Integrated Development Environment e² studio

Creating and executing build CMake project

Introduction

CMake's responsibility is to generate native build tool files from the platform and compiler independent configuration files named CMakeLists.txt.

This document explains processes how to create CMake project in e² studio and execute Build.

Contents

1. Overview

CMake's responsibility is to generate native build tool files from the platform and compiler independent configuration files named CMakeLists.txt.

e² studio supports CMake project since version 2020-04. e² studio need some configurations to work with CMake commands and build with its generated makefile. This document explains processes how to create CMake project in e² studio and execute Build.

- This document does not explain processes how to create CMake toolchain file and configuration file. Please prepare those files by yourself.

2. Installation

At first, please download and install the following tools from the website.

- e² studio
  e² studio | Renesas
  (2021-04 used in this example)
- CMake
  Download | CMake
  (version 3.20.3 used in this example)
- GNU Make for windows (If you already installed e² studio, you can use "make" in e² studio.)
  Make for Windows (sourceforge.net)
  (version 3.81 used in this example)

3. Creating a CMake project

Start e² studio and create CMake project in accordance with the following steps.

1) Select menu items [File] > [New] > [C/ C++ Project].

2) On the [New C/C++ Project - Templates for New C/C++ Project] dialog, select [CMake] > [Empty or Exiting CMake Project]. Then press [Next >] button.

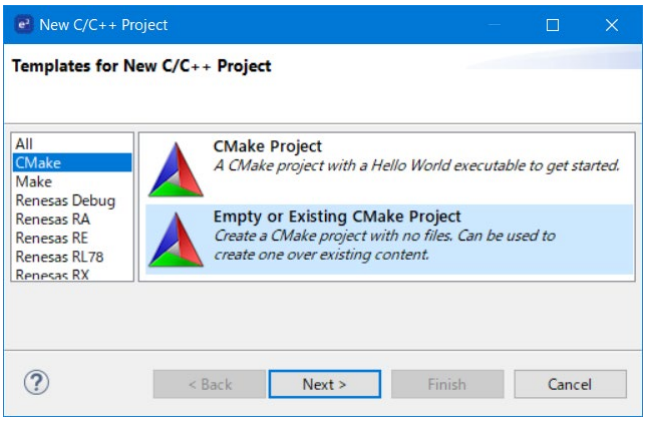

Figure 1

3) After moving to [New CMake Project – Specify properties of new CMake project] screen, put an arbitrary name in [Project name] field (e.g. “Sample”). Then, click [Finish].

4) An empty project will be created.

5) Copy source files, toolchain file and configuration file for CMake. And paste them into the created project.

* When you select [CMake Project] on the [New C/C++ Project - Templates for New C/C++ Project] dialog, a created project has <project name>.cpp and CMakeLists.txt.

4. Modifying items for Builder configuration

There is no command to execute Build in the created project. To execute Build, you need to add “CMake” and “Make” setting items for the builder configuration of the created project. Add the items in accordance with the following steps.

4.1 Disable CDT Core Builder

CDT Core Builder in builder configuration is not used to execute Build. So, CDT Core Builder in builder configuration need to be disable. This chapter explains how to disable CDT Core Builder commands as builder configuration.

1) Select “Sample [Configuration]” in the [Project Explorer]. Then, open right-click context menu and select [Properties].
2) In [Properties] dialog, select [Builders] in the tree box on the left.
3) In a normal e² studio project, the makefile is created by the CDT builder, but here uncheck registered [CDT Core Builder] and let CMake create it.
4) A warning dialog turns up. Then, click [OK].

