## Model: UT-861 USB/RS-485/RS-422 4Port Industrial Grade Opto-Isolated Interface Converter Users' Manual

# Instruction Manual



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#### 1. Overview

USB interface is gradually replacing the old-fashioned low-speed peripheral interfaces of PC with the continuous development of PC industry. But many vital devices in current industrial environment is still designed using RS-485/RS-422 interface, so the USB to RS-485/RS-422 converters are needed to transfer data between PC and RS-485/RS-422 devices.

UT-861 is a universal USB/RS-485/422 converter which doesn't need external power supply and has built-in opto-isolator and DC/DC power isolation module. It is compatible with USB ,RS-422 and RS-485 standards, and it can convert single-end USB signal to balanced differential RS-422 or 485 signal. The built-in photoelectric isolator can provide isolating voltage up to 2500Vrms and it equips with high-speed transient voltage supressor which is designed to protect the RS-422/RS-485 interface. The advanced TVS (TRANSIENT VOLTAGE SUPPRESSOR) presents high-impedance state under normal conditions, and it can rapidly decrease the resistance between its two ends while it's withstanding transient high-power impulse so as to absorb the high current and clamp the voltage across it to a preset value, and then the following components will not be damaged by the transient high-voltage impulse. This suppressor can effectively restrain lightning and ESD (electro-static discharge) with lightning surge protection power of 600W for each line, and it also can restrain surge voltage and transient over-voltage on the lines for any reason. Extremely small interelectrode capacitance ensures high speed data transmission of RS-422/RS-485 interface. The RS-422/RS-485 end is connected through male DB9 connector. It has built-in automatic transmit-receive switch without time delay. The unique I/O circuit can be used to automatically control the direction of data flow without any hand-shaking signals(such as RTS and DTR) and full-duplex (RS-422) and half-duplex (RS-485) can be implemented without jumper configuration, so as to make it plug-and-play and applicable to all existing communication software and interface hardware.

UT-861 industrial photoelectric isolated interface converter can provide reliable connection for point-to-point or point-to-multipoint communication. Maximum 128 RS-422 or RS-485 interface devices can be supported for the point-to-multipoint communication. Data communication rate can be 300-128000BPS, and the power indicator light and data traffic indicator light can be used for malfunction indication. USB to RS-422 and USB to RS-485 conversions are supported.

#### 2. Main Features

Following communication modes are supported by UT-861 interface converter:

- 1) Point-to-point/4-wire full-duplex
- 2) Point-to-multipoint/4-wire full-duplex
- 3) Point-to-point/2-wire half-duplex
- 2) Point-to-multipoint/2-wire half-duplex

When the converter is connected for full-duplex or half-duplex communication, a matching resistor (120 Ohm, 1/4W) should be connected to the wire terminal for avoiding signal reflection and interference.

#### 3. Hardware Installation and Application

Please read this manual thoroughly and connect the USB cable to the USB port of computer before the installation of UT-861 interface converter. USB/DB9 connectors are adopted for the input/output terminal and twisted cable or screened cable can be used. RS-422 or RS-485 communication mode can be implemented without any configuration and the connection and disassembly are very convenient. T/R+ and T/R- represent transmit and receive A+/B-, RXD+/RXD- represent receive A+/B- , GND means common ground. T/R+ and T/R- should be connected for point-to-point, point-to-multipoint half-duplex communication, and T/R+, T/R-, RXD+, RXD-should be connected for point-to-point, point-to-multipoint full-duplex communication.

#### 4. Performance Parameters

1) Standards: Conforming to USB1.1, 1.0 and 2.0 standards and EIA RS-485 and RS-422 standard

2) USB signals: VCC、DATA+、DATA-、GND、FG

3) RS-485 signals:T/R+、T/R-、GND

4) RS-422 signals: T/R+, T/R-, RXD+, RXD-, GND

5) Operating mode: Asynchronous mode, point-to-point or point-to-multipoint mode, 2-wire half-duplex, 4-wire full-duplex

6) Data flow control: Automatic data flow control technique is adopted to automatically determine and control the data flow

7) Baud rate: 300-128000bps, automatically detecting the data rate

8) Load capacity: point-to-multipoint communication mode is supported, maximum 128 RS-422 or RS-485 devices are supported

9) Communication distance: 5000 meters for RS-485/422 interface (128000bps-9600bps) and no more than 5 meters for the USB port

