

PC-HELPER

RS-422A/485 1ch

Isolated Serial I/O Card for CardBus

COM-1PD(CB)H

User's Guide

CONTEC CO.,LTD.

Check Your Package

Thank you for purchasing the CONTEC product.

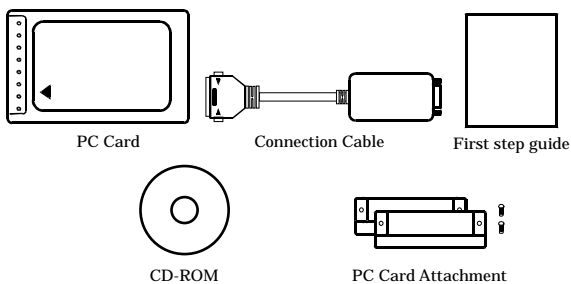
The product consists of the items listed below.

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

Product Configuration List

- PC Card [COM-1PD(CB)H] ...1
- Connection Cable [PCE32/9P1PDS] ...1
- PC Card attachment [CARD-AT1] ...1set
- First step guide ...1
- COM Setup Disk *1 (CD-ROM) ...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 PC Card

This product is a PC Card Standard-compliant CardBus serial I/O card for performing RS-422A/485-compliant serial communications with external devices.

Use the card in a PC Card Standard-compliant CardBus PC Card slot.

COM-1PD(CB)H has **one RS-422A/485-compliant serial port per card**.

You can use the standard COM driver software (COM Setup Disk) supplied with the PC Card to access the serial ports as standard Windows or Linux COM ports.

This card can be used with Windows XP, Windows Server 2003, Windows 2000, Windows Me, Windows 98SE, Windows 98, or Linux.

Features

- PC Card Standard-compliant CardBus PC Card corresponding to RS-422A/485 standard.
- Driver software is supplied to allow the serial ports to be used as standard Windows or Linux COM ports.
- Maximum communication speed = 921,600bps.
- Capable of setting the baud rate by software
- The PC Card has 128-byte FIFO buffers, one for transmission and the other for reception, capable of changing the FIFO trigger size. The FIFO trigger size can be specified. This permits operation to be adjusted to achieve optimal performance for your system.
- An internal insulated circuit enables safe use of the card for long-distance communications.
- You can use up to two cards, using the standard COM driver software supplied with the PC Card (for Windows XP, Server 2003, 2000).
- You can use the PC Card attachment to protect the PC Card and cable socket.
- The data transmission mode (full or half duplex) setting can be changed using a switch.
- The card includes the 100Ω terminating resistors required for a party line (multi-drop) connection. The resistors can be inserted in each signal line by setting a switch.

Support Software

You should use CONTEC support software according to your purpose and development environment.

Standard COM Driver Software (Bundled)

The purpose of this software is to allow the CONTEC serial communication boards (cards) to be used under Windows or Linux in the same way as the standard COM ports on the PC. By installing additional boards (cards), you can use COM ports in the range COM1 - COM256.

The boards can be used for all types of serial communications such as for remote access service (RAS) and uninterruptible power supply (UPS) applications.

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).

Under Linux, the serial ports are compatible with the operating system's standard tty driver. The standard routines including open(), close(), read(), write() are supported.

< Operating environment >

OS Windows XP, 2000, Server 2003, NT, Me, 98, etc..



CAUTION

You can use up to two CardBus products (for Windows XP, Server 2003, 2000).

Driver Library **API-PAC(W32)** (Available for downloading (free of charge) from the CONTEC web site.)

API-PAC(W32) is the library software that provides the commands for CONTEC hardware products in the form of Windows standard Win32 API functions (DLL). It makes it easy to create high-speed application software taking advantage of the CONTEC hardware using various programming languages that support Win32 API functions, such as Visual Basic and Visual C++.

It can also be used by the installed diagnosis program to check hardware operations.

See <http://www.contec.com/apipac/> for details and download of API-PAC(W32).

< Operating environment >

OS Windows XP, Server 2003, 2000, Me, 98, etc..

Adaptation language Visual C++ .NET, Visual C# .NET, Visual Basic .NET, Visual C++, Visual Basic, Delphi, C++Builder, etc..



CAUTION

- This library provides local routines that are specific to CONTEC (SioOpen(), SioWrite(), SioRead(), SioStatus(), etc.). These are not compatible with the standard Win32 API communication routines (CreateFile() and WriteFile(), etc.).

- You can use only one CardBus product.

Cable & Connector (Option)

D-SUB9P (Female) Connector Set (5 Pieces) : CN5-D9F

D-SUB9P (Male) Connector Set (5 Pieces) : CN5-D9M

* Check the CONTEC's Web site for more information on these options.

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 Three-Years Warranty

CONTEC Interface products are warranted by CONTEC CO., LTD. to be free from defects in material and workmanship for up to three years 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

- Mount the PC Card in a PC Card Standard CardBus compatible PC Card slot.
 - Power saving mode (standby mode) is not supported. Set up the PC so that the power can be always ON.
 - Do not strike or bend the PC Card.
Otherwise, the PC Card may malfunction, overheat, cause a failure or breakage.
 - Do not subject the socket used to connect the cable to the PC Card to knocks or other excessive force.
Otherwise, the PC Card may malfunction, overheat, cause a failure or breakage.
 - Do not plug or unplug any PC Card into or from the Card slot with the PC powered.
 - Do not plug or unplug the connection cable with the PC powered.
 - Connect the cable to the card before inserting the card into the PC.
Otherwise, the PC Card may malfunction, overheat, or cause a failure.
 - Do not try to remove the cable from the connector on the PC Card without pressing the locking spring as this may prevent the cable from being securely connected.
 - When you use the PC Card in a noisy environment or are nervous about noise, strengthen the earthing between the PC Card frame and the frame ground of your PC. Specifically, install the PC Card attachment, and then connect the PC Card frame and the frame ground of the PC to earth the PC Card frame (e.g. using an earth cable).
 - When inserting the PC Card, check that you are inserting the card with the correct orientation and that the card is inserted firmly.
Inserting the PC Card incorrectly may damage the PC Card or connector or result in a bad connection.
 - Ensure that the PC power supply has sufficient capacity for all mounted cards.
An inadequate power supply may malfunction, overheat, or cause a failure.
 - The specifications of this product are subject to change without notice for enhancement and quality improvement.
Even when using the product continuously, be sure to read the manual and understand the contents.
 - Do not modify the 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.
-

Environment

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

Operating temperature

0 - 50°C

Operating humidity

10 - 90%RH (No condensation)

Corrosive gases

None

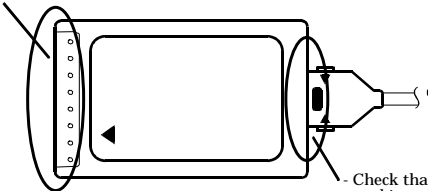
Floating dust particles

Not to be excessive

Inspection

Inspect the product periodically as follows to use it safely.