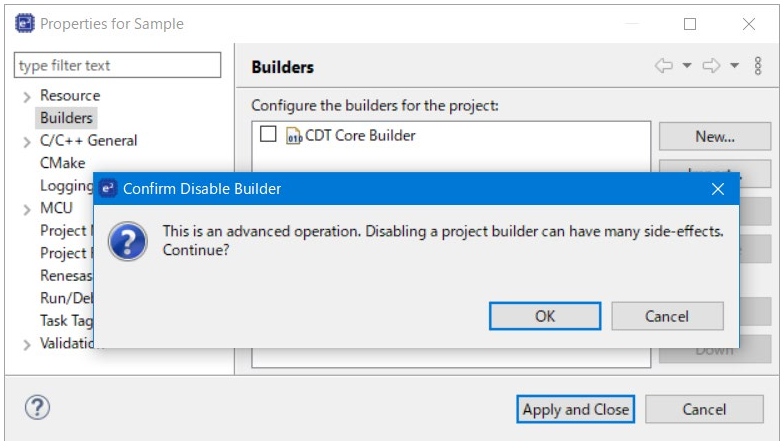

Figure 2

5) Proceed to the next chapter.

4.2 Adding CMake configuration

This chapter explains how to add CMake commands as builder configuration. CMake will generate "Makefile" with the following settings in the toolchain and configuration files.

6) Click [New…], then [choose configuration type] dialog will pop up. Select [Program] and click [OK] in the dialog.
7) [Edit Configuration] will be displayed. Input an arbitrary name in [Name:] field. (e.g. “CMake”).
8) Click [OK] after setting the following parameters.
   - [Main] tab
     - [Location:]
       Specify a location of installed cmake.exe.
       (e.g. <CMake install folder>\bin\cmake.exe)
     - [Working Directory:]
       Specify the "${workspace_loc:/${project_name}}".
     - [Arguments:]
       Specify CMake command parameters.
       (e.g. -H. -B_builds -G "Unix Makefiles" -DCMAKE_TOOLCHAIN_FILE=./ccrx.cmake)
   - [Refresh] tab

- Check [Refresh resources upon completion.].
  Select [The entire workspace].

