



2 Channel
USB to RS485/422 Converter
USB-304
User's Manual
Ver. 1.0

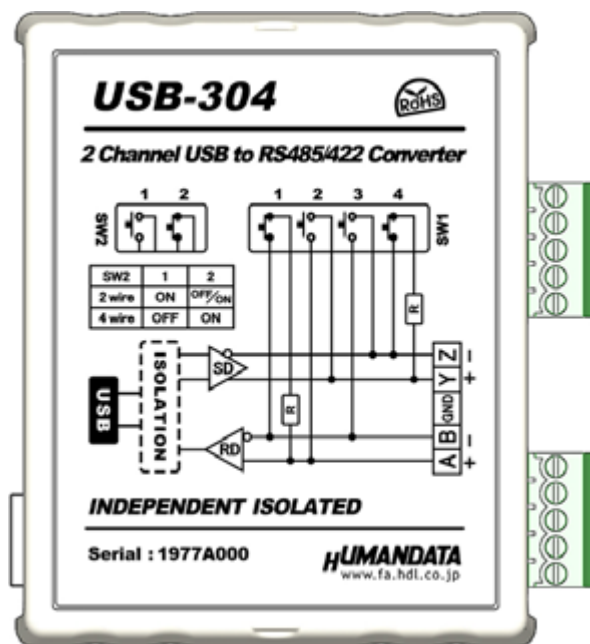




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● **Precautions**

 <p>Do Not</p>	1	This product uses ordinary off-the-shelf electronic components, and is therefore inappropriate for use in applications that require special quality or reliability and are expected to protect human lives or prevent accidents, such as safety mechanisms in fields including space, aeronautics, medicine, and nuclear power.
	2	Do not be used underwater or in high-humidity environments.
	3	Do not be used in the presence of corrosive gases, combustible gases, or other flammable gases.
	4	Do not turn on power when circuit board surface is in contact with other metal.
	5	Do not apply voltage higher than rated voltage.

 <p>Attention</p>	6	This manual may be revised in the future without notice owing to improvements.
	7	All efforts have been made to produce the best manual possible, but if users notice an error or other problem, we ask that they notify us.
	8	Item 7 notwithstanding, HuMANDATA cannot be held liable for the consequences arising from use of this product.
	9	HuMANDATA cannot be held liable for consequences arising from using this product in a way different from the uses described herein, or from uses not shown herein.
	10	This manual, circuit diagrams, sample circuits, and other content may not be copied, reproduced, or distributed without permission.
	11	If the product emits smoke, catches fire, or becomes unusually hot, cut the power immediately.
	12	Do not install the control cables or communication cables together with the main circuit lines or power cables. In such an environment, it may result in malfunction due to noise.
	13	Be careful of static electricity.

● **Revision History**

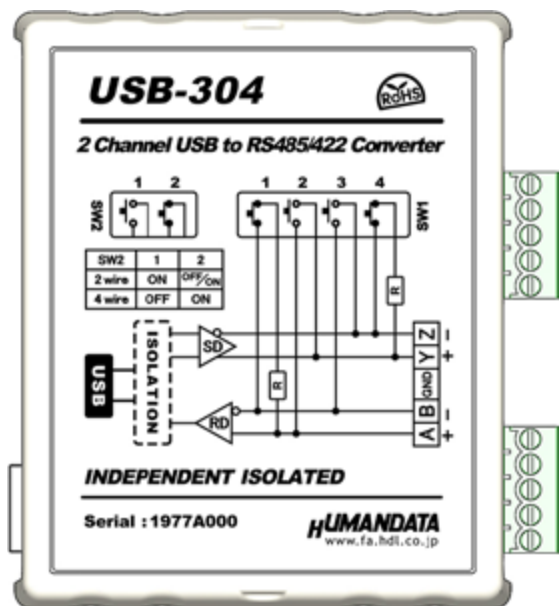
Date	Revision	Description
Nov. 17, 2017	v1.0	Initial release