- The bus connector have no stain or corrosion.



Storage

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

- (1) Put the PC Card 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 PC Card.

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.

The setup procedure varies with the OS and software used.

Using the PC Card under Windows

Using the Standard COM Driver Software COM Setup Disk

This section describes the setup procedure to be performed before you can start developing application programs for the PC Card using the bundled CD-ROM "Standard COM Driver Software - COM Setup Disk".

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

On the CD-ROM, refer to the \Pccard\Com(Cb)\Readmee.txt file and the installation instructions files for each OS located in the \Pccard\Com(Cb)\InstDoc.

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

Using the PC Card under Windows

Using the Driver library API-PAC(W32)

Refer to the API-PAC(W32) "Hardware Installation Procedure (HWINSTU.HLP)" help file for the procedure to follow when using API-SIO in the "Driver Library API-PAC(W32)".

If using API-SIO from API-PAC(W32), install from API-PAC(W32) instead of from the supplied CD-ROM.

See also the following parts of this manual as required.

This chapter Step 1 Setting the Hardware

Using the PC Card under Linux

Using the Standard COM Driver Software COM Setup Disk

You can perform application program development using the "Standard COM Driver Software - COM Setup Disk" in the supplied CD-ROM. The procedure for using the software is described in the \Linux\Readmee.htm file.

See also the following parts of this manual as required.

This chapter Step 1 Setting the Hardware

Step 1 Setting the Hardware

This section describes how to set the PC Card and plug it on your PC.

Check that your PC has a TYPE II PC Card slot that complies with PC Card Standard CardBus.

Connecting the PC Card to the Connection Cable

Connect the PC Card end of the supplied cable to the PC Card.

CAUTION

- When inserting the cable, carefully align the connection cable with the socket on the PC Card and push straight in. Applying excessive force to the connector on the PC Card may damage the connector or result in a bad connection.
 - Do not plug or unplug any connection cable or PC Card with the PC powered.
-

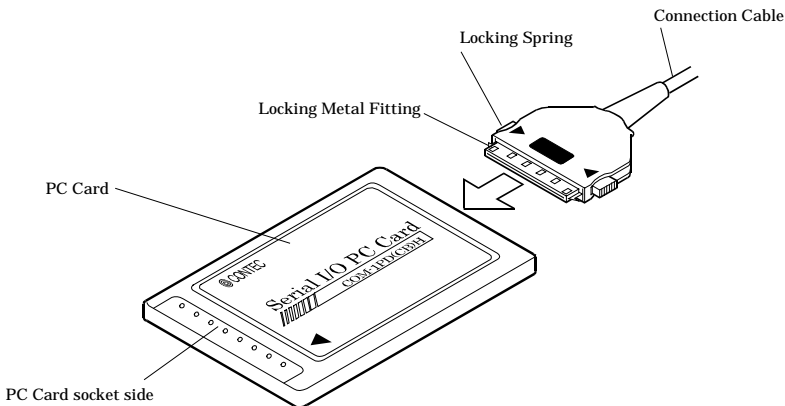


Figure 2.1. Connecting the PC Card to the Connection Cable

Fitting the PC Card Attachment

Fitting the PC Card attachment helps prevent the cable from being disconnected if force is accidentally applied to the top of the connector.

⚠ CAUTION

When using other PC Cards in the same PC, the PC Card attachment may obstruct the other cards and make them difficult to insert. In this case, please remove the PC Card attachment.

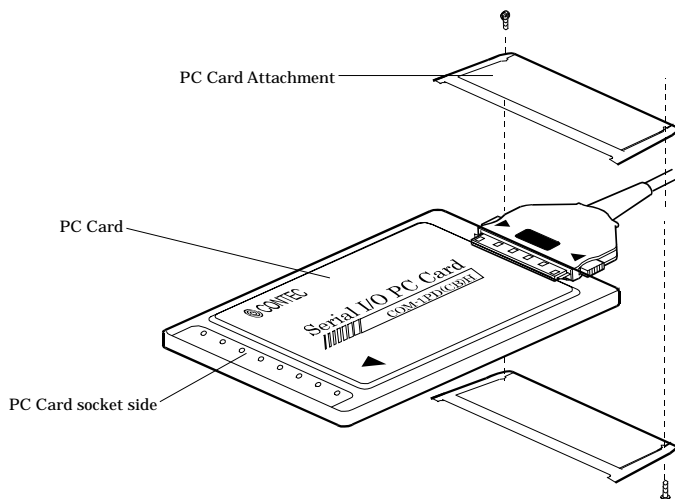


Figure 2.2. Fitting the PC Card Attachment

Setting the Data Transmission Mode and terminating resistor

Use a flathead screwdriver or similar to open the cover on the underside of the connection cable (part of BOX). This exposes the DIP switch (SW1). As shown in Figure 2.3, an easy way to open the cover is to insert the tip of the screwdriver into the slot on the underside of the connection cable and then rotate the screwdriver.

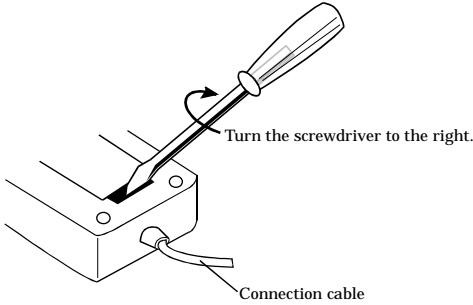


Figure 2.3. How to open the cover

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.