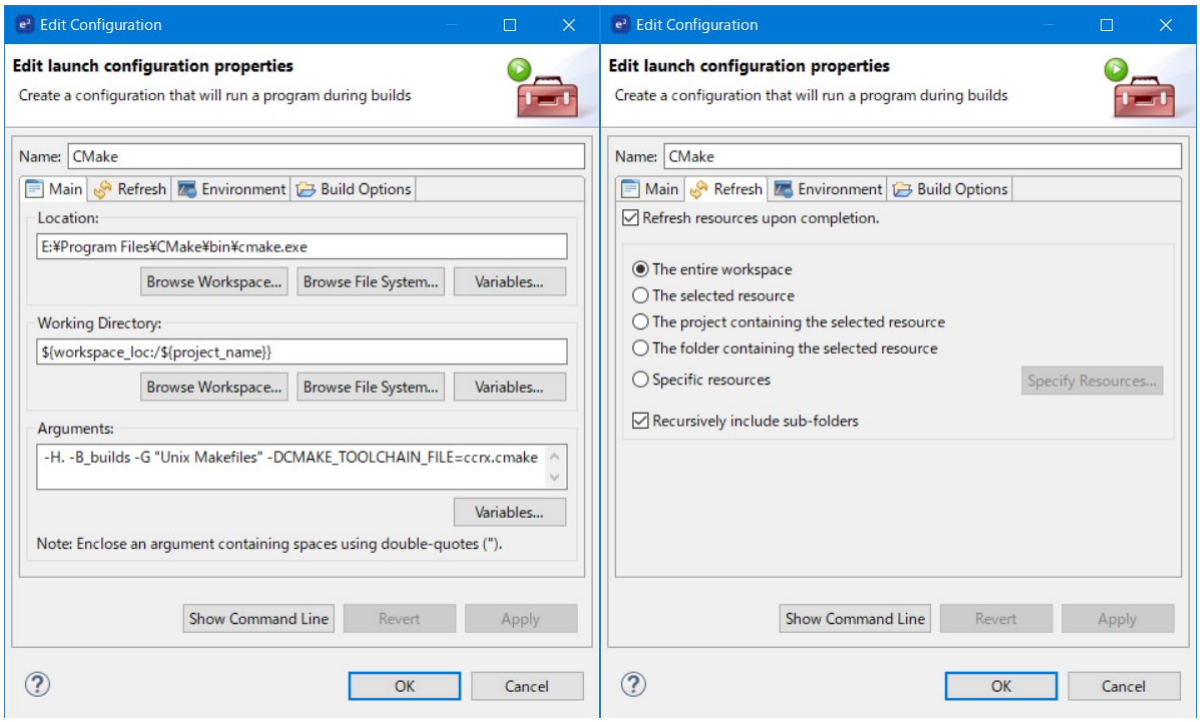

Figure 3

- [Environment] tab
  - [Environment variables to set:]
    Add the environment variables needed to run CMake by click [Add...] button.
  - Check [Append environment to native environment]

For example, in case of using toolchain in a project is C/C++ Compiler Package for RX Family CC-RX, specify "<CC-RX install folder>\bin" in Path as environment variable.

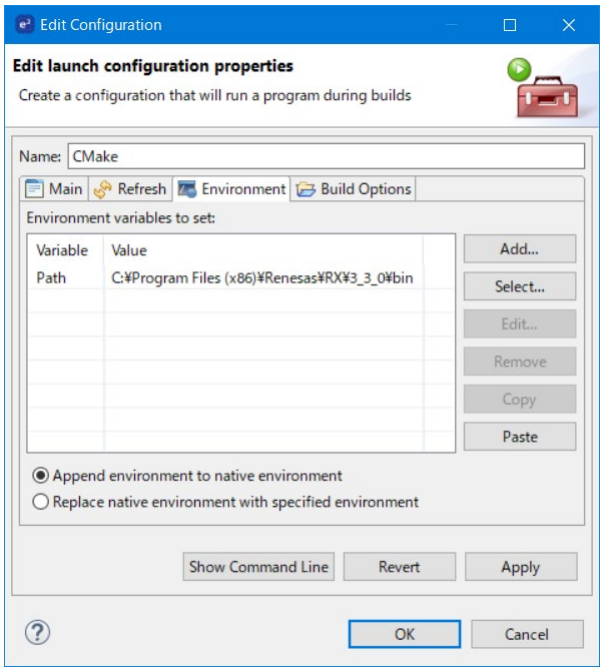

Figure 4

9) Proceed to the next chapter.

4.3 Adding Make configuration

This chapter explains how to add Make commands as builder configuration. Build is executed with the generated makefile. It is the continuity of setting on [Builder] panel.

10) Click [New…].

11) [Choose configuration type] dialog will pop up. Select [Program] and click [OK] in the dialog.

12) [Edit Configuration] will be displayed. Input an arbitrary name in [Name:] field. (e.g. “Make”).

13) Click [OK] after setting the following parameters.

- [Main] tab
  - [Location:]
    Specify location of installed make.exe. (e.g. : <make install folder>\bin\make.exe)

When using make.exe of e² studio, check make.exe folder by following steps below.

a. Select [Help] > [About e² studio] on the menu bar.

b. In [About e² studio] dialog, click [Installation Details].

c. Click [Support Folders] tab in [e² studio Installation details] dialog.

d. Click [e² studio support area:] to confirm the location.
(e.g. C:\Users\<User name>\.eclipse\com.renesas.platform_XXXX\Utilities\make.exe)
The part “XXXX” differs from each version of e² studio.

