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User's Manual

Voltage Conversion Board

User's Manual

RENESAS SINGLE-CHIP 8-BIT CMOS
MICROCOMPUTER
740 FAMILY

Renesas Electronics
www.renesas.com

Rev.2.00 2007.07

Table of Contents

Chapter 1. Preface

Cautions

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Website: http://www.renesas.com/ (Global)

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Glossary

CPU	Central Processing Unit	PC	Personal Computer
FDT	Flash Development Toolkit	VCB	Voltage Conversion Board
LED	Light Emitting Diode		

Chapter 2. Precautions

Please be sure to read Notes shown below before using this tool.

Warning

This Voltage Conversion Board is an optional programming tool for QzROM microcontrollers, and cannot be used for Flash microcontrollers. When connecting the Voltage Conversion Board to CPU Board, the Voltage Conversion Board and CPU Board may be damaged. Therefore, do not connect the Voltage Conversion Board to CPU Board contained in Renesas Starter Kit.

Warning

This Voltage Conversion Board builds in the voltage conversion circuit for VPP supply generation. Therefore, do not connect the Voltage Conversion Board to a User Target with the conversion circuit for VPP supply. Connection with such a User Target, may cause the Voltage Conversion Board and User Target to be damaged.

Warning

This Voltage Conversion Board has the IDC connector for connecting the E8a and User Target mounted, and these connectors are the same form. Please be sure to connect E8a to the connector “CN2” on Voltage Conversion Board. When connecting the Voltage Conversion Board to connector CN1 on Voltage Conversion Board, the Voltage Conversion Board and E8a may be damaged.

>> Please refer to Section 5.2.

Warning

Before using Voltage Conversion Board, the user must adjust a VPP level using the potentiometer “VR1” on the Voltage Conversion Board. If the Voltage Conversion Board is used without adjusting the VPP level, programming the QzROM microcontroller may not be performed properly. Also, the microcontroller may be damaged.

>> Please refer to Section 6.2.

Chapter 3. Purpose

This Voltage Conversion Board is a programming option tool for Renesas 740 QzROM microcontrollers.

Features include:

- Programming Circuit. (via E8a emulator)
- Voltage Conversion Circuit for VPP Power Supply Generation.

This manual describes the technical details of the Voltage Conversion Board hardware. Moreover, this manual provide details of the programming method and programming environment.

Chapter 4. Power Supply

4.1. Requirements

This Voltage Conversion Board operates from a 3V to 5V power supply. Power is supplied from the E8a or user target system. The Voltage Conversion Board uses this supply to generate VPP supply through a voltage conversion circuit on Voltage Conversion Board.

The power jack (J1) for VPP supply generation is provided for the user target system. Normally, the power is provided from E8a or the user target system. If their drive capability is not enough, external power for VPP supply of the user target system can be provided from the power jack. The input voltage range of the external power for VPP supply is 9.0V to 12.0V.

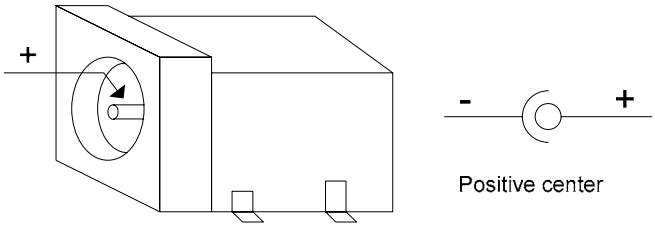


Figure 4-1: Power Jack (J1) Polarity

Chapter 5. Layout and Connectivity

5.1. Component Layout

The following diagram shows the top layer component layout of the board.

