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A Tektronix Company

Model KUSB-488B USB to GPIB Converter

Quick Start Guide

Keithley Instruments
28775 Aurora Road
Cleveland, Ohio 44139
1-800-935-5595
tek.com/keithley

Welcome

Thank you for choosing a Keithley Instruments product.

The Model KUSB-488B USB to GPIB Converter has the following features:

- Compatibility with IEEE-488.1 and IEEE-488.2 standards
- Plug and play interface (attached 2 m (78.74 in.) cable; USB 2.0 compatible)
- Up to 1.2 MB per second data transfer rates
- Built-in 32 KB first-in first-out (FIFO) buffer for read/write operations
- No external power required
- Device drivers for Microsoft Windows®
- An interactive utility for testing and diagnostics
- Command-compatible driver APIs (application program interfaces) for use with Keithley Instruments, National Instruments™ (NI), and VISA (Virtual Instrument Software Architecture) libraries

Figure 1: KUSB-488 USB to GPIB converter



Contact and support information

This guide is designed to help you to install your KUSB-488B to GPIB Converter. For more detailed information, refer to the Keithley Instruments *Model KPCI-488LPA GPIB Controller Interface Card and Model KUSB-488B USB to GPIB Converter Reference Manual*, available from tek.com/keithley.

From the website, you can also access updated drivers and information about related products.

Your local Field Applications Engineer can help you with product selection, configuration, and usage. Check the website for contact information.

Inspection for damage

The Model KUSB-488B was carefully inspected electrically and mechanically before shipment. After unpacking all items from the shipping carton, check for any obvious signs of physical damage that may have occurred during transit. Report any damage to the shipping agent immediately. Save the original packing carton for possible future shipment.

Repacking for return shipment

Should it become necessary to return the KUSB-488B for repair, carefully pack the entire instrument in its original packing carton or the equivalent, and follow these instructions:

- Call Keithley Instruments' repair department at 1-800-935-5595 for a Return Material Authorization (RMA) number.
- Let the repair department know the warranty status of the KUSB-488B.
- Write ATTENTION REPAIR DEPARTMENT and the RMA number on the shipping label.

Software and hardware installation

To download the latest software drivers, visit tek.com/keithley.

NOTE

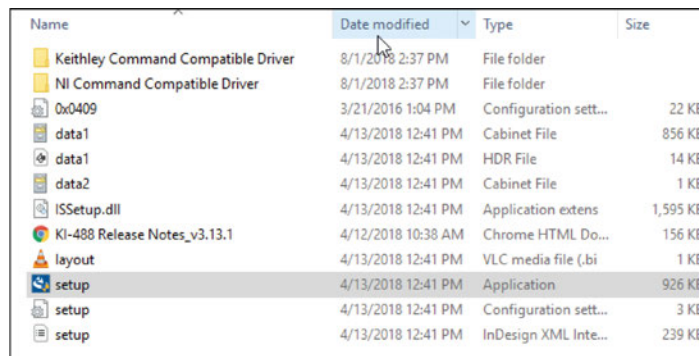
You must install the software driver before you connect the KUSB-488B to your computer.

Driver installation

To install the drivers:

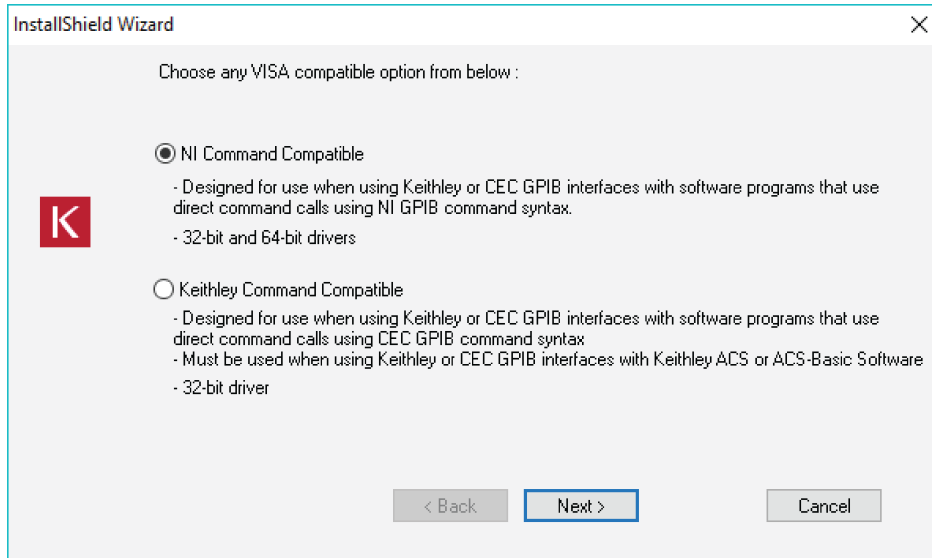
1. Remove any existing GPIB interfaces and GPIB drivers from your computer.
2. Download the latest KUSB-488B software from the [Product Support web page](https://www.tek.com/product-support) (<https://www.tek.com/product-support>). The software is available in a compressed (.zip) format.
3. Extract the files to your computer.
4. Launch `setup.exe` to begin the driver installation.