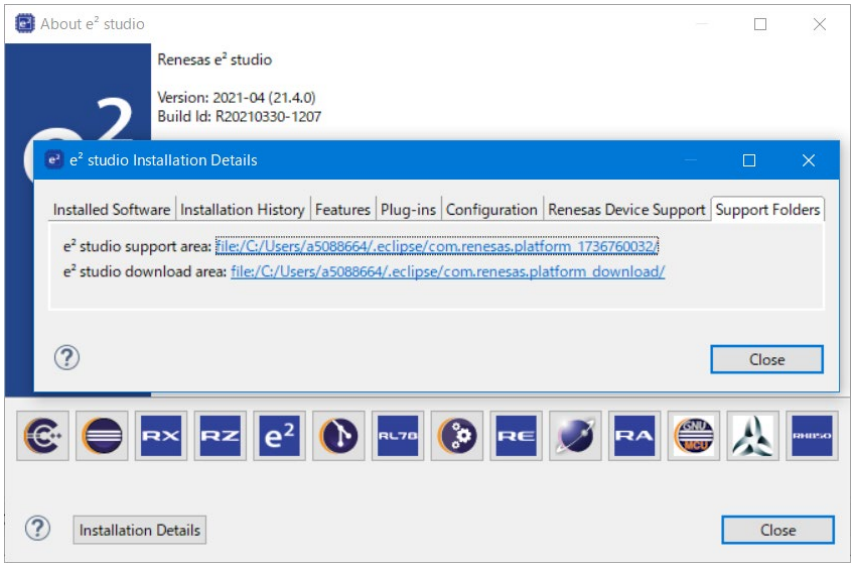

Figure 5

  - [Working Directory:]
    Specify "${workspace_loc:/${project_name}/<makefile folder>}"
    (e.g. ${workspace_loc:/${project_name}/_builds)
  - [Arguments:]
    Specify "all".
- [Refresh] tab
  - Check [Refresh resources upon completion.].
    Select [The entire workspace].

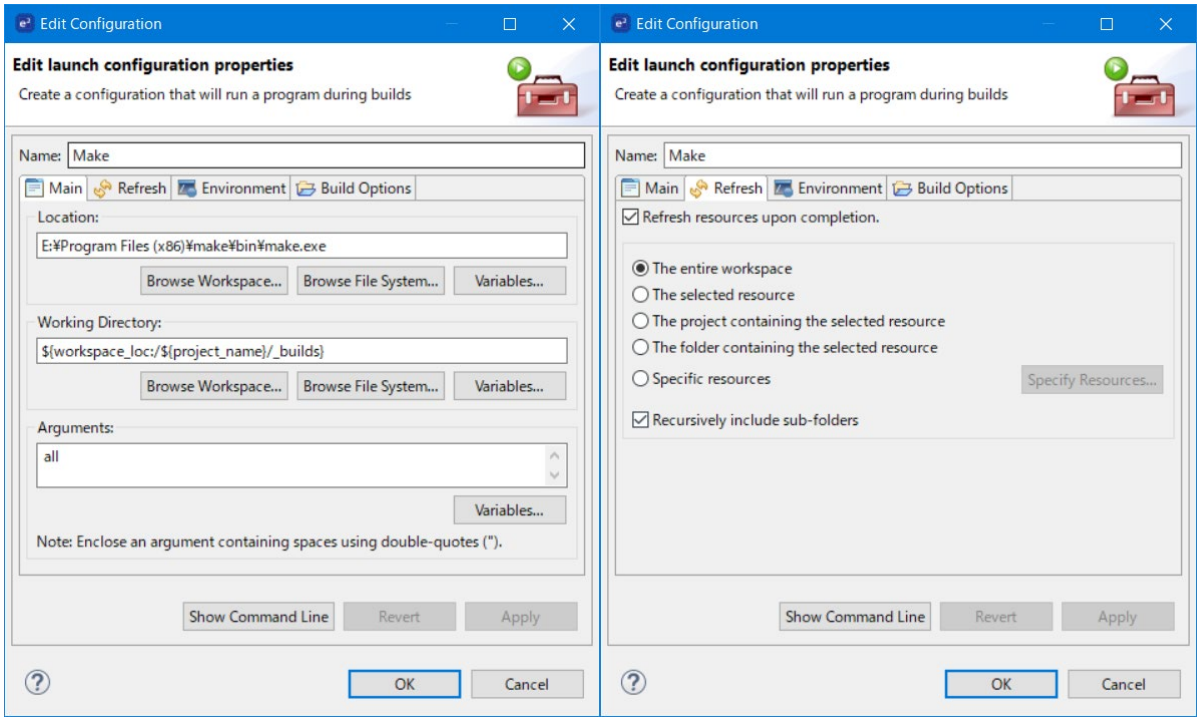

Figure 6

- [Environment] tab
  - [Environment variables to set:]
    Add the environment variables needed to run Make by click [Add...] button.
  - Check [Append environment to native environment]

For example, in case of using toolchain in a project is C/C++ Compiler Package for RX Family CC-RX, specify the following environment variables using [Add…] button.

