

TPS-1

R18AN0033EJ0100

Rev.1.00

2017/04/25

TPS-1 Solution Board Startup Manual

Introduction

This manual describes how to use the TPS-1 Solution Board, which allows you to evaluate LSI TPS-1 for PROFINET communication without requiring proprietary hardware on the user side.

Target Device

TPS-1



TPS-1

 Overview 1.1 Overview 	5 5
2 TPS-1 Solution Board Hardware Configuration	6
2.1 Board Lists	0 6
3. General Specifications	7
3.1 Electrical specifications	7
3.2 Specifications	7
3.3 Environmental Specifications and Weight	8
3.4 Communication Specifications	8
4 TPS-1 Main Board Blocks and Descriptions	٩
4. TPS-1 Main Board Block Diagram	3 م
4.1 TPS-1 Wall Board Block Diagram	9 Q
4.3 External Memory (Serial Flash Memory)	10
4.4 Power Supply	10
	11
4.6 LIART	12
4.7 Reset Circuit	12
4.8 LEDs	13
4.8.1 PROFINET indicator	13
4.8.2 Power indicator	13
4.9 Mode Switches	14
4.9.1 TRSTN jumperJ2	14
4.9.2 Boot mode switching jumper J6	14
4.10 Multi-board Interface J14	15
5. CPU Board	16
5.1 Overview	16
5.2 Connectors, Switches and LEDs	16
5.2.1 Reset Switch SW10	16
5.2.2 General-purpose Slide Switch SW11	16
5.2.3 General-purpose Push Switch SW12	17
5.2.4 General-purpose LEDs LED8-LED11	17
5.3 Parallel Host Interface Bus Width Switching Jumpers	18
5.3.1 Bus width switching	18
6. I/O Board	19
6.1 Overview	19
6.2 Switches and LEDs	19
6.2.1 LEDs for Output Display	19
6.2.2 Slide Switches for Input	20
7. Setting Up theTPS-1 Environment	21



7.1 Preparing the TPS-1 Development Toolkit	21
7.1.1 Downloading the PROFINET TPS-1 Development Toolkit	21
7.1.2 Application Installation	21
7.1.3 Preparing the GSDML File	22
8. TPS-1 Stack Preparation	23
8.1 Creating a TPS-1 Stack Image File	23
8.1.1 Setting the Vendor ID and Device ID	23
8.1.2 Creating an image file	24
8.2 Creating a TPS-1 Ethernet Updater Image File	26
8.2.1 Changing the header file	
8.2.2 Creating an image file	
8.3 Creating a TPS FWUpdater Work Folder	
8.3.1 Creating a work folder	
8.3.2 Copying image files to the work folder	28
9 Setting up the TPS-1 Solution Board	20
9.1 Connecting the TPS-1 Main Board and Computer	29 20
9.1 Computer network settings	29
9.1.1 Computer network settings	29
9.1.2 Connecting the Tro-Trivian Doard and Computer	29 30
3.1.5 Terminal program settings	
10. Booting the TPS-1 Solution Board	31
10.1 TPS-1 Configuration Settings	
10.1.1 Sending the Starter program (TPS_Starter.s)	
10.1.2 TPS Configurator Settings for Operation Modes	
10.1.3 Send TPS Configurator Settings	
10.2 TPS-1 Firmware Updates	45
10.2.1 Editing DAT files for TPS FWUpdater (Part 1)	45
10.2.2 Booting TPS FWUpdater	45
10.2.3 TPS-1 Ethernet updater image file write check	
10.2.4 Checking the image file write results	46
10.2.5 Editing DAT files for TPS FWUpdater (Part 2)	47
10.2.6 Checking TPS-1 stack image file write	47
10.2.7 Checking the image file write results	
10.2.8 After FW update is complete	
11. Writing a Sample Program for the CPU Board	50
11.1 Connecting the CPU board (RX231) and Computer	50
11.2 CPU Compiler Package Installation	51
11.2.1 Writing an RX231 sample program	51
12 Startup PROFINET Communication	55
12.1 Defining FROFINET Device Names	
12.1.1 Oreanny a seminys me	55
12.1.2 PROFINET Configurator	55 57
12.1.2 PROFINET Configurator	



12.2.1 PROFINET Smart Control Express	67
12.2.2 Confirm I/O Board Operations	69
12.2.3 Confirm CPU Board Operations	71
13. Appendix A	•••••
13. Appendix A 13.1 Erasing the Flash Memory from the TPS-1 Main Board	73



1. Overview

1.1 Overview

This manual describes how to use the TPS-1 Solution Board using TPS-1.

The TPS-1 Solution Board is used for evaluation of TPS-1 series communication, and has the following interfaces:

- 10Base-T / 100Base-TX (PROFINET)
- UART(USB mini-B)
- External interfaces (SPI, parallel I/O interface, parallel bus interface and others)
- Other: LEDs, switches, etc.



2. TPS-1 Solution Board Hardware Configuration

2.1 Board Lists

The TPS-1 Solution Board is made up of the three boards shown below. The TPS-1 main board can be connected to an I/O board or CPU board and used to evaluate parallel I/O interfaces, as well as CPU parallel and serial host interfaces (SPIs).

- 1) TPS-1 main board: Dedicated board for PROFINET communication
- 2) I/O board: Used to check operation of the parallel I/O interface
- 3) CPU board: Used to confirm parallel and serial host interface (SPIs) operations (comes with RX231)

1) TPS-1 main board



2) I/O board

3) CPU board



Figure 2-1 Board Lists



3. General Specifications

3.1 Electrical specifications

This chapter describes the electrical specifications and performance of the board, in table format.

	Item	Specification
Power supply	Rated voltage	5V DC
	Status LED(PWR)	Red

3.2 Specifications

Item		Speci	fication
Main LSI	TPS-1 (Operating fre	quency 100MHz)	
Interface	Ether	2ch	RJ-45(w/ built-in pulse-trans)
	USB	1ch(Mini-B)	Virtual COM port(UART)
	JTAG	1ch	10-pin half pitch for ICE connection
	External I/F	68pins	FX2-68P-1.27DSL (71) by HIROSE
LED	Power	1bit	Red LED
	PROFINET	4bits	Red LED / Green LED/Yellow LED
	PHY_Link	1bit(2ch) each	Green LED
	Activ	1bit(2ch) each	Green LED
Power supply	DC jack/USB	+5.0V	
Operating temperature		0 to +55℃	



TPS-1

3.3 Environmental Specifications and Weight

	Item		Specification
Physical	Ambient operation	ng temperature	0 to +55°C
environment	Ambient storage	etemperature	-25 to +70°C
	Ambient operation	ng humidity	30 to 90%RH (no condensation)
	Ambient storage	e humidity	30 to 90%RH (no condensation)
	Usage atmosph	ere	No corrosive gas
Weight	Main board	50 g	
	CPU board	30 g	
	IO board	25 g	
Dimensions	Main board	74mm(W)×74r	nm(D)×34mm(H)
		(excluding p	rotuberances)
	CPU board	74mm(W)×74r	nm(D)×11mm(H)
		(excluding p	rotuberances)
	I/O board	74mm(W)×74r	nm(D)×10mm(H)
		(excluding th	e protuberance)

3.4 Communication Specifications

Item	Spec	cification
Communication protocol	PROFINET IO	
Communication control IC	TPS-1	
PROFINET	РНҮ	Internal
	Communication system	IEEE802.3u(100base-TX)
	Insulation system	Pulse transformer insulation
	External interface	RJ45 x 2ch
Status LED	BF (red), SF (red), READY	(green), MT (yellow)
	ACT0 (yellow), ACT1 (yellow) (green)	w), Link0 (green), Link1



- 4. TPS-1 Main Board Blocks and Descriptions
- 4.1 TPS-1 Main Board Block Diagram



Figure 4-1 TPS-1 Main Block Diagram

4.2 TPS-1 System Clock

The oscillator supplies 25 MHz as the TPS-1 standard clock. The TPS-1 system clock is quadrupled internally to 100 MHz .



Figure 4-2 Clock Circuit



4.3 External Memory (Serial Flash Memory)

A serial flash (1 Mbyte) memory is mounted on as the TPS-1 stack, storing the PROFINET IO stack and device information.

Changes to other models is made easy with these compatible sockets.



Figure 4-4 Serial Flash Memory

4.4 Power Supply

A 5V DC power supply can be input through the DC jack or a USB to power the TPS-1. The POWER LED (green) lights up when 5.0V is being supplied.



Figure 4-5 Power Supply



4.5 PROFINET IO

PROFINET IO communication from the TPS-1 is carried out via a built-in PHY. The board is equipped with a 2-channel RJ45 connector (built into the transformer) as an external connector.



Figure 4-6 PROFINET IO Communication



4.6 UART

UPS to USB conversion LSI (FT 232 RQ) is mounted on the TPS-1 Main board. The TPS-1 Main board performs asynchronous communication with a PC by connecting a USB connector. The board is equipped with USB micro-B connectors.

The Terminal Program described later in this document can be used to communicate with TPS-1 via USB, allowing the TPS-1 to be set or firmware updated.





CN1

Pin no.	Signal name
1	VBUS
2	USB_DM
3	USB_DP
4	GND
5	GND

4.7 Reset Circuit

The Reset IC triggers a reset of TPS-1 when the power is turned on.

Pressing the Reset switch with the power on resets the system through the reset IC.

TPS-1 can also be reset from the CPU board when TPS-1 is connected to a CPU board, in case the reset processing has been added to the RX231 sample program.



Figure 4-7 Reset Circuit



4.8 LEDs

4.8.1 PROFINET indicator

Reference No.: LD1, LD2, LD3, LD4

Part Model No.: BR1111C-TR, PG1111C-11-TR, FY1111C-TR

These are red, green and yellow 4-bit LEDs used to check PROFINET operations.

BF (red)

SF (red)

READY (green)

MT (yellow)

4.8.2 Power indicator

Reference No.: LD5

Part Model No.: BR1111C-TR

This is a red 1-bit LED used to monitor the power supply.



Figure 4-9-2 LEDs (TPS-1 main board)



4.9 Mode Switches

This section describes the mode switches on the board.



Figure 4-10 Mode Switches (TPS-1 main board)

4.9.1 **TRSTN** jumperJ2

This is the switching jumper for the JTAG interface. Set Jumper J2 to 2-3 because it is not used with this board. J2

Jumper	Function
1-2	Normal
2-3	RESET

4.9.2 Boot mode switching jumper J6

This is the switching jumper for the Boot mode. Normally, please set to Flash mode.

If there is no data written to the flash memory, this system starts up in UART mode regardless of the boot mode setting. Switch to the UART mode to erase the data written to the flash memory.

J6

Jumper	BOOT
1-2	Flash
2-3	UART



4.10 Multi-board Interface J14

This connector enables connection to I/O and CPU boards.



