

PC-HELPER

Isolated RS-422A/485 Micro Converter
for USB2.0

COM-1PD(USB)H

User's Guide

CONTEC CO.,LTD.

Check Your Package

Thank you for purchasing the CONTEC product.

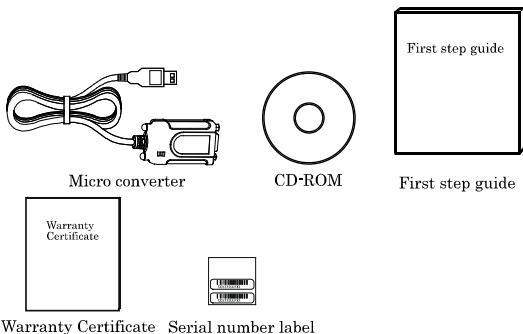
The product consists of the items listed below.

Check, with the following list, that your package is complete. If you discover damaged or missing items, contact your retailer.

Product Configuration List

- Micro converter ...1
[COM-1PD(USB)H]
- First step guide ...1
- COM Setup Disk(CD-ROM *1) ...1
- Warranty Certificate ...1
- Serial number label ...1

*1: The CD-ROM contains the driver software and User's Guide (this guide)



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1. Before Using the Product

This chapter provides information you should know before using the product.

About the Product

This product is an isolated micro converter for converting the USB port of PC into RS-422A/485 serial communications. Each converter has one channel RS-422A/485 communication port. Higher noise-resistant models with isolation between a PC and bus line as well as a surge protection circuit for communication ports. This product supports a baud rate of up to 921,600bps and has separate 128-byte / 384-byte buffer memory for transmit and receive. It also comes with a Windows driver, which allows boards to be used as OS-standard COM ports.

This product supports CONTEC-defined driver library “API-PAC(W32)” that provide local routines.

Features

- Max. 921,600bps RS-422A/485 Serial Communication

This product has one channel RS-422A/485-standard serial ports. Baud rates from 300 to 921,600bps can be set by software. When data is transferred at the high speed, it may not be transferred normally, depending on the use environment such as the external device and cable length used.

- Compatible to USB1.1/USB2.0 and not necessary to power this product externally as the bus power is used.

Compatible to USB1.1/USB2.0 and capable to achieve high speed transfer at Full Speed (12Mbps).

Not necessary to power this product externally as the bus power of USB is used.

- Possibly used as Windows-standard COM ports, using the bundled driver library

Comes with a driver software that allows the products to be used under Windows in the same way as COM ports on the PC. Under Windows, the product supports the OS-standard Win32 API communication function as well as Visual Basic MSComm. In addition, supplies a diagnostic program to confirm hardware operation and to perform a communication test with equipment.

- Electric isolation is provided between channels and between PCs.

Electric isolation is provided between channels and between PCs.

This prevents electric noise between PCs and external circuits.

- Max. 127 converter can be installed as configured in the range COM1 - COM256.

Using a USB hub allows you to install up to 127 converters to a single PC.

COM1 - COM256 can be set using the device manager.

- Each channel is equipped with separate 128-byte / 384-byte FIFO buffers for transmit and receive.

These are FIFO format, useful for high speed communications and to reduce the load to the CPU when transmitting/receiving.

As the device manager can be used to enable/disable the use of FIFO and set the FIFO trigger size, you can build an optimum system according to your use.

- To suit your application, cables and connectors are available as optional

Straight cables (1.8m), cross cables (1.8m) and 9-pin D-SUB connectors (male or female type) for your own cables are available as optional.

- The control line for RS-422A/485 can be controlled and monitored by software.

The control lines for RTS+, RTS-, CTS+ and CTS- can be controlled and monitored using software.

Support Software

Standard COM Driver Software **COM Setup Disk** (Bundled)

Under Windows, this software allows you to use the serial ports on the converter as if they were standard COM ports on the PC. You can add additional micro converters up to a maximum of 127 COM ports.

Under Windows, the serial ports can be accessed using the standard Win32 API communication routines (CreateFile(), WriteFile(), ReadFile(), and SetCommState(), etc.) The serial ports are also compatible with the Visual Basic communication control (MSComm). * API-SIO(98/PC) is not used.

< Operating environment >

OS Windows Vista, XP, Server 2003, 2000

Cable & Connector (Option)

D-SUB 9 pin Male Connector Set (5 Pieces)	:	CN5-D9M
D-SUB 9 pin Female Connector Set (5 Pieces)	:	CN5-D9F

Customer Support

CONTEC provides the following support services for you to use CONTEC products more efficiently and comfortably.