SW1 can be used to set to full or half duplex mode. Full duplex can be used for a one-to-one connection. Half duplex mode allows a party line connection to be used. You can also use this switch to specify whether or not to insert the 100Ω terminating as a terminating resistor.

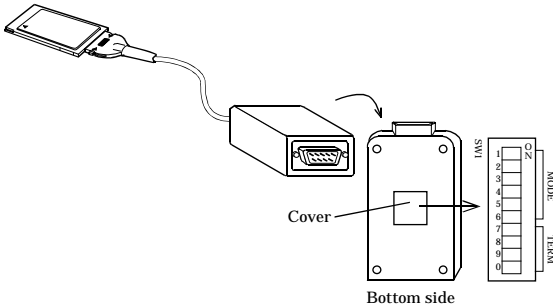


Figure 2.4. Switch for Setting the Transmission Mode and Terminating Resistors

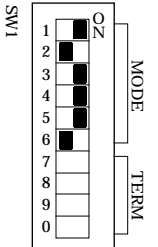
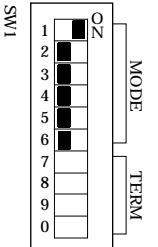
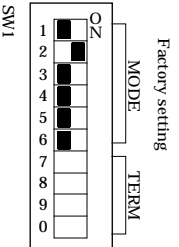
Setting the Data Transmission Mode

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 PC Card.

Set the transmission mode using from the bit 1 - 5. However, the bit 6 must be fixed at OFF.

Setup method

Table 2.1. Setting the Data Transmission Mode

Data Transmission Mode	Half-duplex [Full]	Full-duplex [Full]	
		Loopback RTS and CTS	Connect RTS and CTS to external device.
Setup method	 <p>This sets TxD as the only data line and uses the RTS signal on the PC Card to 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 PC Card 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 PC Card to malfunction.

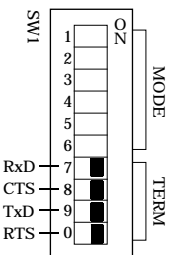
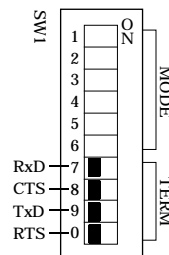
Setting the Terminator

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

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

	Insert the terminator [Term ON]	Not Insert the terminator [Term OFF]
Setup Method	 <p>Figure 2.5 A or D (either end of signal line)</p>	 <p>Factory setting Figure 2.5 B or C (other than end of signal line)</p>

