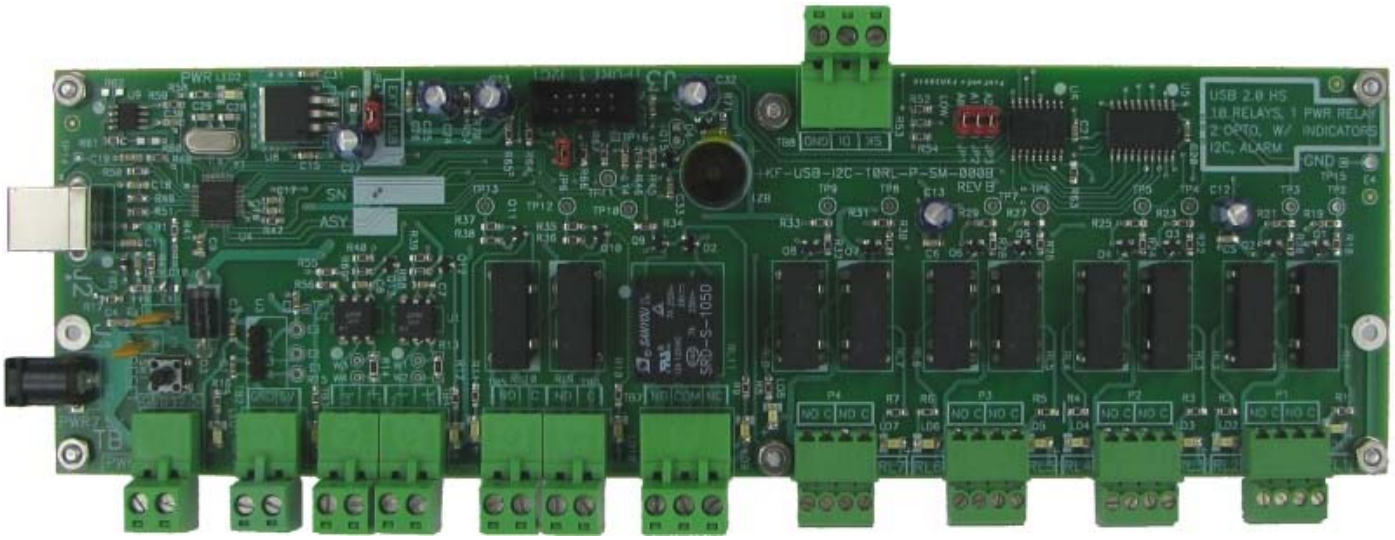
USB-I²C 13-Channel Controller

P/N KA-USB-I2C-10RL

I2C-USB-Relay10



User Manual

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What Does it Do?

The I2C-USB-Relay10 is designed to:

- Generate digital output to up to 11 independent channels:
  - 10 signal relays
  - 1 power relay
- Accept digital input from up to 2 independent channels. It uses Optocouplers (also known as Photocouplers or Optical Isolators) to accept this input while protecting against voltage surges.
- Act as a controller for other members of the I2C-Pak family, including the I2C-Opto8 and the I2C-Relay8

Each input and output channel on the I2C-USB-Relay10 has an LED indicator light. The LEDs on activated output channels will turn on, and the LEDs on activated input channels turn off (vice versa for inactive channels). Additionally, the I2C-USB-Relay10 can report the state of a port to a PC or other external device via the on-board I^2C communications port.

The I2C-USB-Relay10 is modular, expandable, and stackable.

All features can be manipulated and monitored via the on-board USB communications port, including:

- All relay output channels
- All optically isolated input channels
- Buzzer

The I^2C communications bus feature allows only for the remote manipulation of the first 8 signal relay output channels, if you decide not to take advantage of the USB communications port.

What Do I Need to Make it Work?

You will need:

- Power Supply (optional, you can also power this unit via USB)
  - 7.5VDC @ 100mA maximum
  - Can be brought in via on-board terminal block TB1
  - Can be brought in via standard 2.1mm X 5.1mm DIN connector J1
- USB cable
- 14-22 AWG wire, for connecting ports to input / output sources
- Windows PC with LabView driver or other I²C controller device

What Else Does it Work With?

