KEH3 and KEH6 K-Cube® Module Ethernet or USB Controller Hubs and Power Supply

User Guide



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Chapter 1 Introduction

1.1 Intended Use

The KEH3 Controller Hub and KEH6 Controller Hub simplify power and communication between K-Cube® modules, enabling an optimized optical table mounting and enhanced system use experience. They can operate with multiple K-Cube modules.

The controller hubs can be used as a teaching tool in the scientific community and used in a laboratory setting by technicians and scientists, and in a production environment with trained staff.

The controller hubs are designed to be used with K-Cube series modules only, using the supplied power supply within an indoor laboratory environment or equivalent production environment, however, adapter plates KAP101 and KAP102 can be installed to allow legacy T-cube series units to be fitted. Hub communication supports Ethernet (10/100) with CAT 6 screen cables or USB 2.0 cables.

NOTICE These products do not support hot swapping for any connection. The power must be switched off prior to changing K-Cubes modules, Ethernet, or USB connections.

The KEH3 and KEH6 controller hubs should not be used in a humid or dirty environment. They have been tested to standard ESD discharge and would not be expected to be used within a high discharge environment. Some K-Cube modules produce a high voltage, so it is not advised to use the device in high relative humidity.

The products may only be used in accordance with the instructions described in this manual. Any other use will invalidate the warranty.

1.2 Explanation of Safety Warnings

WARNING Warning indicates a hazard with a medium level of risk that, if not avoided, could result in death or serious injury.

CAUTION Caution indicates a hazard with a low level of risk that, if not avoided, could result in minor or moderate injury.

NOTICE Indicates information considered important, but not hazard-related, such as possible damage to the product.



Danger, Warning, or Caution



Shock Warning





The CE/UKCA markings on the product are the manufacturer's declaration that the product complies with the essential requirements of the relevant European health, safety, and environmental protection legislation.



The symbol on the product, the accessories or packaging indicates that this device must not be treated as unsorted municipal waste but must be collected separately.

1.3 Description

The KEH3 and KEH6 controller hubs allow the user to run multiple K-Cube modules using one power supply and one communication connection. USB operation will be the same as if connected to each individual K-Cube module.

The controller hubs comprise a slim base-plate type carrier with electrical interconnection located on the upper surface to accept K-Cube modules. Any combination of K-Cube modules can be mixed and matched to build a custom multi-channel driver arrangement in an extremely compact footprint. The controller hubs are available as either a three-bay (Item # KEH3) as shown in Figure 1 or as a six-bay (Item # KEH6) option as shown in Figure 2.



Figure 1 KEH3 Controller Hub with Accessories



Figure 2 KEH6 Controller Hub with Accessories

Internally, the controller hubs contain an Ethernet connection and a fully compliant USB 2.0 hub circuit to provide PC communications for all K-Cube modules. The controller hubs also provides power distribution for the K-Cube modules with only a single power connection. This single communication and power routing capability vastly reduces the number of cables needed when operating multiple K-Cube modules. Furthermore, the second Ethernet port or USB OUT can be connected to the input on another controller hub to allow multiple controller hub connections while still only requiring a single Ethernet or USB cable from the host PC.

NOTICE It is not possible to mix communication types between controller hubs.

An additional K-Cube module can be connected to the USB OUT connection if a single device in another location is required (an external PSU is needed). The controller hubs' circuitry also provides several internal flexible digital and analogue interconnect lines for deterministic multi-cube synchronized operations.

The controller hubs provide a rigid mechanical mounting platform for carrying K-Cube modules. Mounting holes allow for a variety of mounting orientations:

- Flat to a table surface (much like the individual K-Cube modules).
- Vertically to allow vertical stacking of the K-Cube modules.

This keeps the optical table footprint to an absolute minimum. In addition, the underside of the bottom face includes three magnets for secure but temporary fixing.

Adapter plates KAP101 and KAP102 are available to allow legacy T-cube series units to be fitted to the controller hubs (see Section 3.3.6 for more details).

1.4 Technical Data

1.4.1 Specifications

Item	Spec
Power Supply	48 V, 4.6 A
Mains Supply	85-264 V AC, 220 W
USB Hub	Fully Compliant USB 2.0
Ethernet	10/100BASE-T
Enclosure	Rigid Slim Profile 'Baseplate' Construction
Finish	Black Powder Coat
K-Cube Module Bays	3 (Three) (Item # KEH3) or 6 (Six) (Item # KEH6)
Table Mounting Orientation	Horizontal or Vertical Using Thorlabs AP90(/M) Bracket
Table Mounting Fixings	Universal Metric (M6) or Imperial (1/4"-20) Design