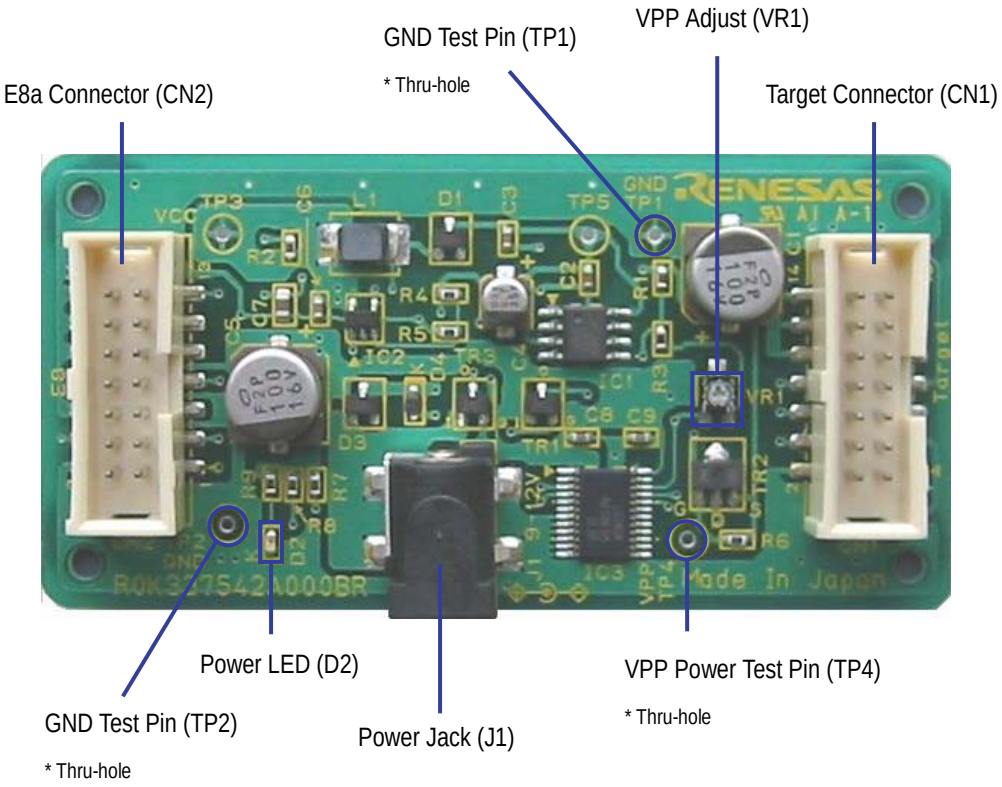


Figure 5-1: Component Layout

5.2. Board Connectivity

The following diagram shows the board connectivity.

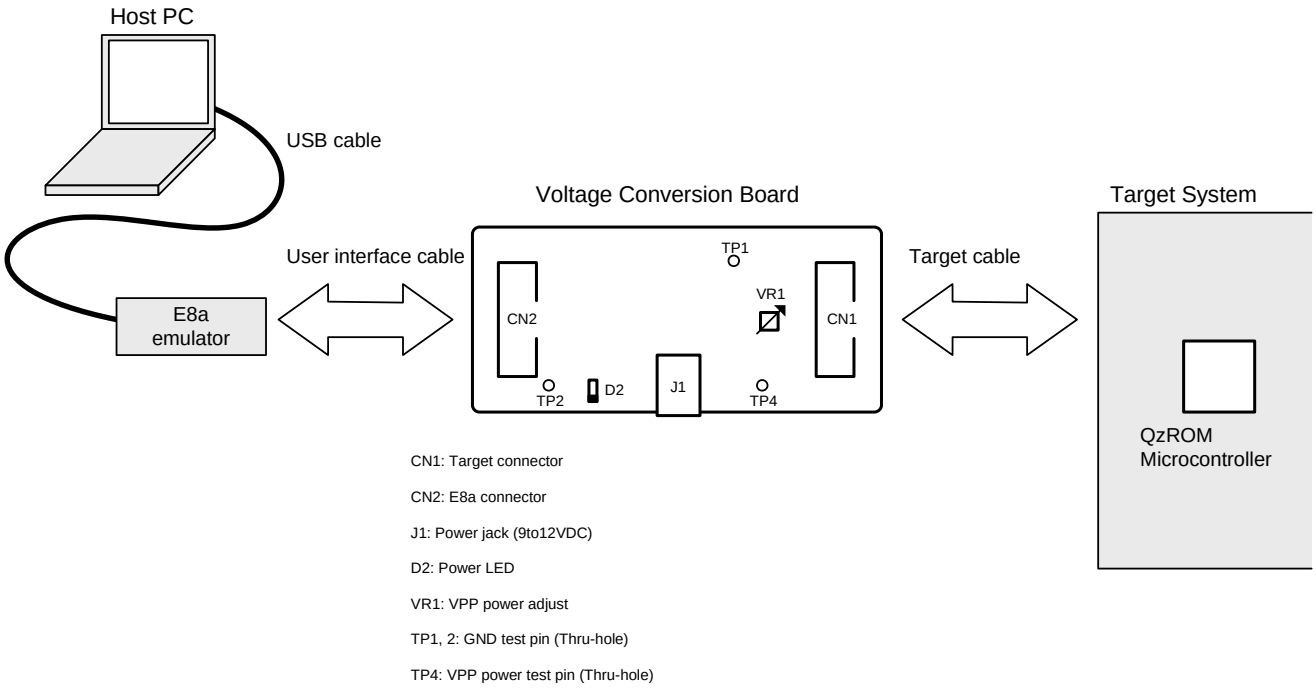


Figure 5-2 : Board Connectivity

Chapter 6. Programming

6.1. Introduction

Renesas's Flash Development Toolkit is a dedicated flash programming software for Renesas F-ZTAT microcontrollers, which offers a sophisticated and easy-to-use Graphical User Interface. Flash Development Toolkit will have been installed during the installation of the software support for the Renesas Starter Kit product. This manual will describe the stages required to program the code.

6.2. Adjusting a VPP Voltage

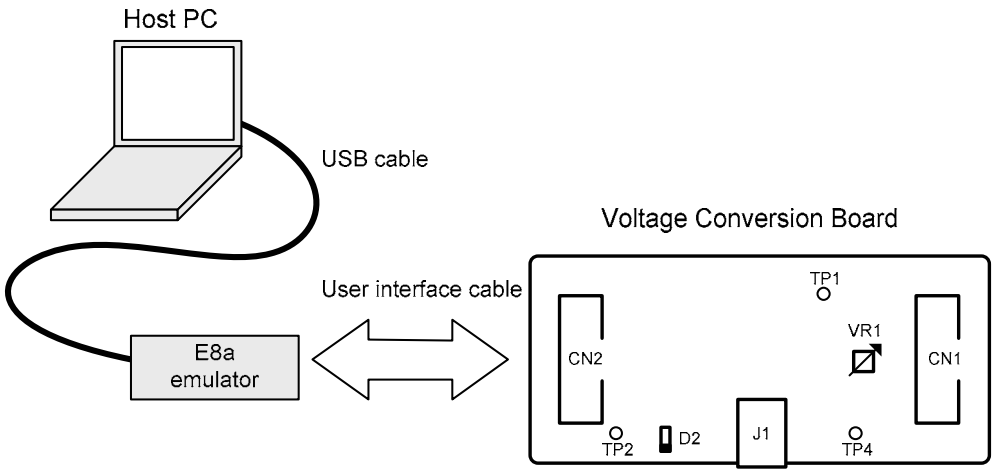
Before using Voltage Conversion Board, user must adjust a VPP voltage level using the potentiometer "VR1" on the Voltage Conversion Board. If the Voltage Conversion Board is used without adjusting the VPP level, programming the QzROM microcontroller may not be performed properly. Also, the microcontroller may be damaged.

