TPS-1

Add TPS-1 into TIA Portal

Introduction

This application note describes how to add TPS-1 device into Siemens TIA Portal.

Target Device

TPS-1

Contents

1. Software requirement

To add TPS-1 into TIA portal, we need to prepare the software below.

1.1 TIA Portal V13

TIA portal is software developed by Siemens which is mainly used for automation. SIMATIC STEP 7 in the TIA Portal is the software for the configuration, programming, testing, and diagnosis of all SIMATIC controllers. With user-friendly functions, TIA portal ensures significant cost savings for all automation tasks.

1.2 GSD file V2.3 for TPS-1

The GSD file allows for a textual description of some attributes of a PROFINET field device. In the example of this application note, the GSD file template in TPS Development Toolkit V.1.2.4.6 is used.

2. Hardware Configuration

Figure 2.1 shows the hardware connection of the example system. The system consists of Siemems Smatic S7-1200 PLC, TPS-1 remote IO target board and Windows 7 PC. All the components in the system are connected by Ethernet cable.
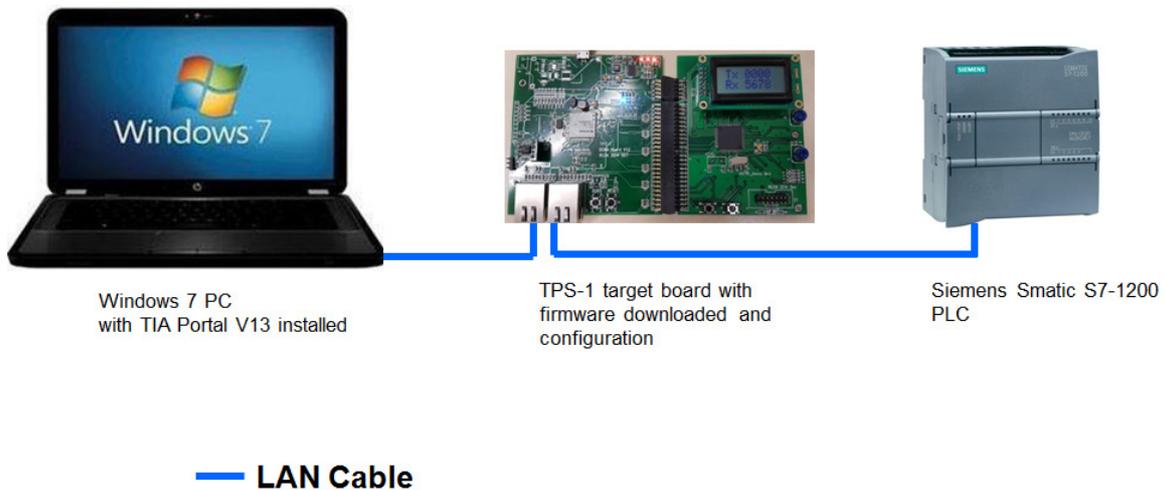
Figure 2-1   Hardware Configuration

2.1   TPS-1 Target Board

Starter kit SK-TPS-1 can be used as the TPS-1 target board in the example of this application note. The firmware in "TPS-1 Development Toolkit 1.2.4.6" needs to be programed in the target board first. For more detail about firmware download and configuration, please refer the document in "TPS-1 Development Toolkit 1.2.4.6".

2.2   Siemens Smatic S7-1200 PLC

Siemens's PLCs are widely used in factory automation. In the example of this application note, Smatic S7-1200 was used. S7-1200 can provide the basic functions of PLC, which is enough to demonstrate the features of TPS-1 PROFINET remote IO.

2.3   MS Windows 7 PC

TIA portal needs to be installed in MS Windows 7 or above. With TIA portal, the PC can download the software and hardware configuration to Smatic S7-1200 PLC. The exchange data between PLC and PROFINET remote IO can be monitored by the TIA portal software in PC.