Web Site

Japanese <http://www.contec.co.jp/>
English <http://www.contec.com/>
Chinese <http://www.contec.com.cn/>

Latest product information

CONTEC provides up-to-date information on products.

CONTEC also provides product manuals and various technical documents in the PDF.

Free download

You can download updated driver software and differential files as well as sample programs available in several languages.

Note! For product information

Contact your retailer if you have any technical question about a CONTEC product or need its price, delivery time, or estimate information.

Limited One-Year Warranty

CONTEC Interface products are warranted by CONTEC CO., LTD. to be free from defects in material and workmanship for up to one year from the date of purchase by the original purchaser.

Repair will be free of charge only when this device is returned freight prepaid with a copy of the original invoice and a Return Merchandise Authorization to the distributor or the CONTEC group office, from which it was purchased.

This warranty is not applicable for scratches or normal wear, but only for the electronic circuitry and original products. The warranty is not applicable if the device has been tampered with or damaged through abuse, mistreatment, neglect, or unreasonable use, or if the original invoice is not included, in which case repairs will be considered beyond the warranty policy.

How to Obtain Service

For replacement or repair, return the device freight prepaid, with a copy of the original invoice. Please obtain a Return Merchandise Authorization number (RMA) from the CONTEC group office where you purchased before returning any product.

* No product will be accepted by CONTEC group without the RMA number.

Liability




The obligation of the warrantor is solely to repair or replace the product. In no event will the warrantor be liable for any incidental or consequential damages due to such defect or consequences that arise from inexperienced usage, misuse, or malfunction of this device.

Safety Precautions

Understand the following definitions and precautions to use the product safely.

Safety Information

This document provides safety information using the following symbols to prevent accidents resulting in injury or death and the destruction of equipment and resources. Understand the meanings of these labels to operate the equipment safely.

 DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

Handling Precautions

DANGER

Do not use the product where it is exposed to flammable or corrosive gas. Doing so may result in an explosion, fire, electric shock, or failure.

CAUTION

- Do not strike or bend this product.
Otherwise, these products may malfunction, overheat, cause a failure or breakage.
- Do not touch this product's metal plated terminals (USB connector, D-SUB connector) with your hands.
Otherwise, the product may malfunction, overheat, or cause a failure.
If the products are touched by someone's hands, clean the products with industrial alcohol.
- Make sure that your PC can supply ample power to all the products installed.
Insufficiently energized products could malfunction, overheat, or cause a failure.
- The specifications of this product is subject to change without notice for enhancement and quality improvement.
Even when using this product continuously, be sure to read the manual and understand the contents.
- Do not modify this product. CONTEC will bear no responsibility for any problems, etc., resulting from modifying this product.
- Regardless of the foregoing statements, CONTEC is not liable for any damages whatsoever (including damages for loss of business profits) arising out of the use or inability to use this CONTEC product or the information contained herein.
- It may cause a trouble in recognizing and operating the device according to the kind of USB hub.
If you use the USB hub, we encourage you to take advantage of the CONTEC's product loan service to confirm operation before purchasing.

- Regarding “EMC Instruction Class A Notice”

This product has acquired the above-mentioned standard.

However, a sufficient margin may not be secured for the standard. In this case, use a ferrite core (SEIWA E04SR301334 or a compatible product) for the COM cable (this product’s / connected device’s side) or use a ferrite core (SEIWA E04SR170730A or a compatible product) for the USB cable (PC side).

When attaching a ferrite core to the USB cable, just put the cable inside the case; when attaching a ferrite core to the COM cable, coil it around once near the connector while leaving it open, and then close it.

FCC PART 15 Class A Notice

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference at his own expense.

WARNING TO USER

Change or modifications not expressly approved the manufacturer can void the user's authority to operate this equipment.

Environment

Use this product in the following environment. If used in an unauthorized environment, the board may overheat, malfunction, or cause a failure.

Operating temperature

0 - 50°C

Operating humidity

10 - 90%RH (No condensation)

Corrosive gases

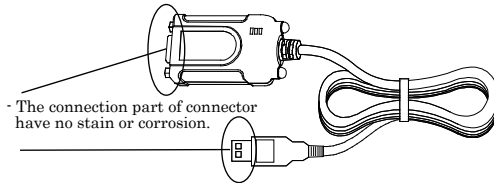
None

Floating dust particles

Not to be excessive

Inspection

Inspect the product periodically as follows to use it safely.



