Pass-Through Function Guide

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1 General Description

1.1 What is the Pass Through Function?

When communicating with the external devices using Windows applications such as ladder software that uses serial interfaces, the ladder software and external device need to be serially interfaced. Example)



- 1. PC with an application such as ladder software installed.
- 2. External device to be communicated with.
- 3. Serial interface

On GP-Pro EX, using the pass through function enables communication between the ladder software and external device through an indicator.

Example)



- 1. PC with an application such as ladder software installed.
- 2. External device to be set.
- 3. Indicator to relay serial interface.
- 4. USB or Ethernet (UDP) connection
- 5. GP-Pro EX driver corresponding to the external device.

Using the pass through function makes connecting cables unnecessary when changing the settings of external devices with the ladder software.

1.2 Mechanism of the Pass through Function

The Pass Through function is a mechanism for the associate virtual port on the PC to communicate with the serial interface port of the external device.

Hereinafter, the virtual port on the PC is to be referred to as "virtual COM."

Example)

By setting the virtual COM "Port 1" in communication setting of the ladder software, the system operates as if it is connected to port 1 of the external device.

To implement this operation, the pass through function setting tool, virtual COM bus driver, and virtual COM port driver are used.



1. Port 1 of external device for serial interface.

2. Hereinafter, the virtual port on the PC is to be referred to as "virtual COM."

The Pass Through function setting tool and virtual COM bus driver, virtual COM port driver provide the functions below.

- Make port 1' on the PC: Virtual COM port driver
- Associate port 1' with port 1: Pass Through function setting tool
- Exchange data of port 1' and port 1: Virtual COM bus driver

External device that can communicate the Pass Through function at the same time is four or less. Example)



1.3 Operation Environment

The following environment is required to use the Pass Through function.

Compatible OS Microsoft Windows 2000 Professional (SP4 or later) Microsoft Windows XP (SP2 or later)

2 Install

Installation of the Pass Through function setting tool and virtual COM path driver/virtual Com port driver for Pass Through function use.

Installation procedure is as follows.

- 1. Install pass through function setting tool.
- 2. Install virtual COM path driver.
- 3. Install virtual COM port driver.

2.1 Install of Pass Through Function Setting Tool

- 1 Start up the installer of GP-Pro EX.
- 2 When the install screen is displayed, click "Tools."



3 When the "Tools" screen is displayed, click "Pass Through."

Pro-face	GP-Pro SET UP MENU Pass Through
	Movie Converter

4 Select where to install the Pass Through function setting tool and click "OK."

2.2 Install of Virtual COM Bus Driver

2.2.1Install on Windows 2000

Install virtual COM bus driver using "Add/Remove Hardware Wizard."

INF file, "vrcombus.inf" for virtual COM driver required for installation is in the COM folder where the Pass Through function setting tool is installed.

Procedure

1 Start up the "Add/Remove Hardware Wizard" on the Control Panel. The dialog box, "Welcome to Add/Remove Hardware Wizard" is displayed, and go forward with the installation following the directions of the wizard.



2 When the dialog box, "Choose a Hardware Task," is displayed, select "Add/Troubleshoot a device" and click "Next."

Add/Remove Hardware Wizard
Choose a Hardware Task Which hardware task do you want to perform?
 Select the hardware task you want to perform, and then click Next. Add/Troubleshoot a device Choose this option if you are adding a new device to your computer or are having problems getting a device working. Uninstall/Unplug a device Choose this option to uninstall a device or to prepare the computer to unplug a device.
< <u>B</u> ack (<u>Next></u>) Cancel

3 When the dialog box, "Choose a Hardware Device," is displayed, select "Add new device" and click "Next."

Add/Remove Hardware Wizard
Choose a Hardware Device Which hardware device do you want to troubleshoot?
The following hardware is already installed on your computer. If you are having problems with one of these devices, select the device, and then click Next. If you are attempting to add a device and it is not shown below, select Add a new device, and then click Next.
Devices ▲ Add a new device ■ ■ Default Monitor ■ ■ Floppy disk drive ● ● MITSUMI CD-ROM FX140S IB ■ ■ WDC WD307AA ● ● Creative Sound Blaster 16 Plug and Play (WDM) ■ ● Unsurported Device ■
< <u>B</u> ack <u>N</u> ext > Cancel

4 When the dialog box, "Faind New Hardware," is displayed, select "No, I want to select the hardware from a list" and click "Next."

