013), a bare fiber clamp (HFF001), and a cable strain relief clamp (HFS001). Other accessories can be purchased separately (see page 496) in order to expand the system's capabilities for use with other optical elements like waveguides or connectorized fibers.

NanoTrak™ Controller

When activated, the NanoTrak™ controller (see schematic below) generates drive voltages for two piezo actuators based on the optical (electrical) feedback signal. In the MAX373 kits, the piezo actuators will control the position of the fiber along the two axes perpendicular to the optical axis, and the feedback signal will be proportional to how much light is coupled into the optical fiber. By letting the NanoTrak™ controller position the fiber tip on the optical axis, optimizing the coupling simply requires the user to manually align the fiber along the optical axis. After the coupling of light into the fiber has been optimized, the tracking mode can be turned off without affecting the coupling, or the tracking mode can be left on in order to ensure that the coupling remains optimized even if external effects, like changes in temperature, cause small changes in the beam position. See page 583 for information on how the Auto Alignment Circuit in the NanoTrak™ controller functions.



10 Minute Alignment Procedure

By using Thorlabs' MAX311 (see page 471) flexure stage as the base for this fiber launch system, first light detection, even with single mode fiber, is straightforward. Before starting this procedure use two steering mirrors to steer the beam so that it is roughly propagating 12.5 mm above the channel on the empty stage, which is locked down on an optical table. Also have the NanoTrak™ controller connected to the stage and to a computer with the software loaded and operational.

- Mount your coupling optic on the provided RMS threaded mount (HCS013) and place the mount in the channel on the fixed large angle bracket (AMA009) attached to the stage.
- Adjust the stage using the manual differential adjusters so that the HCS013 can be slid easily from the AMA009 to the stage platform (keep the HCS013 tight against one side of the channel).
- Steer your free-space beam so that the beam position does not wander as the coupling optic is slid from the large angle bracket to the stage platform.
- While keeping the mount pressed against one side of the channel, lock down the HCS013 on the AMA009 such that the light is focused at a point near the edge but still over the adjustable platform on the stage.
- Lock down the fiber clamp and the strain relief cable on the stage platform so that the tip of the fiber will be further away from the coupling optic than the point at which the light is focused. (Make sure the stage platform can be translated forward far enough to move the fiber tip through the focal point.)
- Load the fiber and if the other end of the fiber has an FC connector attach it to the NanoTrak™ detector. Otherwise, use a suitable detector to measure the light coupled into the fiber and use the electrical input on the NanoTrak™ controller to provide the feedback it requires.
- Use the manual actuator to move the fiber tip toward or away from the lens untill first light is detected.
- Coarsely maximize the signal using all three manual adjusters.
- Activate the NanoTrak™. It will immediately maximize the position of the fiber tip perpendicular to the beam propagation direction.
- Use the manual actuator to move the fiber tip toward or away from the lens while watching the power monitor. If the piezo actuators near the limit of their range use one of the other manual actuators to put them back toward the middle.
- Stop once the coupled power has been maximized.

SM Fiber Launch System with Auto-Alignment Controller (Page 2 of 2)

The apt™ NanoTrak™ controller is supplied with a full suite of software support tools. Once the software and associated USB drivers are installed, the aptUser utility provides a full featured intuitive graphical instrument panel allowing full control and visualization of the NanoTrak™ operation. Additionally, ActiveX® components are included to speed user developed routines in the user's programming environment of choice (e.g., LabVIEW™, Visual Basic, or C++).

NanoTrak™ Controller Specifications

- **Optical Power Measurement**
  - PIN Photodiode: FC/PC Fiber Input
  - Si or InGaAs Detector: 1 nA to 10 mA Photocurrent
  - Optical Power Monitor (BNC): Multiple Ranges
  - Signal Phase Compensation: -180° to 180°
- **Principle NanoTrak Parameters**
  - Circle Scanning Frequency: 1-300 Hz
  - Circle Dia Adjustment Modes: Automatic and Manual
- **Piezoelectric Input/Output**
  - Two Output Connectors (SMC Male):
    - Voltage Output: 0-75 VDC/Channel
    - Voltage Stability: 100 ppm Over 24 Hours
    - Noise: <3 mV_{rms}
    - Output Current: 500 mA/Channel
  - Output Monitors (BNC): 0-10 VDC
  - Analog Inputs (BNC): 0-10 VDC (Used in Piezo Amp Mode)
  - Strain Gauge Position Feedback: (Two 9-Pin D-Type Female)
- **Other Input/Output**
  - Optical Power Monitor (BNC): 0-10 VDC
  - User Control (37-Pin D-Type Female)
    - Isolated Digital I/O
  - Trigger In/Out (BNC): 0-10 DC
  - USB Port
- **Power Requirements**
  - Voltage: 85-64 VAC
  - Frequency: 47-63 Hz
  - Power: 200 W
  - Fuse: 3 A
- **General**
  - Dimensions (W x D x H): 245 mm x 330 mm x 130 mm (9.65" x 13" x 5.12")
  - Weight: 6 kg (13 lbs)

See page 471 for a complete presentation of the NanoTrak controller used in the MAX373K1 and MAX373K2 kits.

Flexure Stage Specifications

- **Manual Travel:** 0.16" (4 mm)
- **Thermal Stability:** 1 µm/°C
- **Differential Adjusters**
  - Coarse Adjustment: 0.5 mm/rev
  - Fine Adjustment: 50 µm/rev
- **Piezoelectric Travel:** 20 µm
- **Manual Drive Resolution:** Provides 50 nm Resolution Over a 300 µm Travel Range
- **Piezoelectric Actuator Resolution:** 5 nm When Operating with Internal Piezo Displacement Sensors.
- **Max Piezoelectric Drive Voltage:** 75 VDC
- **Crosstalk:** 20 µm/mm of Travel (Max)
- **Resonant Frequency (±10%):** 375 Hz (No Load), 200 Hz (275 g Load), 150 Hz (575 g Load)
- **Load Capacity:** 2.2 lbs (1 kg)
- **Deck Height:** 62.5 mm from the Base of the Stage to the Mounting Surfaces of the Moving Platform, the Accessory Beam Height is 75 mm from the Bottom Surface of the Stage
- **Accessories:** Mounted on the Top Deck of the Stage:
  - Large Fixed Bracket (AMA009)
  - Microscope Objective Mount (HCS013)
  - Adjustable Force Fiber Clamp (HFF001)
  - Cable Strain Relief (HFS001)

See page 479 for a complete presentation of the MAX311 flexure stage used in the MAX373K1 and MAX373K2 kits.

ITEM#	$	£	€	RMB	DESCRIPTION
MAX373K1	$ 8,950.50	£ 6,205.00	€ 7.947,00	¥ 75,579.00	apt™ NanoTrak™ Fiber Launch System with InGaAs Detector
MAX373K2	$ 8,950.50	£ 6,205.00	€ 7.947,00	¥ 75,579.00	apt™ NanoTrak™ Fiber Launch System with Silicon Detector