Therefore, please be sure to adjust the VPP voltage level according to the procedure shown in the following sections.

6.2.1. Connecting a Voltage Conversion Board

This section shows how to connect the Voltage Conversion Board.

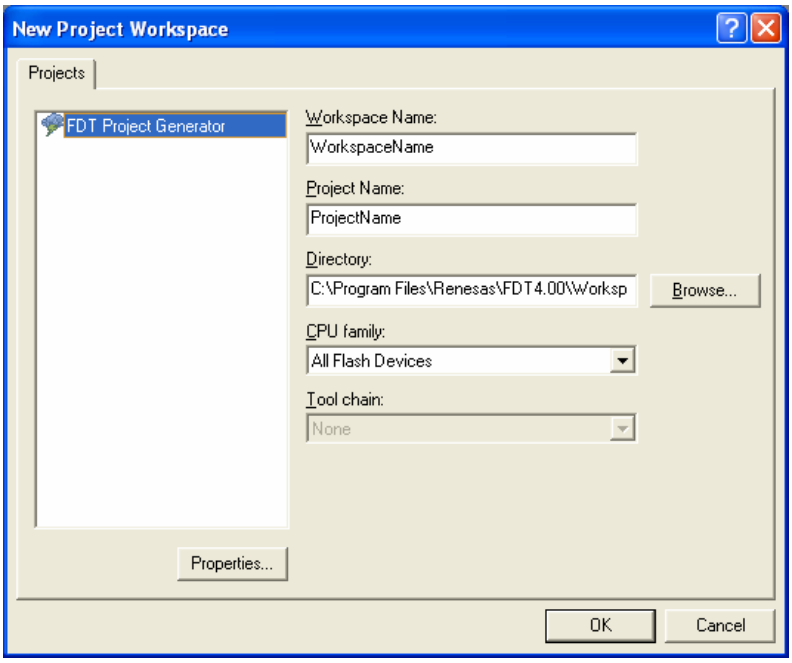
- Connect E8a to Host PC by the USB cable.
- Connect Voltage Conversion Board to E8a by the User interface cable.



- Check that the User interface cable is not connected to the Target Connector (CN1) on Voltage Conversion Board. If it is connected, please reconnect with the E8a Connector (CN2) on Voltage Conversion Board.
- Check that the user target system is not connected to Voltage Conversion Board. If it is connected, please disconnect the user target system from Voltage Conversion Board.

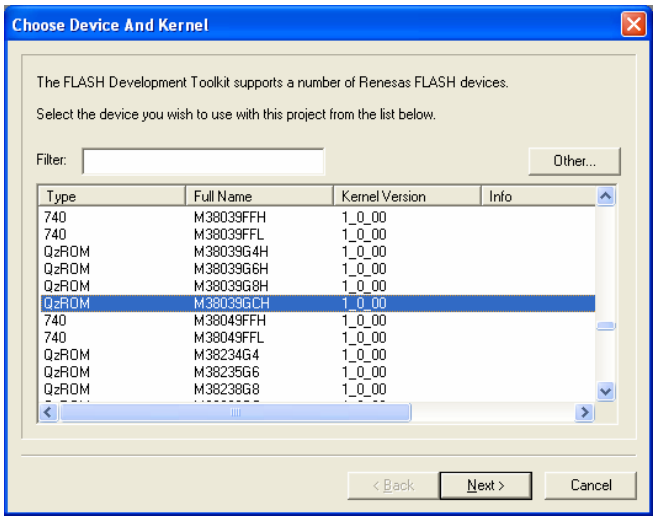
6.2.2. Creating a new Project Workspace

- Start Flash Development Toolkit from the Windows Start Menu, Start | All Programs | Renesas | Flash Development Toolkit 4.00 | Flash Development Toolkit 4.00.
- Open a new workspace from the [File -> New Workspace…] menu or select 'Create a new project workspace' when presented with the 'Welcome!' dialog.

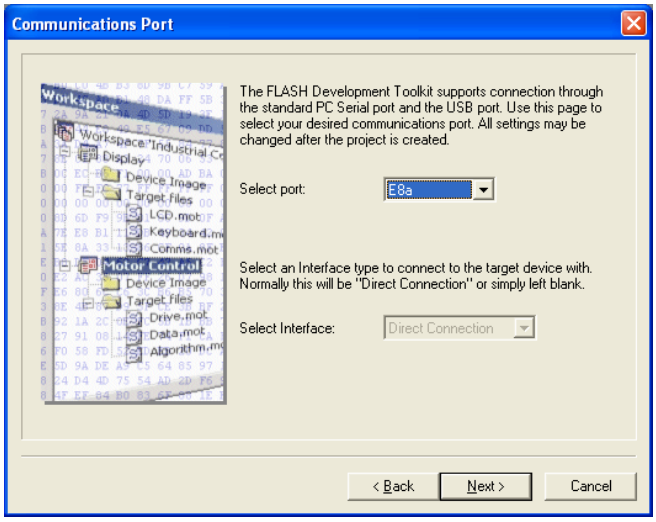


The example above shows the New Project Workspace dialog.