1.4.2 Mechanical Drawings

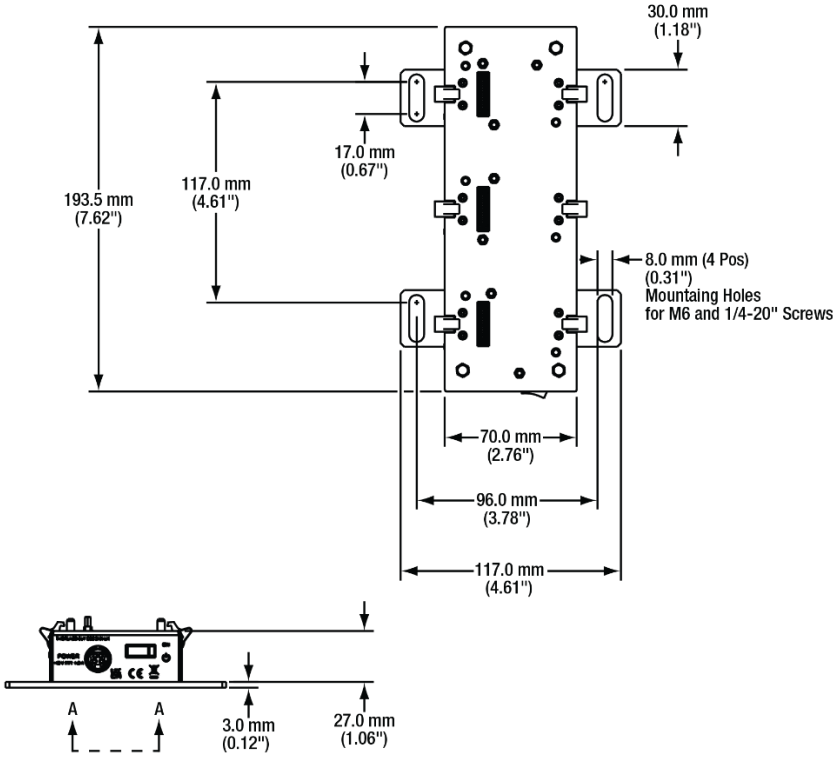


Figure 3 KEH3 Mechanical Drawing

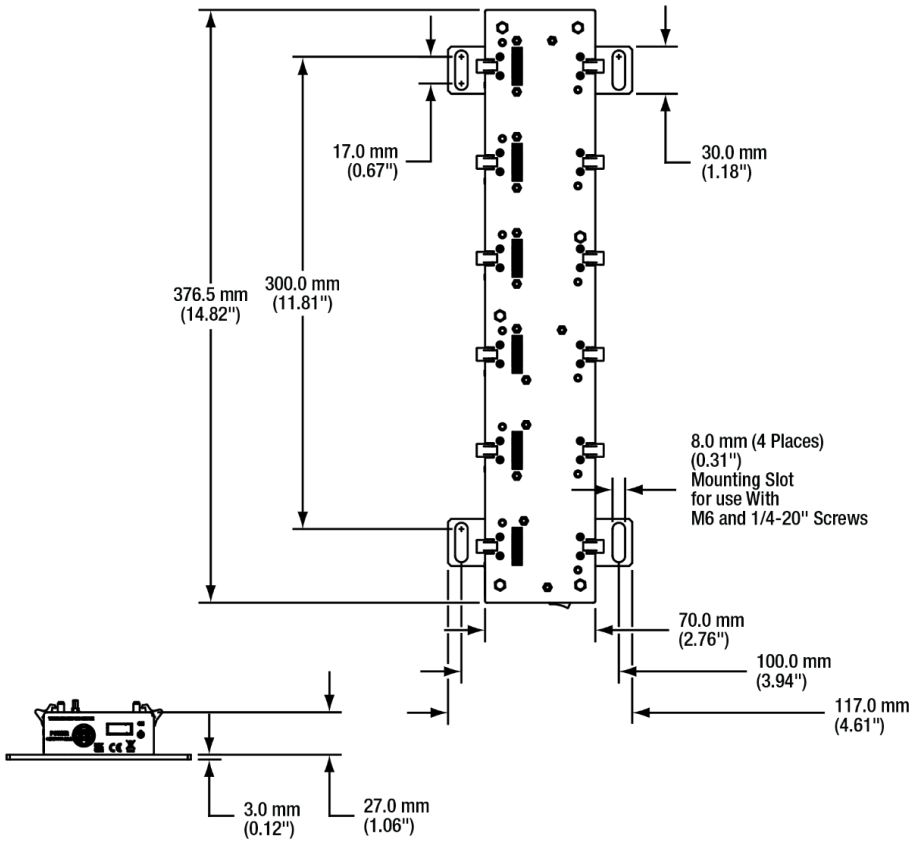


Figure 4 KEH6 Mechanical Drawing

1.5 Pin Diagrams

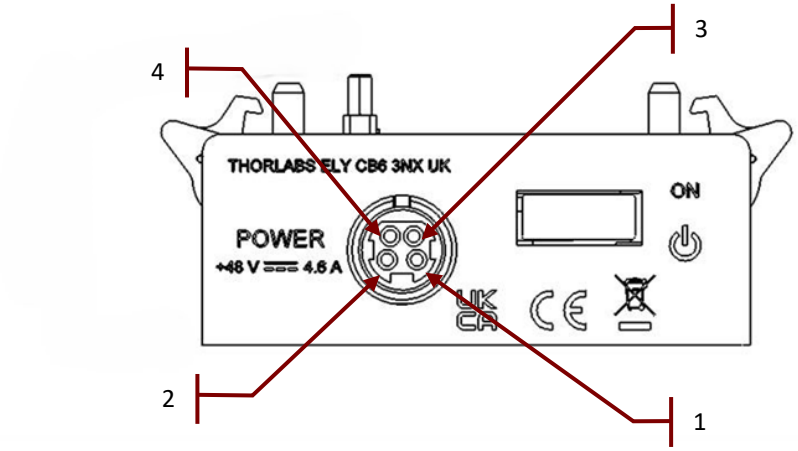


Figure 5 Power Connector Pin Configurations

Pin	Description	Min	Max	Notes
1 and 3	0 V	-	-	-
2 and 4	+48 V supply	45 V	48.5 V	Max 4.6 A @ 48 V

1.6 Identification of Controller Features

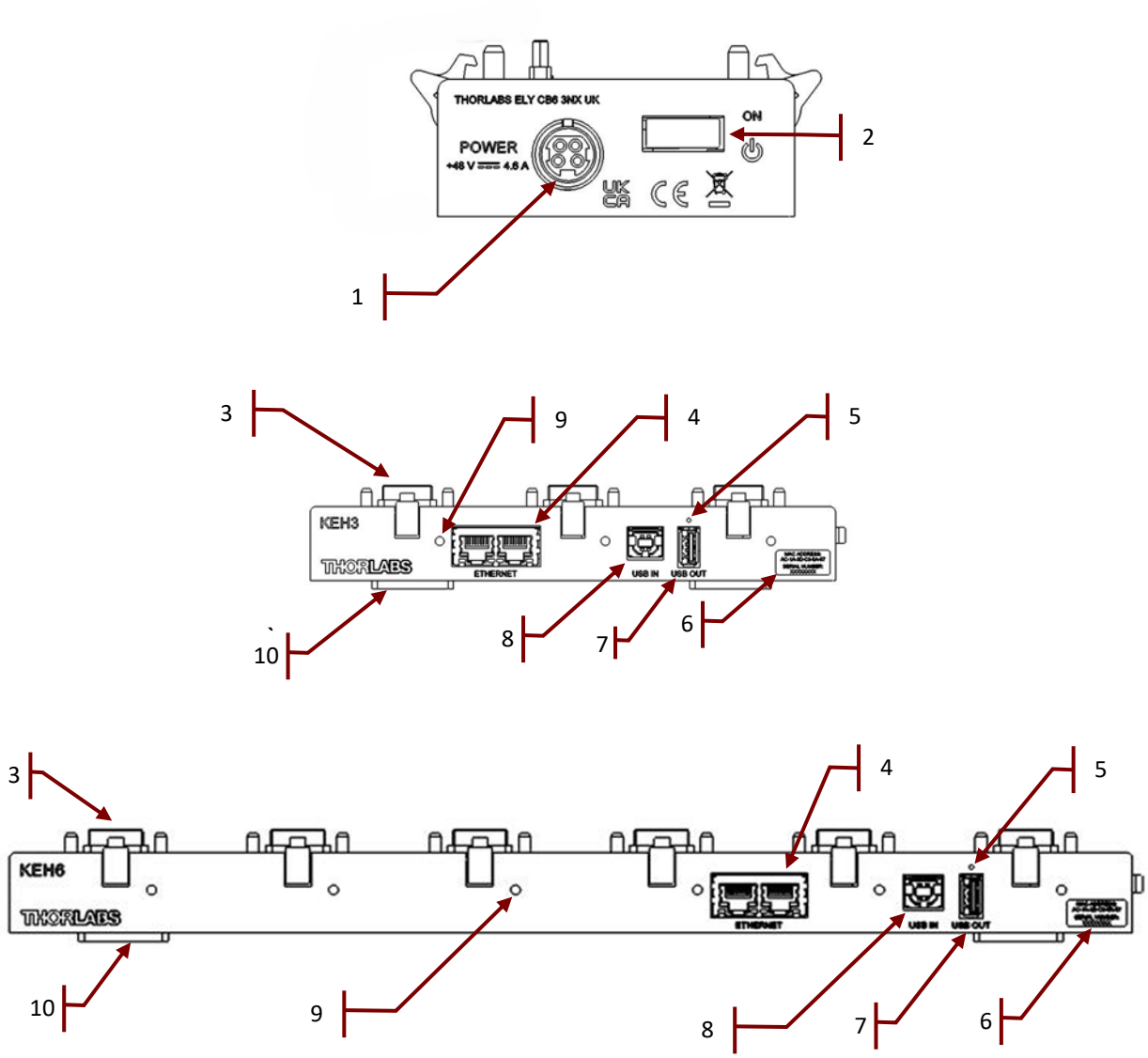


Figure 6 Identification of Controller Features

Callout	Description
1	Power Connector
2	Power Switch
3	K-Cube Module Mounting Point (3 (Three) for KEH3, 6 (Six) for KEH6)
4	Ethernet Port x 2
5	Reset Button
6	MAC Address Label
7	USB OUT Port
8	USB IN Port
9	LED Indicator (3 (Three) for KEH3, 6 (Six) for KEH6)
10	Table Mounts x 2

1.7 Simplified Declaration of Conformity



EU Declaration of Conformity

Manufacturer: Thorlabs LTD

Address: 204 Lancaster Way, Ely, CB6 3NX

We hereby declare under our sole responsibility that:

Product: **KEH3 and KEH6**

Product description: **K-Cube Module, Ethernet or USB Controller Hub and Power Supply**

is/are in conformity with the following directive(s):

2014/30/EU	**Electromagnetic Compatibility (EMC) Directive**
2014/35/EU	**Low Voltage Directive (LVD)**
2011/65/EU	**Restriction of Use of Certain Hazardous Substances (RoHS), including 2015/863**

and (harmonized) standards / technical specifications :

EN 61326-1	Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements	2021
EN 61010-1	Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use.	2010 + A1:2019 + AC:2019
EN IEC 63000	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances	2018

I hereby declare that the equipment named has been designed to comply with the relevant sections of the above referenced specifications and complies with all applicable Essential Requirements of the Directives.