- Variable name: Path
  Value: <make install folder>\bin;<CC-RX install folder>\bin
- Variable name: BIN_RX
  Value: <CC-RX install folder>\bin
- Variable name: INC_RX
  Value: <CC-RX install folder>\include

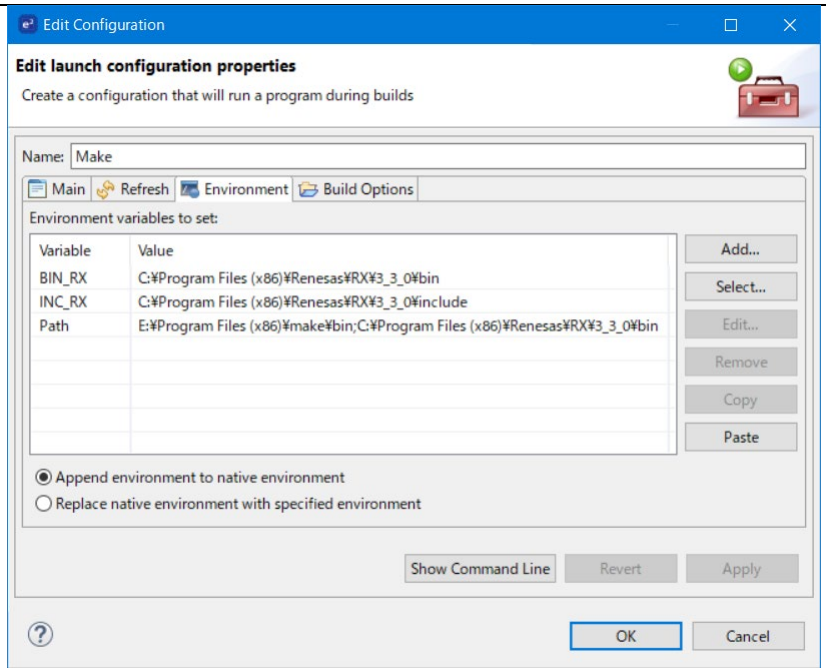

Figure 7

14) Click [Apply and Close] on [Properties] dialog.

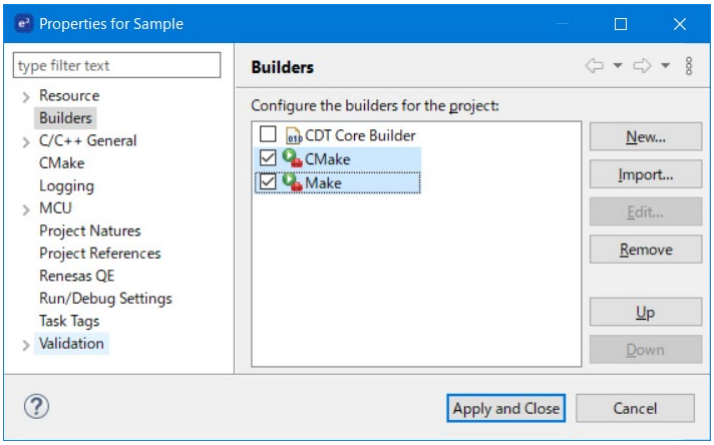

Figure 8

5. Executing Build

After editing source files, execute build. By following steps below, [CMake] and [Make] set as builder's configuration will run, and [.abs file] will be generated in [_builds] folder.

1) Select [Sample [Configuration]] in [Project Explorer]. Then, execute on any of the following procedures.
   - Click [Build Project] on the right click context menu.
   - Click [Project] > [Build Project] on the menu bar.

Once build is executed, execution results are output on [Console] view.