Half-duplex

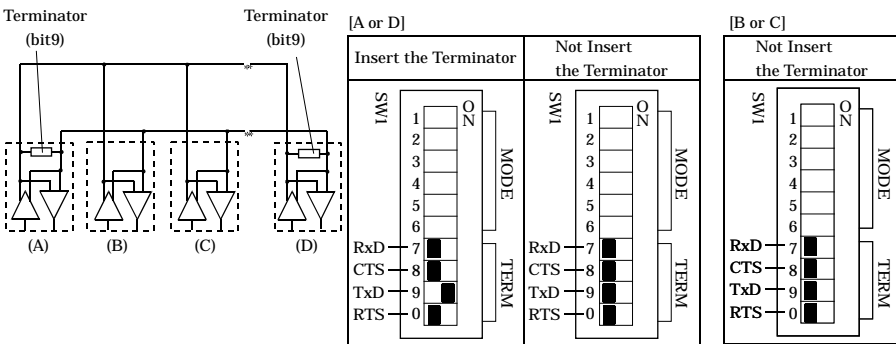


Figure 2.5. Party Line Connection

Full-duplex

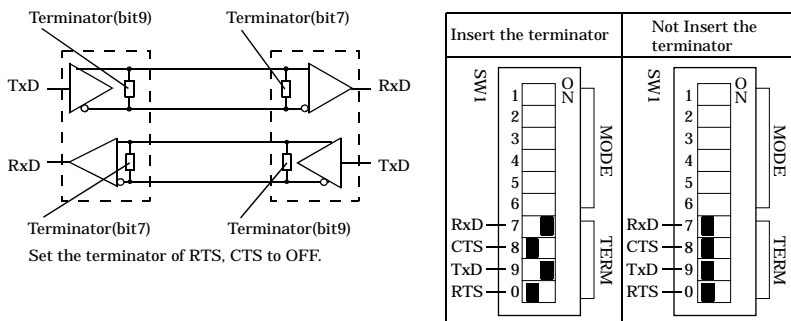


Figure 2.6. Loopbacking RTS and CTS

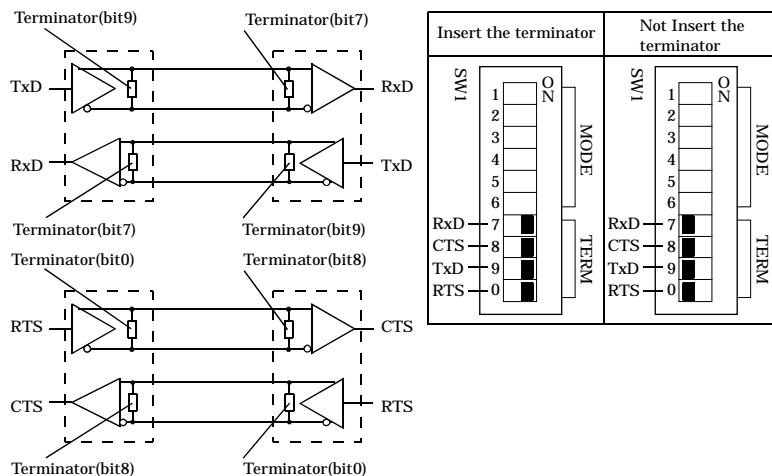


Figure 2.7. Connecting RTS and CTS to external device

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

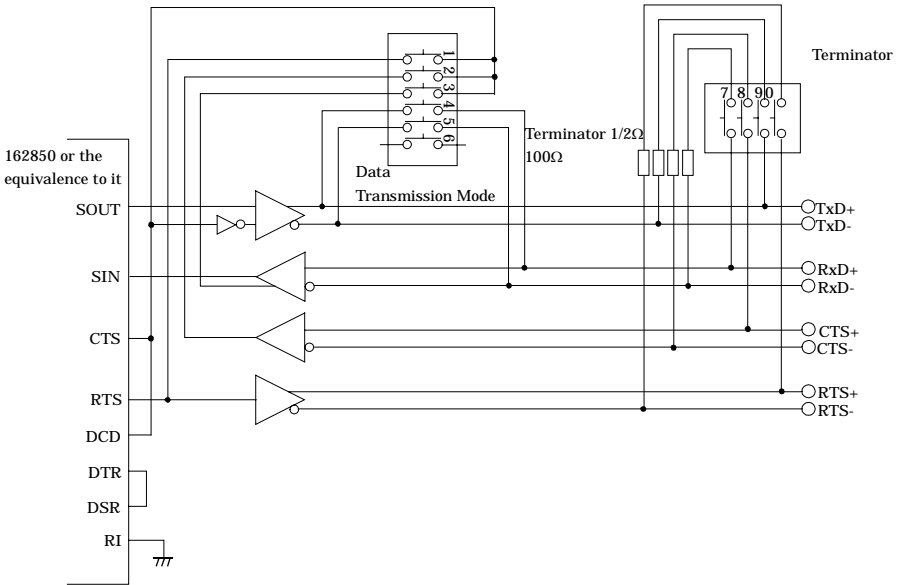


Figure 2.8. Setting Switch Peripheral Circuits

Insert the PC Card

Insert the card into the PC Card slot on the PC.

Firmly insert the card into the slot with the orientation indicated by the arrow symbol on the card, as shown in Figure 2.9.

The PC Card has a key to prevent it from being inserted incorrectly. Do not try to force the card into the slot the wrong way around as this may damage the card or the slot on the PC. Also, check the card slot on your PC as the slots on some PCs are oriented so that cards are inserted with the top side facing down.

Refer to the manual for your PC for instructions on how to remove the card.

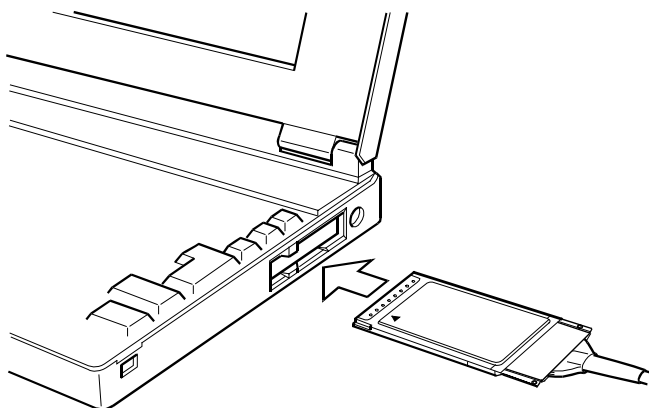


Figure 2.9. Insert the PC Card

CAUTION

Take note of the following points as inappropriate handling of the PC Card may damage the card or connector socket and may result in a bad connection.

- Always insert the PC Card with the correct orientation and in accordance with the instructions.
- Do not hold the card by the cable or connector when inserting the card into the slot.
- Do not move the PC with the cable still plugged in.
- Do not apply any excessive force to the cable socket on the PC Card such as by pulling on the connection cable.
- Do not place any objects on top of the connection cable.

Step 2 Installing the Hardware

Under Windows, you have to let the OS detect the I/O addresses and IRQ to be used by the PC Card. The process is referred to as installing the hardware.

Turning on the PC

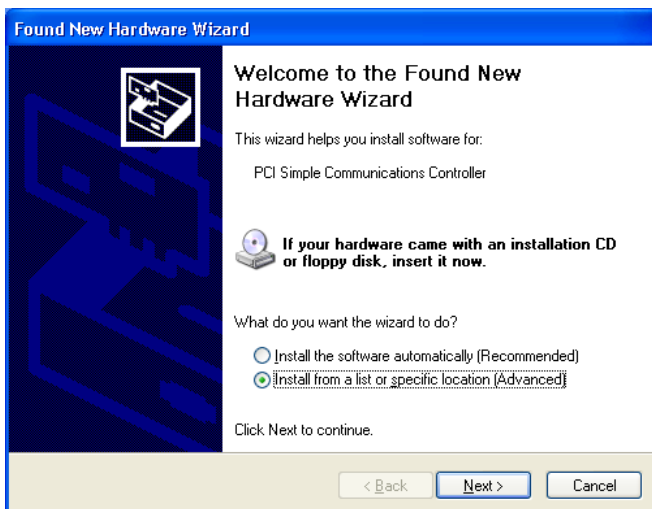
- (1) Insert the PC Card into the card slot on the PC.
- (2) Turn on the power to your PC.

CAUTION

- Refer to the API-PAC(W32) "Hardware Installation Procedure (HWINSTU.HLP)" help file for the procedure to follow when using API-SIO from the "Driver Library API-PAC(W32)". If using API-SIO from API-PAC(W32), install from API-PAC(W32) instead of from the supplied CD-ROM. If you install from the supplied CD-ROM by mistake, uninstall API-SIO as described in "Uninstalling the Driver Software" in "Chapter 5 About Software" and then, install it.
 - The PC Card cannot be properly installed unless the resources (I/O addresses and interrupt level) for the PC Card can be allocated. Before attempting to install the PC Card, first determine what PC resources are free to use.
 - The resources used by each PC Card do not depend on the location of the PC Cards slot or the PC Card itself. If you remove two or more PC Cards that have already been installed and then remount one of them on the computer, it is unknown that which one of the sets of resources previously assigned to the two PC Cards is assigned to the remounted PC Card. In this case, you must check the resource settings.
 - You can use up to two CardBus products (for Windows XP, Server 2003, 2000).
-

