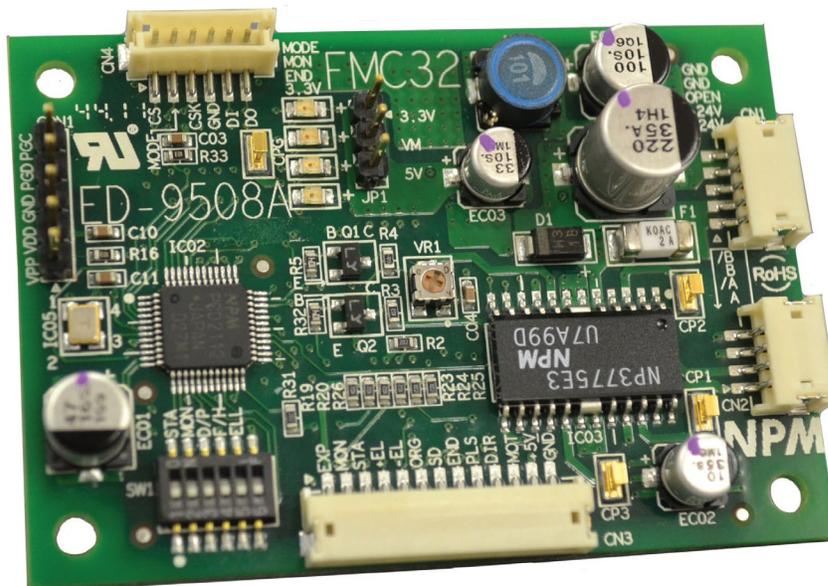


PUSB User's Manual

FMC32

Compact Controller with Integrated Driver



NPM

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1. Preface

Thank you for considering "PUSB3503", a USB to 4 wire serial conversion UNIT.

The "PUSB3503" is an unit for connecting FMC32 that is a compact controller with built-in driver and has a 4-wire serial interface to connect with your PC.

This manual describes the "PUSB3503" specification and how to use "PUSB3503".
Please read this manual thoroughly to use this product's functions.

This manual does not describe the following functions.

- FMC32 hardware function
- FMC32 Verification method on PC and how to write execution sequence program
- The detail of PCD2112 registers

Please refer to our user's manual about these LSI's function and the detail of registers (described below).

- Compact controller with integrated driver FMC 32 Hardware User's Manual
Document No. YA7174
- Compact controller with integrated driver FMC32 Control software User's Manual
Document No. YA7175
- Pulse Control LSI for Serial Bus Control, PCD2112 User's manual
Document No. DA70115

2. Warranty

2-1. In the case of purchase from a supplier other than NPM

Regarding the product warranty in the case of purchase from a supplier other than NPM, please contact to the supplier

2-2. Warranty period

The warranty period is one year from the date of the delivery to an assigned place.

2-3. Warranty scope

If defects are found in the product during the warranty period under normal use following this document, NPM will repair the product without charge. However, the following cases are not covered by the warranty and free repair does not apply to the product even during the warranty period.

- The products are modified or repaired by anyone other than NPM or an authorized person by NPM.
- The defect results from falling of the product after delivery or mishandling in transit.
- -Wearing of components, natural deterioration or fatigue (motor axle bearing, gear, grease, cables, etc.)
- The defect results from any use other than original use.
- The product has been subjected to natural disaster or force majeure such as fire, earthquake, lightning strike, wind and flood, salt, and electrical surges.
- The defects or damage results from the cause other than the fault of NPM.

Note 1) Products exported outside of Japan are not covered by this warranty.

Note 2) Only if the product with defects is carried to the specific place to repair, NPM will repair the product and we will not provide on-site repair.

Note 3) The warranty period of the repaired product is not extended beyond the warranty period of the product before the failure. It is the same as the warranty product of the product before the repair.

Note 4) This warranty covers the product. It does not cover the detriments caused by the product's defects, etc.

Note 5) A replacement may be provided instead of a repair at the direction of NPM.

This documents aims to describe the detail of the function of the product and it does not warrant fitness for a particular purpose of the customers.

The examples of application and circuit diagram in this manual are described for your reference. Please confirm the feature and the safety of device or equipment before use.

Please do not use this product for the following use in principle.

If you use the product for the following use, please contact our sales department.