Storage

When storing this product, keep it in its original packing form.

- (1) Put the product in the storage bag.
- (2) Wrap it in the packing material, then put it in the box.
- (3) Store the package at room temperature at a place free from direct sunlight, moisture, shock, vibration, magnetism, and static electricity.

Disposal

When disposing of the product, follow the disposal procedures stipulated under the relevant laws and municipal ordinances.

2. Setup

This chapter explains how to set up the converter.

What is Setup?

Setup means a series of steps to take before the product can be used.

Different steps are required for software and hardware.

Installing the driver

This section enables you to prepare the software and hardware by operating in accordance with each step in this chapter using the bundled CD-ROM. Taking the following steps sets up the software and hardware. You can use the diagnosis program later to check whether the software and hardware function normally.

Step 1 Setting the Hardware

Step 2 Installing the Hardware

Step 3 Initializing the Software

Step 4 Checking Operations with the Diagnosis Program

If Setup fails to be performed normally, see the “Setup Troubleshooting” section at the end of this chapter.

Step 1 Setting the Hardware

This section describes how to setup the converter and connect it to your PC.

There are switches and jumpers on the product that need to be set in advance.

The converter can be set up even with the factory defaults untouched. You can change board settings later.

Name of each parts and Factory setting

Note that the switch setting shown below is the factory default.

COM-1PD(USB)H

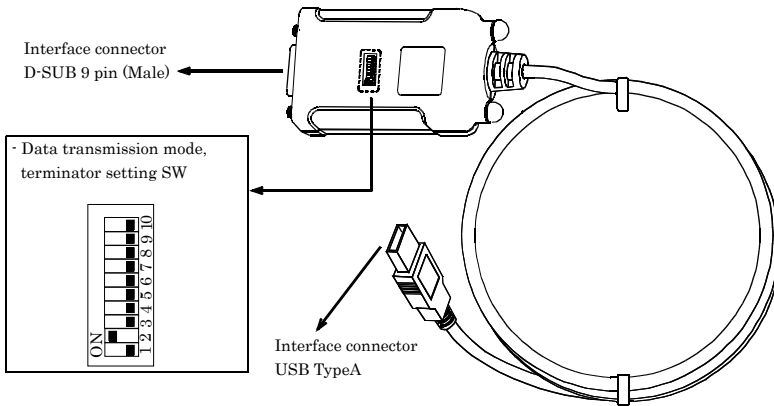


Figure 2.1. Name of each parts and Factory setting

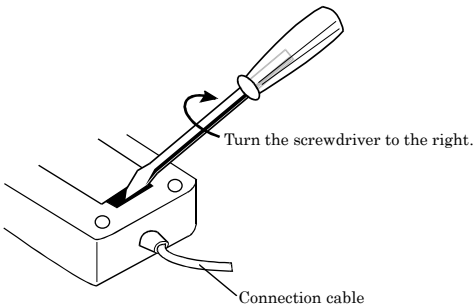


Figure 2.2. How to open the cover

Insert a standard screwdriver into the groove in the cover and turn the screwdriver.

⚠ CAUTION

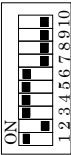
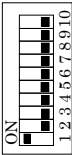

Pushing the screwdriver in too far may damage the inside of the connector. Take care not to apply any force to the inside when turning the screwdriver.

Setting the Data Transmission Mode

The data transmission mode setting switch can be used to switch between half-duplex and full-duplex and between RTS and CTS in full-duplex mode. Set the appropriate data transmission mode depending on the remote device to which to connect this converter. Set the transmission mode using from the bit 1 to bit 6.

Setup method

Table 2.1. Setting the Data Transmission Mode

Data Transmission Mode	Half-duplex [Half]	Full-duplex [Full]	
		Loopback RTS and CTS RTS CTS	Connect RTS and CTS to external device RTS CTS
Setup method	 <p>This sets TxD as the only data line and uses the TxEN signal on the converter to automatically switch between send and receive.</p>	 <p>If the device you are communicating with does not use the RTS and CTS signals, you can use this setting to make CTS active when the RTS signal on the converter is set to active.</p>	 <p>Connecting to the RTS and CTS signals from the external device.</p>

⚠ CAUTION

Do not set bits 1 and 2 of each switch to both ON. Doing so may cause the Converter to malfunction.