Figure 4-11-1 Multi-interface Connector (TPS-1 main board)

N 1	Terminal Name			Di la la	Terminal Name		
Pin number	Main board	CPU board	IO board	Pin number	Main board	CPU board	IO board
A1	GPI00	WE_EN	-	B1	GP1034	DBUS-A12	-
A2	GPI01	DBUS-RDZ	-	B2	GP1035	DBUS-A13	-
A3	GPI02	DC\$Z1	-	B3	GP1036	DBUS-A14	-
A4	GPI03	BE1	-	B4	GPI037	DBUS-A15	-
A5	GPIO4	BE2	-	B5	GPI038	Reset_Host_SPI	-
A6	GPI05	DBUS-WAITZ	-	B6	GP1039	SFRM	-
A7	GPI06	DBUS-D0	-	B7	GPI040	SMOS[1	-
A8	GPI07	DBUS-D1	-	B8	GPI041	SCK1	-
A9	GPI08	DBUS-D2	GPI08	B9	GP1042	SMISO 1	-
A10	GPI09	DBUS-D3	GPI09	B10	GP1043	SHDR	-
A11	GPIO10	DBUS-D4	GPI010	B11	GP1044	-	-
A12	GPI011	DBUS-D5	GPI011	B12	GP1045	-	-
A13	GPI012	DBUS-D6	GPI012	B13	GPI046	-	-
A14	GPIO13	DBUS-D7	GPI013	B14	GPI047	-	-
A15	GPI014	DBUS-D8	GPI014	B15	INT_OUT	INT	-
A16	GPI015	DBUS-D9	GPI015	B16	WD_IN	WD_IN	-
A17	GPI016	DBUS-D10	GPI016	B17	WD_OUT	WD_OUT	-
A18	GPI017	DBUS-D11	GPI017	B18	-	-	-
A19	GPIO18	DBUS-D12	GPI018	B19	TP\$1_RST_IN	TPS1_RST	-
A20	GPIO19	DBUS-D13	GPI019	B20	RESETN	RSTN	-
A21	GPIO20	DBUS-D14	GPI020	B21	TP\$1-T1	T1	-
A22	GPI021	DBUS-D15	GPI021	B22	TPS1-T2	T2	-
A23	GPI022	TPS-A0	GPI022	B23	TPS1-T3	T3	-
A24	GPI023	DBUS-A1	GPI023	B24	TP\$1-T4	T4	-
A25	GPI024	DBUS-A2	-	B25	TPS1-T5	T5	-
A26	GPIO25	DBUS-A3	-	B26	TP\$1-T6	T6	-
A27	GPIO26	DBUS-A4	-	B27	VDD33	VDD33	VDD33
A28	GPI027	DBU\$-A5	-	B28	VDD33	VDD33	VDD33
A29	GPI028	DBUS-A6	-	B29	VDD33	VDD33	VDD33
A30	GPIO29	DBUS-A7	-	B30	VDD33	VDD33	VDD33
A31	GPIO30	DBUS-A8	-	B31	GND	GND	GND
A32	GPI031	DBUS-A9	-	B32	GND	GND	GND
A33	GPI032	DBUS-A10	-	B33	GND	GND	GND
A34	GPI033	DBUS-A11	-	B34	GND	GND	GND

Figure 4-11-2 Multi-interface Connector Pin Layout (TPS-1 main board)



5. CPU Board

5.1 Overview

With the built-in RX231, the CPU board can be connected to the TPS-1 main board, enabling 8-bit and 16-bit serial and parallel host interfaces.

5.2 Connectors, Switches and LEDs



Figure 5-2 Connectors, Switches, and LEDs (CPU board)

5.2.1 Reset Switch SW10

Push SW10 to reset the CPU.

(See section "4.7 Rest Circuit" about detailed circuit.)

5.2.2 General-purpose Slide Switch SW11

The board comes with a general-purpose slide switch. The switch ON/OFF status can be retrieved through the CPU port.

SW11

SW Pin No.	Terminal name(TPS-1)
1	P44
2	P45
3	P46
4	P47



5.2.3 General-purpose Push Switch SW12

The board comes with a general-purpose push switch. The status can be retrieved as a trigger signal through the CPU port.

SW12

SW Pin No.	Terminal name(TPS-1)
1	P31

5.2.4 General-purpose LEDs LED8-LED11

These LEDs are mounted for general-purpose use.

Reference No.	Terminal name(TPS-1)
LED8	PC0
LED9	PC1
LED10	PC2
LED11	PC3



5.3 Parallel Host Interface Bus Width Switching Jumpers

These jumpers are used to switch the width of the parallel host interface between 8 and 16 bits.



Figure 5-3 Bus Width Switching Jumpers

5.3.1 Bus width switching

Set the jumpers as follows to change the bus width.

J15-J17

Jumper	Bus wid t h
1-2	8bit
2-3	16bit



6. I/O Board

6.1 Overview

When connected to the TPS-1 main board, this board can function as a remote I/O and can be used to confirm parallel IO operations. The board has 8 LEDs and 8 slide switches, enabling 8-bit I/O operations for both input and output.

6.2 Switches and LEDs



Figure 6-1 LEDs and Switches

Channel	TPS-1Signal Name	LED
CH0	GPIO8	LED1
CH1	GPIO9	LED2
CH2	GPIO10	LED3
CH3	GPIO11	LED4
CH4	GPIO12	LED5
CH5	GPIO13	LED6
CH6	GPIO14	LED7
CH7	GPIO15	LED8

6.2.1 LEDs for Output Display



Channel	TPS-1Signal Name	Switch
IN0	GPIO16	SW2
IN1	GPIO17	SW3
IN2	GPIO18	SW4
IN3	GPIO19	SW5
IN4	GPIO20	SW6
IN5	GPIO21	SW7
IN6	GPIO22	SW8
IN7	GPIO23	SW9

6.2.2 Slide Switches for Input



7. Setting Up the TPS-1 Environment

7.1 Preparing the TPS-1 Development Toolkit

7.1.1 Downloading the PROFINET TPS-1 Development Toolkit

After registering as a user on the Phoenix Contact website, download the PROFINET TPS-1 Development Toolkit. Note that you will not be able to download the toolkit until a few days after registering as a user.

Phoenix Contact URL:

https://www.phoenixcontact-software.com/en/downloads

PHOENIX CONTACT Software GmbH	Downloads PHOENIX CONTACT Software GmbH Software GmbH Langentruch fi Software Software Hotochix Contract Software Software Langentruch fi Software GmbH Langentruch fi Software Langentruch fi Software GmbH La	PHOENEX CONTACT Software GmbH English German	(Logi
Downloads PHOENIX CONTACT Software GmbH Langerbruch 6 32657 Lange +49 5261/93730 +CHai More information More information	Downloads PHOENIX CONTACT Software Control Software Control Software Software PHOENIX CONTACT Software Control Software		PHOENIX CONTACT Software GmbH
Entropy Contract Software	IEC 61131 Control Pemp software	Downloads	PHOENIX CONTACT Software Grabit Langentruch fi 32657 Lamgo +49 5261/93730 + E-Hail More information shifteenix CONTACT Software
MULTIPROG Express MULTIPROG Pro ProConOS OPC-Server TES 61131 Starter Bt for Baseberry Pt		IEC 61508 Safety	
MULTIPRIOG Express MULTIPRIOG Pro ProConDS OPC-Server TEC 61101 Starter Kit for Baseberry PI IEC 61508 Safety	IEC 61508 Safety	Demo software	
MOLTIPROG Express MULTIPROG Pro ProCentOS OPC-Server TEC 6111).Starter Kit for Rassbarry Pi IEC 61508 Safety Demo software	IEC 61508 Safety Demo software	* SACEPROG	
MULTIPROG Express MULTIPROG Pro	IEC 61508 Safety Demo software * SAFEDROG	PROFINET Industrial Ethernet	
HOLTIPRIGE Express HOLTIPRIGE Pro HOLTIPRICE HOLTIPRICE HOLTIPRICE HOLTIPRICE HOLTIPRICE HOLTIPRICE	IEC 61508 Safety Demo software * SAFEPROS PROFINET Industrial Ethernet	Collucion	

Figure 7-1-1 Download Site for TPS-1 Development Toolkit

7.1.2 Application Installation

Install the applications in the TPS-1 Development Toolkit.

Execute each of the following applications:

TPS Development Toolkit V.x.x.xx/TPS Configurator/Setup/TPS Configurator.msi

TPS Development Toolkit V.x.x.xx/TPS FWUpdater/TPS FWUpdater.msi

TPS Development Toolkit V.x.x.xx/PROFINET Configurator/PROFINET Configurator.exe

TPS Development Toolkit V.x.x.xx/PROFINET Smart Control/PROFINET Smart Control.msi



TPS-1

7.1.3 Preparing the GSDML File

In this section, prepare the GSDML file. This description uses the GSDML file created by Renesas Electronics as a sample.

The TPS Development Toolkit V.xxxxx is referred to as TDT from here on.

All GSDML files are saved together in under TDT/GSDML.

- I 🗸	- =			Compressed Folder Tools	GSDML	- 0	×
File	Home	Share	View	Extract			~ ?
Extract To $ imes$ Extract To	Extract all						
$\leftarrow \rightarrow$	· 1	< TPS [Developme	nt Toolkit V.1.4.1.7 > GSDI	ŭ ∽ JN	Search GSDML	Q
Name			~		Туре	Compressed size	Passwor
GSDML-V2.32-Phoenix_Contact-TPS1-Template-20160615.xml		XML Document	4 KE	No			
GSDML-V2.32-Phoenix_Contact-TPS1-Extended-20160907.xml			XML Document	6 KE	No		
GSDML-V2.31-Renesas-TPS1-Template-20170222.xml			XML Document	4 KE	No		
GSDML-V2.31-Phoenix_Contact-TPS1-Template-20151113.xml			XML Document	4 KE	No		
📄 GSD	GSDML-V2.31-Phoenix_Contact-TPS1-Extended-20160907.xml		XML Document	6 KE	No		
🖬 GSD	ML-0174-1	1234-TPS-1-	TEMPLAT	E.bmp	BMP File	2 KE	No
GSD GSD	GSDML-0174-1234-TPS-1-EXTENDED.ico		lcon	1 KE	No		
GSDML-02C7-1234-Renesas_TPS-1_TEMPLATE.bmp		BMP File	2 KE	No			
GSDML-02C7-1234-Renesas_TPS-1_EXTENDED.ico			lcon	1 KE	No		
<							>
9 items							

Figure 7-1-2 Preparing the GSDML File



8. TPS-1 Stack Preparation

8.1 Creating a TPS-1 Stack Image File

Here you will create an image file for writing to the flash memory.

8.1.1 Setting the Vendor ID and Device ID

• Open the header file (TDT/TPS_Stack/hdr.txt) and change the third line to whatever VendorID_DeviceID you would like to use, and then save. This document uses the Renesas Vendor ID (HEX) as an example in explanations.

Vendor ID 02C7 (Renesas) Device ID 1234



Figure 8-1-1 Vendor ID and Device ID Settings



8.1.2 Creating an image file

1) Double-click on the following batch file:

TDT/TPS_Stack/make_Target_Image.bat

The following two image files are created in the folder:

TPS_Target_Debug.img

TPS_Target_Release.img

I I I I I I I I I I I I I I I I I I I			
← → → ↑ 📙 « TPS Developmen	t Toolkit V.1.4.1.7 > TPS Sta	ck	
Name	Date modified	Туре	Size
🐱 2C7_1234_01upd.dat	2/14/2017 10:51 PM	Probe Document	1 KB
🖺 hdr.txt	3/24/2017 7:04 PM	TXT File	1 KB
💿 make_Target_Image.bat 🗧 1) Double-click bat file	ws Batch File	1 KB
TPS_Default_Image_ETH.hex	2/14/2017 10:56 PM	HEX File	2,881 KB
TPS_Default_Image_FO.hex	2/14/2017 10:56 PM	HEX File	2,881 KB
TPS_Image_Maker.exe	2/14/2017 10:51 PM	Application	9 KB
TPS_Stack_Debug.bin	2/14/2017 10:54 PM	BIN File	264 KB
TPS_Stack_Release.bin	2/14/2017 10:53 PM	BIN File	239 KB
TPS_Target_Debug.img	2/24/2017 7-10 DM	Disc Image File	264 KB
TPS_Target_Release.img	Image file is created	nage File	239 KB

Figure 8-1-2-1 Creating an Image File



2) Rename the DAT file.

Rename **TDT/TPS_Stack/0174_1234_lupd.dat** as **VenderID_DeviceID_01upd.dat** to match the Vendor ID and Device ID specified in the header file.

