

## RZ/N2L Group

### EtherCAT Sample program Package

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#### Introduction

This document is an application note for the EtherCAT<sup>®</sup> sample program package for RZ/N2L.

This application note describes the structures of this package and usage of the sample programs.

#### Target Device

RZ/N2L Group

#### Related Documents

- Document No. r20ut4984 (RZ/N2L Group Renesas Starter Kit+ for RZ/N2L User's Manual)
- Document No. r01uh0955 (RZ/N2L Group User's Manual: Hardware)
- Document No. r01ds0397 (RZ/N2L Group Datasheet)
- Document No. r01an6434 (RZ/T2, RZ/N2 Getting Started with Flexible Software Package)

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## 1. Overview

This application note applies to the EtherCAT stack sample program package for RZ/N2L.

### 1.1 Requirements

This sample program package runs under the operating requirement below.

**Table 1. Requirements**

Item	Vendor	Description
Board	Renesas Electronics	Renesas Starter Kit+ for RZ/N2L  CPU clock - Cortex®-R52:400MHz
IDE	IAR Systems	Embedded Workbench® for ARM Version 9.50.1 or later
	Renesas Electronics	e² studio 2024-01 or later FSP Smart Configurator 2024-01 or later Flexible Software Package (FSP) for Renesas RZ/N series v2.0.0 or later Please download from the link below. <a href="https://github.com/renesas/rzn-fsp/releases">https://github.com/renesas/rzn-fsp/releases</a>
Emulator	IAR Systems	I-jet
	SEGGER	J-Link (Version : 7.94h or later)
GCC Compiler	Arm	The GNU ARM Embedded Toolchain (version 12.2.1.arm-12-24)
SSC Tool	Beckhoff Automation	SubDevice Stack Code (SSC) Tool Version 5.13
Software PLC	Beckhoff Automation	TwinCAT3

## 2. Package folder structure

The folder structure of this sample program package is below.

```
r01an6523xx0201-rzn2l-ethercat-package
```

```
|--RZN2L_EtherCAT_RSK_rev0201.zip
```

```
| | |--common
```

```
| | | |--ecat_IO_CiA402_FoE
```

```
| | | | |--ESI
```

```
| | | | |--SSCconfig
```

```
| | | | |--Patch
```

```
| | | |--ecat_EoE_lwIP
```

```
| | | | |--ESI
```

```
| | | | |--SSCconfig
```

```
| | | | |--Patch
```

```
| | | |--ecat_EoE_plusTCP
```

```
| | | | |--ESI
```

```
| | | | |--SSCconfig
```

```
| | | | |--Patch
```

```
| | |--project
```

```
| | | |--rsk_rzn2l
```

```
| | | | |--ecat_IO_CiA402_FoE
```

```
| | | | | |--ewarm
```

```
| | | | | | |--xSPI0 (Project)
```

```
| | | | | |--e2studio
```

```
| | | | | | |--xSPI0 (Project)
```

```
| | | | |--ecat_EoE_lwIP
```

```
| | | | | |--ewarm
```

```
| | | | | | |--RAM (Project)
```

```
| | | | | | |--xSPI0 (Project)
```

```
| | | | | |--e2studio
```

```
| | | | | | |--RAM (Project)
```

```
| | | | | | |--xSPI0 (Project)
```

```
| | | | |--ecat_EoE_plusTCP
```

```
| | | | | |--ewarm
```

```
| | | | | | |--RAM (Project)
```

```
| | | | | | |--xSPI0 (Project)
```

```
| | | | | |--e2studio
```

```
| | | | | | |--RAM (Project)
```

```
| | | | | | |--xSPI0 (Project)
```

```
| |--r01an6523ej0201-rzn2l-ethercat-package.pdf
```

```
| |--r01an6764ej0201-rzn2l-ecat-eoe.pdf
```

```
| |--r01an7423ej0201-rzt2l-ecat-cia402-foe.pdf
```

### 3. Feature added

Describes package updates and function additions.

For usage of each sample program, refer to the document which contained in the corresponding sample program package.

## 4. Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Aug 8, 2022	-	First edition issued
1.10	Jan 31, 2023	-	Add EoE project "r01an6764ej0100-rzn2l-ecat-ee"
1.20	May 12, 2023	-	Add FoE project "r01an6890ej0100-rzn2l-ecat-foe"
			Corrected the document corresponding to package version V1.20
1.30	Oct 31, 2023	-	Updated documentation for FSP v1.3.0
			DIP SW 3-4 can be used
			Modified IO project, CiA402 project to pass CTT
			Slightly changed EoE project
2.00	Jul 12, 2024	-	Supported FSP v2.0.0
			Added the new project "r01an7423ej0200-rzn2l-ecat-cia402-foe" integrated IO, CiA402, and FoE project
			Supported Common Device Profile(ETG.5003.1) in the new project
			Deleted IO, CiA402, and FoE project
2.01	Jan. 23, 2025	-	Supported FSP v2.1.0
		3	Updated "Table 1. Requirements"

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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.

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