- Any equipment that may require high reliability or safety, such as nuclear facility, electricity or gas supply system, transportation facilities, vehicle, various safety system, medical equipment, etc.
- Any equipment that may directly affect human survival or property
- Usage under conditions or circumstances that are not specified in the brochure, manual, etc.

When this product is used in any equipment where faults or malfunctions may directly affect human

survival or property, please secure high reliability and security with redundancy design, etc.

3. Function

USB control

Connect with USB (Ver 2.0) and control using PC (Communication speed is 12Mbps.).

Software

PC software (FMC32Vxxx.exe) for FMC32 using PUSB3503 can be available.

4. Handling precautions

Inputting power

Do not connect or disconnect connectors while this board or peripheral circuits are supplied with power.

Static electricity

This board uses a CMOS device. Therefore this board must be stored in order to prevent damage from static electricity.

Connections to electrically noisy devices

Interference from excessively noisy devices or from power surges on the power and I/O circuits may cause the board to malfunction. To connect to a device that may generate electrical noise, we recommend taking countermeasures, such as attaching a protective circuit to the input/output circuits. However, it is best not to share the same power supply with noise generating sources.

5. Specifications

Specifications of each unit are as follows.

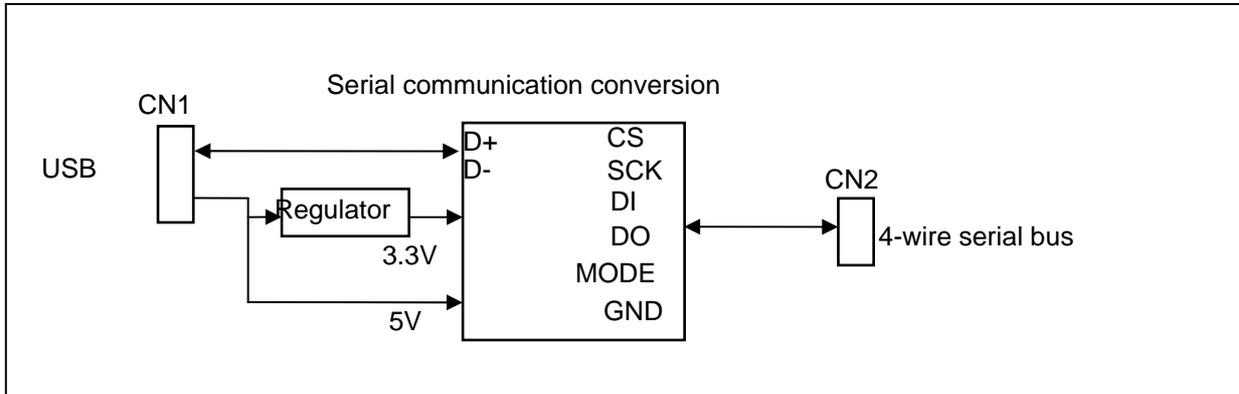
[PUSB3503]

| Item | Specifications |
|-------------------------------------|-----------------------------------------------------------------|
| USB | |
| USB | Ver2.0 full speed (12Mbps) |
| Function | |
| Serial communication method | 4-wire serial bus |
| Power supply and environment | |
| Required power | USB bus power |
| Power indicator | Red LED is turned on while power is supplied. |
| Operating temperature range | 0 to +40°C |
| Operating ambient humidity | 80%RH or less (Non condensing through the10°C to 40°C range) |
| Measures for environmental problems | Complies with the RoHS requirement |
| Weight | Not measured |
| Dimensions | W30 x D40 x H20 (Unit: mm) |

6. Configuration

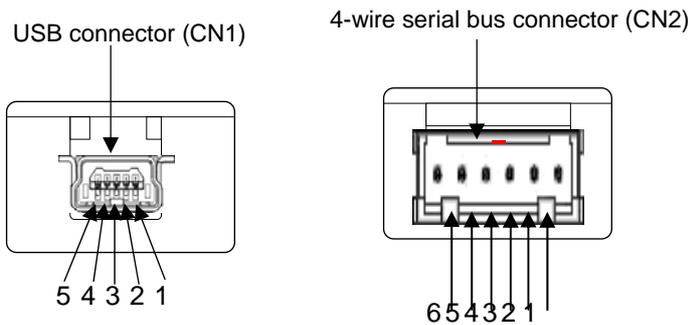
The block diagram is as follows.