● **Introduction**

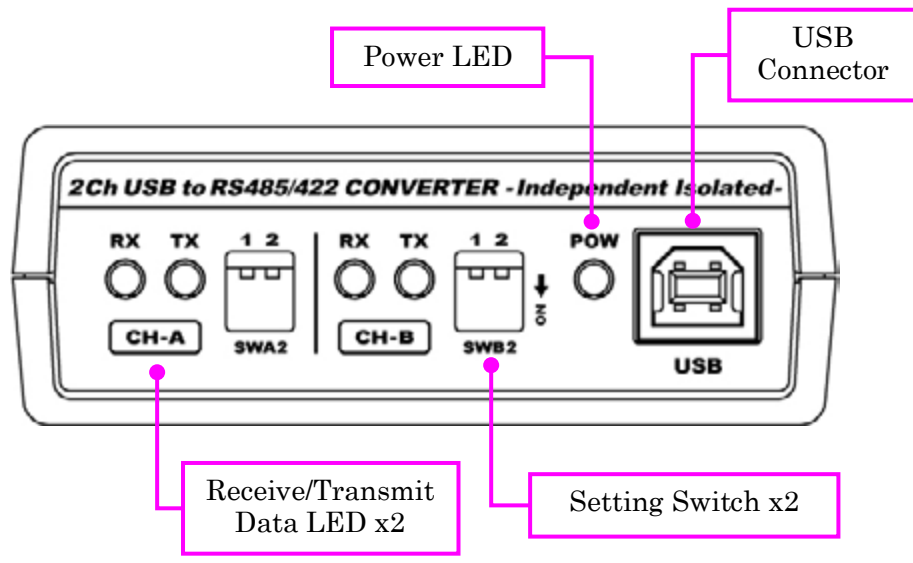
Thank you very much for purchasing our product of USB-304.

USB-304 is a 2 channel USB to RS485/RS422 converter that isolated between each RS-485/422 serial port and a USB port. You can use 2 channels of RS-485/422 serial port from a USB port. Those 2 channels are isolated independently from USB side.

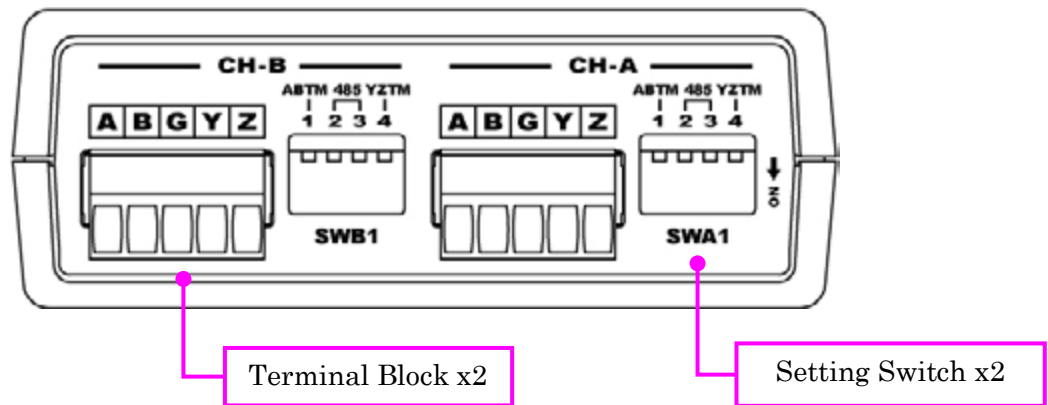
1. Overview



TOP side (Block diagram)



Front Side (USB)

