Integrated Development Environment e² studio

How to use Jenkins to automate build and report

Introduction

Jenkins is an automation engine with an unparalleled plugin ecosystem to support many tools in delivery pipelines, whether the goal is continuous integration, automated testing, or continuous delivery.

This application note guides user to use Jenkins to automate the build and report (of build status) of a project created by Renesas e^2 studio environment.

Contents

1. Overview

1.1 Purpose

This document guides user to use Jenkins to automate building for projects created by e² studio.

1.2 Operating Environment

Renesas have confirmed the operation procedure explained in this document in the following environment.

OS	Windows 10 x64
IDE	e² studio 2022-01
Jenkins	2.332.2
Git	2.35.1

In this document uses the following target device and toolchain with an example project.

Target device	RX64M
Target toolchain	GCC for Renesas RX 8.3.0.202104-GNURX-ELF

2. Getting started with Jenkins

This chapter describes the Jenkins installation, setup, and Git plugin installation instructions.

2.1 Installing Jenkins

The Jenkins installer can be downloaded by jumping to the download page from the following URL.

https://www.jenkins.io/

You have to select the correct package according to your environment OS (e.g. Windows or Linux…), type of operation mode (standalone or servlet). This Application Note is specifically targeted to stand-alone installation on Windows 10. Please select option to download file “jenkins.war”.

Java must be installed before installing Jenkins.

1) Browse above page on your browser and jump to download page for downloading Jenkins installer. Click “Windows” and starts to download “Jenkins.msi” file.

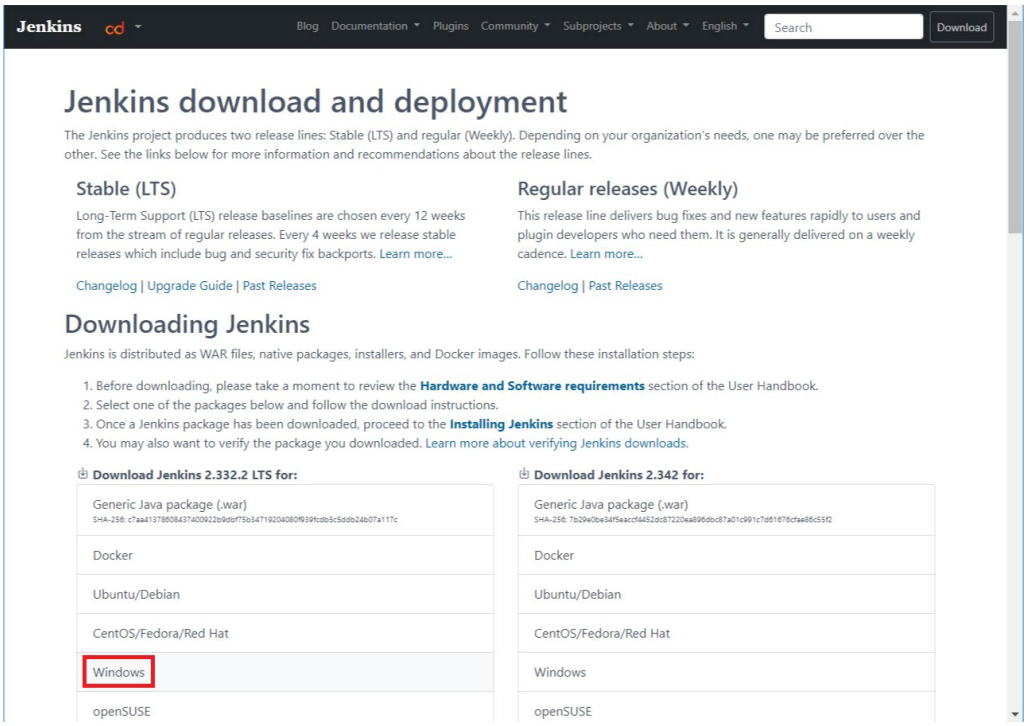

Figure 1

2) After downloaded that file, run it.

3) Jenkins installer is appeared, proceed to answer some questions on the wizard pages. And complete the installation of Jenkins.

2.2 Starting Jenkins

After completed installation of Jenkins, click http://localhost:8080 for starting Jenkins.

1) [Unlock Jenkins] page is appeared at the first time Jenkins execution. Copy the password from the file “initialAdminPassword” from Jenkins home folder, for example “C:\ProgramData\jenkins\.jenkins\secrets\initialAdminPassword”, and paste to the “Administrator password” textbox, then press [Continue].

Figure 2

2) Next, you will be asked to install plugin. You can do it later, then just close this dialog.

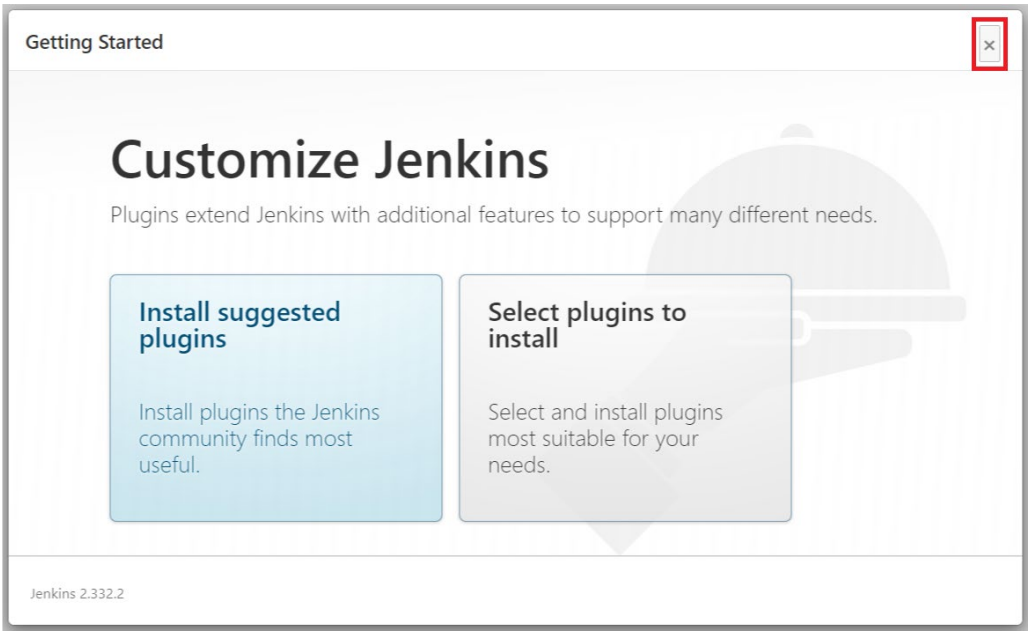

Figure 3

3) In the next dialog, just press [Start using Jenkins].