The I2C-USB-Relay10, in addition to interfacing with your own custom applications, can be used with a PC running LabView version 7 or later.

Simply connect your PC to this module via USB and from there use our LabView drivers to observe the state of all 11 output ports and 2 input ports in real-time.

The I2C-USB-Relay10 module can also be used with other members of the I2C-Pak family, including:

- I2C-Opto8
- I2C-Relay8

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Quick Setup Instructions

This section gives you a very brief set of instructions for setting up your I2C-USB-Relay10 for rapid use. Detailed instructions and advice are in the next section.

1. Install the FTDI drivers included on the CD on the PC you wish to use to operate the I2C-USB-Relay10
2. Connect the “A” (flat rectangular) end of the USB cable to your PC
3. Connect the “B” (squarish) end of the USB cable to the I2C-USB-Relay10
4. *Optional: Connect the I2C-USB-Relay10 to external power using either TB1 or J1*
5. Use the jumpers illustrated in Figure 6 (pg 14) to set the 3 bits of the I²C address for the I2C-USB-Relay10
    a. Short the 2 pins of a jumper for “1”
    b. Leave them open for “0”
    c. See page 9 for more information on how to do this
6. Run LabView driver executable included on the CD, located at:
    \ControllerLabviewDriver.zip\bin\BaseControl.exe
7. Use the switches in the LabView driver’s program window to tell the computer what the I2C address for the I2C-USB-Relay10 is

The address configured on the jumpers *must* match what you tell the computer using the LabView driver.

How to Use This Device

Powering Up the I2C-USB-Relay10

First you have to decide how you are going to power the module – through an external power source, or through the USB port.

It is recommended that if you are going to connect more than two modules to the controller, you should bring power in either through the terminal block TB1 or the DIN connector J1.

Once you have decided how to power your I2C-USB-Relay10, there is a jumper, JP4 that needs to be configured, as illustrated in Figure 4 (pg 12). You need to make sure that it is in the correct position so that the appropriate power source is used, otherwise the unit will not function.

If the shunt is over the bottom pin (marked “EXT”), power must either come from the DIN connector, J1, or the terminal block TB1. If the shunt is over the top pin (marked “USB”), power must come from the USB port.

Connecting to the I²C Communications Port

Connecting to the I²C communications port on your I2C-USB-Relay10 can be done in one of two ways:

IDC connector J3

This connector is also known as a 10-pin IDC connector. Generally what you plug into this is a female-female ribbon cable which look like the illustration found in Figure 2 (pg 11). The pinout for these connectors is illustrated in Figure 3 (pg 11).

This IDC connector is used to:

- Daisy-chain other units in the I2C-Pak family to this one
- Allow another controller to manipulate signal relay output channels 1-8

Terminal Block TB8

First, you will need to short the pins of JP6 together.

The specific pins you need for I²C communications are:

- TB8, “DI”
- TB8, “SK”
- TB8, “GND”

The location of JP6 and the above pins are shown in Figure 5 (pg 13). Once you find them, use 22-14AWG wire to connect the pins on TB8 to the mating pins on the other module(s) in order to “daisy-chain” them (connecting one to the next to the next) together.

Setting the I²C Address

Each unit operating on the same I²C communications bus must have a unique address. Since the I²C address space consists of 3 configurable bits, that means that up to 8 unique devices can share the same I²C communications bus.

On the I2C-USB-Relay10, the I²C address is configured with three jumpers (1 for each bit of the address). Figure 6 (pg 13) shows you where to find these jumpers.

To set the first bit of the address to "0", short use a shunt (included) to short the two pins of JP1 together. To set the first bit to "1", simply leave the shunt off. Repeat with JP2 and JP3 to set the second and third bits of the address.