File Home Share View			
← → → ↑ 📙 « TPS Developme	nt Toolkit V.1.4.1.7 > TPS Sta	ck	
Name	Date modified	Туре	Size
💆 2C7_1234_01upd.dat	Rename file 0:51 PM	Probe Document	1 KB
🖺 hdr.txt	3/24/2017 7:04 PM	TXT File	1 KB
make_Target_Image.bat	2/14/2017 10:51 PM	Windows Batch File	1 KE
TPS_Default_Image_ETH.hex	2/14/2017 10:56 PM	HEX File	2,881 KB
TPS_Default_Image_FO.hex	2/14/2017 10:56 PM	HEX File	2,881 KB
TPS_Image_Maker.exe	2/14/2017 10:51 PM	Application	9 KB
TPS_Stack_Debug.bin	2/14/2017 10:54 PM	BIN File	264 KB
TPS Stack Release.bin	2/14/2017 10:53 PM	BIN File	239 KB

Figure 8-1-2-2 Renaming the DAT File



8.2 Creating a TPS-1 Ethernet Updater Image File

8.2.1 Changing the header file

• Open the header file (TDT/TPS_UpdaterETH/updhdr.txt) and change the third line to whatever VendorID_DeviceID you would like to use, and then save. Vendor ID: 02C7 (Renesas)

Device ID: 1234



Figure 8-2-1 Vendor ID and Device ID Settings

8.2.2 Creating an image file

• Double-click on the following file to create an image file in the same folder: TDT/TPS_UpdaterETH/make_Updater_Image.bat

TPS_UpdaterTarget.img

I Image: Imag				
← → → ↑ 📙 « TPS Development	Toolkit V.1.4.1.7 → TPS Upd	ater ETH		~
Name	Date modified	Туре	Size	
🛃 174_1234_01upd.dat	1/2/2017 6:54 PM	Probe Document	1 KB	
💿 make_Updater_Image.bat	1) Double-Click bat file	Batch File	1 KB	
💿 make_Updater_Image_FO.bat	9/20/2016 6:03 PM	Windows Batch File	1 KB	
TPS_Image_Maker.exe	9/5/2013 10:53 PM	Application	9 KB	
TPS_Updater.bin	2/14/2017 10:54 PM	BIN File	61 KB	
TPS_Updater_FO.bin	2/14/2017 10:55 PM	BIN File	61 KB	
TPS_UpdaterTarget.img	2) Image file is created.		61 KB	
🔄 updhdr.txt	3/24/2017 7:12 PM	TXT File	1 KB	

Figure 8-2-2-1 Creating an Image File



• 2) Rename DAT file.

Rename TDT/TPS_Update ETH/0174_1234_01upd.dat as VenderID_DeviceID_01upd.dat, making sure it matches the VendorID and DeviceID specified in the header file.

📙 🛛 🚽 🗧 TPS Stack			
File Home Share View			
← → × ↑ 📙 « TPS Developme	ent Toolkit V.1.4.1.7 > TPS Sta	ck	
Name	Date modified	Туре	Size
🛃 2C7_1234_01upd.dat	Rename the file.	iment	1 KB
🗐 hdr.txt	3/24/2017 7:04 PM	TXT File	1 KB
make_Target_Image.bat	2/14/2017 10:51 PM	Windows Batch File	1 KE
TPS_Default_Image_ETH.hex	2/14/2017 10:56 PM	HEX File	2,881 KB
TPS_Default_Image_FO.hex	2/14/2017 10:56 PM	HEX File	2,881 KB
TPS_Image_Maker.exe	2/14/2017 10:51 PM	Application	9 KB
TPS_Stack_Debug.bin	2/14/2017 10:54 PM	BIN File	264 KB
TPS Stack Release.bin	2/14/2017 10:53 PM	BIN File	239 KB

Figure 8-2-2-2 Renaming the DAT File



8.3 Creating a TPS FWUpdater Work Folder

8.3.1 Creating a work folder

- Create any work folder that you like. In this example, we will use TFTP_WORK as the Work folder name.
- TDT/TFTP_WORK

📔 📄 🚽 🗧 TPS Development Too	olkit V.1.4.1.7		
File Home Share View			
> · 🛧 📙 « TPS Developm	ent Toolkit V.1.4.1.7 → TPS De	velopment Toolkit	V.1.4.1.7 >
Name	Date modified	Туре	Size
Documentation	3/24/2017 6:48 PM	File folder	
GSDML	3/24/2017 6:48 PM	File folder	
PROFINET Configurator	3/24/2017 6:48 PM	File folder	
PROFINET Smart Control	3/24/2017 6:48 PM	File folder	
TFTP_WORK Create a	WORK Folder 3 PM	File folder	
TPS BSDL	3/24/2017 6:48 PM	File folder	
TPS Configurator	3/24/2017 6:48 PM	File folder	
TPS Driver	3/24/2017 6:48 PM	File folder	
TPS FWUpdater	3/24/2017 6:48 PM	File folder	
TPS Stack	3/24/2017 7:19 PM	File folder	
TPS Starter	3/24/2017 6:48 PM	File folder	
TPS Updater ETH	3/24/2017 7:29 PM	File folder	

Figure 8-3-1 Creating a WORK File

8.3.2 Copying image files to the work folder

• Copy the following files to the work folder that was created. TDT/TPS_Stack/ 02C7_1234_lupd.dat TDT/TPS_Stack/ TPS_Target_Debug.img TDT/TPS_Stack/ TPS_Target_Release.img TDT/TPS_UpdaterETH/ TPS_UpdaterTarget.img

📊 🛛 🛃 🚽 🗍 TFTP_WORK			
File Home Share View			
← → · · ↑ 🔤 « TPS Developm	ent Toolkit V.1.4.1.7 > TFTP_W	/ORK	
Name	Date modified	Туре	Size
🛃 2C7_1234_01upd.dat	2/14/2017 10:51 PM	Probe Document	1 KE
TPS_Target_Debug.img	3/24/2017 7:19 PM	Disc Image File	264 KE
TPS_Target_Release.img	3/24/2017 7:19 PM	Disc Image File	239 KE
TPS UpdaterTarget.img	3/24/2017 7:29 PM	Disc Image File	61 KE





TPS-1

9. Setting up the TPS-1 Solution Board

9.1 Connecting the TPS-1 Main Board and Computer

- 9.1.1 Computer network settings
- Enter the network settings for the computer as shown below. TCP/IPv4 setting IP Address 192.168.16.105

General	
You can get IP settings assigned a this capability. Otherwise, you ne for the appropriate IP settings.	utomatically if your network supports ed to ask your network administrator
Obtain an IP address automa	tically
 Use the following IP address 	
IP address:	192 . 168 . 16 . 105
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	
Obtain DNS server address a	utomatically
Use the following DNS server	addresses:
Preferred DNS server:	
Alternate DNS server:	· · · ·
📰 Validate settings upon exit	Advanced
	OK Cancel

Figure 9-1-1 Network Settings

- 9.1.2 Connecting the TPS-1 Main Board and Computer
- Set the Boot setting for the TPS-1 Main board to FLASH mode.
- Connect the computer and TPS-1 Main board using a LAN cable.
- Use a USB cable to connect the computer and the TPS-1 Main board. Install the USB-to-UART driver on the computer.



Figure 9-1-2 Connecting the Board and Computer



TPS-1

9.1.3 Terminal program settings

In this document, we will use TeraTerm as an example.

This Terminal Program carries out communications between the host computer and the COM port of the RS-232C interface.

Using the host computer, boot the Terminal Program (Tera Term) and set the serial port (baud rate: 115200). Set the line return code to "CR" for both receiving and transmission.

		·
Tera Term: Serial port	t setup	
Port	COM4 OK	
Baud rate:	115200 -	
Data.	Cancel	
Parity:	none •	
Stop:	1 bit • Help	
Flow control:	none 🔻	
Transmit de	lay	
0 ms	ec/char 0 msec/line	
		_

Figure 9-1-3-1 Terminal Software Settings (1)

lerminal size	N	ew-line	
80 X	24 Re	eceive: CR 🔹	
Term size = w	in size Tr	ansmit. CR 🗸	Can
Auto window	resize		
Terminal ID: VT	100 🔹	🗖 Local echo	He
Answerback		Auto switch (VT	<->TEK)
Kanji (receive)	Kanji (transr	nit)	
UTF-8 -	UTF-8 -	Kanji-in:	^[\$B
	Thit kata	kana Kanii aut	AL/P

Figure 9-1-3-2 Terminal Software Settings (2)



10. Booting the TPS-1 Solution Board

10.1 TPS-1 Configuration Settings

10.1.1 Sending the Starter program (TPS_Starter.s)

1) Boot Tera Term.

- 2) Press the Reset switch on the TPS-1 Main board.
- 3) Enter "s" on the Tera Term screen and press the Enter key on the computer.
- 4) The message shown below is displayed on the Tera Term screen.



Figure 10-1-1-1 Sending the Starter Program (1)

When the above message is displayed, send the file.

Click File→Send file...

Ele	Edit Setup Control New connection	Alt+N	Eanj/Code Help
	Cygwin connection	AR+D Ak+G	or WART download 111
	Log Convent to Log View Log Deve (on finites Send file Vanote SSH 5CP Change directory Replay Log	,	r program download. "return" key to start download process o list operation possibilities. oad
	TTY Record TTY Replay		y / S3 record type) le:
	Print_~	Alt+P	
	Disconnect Exit	Ait+1 Alt+Q	

Figure 10-1-1-2 Sending the Starter Program (2)



Open the folder (TDT/TPS_Starter/), select "TPS_Start.s", and click **Open**.



Figure 10-1-1-3 Sending the Starter Program (3)

File transfer begins.

unt l	Tera Termi Sen	för	- 0 3			
Star	Filename:	TPS_Starter.s				
Pres	Fullpath	D:07)TPS1M5	¥\08)REE_TP	download proces	5	
or ⊧ >s	Bytes trans Elapsed tir	fered. ne 0:1	81800 (44.9%) 06 (11.73KB/s)	bilities.		
Send (Mate	Close	Pause	Help			
Downio	adine Shel i	rogram File: .				
10000						

Figure 10-1-1-4 Sending the Starter Program (4)



When the file has been sent, the following screen is displayed:



Figure 10-1-1-5 Sending the Starter Program (5)

Input "g" and press the Enter key on the computer to complete the process.



Figure 10-1-1-6 Sending the Starter Program (6)

The system waits for the factory settings.

Caution: Once a certain amount of time has elapsed, an error will occur. The procedure for handling when an error occurs is described below.



If the following error message is displayed, press the RESET switch on the main board.



Figure 10-1-1-7 Sending the Starter Program (7)

After pressing the RESET switch, the following screen will appear. Input "g" and press the ENTER key.



Figure 10-1-1-8 Sending the Starter Program (8)



This returns the system to the Factory Settings wait state, as shown here.



Figure 10-1-1-9 Sending the Starter Program (9)



10.1.2 TPS Configurator Settings for Operation Modes

- Boot TPS Configurator.
- Enter the settings for 1) to 3) below, based on the interface being used.

1) TPS-1 host serial interface (SPI)

Hardware setting: Connect the CPU board. No particular settings such as jumper pin settings are required.



Figure 10-1-2-1 SPI Board Setting

TPS-1 Configurator settings (1): General Settings tab Set the parameters as shown in the following figure.

One Ideal on the		1		
Comman Software (gent on Operation Mode Host Interface parallel Host Interface setal 10 Senal 10 Parallel	Port 1 Port 1 Frieface R/45 Frieface SC-RJ Frieface SC-RJ Frieface Off	Port2 Freefsoe RJ45 Interface SC-RJ RD Dagnoss Interface Off	Watchdog Settings Watchdog Time (m)	
IM Parm 1 Vendor/D Devoel/D 0x 1234 0x 2x7 0x 1234 1	OrderID 1234567	HWVersion 0001	IM Para 2 TypeOfSabon TPS-1	
0017/02/17 110850 Pasate 0017/02/17 110858 Parate 0017/02/17 110858 Parate 2017/02/17 110843 Parate 2017/02/17 110859 Parate	ter charged sucessfull ter charged sucessfull ter charged sucessfull ter charged sucessfull ter charged sucessfull ter charged sucessfull	PNode -> 10 specOStatue: -> TPS-1 WVersue: -> 0001 der(D -> 1294557 evice(D -> 1294	(ii) •	RENESAS

Figure 10-1-2-2 SPI Configurator Settings (1)


TPS-1 Configurator settings (2): Host Serial Settings tab Set the parameters as shown in the following figure.

