Installing and Using the PKI Relay Box Accessory

This document provides the installation procedure required to use the PKI Relay Box, which replaces the National Instrument USB-6501 I/O and the SeaLevel DIO-16 relay boxes. It also describes how to test that the relay box is connected and operating correctly before starting an experiment.
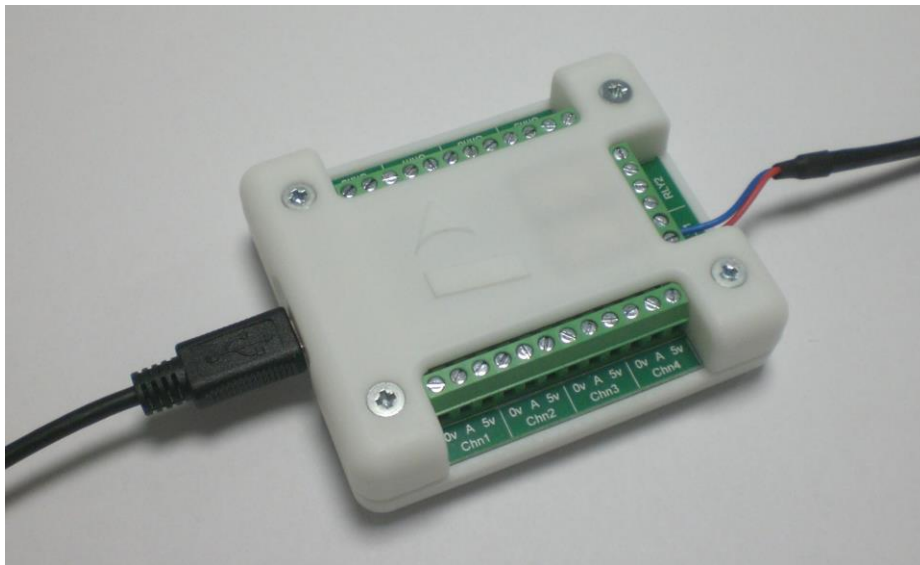

Figure 1 PKI relay box with connected cables

The relay box causes a signal to be sent from a thermal analysis instrument controlled by Pyris software to an infrared spectrometer controlled by TimeBase software. The signal closes a contact which causes the acquisition of infrared spectra to begin.

The relay box can also be used to operate other accessories that are triggered by contact closure, such as a DSC-Photocalorimeter or a GMD 8000 gas mixing device.

Software Requirements

This accessory requires that the computer controlling the thermal analysis instrument is equipped with Pyris software version 1.11 or later.

Refer to the installation instructions supplied with the software for further details.

Parts Supplied

The PKI Relay Box Kit (part number L1371074) contains the following parts:

PerkinElmer®

- Relay box (part number L1370812)

- USB A-Male to Mini B-Male cable (part number 09291131)

- Time-resolved trigger (RS-232) cable (part number L1365756)

- Instruction leaflet (part number L1050306)

Please check that all parts are present in the kit when received. If not, contact your PerkinElmer Service Representative.

Connecting the Cables to the Relay Box

1. Connect the smaller connector on the USB cable to the port on the relay box (shown below) and connect the other end of this cable to an available USB port on the computer running Pyris software.


2. Connect the red wire on the RS-232 cable to the Normally Open (NO) connection of relay 1 (RLY1), and the blue wire to the Closed (C) connection as shown.
   Tighten the terminals firmly with a small screwdriver.
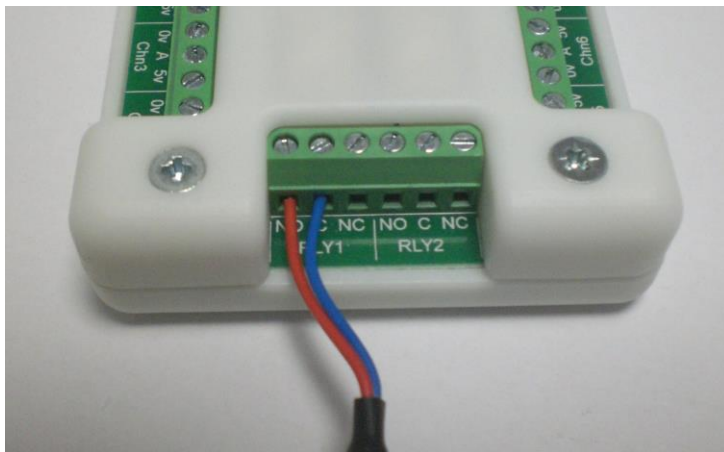
Setting Up the Relay Box in Pyris