Figure 2: Selecting launch.exe from the extracted files



5. The driver installation dialog window opens, as shown in the following figure.

Figure 3: KUSB-488 driver installation screen



6. Install one of the following drivers. The InstallShield Wizard provides guidance on which driver to install.
 - NI command-compatible driver (32- or 64-bit)
 - Keithley command-compatible driver (32-bit)

NOTE

You can install either a Keithley command-compatible driver or an NI command-compatible driver. See the *Models KPCI-488LPA and KUSB-488B Reference Manual* (part number KI488-901-01) for the available functions of each driver.

For LabVIEW™ and LabWindows/CVI™ support, Keithley Instruments recommends that you install the NI command-compatible driver. For LabVIEW programming, you can also install the LabVIEW GPIB virtual instruments (VIs) that are optimized for use with the KUSB-488B.

For ACS and ACS Basic support, install the Keithley command-compatible driver.

To use VISA or an application that uses VISA (such as KickStart Instrument Control Software), install either driver.

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7. Follow the prompts to complete the setup procedure.
 8. When the installation finishes, select **Yes** to restart your system.

Hardware installation

NOTE

You must install the drivers before installing the hardware. See [Driver installation](#) (on page 3).

In most Microsoft Windows® 10 configurations, the KUSB-488B hardware is automatically configured by the operating system. However, previous versions of Windows may display the Found New Hardware Wizard after you plug the Model KUSB-488B cable into a USB port on your computer.

You can initiate the wizard manually with older versions of Windows.

To manually initiate the Found New Hardware Wizard:

1. From the Control Panel on your computer, select **Add Hardware**. The Add Hardware Wizard dialog box displays.
2. Select **Next**. The wizard searches for any new hardware that has not yet been installed.
3. The Found New Hardware Wizard will display. Click **Next** and follow the prompts.
 - a. If the wizard does not find any new hardware:
 - Unplug the KUSB-488B from its USB port, and plug it in again or try another USB port.
 - Turn your computer off and turn it on again. Once it has rebooted, the Found New Hardware Wizard should launch.

Using the Keithley GPIB Configuration Utility

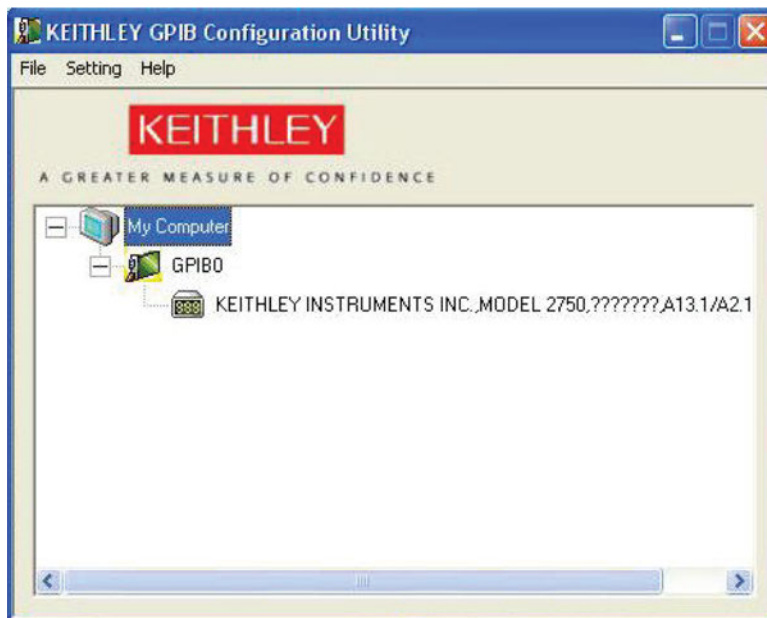
The Keithley GPIB Configuration Utility allows you to configure the following settings:

- KUSB-488B bus address
- Bus timing
- I/O timeout
- Set the KUSB-488B to be a system controller
- Enable autopolling

To launch the configuration utility:

1. From Microsoft Windows, select **Start > All Programs**.
2. From the programs selection, select **Keithley Instruments > KI-488 > KI-488 Configuration Utility**. The Keithley GPIB Configuration Utility window will open. The utility queries the GPIB bus for instruments and displays the response to the identification query for any discovered instruments.