Setting the Terminating Resistors

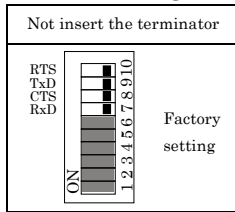
When inserting a terminator, use the terminator setting switch. Set the terminator depending on the remote device to which to connect the converter. The converter contains a 100Ω resistor as a terminator.

The bits correspond to individual signal conductors. Bits 7, 8, 9, and 10 are for RxD, CTS, TxD, and RTS, respectively.

Setup method

To set the terminal to a resistor other than 100Ω, set the terminator setting switch to OFF and insert an external terminator. Given below are examples of inserting the terminator for half-duplex or full-duplex setup.

Table 2.2. Setting the Terminator



- Half-duplex

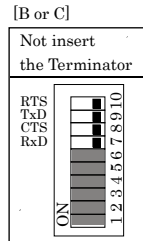
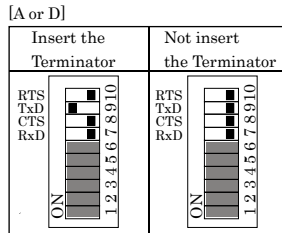
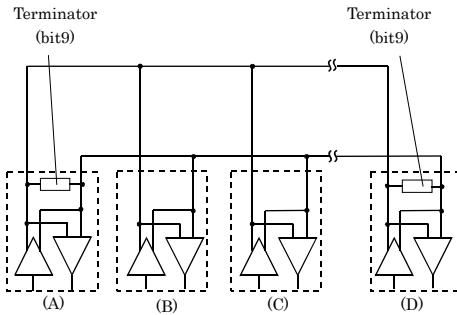


Figure 2.3. Party Line Connection

- Full-duplex

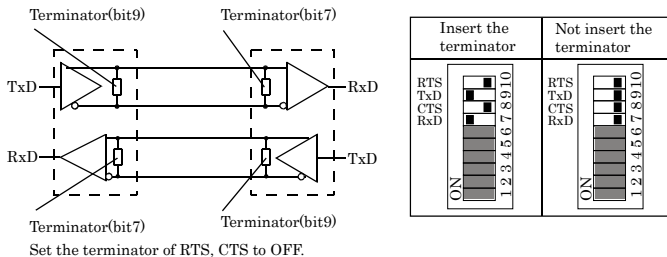


Figure 2.4. Loopbacking RTS and CTS

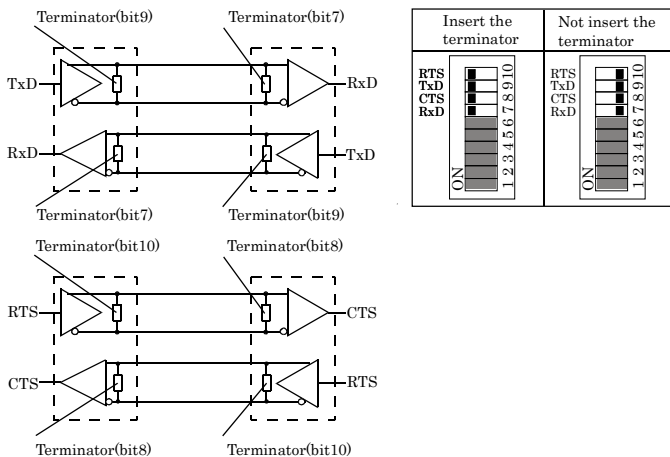


Figure 2.5. Connecting RTS and CTS to external device

Illustrated below are the peripheral circuits for the data transmission mode setting and terminator setting switches.

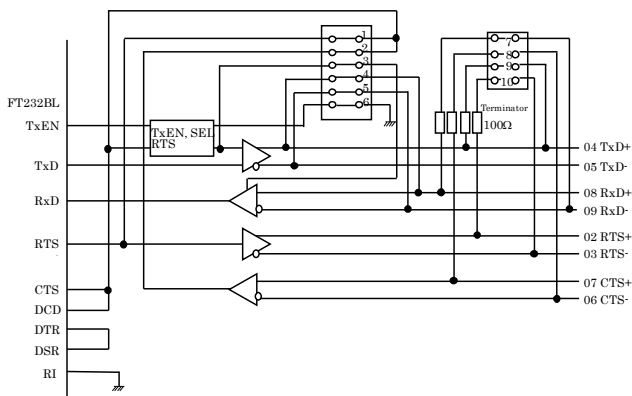


Figure 2.6. Equivalent Circuits

Step 2 Installing the Hardware

Under Windows, you have to let the OS detect the remote device. The process is referred to as installing the hardware.