10) Interface protection: 600W lightning and surge protection for each port, ±15KV ESD portection

11) Isolation degree: 2500Vrms isolation voltage for each port, 500DC contineous specialized DC/DC module

12) Isolation type: master/slave isolation, slave/slave isolation

13) Interface connection: B type female connector at USB side and DB9 male connector at RS-485/422 side

14) Signal indication: 9 signal indicator lights Power(PWR) transmit (TXD) receive (RXD)

15) Transmission media: twisted-pair or shielded cable

16) Baudrate: 128000bps to 300M

38400bps to U2.4KM 9600bps to U5KM

17) Dimension: 210mmX130mmX32mm

18) Environmental parameters: temperature of -25°C to 70°C, relative humidity of 5% to 95%

19) Supported OS: Win98/Win2000/WinXP/Win7/Linux

5. Connector and signals

1 ) DB9 PIN type: signal output and pin assignment of RS-485/RS-422

DB9 PIN type(PIN)	Signal output	RS-422 full-duplex	RS-485 half-duplex
	600	connection	connection
1	T/R+	Transmit (A+)	RS-485 (A+)
2	T/R-	Transmit(B-)	RS-485 (B-)
3	RXD+	Receive(A+)	Not connected
4	RXD-	Receive(B-)	Not connected
5	GND	Ground	Ground
6	N/A		
7	N/A		
8	N/A		
9	N/A		

DB9 PIN type

1) USB-B type: USB signal input and pin assignment



#### 6. Communication Wiring Diagram

#### USB to RS-422 conversion

1) RS-422 point-to-point/4-wire full-duplex communication



3) full-duplex communication connection between UT-861 interface converters







#### USB to RS-485 conversion



#### 7. Faults and trouble-shooting

- 1) Data communication fails
  - A. Check the USB cable connection
  - B. Check the RS-485/RS-422 connection
  - C. Check the power supply
  - D. Check the connection of terminals
  - E. Check if the receiving indication light flashes when receiving data
  - F. Check if the transmitting indication light flashes when transmitting data
- 2) Data lost or error
- A. Check if the data rates and format of both communication devices are identical

#### 8. Appearing diagram





#### 9. Steps of driver installation

Following dialogue will pop up automatically when the UT-861 is connected to PC. Please select [install from list or specified location (For advanced user)] and click "Next".

Hardware Update Wizard	
	Welcome to the Hardware Update Wizard
	This wizard helps you install software for:
	USB <->Serial Cable
	If your hardware came with an installation CD or floppy disk, insert it now.
	What do you want the wizard to do?
	C Install the software automatically (Recommended)
	Install from a list or specific location (Advanced)
	Click Next to continue.
	< Back Next > Cancel

The following dialogue of path selection will be shown, and please select [Don't search. I'll select the driver to be installed by myself (D)] and click "Next".

C Se	arch for the best driver in these locations.		
Use pati	the check boxes below to limit or expand the o is and removable media. The best driver found	default search, wi will be installed.	nich includes loca
1	Search removable media (floppy, CD-FIOM.	]	
1	Include this location in the search:		
	F:\\	<u> </u>	Biowse
• Do	n't search. I will choose the driver to install.		
Cho the	ose this option to select the device driver from driver you choose will be the best match for you	a list. Windows o ur hardware.	does not guarante

Then the hardware type dialogue will be shown and please scroll to (Universal serial bus controller) and click "Next".

		×
Select a hardware type, then click "Next"	9	
Common <u>h</u> ardware types:		
Show All Devices		
🛿 😼 Display adapters		100
IDE ATA/ATAPI controllers		
Reference in the second		
lmaging devices		
🔊 🔊 Infrared devices		
bodems 🕹		
Universal Serial Bus Controllers		_
Ra Network adapters		
Network adapters		•

The dialogue of "select the device driver you want to install for this hardware" will be shown and please click [Have Disk...]

lardwar Selee	re Update Wizard	ver you want t	o install for t	his hardwa	are.	
¢	Select the manufa have a disk that c	cturer and model ontains the driver	of your hardwa	are device ar stall, click Ha	nd then click ave Disk.	Next. If you
Sho	w compatible hardw	are				
(No dri	l ive for this device is	found)				
						Have Disk
			< Ba	ick	Next >	Cancel

Then the dialogue of "install form hard disk" will be shown and please click (browse) to select the path of driver.