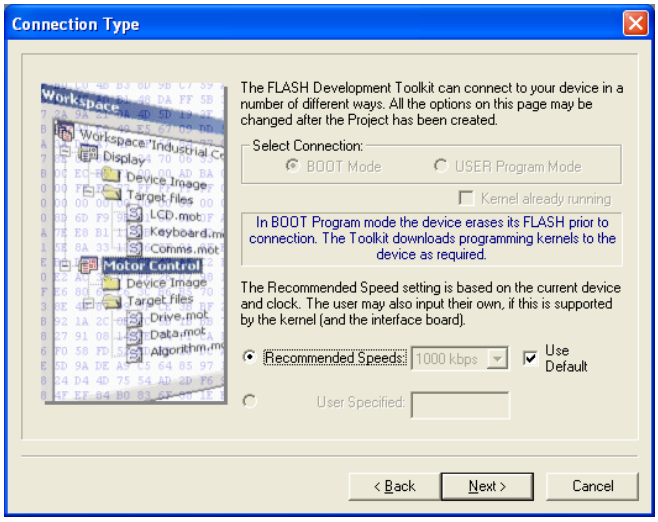
- Enter a Workspace Name; all your files will be stored within a folder called …\Workspaces\<your_name>
- The project name field will be pre-filled to match the workspace name above; you can change this name if you wish.
- Click <OK> to start the Flash Development Toolkit Project Generator wizard.
- Select from a device type list the QzROM microcontroller that you use.
- Click <Next>.



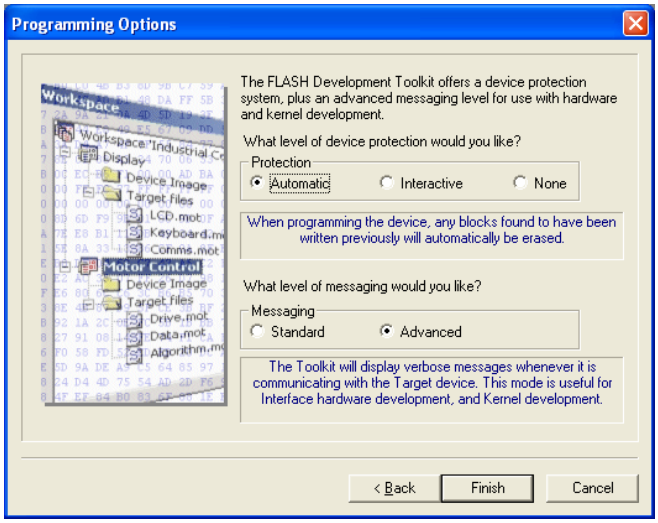
- Select “E8a” as the communication port.
- Click <Next>.



- The “Connection Type” dialog will be shown. Click <Next>.



- Select “Automatic” as the protection level.
- Select “Advanced” as the output massage level.
- Click <Finish>.

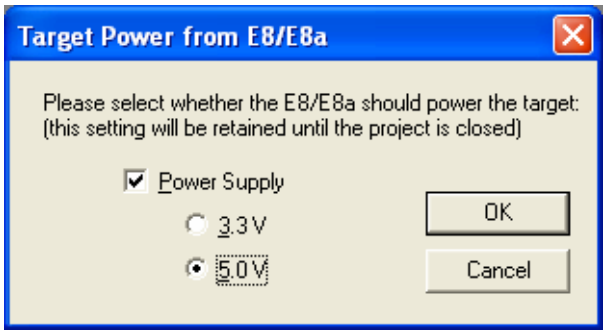


The above Flash Development Toolkit configuration can be changed later using the <Configure Flash Project> button on the toolbar.

6.2.3. Connecting Flash Development Toolkit and Adjusting the VPP Voltage

- Click the <FDT Connect> button on the toolbar.

- Set 'Power supply' checkbox.
- Select '5.0V'.
- Press <OK>.'



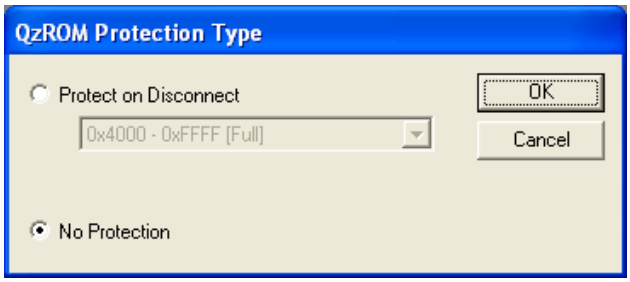
If connection is completed, Flash Development Toolkit's Output window will display 'Connection complete'. Moreover, Power LED (D2) on Voltage Conversion Board lights up.

The following step shows the VPP adjustment using the potentiometer (VR1) on Voltage Conversion Board.

- Check the voltage level between a GND test pin (TP1 or TP2) and a VPP test pin (TP4) using a tester.
- Turn potentiometer and adjust the VPP voltage level to 7.8V – 8.0V (Typ. 7.9V).
- When adjustment is completed, click <Disconnect>.