General Settings Ident Settings Host Serial Settings Ethernet Settings
Frame Format SPICLKPolarity SPICLKPhaseShift SPIHandshakeMode BusyPolarity
Motorola SPI Active High Rising Edge Wait Active Low
2016/11/02 12:18:08 Parameter changed sucessful SPICLKPhaseShift -> Rising Edge RENESAS
2016/11/02 12:12:56 Parameter changed sucessful SPICLKPolarity -> Active High 2016/11/02 12:12:50 Parameter changed sucessful TypeOfStation -> TPS-1
12016/11/02 12:12:40 December of annexed encounter -> 2001
2010/17/02/12/12/06 Parameter changed successful/Wverston -> 0001 2016/11/02 12:12:36 Parameter changed successful/OrderID -> 1284567

Figure 10-1-2-3 SPI Configurator Settings (2)

After completing the above settings, proceed to "10.1.3 Send TPS Configurator Settings".



2) TPS-1 host parallel interface (8-bit)

Hardware settings: Connect the CPU board, and set jumper pins J15-J17 to the 1-2 side.



Figure 10-1-2-4 8-Bit Host Parallel Interface Board Setting

TPS-1 Configurator settings (1): General Settings tab Set the parameters as shown in the following figure.

General Settings Ident Set	tings Host Parallel Set	tines Ethemet Settines		
Operation Mode Host Interface parallel Host Interface setal O Setal O Parallel	Port 1 For Interface RU45 Interface SC-RU FO Degnose Interface Off	Port2 Port2 Fishace RU45 Fishace RU45 Fishace SC-RU Fishace SC-RU Fishace SC-RU Fishace Off	Watchdog Time (na)	
IM Para 1 VendoriD DeviceID 0x 2e7 0x 1234	OrdertD 1234567	HWVersion	IM Para 2 TypeOfStation TPS-1	
2417/02/17 11:10:17 Paramet 2417/02/17 11:00:50 Paramet 2017/02/17 11:00:50 Paramet 2017/02/17 11:00:40 Paramet 2017/02/17 11:00:40 Paramet	ler changed successful Of er changed successful Of er changed successful Ph er changed successful Ph er changed successful Or	Mode -> 17 Mode -> 18 pe0fitation -> TPS=1 Werzon -> 0001 detID -> 1294567	(* 2	RENESAS

Figure 10-1-2-5 8-Bit Host Parallel Interface Configurator Settings (1)



TPS-1 Configurator settings (2): Host Parallel Settings tab Set the parameters as shown in the following figure.

DataBusWidth (Bit)	Access Mode Intel +	Ready Polarity Active Low -	PageSize (Byte)	
And And				
				RENESAS
				VERTER

Figure 10-1-2-6 8-Bit Host Parallel Interface Configurator Settings (2)

After completing the above settings, proceed to "10.1.3 Send TPS Configurator Settings".



3) TPS-1 Host parallel interface (16-bit)

Hardware settings: Connect the CPU board, and set jumper pins J15-J17 to the 2-3 side.



Figure 10-1-2-6 16-Bit Host Parallel Interface Board Settings

TPS-1 Configurator settings (1): General Settings tab Set the parameters as shown in the following figure.

		the second s	and a contraction and a state to care.	
Operation Mode	Port1	Port2	Watchdog Settings	
 Host Interface parallel 	Interface RU45	 Interface RJ45 	Watchdog Time (ns)	
Host Interface setal N Setal	Prenace SUHO	IT RD Datantais	Watchdog Polarity Active Low +	
10 Parallel	Interface Off	kterface Off		
IM_Para_1			IM Para 2	
VendortD DeviceID	OrderID	HWVersion	TypeOf Station	
action action	1444400	1000.1		
2817/02/17 111817 Param 2817/02/17 110850 Param 2817/02/17 110850 Param 2817/02/17 110850 Param	eter changed successful OF eter changed successful OF eter changed successful Ty	Mode -> 17 Mode -> 18 peCrtStation -> TPS-1	* 1	RENESAS

Figure 10-1-2-7 16-Bit Host Parallel Interface Configurator Settings (1)

TPS-1 Configurator settings (2): Host Parallel Settings tab Set the parameters as shown in the following figure.

Date Down Mark (Date		Post Print	0-		
16 •	Intel -	Active Low +	16284 •		
2016/16/18 19 29 05 Parameter	r changed successful DataBu	eWd9(+2-15)		RENESAS	

Figure 10-1-2-8 16-Bit Host Parallel Interface Configurator Settings (2)

After completing the above settings, proceed to "10.1.3 Send TPS Configurator Settings".



4) TPS-1 parallel I/O interface

Hardware settings: Connect the I/O board. No jumper pin or other settings are necessary.



Figure 10-1-2-8 Parallel I/O Interface Board Setting

TPS-1 Configurator settings (1): General Settings tab Set the parameters as shown in the following figure.

General Settings Ident Set	tings 10 General Settin	es ID Parallel Settings.	Diag Channel Ethernet Settings	
Operation Mode Host interface paralet Host interface serial 10 Serial (in 10 Parallet	Port 1 Frieface RJ45 Frieface SC-RJ Frieface SC-RJ Frieface SC-RJ Frieface Off Frieface Off	Port2 Port2 Fiterface RJ45 Fiterface SC-RJ Fit Diagnosis Keterface Off	Watchdog Settings Watchdog Time (m) Watchdog Polarity Active Low	
IM Paca 1 VendoriD DeviceID 0x 2c7 0x 1234	OrdertD 1234567	HW/Venion	IM Para 2 TypeOfStation TPS-1	
2017/02/17 11 11:43 Paramet 2017/02/17 11 10 17 Paramet 2017/02/17 11 10 17 Paramet	ter changed successful() ter changed successful() ter changed successful()	PMode -> 00 PMode -> 17 PMode -> 10	* [1]	-TENESAS

Figure 10-1-2-9 Parallel I/O Interface Configurator Settings (1)



TPS-1 Configurator settings (2): IO General Settings Set the parameters as shown in the following figure.

File Settings Help
General Settings I/O General Settings Diag Channel Ethernet Settings API Stot / Subslot Settings SubslotNo SubslotNo SubslotNo Diagnosis NumberOfDiagChannels StatGPIOPinForDiagChannel Image: Channel StateGPIOPinForDiagChannel Image: Channel StateGPIOPinForDiagChannel
2016/10/20 20:06:29 Parameter changed sucessful/SubModuleIdentNumber -> 2 2016/10/20 20:06:29 Parameter changed sucessful/ModuleIdentNumber -> 2 2016/10/20 20:06:20 Parameter changed sucessful/TypeOfStation -> TPS-1 2016/10/20 20:04:55 Parameter changed sucessful/WVersion -> 0001 2016/10/20 20:04:18 Parameter changed sucessful/OrderID -> 1234567

Figure 10-1-2-10 Parallel I/O Interface Configurator Settings (2)

TPS-1 Configurator settings (3): IO Parallel Settings tab Set the parameters as shown in the following figure.

General Settings Ident Settings Id	General Settings 10 Parallel Se	ttings Diag Channel Ethernet	Settings	
Output Settings ParallelNumberOfOutputs	StartGPIOPpForOutput	Input Settings	StatGPIOPInForinpu	15
	ed sucessful StartGPIOP in For Inpu	ts -> 16	A	NESAS.
12016/10/20 20:41:22 Parameter chang				

Figure 10-1-2-11 Parallel I/O Interface Configurator Settings (3)

After completing the above settings, proceed to "10.1.3 Send TPS Configurator Settings".



10.1.3 Send TPS Configurator Settings

When the settings in 10.1.2 TPS Configurator Settings for Operation Modes are complete, select the Ethernet Settings tab in TPS Configurator and enter the Ethernet settings. Enter the user address for the MAC address. In the example shown here, we have entered "Renesas Electronics Corporation".

: 192.168.16.227
: 192.168.16.105
: 74.90.50.00.FC.B8
: 74.90.50.00.FC.B9
: 74.90.50.00.FC.BA

The first three bytes of the MAC address, 74-90-50, specify "Renesas Electronics Corporation". After entering all settings, click **Send Configuration**.

Openeral Settings Aberd Settings Ab Parablel Settings Diag Chanse Effernet Settings Destination 3P 1952 368 16 227 Source 3P 1952 168 161.05 Senshursber 125458 7000122458 MAC Efferent 145050002C88 MAC Port 1 145050002C88 MAC Port 2 143050002C8A Generate convessed Send configuration	Openeral Settings: Merch Settings: 20. Openeral Settings: Disc Charses Ethernet Settings: Deschartion IP 192.188.16.227 Source IP 192.088.16.207 Serialwareber 192.188.16.227 Serialwareber 192.188.16.208 MAC Ethernet 1450.500.00FO.88 MAC Port 1 1430.500.00FO.88 MAC Fort 2 1430.500.00FO.88 MAC Fort 3 1430.500.00FO.88 MAC Fort 1 1430.500.00FO.88 MAC Fort 3 1430.500.00FO.88 MAC Fort 4 Send configuration Add to clipboard Click Send configuration	File Settings Help			
Destination IP 192.388.19.227 Source IP 382.08.18.195 Seriaburster 123438.7980.123485 MAC Ethernet 74:5050.09FC.89 MAC Port 1 14:5050.09FC.89 MAC Port 2 14:5050.09FC.89 MAC Port 3 34:5050.09FC.89 MAC Port 1 34:5050.09FC.89 MAC Port 3 34:5050.09FC.89 MAC Port 3 34:5050.09FC.89 MAC Port 3 34:5050.09FC.89 MAC Port 3 34:5050.09FC.89 MAC Port 4 5end configuration Add to clipboard	Destination IP 192158.16.227 Source IP 192168.006 Serialwarder 193488.7900192458 MAC Fourners 144005000FC 88 MAC Port 1 144005000FC 89 MAC Port 2 144005000FC 89 MAC Port 2 144005000FC 89 Cerevate command Send configuration	General Settings Ment Settings J	Ordeneral Settings 3D Parallel Settings Di	eg Charaver Ethernet Settings	
Sixere IP 192,100,10,105 Senishumber 125458/990122458 MAC Ethernent 14:5050.00FC B8 MAC Port 1 14:5050.00FC B8 MAC Port 2 14:5050.00FC EA Generate conveand Send contiguartion Add to clipboard	Source IP ISC.106.18.105 • Servicescreter 1254587000125858 MAC Envertert 14405000FC86 MAC Port 1 14305000FC86 MAC Port 2 14405000FC8A Generate converse Send configuration Click Send configuration	Destination IP	192.168.16.227		
Serishureber [234887990123458 MAC Ethernert [F4505008FC88 MAC Port 1 [74505000FC89 MAC Port 2 [74505000FC8A Generate command Send contiguartion Add to clipboard	Serializander (125887000122468 MAC Ethernert (14505000FC B0) MAC Port 1 (14505000FC B0) MAC Port 2 (14505000FC BA) Generate conveal Send confestivation Add to clipboard Click Send configuration	Source IP	182 100 18 105 -		
MAC Ethereert (FE002000FCBB) MAC Port 1 (FE005000FCBB) MAC Port 2 (FE005000FCBA) Generate command Send conferences Add to clipboard	MAC Ethernert 14505000FC BB MAC Port 1 14505000FC BB MAC Port 2 (14505000FC BA Generate command Bend configuration Add to clipboard Click Send configuration	Serialworber	1204587090123458		
MAC Port 1 [74305000FCB9 MAC Port 2 [74305000FCBA Generate conveand Send contastantion Add to clipboard	MAC Port 1 14305000FCB9 MAC Port 2 14305000FCBA Generate command Send configuration Click Send configuration	MAC Ethernert	14.505000.PC-89		
MAC Port 2 (14105000PC EA Generate command Bend configuration Add to clipboard	MAC Port 2 (N4005000PCEA Generate commanit Click Send configuration	MAC Port 1	14.90.50.00FC 89		
Generate conveand Send contenuerian Add to clipboard	Generate conversed Send contrastruction Add to clipboard Click Send configuration	MAG Port 2	14 10 50 00 FC BA		
	Click Send configuration	Generate command	Send configuration	Add to clipboard	
2017/02/01 T44341 Parameter character based of 2017/02/01 T44341 Parameter 2017/02/01 T44341 Parameter character discussed account Parameter/Objects > 10		2817/02/08 154545 Parameter chan 2617/02/08 154545 Parameter chan	ed excessfull*astel%unterOfOutputs -> 11 red excessfull%uteRamtMunder -> 2	8 L	
EXTYGUY IN 14443 Conserve conserve tables - 2 VDC pred and county at mean overlag EXTYGUY IN 14443 Conserve conserve tables - 2 VDC pred and county at mean overlag EXTYGUY IN 14443 Parameter conserved caccendul Parallel Novies/COLoguets -> 16 DITTYGUY IN 14443 Parameter conserved caccendul Parallel Novies/COLoguets -> 16 DITTYGUY IN 14443 Parameter conserved caccendul Parallel Novies/COLoguets -> 16	2017/02/01 154341 Parameter standed accessful Parafelfikerber/OCurputs >> 16 2017/02/01 154331 Parameter standed accessful SubPodueber/Namber >> 2			Clear	

Figure 10-1-2-12 Ethernet Settings Screen

When the message shown below is displayed, the process is complete. Lastly, click OK.