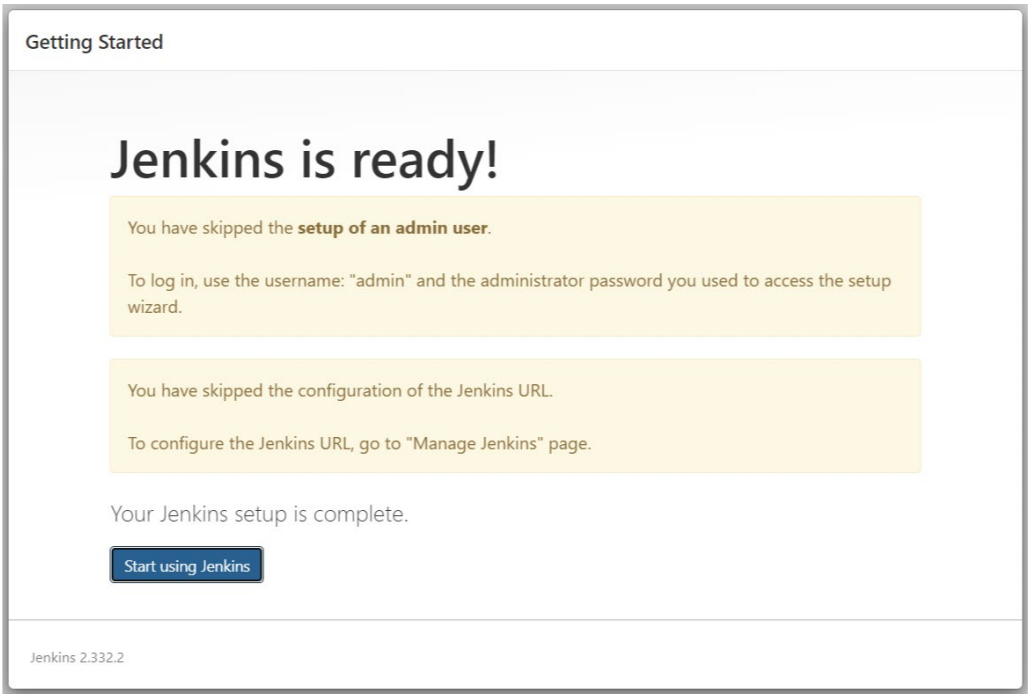

Figure 4

4) Then the Jenkins UI will be shown.

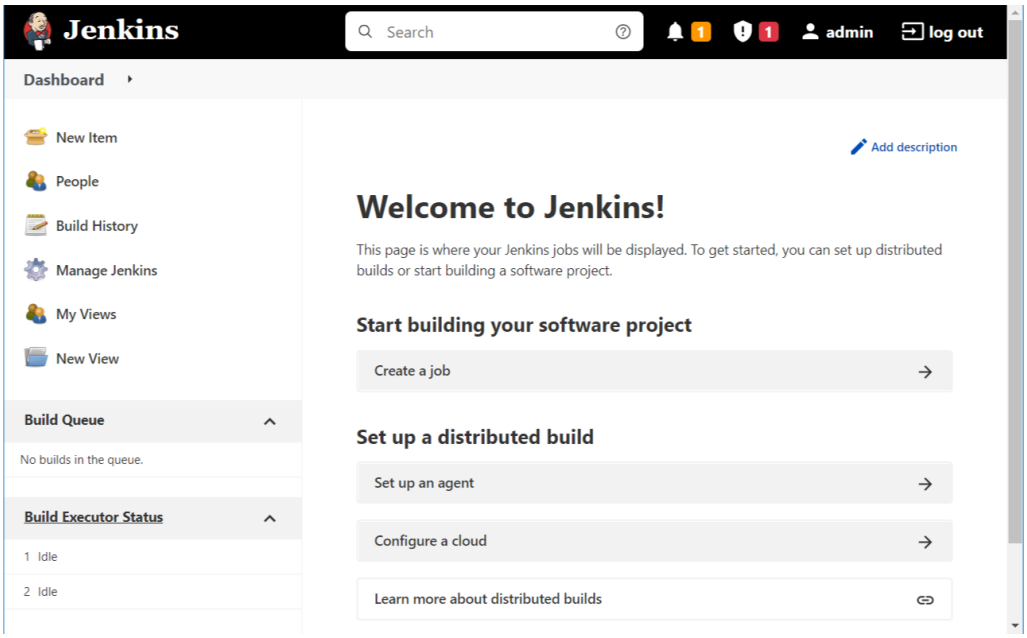

Figure 5

2.3 Adding more users

By default, Jenkins provides 1 user admin with the password mentioned in before chapter. In case that you would like to add more accounts for other users, follow below steps:

1) In the Jenkins UI, click [Manage Jenkins] > [Manage Users].