Figure 4: Keithley GPIB Configuration Utility



3. Double-click the interface icon to open the GPIB Interface & Bus Setting dialog box.
4. Make any changes to the configuration, then select **OK**.

Figure 5: GPIB interface and bus configuration



5. Save these configuration changes by selecting **Setting > Save Configuration** in the Keithley GPIB Configuration Utility window.

Using the Keithley Instruments KI-488 Diagnostic Tool

The KI-488 Diagnostic Tool lets you communicate with any GPIB instrument by writing command strings to your instrument and reading the results.

Before you launch the diagnostic tool, make sure that the KUSB-488B is connected to both your computer and your instrument, and verify that both are powered-on. Make sure that your instrument is set for remote GPIB communication, and verify the assigned GPIB address.

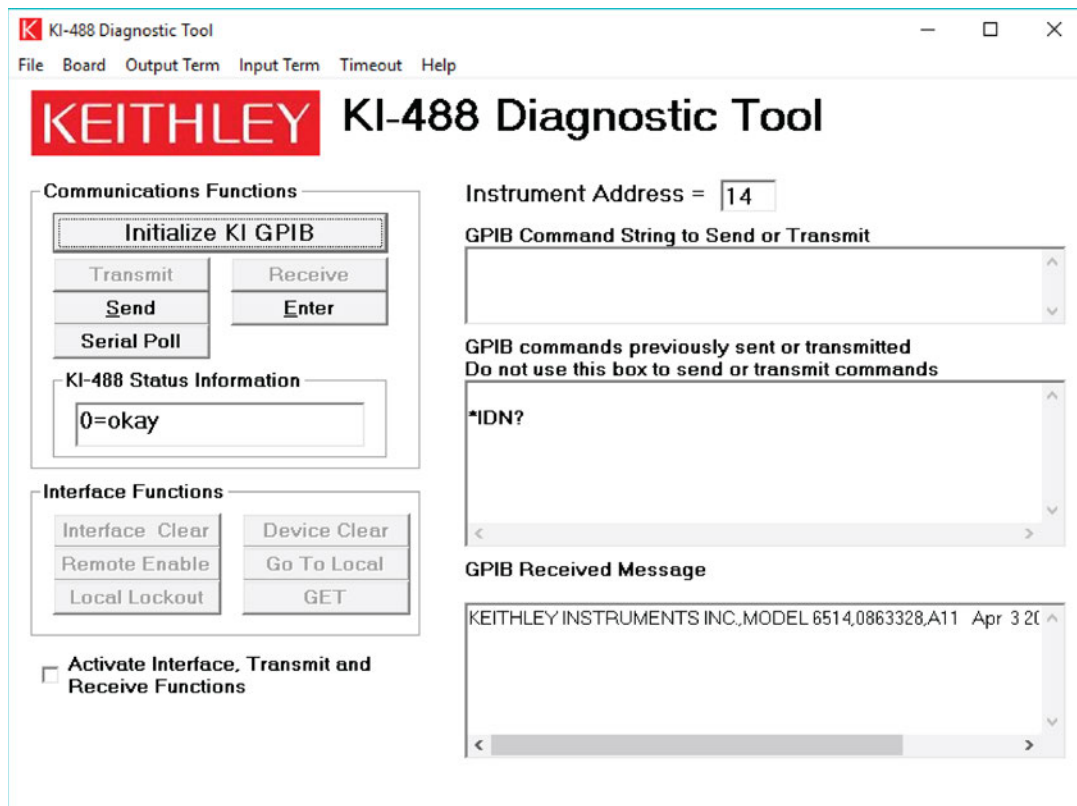
NOTE

The following example demonstrates how to send a single command and receive a response from a GPIB-connected instrument. For detailed information about using command strings with the Model KUSB-488B, refer to the *Models KPCI-488LPA and KUSB-488B Reference Manual* (part number KI488-901-01), available from the [Keithley Instruments website](#).

To use the diagnostic tool:

1. From Windows, select **Start > All Programs**.
2. From the programs selection, select **Keithley Instruments > KI-488 Diagnostic Tool**. The KI-488 Diagnostic Tool window will open.