- If the dialog shown to the right is displayed, select <No Protection> and click <OK>.

This is described in detail by Section 6.2.4.



- Close Flash Development Toolkit.

Flash Development Toolkit retains a power supply setting until the project is closed. This setting will be initialized by closing a project.

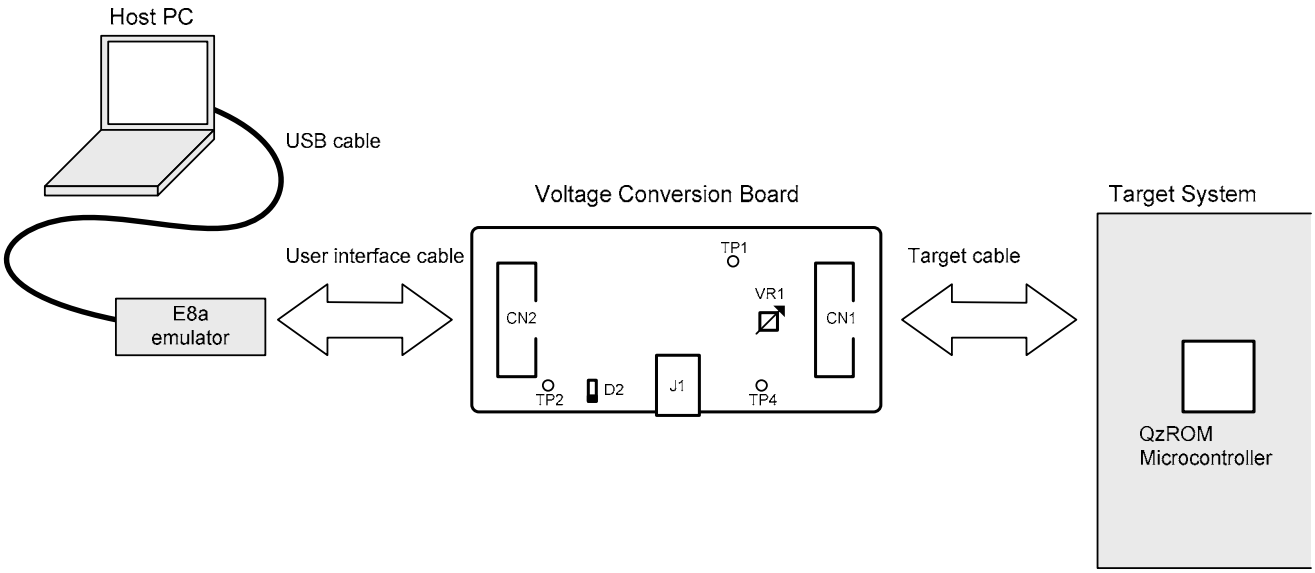
After following the steps above, VPP adjustment is complete.

6.3. Programming to QzROM

6.3.1. Connecting a Voltage Conversion Board and a Target

This section shows how to connect the Voltage Conversion Board to a user target system.

- Connect E8a to Host PC by the USB cable.
- Connect Voltage Conversion Board to E8a by the User interface cable.
- Connect target to Voltage Conversion Board by the Target cable.

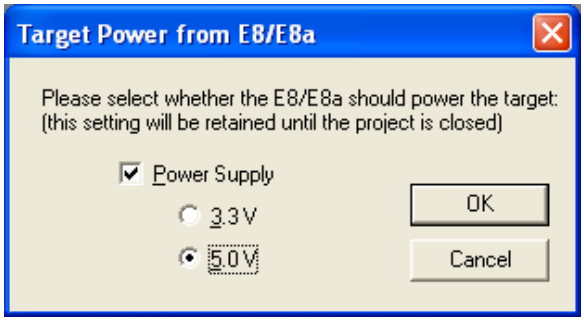


If you provide the power from the target system, or when you provide the VPP power from the power jack (J1) on the Voltage Conversion Board, please provide the power at this time.

6.3.2. Connecting Flash Development Toolkit

- Start Flash Development Toolkit from the Windows Start Menu and open the project workspace created with the Section 6.2.2.
- Click the <FDT Connect> button on the toolbar.

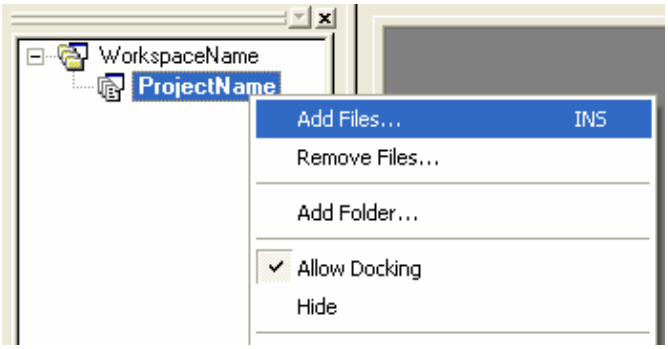
- If the E8 is to provide the power to the Voltage Conversion Board and user target, select “Power Supply”. Otherwise provide the power supply.
- Select “5.0V” or “3.3V” then click <OK> if “Power Supply” is selected, otherwise click <OK>.



If connection is completed, Flash Development Toolkit’s Output window will display ‘Connection complete’. Moreover, Power LED (D2) on Voltage Conversion Board lights up.