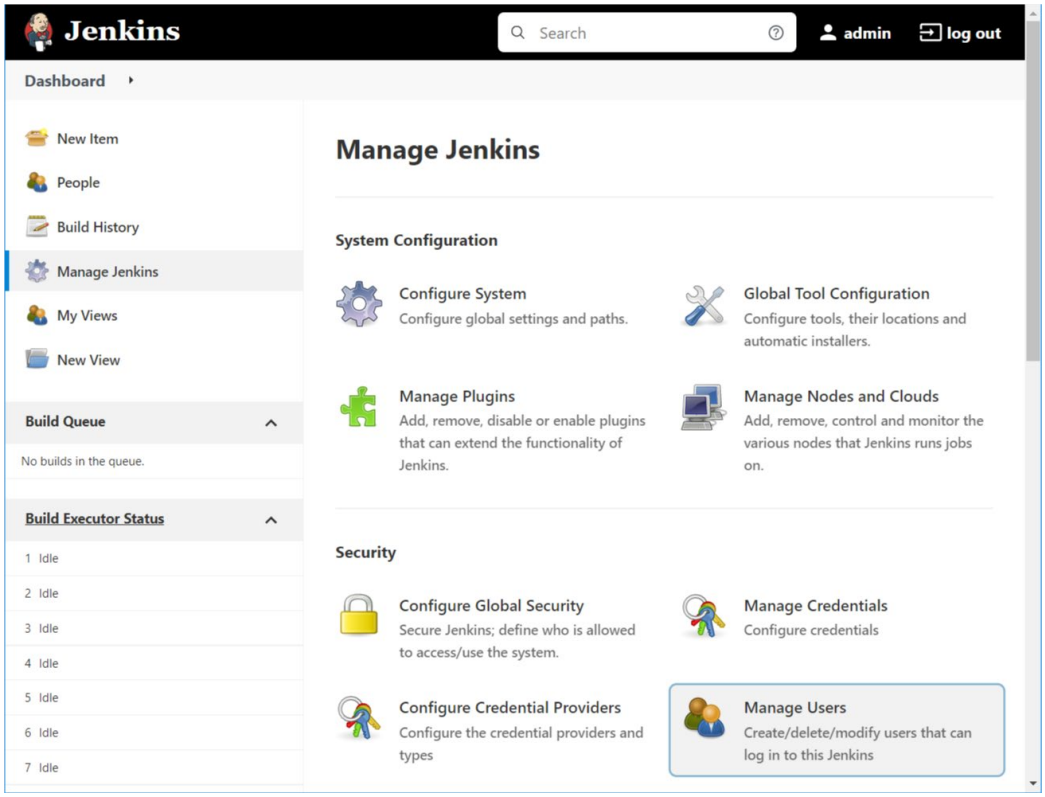

Figure 6

2) In the “Users” page, click [Create User].

3) In the “Create User” page, input the user information such as: username, password, full name. Press [Create User].

4) After user account is created, the username and password can be used to login to Jenkins web UI.

Note: In the “Users” page, user can also change the login password or update other settings by clicking on gear button.

2.4 Configuring Jenkins

You can get the various configuration options for Jenkins by clicking the [Manage Jenkins] > [Configure Systems].

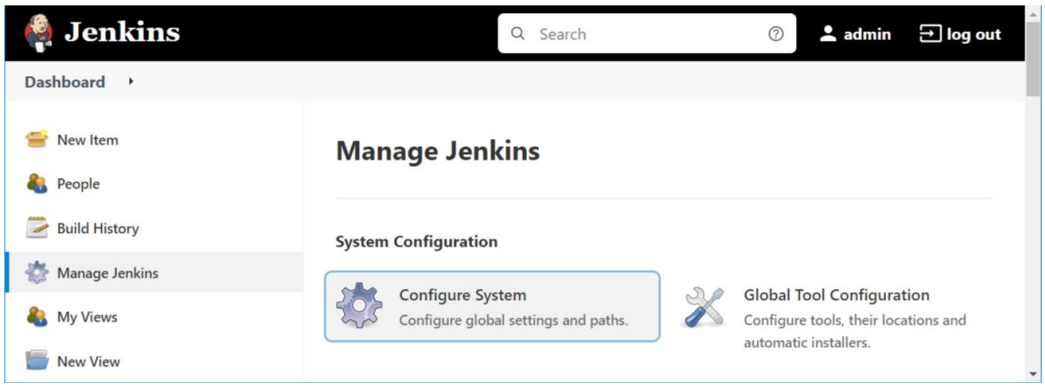

Figure 7

Sections below are some of the Jenkins configuration settings which can be carried out.

2.4.1 Multiple Build

This refers to the total number of concurrent job executions that can take place on the Jenkins machine. This can be changed based on requirements. Sometimes the recommendation is to keep this number the same as the number of CPU on the machines for better performance.

Figure 8

2.4.2 Environment Variables

This is used to add custom environment variables which will apply to all the jobs. These are key-value pairs and can be accessed and used in Builds wherever required.

Figure 9

2.5 Jenkins URL

By default, the Jenkins URL points to http://localhost:8080 if you access on the same machine. If you have a domain name setup for Jenkins machine, set this to the domain name else overwrite localhost with IP of machine. While sending out links using the email you can directly access the Jenkins URL using the environment variable JENKINS_URL which can be accessed as ${JENKINS_URL}.

2.6 Installing Git plugin

Git plugin helps Jenkins to contact Git repository to retrieve the source code via internet connection. To install Git plugin, please follow below steps (it requires internet connection):

1) In the Jenkins UI, click [Manage Jenkins] > [Manage Plugins].