When using multiple converters, install one at a time and complete setup for the previous converter before starting to install the next converter.

Connecting the converter

- (1) Turn on the power to the PC before connecting the product.
- (2) When the PC has been up and running, plug the USB interface connector to a USB port in the PC.

The converter can also be connected to the PC via a USB hub.

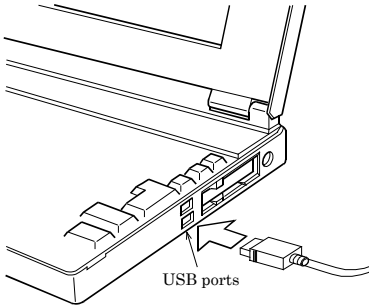


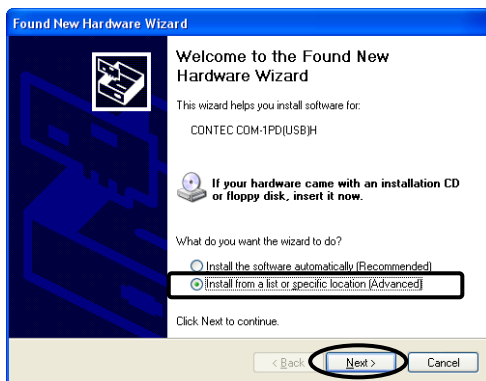
Figure 2.7. Connecting the converter

CAUTION

It may cause a trouble in recognizing and operating the device according to the kind of USB hub. If you use the USB hub, we encourage you to take advantage of the CONTEC's product loan service to confirm operation before purchasing.

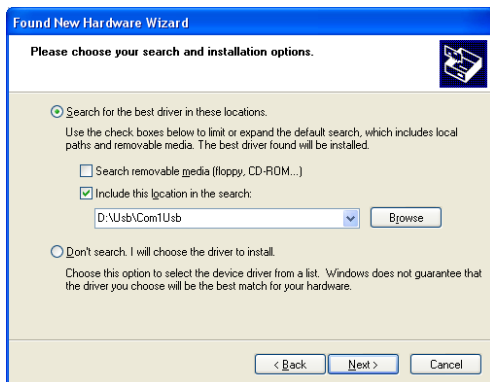
Setting with the Found New Hardware Wizard

- (1) The “Found New Hardware Wizard” will be started.
- (2) Select “Install from a list or specific location[Advanced]”, then click on the [Next] button.



- (3) Specify that folder on the CD-ROM which contains the setup information (INF) file to register the converter.

Source folder is “(CD-ROM drive letter)\USB\COM1USB”.



- * Be sure to uncheck [Search removable media (floppy, CD-ROM)].

- (4) In Windows XP, the Hardware Wizard displays the following alert dialog box when you have located the INF file. This dialog box appears, only indicating that the relevant driver has not passed Windows Logo testing, and it can be ignored without developing any problem with the operation of the terminal.

In this case, click on the [Continue Anyway] button.



When completing the installation, push the completion button and close the wizard.

- (5) After that, do the same operation so that you can confirm the COM port.

You have now finished installing the hardware.

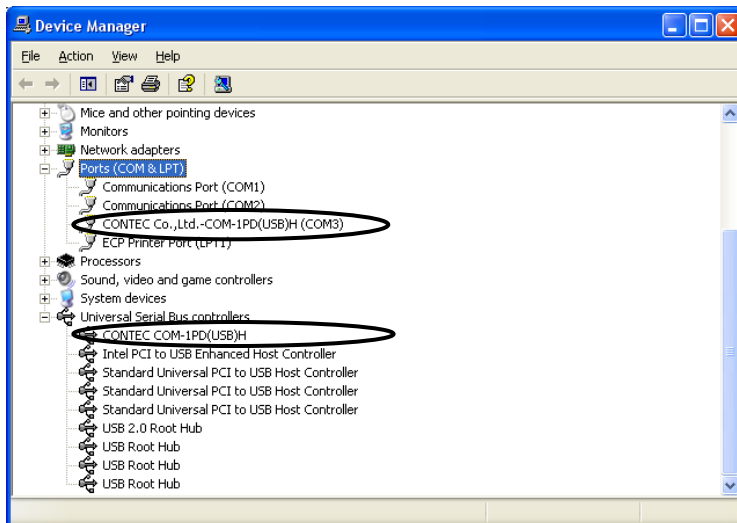
Step 3 Initializing the Software

The COM ports are already assigned by the hardware installation step.