6.3.3. Programming

- Right click on the project listed in the left hand pane and select “Add Files…”.
- Add the download file.
- Double click the download file added to the left hand pane.



- Click the <Download Active File> button on the toolbar. 

The download file will be programmed to the QzROM microcontroller.

6.3.4. Protect setting

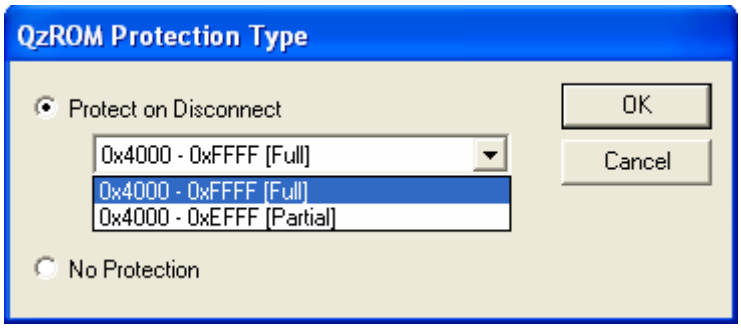
QzROM also introduces the concept of Security Protection into Flash Development Toolkit, which is optionally set as Flash Development Toolkit disconnects (Note: once set, this cannot be undone).

The majority of devices have two levels of protection: Full (which prevents any later reconnection to the device) or None (which allows reconnection normally). Newer devices have more levels – allowing a partial protection of the device and yet still allowing a later connection (but with the protected data region masked).

There are three options for the setting of security protection:

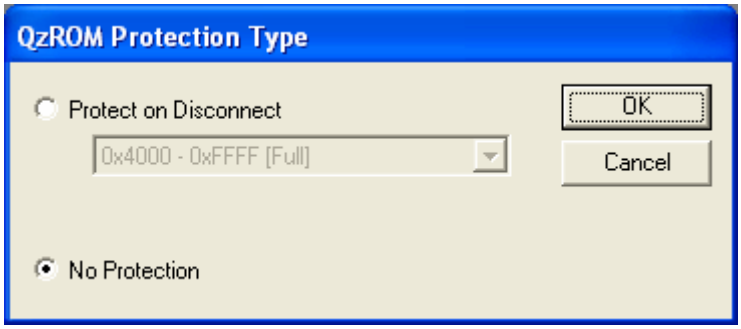
Automatic 

Flash Development Toolkit will protect the device as it disconnects. The level of protection will be determined when Automatic is initially selected, typically ‘Full’. If the device offers multiple levels of protection then a dialog will appear to allow the user to select the level that should automatically be applied.



Prompt 

Flash Development Toolkit will ask what to do during the disconnect stage, i.e. whether to protect or not. The choice is between full protection (or other levels if supported by the device) or no protection at all. The default is 'No Protection'.

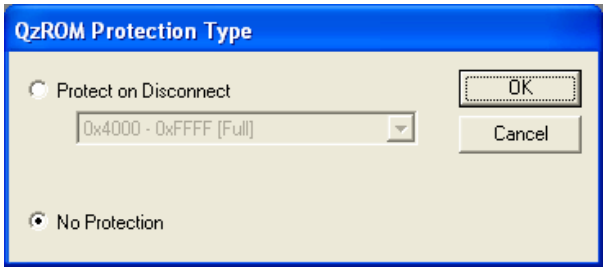


None 

Flash Development Toolkit will not protect the device on disconnect.

- Select a protect option.
- Click the <Disconnect> button on toolbar. 

If you have selected 'Prompt', the dialog shown to the right will be displayed.



- Select protection type by this dialog.
- Click <OK>.