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3.   Add TPS-1 device into TIA Portal

In this chapter, the procedure of adding TPS-1 device will be explained. After completed the procedure below, the TPS-1 device can be added in TIA portal, and the data can be exchanged between S7-1200 PLC and TPS-1 remote IO device.

3.1   Install GSD file

A GSD file (device data file) contains all the DP slave properties. If you want to configure a DP slave that does not appear in the hardware catalog, you must install the GSD file provided by the manufacturer. DP slaves installed via GSD files are displayed in the hardware catalog and can then be selected and configured.

To install GSD file, click **Option -> Install general station description file (GSD)**, see Figure 3-1.
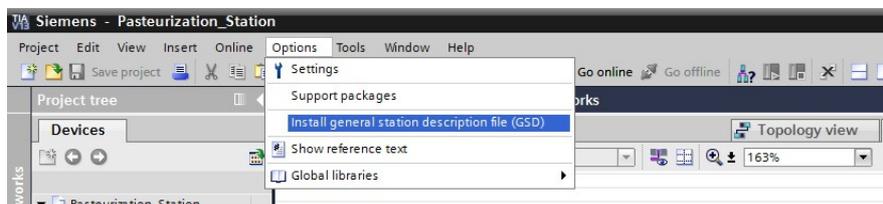
Figure 3-1   Install GSD file

Select the GSD file for TPS-1, see Figure 3-2.
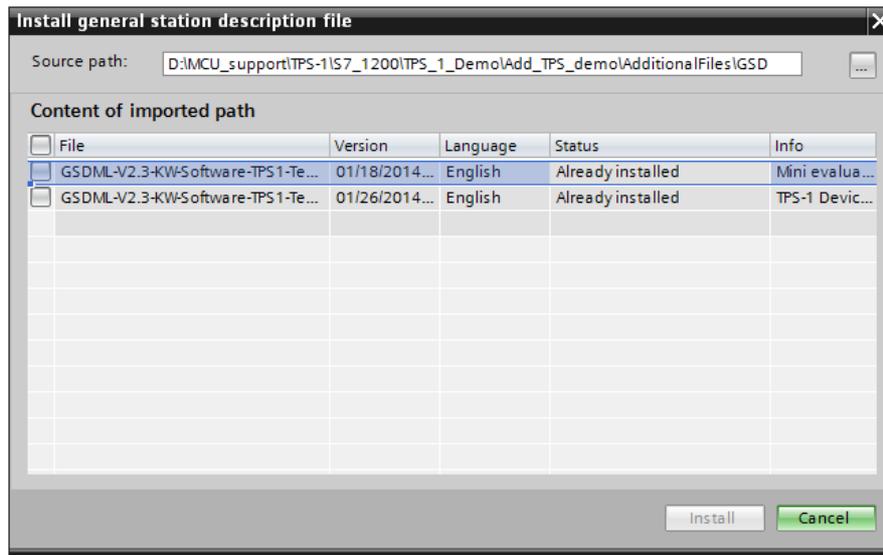
Figure 3-2   Select GSD file

After installed the GSD file of TPS-1 Template, the device will appear in Hardware catalog. See Figure 3-3.