Using the I2C-USB-Relay10

Once your I2C-USB-Relay10 is connected to your computer and the unit's address is configured, how exactly you actually use the product will rely heavily on you.

You can use our LabView driver to talk to the device, or you can use your own custom software. You can interface the I2C-USB-Relay10 to our other products, or to your own custom applications.

Note: If you use external power (TB1 or J1) instead of powering the I2C-USB-Relay10 off the USB connection *and* you don't use the included LabView driver, a buzzer will sound continously.

In order to turn the buzzer off with your own software, you will need to read the FTDI datasheet included with this product in order to learn how to write the value "4" to channel "B."

For any other specifics on how to write your own custom applications software, you will want to refer to the included datasheets for the instructions you will need.

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Illustrations

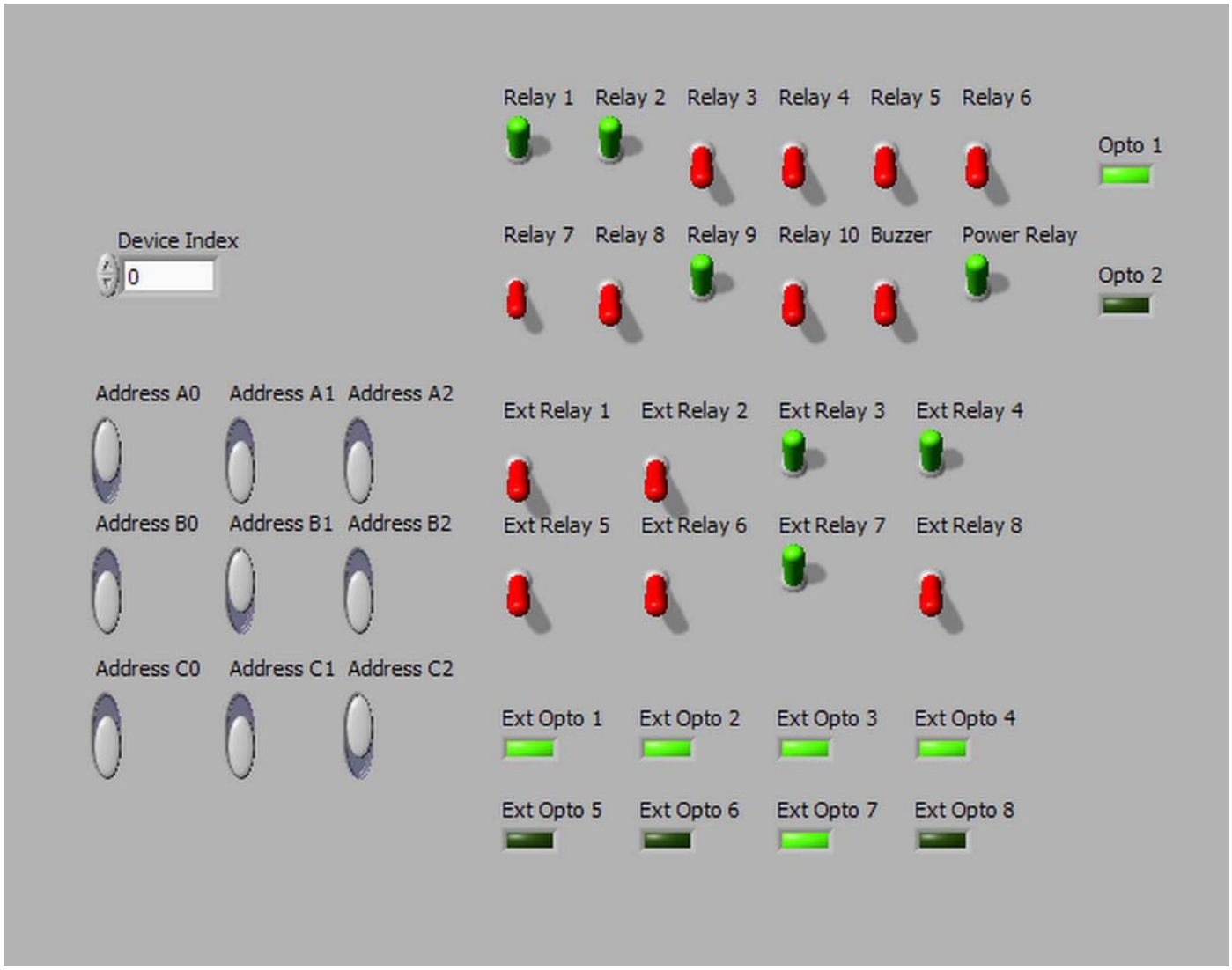

Figure 1: Screen view of LabView interacting with the I2C-USB-Relay10.
In this illustration, the unit has also been daisy-chained to an I2C-Opto8 and an I2C-Relay8.