[PUSB3503]



7. Connector pin assignment

7-1. PUSB3503



7-1-1. CN1 (USB Connector)

Connect USB signals with the PC.

| NO | Signal name | Function | Signal direction | NO | Signal name | Function | Signal direction |
|----|-------------|---------------------------------------|------------------|----|-------------|---------------------|------------------|
| 1 | VBus | USB cable connection detection signal | I | 2 | D- | USB signal data (-) | I/O |
| 3 | D+ | USB signal data (+) | I/O | 4 | N.C. | | |
| 5 | GND | Ground | | | | | |

Note 1. The signal directions above refer to the signal flow direction as seen from the board:

"I" = Input and "O" = Output.

Note 2. N.C. means no connection.

7-1-2. CN2 (4-wire serial bus connector)

Connect 4-wire serial bus.

| NO | Signal name | Function | Signal direction | NO | Signal name | Function | Signal direction |
|----|-------------|---------------|------------------|----|-------------|--------------|------------------|
| 1 | CS | Select signal | O | 2 | GND | Ground | |
| 3 | SK | Serial clock | O | 4 | GND | Ground | |
| 5 | DO | Serial output | O | 6 | DI | Serial input | I |

Note 1. The signal directions above refer to the signal flow direction as seen from the board:

"I" = Input and "O" = Output.

7-2. Connectors used

The model names of the connectors used on this board are shown below.

7-2-1. PUSB3503

| NO | Mfg. | Model name | Remarks |
|-----|-------|-------------------|-------------------------------|
| CN1 | Molex | 548490572 | USB,series miniB connector |
| CN2 | HRS | DF1B-6P-2.5DS(01) | 2.5mm pitch, connector 6 pins |

USB cable (Series A plug-miniB plug) is attached to this board.

8. Signals and functions

8-1. USB (Vbus , D+ , D-)

Function

It connects with USB port on the PC and sends / receives data.

Precautions for USB connection

1. Connection with HUB

This product runs using power from VBus of USB and uses 150mA from it.
Therefore, an USB may not run normally when it is used in multi-layers using HUB.

2. Power saving mode of PC

Recently, the power saving mode of PCs (especially notebook PCs) is often used.
Depending on the setting regarding the power saving mode, power supplied to the USB may be forcibly limited. In such cases, the USB cannot run normally. Turn off the power saving mode on your PC before you use this product.

8-2. 4-wire serial communication

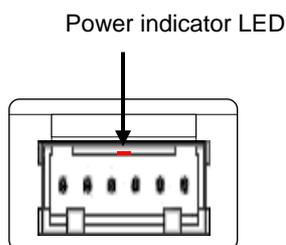
Function

Bus for serial communication to control with 4-wire signals.
Power is not supplied from USB.

