RENESAS

VersaClock 7 EEPROM Conversion: Enabling the VC7 Evaluation Board for EEPROM Loading

This document explains how to enable EEPROM loading on a VersaClock 7 (VC7) <u>RC31012</u>, <u>RC31008</u>, <u>RC21012</u>, or <u>RC21008</u> evaluation board (EVB) using Renesas IC Toolbox (RICBox).

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1. Using RICBox Command Line Interface (CLI)

With RICBox started, click Create new project and select the product variant that matches your evaluation board. During the setup wizard, click Finish. Start the CLI by navigating to the Tools menu in the upper left of part of RICBox and then click CLI.

RE	RENESAS				
File	Tools	Help			
<u> </u>	C	CLI			
_	Status Monitor				
	Register Write Export				
		XTAL			
	<i>ø</i> :	XTAL load capacitar	ce		
		CLKIN0			
1		CLKIN0b			
		CLKIN1			
<u> / / -</u>		CLKIN1b			

In the CLI, type the following command,

evb enable conversion to 001

Renesas	RICBox CLI	—	×
> evb enable conversion to 001 A button on the OTP diagram is now visible			

Close the CLI window.

2. Connecting to the Evaluation Board

In the lower right of RICBox GUI, click on the "Not Connected" button. When the button expands, click "Connect" to connect to the VC7 on the evaluation board. The "Not Connected" button will turn into a green "Connected" button.



3. Accessing the OTP/EEPROM

On the left side of the RICBox GUI, click the Block Diagram button to view the main block diagram of the VC7.





In the block diagram, click on the "OTP/EEPROM" button to bring up the OTP/EEPROM sub-diagram.

In the sub-diagram, scroll to the right to find the hidden "Convert" button.

RENESAS		OTP / EEPROM	
💼 🛃 🔒 🍭 🍭			
el(x)	DEVICE_CNFG.pwrdn_sel Disabled These selections set values in DEVICE_CNFG.tattic_csel[0:2] and GPI0[0:2].GPI0_CNFG. When a GPI0 is assigned, relavent bitsets must not be locked in the settings file(s) to allow the override to use the GPI0.		
	OTP Pressing the "Program" button will read the existing OTP of the connected device and update the OTP contents with	Convert Eval Board	
 ≤ ≤	the new OTP configuration and program the device. The "Verify" button will be accessible after a successful program. There is currently no progress indicator while program or verify is occurring; it can take quite some time for either task to complete. Program Verify	Pressing the "Convert" button will program the OT of a connected EVB (evaluation board) that is currently populated with a 000/Q00 device. After successful programming, the device will effectively be a 001/Q01 device.	
	Skip read if quick blank check passes 🗹 💼		
~	EEPROM		
	Build EEPROM for this OTP dash code 001 (AT24C16 at address 0x50)		

Click on the Convert button to enable the VC7 to load from EEPROM.

4. Generating an EEPROM File

Use RICBox to create your config and save the Project. When ready, click on the "OTP/EEPROM" button to open the sub-diagram. Use the scroll bars to adjust the GUI so the "Configuration Type" section is visible. For the following example, a single config is created. In the "Configuration Type" section, choose "SingleConfig".

RENESAS	OTP / EEPROM	– 🗆 🗙
💼 😳 🎎 🍭 🍭		
Configuration Type	Startup User Config Selection	Dynamic User Config Selection
	Config Select Input 0 Low V	Config Select Input 0 TriLevel
SingleConfig 🗸 🔒	Config Select Input 1 Low	Config Select Input 1 TriLevel 🗸
	Config Select Input 2	Config Select Input 2 TriLevel
		DEVICE_CNFG.pwrdn_sel Disabled V
	These values for DEVICE_CNFG static_cse[[x] set the configuration selection inputs.	These selections set values in DEVICE_UNFG_state_csel[0:2] and GPI0[0:2],GPI0_CNFG. When a GPI0 is assigned, relevent bitsets must not be locked in the settings file(s) to allow the override to use the GPI0.
Config Assig	gnment 区 区 日 日 日 日 日 日 日 日 日 日 日 日 日 日 日 日 日	OTP Pressing the "Program" button will read the existing OTP of the connected device and update the OTP contents with the new OTP configuration and program the device. The "Verifu" button will be accessible after a successful
Single Config 🔶 config_slot_0 v	Config 13 M M M config slot 14	program.
Config 0 L L L config_siot_1 🖉 🚮	Config 14 M M H config_slot_15	There is currently no progress indicator while program or verify is occuring, it can take quite some time for either task to complete.
Config 1 L L M config_slot_2 V	Config 15 M H L config_slot_16	Program Verify
Config 2 L L H config_slot_3	Config_16 M H M config_slot_17 v	
Config 3 L M L config_slot_4	Config 17 M H H config_slot_18 v	Skip read if quick blank check passes 🗹 💼
Config 4 L M M config_slot_5 v	Config_18 H L L config_slot_19 v	Skip verify of unprogrammed words 🛛 🗹

Notice the red error marker for "Single Config". Click on the pull-down box and select the "default" config.