Signed: Keith Dhese

Name: Keith Dhese *On:* 7/21/2025

Position: General Manager

CE

1.8 FCC Designation

Class A FCC Designation

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

1.9 Firmware Update Attributions and Licenses

The KEH3 and KEH6 controller hubs are shipped with a Firmware Update Utility. Existing controller hubs need to have the latest version of firmware to ensure correct operation.

For legal compliance, the license file for the KEH3 and KEH6 controller hub's Firmware Update Utility for 32/64-bit Windows® contains both attribution for the distributed software components involved and the licenses that those components are being redistributed under. This file can be found on the software page using the link below:

https://www.thorlabs.com/software_pages/ViewSoftwarePage.cfm?Code=Motion_Control&viewtab=2

Chapter 2 Safety

2.1 Positioning

⚠CAUTION

Impairment of operation and damage to equipment
This product is for indoor use only, maximum altitude 2000 m.

2.2 Temperature

⚠CAUTION

Impairment of operation and damage to equipment
The temperature range for normal operation is 5 °C to 40 °C.

2.3 Humidity

⚠CAUTION

Impairment of operation and damage to equipment
The maximum humidity for normal operation is 80% RH (non-condensing) at 31 °C.

2.4 Exposure

⚠CAUTION

Impairment of operation and damage to equipment
For reliable operation do not expose the product to corrosive agents or excessive moisture, heat or dust.

2.5 Power-up

⚠CAUTION

Impairment of operation and damage to equipment
If the device has been stored at a low temperature or in an environment of high humidity, it must be allowed to reach ambient conditions before being powered up.

2.6 Using near water

⚠CAUTION

Impairment of operation and damage to equipment
The device is not waterproof. Do not immerse the device in water or use it outdoors in the rain.

Chapter 3 Installation

3.1 Warranty Information

This precision device is only serviceable if returned and properly packed into the complete original packaging including the complete shipment plus the cardboard insert that holds the enclosed devices. If necessary, ask for replacement packaging. Refer servicing to qualified personnel.

3.2 Packing List

- Three- (Item # KEH3) or Six- (Item # KEH6) Port Communication Controller Hub
- 48 V, 220 W Power Supply
- Base Clamps6
- USB Type A to Type B Cable
- Base Clamp Screws M4.0 x 8 mm
- 2.5 mm A/F Hex Key

NOTICE

Power supplies for previous-generation KCH301/KCH601 controller hubs are NOT compatible with the KEH3/KEH6 controller hubs. Use the power supply included with the KEHx hubs for stable operation.

3.3 Installation Instructions

The controller hubs are shipped complete with attachment brackets (base clamps) for horizontal orientation for installation to a breadboard, optical table, or similar surface. To mount the controller hubs vertically, use Thorlabs' AP90(/M) angle brackets (not supplied).

NOTICE

When siting the controller hub, it should be positioned so as not to impede the operation of the control panel buttons on the K-Cube modules.
Make sure that proper airflow is maintained to all K-Cube modules fitted to the controller hub.

3.3.1 Preparation

The preparation of a controller hub that is an existing item being moved from one location to another, differs from the preparation of an out-of-the-box item. In these instances, any existing K-Cube modules and/or mounting brackets need to be removed first.

For controller hubs already hosting K-Cube modules and/or mounting brackets:

1. Remove any K-Cube modules fitted to the controller hub.
2. Turn the controller hub upside down and remove any mounting brackets previously fitted.

Existing controller hubs need to have the latest version of firmware to ensure correct operation. To update the firmware, make sure you have the following:

- Thorlabs HUB Update Software
- PC Running Microsoft Windows® (Version 7 or Later)
- USB Cable

The procedure to update the firmware is shown in Section 3.3.4.

For new controller hubs:

1. Carefully open the box in which the controller hub was delivered.
2. Lay out the contents on a clean flat surface and make sure all components are present by referencing the components listed in Section 3.2 and that nothing is damaged.

NOTICE If something is missing or damaged, contact Thorlabs immediately. Retain original packaging in case returns are required.

To proceed, mount the controller hub either horizontally or vertically.

- For horizontal mounting, see Section 3.3.2.
- For vertical mounting, see Section 3.3.3.

3.3.2 Mounting the Controller Hub Horizontally

NOTICE The images in this section illustrate mounting the KEH6 controller hub. The same principles apply to the KEH3 controller hub.

1. On the back face of the controller hub, fit the flat brackets (supplied) using the four M4.0 x 8 mm screws (supplied) (see Figure 7).

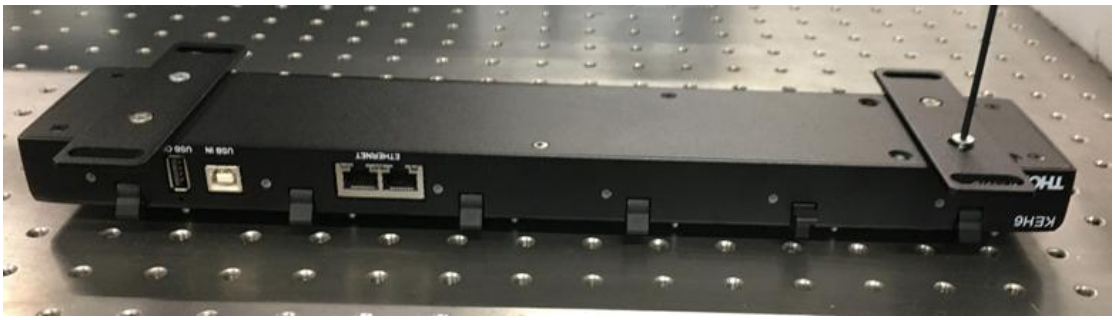


Figure 7 Fitting Flat Brackets

2. Position the controller hub in the desired position on the worksurface.
3. Line up the attachment holes in the bracket and the worksurface and fit the bolts (not supplied) to secure the assembly in position.

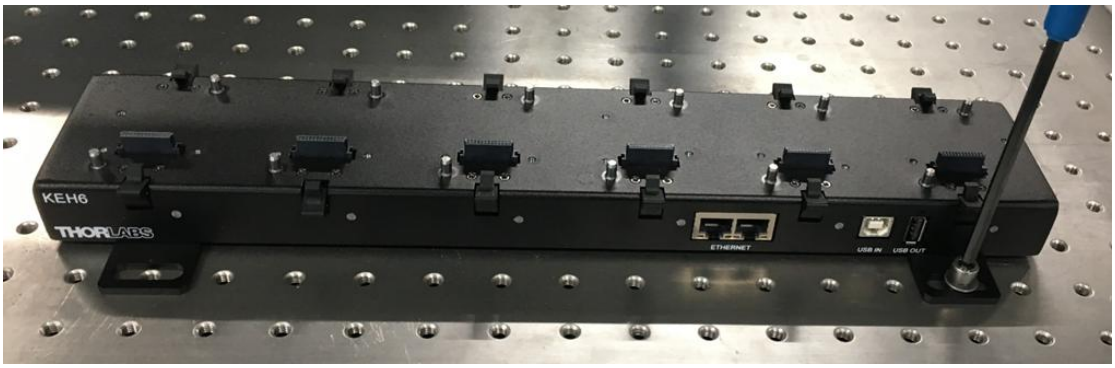


Figure 8 Securing the Assembly to a Horizontal Surface

4. Populate the controller hub with K-Cube modules as required (see Section 3.3.5).

3.3.3 Mounting the Controller Hub Vertically

1. On the back face of the controller hub, fit an AP90(/M) Angle Bracket (not supplied) using M6 x 1.0 bolts (not supplied). See Figure 9 for the KEH3 controller hub, see Figure 10 for the KEH6 controller hub.