9. Status display

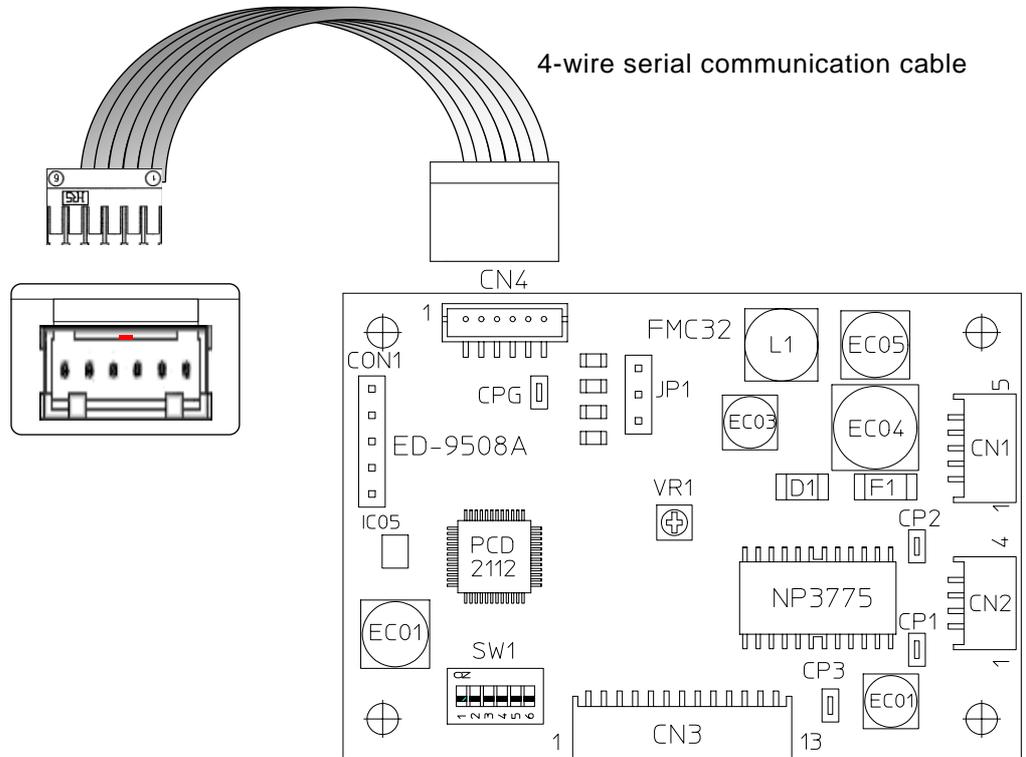
9-1. PUSB3503 power indicator LED

When power is supplied from USB, the LED on the board that CN2 is mounted lights on. Light color is red.



10. Connection between PUSB3503 and other products.

To connect this system, use the attached 4-wire serial communication cable and connect as follows. (4-wire serial communication cable has two GND lines, therefore it has 6 lines.) The below is an example of connection with FMC32.



11. Installation

11-1. Hardware requirements

| Item | Recommended conditions |
|---------|-----------------------------------|
| OS | WindowsXP |
| HDD | 2Mbyte |
| Display | Resolution is more than 1024x768. |

11-2. Installation of this product

In order to use this product, install PUSB3503.

There are two kinds of installation : software installation and hardware installation.

Especially, hardware installation may be needed for every PC (USB port) used.

11-2-1 Software installation

To install this software, use the "Windows installer".

Install it under this program while logged in with administrator privileges on your PC.

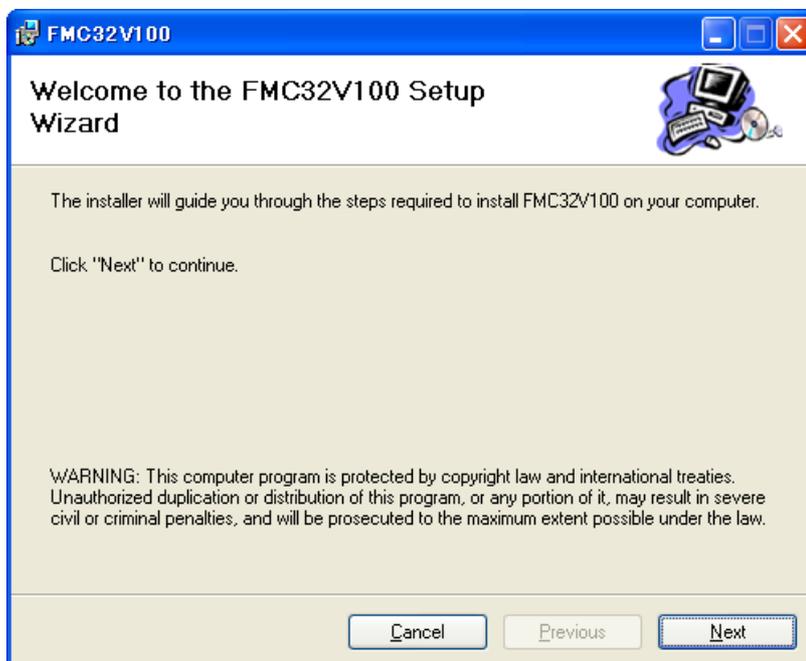
11-2-1-1. Running the installer

Double-click the file named "FMC32Vxxx.msi".