Figure 10-1-2-13 Configurator Completed Screen



10.2 TPS-1 Firmware Updates

10.2.1 Editing DAT files for TPS FWUpdater (Part 1)

• Open the DAT file for TPS FWUpdater (VendorID_DeviceID_01upd.dat) found in the work folder that was created. Rewrite with the following settings:

UpdateTarget = 0 NextBoot = 1 UpdateUpdater = 1

Note) In this document, TPS_Target_Debug.img is used assuming application development. Please use TPS_Target_Release.img when commercializing.

Please rewrite the file name specified by TargetFName in the VenderID_DeviceID_01upd.dat file to TPS_Target_Release.img, when using the release version



Figure 10-2-1 FW Update Procedure (1)

10.2.2 Booting TPS FWUpdater

• If the Preferences screen is not displayed when TPS FWUpdater boots, open the settings screen using Tools→ Preferences.

Use Select Network Adapter to select 192.168.16.105.

In the root directory, select the work folder that was created (in the example, this is TFTP_WORK). Click **OK** to close the Preferences screen.



Figure 10-2-2 FW Update Procedure (2)



10.2.3 TPS-1 Ethernet updater image file write check

- OpenTools→Bootp/Tftp Logfile.
- Wait until the following logs are output: Incoming readrequest for file : TPS_UpdaterTarget.img Incoming writerequest for file : 192_168_16_2_upd.sts

Bootp / Tftp Logfile	
2017/02/14 15:54:45 Incoming readrequest for file: 207_1254_01upd.dat 2017/02/14 15-54:45 Incoming readrequest for file: TPS_UpdaterTarget.img	
2012/02/14 15:34:54 Incoming writerequest for file: 192_168_16_2_upd.sts	
2017/02/14 15:84:56 Incoming Bostprequest from: 192.168.16.227 74-90-50-00 2017/02/14 15:34:86 Sending Bostpreply to: 192.168.16.2 74-90-50-00-FC-B8	-гс-ва
2017/02/14 15:34:67 Incoming readrequest for file: 207_1234_01upd.det	
2017/02/14 15:34:67 Incoming readrequest for file: TPS_DpdaterTarget.img	
2017/02/14 15:85:01 Incoming writerequest for file: 192_168_16_2_upd.sts	-
2017/02/14 15:35:04 Incoming Bootprequest from: 192.168.16.227 74-90-50-00	-FC-B8
2017/02/14 15:35:04 Sending Boctpreply to: 152.168.16.2 74-90-50-00-FC-B8	

Figure 10-2-3 FW Update Procedure (3)

10.2.4 Checking the image file write results

- Open the status file 192.168.2_ups.sts which is in the work folder.
- Check to make sure that the 10th line, right under [Update Updater], reads "performed=yes".



Figure 10-2-4 FW Update Procedure (4)



10.2.5 Editing DAT files for TPS FWUpdater (Part 2)

- Open the DAT file for TPS FWUpdater (VendorID_Device_ID_01upd.dat), which is found in the work folder.
- Rewrite with the following settings: UpdateTarget = 1 NextBoot = 0

UpdateUpdater = 0



Figure 10-2-5 FW Update Procedure (5)

10.2.6 Checking TPS-1 stack image file write

• Reference Bootp/Tftp Logfile, and wait until the following logs have been output: Incoming readrequest for file : TPS_Target_Debug.img Incoming writerequest for file : 192_168_2_upd.sts



Figure 10-2-6 FW Update Procedure (6)



10.2.7 Checking the image file write results

- Open the status file 192.168.2_ups.sts, which is found in the work folder.
- Check to make sure that the 6th line, right under [Update Target], reads "performed=yes".
- If it reads "performed=yes", the FW update is complete.



Figure 10-2-7-1 FW Update Procedure (7)

Post FW update log:

When the update completes successfully, the following screen is displayed in the Terminal Program.



Figure 10-2-7-2 FW Update Procedure (8)



10.2.8 After FW update is complete

- Open the DAT file for TPS FWUpdater (VendorID_Device_ID_01upd.dat), which is found in the work folder.
- Enter the following settings to complete the process. UpdateTarget = 0
 - NextBoot = 1 UpdateUpdater = 1

Desktop¥1	PS Development Toolkit V.1.4.0.14¥TPS Stack¥2C7_1234_01upd.dat - sakura 2.2.0.0
File(F) Edit	E) Convert(C) Search(S) Tool(T) Option(O) Window(W) Help(H)
🖸 💣 🔻 日	🔚 🗢 여 🗑 📾 😂 ಿ 😸 🍝 👶 🛰 🚮 🌃 🙀 📑
1 UpdateTa 2 TargetEN 3 NextBoot 4 UpdateUp 5 UpdaterF LEOFJ	itI3I4I5I6I7I8. rget = Dy ame = TPS_Target_Debug.img↔ = 1↔ dater = 1↔ Name = TPS_UpdaterTarget.img↔

Figure 10-2-8-1 FW Update Procedure (9)

When in parallel I/O mode using the I/O board, TPS-1 becomes the Host. Writing to the stack on the TPS-1 Main board will generate the following Terminal Program display screen, and switch to READY state.

END OF PR	INT	
1 D	Flink Port1 = 1 / Link Port2 = A	
VICE CONFIGURATIO	N	
Port 1 MAC	: 74:90:50:00:FC:B8 (TX)	
Port 2 MAC IP address	: 74:90:50:00:FC:BA (TX) : 192.168.16.12	
IP subnet mas IP sateway	k : 0.0.0.0 : 0.0.0.0	
Name of stati	on: tps=1	
]	
IP-CORE REVISION	0x79 (Increment-Nr.: 9, Build-Nr.:7)	
TPS-1 STACK VERSI	ON: D 1.4.0.14 (Build Date: Aug 12 2016 12:11:40)	

Figure 10-2-8-2 FW Update Procedure (10)



11. Writing a Sample Program for the CPU Board

11.1 Connecting the CPU board (RX231) and Computer

- Connect the TPS-1 main board and CPU board.
- Using a USB cable, connect the computer and CPU board through the E1 emulator.
- Supply 5V DC power to the TPS-1 main board through the USB or DC jack.



Figure 11-2 CPU board (RX231) and PC Connection



11.2 CPU Compiler Package Installation

This explanation in this section assumes that the CPU compiler package "CS+" has already been installed on the computer and that the E1 Emulator is ready for use.

11.2.1 Writing an RX231 sample program

Click on the project file (rx231_tps1_sampl.mtpj) in the sample program. CS+ boots, and the following screen is displayed.

In mesicity Camba - mis in ec. higheritt				- 0	×
File Edit View Project Build Debug Taal	Window Help				
R Sart 2 2 3 3 10 10	C A 5 A .	n 🙀 🗑 SerialSPOF	 K BAN RRENERON 	de.	
Solution List 🗆 🗊 🖓 🖓 🥱					
Project Tree 0 a	T22 Property				
102 18	R m211 that annula Property			٩	1414
R55231544FP (Wicecontroller) CC-RX (Build Tool) RESISEND (Debug Tool) Re E. r. cg. bardware.setup.c main.c driver	Ellis remon Pesadular path 5 Licensie 3 Notes		A221_bal_avegie etti 0 x071F3 00:06250arps_Propertio221_ps1_ampis_s2band_201702	را بور اللين	
iii di commos iii dipsrt	File name This is the name of the life to which the	e information of the main project is to be same	d.		
in the formation in th	File name This is the name of the life to which the	e information of this main project is to be same	4		
in the formation in the formation of th	File name This is the name of the life to which the //Project./ Disput	e information of this main project is to be same	4		
in the formation in th	File same This is the name of the life to which th Project / Delayat Properties Analyzer Place Ind TerrePitten Console Place Ind Stack Using Trotory Webble Rescier Place Ind	e information of this main project is to be same	*		
tps+1	File name This is the name of the file to which th <u>Program</u> Analyzer Plan-Ind Tromphilon Console Plan-Ind Sack Unaver Fracer, Market Weblet Biologer Plan-Ind New Constant Fracer, Market The Sack Street Plan-Ind New Constant Plan-Ind Sack Unaver Plan-Ind New Constant Plan Sack Street Plan-Ind The Sack Street Plan-Ind The Sack Street Plan-Ind The Sack Street Plan-Ind The Sack Street Plan-Ind Sack Str	e information of the main project is to be same lialogs to enclote these sitiag-trop, d or should project "concentry.	4		
tps-1	File name This is the name of the file to which th Program is the name of the file to which th Program Analyzer Plan-Ind Program Analyzer Plan-Ind Program Analyzer Plan-Ind Now the ways Frederic Weldle Stocker Plan-Ind Now the ways Frederic Now the ways of the induced of constal in the Plan of the induced of constal Mark Plan of the induced of the induced All Messages /	e information of this main project is to be same fielding to employ these silling-ind-al as should project these silling-ind-al	4		
tps-1 Pr Open Help St. F27 Income	File same This is the name of the file to which the Project Debug Project Allower Place Ind. TroPythan Console Place Ind. TroPythan Console Place Ind. Sack These Freezer Wedde Sociater Place Ind. You rais use [Place Ind. You rais use [Place Ind. Mark Market Ind. Mark These Ind. Mar	e information of this main project is to be same lialog to enable these silver-instal sourcest stressessed project Fill fault & Court. F7 Build Project	d Fill uppers break. Fill See Danies St. 100 Sang Ocean - Fill Sang in	Reary	a a

Figure 11-2-1-1Sample Program Writing (1)

Select a build option (parallel 16-bit, parallel 8-bit or serial SPI IF), based on the interface being used.