Setting with the Found New Hardware Wizard

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



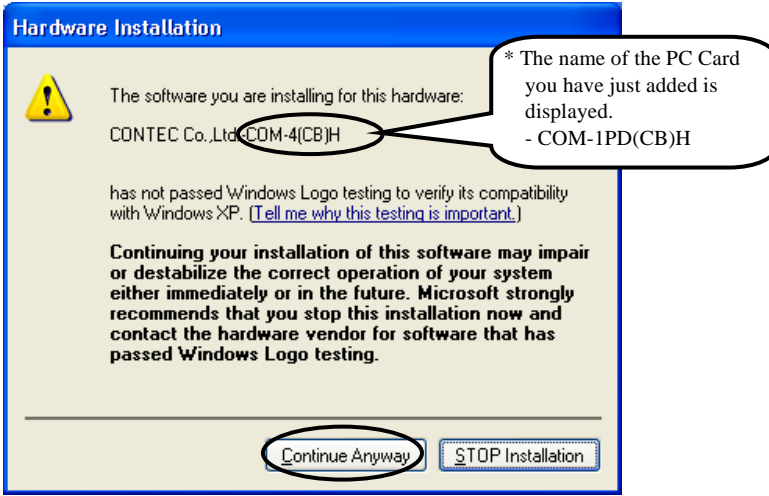
- (2) Specify that folder on the CD-ROM which contains the setup information (INF) file to register the PC Card.
 - Source folder \PCCARD\Com(cb)\ComDrv



⚠ CAUTION

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 PC Card.

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



- (3) Installation of the "Communication Port" starts next. If prompted for a file by the OS, specify the location of the setup information (INF) file, as described above.

You have now finished installing the hardware.

The check method of the completion of hardware installation

- (1) Select "System" from "Control Panel" and open [Device Manager].
- (2) Check that the names of the PC Cards you are using are registered correctly in the [Multifunction adapters] folder.
- (3) Similarly, confirm that the COM ports have been added in the [Ports] folder.

Step 3 Initializing the Software

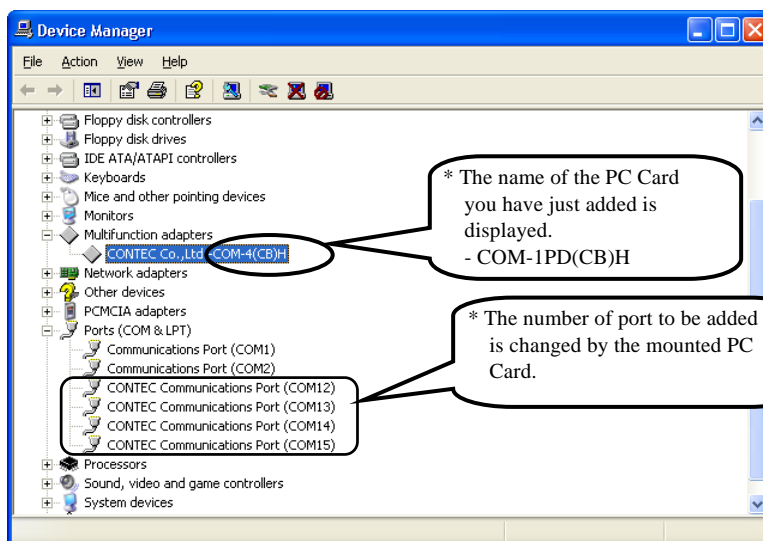
This assigns COM ports to the serial ports on the PC Card. On Windows XP and 2000, you can also change the COM port numbers for existing COM ports.

For use under Windows XP, Windows 2000

On Windows XP and Windows 2000, 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) Check that the new COM ports are displayed in the [Ports] folder.

Updating the Settings

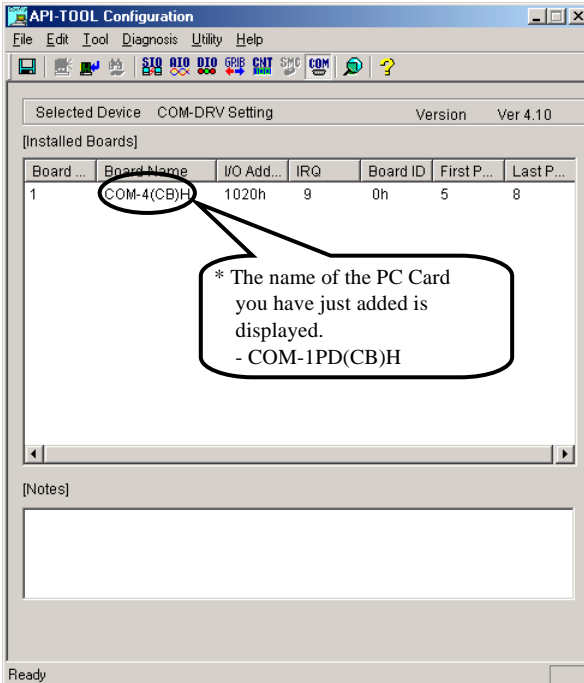
- (1) If you wish to change a port number, open the properties page for the port and click the [Advanced...] button under [Port Settings].
- (2) Use the [COM Port Number] combo box to modify the COM port number.

You have now finished installing the initial setting of Software.

For use under Windows Me, Windows 98

Invoking API-TOOL Configuration

- (1) Run the C:\CONTEC\Config.exe.



- (2) Check that [COM-DRV Setting] appears on the screen.
If a different driver name appears, execute [Tools] - [COM-DRV].
- (3) Double click on the PC Card type name that is already displayed on the screen and modify the COM port number and related settings.

Updating the Settings

- (1) Click on the [File] - [Updating the Settings].
- (2) After rebooting, the registered COM ports are now able to be used as standard COM ports.

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 PC Card 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 PC Card 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).

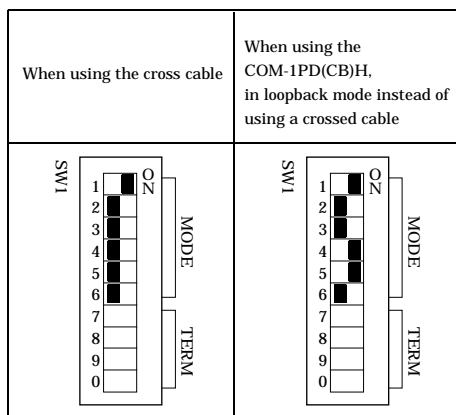
The following describes the procedure for testing using the serial communications diagnostic program (CommChk.exe).

Check Method

Obtain an RS-422A/485 crossed cable. If a cross cable is not available, you can test communication using a single COM port by means of loopback arranged by setting the switch on the connection cable box.