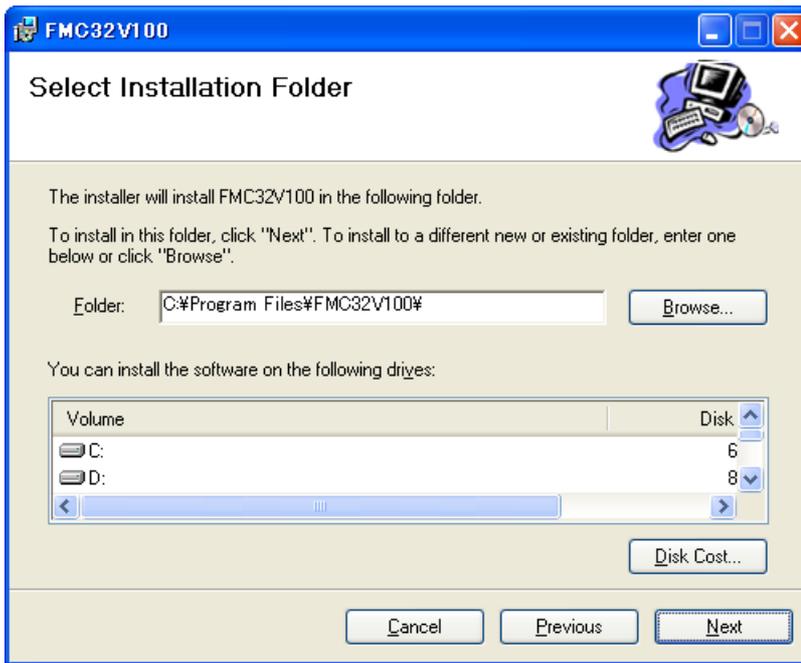
("xxx" shows a version.)

The following window appears.

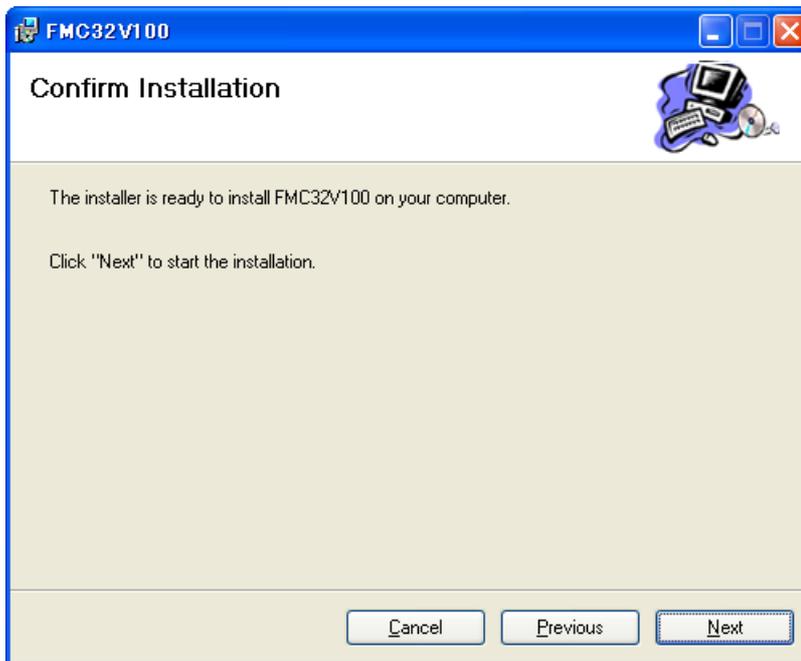
The following is an example of FMC32V100.



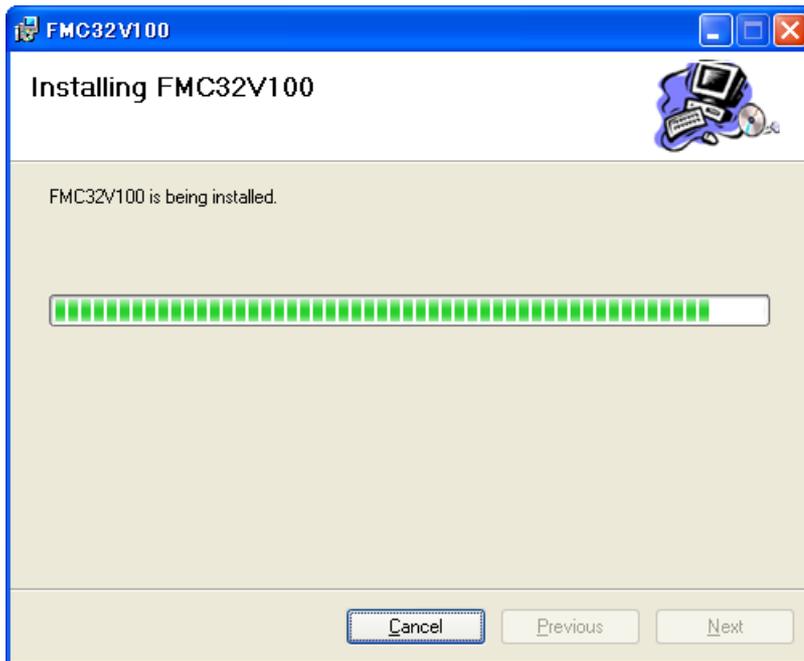
Click the "Next" button.



