User's Manual

MC-COM User's Manual

Renesas Electronics
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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.

MC-COM User's Manual

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1. Overview

MC-COM is a communication board kit for motor control evaluation. This product supports the Motor Control Development Support Tool, and can be used with CPU board equipped with Renesas MCU and inverter board to efficiently perform motor control evaluations.

1.1 Presupposition and precautions of this document

1. Experience of using tools: This document assumes that the user has used terminal emulation program of Integrated Development Environment (IDE) such as e2 studio before.
2. Knowledge about the development subject: This document assumes that the user has a basic knowledge to modify the sample project regarding MCU and embedded system.
3. Before using this product, wear an antistatic wrist strap. If you touch this product with static charge on your body, a device failure may occur, or operation may become unstable
4. All screen shots provided in this document is for reference. Actual screen displays may differ depending on the software and development tool version which you use.

2. Product Contents

This kit consists of the following parts.

1. Communication Board (RTK0EMXC90Z00000BJ) x1
2. Communication Cable x1
3. USB Cable x1
4. Screw x4
5. Standoff x4

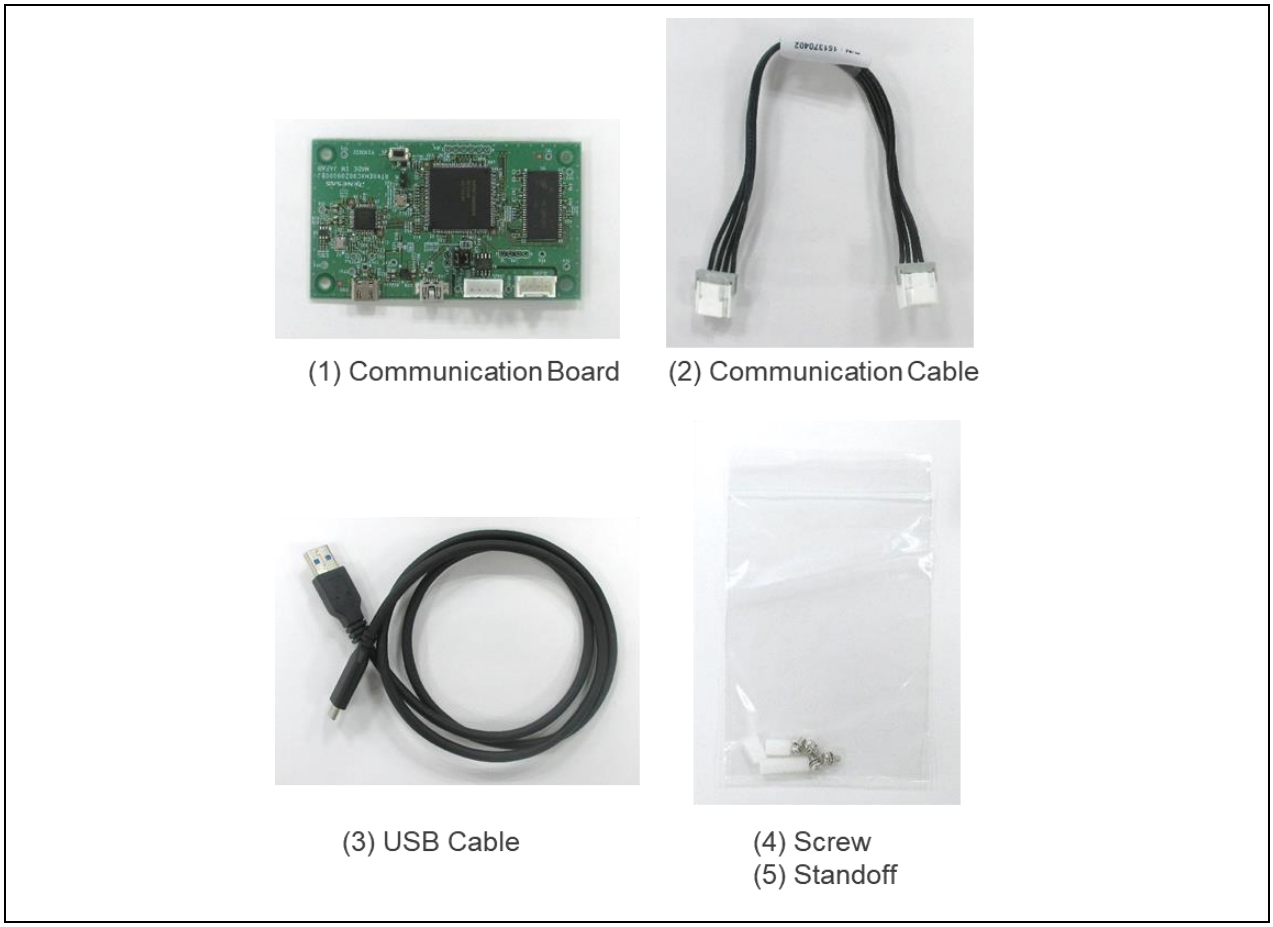


Figure 2-1 Product contents

3. Product Order Information

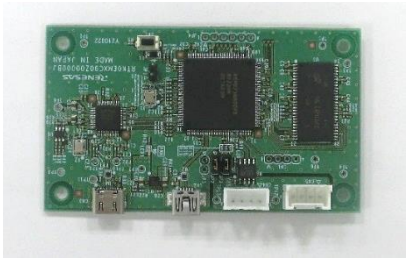
Product No. to order MC-COM : RTK0EMXC90S00000BJ

4. Hardware Configuration and Default Setting

4.1 Hardware configuration

The specifications of the communication board are shown below.

Table 4-1 Communication board specification

item		Specification
Product name		Communication Board
Board part No.		RTK0EMXC90Z00000BJ
External view		 Note: The actual product may differ from this photo.
Mounted MCU	Product group	RX72N group
	Product No.	R5F572NNDDFB
	CPU maximum operating frequency	240MHz
	Bit count	32 bit
	Package / Pin number	LFQFP / 144 pin
	RAM	1M byte
MCU input clock		20MHz (Generate with external crystal oscillator)
Power supply		DC 5V • Power is supplied from USB connector
Connector		• USB Type-C connector for PC • SCI connector for CPU board • USB miniB connector (not available for users)
Isolation		• Between SCI connector and MCU • Isolation device Si8622BC-B-IS (Skyworks Solutions Inc.) or ISO7421FED (Texas Instruments)
Switch		MCU reset switch
Operating temperature		Room temperature
Operating humidity		No condensation allowed