Add/Remove Hardware Wizard
Find New Hardware Windows can also detect hardware that is not Plug and Play compatible.
When Windows detects new hardware, it checks the current settings for the device and installs the correct driver.
Do you want Windows to search for your new hardware?
○ Yes, search for new hardware
No. I want to select the hardware from a list
< <u>B</u> ack <u>Next></u> Cancel

5 When the dialog box, "Hardware Type," is displayed, select "System device" from the list and click "Next."

Add/Remove Hardware Wizard	
Hardware Type What type of hardware do you want to install?	
Select the type of hardware you want to install. <u>H</u> ardware types:	
 PCMCIA adapters Pots (COM & LPT) Printers SCSI and RAID controllers Sound, video and game controllers System devices Tape drives UNTLWDevice 	×
<u> < B</u> ack <u>N</u> ext >	Cancel

6 When the dialog box, "Select Device Driver," is displayed, click "Have Disk."

Add/Remove Hardware Wizard	
Select a Device Driver Which driver do you want to i	install for this device?
Select the manufacturer an have a disk that contains the	nd model of your hardware device and then click Next. If you he driver you want to install, click Have Disk.
Manufacturers:	Mo <u>d</u> els:
Microsoft Corporation	Full screen video driver for console
	Have Disk
	< <u>B</u> ack <u>N</u> ext> Cancel

7 When the dialog box, "Install From Disk," is displayed, click "Browse" and select "vrcombus.inf."

Install Fro	om Disk	×
-	Insert the manufacturer's installation disk into the drive selected, and then click OK.	Cancel
	<u>C</u> opy manufacturer's files from: [C:\Program Files\Pro-face\Pass-Through\COM	Browse

8 When the screen returns to the dialog, "Select a Device Driver," select "Virtual COM Ports Bus Enumerator" from the list. Click "Next" to proceed and complete installation.

Add/Rer	move Hardware Wizard
Sele: \	Inct a Device Driver Which driver do you want to install for this device?
	Select the manufacturer and model of your hardware device and then click Next. If you have a disk that contains the driver you want to install, click Have Disk.
Models: Virtual	COM Ports Bus Enumerator
	Have Disk
	< <u>B</u> ack <u>N</u> ext> Cancel

2.2.2Install on Windows XP

Install virtual COM bus driver using "Add Hardware Wizard."

INF file, "vrcombus.inf" for virtual COM driver required for installation is in the COM folder where the Pass Through function setting tool is installed.

Procedure

1 Start up the "Add Hardware Wizard" on the Control Panel. The dialog box, "Welcame to the Add Hardware Wizard" is displayed, and go forward with the installation following the directions of the wizard.



2 When the dialog box, "Is the hardware connected?" is displayed, select "Yes. I have already connected the hardware" and click "Next."

Add Hardware Wizard		
Is the hardware connected?		E
Have you already connected this hardware to y	our computer?	
Yes, I have already connected the hard	ware	
O No, I have not added the <u>h</u> ardware yet		
	< <u>B</u> ack <u>N</u> ext >	Cancel
_		

3 When the dialog box, "The following hardware is already installed on your computer" is displayed, select "Add a new hardware device" and click "Next."

Add Hardware Wizard	
The following hardware is already installed on your computer	₹£
From the list below, select an installed hardware device, then click Next to check properties or troubleshoot a problem you might be having.	
To add hardware not shown in the list, click "Add a new hardware device."	
I <u>n</u> stalled hardware:	
📽 USB Root Hub	▲
😋 USB Root Hub	
😋 USB Root Hub	
🚓 USB Root Hub	
😪 USB Root Hub	
Add a new hardware device	•
< <u>₿</u> ack <u>N</u> ext>	Cancel

4 When the dialog box, "The wizard can help you install other hardware" is displayed, select "Install the hardware that I manually select from a list (Advanced)" and click "Next."

I F	Hardware Wizard he wizard can help you install other hardware
	The wizard can search for other hardware and automatically install it for you. Or, if you know exactly which hardware model you want to install, you can select it from a list.
	What do you want the wizard to do? © Search for and install the hardware automatically (Recommended)
	Install the hardware that I manually select from a list (Advanced)
	< <u>B</u> ack <u>Next></u> Cancel

5 When the dialog box, "From the list below, select the type of hardware you are installing" is displayed, select "System devices" from the list and click "Next."