After installed the GSD file, the device will appear in Hardware catalog
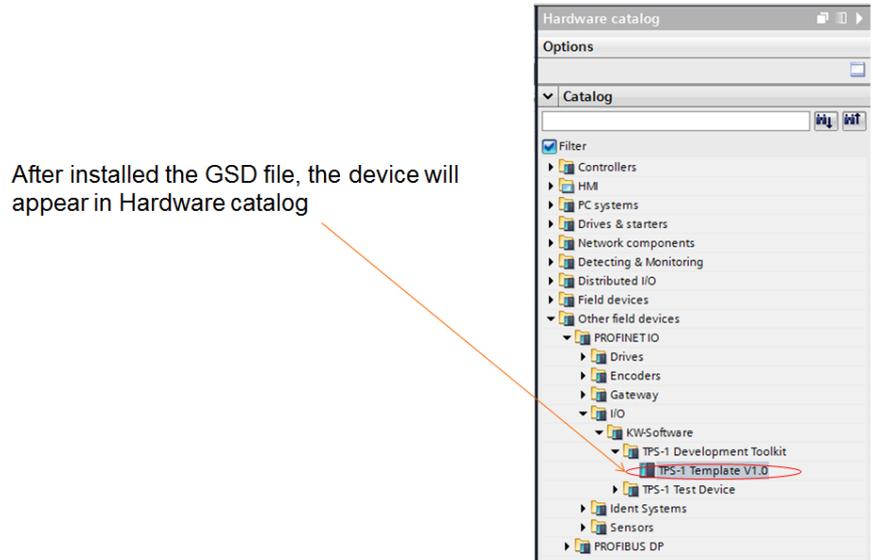
Figure 3-3   Device in Hardware Catalog

3.2   Add TPS-1 Device into Network View

The network view is one of three working areas of the hardware and network editor. You can undertake networking devices with one another

To add TPS-1 device into network view, drag and drop the TPS-1 device from Hardware catalog to Network view (Figure 3-4).
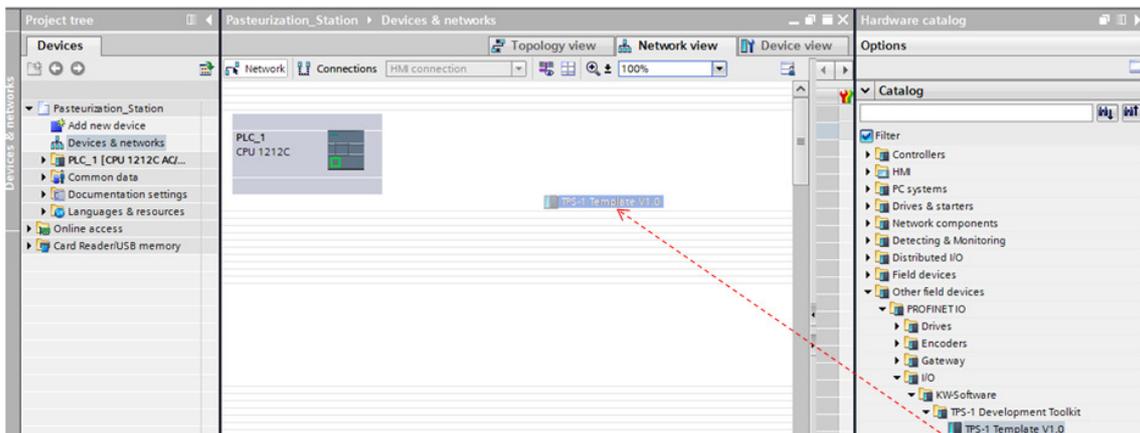
Figure 3-4   Add into Network View

3.3   Connect PLC and TPS-1 in Network View

To connect the PLC and TPS-1 device, click the "Not assigned" label of TPS-1 device, and then select IO controller (e.g. PLC_1) . See Figure 3-5.
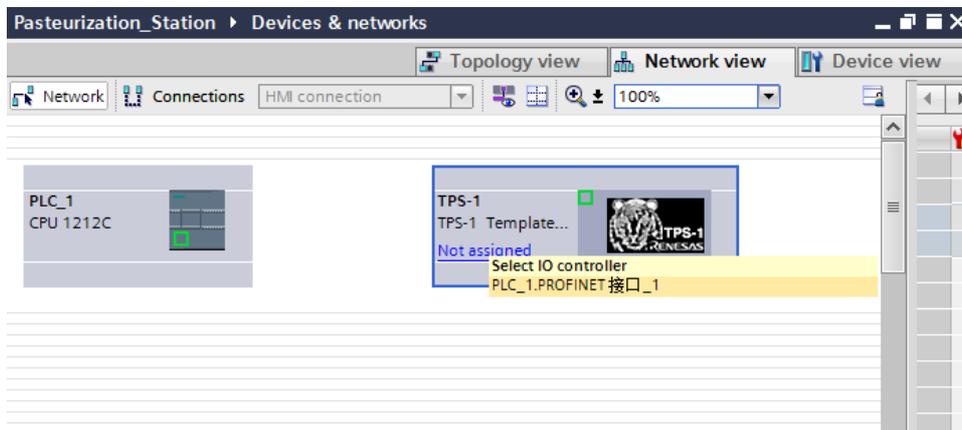
Figure 3-5   Connect PLC and TPS-1