File Solt View Project Build Debug Tool	Window Help		1
ALSon I HO X D. D. O.	() 株式人 ・ ・ 日間 50000 ・ 人 国気力 単分の力 目ののない。	č.	
Solution Lint I III III III III III	DefaultSold		
Project Trees II 3	Paraletter Paraletter		
103 1	Serial SPIF		-
Suc211 tan1 sample (Project)*	v lie	150	
Get Statistical Colored Tool)	License Notes		-
in in the l	File neme This is the name of the Ne to which the information of this main project is to be saved.		
in in the l	File name. This is the name of the file to which the inflatmation of this main project is to be saved.		
in in common in in the l	File neme This is the name of the Ne to which the inflamation of this main project is to be saved Project / Output		9.11
in in common in in the l	File name This is the name of the file to which the inflammation of this main project is to be saved Program / Output Program / Program / Instruction for the instrumental Back Useam Tracer J Back Useam Tracer J Back Useam Tracer J Back Useam Tracer J		9
in in tre-1	File name This is the fame of the file is which the inflamation of this main project is to be saved Verginst / Datest Project / Datest Datest Project / Datest Datest Project / Datest Datest Project / Datest Datest Project / Datest Datest Project / Datest Datest Project / Datest Datest Datest		9
tip-1	File name This is the same of the life to which the information of this main project is to be saved \Project / Output Program final year: Flag: Ing. Instruct for the life to which the information of the main project is to be saved Version Program final year: Flag: Ing. Instruct for the life to which the information of the main project is to be saved Version Version Program final year: Flag: Ing. Version Program final year: Flag: Ing. Version Version <td></td> <td>9</td>		9
tip-1	File name. This is the name of the life to which the information of this main project is to be saved. Project / Outsit Project / Data if the information of the main project is to be saved. Project / Data if the information of the main project is to be saved. Project / Data if the information of the main project is to be saved. Project / Data if the information of the main project is to be saved. Project / Data if the information of the main project informatin project informati		9

Figure 11-2-1-2 Sample Program Writing (2)



Build the program and download it to Tools. Go to **Debug** (D) \rightarrow Download to **Build & Download** (B).

10 Aug 10 10 10 10 10	Contract Con			1.5
A 10.10	Laid Downad			
Souton Lat				_
regarding the	Canada to Datas Tari			
1.2.2.1	a land		2	100
REFERENCE IN A STREET BACK	The assess free advantation of the advantation of t			
CC-RX (Build Tool)	Thing Delays Test			
EX EX E1(Secial) (Delovg 1	and a second sec			
1 2 Build tool generat				
r_og_hardwara_as	and the second data and the second seco			
a dist	a second and a second			
a Contention	Sheeber Fil			
and the second second	Famerican Balt-FTT			
alleg tests	To hear much			
	Amont .			
4	Americal designed states (201-P11)			
	Tere obug tool state			
	Insta			0 .
	Chrone Thermore Chhorager V -			
	Narder Remap	in.	Une P	here:
	Course & Southerner El Drocket			
and the second	the second s			

Figure 11-2-1-3 Sample Program Writing (3)

Select "Execute". Go to $\boldsymbol{Debug}\left(D\right)$ and select $\boldsymbol{Go}\left(G\right).$

R Sac A II II X 4	Dounitad	• 1005 • 藤原 fundelitäe • 6. 田氏内 # 単分内日 400 年点	
🚰 Selatoritat 🛄 🗊 🖬	Tuld & Deenload 19		
Prost Time .	Retrold & Download	(.q.wast) **	Catal Validation * *
1032	Constant for Damage Tests		Bittation 7 mg Bacadag*
= A colli teci sangie Pro	upose.		Carrent
CC-RX Build Teel	Decommentation Debug Sool (1875-78	wild FowerOS Reset PC(wild):	1000 C
EK ET (Swiet) (Debug 1	Using Dehug Tool	Wifief _cplmplus	
a gefox	0.00 (A.A.) (A.A	Femili	
to ranks	inpromönantille 10 Nach 11	forfine 75% init 5e00510000 (* 1994 bis pattern *) foefine FEW_init fe00stondo (* 1996 bit base pattern */	
() CONSTRUCT	lim for 10	Annama setting Senetiki // nation Popular Reset IC to disective surtic	4
Silveria S	Return Data Shift-Fills		
Craintprac Pr	CPU Read Out-PS	Abirthy watch someth want at	4
a op meeters er	Recent	which Wessernth Susser (PCowrade)	4
Cracertible	Residual debug fact place Carl-P11	sifief_3091	4
teahtan:	Save delarge tool state	eet_estb(stskept*fill)	8
and the second	71 822+0017	<pre>##t_tintb(###tep(="cinter")))</pre>	
diag tests	73 74	Alder _mic // Initialize FFW */ Hosting SCHD Defcoolei // Let TEM Editor-11 (round to term) */	Local Variables (#CPUThigner
	28	fdefine _BOHD (#1000010) /* Let FEEN Wining-D) (round to searces) */	129823 2.36.6 g 6.8087 Domani
	76	Softas _BEEN Galloofils /* Lat Fiom Invirvi (Banormal as pars) */	Pola Folds Encounting tion (Print 197)
	81 /52	Histina _20000 Nationitis // Let Will District (menumal as 10) */	AD., (*But (*Rat (*Dat) *

Figure 11-2-1-4 Sample Program Writing (4)



When the program has been executed and the CPU operates as the Host, the following screen appears in the Terminal Program, indicating that the system is in the READY state.

When using an I/O board in the parallel I/O mode, because the TPS-1 becomes the Host, writing a stack on the TPS-1 main board side produces the READY state, as shown on the screen below.



Figure 11-2-1-5 Sample Program Writing (5)

After the firmware writing is complete, select Debug \rightarrow Stop to stop the writing process. Select **Debug** (D), then **Stop** (S).

	Disordiat Build & Doutlant	* 1075 * 10 10 festellite		
Frant live bi	Satural & Described	The second second		Lord Parkins #
1050	Element to Debug find			Netwoor To becalling*
- 2 m231 gat weight (Frg. 2	Universit			
A CT. EX Balt Tell	Disconnectioner Denary Teal States	* wild DowerON Name _BC(wood):		Tele .
RXELSetal) (Debug 1	Using Debug Test	Will anta will be		
- Site	Step 3mb-2	3 Lentit		
E r.cg.hardware.st	opere Daak and Go	Minfine FSW init & 400010000	/* IIB bit patters */	
g- di Mont Ro	Day ki	Addition Althe TER THY ERCOODDOOD	(, LIM BIT Deve Datterr //	
6.2 knows a	Step Ziver 1	#gragma section Reset282	14 minput Bower[B_Benet_BC in These BES service	
r_cq_dbecta	Refue Dia: 36/6-17	Aurages entry Energy Hasen_PC		
Coglindander and	CPU Reat OH+P	2 Antid Scourtfill Least DC (milit)		
- Colligar	Rotet			
r.oj.vectbia	denominant provide China	PET_TATAL PECTIP("IACEPCPTIT")	Ball and a second s	
a tpa-t	Line debug that parts	Fandif and sands and a state of the state of		
alerm, test.c	14		0.4973.4074.4823.00	
- in and lette	34	Biefuse Borni Catinoccii	/* Initialize FESH */ /* Let FYSH UNDIAU-D1 (stand to leave */	Coosi Vienatine 🗊 DP2 Popular
	10	-Helse	the start want was stored as a second start.	Digit Vill
	27	Fendla	1. De lite oente in inne te minero el	C. EM., Command i . Mt.
	78	History DERCH Caleboolst	It fat fills filtered observal as sent 11	0.686.1 FPG8 87.1
	80	Helse		Consumication FPGe BU, Constator Informations,
	12	forfine _BBOH 0x05000010	/* Lat FYIM INCIDES (INALIMAL AN IN) */	AL. (*8.0
Y	18 10			Cubut a first lines

Figure 11-2-1-6 Sample Program Writing (6)



Select Disconnect from Debug => Debugging Tool to exit. Select **Debug** (D), then **Disconnect from Debug Tool**(N).



Figure 11-2-1-7 Writing Sample Program (7)



12. Startup PROFINET Communication

12.1 Defining PROFINET Device Names

Define the PROFINET devices names as you like. This document uses "TPS-1".

12.1.1 Creating a settings file

Boot Netnames+, which comes with PROFINET Configurator. Then click **Refresh**.

	Network Adapter:	ローカルエリ	P接続 [Realtek PCIe)	- >
Device Nan	ne 🔺 IP Address	Subnet Mask	Default Gateway	MAC A
	m			•
.∢ Filter Vendor:	m	Device Type) •:	F
Filter Vendor:	m	Device Type) 2:	
<pre> Image: Image Address Addres</pre>	m	Device Type	i	*
Filter Vendor: All No name	m	Device Type All No IP ac	2: dress allocated	
Filter Vendor: All No name Send	m entered	Device Type All No IP ac Refrest	l :: idress allocated	•

Figure 12-1-1-1 Device Name Setting (1)

When the network settings noted on the screen below are displayed, enter "TPS-1" for Device Name.

		Network A	disciplant.	10- tol. T	COMMON (Deschade)	The CRE Law	ally Controller		- 6
The last bigging	IN Address	Extend to the	Curburk	Conversion of the second	MAC LANSING	In the same ran	my coursest		T I I
tus-1	- IP AUPess	SULFING MIDSK	Linddan	- underway	HHC HOUSES	Vendor	E COLUMN DE LA	Section 2	CRANCE
				1141102					
* [
+ [Filter Vendor:				Device Tr	rpe:				
+ [FRpr Vendor: All				Device Tr All	vpe:				-1
* (Fitter Wenden All The section action	140			Device T Al	rpe:				÷
Riter Werden: All The restrict on the	at III	Stating Dr.		Device Tr All	PF		Espi	et	

Figure 12-1-1-2 Device Name Setting (2)



Click **Send** to complete the setting procedure.

		Network A	depter: g	コーカルエリ	77888 [Realtok P	Cle GBE Family Co	rbalier)	• >
Device Name + 1P	Address	Subnet Masik	Default G	Sateway	MAC Address	Vendor		Device T
/ birt 19	2,158,16.2	255 255,255,11	102.386.3	6.105	74,98150-00:112	ið Hennin Dettr	na Capitalia	n (Rist
- f _{ine}			.#					1 *
* [Filtar Vendori			*	Device Typ	e:			
* Filtar Vendori All			*	Device Typ	e:			-
Filter Vendor All Tol renne online of			*	Device Typ Al	er			*
* Fitter Vendori All TA neme internal Send		Failing Or	*	Device Typ [A]	e: Ed her där sind Refresh		Export	

Figure 12-1-3 Device Name Setting (3)



12.1.2 PROFINET Configurator

Boot PROFINET Configurator.

12.1.2.1 Reading the settings file.

Open the settings file.

Under the tool bar, select File, then Open.



Figure 12-1-2-1 PROFINET Configurator Settings (1)

Select the settings file. Please select the prepared file as shown below.

TDT/PROFINET Configurator/Example Project/tps-1.zcp



Figure 12-1-2-2 PROFINET Configurator Settings (2)



Click Yes.



Figure 12-1-2-3 PROFINET Configurator Settings (3)

12.1.2.2 Register the device

Register the device to be connected in Device Catalog.

- 1) Right-clicking in the Device Catalog area opens a sub-window.
- 2) Left-click on Import GSD File.



Figure 12-1-2-4 PROFINET Configurator Settings (4)



Select the previously prepared GSDML file, and click **Open**.

In this example, we explain how to open the GSDML file prepared by Renesas Electronics.



Figure 12-1-2-5 PROFINET Configurator Settings (5)

In the example used here, Renesas Electronics selected to be added to Device Catalog.