Add Hardware Wizard From the list below, select the type of hardware you are installing	
If you do not see the hardware category you want, click Show All Devices.	
Common <u>h</u> ardware types:	
PCMCIA and Flash memory devices Ports (COM & LPT)	-
Printers	
Sound uides and earre controllers	
System devices	
Tape drives	
🛄 Windows Portable Devices	-
< <u>B</u> ack <u>N</u> ext >	Cancel

6 When the dialog box, "Select the device driver you want to install for this hardware." is displayed, click "Have Disk."

Select the device driver you	want to install for this hardware.
Select the manufacturer an have a disk that contains th	d model of your hardware device and then click Next. If you ne driver you want to install, click Have Disk.
	[
Manufacturer AMD Microsoft Corporation	Model
SUM Microsystems Inc. Silicon Integrated Systems VIA	
This driver is digitally signed. Tell me why driver signing is imp	Have Disk
	< <u>B</u> ack <u>N</u> ext > Cancel

7 When the dialog box, "Install From Disk," is displayed, click "Browse" and select "vrcombus.inf."



8 When the screen returns to the dialog, "Select the device driver you want to install for this hardware." select "Virtual COM Ports Bus Enumerator" from the list. Click "Next" to proceed and complete the installation.

Add Hardware Wizard		
Select the device driver you want to ins	itall for this hardware.	
Select the manufacturer and model of you have a disk that contains the driver you w	ur hardware device and then click Next. If you want to install, click Have Disk.	
Model Virtual COM Ports Bus Enumerator		
This driver is not digitally signed! <u>Tell me why driver signing is important</u>	Have Disk	
	< <u>B</u> ack <u>N</u> ext> Cancel	

2.3 Install of Virtual COM Port Driver

2.3.1Install on Windows 2000

Install virtual COM port driver using "Found New Hardware Wizard."

INF file, "vrcomdrv.inf" for virtual COM driver required for install is in the COM folder where the Pass Through function setting tool is installed.

Procedure

1 Once bus driver's installation is completed, the dialog box, "Found New Hardware Wizard" is displayed, and go forward with the installation following the directions of the wizard.



2 When the dialog box, "Install Hardware Device Drivers" is displayed, select "Display a list of the known drivers for this device so that I can choose a specific driver" and click "Next."

Found New Hardware Wizard		
Install Hardware Device Drivers A device driver is a software program that enables a hardware device to work with an operating system.		
This wizard will complete the installation for this device:		
Hitachi Systems_Services Pass-Through for User		
A device driver is a software program that makes a hardware device work. Windows needs driver files for your new device. To locate driver files and complete the installation click Next.		
What do you want the wizard to do?		
C Search for a suitable driver for my device (recommended)		
Ipisplay a list of the known drivers for this device so that I can choose a specific driver		
< <u>Back</u> Cancel		

3 When the dialog box, "Hardware Type," is displayed, select "Port (COM and LPT)" and click "Next."

Found New Hardware Wizard			
Hardware Type What type of hardware do you want to install?			
Select a hardware type, and then click Next.			
Hardware types:			
Multi-port serial adapters Metwork adapters NT Apm/Legacy Support Other devices PCMCIA adapters Potts (COM & LPT) Frinters SCSI and RAID controllers Sound, video and game controllers			
< <u>B</u> ack <u>N</u> ext >	Cancel		

4 When the dialog box, "Select a Device Driver" is displayed, click "Have Disk."

Found New Hardware Wizard		
Select a Device Driver Which driver do you want to in	nstall for this device?	
Select the manufacturer and have a disk that contains the Manufacturers:	d model of your hardware device and then click Next. If you le driver you want to install, click Have Disk. Models:	
[Standard port types] [Compag GSM Radio Card Ericsson GC25 SIIG Trans Digital Corporation	moges. Communications Port ECP Printer Port Multiport Communications Port Printer Port	
	Have Disk	
	< <u>B</u> ack <u>N</u> ext > Cancel	

5 When the dialog box, "Install From Disk," is displayed, click "Browse" and select "vrcomdrv.inf."



6 When the screen returns to the dialog, "Select a Device Driver," select "Pass-Through for User" from the list. Click "Next" to proceed and complete the installation.