NOTICE

- For the KEH3 controller hub, two M6 x 1.0 bolts are needed.
- For the KEH6 controller hub, four M6 x 1.0 bolts are needed.



Figure 9 AP90(/M) Angle Bracket Fitting to KEH3

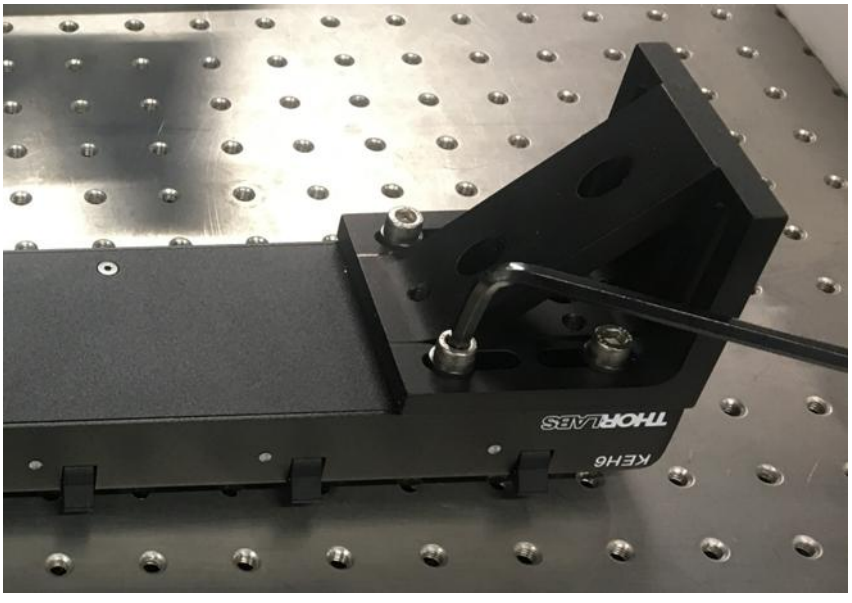


Figure 10 AP90(/M) Angle Bracket Fitting to KEH6

2. Position the controller hub in the desired position on the worksurface.
3. Line up the attachment holes in the bracket and the worksurface and fit the bolts to secure the assembly in a vertical position (see Figure 11 for the KEH3 controller hub assembly, Figure 12 for the KEH6 controller hub assembly).

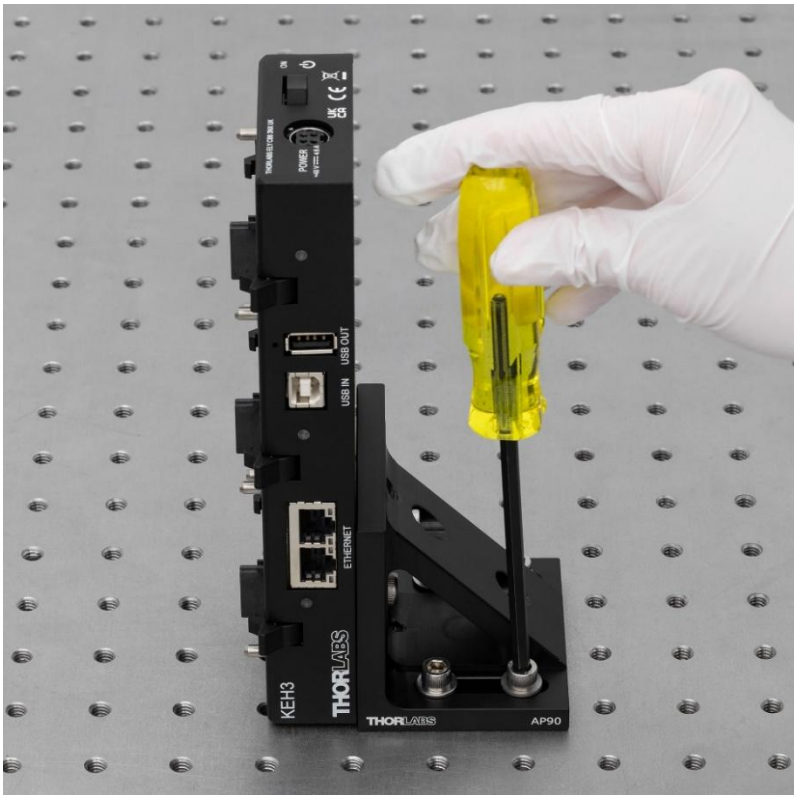


Figure 11 Securing the Assembly to a Vertical Surface (KEH3)

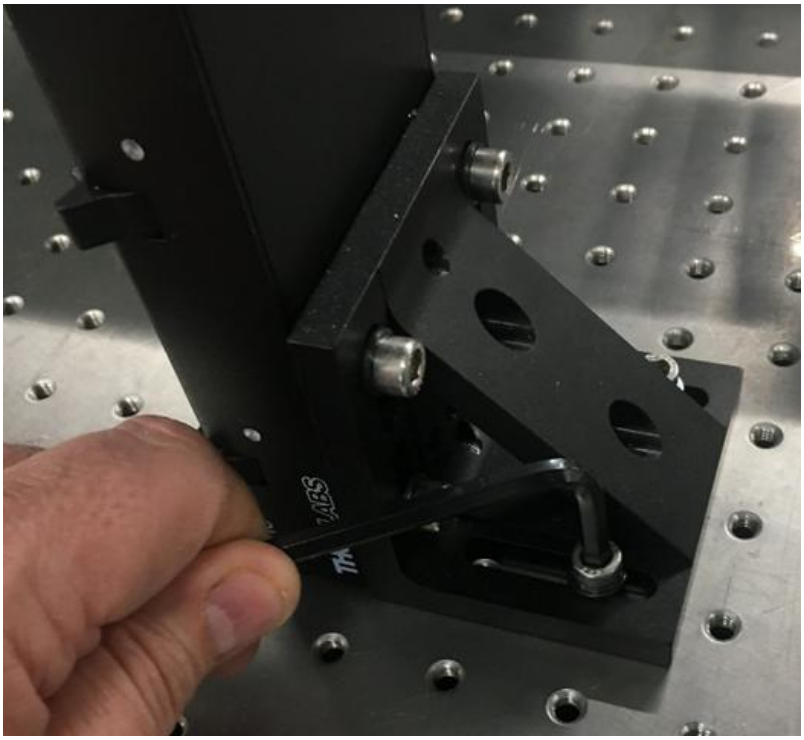


Figure 12 Securing the Assembly to a Vertical Surface (KEH6)

4. Populate the controller hub with K-Cube modules as required (see Section 3.3.5).

3.3.4 Updating Existing Controller Hub Firmware

Existing controller hubs need to have the latest version of firmware to ensure correct operation. Make sure you have the equipment listed in Section 3.3.1 to proceed.

NOTICE

Power supplies for previous-generation KCH301/KCH601 controller hubs are NOT compatible with the KEH3/KEH6 controller hubs. Use the power supply included with the KEHx hubs for stable operation.

To update the firmware, do the following:

1. Extract the software to a suitable location on the PC.
2. Connect one end of the USB cable to the PC.
3. Connect the other end of the USB cable to the controller hub **USB IN** port (see Figure 6).
4. On the side of the controller hub, connect one end of the supplied 48 V, 220 W power supply.
5. Connect the other end of the 48 V, 220 W power supply to a suitable power outlet.
6. On the side of the controller hub, turn the power switch to the ON position.
7. Using a pin or other pointed tool, press the Reset button (see Figure 13) for at least four seconds.