Au Stomer	A x Dent	Desk UV2.31-Phoenix_Contact-TP51-Template-	9 : 20151113 #Project#
A Unconnected	3	Noortwe	Velue
	TS	Project room	GSDML-V2.31-Phonest_Conta
	B	Creator	005
	D	Computer name at project creation	R9115551
	B	Cantle+ version at project creation	160.030.0
	Б	Owetton data	2017-02-21739(38)-41+09(00
	5	Lost editor	ODS .
	B	Computer name at last project backup	89116601
	G	Config+ version at last project backup	160-030-0
	B	Cate of last project backup	2017-02-21719(\$2:23+0#100
	TS	Domain Fostfor	
	0	Print IP Address	192,198.0.2
an england an	B	Last IP Address	100.560.0.754
Dewise Catholog	D	Fabrietriatk	255.755.255.0
+ CH Cottoure	D	Default Gateway	
	×		

Figure 12-1-2-6 PROFINET Configurator Settings (6)

12.1.2.3 Create the topology.

Delete any unnecessary devices. In the example, the devices inside the red line shown below will be deleted.

far Balan	+ # Desix Debais		
Phone Contact Software PROFINET 192 168.0.25	(province)	100.0	
AN PROFINET	The second	ves	
🖓 🖬 TPS-1 Templete VI.0 tps-1 197.100.0.50	C Proper name	49-1	
D III O (\$17PS-3 Template VI.3	D I more of a balance	1007 1008 10 V	
1 dTPS-1 Template V1.0	The second second	192.100.0.2	
57 17790 (Here 1., 1912)	D Chamrain	500, 200, 200, 0	
\$3 12770 Post 2 - 8343	D Datail Catalan	Constants	
An Diversion Const 1 Posses Const 1 Posses Control (Malk Posses Control (Malk Posses Control (Malk Posses Control (Malk Posses) Con			

Figure 12-1-2-7 PROFINET Configurator Settings (7)

- 1) Select **PROFINET** under Bus Structure.
- 2) To form the topology, select the device(s) to be added from Device Catalog.

In the example used here, **Renesas Electronics** is selected as the device to be added.

Open the sub-layers under Renesas Electronics, and double-click on the location shown below.

Image: Contract Software RECENT 132.180.25 VM/W Image: Contract Software RECENT Phones: Contract Software SortAl Image: Contract Software Sof	far Hulan	ROTHER ARIGINET Settings		9.8
Al PROCENT 1) Select PROFINET. Prevero. Cartical Softwares Bactel Prevero. Cartical Software Provent Cartical Prevero. Cartical Software Provent Cartical Software Provention Provent Cartical Software Provent Cartical Software Provent	## Photens Cartest Software PROFINET 182,188.0.25	1	Webury .	
1) Select PROFINE 1. Plores Cented Software HELPTINE 1) Select PROFILE Plores Cented Software HELPTINE 10 Select PROFILE Plores Cented Software HELPTINE 11 Select PROFILE Plores Cented Software HELPTINE 11 Select PROFILE Plores Cented Software HELPTINE 11 Select PROFILE Plores Cented Software HELPTINE 12 Select PROFILE Plores Cented Software HELPTINE 12 Select PROFILE Plores Cented Software HELPTINE 12 Select PROFILE Plores Cented Software HELPTINE 13 Select PROFILE <td>- ANY PROFINET</td> <td></td> <td>Phoentic Contract Software GmbH</td> <td></td>	- ANY PROFINET		Phoentic Contract Software GmbH	
Press Press Control Press Press	1)5	elect PROFINET .	Phoenex Contract Software PROFIDET	
B General Type HC Consister Type HC Consister Type Strait Control Consister Type HC Consister Type Consister Type Consister Type Consister		4 1 Punctional description.		
Constant formity Stratet Construit D Order manifest 1232485 D Activitie fiber optics alconnis Yes D Activitie fiber optics alconnis Yes D Street parameterization (file option alconnis Yes D Project Control Project Control D Project Control Project Control <tr< td=""><td></td><td>D Device type</td><td>PLC</td><td></td></tr<>		D Device type	PLC	
Conternative Size parameterization (Merry 100 - 100 / Million / 700 - 100 / Mil		D Device family	Smatt Centrol	
Description Provide Control Provide Control Provide Control <t< td=""><td></td><td>D Order number</td><td>1224/867</td><td></td></t<>		D Order number	1224/867	
Image: Constant C		D Revolue: Hill / Put	01/1.es/Swart Control	
		D Activists fiber optics alarres	Yes	
Prest Serve Prest Serve Prest Control Contract Contrac		Save parameterization (Ne system)	250	
	Phone Contact Phone Contact Phone Contact Gall Phone Contact Gall Phone Contact Gall Phone Contact Gall Phone Contact Contact			
	Reveals TPS-1 standard load TPS-1 Tanglans V(0 Rev.)= 1/V(1-3000 / TPS-1 Tanglans	2) Do	uble-click on the Ren	

Figure 12-1-2-8 PROFINET Configurator Settings (8)



The PROFINET device is added to the bus structure.

An Province Contact Tollings, Statement 7 at 144 p. 25	W.W. Develope	E		
BE Diversity Constant Rollmann BillsTould's Stat 365 () 25	TP5-1 3	moiste 41.0 me-12 152,566,0.2 emporte	VET Settinger	
and have been and the second of the second o		hama	190-ca	1
	1513	Concerns (Concerns)	Parenter Electronica	
10 M TPS-1 Terrulate V1.0 (pe-13 192.168.0.2	TN 13	Parate Contract of	10 K005 00,0040	
C 10 0 0 TPS-1 Templete VS.0	50	Paradonito	THU, 1 TREAMARK VI II	
1 0 190-1 Tempiste VI.8	51	Devoit D	01725	
CT 22759 Port L - 8:45	B	Functional descention	Reported TER, 3 Day on the Publication	
20770 Port 3 - RHE	BU	Device type	1/0	
1 IN/007	DI	Device family	Remainer TPS-1 selection board	
4 A Unconnected	15 1	Ortiker number	1234997	
	01	Revision:	1 / V14.00.00 / TPS1-Terrelete 20170.	
	01	ON5/WOPINET Device Name	498-13	
	0	SP Address	192,166,0.2	
	5	Subristimosk	295.255.255.8	
Dence Eduting	** 0 :	Ostault Galaway		
In 🛄 CM-Suffment	B	Reduction ratio input	8 mil	
+ 💭 Pisenic Contact	D I	Reduction value output	1 m	
Phoenic Cartact Oner Phoenic Cartact Software Grabit	B	Foulty fallegrams wild! connection is eb	34	
D Ca Paranas Electronica	B	Noricering Time Inputs (ms)	192	
Berman TPS-1 and sectored	010	Horiboring Time Outputs (ma)	192	
The Investment Investment Investment Investment Provide Advanced in the	0	Substitute value behavior of inputs	Set to sero	
	×			

Figure 12-1-2-9 PROFINET Configurator Settings (9)

Specify the IP address range for the PROFINET device.

1) From Bus Structure, select **tps-1**.

- 2) Specify "Last IP Address".
- 3) Set the "First IP Address".

4) Set the "Subnet Mask".

The values to be set are shown in the figure below.

	* R (SAM) SHAS - (Sal-) SPORTS - (Sal-) SPORTS
Contact Sectors - Experience VID 198.18 WROLDST U → This 1 Providence VID 199.11 Statistics - 1) ● ● 1 STORE 1 Templetes VID 199.11 Statistics - 1) ● ● 1 STORE 1 Templetes VID ● 1 STORE 1 Templetes VID ● 2 STORE 1 Templetes VID	Select tps-1. 3) 192.168.16.2 D Descent Margin remove at project creation
C 32770 feet 2 - FOIS	0 Last allow Ph/9 0 Compare rows at last project looks, and the project l
Serve Selling	B Default Category
Construct Control Construct Con	4) 255.255.255.0
	Set the IP address range.
(IM)	The Property in the Property i
history	Colorado Color

Figure 12-1-2-10 PROFINET Configurator Settings (10)



Enter the settings for the PROFINET IO controller.

- 1) From Bus Structure, select "Phoenix Contact Software PROFINET 192.168.16.201".
- 2) From Device Details, enter IP Address and Subnetmask.
- The following examples shows the IP address setting.



Figure 12-1-2-11 PROFINET Configurator Settings (11)

Specify the PROFINET OUTPUT folder.

1) Select **PROFINET** under Bus Structure.

2) In PROFINET/PROFINET Settings, double click on Save parameterization.

Norme Vela Image: Contract Endbase MPCPUET (22, 58, 18, 1.0) Image: Contract Endbase Contract Software		K S Dens Driets PROFINET Settinger		8 x
	Constant Constant and Cons	Norre Verdor P	Vela Weens Contact Satisfies Grifter Weens Contact Satisfies WiDPINET PLC Similar Control 1254567 GLTLike/Sheet Caleford Yes Click on this icon.	
1) Select " PROFINET ".		1) Select " PROFINE	ET".	

Figure 12-1-2-12 PROFINET Configurator Settings (12)

Under "Path for download to the file system", select the folder called TDT/PROFINET Configurator/Example Project/.



Figure 12-1-2-13 PROFINET Configurator Settings (13)

Set the registered PROFINET devices.

- 1) As shown below, select the PROFINET device under Bus Structure.
- 2) Select PROFINET Setting under Device Details.
- 3) Confirm the IP address and Subnetmask value under Device Details.



Figure 12-1-2-14 PROFINET Configurator Settings (14)



1) Switch the tab from **PROFINET Setting** to **PROFINET Stationnames**.

TPS-1 devices that can be used will be displayed.

2) Click on the TPS-1 device.

3) Click Assign Name.



Figure 12-1-2-15 PROFINET Configurator Settings (15)

The device allocation process is completed when the following is displayed.

Ra Basher	R. S. Disor Disk	
• • • The i • • • • • • • • • • • • • • • • •	THE I THEN TO THE TO A THE STATE AND A SHEET AND A DECOMPOSITION TO A DECOMPOSITION TO A DECOMPOSITION TO A DECOMPOSITION TO A DECOMPOSITION AND A DECOMPOSITICA A DECOMPOSICOMPOSITICA A DECOMPOSITICA A DECOMPOSITICA A DECOMPOSITICA A DEC	Falles (E183) Scientisk (2020)
31789 Part I - RU45		1000 A 1000 A
- C 2076 Her 2 - KHS - T 1070 Her 2 - KHS - T 1070 Her 2 - KHS - KHS - C 2076 Her 2 - KHS - C 2076 Her 2	ter the comment of th	12799 Man
Denie Califia	**	
DPP-Schweise Prever Goden Schweise Schweise Prever Goden Schweise Schweise Prever Extension Schweise	Place Disconstruct Discholaren Disconstructure	Long F

Figure 12-1-2-16 PROFINET Configurator Settings (16)



Execute Parameterize.

Under Bus Structure, select **PROFINET**.
 Click **Parameterize**.



Figure 12-1-2-17 PROFINET Configurator Settings (17)



Click Execute, and then click "Y" for Yes.

Controllier Boards of the System		- filosoate
Controller Board Blate	1) Click Execute.	Cos 349
Storage location for project sources		
House Invitentia	PROFINET Configurator	r
Actions Sowe parameterization (Ne system)	Gave charges to the Line?	
	Virs No Carrel	
2) Click "V"		

Figure 12-1-2-18 PROFINET Configurator Settings (18)

- 1) "Completed" will show as the state.
- 2) Click **Close** to complete the process.

	Controlled diversits of the System Controlled Board (2007) (2007) (2) PROMINET (122.106.10.10) Completend	Gom Line
State shows "completed."	Active Sever parameterization (He system)	

Figure 12-1-2-19 PROFINET Configurator Settings (19)



12.2 Connecting the Software PLC

12.2.1 PROFINET Smart Control Express

Boot PROFINET Smart Control Express.

Load the XML file called "IPPNIO". (Application → Parse XML-File) TDT/PFOFINET Configurator/Example Project/IPPNIO.xml

Application Contraction Dep Options Help Perce XMs-File Onle-0 foot	DEPHOENIX
Adopter: ローカル エリア補助 [192-108.10.105] no xm1-file selected.	

Figure 12.2.1 Booting PROFINET Smart Control Express (1)

Under Device Selection, select TPS-1.

Application Competition Des Optione Help Processional States No-Data Record-Data PROFibine USANY AA AA States Config Feland NPS - Good P-Addresse R-RAMAR R-	
--	--

Figure 12.2.2 Booting PROFINET Smart Control Express (2)



Click START AR.

Device Selection TED - Advanced Stanup IO-Data Record-Data PROFables	DECONTACT
ck Start AR button.	

Figure 12.2.3 Booting PROFINET Smart Control Express (3)

AR Connected and AR Status are enabled.

The AR Connected and AR Status symbols turn green, as shown in the figure below, to indicate the connection with the software PLC is complete.