After selected the PLC, the link will be established in Network view (Figure 3-6).
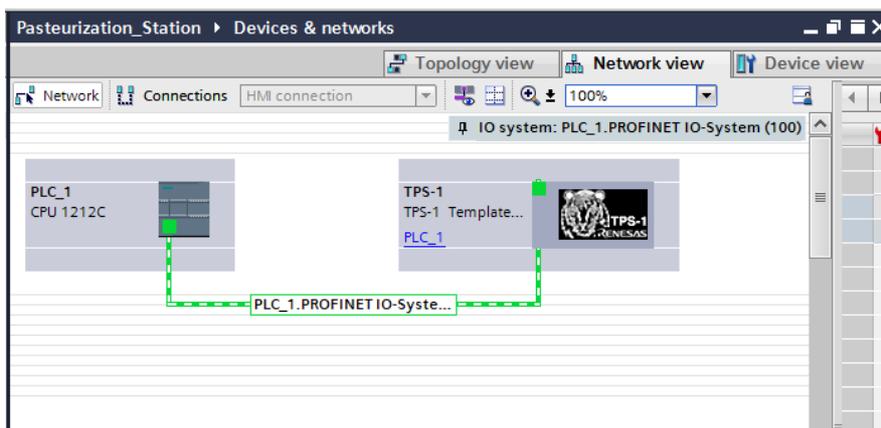
Figure 3-6   Network View

3.4   Assign Device Name for TPS-1

In a PROFINET system, device name is used as the identifier of the PROFINET remote IO device. Thus, each PROFINET remote IO device must be assigned with a device name.

To assign a device name to TPS-1 device, right click the TPS-1 chip in Network view and click **Assign device name** (Figure 3-7)**.**
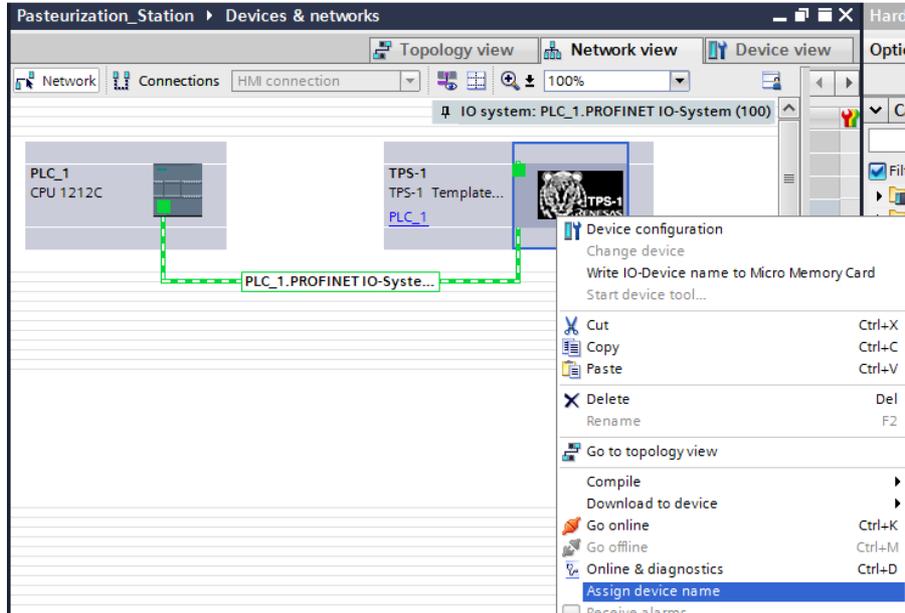
Figure 3-7   Assign Device Name

