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USB-ISO - USB 2.0 compliant, 1000VDC

USB Full Speed isolator

User's manual

All boards produced by Olimex are ROHS compliant

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INTRODUCTION

USB-ISO is USB Full speed USB 2.0 compliant port isolator with 1000V isolation voltage.

USB-ISO is also often used by audiophiles to eliminate noise in audio systems or DACs.

This device is very useful as protects your PC computer USB host from over-voltages, ESD shock. USB-ISO provides 1000VDC isolation and this way you can connect to your PC programmers and debuggers which work directly with targets at high voltages like 220V mains power supply etc. Even if your target is not connected to high voltage, USB-ISO is additional protection for your valuable computer, laptop etc. USB-ISO may work with or without external power supply, if no external power supply it generates with isolated DC-DC converter 5V isolated voltage for your USB device by taking power from your USB host, if your USB device needs more power than your USB host can provide, there is external power supply option you can connect any power supply adapter which provides power supply from +8 to +15VDC and USB-ISO internal DC-DC will convert it to 5VDC for the USB device. Note that in this case the external power supply should be ISOLATED as this DC-DC converter is not isolated and the external power supply will be directly connected to your USB programmer/ debugger etc! Just your PC side will be isolated.

USB-ISO FEATURES

- USB isolation 1000VDC between USB host and USB device
- Fully USB 2.0 Compliant
- Full speed data rate 12 Mbps
- Bidirectional communication
- Short-circuit protection for xD+ and xD- lines
- Class 3A contact ESD performance per ANSI/ESD STM5.1-2007
- High common-mode transient immunity: >25 kV/ μ s
- USB_DEVICE connector- which is USB-B type and have to be connected to the PC USB host.
- USB_HOST connector which is USB-A type and have to be connected to the USB device like USB JTAG, programmer, debugger etc
- Power jack for external power supply with +8-15VDC, note this power jack is not isolated from the USB_HOST connector (the personal computer is always protected; the power supply and the device connected to the USB_HOST might influence each other in case of fault)
- DC-DC converter supply isolated voltage to the USB_HOST from the USB_DEVICE if no external power supply is present
- Dimensions 41.5×36.5mm (1.634×1.437")

ELECTROSTATIC WARNING

The USB-ISO board is shipped in protective anti-static packaging. The board must not be subject to high electrostatic potentials. General practice for working with static sensitive devices should be applied when working with this board.

BOARD USE REQUIREMENTS

Cables: You need two 1.8 meter USB A-B cable to connect to the PC and to your USB device. Note these cables should be with LOW resistance (under 1 ohm) and good insulation, on the market there are cheap cables with HIGH resistance (above 1 ohm) and poor insulation which are not good for USB connection and cause signal fading and lost of communication packets.

USB target speed: It is important to notice that the unit protects and shield USB full-speed devices or devices that can enter USB full-speed mode. USB-ISO would not work with low-speed devices (like keyboards or mice). It would neither work with high-speed-only devices. You can use a USB analyzer program to determine the USB speed of your USB target.

USB target: If you have to power your target device only from the personal computer make sure it doesn't consume more than 350mA or you might need to provide external power supply either to the target or to the USB-ISO's power jack.

SOFTWARE DRIVERS

USB-ISO does not need any software drivers.

SAFETY AND REGULATORY APPROVALS:

The USB isolator component used in USB-ISO have the following regulatory approvals:

- UL recognition: 5000 V rms for 1 minute per
 - UL 1577 (pending)
- CSA Component Acceptance Notice #5A
 - IEC 60601-1: 125 V rms (reinforced)
 - IEC 60950-1: 380 V rms (reinforced)
- VDE certificate of conformity (pending)
 - DIN V VDE V 0884-10 (VDE V 0884-10):2006-12
 - VIORM = 846 V peak

POWER SUPPLY CIRCUIT

USB-ISO can take power from two sources:

- External power jack – 8V to 15 V DC, in this case maximum current available depend on the maximum current which your external power supply can provide, up to 750 mA

- USB_DEVICE connector – 5V, in this case maximum current available depend on the maximum current which PC USB host can provide, up to 350 mA

CONNECTOR DESCRIPTIONS

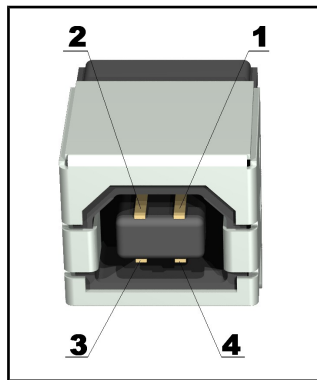
USB DEVICE

This is a USB type B connector. It is used to connect to the PC USB host. It is typically used to power the USB-ISO and, sometimes, your target USB device (that is connected to the board's USB_HOST connector).