	Application Connection Dcp Options Help Device Selection	TAPHENIX
ĸ	Deter Record-Cate PROFibion	LICONTACT
Â	bottor: D-701/. 11/798# [192.168.16.105] Application Ready recoived	green.

Figure 12.2.4 Booting PROFINET Smart Control Express (4)



12.2.2 Confirm I/O Board Operations

1) Data transmission from master

TPS-1 ports GPIO8 to GPIO15 are assigned to the lower byte of output settings of PROFINET Smart Control Express. Port status can be confirmed based on whether the corresponding LED (LED1 to LED8) is ON or OFF.

Specify "0x00FF" as the output setting for PROFINET Smart Control Express to turn the LEDs on the I/O board OFF.



Figure 12-2-2 I/O Board Operation Check (1)

2) Specify "0x0000" as the output setting for PROFINET Smart Control Express to turn the LEDs on the I/O board ON.



Figure 12-2-2 I/O Board Operation Check (2)



3) TPS-1 ports (GPIO16 to GPIO23) are assigned to the upper byte INPUT settings of PROFINET Smart Control Express.

The virtual LEDs on PROFINET Smart Control Express can be turned ON and OFF by setting the I/O board switches SW2 to SW9.

Set the I/O board switches (SW2 to SW9) to ON to turn on the virtual LEDS on PROFINET Smart Control Express.



Figure 12-2-3 I/O Board Operation Check (3)

4) Set the I/O board switches (SW2 to SW9) to OFF to turn off the virtual LEDS on PROFINET Smart Control Express.



Figure 12-2-4 I/O Board Operation Check (4)



12.2.3 Confirm CPU Board Operations

1) Data transmission from master

CPU RX231ports PC0 to PC3 are assigned to the lower 4 bits of output settings of PROFINET Smart Control Express. Changes in port status can be confirmed based on whether the corresponding LED (LED8 to LED11) is ON or OFF.

Specify "0x00FF" as the output setting for PROFINET Smart Control Express to turn the LEDs on the CPU board OFF.



Figure 12-2-5 CPU Board Operation Check (1)

2) Specify "0x0000" as the output setting for PROFINET Smart Control Express to turn the LEDs on the CPU board ON.



Figure 12-2-6 CPU Board Operation Check (2)



TPS-1

3) CPU RX231 ports (P44 to P47) are assigned to the upper byte INPUT settings of PROFINET Smart Control Express. The virtual LEDs on PROFINET Smart Control Express can be turned ON and OFF by setting the CPU board switch (SW11 pin 1 to pin 4).

Set the CPU board switch (SW11 pin 1 to pin 4) to ON to turn on the virtual LEDS on PROFINET Smart Control Express.

Controlling master-side LEDs with the switches on the CPU board ON:



Figure 12-2-7 CPU Board Operation Check (3)

4) Set the CPU board switch (SW11 pin 1 to pin 4) to OFF to turn off the virtual LEDS on PROFINET Smart Control Express.



Figure 12-2-8 CPU Board Operation Check (4)


13. Appendix A

13.1 Erasing the Flash Memory from the TPS-1 Main Board

This section explains how to erase the flash memory of the main board.

13.1.1 Flash erase program (TPS_Erase_Flash.s) transfer

- 1) Set jumper 6 on the TPS-1 main board to 2-3 to set the UART mode.
- 2) Connect the computer and TPS-1 port with the USB cable.
- 3) Boot the Terminal Software. Tera Term is used as an example here.
- 4) Press the Reset switch on the TPS-1 main board.
- 5) Enter "s" on the Tera Term screen and press the Enter key on the computer.
- 6) The message shown below is displayed on the Tera Term screen.



Figure 13-1-1 Flash Erase Procedure (1)

When the above message is displayed, send the file.

Under File, click Send file.



Figure 13-1-2 Flash Erase Procedure (2)



💆 COM5 - Tera Ter	m VT				_	\times
File Edit Setup	Control Wine	dow KanjiCode Help				
						^
	💆 Tera Term	n: Send file			\times	
UART mode cal	Look in:	TPS Starter	~ © 💋) 📂 🛄 🗸		
	Name	^	Dater	nodified	Ту	
Start bootload	TPS_Eras	se_Flash.s	3/9/20	012 6:00 PM	S	
Press small le	TPS_Sta	rter.s	2/14/2	2017 10:55 PM	S	
or press smal	TPS_Sta	rter_FiberOptic.s	2/14/2	2017 10:55 PM	S	
	<				>	
≻s	File name:	TPS_Erase_Flash s		Open		
	Files of type:	All(*.*)	~	Cancel		
Send ASCII St				Help		
(Motorola S-Re	Option					
Downloading or	Binary					
						\sim

Open the folder called TDT/ TPS Starter and select TPS_Erase_Flash.s. Click O (open).

Figure 13-1-3 Flash Erase Procedure (3)

The flash content erase is started.

💆 COM5 File Edit	- Tera Term VT – \Box X Setup Control Window KanjiCode Help	
	Terro Terro Can d Ela	^
UART 🚢 Star	Filename: TPS_Erase_Flash.s	
Pres: or p	Fullpath:D:\07)TPS1関連\08)REE_TPdownload processBytes transfered:61400 (33.7%)Elapsed time0:05 (11.74KB/s)	
>s Send	Close Pause Help	
(Mot Downloa	ding SREC Program File:	
		*

Figure 13-1-4 Flash Erase Procedure (4)



When the flash content has been erased, the following screen is displayed.



Figure 13-1-4 Flash Erase Procedure (5)

Input "g" and press the Enter key on the computer. This returns the system to the initial state.



Figure 13-1-5 Flash Erase Procedure (6)



Website and Support <website and support,ws>

Renesas Electronics Website

http://www.renesas.com/

Inquiries

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

All trademarks and registered trademarks are the property of their respective owners.



Revision History

		Description				
Rev.	Date	Page	Summa	ry		
1.00	2017/04/25	-	First edition issued			

General Precautions in the Handling of MicroprocessingUnit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unitproducts 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 Microprocessing unit or Microcontroller unitproducts 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.

Notice

- Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation or any other use of the circuits, software, and information in the design of your product or system. Renesas Electronics disclaims any and all liability for any losses and damages incurred by you or third parties arising from the use of these circuits, software, or information.
- Renesas Electronics hereby expressly disclaims any warranties against and liability for infringement or any other disputes involving patents, copyrights, or other intellectual property rights of third parties, by or arising from the use of Renesas Electronics products or technical information described in this document, including but not limited to, the product data, drawing, chart, program, algorithm, application examples.
- 3. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
- 4. You shall not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part. Renesas Electronics disclaims any and all liability for any losses or damages incurred by you or third parties arising from such alteration, modification, copy or otherwise misappropriation of Renesas Electronics products.
- 5. Renesas Electronics products are classified according to the following two quality grades: "Standard" and "High Quality". The intended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below.
 - 'Standard': Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots etc.

"High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control (traffic lights); large-scale communication equipment; key financial terminal systems; safety control equipment; etc. Renesas Electronics products are neither intended nor authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems, surgical implantations etc.), or may cause serious property damages (space and undersea repeaters; nuclear power control systems; aircraft control systems; key plant systems; military equipment; etc.). Renesas Electronics disclaims any and all liability for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for which the product is not intended by Renesas Electronics.

- 6. When using the Renesas Electronics products, refer to the latest product information (data sheets, user's manuals, application notes, "General Notes for Handling and Using Semiconductor Devices" in the reliability handbook, etc.), and ensure that usage conditions are within the ranges specified by Renesas Electronics with respect to maximum ratings, operating power supply voltage range, heat radiation characteristics, installation, etc. Renesas Electronics disclaims any and all liability for any malfunctions or failure or accident arising out of the use of Renesas Electronics products beyond such specified ranges.
- 7. Although Renesas Electronics endeavors to improve the quality and reliability of Renesas Electronics products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please ensure to implement safety measures to guard them against the possibility of bodily injury, injury or damage caused by fire, and social damage in the event of failure or malfunction of Renesas Electronics products, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures by your own responsibility as warranty for your products/system. Because the evaluation of microcomputer software alone is very difficult and not practical, please evaluate the safety of the final products or systems manufactured by you.
- 8. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please investigate applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive carefully and sufficiently and use Renesas Electronics products in compliance with all these applicable laws and regulations. Renesas Electronics disclaims any and all liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
- 9. Renesas Electronics products and technologies shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations. You shall not use Renesas Electronics products or technologies for (1) any purpose relating to the development, design, manufacture, use, stockpiling, etc., of weapons of mass destruction, such as nuclear weapons, chemical weapons, or biological weapons, or missiles (including unmanned aerial vehicles (UAVs)) for delivering such weapons, (2) any purpose relating to the development, design, manufacture, or use of conventional weapons, or (3) any other purpose of disturbing international peace and security, and you shall not sell, export, lease, transfer, or release Renesas Electronics products or technologies to any third party whether directly or indirectly with knowledge or reason to know that the third party or any other party will engage in the activities described above. When exporting, selling, transferring, etc., Renesas Electronics products or technologies, you shall comply with any applicable export control laws and regulations promulgated and administered by the governments of the countries asserting jurisdiction over the parties or transactions.
- 10. Please acknowledge and agree that you shall bear all the losses and damages which are incurred from the misuse or violation of the terms and conditions described in this document, including this notice, and hold Renesas Electronics harmless, if such misuse or violation results from your resale or making Renesas Electronics products available any third party.
- 11. This document shall not be reprinted, reproduced or duplicated in any form, in whole or in part, without prior written consent of Renesas Electronics.
- 12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products.
- (Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.
- (Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.

(Rev.3.0-1 November 2016)



SALES OFFICES

Renesas Electronics Corporation

http://www.renesas.com

Refer to "http://www.renesas.com/" for the latest and detailed information. Renesas Electronics America Inc. 2801 Scott Boulevard Santa Clara, CA 95050-2549, U.S.A. Tel: +1-408-588-6000, Fax: +1-408-588-6130 Renesas Electronics Canada Limited 9251 Yonge Street, Suite 8309 Richmond Hill, Ontario Canada L4C 9T3 Tel: +1-905-237-2004 Renesas Electronics Europe Limited Dukes Meadow, Miliboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K Tel: +44-1628-585-100, Fax: +44-11628-585-900 **Renesas Electronics Europe GmbH** Arcadiastrasse 10, 40472 Düsseldorf, German Tel: +49-211-6503-0, Fax: +49-211-6503-1327 Renesas Electronics (China) Co., Ltd. Room 1709, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100191, P.R.China Tel: +86-10-8235-1155, Fax: +86-10-8235-7679 Renesas Electronics (Shanghai) Co., Ltd. Unit 301, Tower A, Central Towers, 555 Langao Road, Putuo District, Shanghai, P. R. China 200333 Tel: +86-21-2226-0888, Fax: +86-21-2226-0999 Renesas Electronics Hong Kong Limited Unit 1601-1611, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong Tel: +852-2265-6688. Fax: +852 2886-9022 Renesas Electronics Taiwan Co., Ltd. 13F, No. 363, Fu Shing North Road, Taipei 10543, Taiwan Tel: +886-2-8175-9600, Fax: +886 2-8175-9670 Renesas Electronics Singapore Pte. Ltd. 80 Bendemeer Road, Unit #06-02 Hyflux Ini Tel: +65-6213-0200, Fax: +65-6213-0300 Innovation Centre, Singapore 339949 Renesas Electronics Malaysia Sdn.Bhd. Unit 1207, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia Tel: +60-3-7955-9390, Fax: +60-3-7955-9510 Renesas Electronics India Pvt. Ltd. No.777C, 100 Feet Road, HAL II Stage, Indiranagar, Bangalore, India Tel: +91-80-67208700, Fax: +91-80-67208777 Renesas Electronics Korea Co., Ltd. 12F., 234 Teheran-ro, Gangnam-Gu, Seoul, 135-080, Korea Tel: +82-2-558-3737, Fax: +82-2-558-5141