Digital I/O Terminal for USB2.0
DIO-0808TY-USB

This product is a USB 2.0 compliant terminal that extends the digital signal I/O functions of a PC.

Being bus-powered, it does not need an external power supply.

DIO-0808TY-USB has the 8ch of unisolated TTL level input and 8ch of unisolated open-collector output. In addition, it uses a protection circuit (surge protection) as its I/O circuit as well as an easily-wired terminal connector.

Windows/Linux device driver is supported with this product.

* The contents in this document are subject to change without notice.

* Visit the CONTEC website to check the latest details in the document.

* The information in the data sheets is as of April, 2024.

* Specifications, color and design of the products are subject to change without notice.

Features

Unisolated TTL level input, unisolated open-collector output
DIO-0808TY-USB has the 8ch of unisolated TTL level input whose response speed is 200nsec and 8ch of unisolated open-collector output. The output rating is max. 28VDC, 40mA per ch.

Compatible to USB2.0/USB1.1 and not necessary to power this product externally as the bus power is used
Compatible to USB2.0/USB1.1 and capable to achieve high speed transfer at High Speed (480 Mbps). Not necessary to power this product externally as the bus power of USB is used.

Surge absorption diodes are built in the I/O circuit for surge voltage protection
DIO-0808TY-USB has a surge absorption diode connected to the +5V output pin at each I/O point to protect against surge voltages.

Easy-to-wire terminal connector adopted
Adoption of terminal connector (with screws) enables to achieve easy wiring.

Windows/Linux support device driver
Using the device driver API-TOOL makes it possible to create applications of Windows/Linux. In addition, a diagnostic program by which the operations of hardware can be checked is provided.

Specifications

Function specification

Item		Specifications
Input	Type	TTL-level input (Negative logic *1)
	Number of Channels	8ch (1 common)
	Input resistance	10kΩ (1 TTL load)
	Surge protector	ESD Noise-Clipping Diodes NNCD6.8J (NEC) or equivalent
	Response time	200nsec within *2
Output	Type	Unisolated open collector output (Negative logic*1)
	Number of Channels	8ch (1 common)
	Output rated voltage	28VDC (Max.)
	Output rated current	40mA (per point) (Max.)
	Surge protector	Diodes for Surge Absorption HZC30 (RENESAS) or equivalent
	Response time	200nsec within *2
+ 5V output section	Output voltage	4.75 - 5.25V
	External supply capable current	5VDC 100mA (Max.)
	Surge protector	ESD Noise-Clipping Diodes NNCD6.8J (NEC) or equivalent
USB	Bus specification	USB Specification 2.0/1.1 standard
	USB transfer rate	12Mbps (Full-speed), 480Mbps (High-speed) *3
	Power supply	Bus power
Common	Allowable distance of signal extension	Approx. 1.5m (depending on wiring environment)
	Number of terminals used at the same time	127 terminals (Max.) *4
	Current consumption	5VDC 300mA (Max.)
	Physical dimensions (mm)	64(W) x 62(D) x 24(H) (exclusive of protrusions)
	Weight	70g (Not including the USB cable, attachment)
	Attached cable	USB cable 1.8m

*1   Data "0" and "1" correspond to the High and Low levels, respectively.

*2   The opto-coupler's response time comes.

*3   This depends on the host PC environment used (OS and USB host controller).

*4   As a USB hub is also counted as one device, you cannot just connect 127 USB terminals.

Installation Environment Requirements

Item	Specifications
Operating ambient temperature	0 - 50℃
Operating ambient humidity	10 - 90%RH (No condensation)
Floating dust particles	Not to be excessive
Corrosive gases	None
Standard	VCCI Class A, CE Marking (EMC Directive Class A, RoHS Directive), UKCA

Support Software

Name	Contents	How to get
Windows Version Digital I/O Driver software API-DIO(WDM)	The Windows device driver is provided as a form of Windows API functions. Various sample programs such as C# and Visual Basic .NET , Visual C++, Python etc. and diagnostic program useful for checking operation is provided.	Download from the CONTEC website *1
Linux Version Digital I/O Driver software API-DIO(LNX)	The Linux device driver is provided as a shared library. The software includes various sample programs such as gcc (C, C++) and Python programs, as well as a configuration tool to configure the device settings.	Download from the CONTEC website *1
Software Development Tool Kits (SDK) and Support Software	In addition to the device drivers, we offer many software programs for using CONTEC devices in an easier manner.	Download from the CONTEC website *2

*1 Download the files from the following URL.

https://www.contec.com/download/

*2 For supported software, search the CONTEC website for this product and view the product page.

https://www.contec.com/

Optional Products

Product Name	Model type	Description
14pin Screw Terminal Connector Set	CN6-Y14	6 pieces
Bracket for USB I/O Terminal products	BRK-USB-Y	

Visit the CONTEC website for the latest optional products.
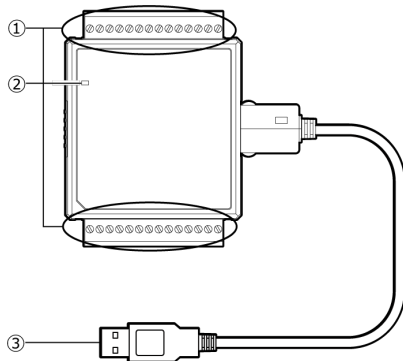
Included Items