USB_DEVICE and USB_HOST connectors are completely isolated from each other.

It is important to notice that personal computer USB ports usually provide up to 500mA. USB-ISO consumes up to 150mA, which leaves up to 350mA for the device connected to USB-ISO. If your device needs more current make sure to provide external supply to either the device or to the power jack of USB-ISO.

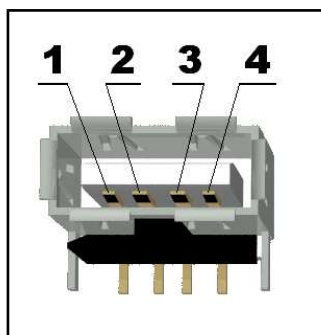
Pin #	Signal Name
1	+5V_USB_DEV
2	DEV_D-
3	DEV_D+
4	GND_DEV



USB HOST

This connector is used to connect to USB-ISO to your USB device that needs over-voltage protection - programmer, debugger, etc which you want to isolate from your PC.

Pin #	Signal Name
1	HOST_PWR
2	HOST_D-
3	HOST_D+
4	GND_HOST



PWR JACK

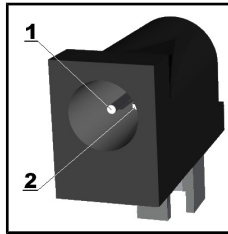
This connector is used to provide additional power supply to your target device (the device that is connected to USB_HOST). If your target draws more than 350mA of current you might consider using the power jack. The maximum tested current that USB-ISO can provide with a capable external power supply is 750A. If you have both external power supply provided and USB cable in USB_DEVICE connector the maximum current available would raise to 1A.

This power jack is not isolated from the USB_HOST connector (the personal computer is always protected, however, the power supply and the device connected to the USB_HOST might influence each other in case of fault).

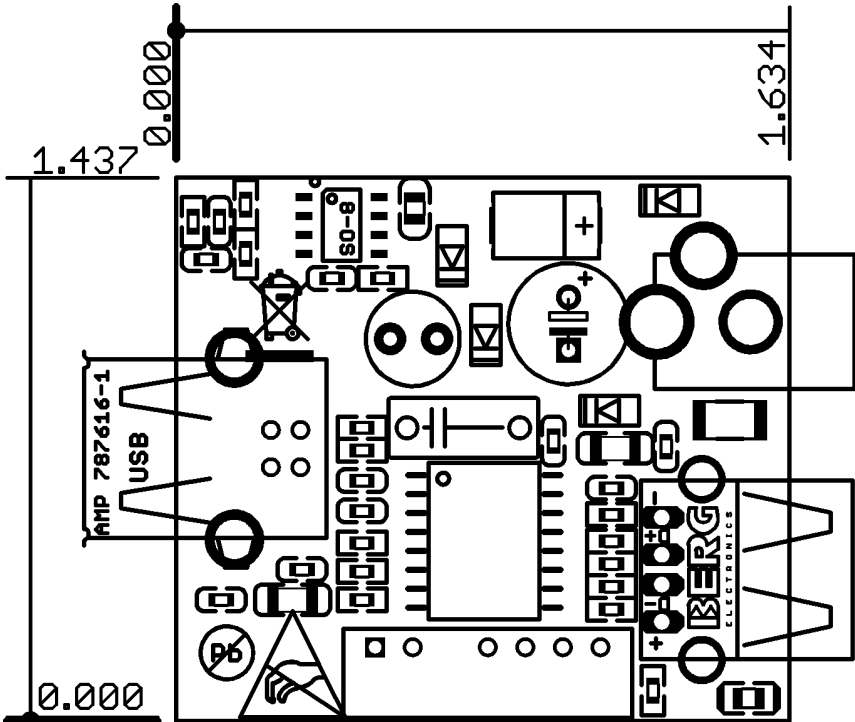
The voltage you need to provide to the power jack is in the range of 8V to 15V DC. The power jack can't work with AC voltage. Make sure the voltage you provide is not more than 15V DC.

The power jack used is the typical DC barrel jack one used by Olimex in most of our products. More information about the exact component might be found here: <https://www.olimex.com/wiki/PWRJACK>

Pin #	Signal Name
1	Power Input
2	GND_HOST



MECHANICAL DIMENSIONS



All dimensions are in inches.

ORDER CODE

USB-ISO - assembled and tested

How to order?

You can order directly from our web-shop or from any of our distributors.

Check our web <https://www.olimex.com> for more info.

Revision history:

REV. A	- initial release October 2009
REV. B	- edited by TU March 2010
REV. C	- edited DC-DC power supply description in board features
REV. D	- edited USB types in BOARD FEATURES
REV. E	- edited the power jack information, updated disclaimer

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It is possible that the pictures in this manual differ from the latest revision of the board.

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