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Figure 2: IDC Female-Female Ribbon Cable

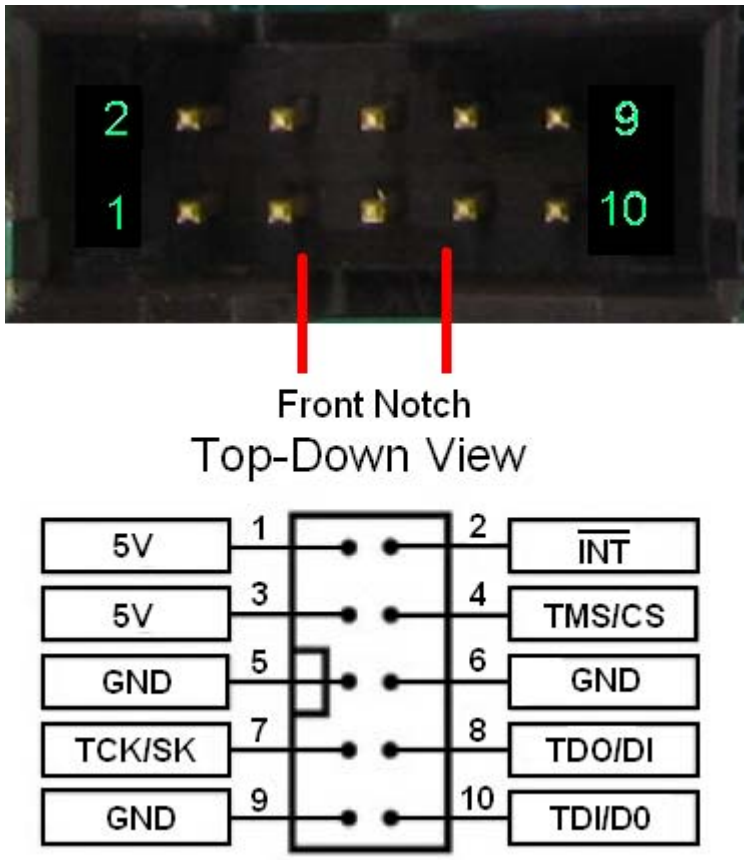

Figure 3: IDC Connector Pinout

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Figure 4: Power Jumper JP4. "INT" means power from the USB port, "EXT" means power from the DIN connector J1 or terminal block TB1.

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Figure 5: I2C Jumper JP6.

Figure 6: I2C Address Jumpers JP1-JP3.

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Technical Specifications

Number of Output Ports	10 signal, 1 power
Arrangement	Form A, SPST
Number of Input Ports	2
Contact Materials	Optically isolated
Input Port Voltage	5VDC, 5mA minimum
Maximum Switching	100 Hz
Isolation	5300Vrms
Max. allowable Voltage	12VDC
Max allowable current	12mA
Operating humidity	10-80% RH non-condensing
Ambient Temperature	0 to 60 C (with no icing)
Unit Weight	About 120 grams (4.3oz)
Form Factor	76 mm W x 252 mm L (3.0" X 9.9")
Total Power Consumption	7.5VDC @ 100mA max.
Short-Circuit Protection	1.5A with resettable PTC fuse
Power Indicator	Green LED

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