1. Select **Preferences** in the **Tools** menu.

2. Select the **Hyphenation** tab in the dialog box.

3. Check the **Use Relay Box (PKI)** option.

4. Select the correct COM port in the box below and then click **OK**.
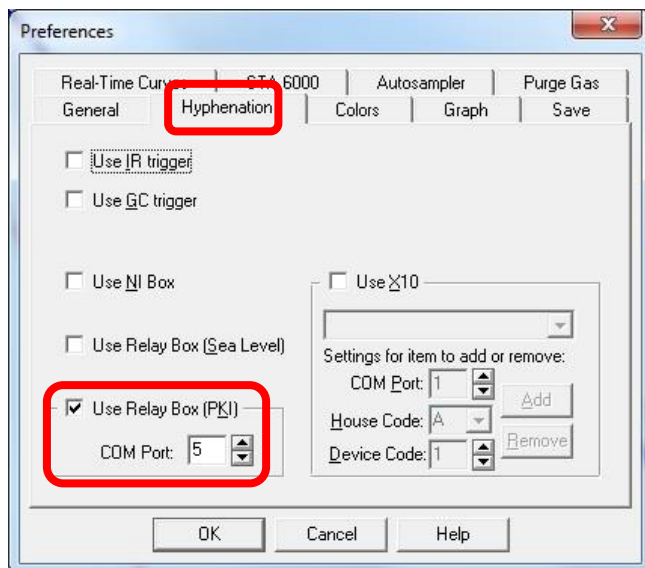
> **NOTE:** Go to **Device Manager** > **Ports (COM&LPT)**. Identify the COM port to which the relay box cable is connected by removing and inserting the USB cable at the Pyris computer.

The relay box can now be used to trigger an external event as part of a Pyris method. For details of how to create this step in a method, refer to the on-screen Help provided with the Pyris software.

Installing the Relay Box Driver

The driver for the relay box should be installed at the same time as the Pyris software (version 1.11 or later). If the computer fails to recognise the relay box when it is connected, then you can manually install the driver as follows:

1. Go to the Pyris installation folder and locate a folder named **drivers\RobotElectronics**.

2. Note the name of the *.inf file in this folder.
   An example is: devtech16.inf.

3. Open a Command Prompt window and execute the following command:
   pnputil.exe -a -i (*.inf filename with no parentheses).
   An example is: *pnputil.exe -a -i devtech16.inf*.

> **NOTE:** You must be logged in as a user with 'Run as administrator' permission to install the driver software.

Connecting the Relay Box to an Infrared Spectrometer

A common use of the PKI relay box is to start the acquisition of time-resolved infrared spectra as part of a TG-IR experiment. This requires that the thermal instrument (such as a thermogravimetric analyzer) is connected to the infrared spectrometer using a suitable transfer line to carry the evolved gases between the two instruments. The infrared spectrometer must be controlled by TimeBase software.

1. Connect the RS-232 cable attached to the relay box to the RS-232 port on the computer running TimeBase software.

2. Select the **Options** menu in TimeBase, which displays a series of tabs.

3. On the **Instruments** tab, select the correct COM port for the **External Trigger**.

> **NOTE:** Go to **Device Manager** > **Ports (COM&LPT)** to check which COM port is connected to the relay box.
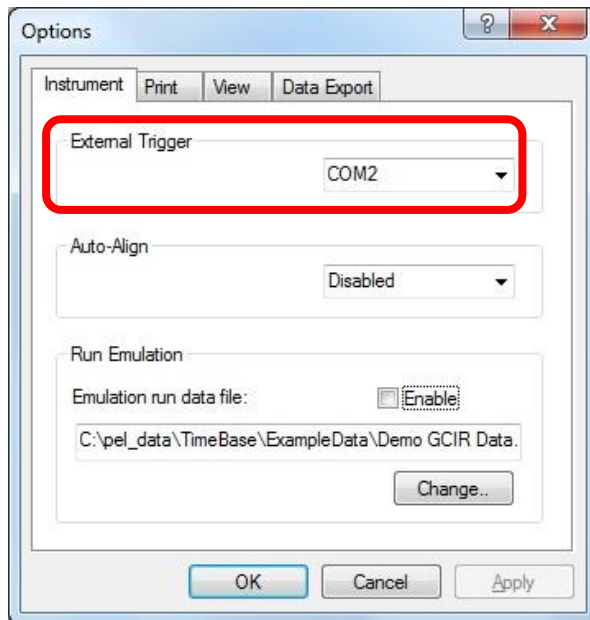

4. In the **Data Collection Setup** dialog, select the option **Wait for External Trigger** to use the signal from the relay box to start data acquistion.