4.2 Block diagram

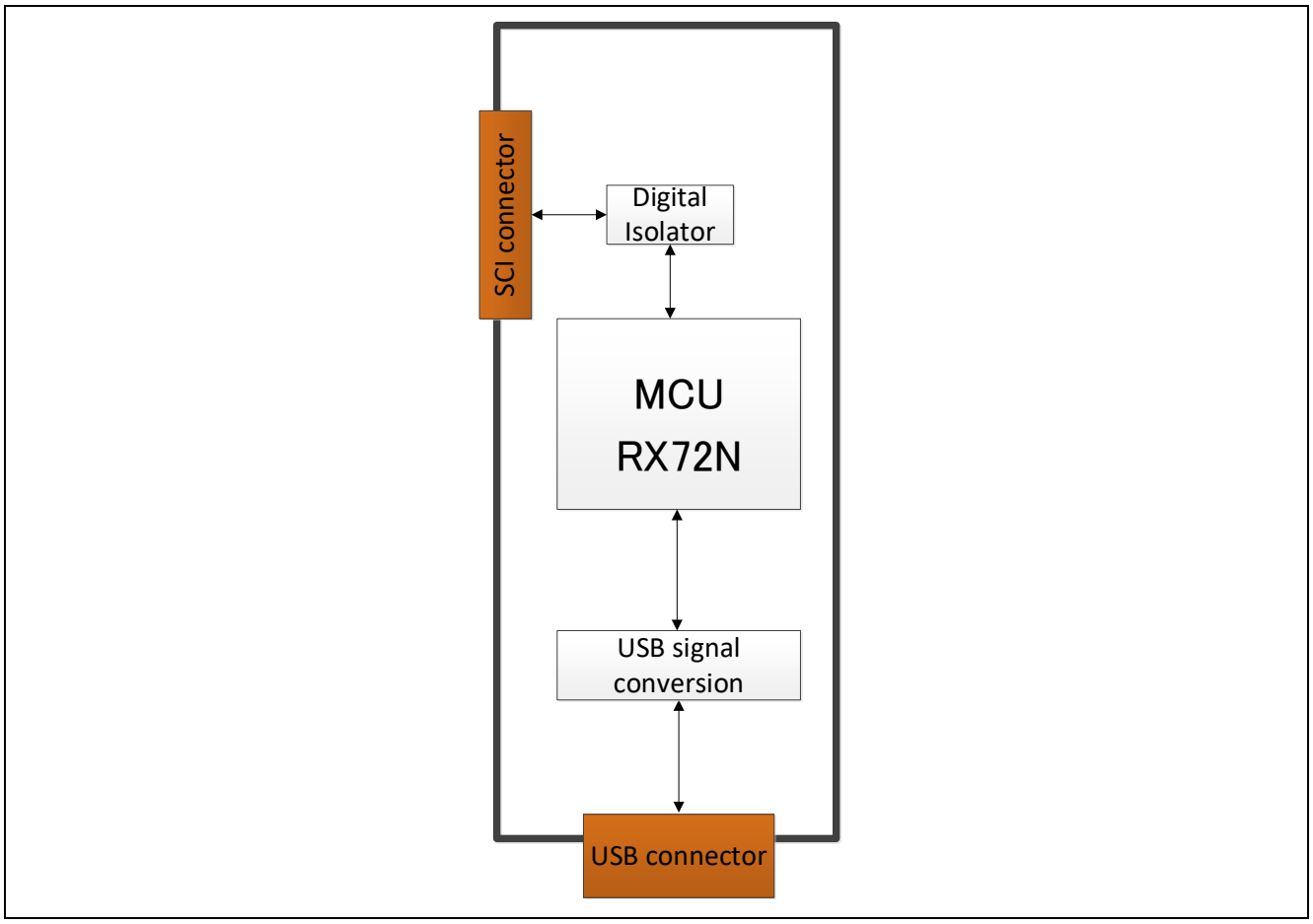


Figure 4-1 MC-COM block diagram

4.3 Board Layout

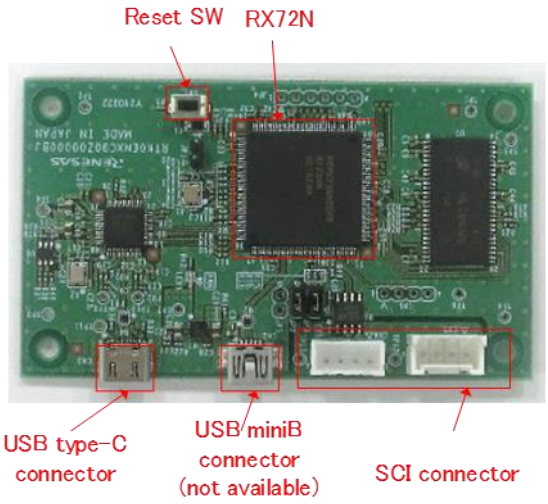


Figure 4-2 Communication board

4.4 Standoffs and Screws

Before using this product, assemble the included standoffs and screws as shown below.