Eight virtual COM port drivers will be installed automatically.

ound N	ew Hardware Wizard		
Sele \	ct a Device Driver Which driver do you want to install fo	r this device?	
Ţ	Select the manufacturer and mode have a disk that contains the drive	el of your hardware device a er you want to install, click H	nd then click Next. If you ave Disk.
Models:	: Ekrouals for AGP		
Pass-T	hrough for User		
			<u>H</u> ave Disk
		< <u>B</u> ack	Next > Cancel

- If the dialog box asking to reboot during the virtual COM port driver installation, select "No" for all requests.
 - You can confirm the installed virtual COM port by Device Manager. Select [Show hidden devices] on the [View] menu, and confirm that eight virtual COM port drivers are displayed.

2.3.2Installation on Windows XP

Install virtual COM port driver using "Found New Hardware Wizard."

INF file, "vrcomdrv.inf" for virtual COM driver required for installation is in the COM folder where the pass through function setting tool is installed.

1 Once bus driver's installation is completed, the dialog box, "Welcome to Found New Hardware Wizard" is displayed, select "No, not this time." and click "Next." (This dialog box may not be displayed depending on the environment.)



2 When the dialog box, "This wizard helps you install software for: Virtual COM Port" is displayed, select "Install from a list or specific location (Advanced)" and click "Next."



3 When the dialog box, "Please choose your search and installation options." is displayed, remove the check on "Search removable media (floppy, CD-ROM...)" and put a check in "Include this location in the search:" box

Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM)
Include this location in the search:
C.¥Program Files¥Pro-face¥Pass-Through¥COM Browse Browse
O Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< <u>Back</u> Cancel

4 Click "Browse," select the path where INF file for virtual Com driver is stored (COM folder where the pass through function setting tool is installed), and click "OK."

Browse For Folder	? ×
Select the folder that contains drivers for your hardwa	are.
🗉 🚞 Nifty Roaming	•
🕀 🗀 OfficeUpdate11	
🛅 Online Services	
🗀 Outlook Express	
🖃 🧰 Pro-face	
🕀 🛅 GP-Pro EX]
🖃 🧰 Pass-Through	
СОМ	-
To view any subfolders, click a plus sign above.	
OK Canc	el

5 When the dialog box, "The software you installing for this hardware: Pass-Through for User" is displayed, click "Continue Anyway" to complete the installation.

Hardwar	e Installation
<u>.</u>	The software you are installing for this hardware: Pass-Through for User
	has not passed Windows Logo testing to verify its compatibility with Windows XP. [Tell me why this testing is important.]
	Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
	Continue Anyway

6 There are eight virtual COM port drivers. Install all virtual COM port drivers, repeating procedure 1 through 5.

- If the dialog box asking to reboot during the virtual COM port driver installation, select "No" for all requests.
 - You can confirm the installed virtual COM port by Device Manager. Select [Show hidden devices] on the [View] menu, and confirm that eight virtual COM port drivers are displayed.

3 Setting

Set association between virtual Com made by virtual COM bus driver/virtual COM port driver and external device using the pass through function setting tool.

3.1 Setting with Pass Through Function Setting Tool

3.1.1Interface of Pass Through Function Setting Tool

• Pass Through Function Setting Tool

¢	💞 GP-Pro EX Pass-Through Configuration Tool 📃 📃 🗙			
F	File(E) Online(L) Option(O) Help(H)			
[COM No.	GP	Driver	Node
	COM2	192.168.000.102	QUTE Series CPU Direct	PLC1
			Add(A) Conf	ig(C) Delete(D)
		_		

Setup Items	Setup Description
Menu bar	Menu to operate pass through function setting tool is displayed. When these are selected, pull down menu is displayed.
COM No.	The currently set virtual COM port is displayed. Check box shows the current on-line status. When there is a check in the box, virtual COM port is on line.
GP	Connection method with GP is displayed.
Driver	Driver set on the GP is displayed.
Node	Name of external device connected to GP is displayed.
Add	Virtual COM connection is added.
Config	The setting of virtual COM registered in the pass through function setting tool is changed.
Delete	The setting of virtual COM registered in the pass through function setting tool is deleted.