The figure below shows the switch settings.

SW setting



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 to a single COM port, specify the same PC Card 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: COM3

Device2: COM4

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

Infinity

Num. of Iterations: 10

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

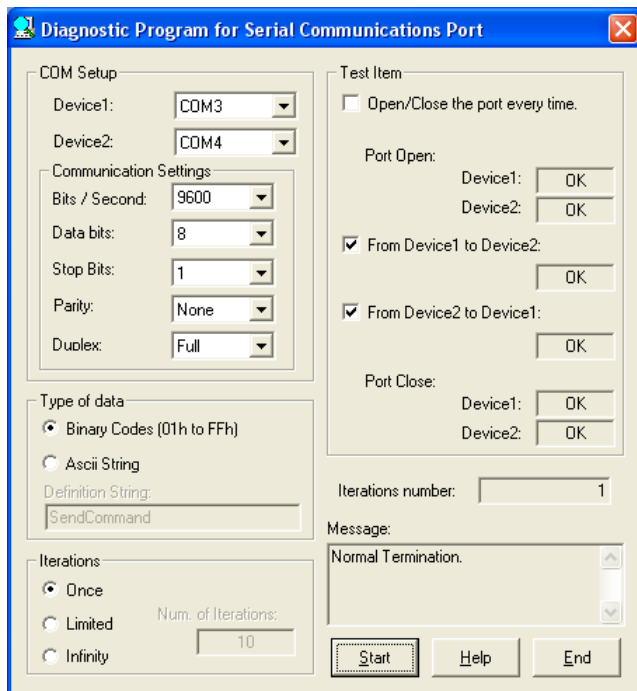
Start test

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.



Setup Troubleshooting

Symptoms and Actions

Incorrect driver software was installed by mistake [Windows XP, 2000]

The API-SIO software from the "Driver Library API-PAC(W32)" cannot be installed in the PC at the same time as the "Standard COM Driver Software COM Setup Disk" from the supplied CD-ROM.

The COM Setup Disk and the API-SIO software from API-PAC(W32) are intended for different purposes. Please only use the software that is applicable for your intended use.

If the incorrect software is installed by mistake, please uninstall the incorrect software then install the correct software.

See "Uninstalling the driver software" in the Chapter 5 "About Software" for uninstalling the driver.

If your problem cannot be resolved

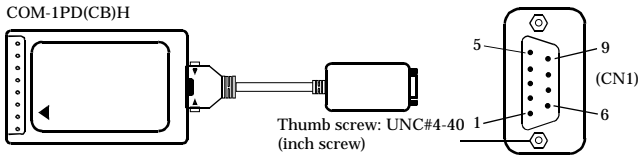
Contact your retailer.

3. External Connection

This chapter describes the interface connectors on the PC Card.
Check the information available here when connecting an external device.

Interface connector

Use the interface connectors on the connection cable to connect to the external devices.
Make your own cable by using the optional connector (CN5-D9F) and connect it.



- Connector used
DELIC-J9PAF-20L9 or equivalence to it
[mfd. by JAE, Male]
- Applicable connectors
17JE-13090-02(D8C) (mfd. by DDK, Female)
CN5-D9F(connector 5 sets) [CONTEC, Female]

Figure 3.1. Interface connector

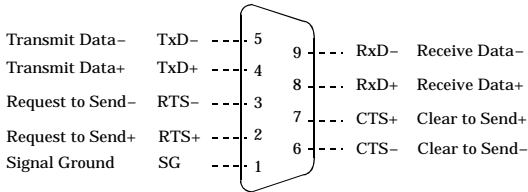


Figure 3.2. Pin Assignments of Interface Connector

Connector (Option)

D-SUB9P Female Connector Set (5 Pieces)

: CN5-D9F

⚠ 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 following diagrams show sample cable connections of the PC Card. 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 PC Card, a twisted-pair cable (balanced line) should be used as possible to improve noise immunity.

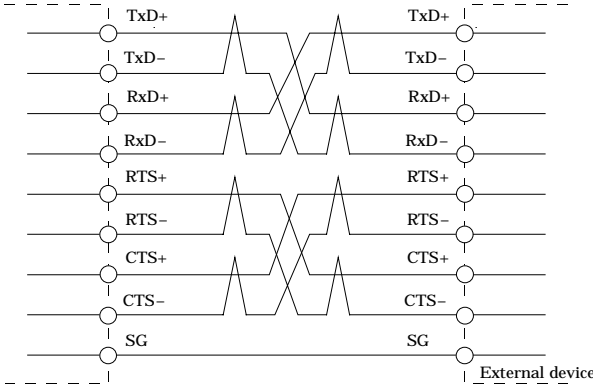


Figure 3.3. Example of connection with RTS and CTS connected to external device in full-duplex mode

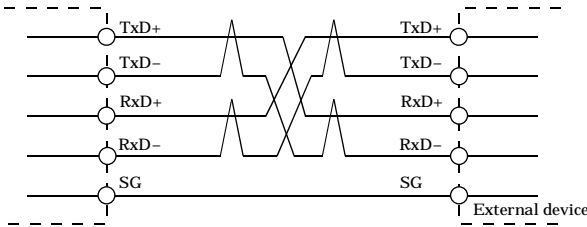


Figure 3.4. Example of connection with RTS and CTS self-looping in full-duplex mode

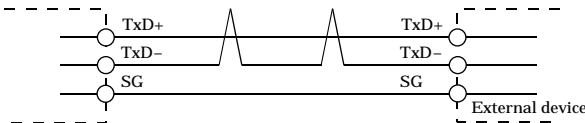


Figure 3.5. Example of connection in half-duplex mode

⚠ CAUTION

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

4. Functions

This section describes the functions of the PC Card.

Communication Function

Serial Data Transmission

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

Baud rates from 2 - 921,600 bps can be set by software.

RS-422A/485 Control Lines

The RTS+, RTS-, CTS+, and CTS- control lines are provided.

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

Send and Receive Data Buffers

The PC Card has a pair of 128-byte data buffers dedicated for transmission and reception respectively.

The buffers operate as FIFO buffers and help reduce the load on the CPU for high-speed communications or system operation.