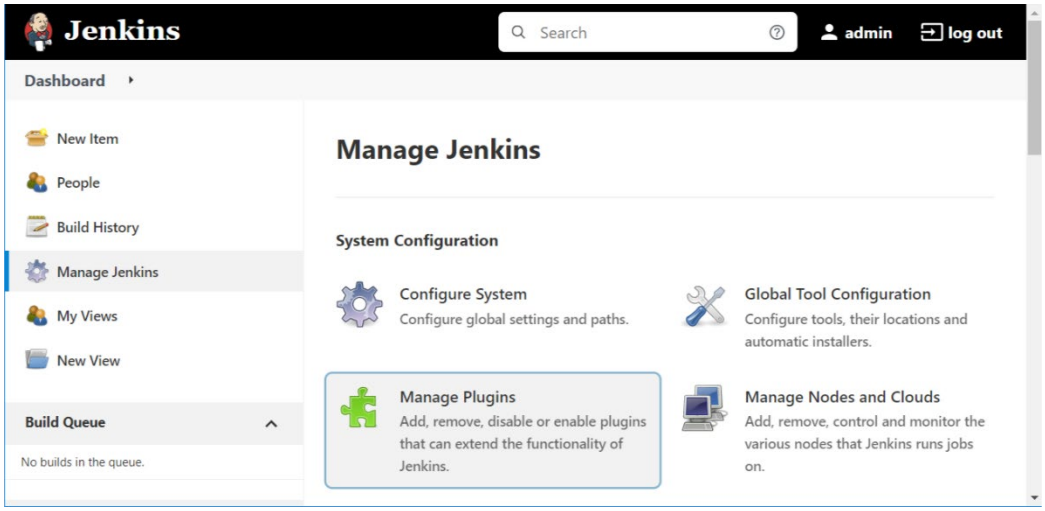

Figure 10

2) In the next screen, click the [Available] tab. This tab will give a list of plugins which are available for downloading. In the [Search] textbox type “Git” to filter the list.

3) Check the Git Plugin option and click on the button “Install without restart”. The installation will then begin, and the screen will be refreshed to show the status of the download.

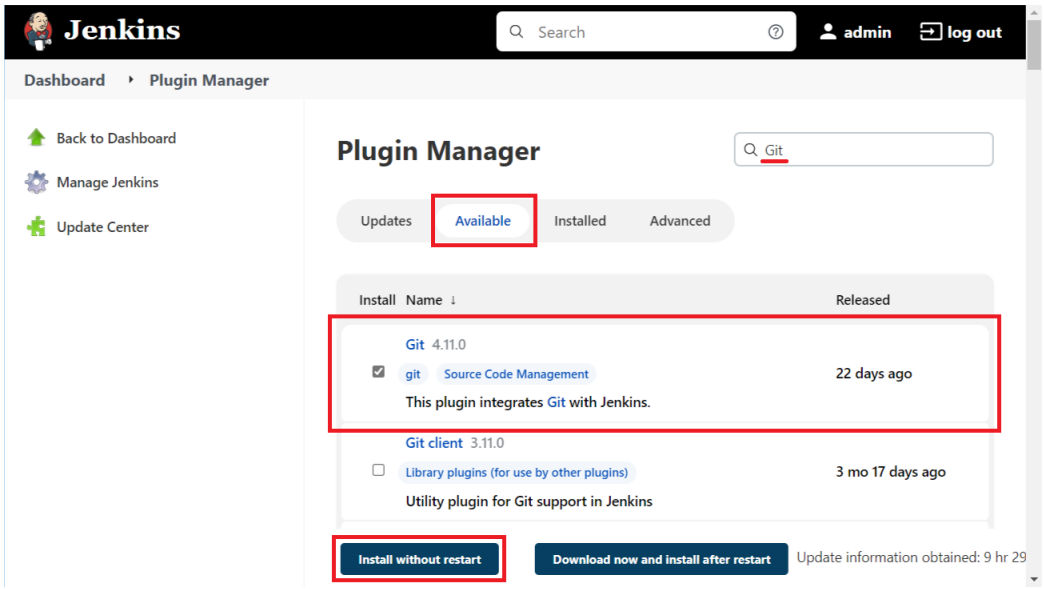

Figure 11

4) Once all installations are complete, restart Jenkins by closing the browser, then log in to Jenkins again.

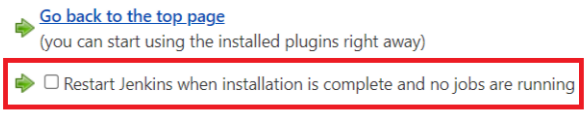

Figure 12

5) After Jenkins is restarted, Git will be available as an option whilst configuring jobs. You can verify it in next section.

   You need to install Git first by following the instructions in the next chapter before performing the following operations.

6) In the Jenkins UI, click [Manage Jenkins] > [Global Tool Configuration].

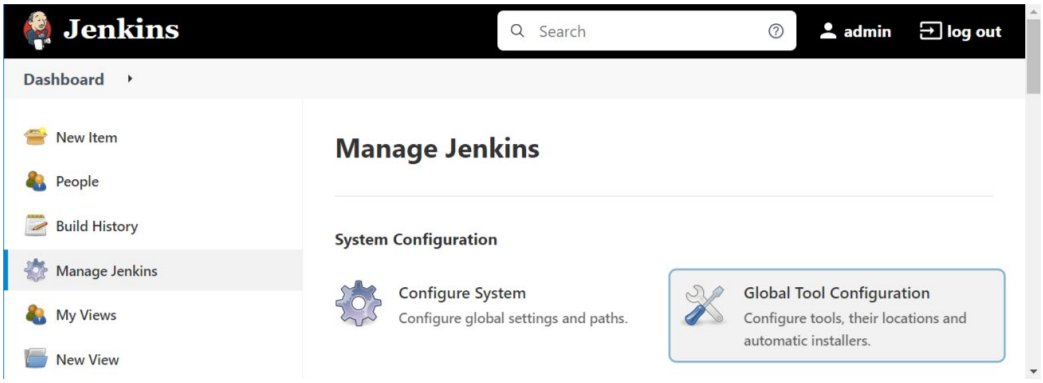

Figure 13

7) In the next screen, check the setting of [Path for Git execution program]. If you can see the following error message, update the path for Git execution program.