After that, all the PROFINET devices in the network will be listed out.
Select the corresponding TPS-1 device to assign a device name (Figure 3-8).
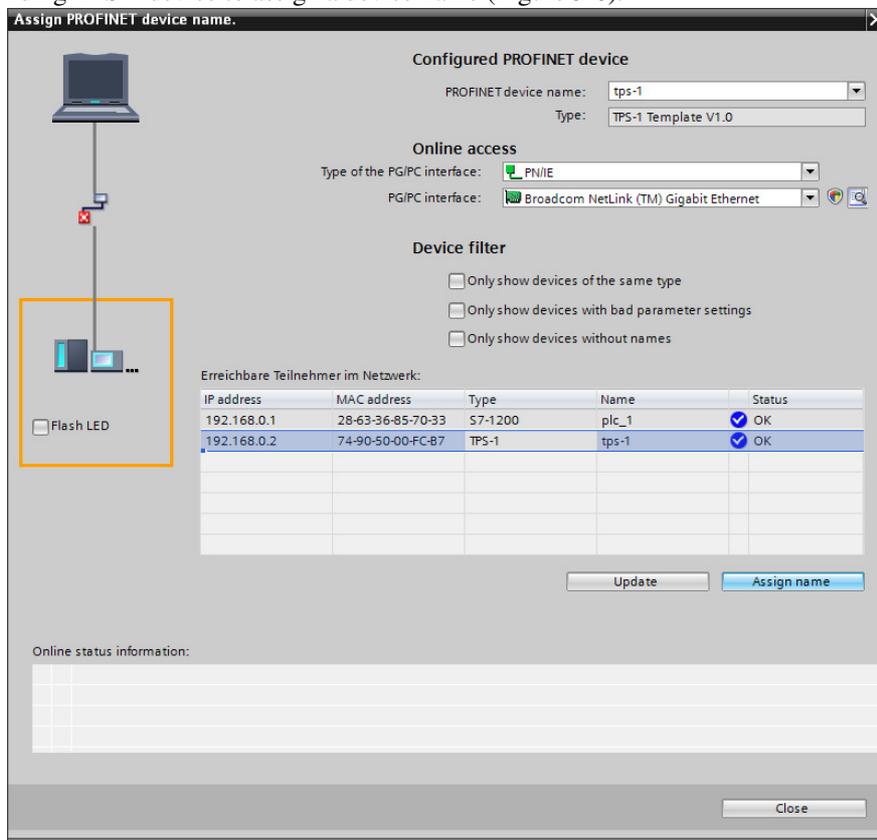
Figure 3-8   PROFINET Devices

3.5   Update I/O Image

In order to synchronize the memory of remote IO and PLC, the process image option needs to be set as automatic update. The procedure is shown as below.

Right click **IN/OUT_1** of TPS-1 in project tree, and click the **Properties** (Figure 3-9).
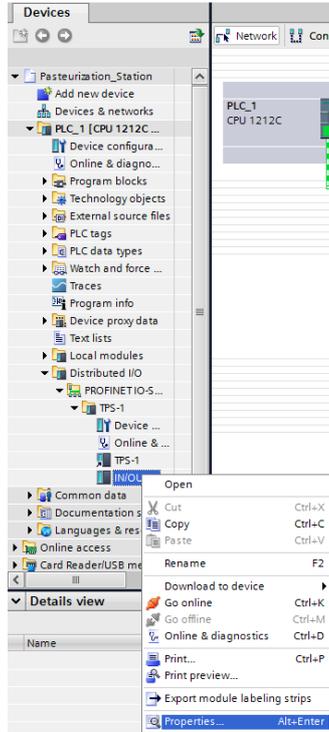
Figure 3-9   Update I/O Image