Figure 6: KI-488 Diagnostic Tool



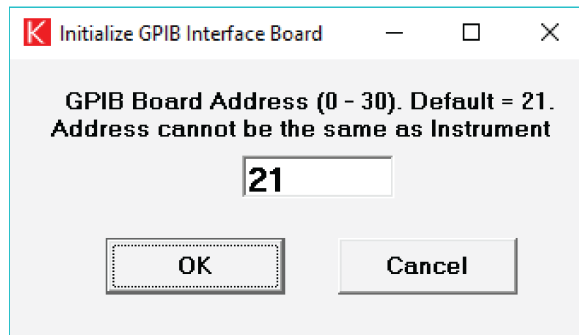
To initialize your GPIB interface accessory:

1. Select **Initialize KI GPIB**. The Initialize GPIB Interface Board dialog is displayed.

NOTE

You must select **Initialize KI GPIB** before communicating with your instrument using the KI-488 Diagnostic Tool. To initialize the communication interface, select a GPIB address that is not assigned to any instrument connected to your GPIB bus.

Figure 7: Specifying the GPIB board address



2. Enter the address to assign to your GPIB interface. The default is 21.
3. Select **OK**.

To communicate with a GPIB-connected instrument:

1. Enter the instrument GPIB address.

Figure 8: Specifying the instrument address

KI-488 Diagnostic Tool

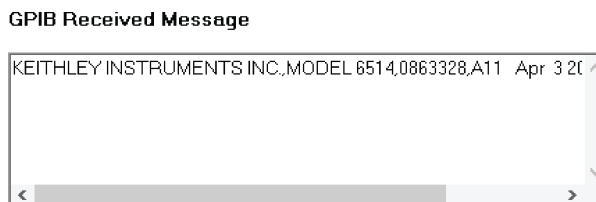


2. Type any commands to send to your instrument in the GPIB Command String to Send or Transmit field. For example, you can send *IDN? to query the identification of an instrument.
3. Under Communications Functions, select **Send**. The command string will appear in the GPIB Commands Previously Sent or Transmitted field.

To read the instrument response to a query:

Select **Enter** under Communications Functions. Any instrument responses are displayed in the GPIB Received Message field. In this example, sending the *IDN? command to the instrument returns the manufacturer, model number, and other information about the instrument.

Figure 9: GPIB Received Message field



The following safety precautions should be observed before using this product and any associated instrumentation. Although some instruments and accessories would normally be used with nonhazardous voltages, there are situations where hazardous conditions may be present.

This product is intended for use by personnel who recognize shock hazards and are familiar with the safety precautions required to avoid possible injury. Read and follow all installation, operation, and maintenance information carefully before using the product. Refer to the user documentation for complete product specifications.

If the product is used in a manner not specified, the protection provided by the product warranty may be impaired.

The types of product users are:

Responsible body is the individual or group responsible for the use and maintenance of equipment, for ensuring that the equipment is operated within its specifications and operating limits, and for ensuring that operators are adequately trained.

Operators use the product for its intended function. They must be trained in electrical safety procedures and proper use of the instrument. They must be protected from electric shock and contact with hazardous live circuits.

Maintenance personnel perform routine procedures on the product to keep it operating properly, for example, setting the line voltage or replacing consumable materials. Maintenance procedures are described in the user documentation. The procedures explicitly state if the operator may perform them. Otherwise, they should be performed only by service personnel.

Service personnel are trained to work on live circuits, perform safe installations, and repair products. Only properly trained service personnel may perform installation and service procedures.

Keithley products are designed for use with electrical signals that are measurement, control, and data I/O connections, with low transient overvoltages, and must not be directly connected to mains voltage or to voltage sources with high transient overvoltages. Measurement Category II (as referenced in IEC 60664) connections require protection for high transient overvoltages often associated with local AC mains connections. Certain Keithley measuring instruments may be connected to mains. These instruments will be marked as category II or higher.

Unless explicitly allowed in the specifications, operating manual, and instrument labels, do not connect any instrument to mains.

Exercise extreme caution when a shock hazard is present. Lethal voltage may be present on cable connector jacks or test fixtures. The American National Standards Institute (ANSI) states that a shock hazard exists when voltage levels greater than 30 V RMS, 42.4 V peak, or 60 VDC are present. A good safety practice is to expect that hazardous voltage is present in any unknown circuit before measuring.