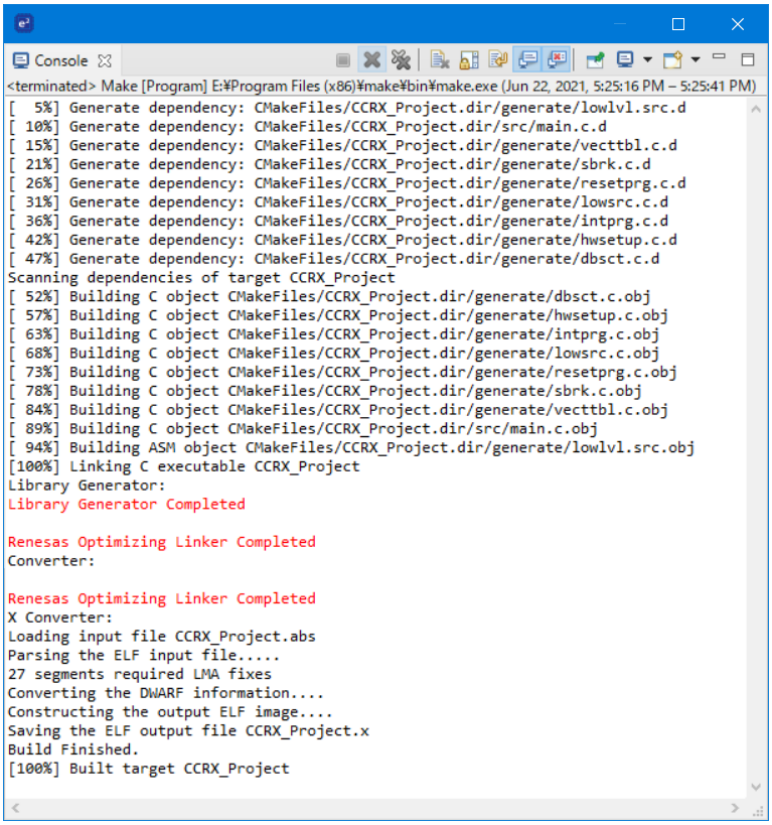

Figure 9

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Dec.25.20	-	New creation
2.00	Jun.30.21	all	Update whole. - Remove unnecessary information. - Separate toolchain-specific settings.
2.01	Jun.28.22	P.6	Replace “The part “XXXX” differs from each user.” to “The part “XXXX” differs from each version of e^2 studio.”

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

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

1. Precaution against Electrostatic Discharge (ESD)

   A strong electrical field, when exposed to a CMOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop the generation of static electricity as much as possible, and quickly dissipate it when it occurs. Environmental control must be adequate. When it is dry, a humidifier should be used. This is recommended to avoid using insulators that can easily build up static electricity. Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors must be grounded. The operator must also be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions must be taken for printed circuit boards with mounted semiconductor devices.
2. Processing at power-on

   The state of the product is undefined at the time 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 time 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 time 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 time when power is supplied until the power reaches the level at which resetting is specified.
3. Input of signal during power-off state

   Do not input signals or an I/O pull-up power supply while the device is powered off. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Follow the guideline for input signal during power-off state as described in your product documentation.
4. 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 the 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.
5. Clock signals

   After applying a reset, only release the reset line after the operating clock signal becomes stable. When switching the clock signal during program execution, wait until the target clock signal is 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. Additionally, 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.
6. Voltage application waveform at input pin

   Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between V_{IL} (Max.) and V_{IH} (Min.) due to noise, for example, the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between V_{IL} (Max.) and V_{IH} (Min.).
7. Prohibition of access to reserved addresses

   Access to reserved addresses is prohibited. The reserved addresses are provided for possible future expansion of functions. Do not access these addresses as the correct operation of the LSI is not guaranteed.
8. Differences between products

   Before changing from one product to another, for example to a product with a different part number, confirm that the change will not lead to problems. The characteristics of a microprocessing unit or microcontroller unit products in the same group but having a different part number might differ in terms of internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

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