Select **I/O address**, then modify **Organization block** in **Input addresses** and **Output address** to **---(Automatic update).** See Figure 3-10.
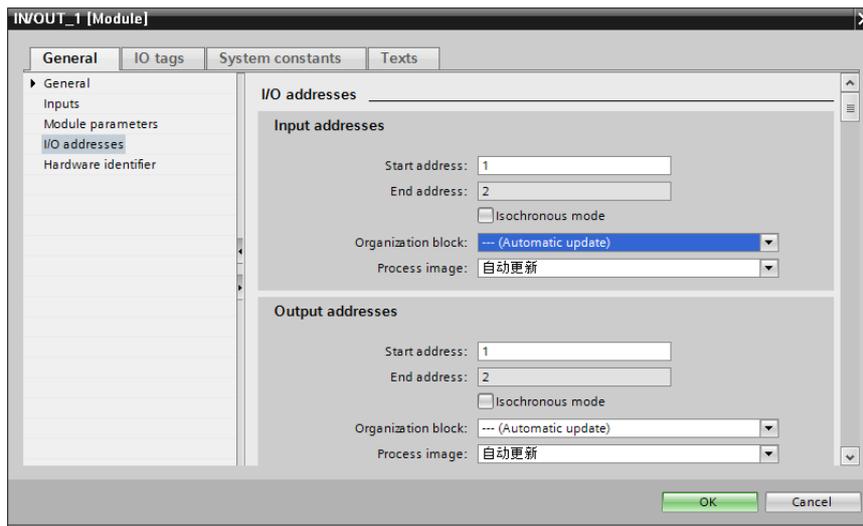
Figure 3-10   I/O Address Setting

3.6   Download Hardware Configuration

After completed the previous steps, the hardware configuration needs to be download to the PLC.

Right click the TPS-1 device in topology view and select **Download to device** -> **Hardware configuration** to download the hardware configuration to PLC (Figure 3-11).
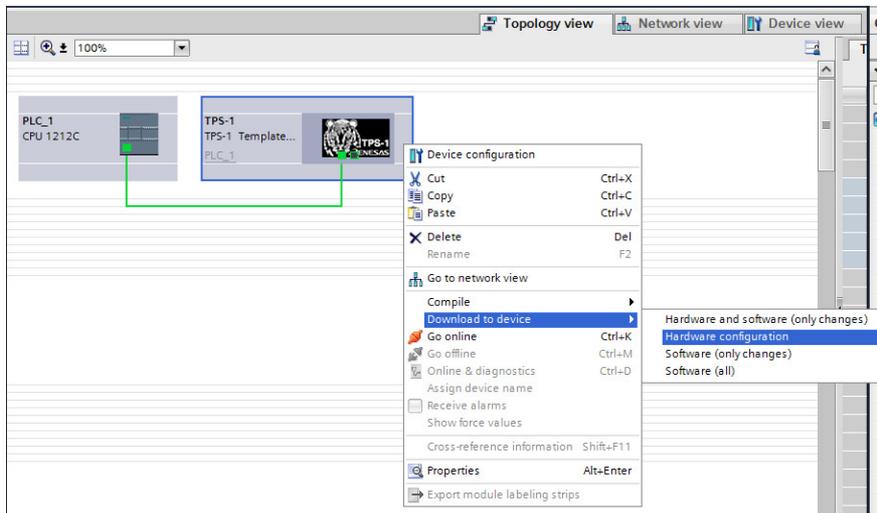
Figure 3-11   Download Hardware Configuration

3.7   Add Variables of Remote I/O

To view or modify the remote I/O, we can add variable in **PLC tags** in project tree first (Figure 3-12).
e.g.   Remote_IO_I (Address: %IW1)
         Remote_IO_O (Address: %QW1)