Operators of this product must be protected from electric shock at all times. The responsible body must ensure that operators are prevented access and/or insulated from every connection point. In some cases, connections must be exposed to potential human contact. Product operators in these circumstances must be trained to protect themselves from the risk of electric shock. If the circuit is capable of operating at or above 1000 V, no conductive part of the circuit may be exposed.

Do not connect switching cards directly to unlimited power circuits. They are intended to be used with impedance-limited sources. NEVER connect switching cards directly to AC mains. When connecting sources to switching cards, install protective devices to limit fault current and voltage to the card.

Before operating an instrument, ensure that the line cord is connected to a properly-grounded power receptacle. Inspect the connecting cables, test leads, and jumpers for possible wear, cracks, or breaks before each use.

When installing equipment where access to the main power cord is restricted, such as rack mounting, a separate main input power disconnect device must be provided in close proximity to the equipment and within easy reach of the operator.

For maximum safety, do not touch the product, test cables, or any other instruments while power is applied to the circuit under test. ALWAYS remove power from the entire test system and discharge any capacitors before: connecting or disconnecting cables or jumpers, installing or removing switching cards, or making internal changes, such as installing or removing jumpers.

Do not touch any object that could provide a current path to the common side of the circuit under test or power line (earth) ground. Always make measurements with dry hands while standing on a dry, insulated surface capable of withstanding the voltage being measured.


For safety, instruments and accessories must be used in accordance with the operating instructions. If the instruments or accessories are used in a manner not specified in the operating instructions, the protection provided by the equipment may be impaired.


Do not exceed the maximum signal levels of the instruments and accessories. Maximum signal levels are defined in the specifications and operating information and shown on the instrument panels, test fixture panels, and switching cards.


When fuses are used in a product, replace with the same type and rating for continued protection against fire hazard.

Chassis connections must only be used as shield connections for measuring circuits, NOT as protective earth (safety ground) connections.


If you are using a test fixture, keep the lid closed while power is applied to the device under test. Safe operation requires the use of a lid interlock.


If a  screw is present, connect it to protective earth (safety ground) using the wire recommended in the user documentation.

The  symbol on an instrument means caution, risk of hazard. The user must refer to the operating instructions located in the user documentation in all cases where the symbol is marked on the instrument.

The  symbol on an instrument means warning, risk of electric shock. Use standard safety precautions to avoid personal contact with these voltages.


The  symbol on an instrument shows that the surface may be hot. Avoid personal contact to prevent burns.

The  symbol indicates a connection terminal to the equipment frame.

If this  symbol is on a product, it indicates that mercury is present in the display lamp. Please note that the lamp must be properly disposed of according to federal, state, and local laws.

The **WARNING** heading in the user documentation explains hazards that might result in personal injury or death. Always read the associated information very carefully before performing the indicated procedure.

The **CAUTION** heading in the user documentation explains hazards that could damage the instrument. Such damage may invalidate the warranty.

The **CAUTION** heading with the  symbol in the user documentation explains hazards that could result in moderate or minor injury or damage the instrument. Always read the associated information very carefully before performing the indicated procedure. Damage to the instrument may invalidate the warranty.

Instrumentation and accessories shall not be connected to humans.

Before performing any maintenance, disconnect the line cord and all test cables.

To maintain protection from electric shock and fire, replacement components in mains circuits — including the power transformer, test leads, and input jacks — must be purchased from Keithley. Standard fuses with applicable national safety approvals may be used if the rating and type are the same. The detachable mains power cord provided with the instrument may only be replaced with a similarly rated power cord. Other components that are not safety-related may be purchased from other suppliers as long as they are equivalent to the original component (note that selected parts should be purchased only through Keithley to maintain accuracy and functionality of the product). If you are unsure about the applicability of a replacement component, call a Keithley office for information.

Unless otherwise noted in product-specific literature, Keithley instruments are designed to operate indoors only, in the following environment: Altitude at or below 2,000 m (6,562 ft); temperature 0 °C to 50 °C (32 °F to 122 °F); and pollution degree 1 or 2.

To clean an instrument, use a cloth dampened with deionized water or mild, water-based cleaner. Clean the exterior of the instrument only. Do not apply cleaner directly to the instrument or allow liquids to enter or spill on the instrument. Products that consist of a circuit board with no case or chassis (e.g., a data acquisition board for installation into a computer) should never require cleaning if handled according to instructions. If the board becomes contaminated and operation is affected, the board should be returned to the factory for proper cleaning/servicing.

Safety precaution revision as of June 2017.



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KUSB-488B-903-01 Rev. B / September 2018