• [Add]/[Edit] Dialog Box

Add	X
Please select the COM port that the application	on uses.
COM2	T
USB Q Series CPU Direct PassThrough_PLC1 PassThrough_PLC4 I92.168.000.102 - Added Q Series CPU Direct PLC1 PLC1 PLC2	Add(A) Delete(D) Find GP(E)
ОК	Cancel

Setup Items	Setup Description	
Please select the COM port that the application uses.	Virtual COM port used by an application such as ladder software is selected.	
List	USB or indicator connected on the Ethernet is searched, and the list of external device connected to the GP is displayed.	
Add	GP that cannot be found by search such as access beyond the rooter is added. GP is searched by inputting IP address in the displayed dialog box, and added to the list.	
Delete	GP is deleted from the list. Only GP that is added by "Add" button can be deleted.	
Find GP	USB or GP on the Ethernet is searched again. NOTE GP that is added by "Add" button is not deleted even if it is searched again. However, when an GP using the same IP address is searched, information is updated.	

3.1.2Setting with Pass Through Function Tool

1 From [Start Menu], select [Pro-face]-[Pass Through function setting tool] to start up the pass through function setting tool.

• An icon is displayed on the task bar while the Pass Through application is starting up. When right-clicking the Pass Through setting tool icon in the task bar, the menu is displayed, and select [Start the setting tool] in the menu.

- **2** If the Pass Through function setting tool is started up for the first time, the virtual COM driver is automatically adjusted. After the automatic adjustment of virtual COM driver completes, restart the PC.
- **3** Start up the Pass Through function setting tool again.

💏 GP	-Pro EX	Pass-Through Con	figuration Tool	_ 🗆 ×
File(E)	Online	(L) Option(O) Help(H	1)	
COM	l No.	GP	Driver	Node
<u> </u>				
<u> </u>				
-				
-				
<u> </u>				
			Add(<u>A</u>) Conf	ig(<u>C</u>) Delete(<u>D</u>)

- 4 Click "Add" from the dialog box of Pass Through function setting tool.
- **5** The list of usable external devices is displayed in the "Add" dialog box, select the virtual COM and external device to be used, and click "OK."



• If external device to be used is not displayed, click "Find GP." If it is not displayed even after the search, click "Add," a dialog box is displayed, and input IP address of the GP connected to the external device. 6 Combinations of associated virtual COM and external device are displayed in the dialog box of the Pass Through function setting tool. Place a check in the check box in the COM port column to make the combination on-line.

💞 GP-Pro EX Pass-Through Configuration Tool			
File(<u>F</u>) Onlir	File(E) Online(L) Option(O) Help(H)		
COM No.	GP	Driver	Node
COM2	192.168.000.102	QUTE Series CPU Direct	PLC1
			· · · ·
		A44(A) [0	(-(0) D-(-+-(0)

4 Error Messages

Error messages of pass through functions are as follows.

Error Message	Description
Timeout error is occurred.	Time out occurred when connecting with the setting registered in the pass through function setting tool. Check that the GP is connected.
Failed to open port of Virtual Com Driver.	Failed to open Virtual COM when connecting with the setting registered in the pass through function setting tool. Check that port number set by applications such as ladder software is the same.
The node is already connected.	Connected to the GP that has already been connected with pass through function. Check the connection status of pass through function with the pass through function setting tool.
Virtual COM port driver is not normally installed. Please install Virtual COM port driver	Virtual COM port driver is not properly installed. After deleting virtual COM port driver, reinstall.
The port number of virtual COM is overlaped. Please change virtual port number of virtual Com in the device manager	Port number of virtual COM duplicated. Change the corresponding COM port number with device manager.

5 Appendix

5.1 Uninstall of Virtual COM Bus Driver/Virtual COM Port Driver

- 5.1.1Uninstall on Windows 2000
- 1 Start up the "Add/Remove Hardware Wizard" on the Control Panel. The dialog box, "Welcome to Add/Remove Hardware Wizard" is displayed, and go forward with the installation following the directions of the wizard.