Run Device Manager as described below if you wish to view or modify the COM port settings.

Start Device Manager

- (1) Select "System" from "Control Panel" and start [Device Manager].



- (2) Make sure that the detected USB device is listed in the "Universal Serial Bus controllers" folder.
- (3) Check that the new COM ports are displayed in the [Ports] folder.

Updating the Settings

- (1) If you wish to change a port number, open the properties page for the port and click the [Advanced...] button under [Port Settings].
- (2) Use the [COM Port Number] combo box to modify the COM port number.

You have now finished installing the initial setting of Software.

Step 4 Checking Operations with the Diagnosis Program

Use the diagnosis program to check that the terminal and driver software work normally, thereby you can confirm that they have been set up correctly.

What is the Diagnosis Program?

These programs perform some simple checks on the terminal operation. Two programs are provided.

Terminal program (CTstCom.exe)

Data entered from the keyboard is sent directly from the port. The function of the program is equivalent to the Hyper Terminal program provided with Windows.

Serial Communications Diagnostic Program (CommChk.exe)

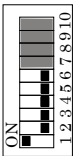
Performs actual communications and indicates whether the results are correct or not (error).

The following describes the procedure for testing using the serial communications diagnostic program (CommChk.exe).

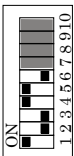
Check Method

Obtain an RS-422A/485 crossed cable. If you do not have a crossed cable, you can perform the test on a single COM port by using the switch settings on the converter to set communications to loopback. The figure below shows the switch settings.

SW setting using the cross cable



When using the COM-IPD(USB)H in loopback mode instead of using a cross cable



Using the Diagnosis Program

Starting the Diagnosis Program

Run [\\Utility\\CommChk\\CommChk.exe] from the supplied CD-ROM.

Communication Settings

COM Setup: Specify the number of the COM port you wish to test.

If connecting two COM ports via a cross cable, specify the respective COM ports in [Device1] and [Device2].

When performing loopback communications on a single COM port, set the same port number in both [Device 1] and [Device 2].

Communication Settings: Specify the [Bits / Second], [Data bits] and other settings you wish to use.

Diagnostic Program for Serial Communications Port

COM Setup

Device1: COM1

Device2: COM3

Communication Settings

Bits / Second: 9600

Data bits: 8

Stop Bits: 1

Parity: None

Duplex: Full

Type of data

Binary Codes (01h to FFh)

Ascii String

Definition String: SendCommand

Iterations

Once

Limited Num. of Iterations: 10

Infinity

Test Item

Open/Close the port every time.

Port Open: Device1: Device2:

From Device1 to Device2:

From Device2 to Device1:

Port Close: Device1: Device2:

Iterations number:

Message:

Start Help End

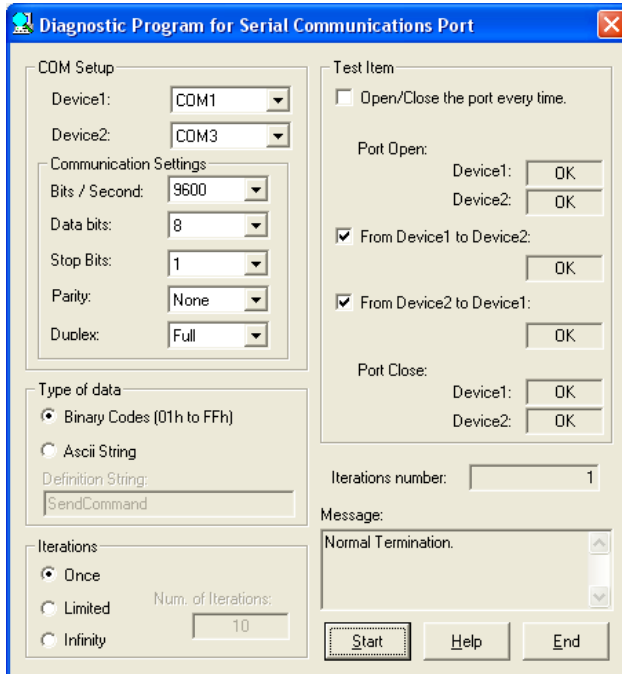
Start test

Click the [Start] button to start the test using the specified conditions.