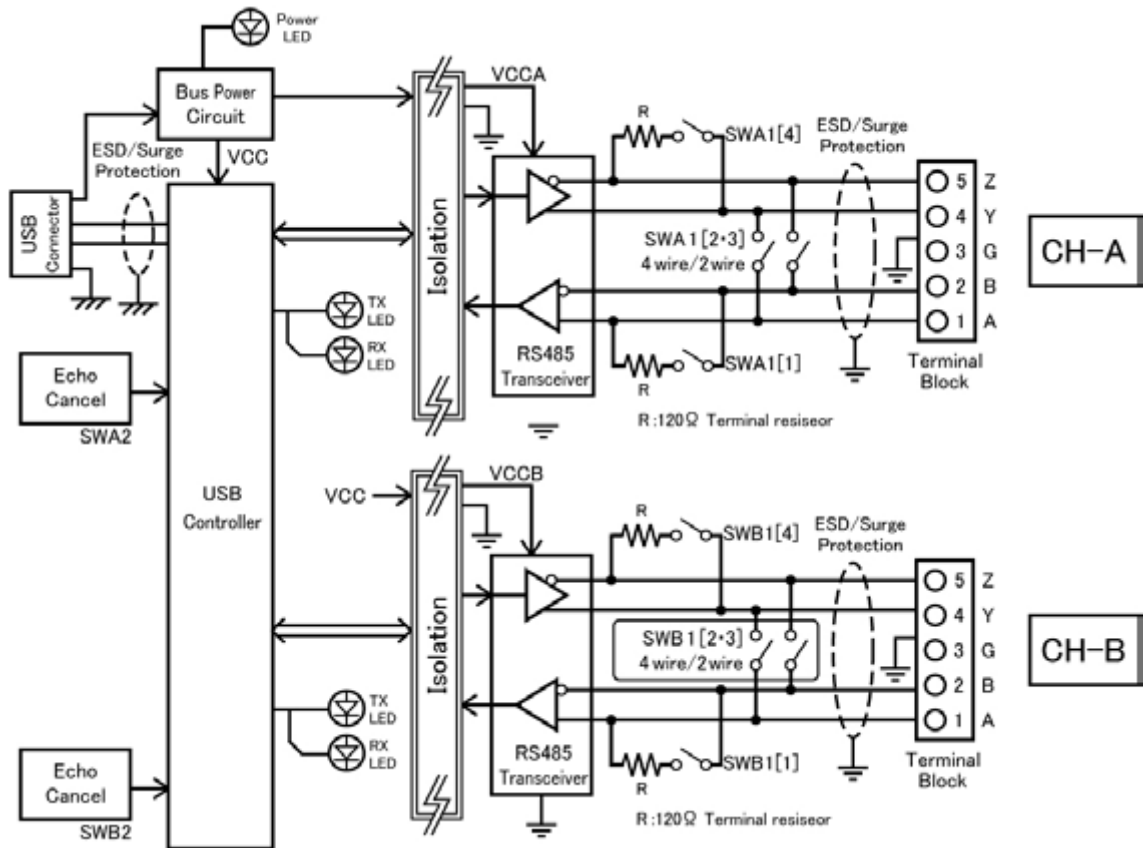


Rear Side (RS-485/422)

1.1. Power Supply

USB-304 is powered through a USB port (Bus-powered). No external power supply is required.

1.2. Block Diagram



Between USB and each RS-485/422 serial port are isolated.

2. Specifications





Item	Description	Remarks
Model	USB-304	
Power	5VDC Supplied through a USB port(Bus-powered)	No external power supply required
Current Consumption	Less than 200 mA	
Number of RS-485/422 Port	2	
I/O Interface	RS-485/422 (2-wire or 4-wire)	ESD protection ±15KV
HOST interface	USB 2.0 Compliant (Support HiSpeed)	USB 1.1 compatible ESD protection ±11KV
USB connector	Standard Type B Female	
Isolation Method	Bus isolation	
Isolation Protection	Over 2000VDC	Designed value
Processor	FT2232H	FTDI
USB Driver	Virtual COM port driver	
Baud Rate	300bps to 6M/8M/12Mbps	Support custom baud rate
Data Bits	7 or 8 bit	
Stop Bits	1 or 2 bit	
Parity	Even, Odd, No-parity	
FIFO RX Buffer Size	4096 bytes/Ch	
FIFO TX Buffer Size	4096 bytes/Ch	
LED	POW: USB bus power RX: Receive data x2 TX: Transmit data x2	
RS-485/422 Connector	5pin detachable screw terminal (PHOENIX CONTACT)	3.5mm pitch
Supports OS	Windows 10/8.1/8/7/Vista/XP	
Operating Ambient Temperature	-20 to 60 °C (-4 to 140 °F)	No condensation permitted
Operating Ambient Humidity	30 to 85%RH	

Storage Ambient Temperature	-20 to +60 °C (-4 to 140 °F)	No condensation permitted
Storage Ambient Humidity	30 to 85%RH	
Weight	Approx. 100 [g]	Only main body
Dimensions	69 x 82.5 x 30 [mm] (2.638" x 3.248" x 1.181")	Without projections

* There is a case to be changed to the parts of the compatibility

* Power saving function (suspend, standby, sleep and others) is not supported

2.1. Optional Accessories

Model Name	Image	Description
PEN-003		USB series Attachment with clamping screw JAN : 4937920800709
PEN-003-DIN		USB series Attachment for 35mm DIN rail JAN : 4937920800716
PEN-003-MG		USB series Attachment with neodymium magnet JAN : 4937920801201
TB35-USB-5		Detachable 5P(3.5mm pitch) Terminal Connector : 1840395 (Phoenix) JAN : 4937920801287

2.2. RS-485/422(4 wire) Mode

Item	Specification	Remarks
Comm. Method	Full-duplex transmission	
Baud Rate	300bps to 6M/8M/12Mbps	Custom baud rate is supported *
Number of Connectable Terminals	128	Typical example
Terminal Resistor	120 Ω	Configurable by setting switch (SWA1/SWB1) ON/OFF
Transmit Enable Control	Automatically controlled by USB controller	
Receive Enable Control	Available by setting switch (SWA2/SWB2)	

RS-485 or RS-422 mode can communicate with multiple terminals by using two twist pair cables. Wires of upstream and downstream are separated and simultaneous communication (full-duplex transmission) is available.