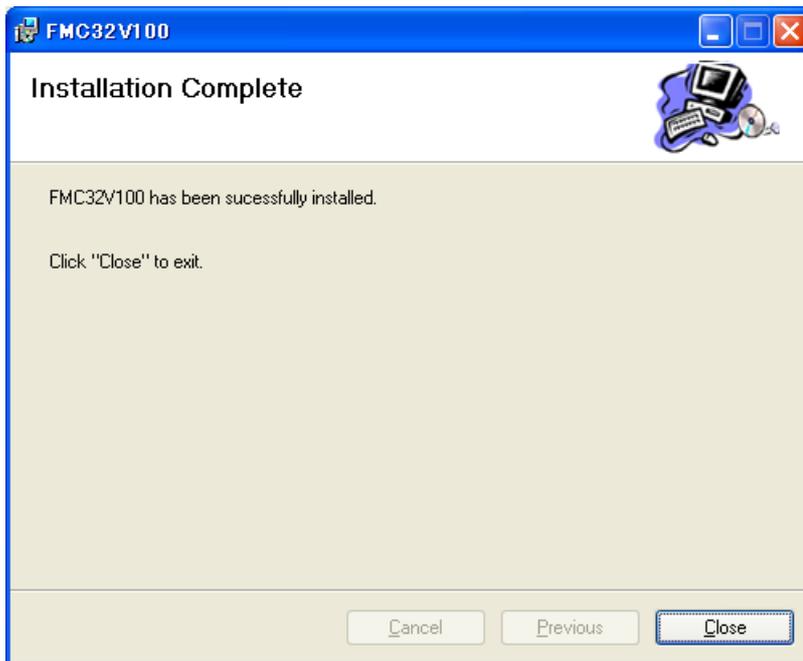
On this window, select the folder in which the software is installed. After you select, click the "Next" button.



Click the "Next" button.



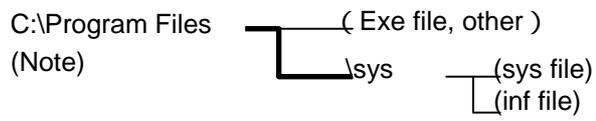
Now FMC32V100 is being installed.



Installation is completed.
Click the "Close" button.

11-2-1-2. Folder structure after installation

After installation is completed, the following folder structure is made generally.



(Note): When you specify the folder to be installed, the specified folder is shown.

11-2-2. Hardware installation

After you install software in advance, install hardware.

After this product is connected with the USB port of PC, PC recognizes it as a new device. The following example is using an English OS. The window is different in different OS, version and language.

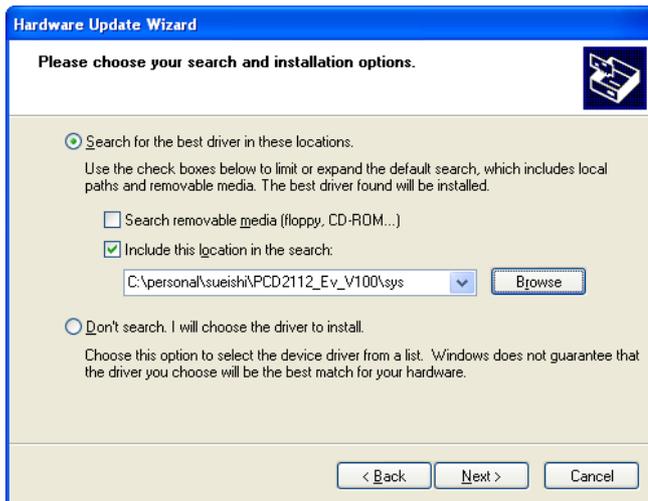
When installing under WindowsXP with or without SP1, connection to Internet should be removed (Such as removing cables, etc.). When using WindowsXP with SP2, you do not have to remove connection to Internet.