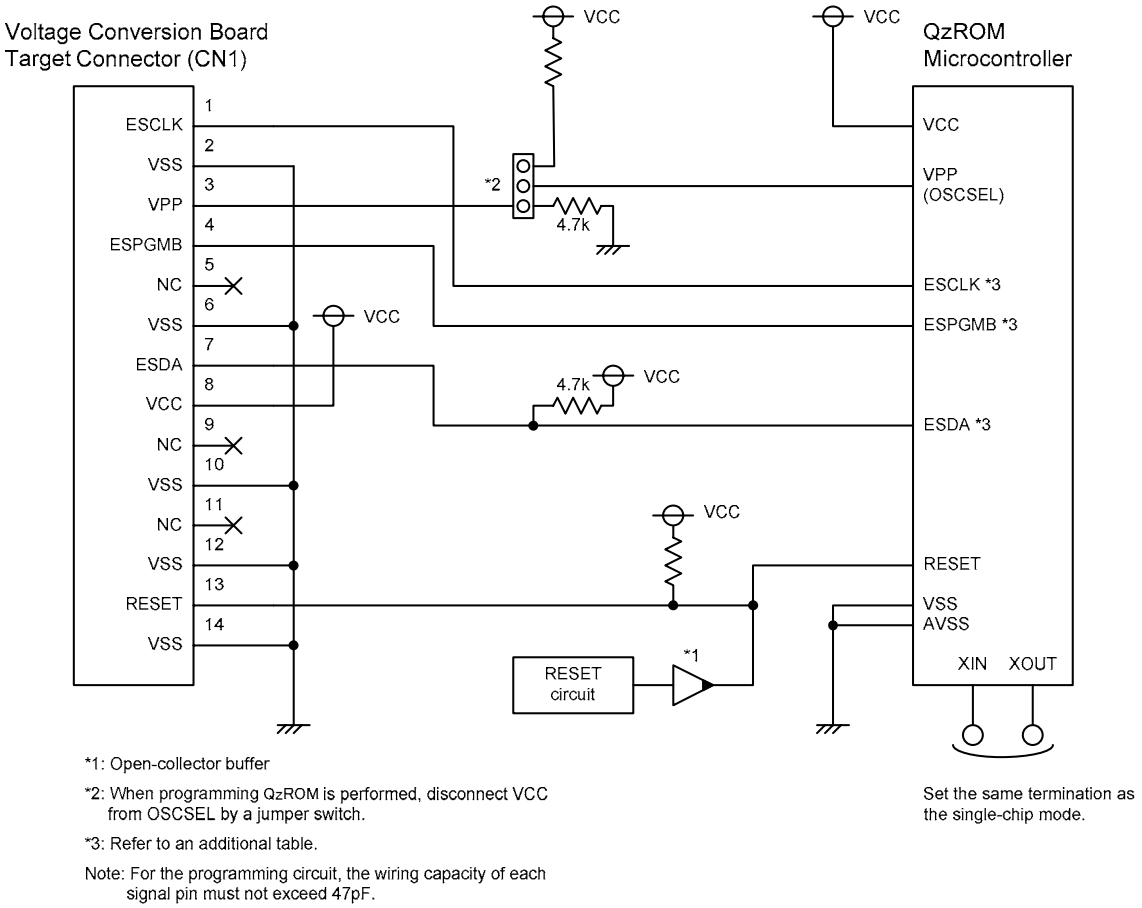
After following the steps above, QzROM programming is completed.

Chapter 7. Pin Handling

This chapter shows the programming pin handling which is used by the Voltage Conversion Board and E8a. Note that pin handling varies depending on the QzROM microcontroller used.

7.1. Example 1

This Example shows pin handling of 38D5/38D2 Group (OSCSEL="H").



*1: Open-collector buffer

*2: When programming QzROM is performed, disconnect VCC from OSCSEL by a jumper switch.

*3: Refer to an additional table.

Note: For the programming circuit, the wiring capacity of each signal pin must not exceed 47pF.

Figure 7-1 : Example of pin handling 1

VCB Connector CN1	38D5	38D2
ESCLK (Pin1)	P42/SCLK1	P31/SCLK2
ESPGMB (Pin4)	P43/SRDY1	P30/SRDY2
ESDA (Pin7)	P41/TxD	P32/TxD2

Table 7-1: Additional table 1

7.2. Example 2

This Example shows pin handling of 38D5/38D2 Group (OSCSEL="L") and 3803H/3850A/3858/7544/7545/7546/7547/7548/7549 Group.