Add/Remove Hardware Wizard		
	Welcome to the Add/Remove Hardware Wizard This wizard helps you add, remove, unplug, and troubleshoot your hardware.	
	To continue, click Next.	
	< Back Next > Cancel	

2 When the dialog box, "Choose a Hardware Task," is displayed, select "Uninstall/Unplug device" and click "Next."

Add/Remove Hardware Wizard
Choose a Hardware Task Which hardware task do you want to perform?
 Select the hardware task you want to perform, and then click Next. Add/Troubleshoot a device Choose this option if you are adding a new device to your computer or are having problems getting a device working. Uninstall/Unplug a device Choose this option to uninstall a device or to prepare the computer to unplug a device.
< Back Next> Cancel

3 When the dialog box, "Choose a Removal Task," select "Uninstall a device" and click "Next."

Add/Remove Hardware Wizard
Choose a Removal Task You can remove a device permanently or temporarily.
Select the removal task you want to perform, and then click Next.
< <u>B</u> ack <u>Next></u> Cancel

4 When the dialog box, "Installed Devices on Your Computer" is displayed, select "Pass-Through for User (COMx)" from the list and click "Next."

Add/Remove Hardware Wizard		
Installed Devices on Your Computer The following hardware is installed on your computer.		
Select the device you want to uninstall.		
< <u>₿</u> ack <u>N</u> ext > Cancel		

5 When the dialog box, "Uninstall a Device" is displayed, select "Yes, I want to uninstall this device." Click "Next" to complete uninstall.

Add/Remove Hardware Wizard
Uninstall a Device Confirm that you want to uninstall this device.
Pass-Through for User (COM3) Are you sure that you want to uninstall this device?
• Yes I want to uninstall this device.
<u>Tes</u> , i want to uninstant mis device
V NO, I do not want to uninstali this device
< <u>Back</u> Cancel

- **6** Repeat the procedure 1 through 5, and delete "Pass-through for AGP (COMx)" and "Virtual COM Ports Bus Enumerator" device.
- 7 Open the folder, "C:\WINNT?inf" with the Explorer, etc., refer to "oemxx.inf" file with editor, and delete files containing "VRCOMBUS.INF" and "VRCOMDRV.INF" string at the header of the file. Delete "oemxx.PNF" file at the same time.
 - **NOTE** "C:?WINNT" stands for a file where the OS is installed.
 - When looking for the onemxx.inf file to be deleted, searching for the bigger figure of xx is effective.
- 8 Open the folder "C:\WINNT\SYSTEM32\DRIVERS" with the Explorer, etc., and delete "vrcombus.sys," "vrcomgdrv.sys," and "vrcomudrv.sys" files.
- 9 Open the folder "C:\WINNT\SYSTEM32" with the Explorer, etc., and delete "vrcomctrl.dll" file.
- 10 Start up the registry editor, open the paths below, and delete entire key. "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Service\vrcombus" "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Service\vrcomgdrv" "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Service\vrcomudrv"
- **11** Reboot the computer.

IMPORTANT • Always reboot the computer after uninstallation.

- 5.1.2Uninstallation on Windows XP
- **1** Start up the device manager.
- 2 Select the virtual COM port to be deleted from the device list, "Ports (COM & LPT)" by clicking right-button of the mouse, and select "Uninstall" from the displayed menu.



3 Repeat the procedure 2 to delete all virtual COM ports.

- 4 Select "Virtual COM Ports Bus Enumerator" from the device list "System device" by clicking right-button of the mouse, and select "Delete" form the displayed menu.
- 5 Open the folder, "C:\WINDOWS\inf" with the Explorer, etc., refer to "oemxx.inf" file with editor, and delete files containing "VRCOMBUS.INF" and "VRCOMDRV.INF" string at the header of the file. Delete "oemxx.PNF" file at the same time.

NOTE • "C:?WINDOWS" stands for a folder where the OS is installed.

- When looking for the onemxx.inf file to be deleted, searching for the bigger figure of xx is effective.
- 6 Open the folder "C:\WINDOWS\SYSTEM32\DRIVERS" with the Explorer, etc., and delete "vrcombus.sys," "vrcomgdrv.sys," and "vrcomudrv.sys" files.
- 7 Open the folder "C:\WINDOWS\SYSTEM32" with the Explorer, etc., and delete "vrcomctrl.dll" file.
- **8** Start up the registry editor, open the paths below, and delete entire key.

 $``HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Service\vrcombus''$

 $``HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Service\vrcomgdrv''$

"HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Service\vrcomudrv"

9 Reboot the computer.

IMPORTANT • Always reboot the computer after uninstallation.