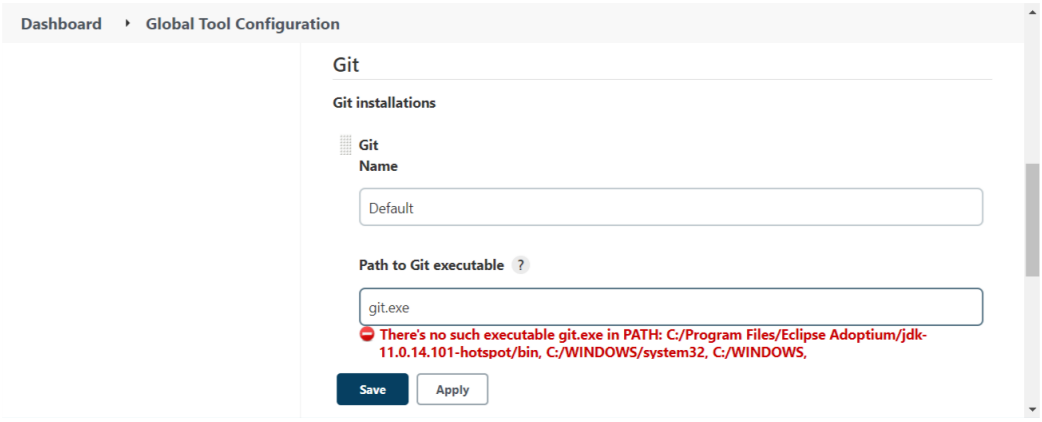

Figure 14

8) Error disappeared when you specify correct path.

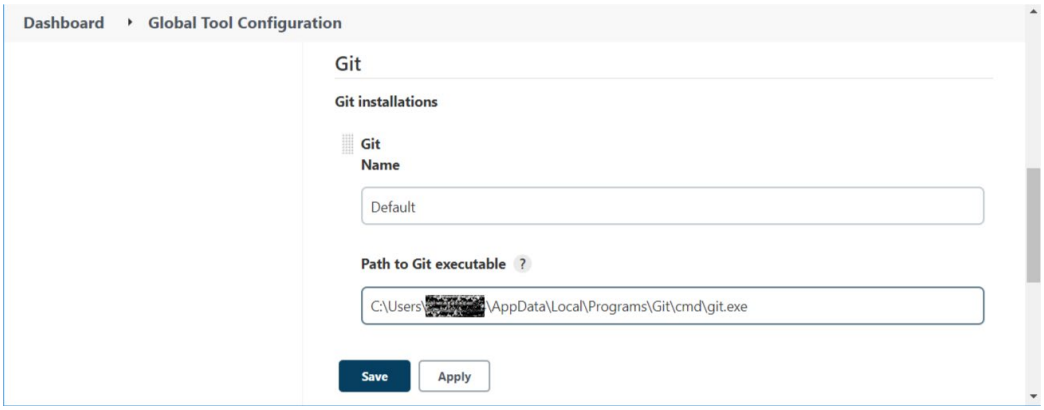

Figure 15

9) Click [Save] button.

Git will be available as an option whilst configuring jobs.

3. Installing Git tools

The previous section describes how to install the git plugin to make Jenkins git aware. The underlying git tools, that Jenkins will use, must be installed on the host you intend running the Jenkins server on. If you're not sure if git is already installed, then the following steps will help.

3.1 Is git already installed?

1) Enter the following command from a Windows Command Prompt, on the machine where the Jenkins server will run (you can run it directly on the server machine, or remotely login to the server from client machine, then run it):

```
> git --version
```

2) If git is already installed, the version number is returned, for example:

```
git version 2.35.1.windows.2
```

3) If git is not installed, the following response is displayed:

```
'git' is not recognized as an internal or external command,
operable program or batch file.
```

3.2 Git Installation

1) To install "git for windows", jump to the download page from the following URL and select the git installer download most appropriate for your system.

   https://git-scm.com/

2) Run the installer.

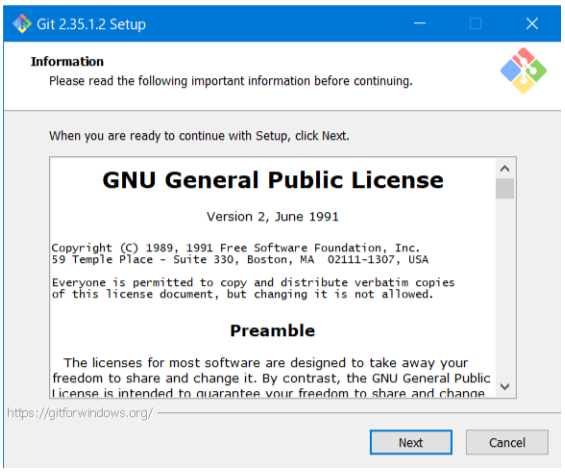

Figure 16

3) In the Git Setup installer click Next and accept the default values until "Adjusting your PATH environment". On this page, choose the middle option, "Use Git from the Windows Command Prompt".

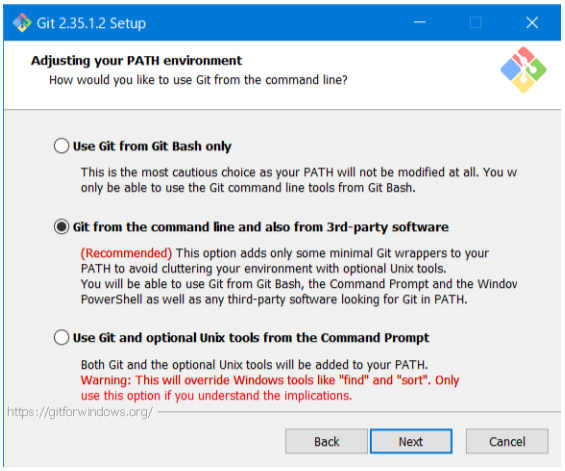

Figure 17

4) Continue and accept the remaining default options and complete the install.

No further installation or configuration is required at this stage. Jenkins allows you to configure the user identity and credentials, and this is described in the next chapter.

4. Setting up a build job

This chapter describes how to create a job in Jenkins which picks up a simple project created using e² studio and builds it.

4.1 Creating a build job

1) In the Jenkins UI, click [New Item].

2) In the next screen, enter “e2Build” in the [Enter an item name] textbox. Choose the “Freestyle project” option, then click [OK].