				S.
≈ _ S Istall Fr	elect the manufacturer and m om Disk	odel of your hardware devic	e and then click N	lext. If you
<b>B</b>	Insert the manufacturer's in make sure that the correct of	stallation disk, and then drive is selected below.	OK Cancel	
	Copy manufacturer's files fro	om:	Browse	Disk

The dialogue of "find files" will pop up, and then select the CD path. Open it as shown in the following figure or double click it.

Locate File					? ×
Look <u>i</u> n	Software	0f: )	•	G 🖻 🖻	
My Recent Documents Desktop My Documents	Driver Product User manu	ual.			1
My Network Places	File <u>n</u> ame: Files of <u>type</u> :	FTDIBUS. INF	र्ग)	•	<u>O</u> pen Cancel

Select the driver of installed converter type as shown in following figure. Click the folder of UT-861 and open it, then select PCDriver folder.

Locate File					? ×
Look in:	Driver		•	3 🖻 🖻	
My Recent Documents Desktop My Documents My Computer	PCL-32c PCL-85C PCL-85C VT-620 VT-630 VT-810 VT-810 VT-830 VT-840 VT-840 VT-850 VT-860 VT-861 VT-861 VT-861 VT-880 VT-880 VT-880	i UT-2002 i UT-2003 i UT-2005			
My Network Places	File <u>n</u> ame:	FTDIBUS. INF		•	<u>O</u> pen
	Files of type:	Setup Information (* inf)		7	Cancel

Select the appopriate operating system (such as windows xp), and select (Winxp 2003.2000) and click to open it or double click it.

Locate File						? ×
Look in:	PC Drive	r	•	3 🕫	•11 💙	
My Recent Documents	WIN98.ME	3. 2000]				
Desktop						
My Documents						
<b>S</b>	-	-				
My Network Places	File <u>n</u> ame: Files of <u>type</u> :	Setup Information (*.inf)				<u>Open</u> Cancel

In the popped up dialogue select FTDIBUS.INF and click it to open it, then a new dialogue with selected FTDIBUS file will be shown.

Locate File					? ×
Look in:	WINXP. 20	03, 2000	•	3 🕫 🖻	<b></b>
My Recent Documents Desktop My Documents My Computer	FTDIPORT				
My Network	File <u>n</u> ame:	FTDIBUS. INF		-	<u>O</u> pen
Places	Files of type:	Setup Information (*.inf	)		Cancel

Following is the driver path and then please click (OK).

Selec	t the manufacturer and model of your bardware device and then click. Next. If yo
Insta	I from the disk
	Insert the Installation disk from the Manufacuturer, then make sure to choose the right drive below.
	Copy source of the files from the manufacturer (C):
	H:\software\USB_Serial\USB 2.0 TO ES232 V Browse (B)

The system has found the hardware installation information of the USB Serial Converter as shown in the figure below, then click "Next".

lardware Update Wizard			
Select the device driver you want to	install for this h	ardware.	
Select the manufacturer and model o have a disk that contains the driver y	of your hardware dev vou want to install, c	rice and then d ick Have Disk	slick Next. If you 
Show compatible hardware			
Gar USB Senal Converter			
This driver is digitally signed. <u>Tell me why driver signing is important</u>			Have Disk
	< Back	Next >	Cancel

The USB Serial Converter installation wizard is completed just as shown in the following figure. Then the system will detect the USB Serial Port automatically and show the "New hardware found" wizard.



The following dialogue shows the new hardware wizard of USB Serial Port. Please click "Next" and the following steps are just the same as the wizard of USB Serial Converter, so we won't describe it in detail here.



The system has found the hardware installation information of the USB Serial Port as shown in the figure below, then click "Next".

Select th	e device driver y	you want to	install for this h	ardware.	X
Sele	ect the manufacture	er and model of	your hardware de	vice and then	click Next. If you
Show cor Model	npatible hardware				
GU USB S	erial Converter				

The USB Serial Port installation wizard is completed just as shown in the following figure. Now the driver of UT-8814 has been installed completely.



After the driver has been installed correctly please have a look at the device manager to make sure whether there is virtual COM port. If it's the first time to install the USB driver on this system then the default COM ports are COM3.4.5.6 as shown in the following figure. Up to now the driver of UT-861 has been installed successfully.