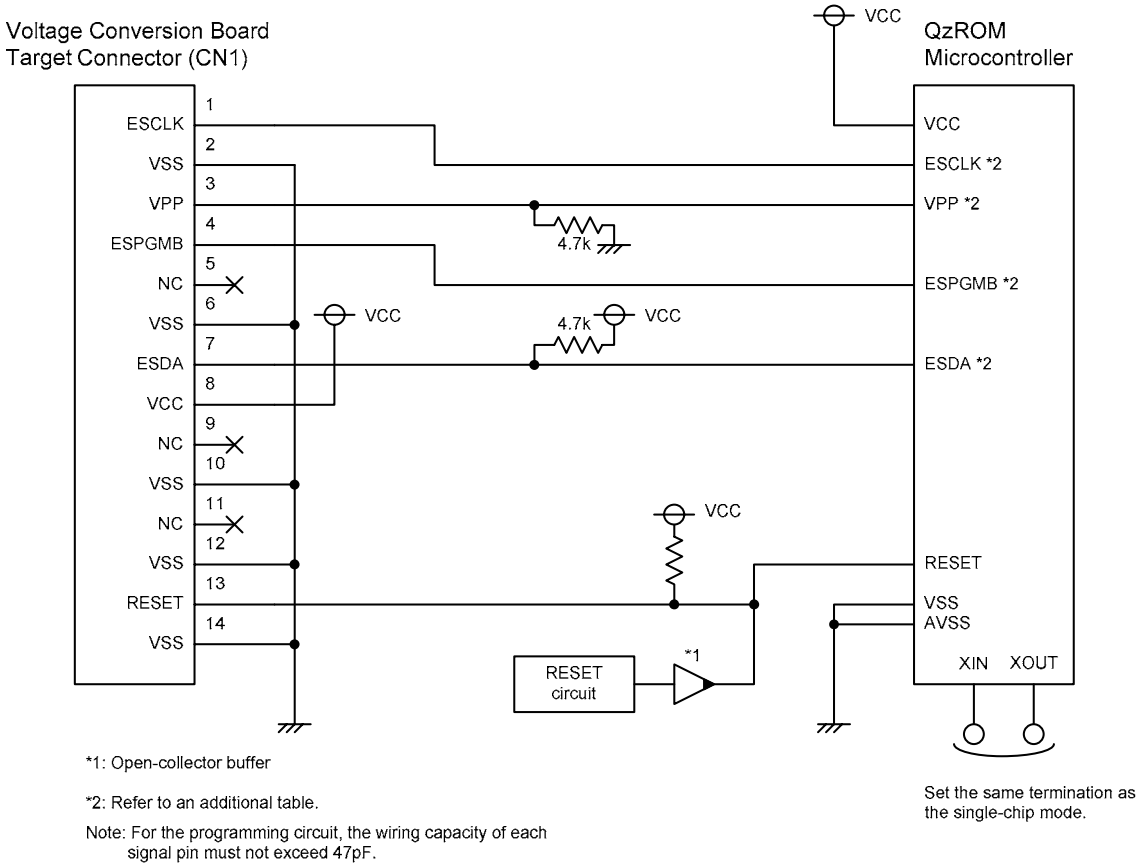


Figure 7-2 : Example of pin handling 2

VCB Connector CN1	3803H	3850A 3858	38D5	38D2	7544	7545	7546 7547
ESCLK (Pin1)	P46/SCLK1	P43/INT2	P42/SCLK1	P31/SCLK2	P12/SCLK	P20/INT0	P12/SCLK1
VPP (Pin3)	CNVSS	CNVSS	OSCSEL	OSCSEL	CNVSS	CNVSS	CNVSS
ESPGMB (Pin4)	P47/SRDY1	P40/CNTR1	P43/SRDY1	P30/SRDY2	P10/RxD	P06/KEY6	P10/RxD1
ESDA (Pin7)	P45/TxD1	P42/INT1	P41/TxD	P32/TxD2	P11/TxD	P07/KEY7	P11/TxD1

Table 7-2: Additional table 2-1

VCB Connector CN1	7548 7549	---	---	---	---	---	---
ESCLK (Pin1)	P06/SCLK	---	---	---	---	---	---
VPP (Pin3)	CNVSS	---	---	---	---	---	---
ESPGMB (Pin4)	P07/SRDY	---	---	---	---	---	---
ESDA (Pin7)	P10/AN0	---	---	---	---	---	---

Table 7-3: Additional table 2-2

7.3. Example 3

This Example shows pin handling of 3823 Group.

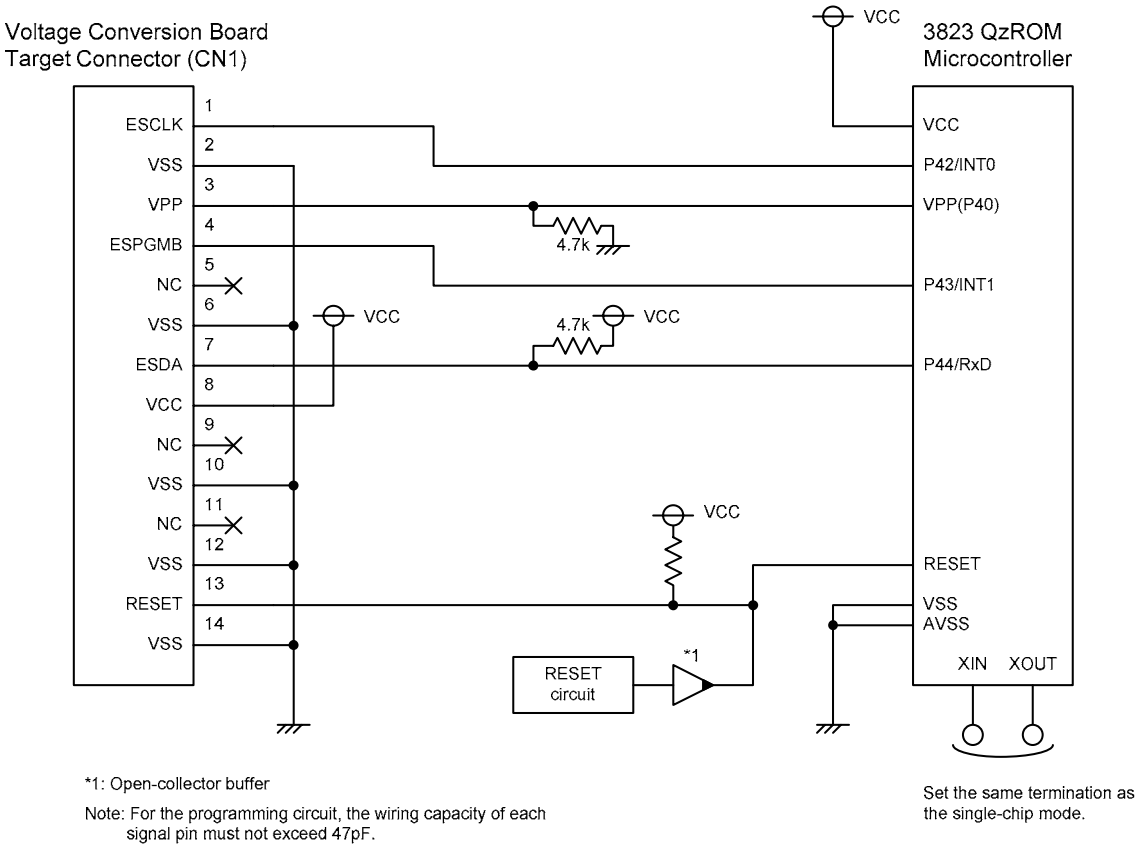


Figure 7-3 : Example of pin handling 3

Chapter 8. Additional Information

For details on how to use Flash Development Toolkit, refer to the Flash Development Toolkit manual available on the CD or from the web site.

Online technical support and information is available at: http://www.renesas.com/renesas_starter_kits

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