Q: output, I: input W: Word (2Bytes)
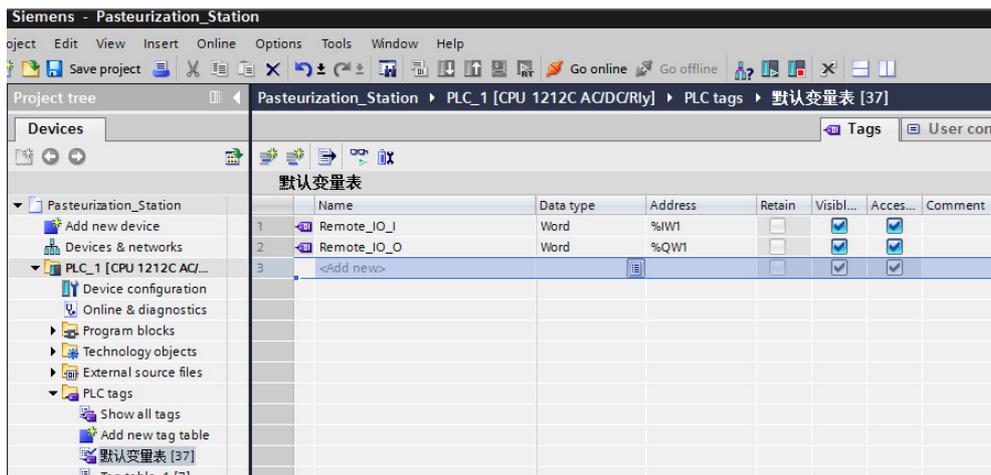
Figure 3-12   Variables of Remote I/O

3.8   View and Modify Variables of Remote I/O

The variables can be viewed and modified in **Watch and force tables** in project tree. The change of output variable will reflect in the output of TPS-1 device (Figure 3-13).

Figure 3-13   View and Modify Variables

Appendix - Glossary

GSD file
- General Station Description file. It is used to describe PROFINET IO field devices.

GSDML
- General Station Description Markup Language. It is a XML based language for writing GSD file.

PROFINET
- It is a standard for Industrial Ethernet. PROFINET is defined by PROFIBUS and PROFINET International (PI)

PLC
- Programmable logic controller. Siemens Simatic S7-1200 was use as example in this document.

TPS-1
- Renesas PROFINET IO Device Chip.

Website and Support

Renesas Electronics Website
http://www.renesas.com/

Inquiries
http://www.renesas.com/contact/

Revision History

Rev.	Date	Description	
		Page	**Summary**
1.00	Jun. 1 2015	---	First edition issued

General Precautions in the Handling of MPU/MCU Products

The following usage notes are applicable to all MPU/MCU products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Handling of Unused Pins

    Handle unused pins in accordance with the directions given under Handling of Unused Pins in the manual.

    — The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible. Unused pins should be handled as described under Handling of Unused Pins in the manual.

2. Processing at Power-on

    The state of the product is undefined at the moment when power is supplied.

    — The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the moment when power is supplied.
    In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the moment when power is supplied until the reset process is completed.
    In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the moment when power is supplied until the power reaches the level at which resetting has been specified.

3. Prohibition of Access to Reserved Addresses

    Access to reserved addresses is prohibited.

    — The reserved addresses are provided for the possible future expansion of functions. Do not access these addresses; the correct operation of LSI is not guaranteed if they are accessed.

4. Clock Signals

    After applying a reset, only release the reset line after the operating clock signal has become stable. When switching the clock signal during program execution, wait until the target clock signal has stabilized.

    — When the clock signal is generated with an external resonator (or from an external oscillator) during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Moreover, when switching to a clock signal produced with an external resonator (or by an external oscillator) while program execution is in progress, wait until the target clock signal is stable.

5. Differences between Products

    Before changing from one product to another, i.e. to a product with a different part number, confirm that the change will not lead to problems.

    — The characteristics of an MPU or MCU in the same group but having a different part number may differ in terms of the internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

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