Configuration Type Startup User Config Selection Dynamic User Config Selection	
Config Select Input 0 Low Config Select Input 0 TriLevel Config Select Input 0 TriLevel	
SingleConfig V 🔒 Config Select Input 1 Low 🖌 🖬 Config Select Input 1 TriLevel V	
Config Select Input 2 Low Config Select Input 2 TriLevel Trilevel	
DEVICE_CNFG.pwrdn_sel Disabled	
These values for DEVICE_CNFG static_cos[[n] These selections set values in DEVICE_CNFG static_cos[[n] set the configuration selection inputs. DEVICE_CNFG static_cos[[n] When a CPIO is assigned, relevent bitsets must not be locked in the settings file(s) to allow the override to use the GPIO.	
Config Assignment OTP	
Pessing the "Program" button will read the existing OTP of the connected device and update the OTP contents with the new OTP configuration and program the device. ************************************	
Single Config default Config 13 M M M Config_slot_14 There is surgery indicator while program or	
Config 0 L L L Config_slot_1 Config_14 M M H Config_slot_15 Config_slot_15 Config_slot_15 Config_slot_16 Config_slot_16 Config_slot_16 Config_slot_16 Config_slot_17 Config_slot_17 Config_slot_17 Config_slot_17 Config_slot_18 Config	
Config 1 L L M config_slot_2 Config 15 M H L config_slot_16 Config_slot_16 Verify	
Config 2 L L H config_slot_3 Config 16 M H M config_slot_17	
Config 3 L M L config_slot_4 Config 17 M H H config_slot_18 Skip read if quick blank check passes 🗹 🖬	
Config 4 L M M config_slot_5 V 🖬 Config 18 H L L config_slot_19 V 🖬 Skip verify of unprogrammed words V 🖬	



VersaClock 7 EEPROM Conversion: Enabling the VC7 Evaluation Board for EEPROM Loading Application Note

Re-adjust the GUI again to see the EEPROM section. Click on "..." to determine a save location for the EEPROM hex file or type out the full path.

RENESAS OTP / EEPROM			OTP / EEPROM	– 🗆 X
💼 🔄 🔒 🍳 🍭				
	Config Assig	gnment		OTP
зейест [2] зейест [2] зейест [0]		select [2] select [1] select [0]		Pressing the "Program" button will read the existing OTP of the connected device and update the OTP contents with the new OTP configuration and program the device. The "Verify" button will be accessible after a successful
Single Config	default ~ 🔒	Config 13 M M M	config_slot_14 🛛 🖉	program.
Config 0 L L L	config_slot_1 v	Config 14 M M H	config_slot_15 V	verify is occuring; it can take quite some time for either task to complete.
Config 1 L L M	config_slot_2 v	Config 15 M H L	config_slot_16 🗸 💼	Program Verify
Config 2 L L H	config_slot_3 🗸 🖬	Config 16 M H M	config_slot_17 🗸 🖬	
Config 3 L M L	config_slot_4 v	Config 17 M H H	config_slot_18 \checkmark	Skip read if quick blank check passes 🗹 🖬
Config 4 L M M	config_slot_5 v	Config 18 H L L	config_slot_19 v	Skip verify of unprogrammed words 🗹 💼
Config 5 L M H	config_slot_6 🗸 🖬	Config 19 H L M	config_slot_20 🗸 🖬	
Config 6 L H L	config_slot_7 v	Config 20 H L H	config_slot_21 v	EEPROM
Config 7 L H M	config_slot_8 🗸 🖬	Config 21 H M L	config_slot_22	
Config 8 L H H	config_slot_9 v	Config 22 H M M	config_slot_23 v	001 (AT24C16 at address 0x50)
Config 9 M L L	config_slot_10 v	Config 23 H M H	config_slot_24 v	Filename to export EPROM as
Config10 M L M	config_slot_11 🗸	Config 24 H H L	config_slot_25	C:\Temp\example.hex
Config11 M L H	config_slot_12 v	Config 25 H H M	config_slot_26 🗸 🖬	
Config 12 M M L	config_slot_13 v	Config 26 H H H	config_slot_27 v	Export Program
	L = Iow / M = mid	I / H = high		
L				

Move the OTP/EEPROM window aside and save the project again.

When ready, use RICBox to scan the devices on the I²C bus. On the main RICBox GUI, check to see if you are connected to the VC7. If connected, go ahead and disconnect. Push the "Not Connected" button and then "Configure". Push "Refresh" to re-scan the I²C bus.



If the EEPROM is detected, then you are ready to program. Refer to the EEPROM user's manual about which jumpers to set to add the EEPROM to the I²C bus.

Click on the Connect button. Go back to the OTP/EEPROM GUI. Click on the Program button to program the EEPROM device. After programming, remove the jumpers to take the FTDI controller off the I²C bus.

Unplug/Plug the USB-C cable to power cycle. The config programmed into the EEPROM should now load. With this conversion, only the AT24C16 EEPROM chip is supported.

5. Revision History

Revision	Date	Description
1.00	Sep 21, 2023	Initial release.

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