

R-IN32M4 series

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R-IN32M4-CL3 Driver/Middleware Release Note TSN

Summary

Thank you for using Driver/Middleware Set for R-IN32M4-CL3 evaluation board.

This document describes the package contents and operating environment of this product.

Please be sure to read before use.

For details on how to use each sample software, middleware etc, please refer to the related documents below.

Related documents

| | |
|-----------------|--|
| R18UZ0042EJ**** | R-IN32M4 Series Startup Manual CC-Link IE TSN |
| R18UZ0072EJ**** | R-IN32M4-CL3 Programming Manual (OS edition) |
| R18UZ0076EJ**** | R-IN32M4-CL3 Programming Manual (Driver edition) |
| R18UZ0070EJ**** | R-IN32M4-CL3 User's Manual CC-Link IE TSN |
| R18UZ0073EJ**** | R-IN32M4-CL3 User's Manual Hardware |
| R18UZ0075EJ**** | R-IN32M4-CL3 User's Manual Gigabit Ether PHY |
| R18UZ0074EJ**** | R-IN32M4-CL3 User's Manual Board Design |

Last four digits of document number (described as ****) indicate version information of each document.

Please download the latest document from our web site and refer to it.

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1. Introduction

This software package is a software package that collects sample applications and libraries that can be used to check the operation of CC-Link IE TSN remote stations on the R-IN32M4-CL3 evaluation board.

2. Package contents

This package is including the below.

- Sample application

| No. | Sample application name |
|-----|---------------------------------|
| 1 | CC-Link IE TSN (Remote station) |
| 2 | CC-Link IE TSN (CANOpen) |

- Library

| No. | Library name |
|-----|----------------------|
| 1 | HW-RTOS library |
| 2 | EtherPHY library |
| 3 | TCP/IP stack library |
| 4 | PTP library |

3. Folder structure

Folder structure of this package is shown below.

TOP

```

|
|-- CSPP          << CSP+ file >>
|-- GX Works3    << PLC sample project >>
|-- Software
|   |-- CCLinkIE_TSN    << Sample Program >>
|   |   |-- IAR        << Library directory >>
|   |   |   |-- Project
|   |   |   |-- ProjectCAN
|   |   |   |
|   |   |-- library    << Library directory >>
|   |   |-- src        << Source directory >>
|   |       |-- Driver
|   |       |-- main
|   |       |   |-- IAR    << IAR compiler dependent files >>
|   |       |   |
|   |       |-- rtos
|   |       |-- sample
|   |
|-- USNetPlus    << USNetPlus manual >>

```

4. Operating environment

The operating environment of this package is shown below.

- Target device
R-IN32M4-CL3

- Target board
SBEV-RIN32M4CL3 (Shimafuji Electric Incorporated.)
TS-TCS07908 (Tessera Technology Inc.)

- Development environment
 - Compiler
IAR Embedded Workbench for Arm 9.10.1 (IAR Systems)
 - Debugger
IAR Embedded Workbench for Arm 9.10.1 (IAR Systems)
 - ICE
I-jet / I-jet Trace for Arm Cortex-M (IAR Systems)

5. Change history

| Version | Changes |
|--------------------------|--|
| V1.0.0 (Nov 11, 2019) | First release |
| V1.0.1 (Apr 30, 2020) | <ul style="list-style-type: none"> - Update of sample application CC-Link IE TSN (Remote station) - Update of R18UZ0070JJ R-IN32M4-CL3 User's Manual CC-Link IE TSN |
| V1.0.2 (Nov 10, 2020) | <ul style="list-style-type: none"> - Add synchronous cyclic communications. - Add CANOpen sample application. - Support for new evaluation board : SBEV-RIN32M4CL3 |
| V1.0.5 (Dec 31, 2021) | <ul style="list-style-type: none"> - Added SLMP commands sent and received by user programs - Added description of expansion unit during CANopen communication - Added communication speed setting via SLMP - SLMP command execution related user program function added - Added R-IN32M4-CL3 driver interface function |
| V1.0.6 (Jul 29, 2022) | <ul style="list-style-type: none"> - Added CC-Link IE Safety Communication Function support - Update to protocol version 2.0 - Added certification class A support |
| V1.0.7 (Apr 2, 2024) | <ul style="list-style-type: none"> - Added support for IP address setting function. - Added IP address duplicate detection API. - Added Network-Synchronized Communications for CANopen - Improved option information type settings. - Improved the response data "watchdog counter offset value" of the SLMP watchdog counter setting command so that different values can be set for sending and receiving. - In a ring-connected network configuration, the L ER LED of the link-down port is now lit during loopback. - Improved to check against the active IP address when receiving the SLMP parameter delivery necessity check command. - In TCP/IP communication, improvements have been made so that a connection can be established even if the maximum segment size is undefined for the connection (SYN) from the other device. - Improved communication by TCP/IP so that the response (SYN + ACK) received after the connection connection (SYN) timeout is discarded. - In ICMP communications, improvements have been made so that ICMP error packets received from devices along the route are discarded while data is being sent to the other device. - Improved communication using ARP so that abnormal data with a source IP address of 255.255.255.255 is discarded. - Improved the ability to respond with the corresponding information in response to continuous information acquisition requests from the other device during SNMP communication. - Improved to disconnect unnecessary connections during TCP/IP communication. - Enhanced validation of received data during ICMP communication. |

6. Website and Support

Renesas Electronics Website

<http://www.renesas.com/>

Inquiries

<http://www.renesas.com/contact/>

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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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