View test result

The test result is displayed in the [Message] window.

A successful completion message appears if the test completed OK.

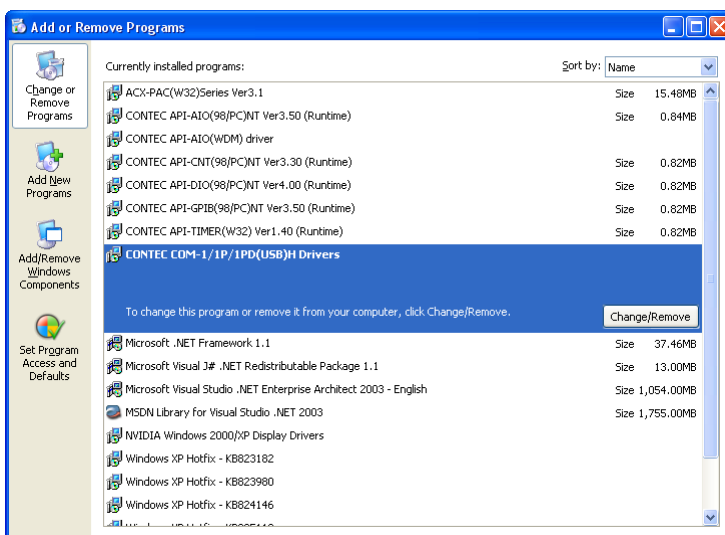


Step 5 Uninstalling the Driver Libraries

To uninstall COM-1/1P/1PD(USB)H Drivers, follow the procedure below.

- (1) Click on the [Start] button on the Windows taskbar. From the Start Menu, select “Settings” – “Control Panel”.
- (2) Double-click on “Add and Remove Programs” in the Control Panel.
- (3) Select “CONTEC COM-1/1P/1PD(USB)H Drivers VerX.XX” from the displayed application and then click on the [Change/Remove] button. Follow the on-screen instructions to uninstall the function libraries.

* X.XX shows the version of driver.



If your problem cannot be resolved

Contact your retailer.

3. External Connection

This chapter describes the interface connectors on the converter.

Check the information available here when connecting an external device.

Interface connectors

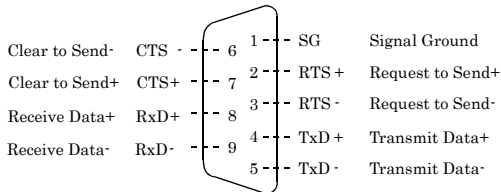


Figure 3.1. Pin assignment of interface connectors

⚠ CAUTION

For TxD, RxD, and RTS, pin assignment has even-numbered pins for positive and odd-numbered ones for negative. For CTS, however, even-numbered and odd-numbered pins are assigned for negative and positive, respectively, in contrast with other signals. This is not a description error.

Example Connections

The RS-422A/485 interface provides a differential method of transmission, in which relative potential differences between two conductors (positive and negative) are meaningful as signals. For the converter, a twisted-pair cable (balanced line) should be used as possible to improve noise immunity.

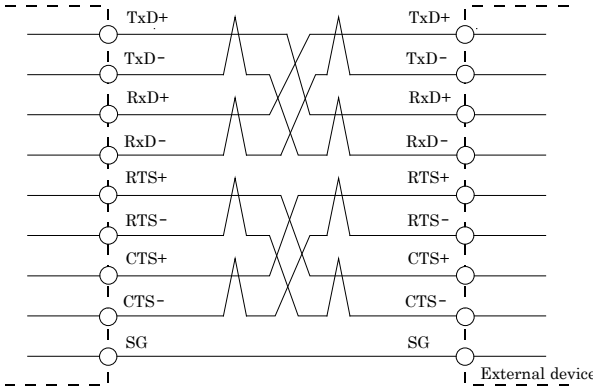


Figure 3.2. Example of connection with RTS and CTS connected to external device in full-duplex mode

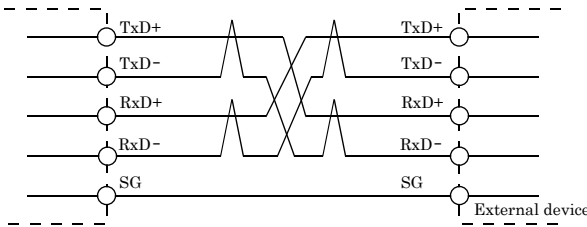


Figure 3.3. Example of connection with RTS and CTS self-looping in full-duplex mode

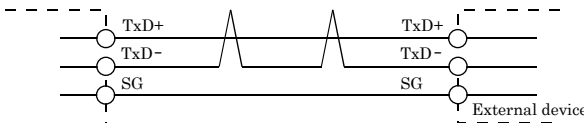


Figure 3.4. Example of connection in half-duplex mode

⚠ CAUTION

Connecting the converter by incorrect wiring can cause a fault in the converter and/or the device connected.