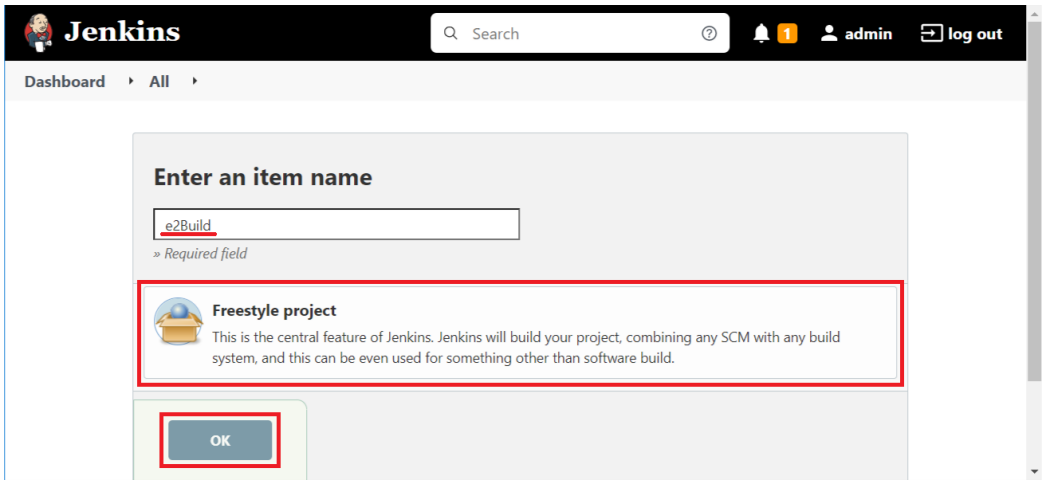

Figure 18

3) The following screen will come out in which you can specify the details of the job.

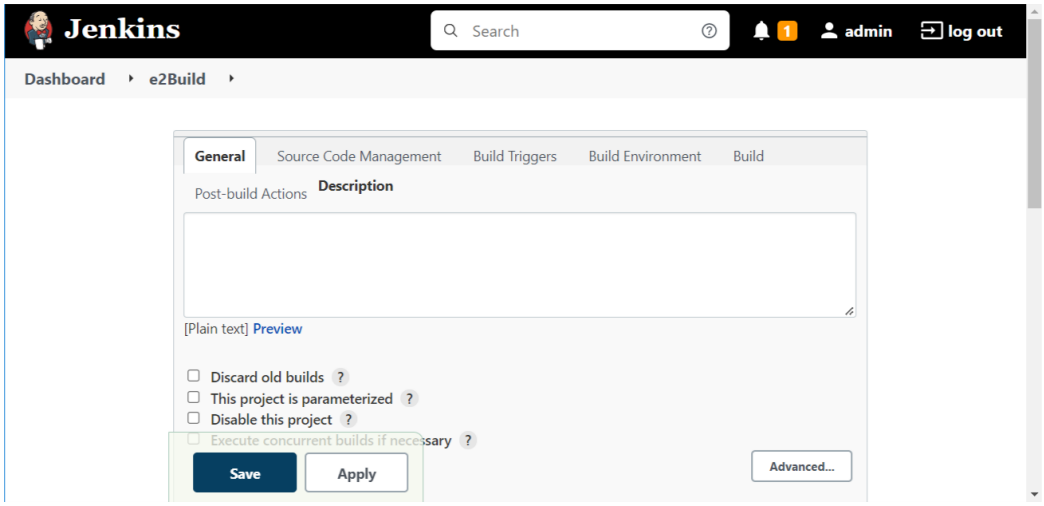

Figure 19

4) [Source Code Management]: we need to specify the Git repository which stores the project. We will assume that a Git repository (for example “\\192.168.0.43\Shared\EGitRepo”) has been setup which contains a “rx64m_sample” project. Please refer to Application Note Integrated Development Environment e² studio: How to use EGit in e² studio Rev.1.01 (renesas.com) for details.

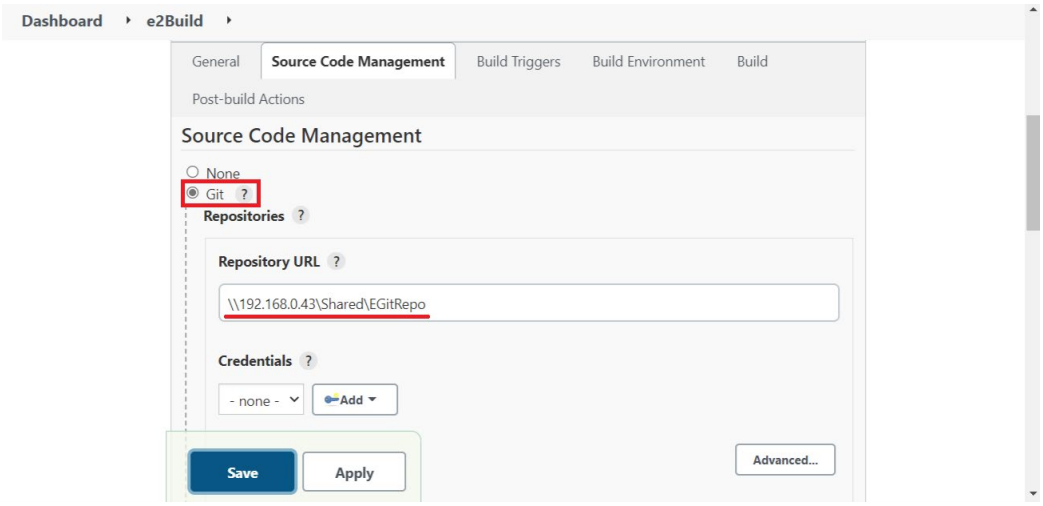

Figure 20

5) Fill in the repository URL. Then Click [Add] next to the “Credentials” textbox to add the credential to login to the machine of Git repository.
In the “Jenkins Credentials Provider: Jenkins” dialog, input following information:
The added credential will be listed in the list box “Credential” under “Repository URL” text box. Select the credential.