   For further details, refer to the on-screen Help provided with the TimeBase software.

Testing the Relay Box Operation

Before starting to use the relay box in TG-IR experiments, it can be useful to check that the relays are operating correctly. A simple software application is included with both Pyris and Spectrum 10 to allow this.

Once the relay box is connected to the computer running Pyris, it can be tested as follows:

1. Close the instance of Pyris software running on the computer.

2. From the Pyris installation folder or the Spectrum 10 software disk, locate and double-click the file named **PkiRelayBoxTest.exe**.

   The PKI Trigger Box Test application will be opened.
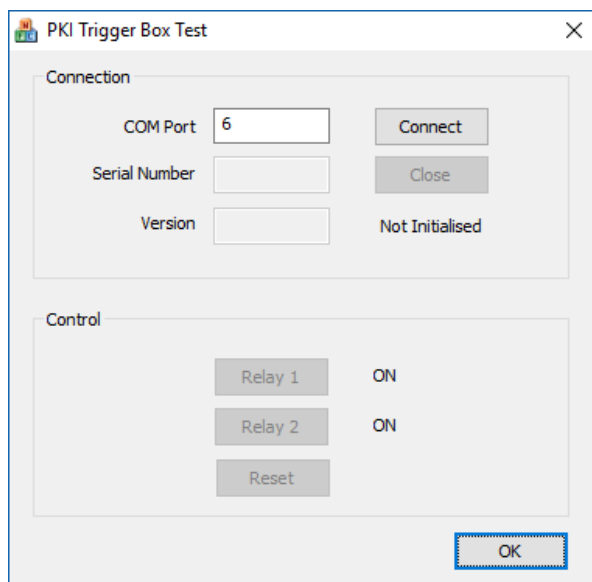
3. Enter the number of the **COM Port** to which the relay box is connected and click **Connect.**

   The test application will display the serial number and firmware version of the relay box, and show the relay box status as **Initialised**. The buttons in the Control section will be enabled, with the relays shown as **OFF**.

4. Click the relay buttons to switch the relays on and off.

   Check that the relay box responds with an audible click when the relays operate. Click **Reset** to switch both relays OFF.

5. When you are satisfied that the relay box is operating correctly, click **Close** to disconnect the test application from the relay box, and click **OK** to close the application.

Connecting the Relay Box to a DSC-Photocalorimeter

The PKI relay box can be used in conjunction with the DSC-Photocalorimeter to start and stop the UV irradiation of a sample in a thermal analyzer.

Figure 2 Thermal analyzer connected to a DSC-Photocalorimeter

1. Connect the RS-232 cable attached to the relay box to the **P3** connector on the rear of the photocalorimeter.

> **NOTE:** A male-male RS-232 adaptor will be needed to connect the relay box cable to the photocalorimeter.

2. Set up the method in Pyris software to open and close the UV lamp shutter in response to signals from the relay box.

   Refer to the *DSC-Photocalorimeter Accessory User's Guide* (part number L8050008) for further details.

Connecting the Relay Box to a Gas Mixing Device

The GMD 8000 Gas Mixing Device is used to mix up to three different gases and deliver the mixture to a thermal analyzer. The PKI relay box can be used to switch the flow of mixed gases on and off during a thermal analysis experiment.

Figure 3 GMD 8000 Gas Mixing Device

1. Connect the RS-232 cable attached to the relay box to the **Trigger** connector on the rear of the gas mixing device.

NOTE: An adaptor cable is provided with the gas mixing device to connect the relay box to the 3-pin trigger connector on the GMD 8000. This cable should be used in place of the RS-232 trigger cable supplied with the relay box.

2. Set up the method in Pyris software to switch the gas flow on and off in response to signals from the relay box.

   For further details, refer to the on-screen Help provided with the Pyris software. Note that the relay box closes the contact which will switch the gas flow on; opening it will switch the flow off.