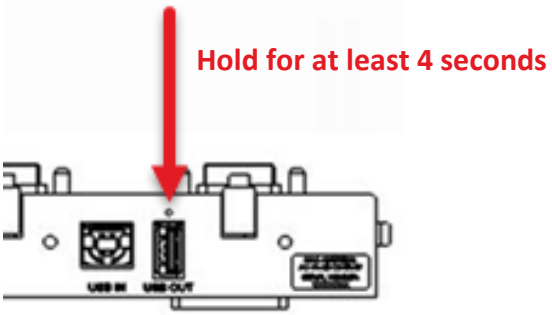
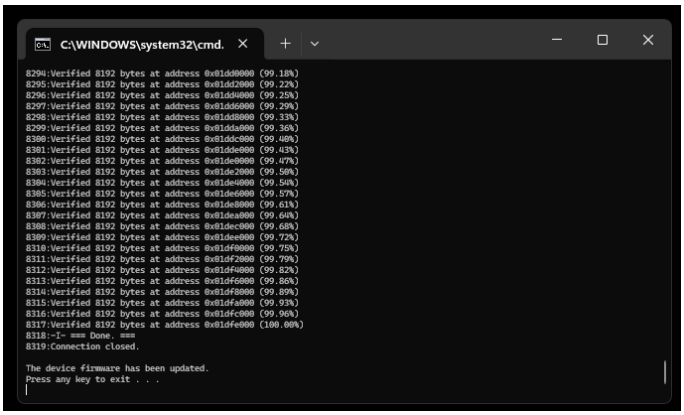


Figure 13 Reset Button Location

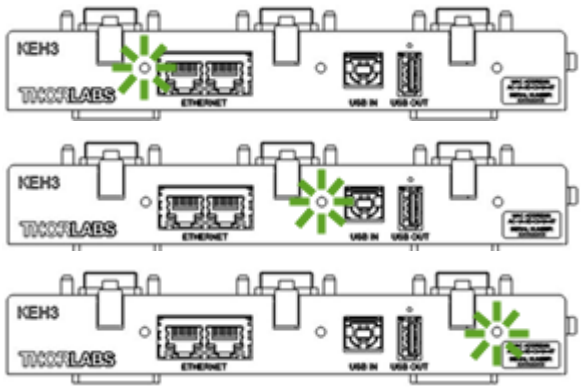
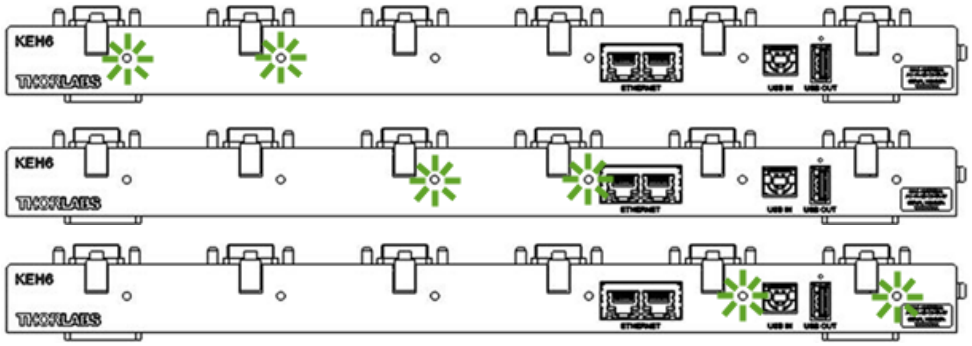
The controller hub LEDs illuminate immediately except for the one furthest away from the power switch.

8. Run the **Update Firmware.bat** program on the extracted software. The update process runs for approximately 80 seconds after which a message stating the device firmware has been updated is displayed.



9. Press RESET for no more than one second.

The LED indicator lights illuminate in the following sequence:

Controller Hub	LED Indicator sequence
KEH3	
KEH6	

When the LED indicator lights nearest the power switch are illuminated, the controller hub is rebooted and the firmware is updated.

3.3.5 Fitting a K-Cube Module

WARNING

Potential damage to equipment and personal injury
DO NOT INSERT A K-Cube MODULE INTO A POWERED-UP CONTROLLER HUB
Always make sure that all power is disconnected from the K-Cube modules AND the controller hub before a K-Cube module is inserted. Failure to observe this precaution will seriously damage the K-Cube module, controller hub, and could result in personal injury.

WARNING

Potential damage to equipment and personal injury
NEVER POWER A K-Cube MODULE USING ITS LOCAL POWER SOCKET WHEN IT IS ALSO PLUGGED INTO THE CONTROLLER HUB.
Dual-powering a K-Cube module in this way will result in severe damage to the K-Cube module and could result in personal injury.

NOTICE The images in this section illustrate fitting a K-Cube module on the KEH6 controller hub. The same principles apply to the KEH3 controller hub.

1. Make sure all power from the controller hub AND the K-Cube module to be fitted is disconnected.
2. From the connector to be fitted, remove the plastic cover.
3. On each side of the controller hub at the position the connector is to be fitted, undo the plastic securing clips.



Figure 14 Plastic Securing Clip Positions

4. On the controller hub, check for correct orientation of the ERNI connector socket and its mating plug on the K-Cube module, (the K-Cube front panel featuring the ON switch and part number faces the same direction as the Thorlabs logo on the controller hub).
5. Carefully slot the K-Cube module into the controller hub, making sure that the locating pegs are correctly fitted into the lugs on the K-Cube module (see Figure 15).



Figure 15 Slotting the K-Cube Module into the Controller Hub

6. Secure the K-Cube module by lifting the front and rear clips until they latch into place (see Figure 16).



Figure 16 K-Cube Module Installation

7. Repeat the above steps for additional K-Cube modules to be fitted.

3.3.6 Fitting KAP101 Adapter Plates

Adapter plates (KAP101 and KAP102) are available separately which allows existing T-Cubes to be fitted easily to the KEH3 and KEH6 controller hubs.

To fit the adapter plates, make sure that all power is disconnected from the controller hub and do the following:

1. From the connector to be fitted, remove the plastic cover.
2. On each side of the controller hub at the position the adapter plate is to be fitted, undo the plastic securing clips.
3. On the controller hub, check for correct orientation of the ERNI connector socket and its mating plug on the adapter plate.
4. Carefully slot the adapter plate into the controller hub, making sure that the locating pegs are correctly fitted into the lugs on the adapter plate.
5. Secure the adapter plate by lifting the front and rear clips until they latch into place.
6. If fitted, remove the base plate from the T-Cube and retain the screws for later use.
7. Check for correct orientation of the ERNI connector socket on the KAP101 adapter plate and its mating plug on the T-Cube unit, then plug the T-Cube unit into the hub, ensuring that the locating pegs on the adapter plate are correctly fitted into the lugs on the T-Cube.
8. Using the retained screws, secure the T-Cube to the adapter plate.

Chapter 4 Operation

WARNING

Potential damage to equipment and personal injury
When making any connections to the controller hub, make sure that the controller hub is switched off.
If connecting the power connector, make sure the mains supply is removed from the power supply brick first.

WARNING

Risk of electrical shock
There is a risk of electrical shock if the equipment is operated with the covers removed. Only personnel authorized by Thorlabs Ltd and trained in the maintenance of this equipment should remove its covers.

4.1 Powering up a Populated Controller Hub

NOTICE

Power supplies for previous-generation KCH301/KCH601 controller hubs are NOT compatible with the KEH3/KEH6 controller hubs. Use the power supply included with the KEHx hubs for stable operation.