Check the "No, not this time" option and click the "Next" button.



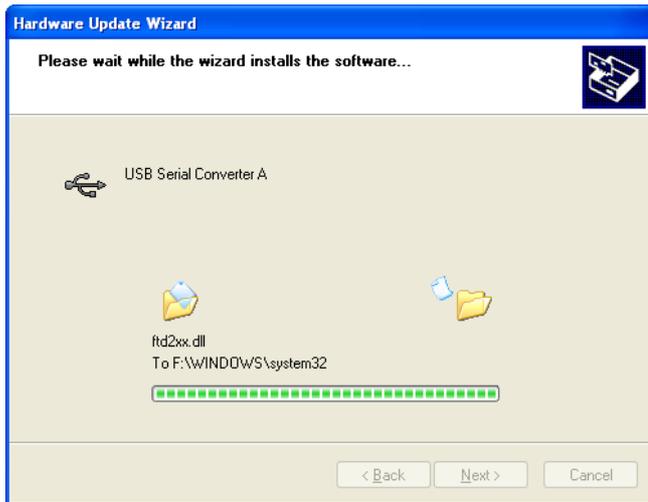
Check the "Install from a list or specific location" option and click the "Next" button.



Click the "Browse" button and select the "sys" folder in the folder installed in advance. Check the checkbox to search the specified folder and click the "Next" button.



In the case that the above message appear, click the "Continue Anyway".



The device driver is installed.



Due to the nature of this IC, you have to install this device driver twice. After the second operation is completed, installation is completed.

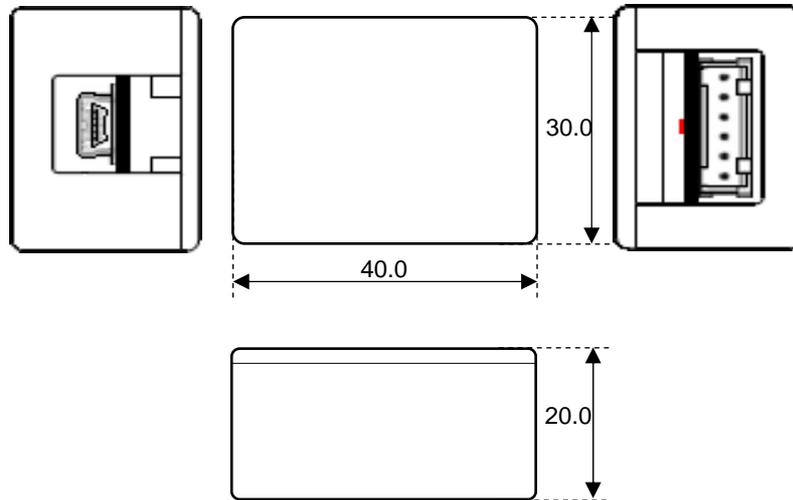
The device driver that is installed is made by FTDI Ltd.(FT2232)
About the detailed information or other device drivers, please see the following web site.

<http://www.ftdichip.com/Drivers/D2XX.htm>
<http://www.ftdichip.com/Support/Documents/InstallGuides.htm>

12. External dimensions

The external dimensions are shown below.

12-1. PUSB3503



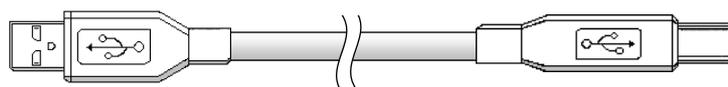
Unit: mm

13. Accessories

This product comes with the following parts.

- 1) USB cable (1.0m)
- 2) 4-wire serial bus cable (approximately 0.2m) x 1

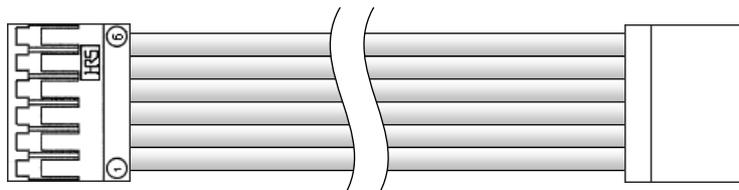
USB Cable



Series A plug

Series mini B plug

4-wire serial bus cable



[MEMO]

CAUTION

The descriptions in this manual may be changed without prior notice to improve performance or quality.

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