The data buffer operation (whether to use FIFO operation, FIFO trigger size) can be set using Device Manager (on Windows XP, 2000) or API-TOOL Configuration (on Windows Me, 98).

The FIFO trigger is the data buffer size that determines the timing of the hardware interrupt.

Setting a large FIFO trigger size lightens the load on the CPU by reducing the number of hardware interrupts generated by sending or receiving data.

However, as data is not actually sent or received until a certain amount is present, a delay may occur in sending data to the other device or in notifying the application that data has been received.

Alternatively, setting a small FIFO trigger size or disabling FIFO operation increases the speed of data sending and receiving but increases the load on the CPU and risks received data being missed.

As the FIFO buffer size is variable, you can adjust this setting to achieve optimum performance for your system.

Setting the Baud Rate

The baud rate is set by specifying the divide register value (divisor). The available setting range depends on which clock mode is used.

Clock 3 mode: 15 - 921,600bps

Clock 2 mode: 8 - 460,800bps

Clock 1 mode: 4 - 230,400bps

Clock 0 mode: 2 - 115,200bps

However, some baud rate values do not have a corresponding Baud Rate Generator register setting. If the result of substituting the baud rate into the equation below is an integer, then that baud rate can be set. If the result contains a fractional part, the baud rate cannot be set.

Clock 3 mode

$921600 \div \text{Desired baud rate} = \text{Division register setting value}$

Ex.) $921600 \div 9600\text{bps} = 96$ (As the result is an integer, this baud rate can be set.)

$921600 \div 128000\text{bps} = 7.2$ (As the result contains a fractional part, this baud rate cannot be set.)

Clock 2 mode

$460800 \div \text{Desired baud rate} = \text{Division register setting value}$

Ex.) $460800 \div 9600\text{bps} = 48$ (As the result is an integer, this baud rate can be set.)

$460800 \div 128000\text{bps} = 3.6$ (As the result contains a fractional part, this baud rate cannot be set.)

Clock 1 mode

$230400 \div \text{Desired baud rate} = \text{Division register setting value}$

Ex.) $230400 \div 9600\text{bps} = 24$ (As the result is an integer, this baud rate can be set.)

$230400 \div 128000\text{bps} = 1.8$ (As the result contains a fractional part, this baud rate cannot be set.)

Clock 0 mode

$115200 \div \text{Desired baud rate} = \text{Division register setting value}$

Ex.) $115200 \div 9600\text{bps} = 12$ (As the result is an integer, this baud rate can be set.)

$115200 \div 76800\text{bps} = 1.5$ (As the result contains a fractional part, this baud rate cannot be set.)

CAUTION

The "Standard COM Driver Software COM Setup Disk" from the supplied CD-ROM and the "Driver Library API-SIO from the API-PAC(W32)" uses "Clock mode 3". (Fixed).

Refer to the following baud rate setting examples. Baud rates other than those listed below can also be set if they produce a valid setting value in the equation described above.

Table 4.1. Baud Rate Generator Programming Table

Output baud rate	Clock 0 mode (1.8432MHz)		Clock 1 mode (3.6864MHz)		Clock 2 mode (7.3728MHz)		Clock 3 mode (14.7456MHz)	
	Division register	Setup error	Division register	Setup error	Division register	Setup error	Division register	Setup error
	setting value	(%)	setting value	(%)	setting value	(%)	setting value	(%)
2	57600	---						
4	28800	---	57600	---				
5	23040	---	46080	---				
8	14400	---	28800	---	57600	---		
15	7680	---	15360	---	30720	---	61440	---
50	2304	---	4608	---	9216	---	18432	---
75	1536	---	3072	---	6144	---	12288	---
110	1047	0.026	2094	0.026	4189	0.0022	8378	0.0022
134.5	857	0.058	1713	0.0006	3426	0.0006	6852	0.0006
150	768	---	1536	---	3072	---	6144	---
300	384	---	768	---	1536	---	3072	---
600	192	---	384	---	768	---	1536	---
1200	96	---	192	---	384	---	768	---
1800	64	---	128	---	256	---	512	---
2000	58	0.68	115	0.17	230	0.17	461	0.04
2400	48	---	96	---	192	---	384	---
3600	32	---	64	---	128	---	256	---
4800	24	---	48	---	96	---	192	---
7200	16	---	32	---	64	---	128	---
9600	12	---	24	---	48	---	96	---
14400	8	---	16	---	32	---	64	---
19200	6	---	12	---	24	---	48	---
28800	4	---	8	---	16	---	32	---
38400	3	---	6	---	12	---	24	---
57600	2	---	4	---	8	---	16	---
76800			3	---	6	---	12	---
115200	1	---	2	---	4	---	8	---
153600					3	---	6	---
230400			1	---	2	---	4	---
460800					1	---	2	---
921600							1	---

Automatic RTS switching

This function is effective during half-duplex communication.

For half-duplex communication, the RTS and CTS signals must be used for switching between transmission and reception as it uses a common line for transmission and reception. Usually, the bit corresponding to RTS is written to a register for switching. This product switches between transmission and reception automatically by means of hardware, thereby reducing the load on the CPU.

To use this function via the bundled CD-ROM "Standard COM Driver Software COM Setup Disk," you can specify it from within the user application.

Visual C++

Use the Win32 API communication function, `SetCommState()`, to set the `fRtsControl` member of the DCB structure to `[RTS_CONTROL_TOGGLE(0x03)]`.

CAUTION

Visual Basic cannot provide half-duplex communication using `MSComm` alone as Visual Basic has no function to be specified for communication control (`MSComm`).

Other function

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

5. About Software

The "Standard COM Driver Software COM Setup Disk" from the supplied CD-ROM provides the following functions.

- Operation under Windows and Linux.
- The serial ports can be used in the same way as the standard COM ports on the PC.
- The PC Card can be used for all types of serial communications such as for remote access service (RAS).
- 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).
- Under Linux, the software functions as a standard Linux tty driver. The standard open(), close(), read(), and write(), etc. routines are supported.

Refer to the \Pccard\Com(Cb)\Readmee.txt or \Linux\Readmee.htm files on the CD-ROM for details.

About Sample programs

Sample programs are provided in the \Samples folder on the supplied CD-ROM. Use the sample programs for reference and testing when developing program.