1. Make sure that all required K-Cube modules are installed as per Section 3.3.5.
2. On the side of the controller hub, connect one end of the supplied 48 V, 220 W power supply.
3. Connect the other end of the 48 V, 220 W power supply to a suitable power outlet.
4. On the side of the controller hub, turn the power switch to the ON position.

The front panels lights flash on over a period of a few seconds indicating startup is in progress. When startup is complete, the front panel lights go out.

NOTICE

- If intended communication is through USB, then operation can commence from power up.
- If intended communication is through Ethernet, the controller hub will be inoperable until the startup process is complete.
- When using USB communication, the front panel lights remain dormant.

4.2 Using in USB Mode

Connecting a Type A to Type B USB cable into the controller hub disables Ethernet operation. In this mode the **USB OUT** port can be used to connect an additional K-Cube module with an external power source or can be used with other USB devices. All devices will be available as if they are connected separately to the computer.

4.3 Using in Ethernet Mode

When using the controller hub in Ethernet mode, no connection to the **USB IN** port must exist. All communication occurs on one IP address using different ports to channel the data to the correct bay. The ports are shown in Figure 17 for the three-bay option and Figure 18 for the six-bay option.

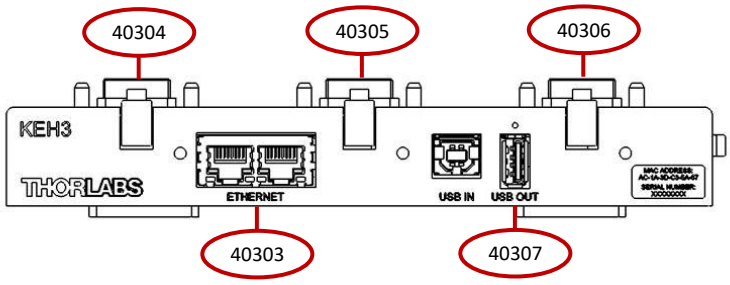


Figure 17 KEH3 Controller Hub Ports

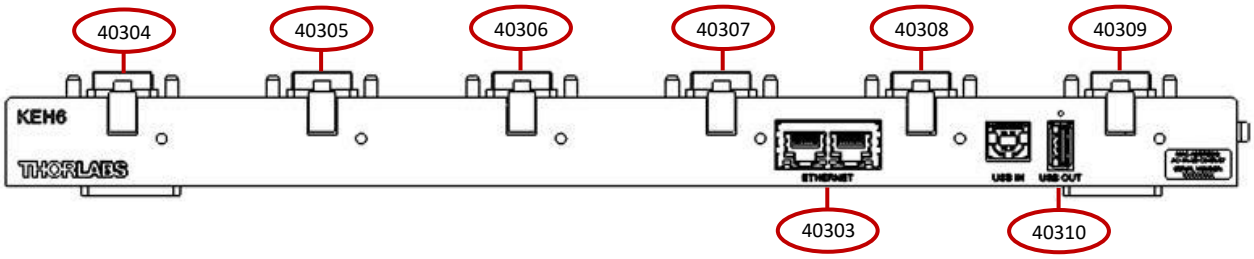


Figure 18 KEH6 Controller Hub Ports

When startup has finished (all front panel LED are extinguished) default operation will start by either:

- Using a pre-configured static IP address and a DHCP address if a DHCP server is available (communication is available on both addresses).
- Using a DHCP address if a DHCP server is available.

The controller hub is shipped with a static IP set to address of 192.168.0.200, however it will also find an address with a DHCP server even if the controller hub is set to static IP mode.

To operate the controller hub using Kinesis, connect to it using the method described in Section 4.3.1. Kinesis uses the IP address discovered during the process.

If the IP address cannot be discovered, use one of the following methods to find it:

NOTICE These methods only work on small networks.

- Using the serial number of the controller hub (DNS-SD) (see Section 4.3.2).
- Using the MAC address of the controller hub (ARP table) (see Section 4.3.3).

4.3.1 Connecting to the Controller Hub Using Kinesis

1. Open the Kinesis software.
2. Make sure all K-Cube modules to be used are connected to the powered-up controller hub and that no connection to the **USB IN** port exists.
3. From the Kinesis GUI, select **Connect**. The **Connect** window is displayed.

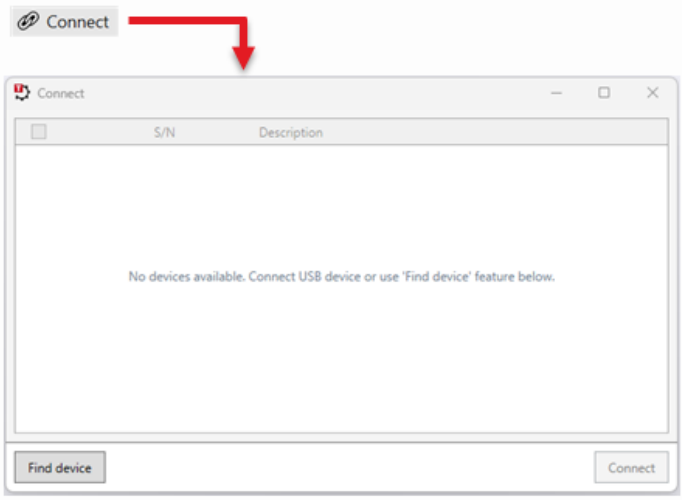


Figure 19 Kinesis Connect Window

4. From the **Connect** window, select **Find device**. The **Device Discovery** window is displayed.

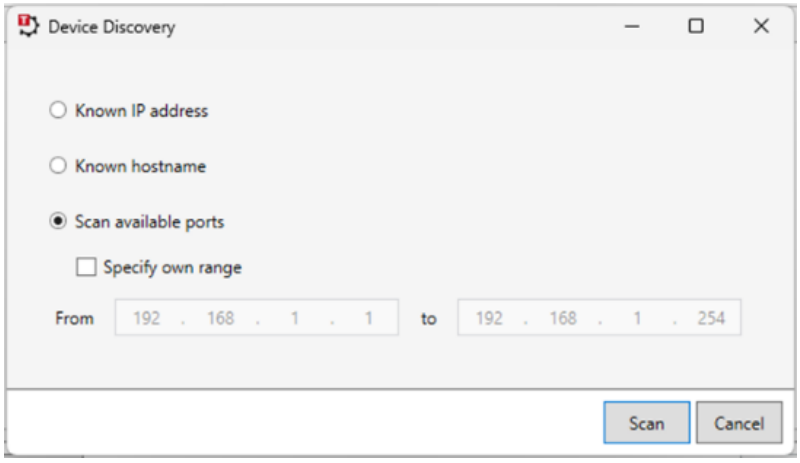


Figure 20 Device Discovery Window

5. From the **Device Discovery** window, select **Scan available ports**. The default IP range will be calculated from the subnet mask and the host PC address, however, a scan limit exists of 200,000 addresses. If using a subnet setting that supports a larger number of IP addresses, contact IT support to get the IP range of the DHCP server.

NOTICE

If the possible range of IP addresses that the DHCP server can assign from is known, tick **Specify own range** and enter the known possible range. This speeds up the process.

6. Select **Scan**. After a few seconds, the controller hub is displayed in the list together with the connected K-Cubes. The IP addresses assigned to each item are shown in the **Description** field.