6) [Build Triggers]: Plan the build schedule. In order to build whenever the project is updated on Git repository, select “Poll SCM” option. This will check the Git repository periodically for new update then trigger the build if there is any update.

7) The period to check Git repository is specified in cron-like syntax. For example: “H/15 * * * *” means to check Git repository every 15 minutes. Click the question mark Figure next to “Schedule” caption of the textbox for details.

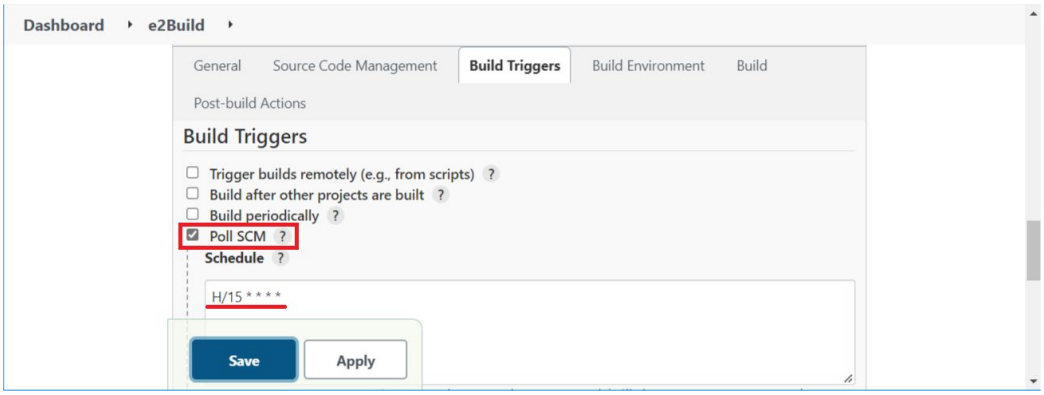

Figure 21

8) [Build]: Select Click “Execute Windows batch command” on the [Add build step] dropdown list.

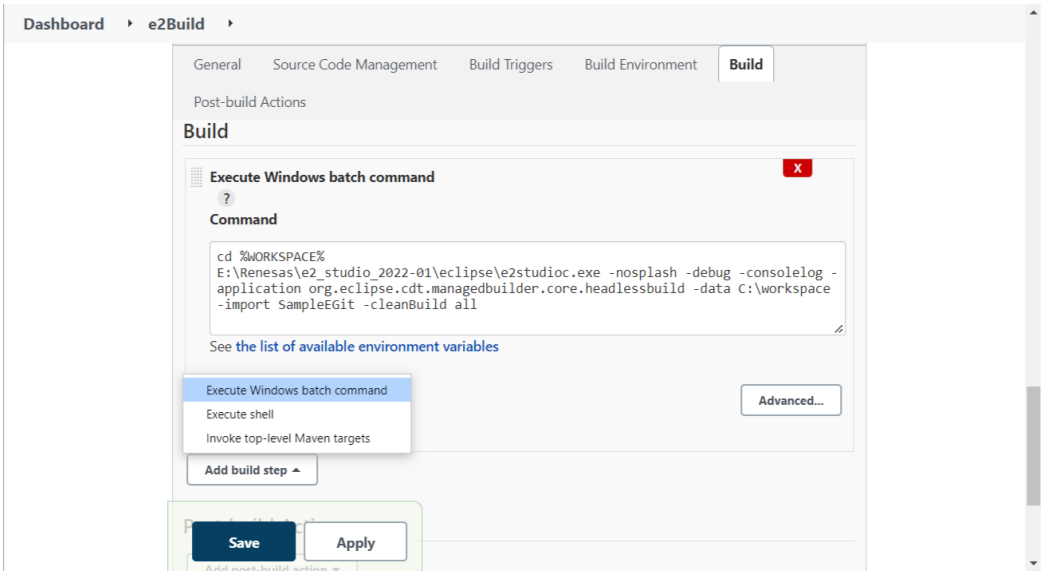

Figure 22

9) In the command window, enter the following commands and then click [Save] button.

```
cd %WORKSPACE%
<e2 studio install folder>\eclipse\e2studioc.exe -nosplash -debug -
consolelog -application org.eclipse.cdt.managedbuilder.core.headlessbuild
-data <workspace folder> -import <project name> -cleanBuild all
```

- <e2 studio install folder> : You specify the install directory of e2 studio.
- e2studioc.exe : When you use e2 studio 2021-10 or earlier version, you replace it to eclipsec.exe.
- <workspace folder> : You need to specify the workspace as usually even though the headless build do not use e2 studio UI. You specify a folder of workspace exclude your project.
- <project_name> : You specify the project name registered in the Git repository. Here, specify "SampleEGit".

10) Click [Save] button. The configuration of Build job is completed.

4.2 Executing a build job

1) Click on [Build Now] to see if you have successfully defined the job. Then the job is scheduled and run (this is for testing the build only, the job will be triggered when new source code is committed to Git repository).