Visual Basic sample programs

(1) Transmit/Receive sample

- Sends data entered from the keyboard and displays received data on the screen.
- Source folder: \Samples\Vb folder

Visual C++ sample programs

(1) Transmit sample

- Sends data entered from the keyboard. Execute from the command prompt.
- Source folder: \Samples\Vc\Comsend.c file

(2) Receive sample

- Displays received data on the screen. Execute from the command prompt.
- Source folder: \Samples\Vc\Comread.c file

Uninstalling the driver software

Use the following procedure to uninstall a previously installed COM Setup Disk. Refer to the \Linux\Readmee.htm file on the supplied CD-ROM for instructions on how to uninstall from Linux.

Uninstalling function

Function to delete the COM-DRV driver or registry information from the [ADD/Remove applications].

This can only be used in Windows XP, 2000. In any other operating system, you have to uninstall the driver manually.

Windows XP, 2000

- (1) Run [Device Manager] from [Control Panel] - [System].
- (2) Use the delete key to delete [CONTEC Co., Ltd-XXXXXXXXXX](name of the added hardware) from under [Multi-function adapter].
- (3) Start the [Add/Remove applications] from the [Control Panel].
- (4) Select [CONTEC COM-DRV(WDM) driver] from the list of applications and click the [Change/Remove] button to start uninstalling the driver.

Windows Me/98

CAUTION

[CONTEC COM-DRV(WDM) driver] is not displayed in the [Add/Remove applications].

Uninstalling manually is required in accordance with the following procedure.

- (1) Start the Config.exe and select [Tools] - [COM-DRV] from the menu.
If any piece of hardware (PC Card) has been registered, delete the entry. If not, go to step (2).
- (2) Run [Device Manager] from [Control Panel] - [System].
- (3) Use the delete key to delete [CONTEC Co., Ltd-XXXXXXXXXX](name of the added hardware) from under [Multi-function adapter].
- (4) Start Explorer.
- (5) Select [Tools] - [Folder Options] from the menu.
- (6) Select the [View] tab.
- (7) Select [Show all folders and files] (or [Show all files]), then click OK.
- (8) Right click on the \Windows\Inf folder and run [Search].

(9) Enter the usable hardware model type (example: COM-1PD(CB)H etc.) in the [Containing text] field then click [Start Search].

Do not enter anything in the [File or folder name] (or [Named]) field.

(10) Delete all files found by the search.

(11) Delete the file in the C:\Contec folder.

(12) Delete the ComDrv95.vxd in the \Windows\system folder.

Installing the API-PAC(W32) API-SIO driver in a Windows XP/2000 environment

- (1) Run SETUP.EXE included in the file (API-PAC(W32) either stored on the API-PAC(W32) CD-ROM or downloaded from the CONTEC's download site to install the API-SIO driver.
- (2) Restart your OS, and the hardware wizard will be launched.
- (3) When you are asked for an inf file during the installation process, specify the device type specific folder for your OS in the API-PAC(W32) inf folder.
- (4) Register the board in the Config.exe.

[Notes]

If you install API-SIO from the API-PAC(W32) CD-ROM in Windows XP, uncheck the [Search removable media (floppy, CD-ROM...)] option at the "Please choose your search and installation options" prompt.

Otherwise, the API-SIO driver will not be installed normally. If you have installed it with that option checked, take the above steps for "Uninstalling COM-DRV" again.

CD-ROM Directory Structure

```
\
|- Linux                Linux device driver (for PCI boards and PC Cards only)
|- PCCARD               PC Card related files
|  |- Com(cb)           COM-*(CB)H related files
|  |  |- ComDrv         Device driver for Windows or INF file.etc
|  |  |- InstDoc        Installation instructions for each OS
|  |- Com(pm)           COM-1(PM), COM-1D(PM) related files
|  |- Com(pm)2         COM-2(PM) related files
|- PCI                  PCI board related files
|- Samples              Each sample programs
|  |- VB                Sample program for Visual Basic
|  |- VC                Sample program for Visual C++
|- USB                  USB related files
|- UTILITY              Various utilities
|  |- CommChk           Self diagnostic program (Loopback communication test)
|  |- CTstCom           Self diagnostic program (Terminal utility)
```

6. About Hardware

This chapter provides hardware specifications and hardware-related supplementary information.

For detailed technical information

For further detailed technical information (“Technical Reference” including the information such as an I/O map, configuration register, etc.), visit the Contec's web site (<http://www.contec.com/support/>) to call for it.

Hardware specification

Table 6.1. Specification

Item	Specification
Number of channels	1ch
I/O specification	RS-422A/485
Isolated specification	Bus isolation
Dielectric strength	300VDC
Transfer method	Asynchronous serial transfer (Full / Half duplex)
Baud rate	2 - 921,600bps *1 *2
Data length	5, 6, 7, 8bits 1, 1.5, 2 stop bits *1
Parity check	Even, Odd, Non-parity *1
Loading LSI	162850 or equivalent (The FIFO buffers are a 128-byte transmit buffer and a 128-byte receive buffer.)
Connecting distance	1200m(Max.) *3
Interrupt requests	One channel used
I/O address	32 port boundary
Power consumption	3.3VDC Terminator OFF:300mA(Max.) / Terminator ON:500mA(Max.)
Operating condition	0 - 50°C, 10 - 90%RH(No condensation)
Length of supplied cable	250mm
Card slot specifications	PC Card Standard-compliant CardBus
Card size	TYPE II
Weight	30g(80g including cable)

*1 These items can be set by software.

Baud rate is 15 - 921,600bps in "Standard COM driver software COM Setup Disk" or "driver library API-SIO within API-PAC(W32)" of the bundled CD-ROM.

*2 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.

*3 Relationship between the communication distance and baud rate is as follows.

Communication distance	Baud rate
300m	115,200bps
600m	57,600bps
900m	19,200bps
1200m	9,600bps

Communication cable: 28 AWG, Double shielded cable. The positive and negative conductors for each signal are a twisted pair.

The interrupt signals from all channels are connected as a single interrupt signal on the CardBus.

COM-1PD(CB)H

User's Guide

CONTEC CO.,LTD.

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Japanese <http://www.contec.co.jp/>

English <http://www.contec.com/>

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