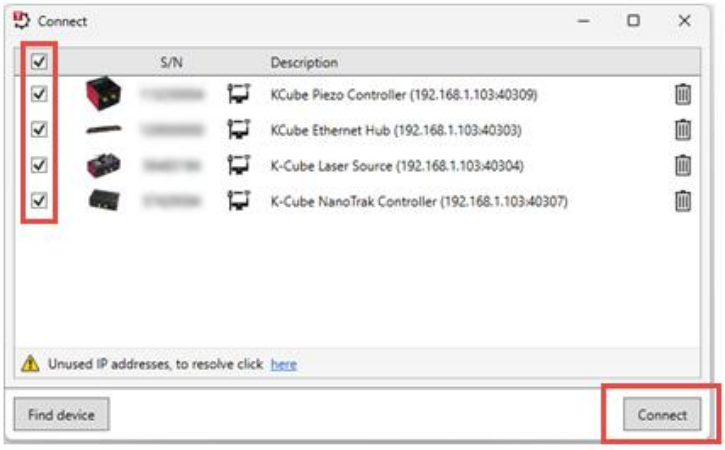
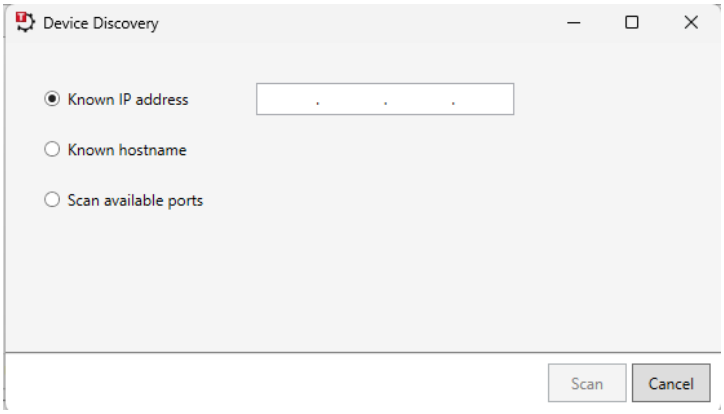


Figure 21 Kinesis Connect Window

NOTICE

If the IP address cannot be found, use either the method shown in Section 4.3.2 or Section 4.3.3 to find it. Make a note of the address then in the **Device Discovery** window, select **Known IP address**, type it in and select **Scan**.



7. Select the items that require connection and select **Connect**. In the main Kinesis window, the controller hub settings for an IP address of 192.168.1.101 are displayed as follows:



Figure 22 IP Address Setting in Kinesis

To set the static IP address, do the following:

1. Select **Settings**. The **Device Settings** window is displayed.

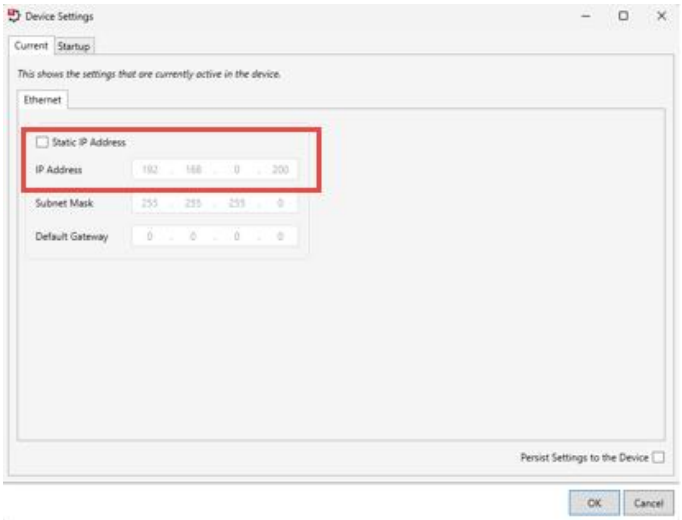


Figure 23 Device Settings Window

2. From the **Device Settings** window, **Current** tab, check the **Static IP Address** checkbox, type the IP address in the **Static IP Address** field and select **OK**. The LEDs on the front of the controller hub blink three times while changing the internal configuration.

NOTICE Static settings are remembered on power cycle; however, a second address will be assigned from a DHCP server if connected.

4.3.2 Finding the Controller Hub IP address Using the Serial Number

NOTICE This procedure only works on small networks.

1. Press ⊞ + **R**.
2. In the Run window, type **cmd**. The Windows® Command Prompt opens.
3. In the Windows® Command Prompt, type either:
   a. **ping KEH3-<Serial Number>.local** for the KEH3 controller hub.
   b. **ping KEH6-<Serial Number>.local** for the KEH6 controller hub.

   where **<Serial Number>** is the serial number as printed on the front of the controller hub.

   A typical response for a KEH6 controller hub with serial number 120000000 is shown below:

```
C:\Users>ping KEH6-120000000.local

Pinging KEH6-120000000.local [192.168.1.103] with 32 bytes of data:
Reply from 192.168.1.103: bytes=32 time<1ms TTL=64
Reply from 192.168.1.103: bytes=32 time=1ms TTL=64
Reply from 192.168.1.103: bytes=32 time<1ms TTL=64
Reply from 192.168.1.103: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.1.103:
    Packets: Sent =
, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

The IP address is highlighted.

4.3.3 Finding the Controller Hub IP address Using the MAC Address

NOTICE This procedure only works on small networks.

1. Press ⊞ + **R**.
2. In the Run window, type **cmd**.
3. Type **arp -a | find "<MAC address>"** where **<MAC address>** is the MAC address printed on the front of the controller hub.

A typical response for a controller hub with MAC address fc-0f-e7-ec-de-27 is shown below:

```
C:\Users>arp -a | find "fc-0f-e7-ec-de-27"
  192.168.9.126         fc-0f-e7-ec-de-27     dynamic
```

The IP address is highlighted.

4.4 K-Cube Module Mounting Configurations

When K-Cube modules are used on the controller hubs, signals can be routed through dedicated internal communication channels. These channels are selected via the associated K-Cube module settings panel, or by using the **MENU** button on the top panel of the module.

The feedback signal routes for the available channels are described in Table 1.

Channel	Feedback Signal Route	
	KEH3	KEH6
1	All bays	All bays
2	All bays	Adjacent pairs of bays (1 and 2, 3 and 4, 5 and 6)

Table 1 Internal Communication Channel Routes

Figure 24 shows both configurations for the KEH6 controller hub.

NOTICE Each bay is connected to Channel 1 and Channel 2.

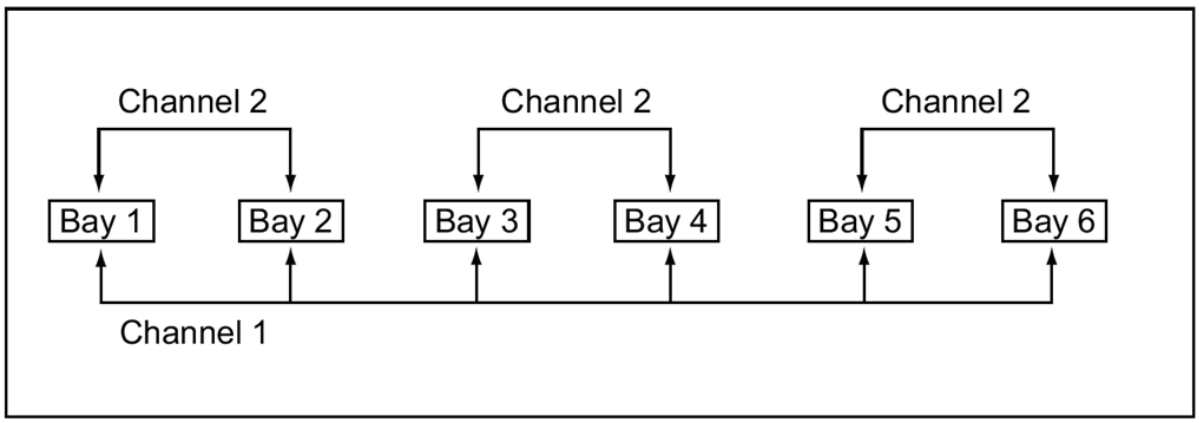


Figure 24 K-Cube Communication through Dedicated Internal Channels

For the KEH6 controller hub, only certain K-Cube module arrangements allow the system to function correctly. Furthermore, the setting for the Analogue Input Source (**EXT IN**) parameter in the piezo settings panel, depends on the bays in which the K-Cube modules are fitted. The various bay options for the KEH6 controller hub are described in Figure 25.

NOTICE For the KEH3 controller hub, any K-Cube module arrangement is possible.

NOTICE

In general, when signal channels 1 and 2 are being used, make sure that:

- The individual cubes are set up to use the intended signal channel.
- Only one cube drives the intended signal channel.

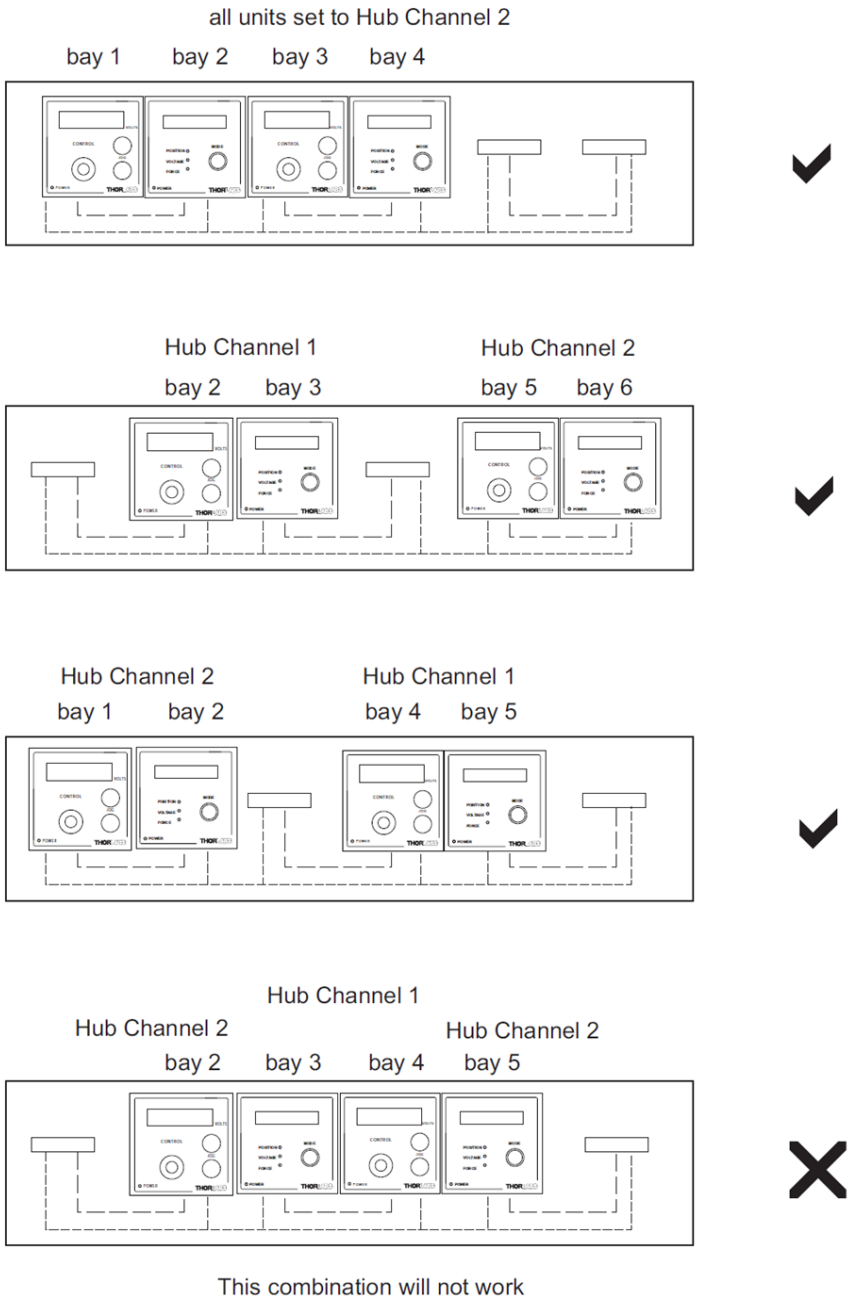


Figure 25 K-Cube Module Bay Options

Chapter 5 Maintenance and Cleaning

The equipment contains no user serviceable parts. Maintenance is limited to safety testing and cleaning.

5.1 Maintenance

⚠WARNING

Risk of electrical shock

There is a risk of electrical shock if any maintenance is attempted while the equipment is in operation and the covers are removed. Only personnel authorized by Thorlabs Ltd and trained in the maintenance of this equipment should remove its covers or attempt any repairs or adjustments.

If a fuse is present in the main supply plug, test it as part of a regular Portable Appliance Test (PAT) in accordance with local regulations (this is typically, annually if used daily).

5.2 Cleaning

⚠CAUTION

Damage to equipment and risk of personal injury

- Disconnect the power supply before cleaning the controller hub.
- Use only a soft dry cloth when wiping the outside surfaces.
- Do not use water, detergents, solvents, or other liquids.
- Do not use any abrasive pads or scouring powder.

To clean the controller hub, gently wipe over with a soft dry cloth.

Chapter 6 Troubleshooting and Repair

If the controller hub does not power up correctly, check the following items:

- Make sure the power supply included with the KEHx hubs is being used. Power supplies for previous-generation KCH301/KCH601 controller hubs are NOT compatible with the KEH3/KEH6 controller hubs.
- Check the main power fuse (see Section 5.1).
- Make sure the main power cable is fully seated at both ends.
- Make sure the power brick is powered and has a green light illuminated.
- Check the orientation of the power cable into the controller hub.
- Make sure the side power switch is in the ON position.
- Make sure the LEDs light-up in the correct sequence when powering up (see Section 4.1).

If there is no communication to the K-Cube modules in Ethernet mode:

- Check the K-Cube modules are powered up.
- Check there is no USB cable attached to **USB IN** (see Section 4.3).
- Check the lights on the employed Ethernet ports are lit.
- If there are two K-Cubes of identical type and only one is shown in Kinesis, check that the K-Cube has the latest firmware.
- Check a valid IP address is being used (see Section 4.3).

If connection to a controller hub cannot be made with the static IP address set, connect the controller hub to a network with DHCP. The controller hub will obtain a second address which can be used to access the device and change the settings.

The front panel standby bay LED indicates certain conditions as follows:

Standby Bay LED Color and State	Condition
Solid Green on Each Bay	Ethernet connection present.
Slow Blinking Green (All LEDs)	The controller hub is identified (when connected to Ethernet and APT **MGMSG_MOD_IDENTIFY 0x0223** is sent via Ethernet communication).
Fast Blinking Green (All LEDs)	The controller hub is changing settings, boot sequence is finished.

Please contact your local Thorlabs Technical Support office with any questions.

Chapter 7 Disposal



Thorlabs verifies our compliance with the WEEE (Waste Electrical and Electronic Equipment) directive of the European Community and the corresponding national laws. Accordingly, all end users in the EC may return “end of life” Annex I category electrical and electronic equipment sold after August 13, 2005 to Thorlabs, without incurring disposal charges. Eligible units are marked with the crossed out “wheelie bin” logo (see right), were sold to and are currently owned by a company or institute within the EC and are not dissembled or contaminated. Contact Thorlabs for more information. Waste treatment is your own responsibility. “End of life” units must be returned to Thorlabs or handed to a company specializing in waste recovery. Do not dispose of the unit in a litter bin or at a public waste disposal site. It is the user’s responsibility to delete all private data stored on the device prior to disposal.

Chapter 8 Thorlabs Worldwide Contacts

For technical support or sales inquiries, please visit us at www.thorlabs.com/contact for our most up-to-date contact information.



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