Product [DIO-0808TY-USB] ...1
Interface Connector Plugs ... 2
USB Cable (1.8m) ... 1
USB Cable Attachment ... 1
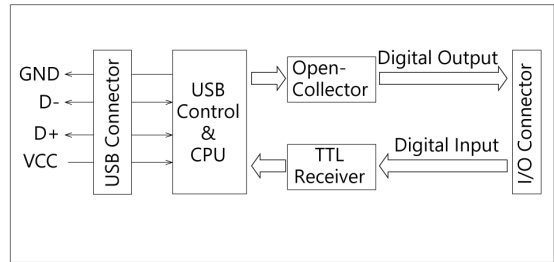Please read the following ... 1

Physical Dimensions

62
24
14
9   64   9

[mm]

Component Name

① ② ③
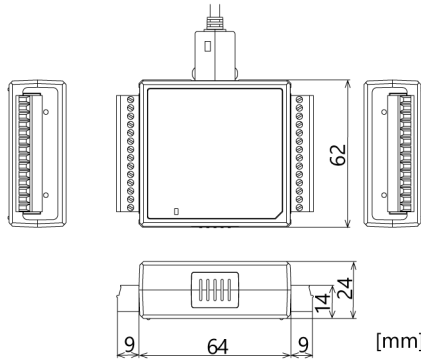
No.	Name	No.	Name
1	Interface Connector	3	USB Type-A connector
2	LINK Status		

LINK Status

Various communication statuses can be checked.

Name	Function	Indicator color	LED indicator
LINK Status	USB communication status	GREEN	ON : Communication established
			OFF : Communication unestablished
	PC connection status		ON : PC communication established
			OFF : PC communication unestablished

Circuit Block Diagram

Layout on the Interface Connector

CN2	
GND	1
GND	2
FG	3
I-07	4
I-06	5
I-05	6
I-04	7
I-03	8
I-02	9
I-01	10
I-00	11
N.C.	12
+5V	13
+5V	14

CN1	
14	+5V
13	+5V
12	N.C.
11	O-10
10	O-11
9	O-12
8	O-13
7	O-14
6	O-15
5	O-16
4	O-17
3	FG
2	GND
1	GND

Signal name	Description
I-00 - I-07	8 input signal pins. Connect output signals from the external device to these pins.
O-10 - O-17	8 output signal pins. Connect these pins to the input signal pins of the external device.
+5V	This pin outputs power at +5 V. Max. electrical current is 100mA.
GND	This pin is connected to the USB-pin's GND.
FG	This pin is connected to the Frame Ground of PC.
N.C.	These pins are left unconnected.

Connecting Input and Output Signals
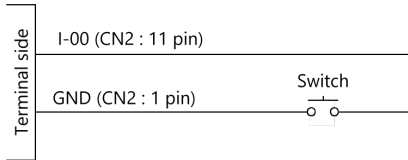
Input Circuit
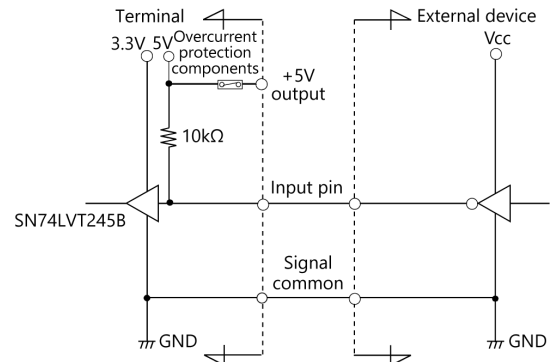
* I-xx represent an input pin.
* One PolySwitch is connected to all of the +5V output pins.

The input circuits of interface blocks of the DIO-0808TY-USB is illustrated in the figure above.

External digital signals given to signal inputs are TTL levels. The individual input signals are passed to the personal computer as active low signals. As each of the signal inputs is pulled up internally, the output of a relay contact or semiconductor switch can be connected directly between the signal input and the signal common pin.
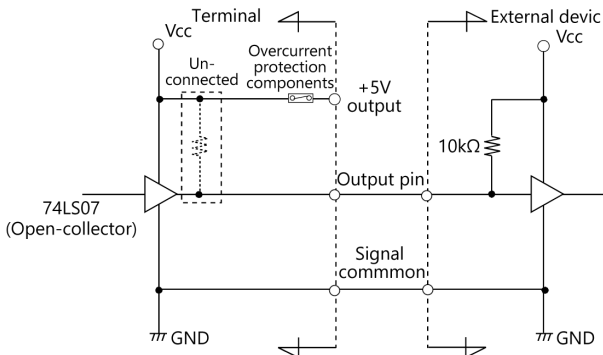
Surge absorption diodes are connected to the input circuit.

Connecting a Switch

Terminal side

I-00 (CN2 : 11 pin)

GND (CN2 : 1 pin)

Switch

When the switch is ON, the corresponding bit contains 1.
When the switch is OFF, by contrast, the bit contains 0.

Output Circuit

Terminal
Vcc

External devic
Vcc

Un-
connected

Overcurrent
protection
components

+5V
output

10kΩ

Output pin

74LS07
(Open-collector)

Signal
commmon

GND

GND

* O-xx represents an output pin.
* One PolySwitch is connected to all of the +5V output pins.

The output circuits of interface blocks of the DIO-0808TY-USB is illustrated in the figure above.

Signal outputs are open-collector outputs; individual output signals are sent to the external device as active low signals. Note that each signal output must be pulled up at the external device as it is not pulled up internally.

Surge absorption diodes are connected to the output circuit.

Connection to the LED

Terminal side

+5V (CN1 : 14 pin)

2kΩ

LED

O-10 (CN1 : 11 pin)
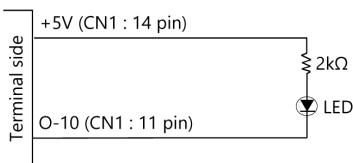
When "1" is output to a relevant bit, the corresponding LED comes on.
When "0" is output to the bit, in contrast, the LED goes out.