56 Sparta Avenue • Newton, New Jersey 07860
(973) 300-3000 Sales • (973) 300-3600 Fax
www.thorlabs.com

THORLABS

TIM101 - MAR 15, 2018
Item # TIM101 was discontinued on MAR 15, 2018. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

T-CUBE PIEZO INERTIA ACTUATOR CONTROLLER

- ► **Four Channel, Open-Loop Piezo Inertia Actuator Controller**
- ► **Custom Sawtooth Voltage Waveform Output**
- ► **Required Controller for Our Piezo Inertia Actuators**
- ► **Operation via Local Panel Controls or Remote PC via USB**

TIM101

Application Idea
The TIM101 Controller is designed to operate our Piezo Inertia Actuators. It contains four channels, making it ideal for use with mirror mounts and beam steering applications.

OVERVIEW

Features

- Compact Footprint (121.0 mm x 60.0 mm x 47.0 mm)
- Adjustable Voltage Output from 85 V to 125 V
- Four Independent Output Channels (Can Be Selected via On-Unit Controls)
- 0 - 10 V Analog Input (SMA Female, See *Pin Diagrams* Tab for Details)
- Custom Sawtooth Output Voltage Waveform Required for Piezo Inertia Motors
- Standalone or PC Controller Operation via USB Plug and Play
- Software Control Suite Included
- Software Compatible with other APT™ Controllers for Integrated Systems Development

Click to Enlarge
Back View of the TIM101 Controller (See the *Pin Diagrams* Tab for more information)

Item #	TIM101
Piezoelectric Output (4x SMC Male)	
Drive Voltage	85 - 125 VDC per Channel
External Input	
External Input (SMA Female)	0 - 10 V ±2%
USB Port[a]	Version 2.0, Full Speed Compatible
General	
Input Power	+15 VDC @ 2 A
Housing Dimensions (W x D x H)	121.0 mm x 60.0 mm x 47.0 mm (4.76" x 2.36" x 1.85")

This T-Cube Controller is a compact four-channel controller/driver for easy manual and automatic control of our piezoelectric inertia actuators. The driver has an internal custom sawtooth voltage signal generator capable of sending sub-millisecond pulses (steps) with controllable amplitudes from 85 V to 125 V. Only one channel is active at a time. The active channel can be selected using the channel select button on the top of the controller. An external analog input is provided either as an external drive option, or, when coupled with a position detector, a way to create a closed-loop system.

The unit has a very small 121.0 mm x 60.0 mm x 47.0 mm (4.76" x 2.36" x 1.85") footprint that is only twice as long as a standard T-Cube. A mounting plate with a 1/4" (M6) clearance slot is provided to mount the unit directly to the optical table. The compact size allows the controller to be positioned close to the motorized system for added convenience when manually adjusting motor positions using the top panel controls. Tabletop operation also allows minimal drive cable lengths for easier cable management. For convenience, a Type A to Type Mini B USB cable is included with the TIM101 T-Cube.

Although compact in footprint, this unit offers full piezo inertia motor control capability. These include jog settings, limit switch handling, "on-the-fly" changes in the direction of movement, and, for advanced operation, control over the number of steps performed. For more information see the manual, which can be found by clicking on the red "Docs" icon (📄) below. Please note that the TIM101 controller is designed to operate our piezoelectric inertia actuators and cannot be used to operate a standard piezo actuator.

USB connectivity provides easy plug and play PC controlled operation. The TIM101 also includes the user-friendly APT software which allows the user to quickly set up complex control sequences. For example, all relevant operating parameters are set automatically by the software for Thorlabs stage and actuator products. Advanced custom motion control applications and sequences are also possible using the extensive ActiveX® programming environment described in more detail on the *Motion Control Software* and *APT Tutorials* tabs.
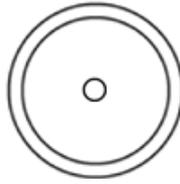
Power Supply Options

The preferred power supply for the TIM101 depends on the end user's application and whether you already own compatible power supplies. To that end and in keeping with Thorlabs' green initiative, we do not ship these units bundled with a power supply. This avoids the cost and inconvenience of receiving an unwanted single channel supply if a multi-channel would be more appropriate. The power supply options compatible with the TIM101 Piezo Inertia Controller are listed below.

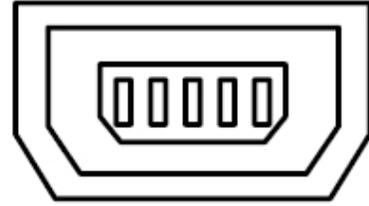- A USB cable with a Type A connector on one end and a Type Mini B connector on the other end is included.

Compact Motion Control Modules
K-Cube Control Modules[a]
Brushed DC Servo Motor Controller
Brushless DC Servo Motor Controller
Stepper Motor Controller
Single-Channel Piezo Controller
T-Cube Control Modules[a]
Four-Channel Piezo Inertia Controller
Single-Channel Strain Gauge Reader
Dual-Channel NanoTrak Auto-Aligner
Quadrant Detector
Solenoid Controller

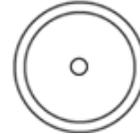- K-Cube and T-Cube modules are fully compatible with one another.

PIN DIAGRAMS

EXT IN

SMA Female

Used to connect an external analog signal source to control the position of the actuator. The input voltage range is 0 to +10 V, where 0 V provides max backwards velocity and +10 V provides max forward velocity. 5 V results in no movement. The input impedance is 100 kΩ.

Computer Connection

USB Mini-B*

*Type A to Mini-B cable included

HV OUT (4 Channels)

SMC Male

85 to 125 V. Provides the drive signal to the piezo actuator. The maximum voltage is set via the included APT Software.