* When baud rates are more than 6Mbps, only 8 Mbps or 12 Mbps are supported.

2.3. RS-485(2 wire) Mode

Item	Specification	Remarks
Comm. Method	Half-duplex transmission	
Baud Rate	300bps to 6Mbps	Custom baud rate is supported
Number of Connectable Terminals	128	Typical example
Terminal Resistor	120 Ω	Configurable by setting switch (SWA1/SWB1) ON/OFF
Transmit-Receive Switching	Automatically controlled by USB controller	
Echo Cancellation	Available by setting switch (SWA2/SWB2)	

RS-485 mode can communicate with multiple terminals by using a twist pair cable.

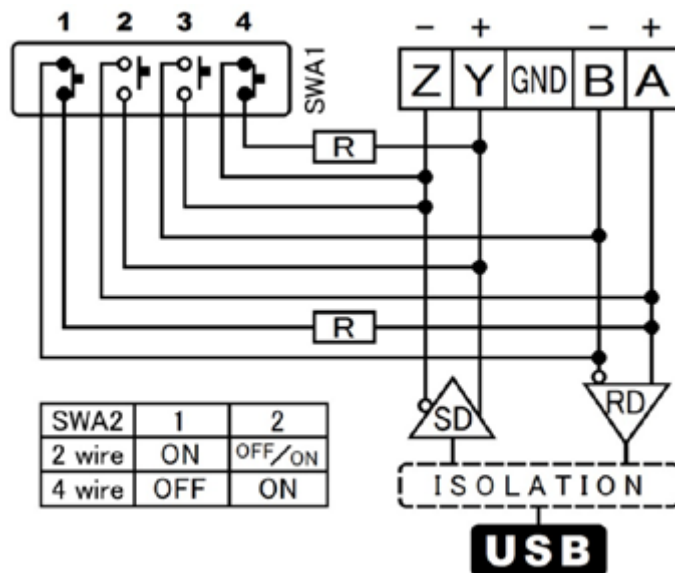
3. Interface Terminal

Terminal block is pluggable. Do not remove it while the power is supplied.

Pin Number	Signal	Signal and Polarity
1	A	RD+
2	B	RD-
3	GND	GND
4	Y	SD+
5	Z	SD-



The GND(Ground) pin is recommended to be wired.




Channel A Connection


4. Setting Switch

USB-304 can change operating mode by setting, switching echo cancelling and terminal resistor.

4.1. RS-485/422(4 wire)

SWA2/SWB2			Factory Setting	
	1	2		
4 wire	OFF	ON		

* Please refer to Section 4.3

SWA1/SWB1					
	1	2	3	4	
No termination	OFF	OFF	OFF	OFF	

SWA1/SWB1

	1	2	3	4
Transmit Side termination	OFF	OFF	OFF	ON



SWA1/SWB1

	1	2	3	4
Receive Side termination	ON	OFF	OFF	OFF



SWA1/SWB1

	1	2	3	4
Both Sides termination	ON	OFF	OFF	ON



4.2. RS-485(2 wire)

- Echo Cancelling Enable (no echo)

SWA2/SWB2

	1	2
2 wire	ON	OFF



* Please refer to Section 4.3

SWA1/SWB1

	1	2	3	4
No termination	OFF	ON	ON	OFF



SWA1/SWB1

	1	2	3	4
Termination Enable	ON	ON	ON	OFF



- Echo Cancelling Disable (echo enable)

SWA2/SWB2

	1	2
2 wire	ON	ON



4.3. Setting Switch (SWA2/SWB2) Function

SWA2-1/SWB2-1	DE (Transmit enable) Control
OFF	Always Enable
ON	Enable in Transmission

SWA2-2/SWB2-2	Echo Control
OFF	Echo Cancelling Enable (no echo)
ON	Echo Cancelling Disable (echo enable)

5. Additional Documentation and User Support

The following documents and other supports are available at

<http://www.hdl.co.jp/en/faspc/USB/usb-304>

- Device Driver
 - Outline Drawing
- ... and more.

6. Warranty and Compensation

Please refer to the following URL for the warranty.

<http://www.fa.hdl.co.jp/en/fa-warranty.html>

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