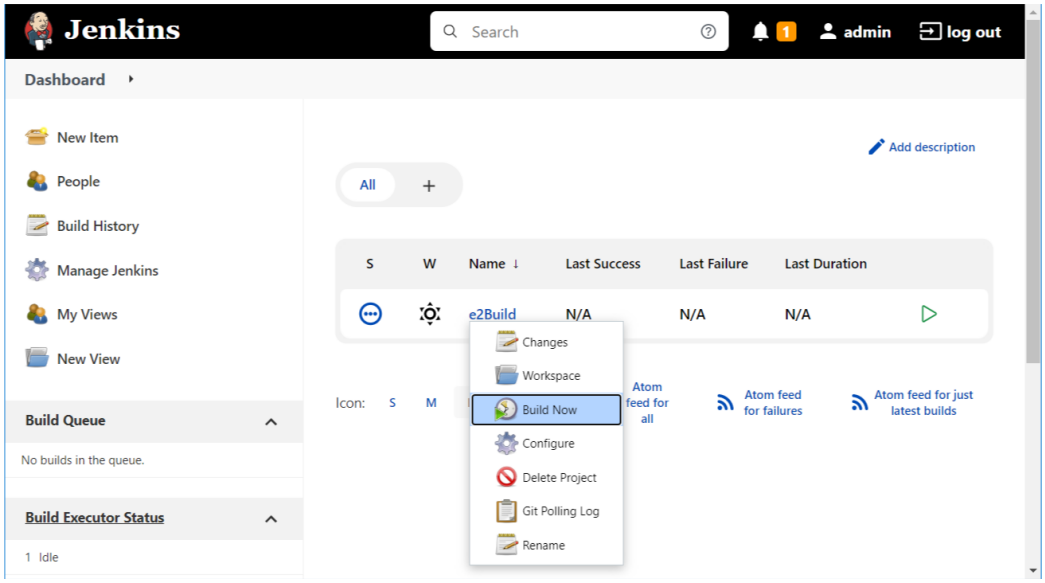

Figure 23

2) Once the build is completed, build status will be shown. Click [#1] in the “Build history” to bring up the details of the build.

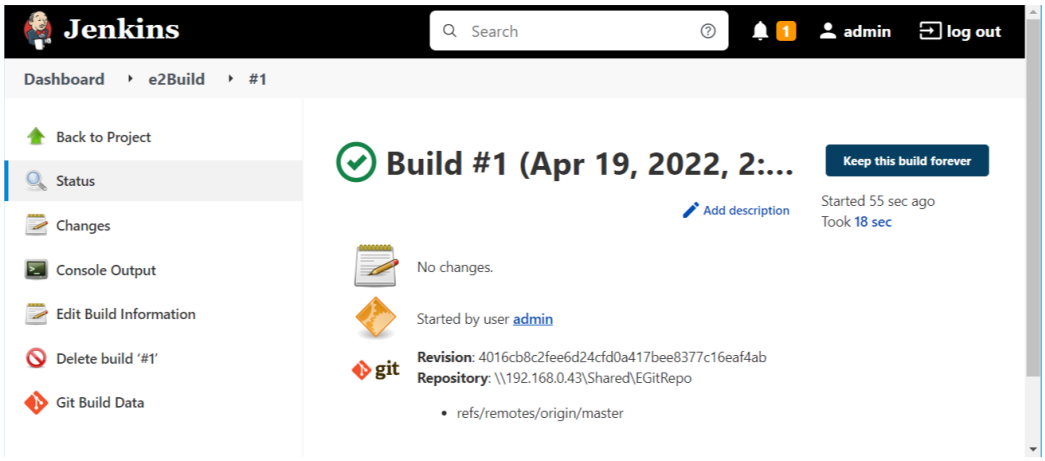

Figure 24

3) In the summary page of build #1, click [Console Output] to see the details of the build.

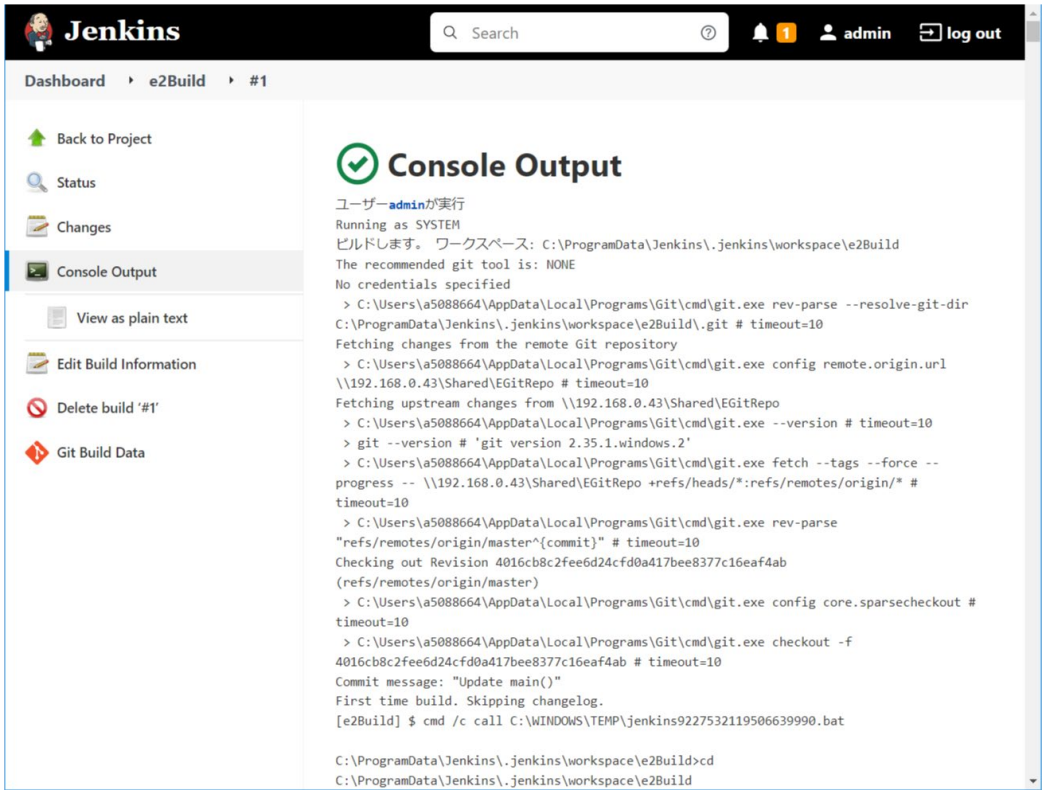

Figure 25

4) Open a source file in e² studio, update it, commit and push to repository. Then after the period defined in “Poll SCM”), the job will be started automatically.

5. Website and Support

- e² studio
  https://www.renesas.com/software-tool/e-studio
- Jenkins
  https://jenkins.io/
- Git
  https://git-scm.com

Revision History

Rev.	Date	Description	
		Page	Summary
1.01	Apr 20.22	All	Revise all pages based on "R20AN0524JE0101".

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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