4. Functions

This section describes the functions of the converter.

Communication Function

Serial Data Transmission

Sends and receives data in accordance with the RS-422A/485 standard.

RS-422A/485 Control Lines

All ports include the RTS+, RTS-, CTS+ and CTS- control lines.

The lines can be controlled or monitored by software from the application.

Setting the Baud Rate

This converter can set the following baud rate using the software.

Baud Rate: 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400,
57600, 115200, 230400, 460800, 921600bps

Bus isolation

It is electrically isolated between the PC to be installed and the remote device.

Isolation between buses, prevents electrical disturbance between the PC and an external circuit and inter-channel interference as well.

The converter can therefore be used comfortably even when line noise can be easily generated to seemingly cause the PC to malfunction or break.

Surge protection

As the RS-422A/485 control lines are all surge-protected, you can use the product without anxiety about surges which can cause the PC to malfunction or be damaged.

5. About Hardware

LED display

Table 5.1. Function list

LED name	LED display content
POWER (green)	ON ... Power ON
	OFF ... Power OFF
RxD (yellow)	Blinking ... Receiving data *
	OFF ... Not receiving data or not connected
TxD (yellow)	Blinking ... Transmitting data *
	OFF ... Not transmitting data or not connected

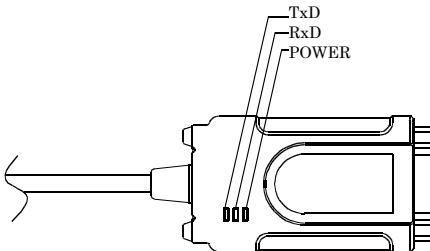


Figure 5.1. LED display

- * If you forget the COM port number of this product, perform communication via specific COM ports and check the LEDs on the product to identify its COM port number.

Hardware specification

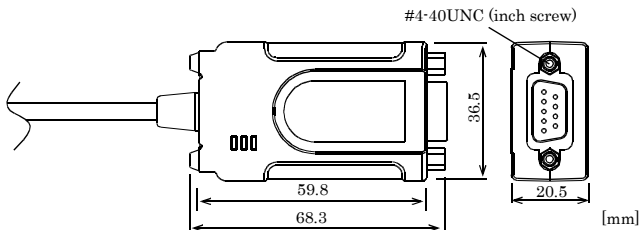
Table 5.2. Specification

Item	COM-1PD(USB)H
Number of channels	1 channel
I/O specification	RS-422A/RS-485
Isolated specification	Bus isolation
Dielectric strength	300VDC
Transfer method	Asynchronous serial transfer (Full-duplex / half-duplex)
Baud rate	300 - 921,600bps *1*2
Data length	7, 8 bit / 1, 2 stop bit
Parity check	Even, Odd, Non-parity
Loading LSI	FT232BL Mounting the FIFO memory as the common buffer of RS-422A/RS-485 communication and USB. Sending: 128byte / receiving: 384byte (by the view of PC)
Connecting distance	Within 1200m
Connector specification	USB side : USB A connector RS-422A/485 side : 9 pin D-SUB connector (male)
Operation guaranteed voltage	5V±5%
Power consumption	5VDC 350mA (Max.)
Operating condition	0 - 50°C, 10 - 90%RH(No condensation)
USB bus specification	USB Specification 1.1/2.0 standard
Power supply	Only bus power
USB transmission speed	12Mbps (full speed mode)
Cable length	1.8m
Physical dimension (mm)	68.3(W) x 20.5(D) x 36.5(H)
Weight	130g

*1 Data transmission at high speed may not be performed normally depending on the environment including the type of status of connected material of cable and environment.

*2 These items can be set by software.

Physical dimension


Figure 5.2. Physical dimension

COM-1PD(USB)H

User's Guide

CONTEC CO.,LTD.

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