MOTION CONTROL SOFTWARE

Thorlabs offers two platforms to drive our wide range of motion controllers: our Kinesis® software package or the legacy APT™ (Advanced Positioning Technology) software package. Either package can be used to control devices in the Kinesis family, which covers a wide range of motion controllers ranging from small, low-powered, single-channel drivers (such as the K-Cubes and T-Cubes) to high-power, multi-channel, modular 19" rack nanopositioning systems (the APT Rack System).

The Kinesis Software features .NET controls which can be used by 3rd party developers working in the latest C#, Visual Basic, LabVIEW™, or any .NET compatible languages to create custom applications. Low-level DLL libraries are included for applications not expected to use the .NET framework. A Central Sequence Manager supports integration and synchronization of all Thorlabs motion control hardware.

Our legacy APT System Software platform offers ActiveX-based controls which can be used by 3rd party developers working on C#, Visual Basic, LabVIEW™, or any Active-X compatible languages to create custom applications and includes a simulator mode to assist in developing custom applications without requiring hardware.
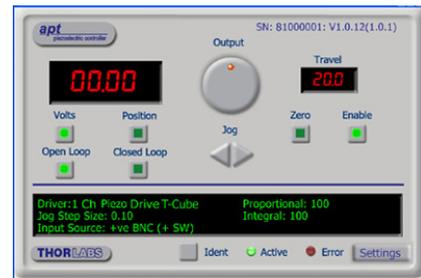

Kinesis GUI Screen

By providing these common software platforms, Thorlabs has ensured that users can easily mix and match any of the Kinesis and APT controllers in a single application, while only having to learn a single set of software tools. In this way, it is perfectly feasible to combine any of the controllers from single-axis to multi-axis systems and control all from a single, PC-based unified software interface.

The software packages allow two methods of usage: graphical user interface (GUI) utilities for direct interaction with and control of the controllers 'out of the box', and a set of programming interfaces that allow custom-integrated positioning and alignment solutions to be easily programmed in the development language of choice.

APT GUI Screen

A range of video tutorials is available to help explain our APT system software. These tutorials provide an overview of the software and the APT Config utility. Additionally, a tutorial video is available to explain how to select simulator mode within the software, which allows the user to experiment with the software without a controller connected. Please select the *APT Tutorials* tab above to view these videos, which are also available on the software CD included with the controllers.

Software

Kinesis Version 1.14.6

The Kinesis Software Package, which includes a GUI for control of Thorlabs' Kinesis and APT™ system controllers.

Also Available:

- rotocol

Software

APT Version 3.21.1

The APT Software Package, which includes a GUI for control of Thorlabs' APT™ and Kinesis system controllers.

Also Available:

- rotocol

APT TUTORIALS

These videos illustrate some of the basics of using the APT System Software from both a non-programming and a programming point of view. There are videos that illustrate usage of the supplied APT utilities that allow immediate control of the APT controllers out of the box. There are also a number of videos that explain the basics of programming custom software applications using Visual Basic, LabView and Visual C++. Watch the videos now to see what we mean.

 Click here to view the video tutorial

To further assist programmers, a guide to programming the APT software in LabView is also available.

 Click here to view the LabView guide

T-Cube Piezo Inertia Actuator Controller

Part Number	Description	Price	Availability
TIM101	T-Cube Piezo Inertia Actuator Controller, Four-Channel Output	$988.38	Today

Compatible Power Supplies

KAP101

KAP102

Click to Enlarge

▶ Power Supplies
    ▶ KPS101: For One K-Cube or T-Cube
▶ USB Controller Hubs Provide Power and Communications
    ▶ KCH301: For up to Three K-Cubes or T-Cubes
    ▶ KCH601: For up to Six K-Cubes or T-Cubes
    ▶ KAP101: Adapter Plate for Connecting 60 mm Wide T-Cubes to KCH Hubs
    ▶ KAP102: Adapter Plate for Connecting 120 mm Wide T-Cubes to KCH Hubs

KPS101

Click to Enlarge
The KPS101 Power
Supply Unit

Click for Details
A location-specific
adapter is shipped with
the power supply unit
based on your location.
The adapters for the
KPS101 are shown
here.

The KPS101 can supply up to 2.4 A and power a single K-Cube or T-Cube. It plugs into a standard wall outlet and provides +15 VDC.

The KCH301 and KCH601 USB Controller Hubs each consist of two parts: the hub, which can support up to three (KCH301) or six (KCH601) K-Cubes or T-Cubes, and a power supply that plugs into a standard wall outlet. The hub draws a maximum current of 10 A; please verify that the cubes being used do not require a total current of more than 10 A. In addition, the hub provides USB connectivity to any docked K-Cube or T-Cube through a single USB connection.

A KAP101 or KAP102 Adapter Plate (sold separately) is required for each T-Cube to operate on the KCH301 or KCH601 controller hub. The KAP101 is designed to adapt 60 mm wide T-Cubes to the hubs, while the KAP102 is designed to adapt 120 mm wide T-Cubes to the hubs.

For more information on the USB Controller Hubs, see the full web presentation.

Part Number	Description	Price	Availability
KPS101	15 V, 2.4 A Power Supply Unit for One K-Cube or T-Cube	$33.33	Today
KCH301	USB Controller Hub and Power Supply for Three K-Cubes or T-Cubes	$494.70	Today
KCH601	USB Controller Hub and Power Supply for Six K-Cubes or T-Cubes	$598.74	Today
KAP101	Adapter Plate for KCH Series Hubs and 60 mm Wide T-Cubes	$57.38	Today
KAP102	Adapter Plate for KCH Series Hubs and 120 mm Wide T-Cubes	$62.48	Today

Visit the *T-Cube Piezo Inertia Actuator Controller* page for pricing and availability information:
https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=9790