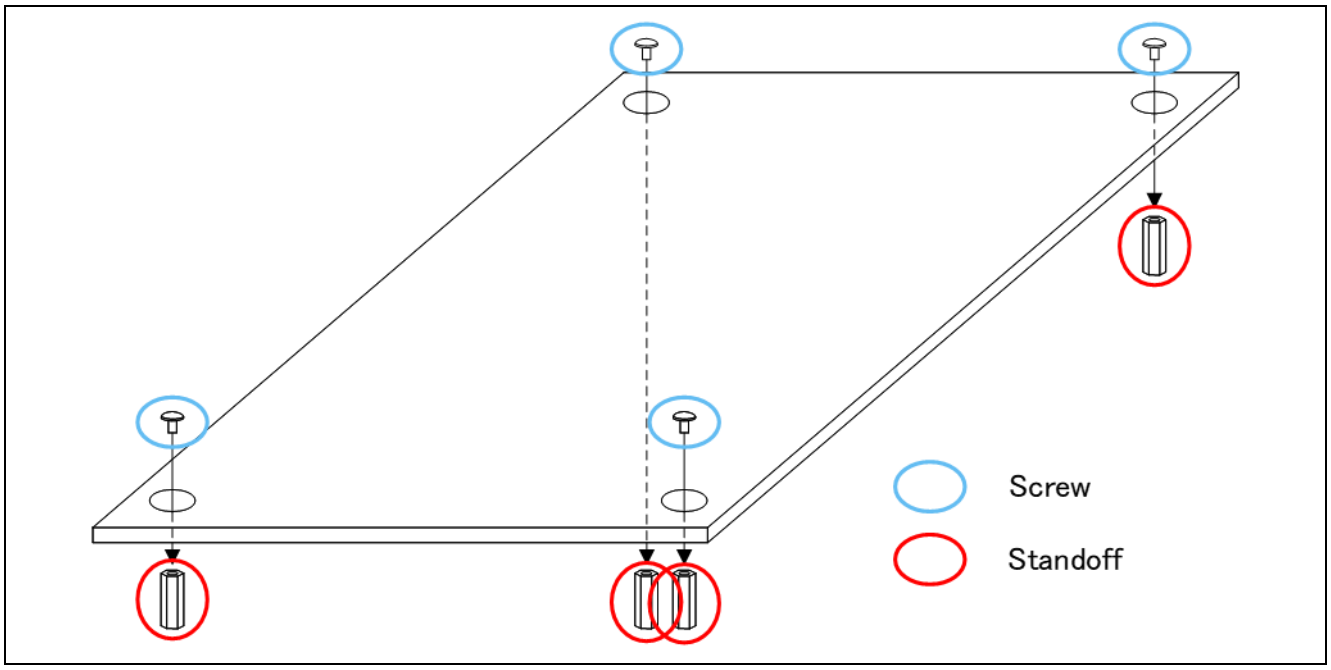


Figure 4-3 Standoffs and Screws assembly

4.5 Jumper pin setting

Default settings and functions of the jumper pins (JP1~JP3) are as follows.

Table 4-2 Jumper pin setting

Jumper pin	Default setting	Function
JP1	1-2pin open	1-2pin short : Disable pull-up for MD port (Not available) 1-2pin open : Enable pull-up for MD port
JP2	1-2pin short	1-2pin short : Disable pull-up for GPIO(PC6) 1-2pin open : Enable pull-up for GPIO(PC6)
JP3	1-2pin short	1-2pin short : Disable pull-up for GPIO(PC5) 1-2pin open : Enable pull-up for GPIO(PC5)

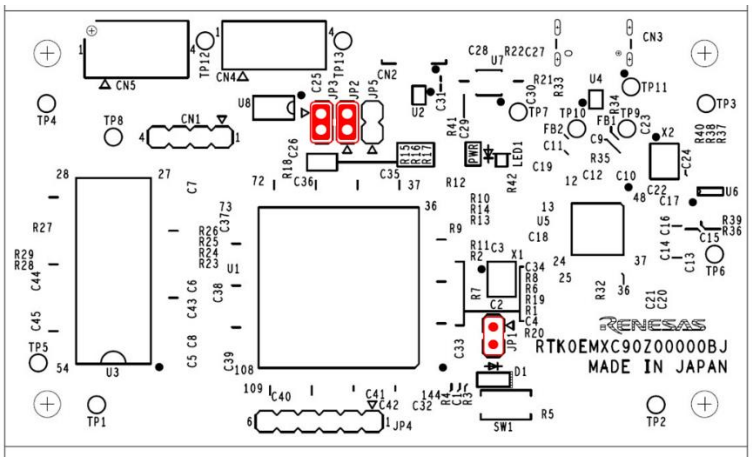


Figure 4-4 Default jumper pin setting

4.6 Connection Example

Figure 4-5 shows a connection example when using this product in combination with a Renesas CPU board and a Renesas inverter board kit (MCI-LV-1, P/N: RTK0EM0000S04020BJ).

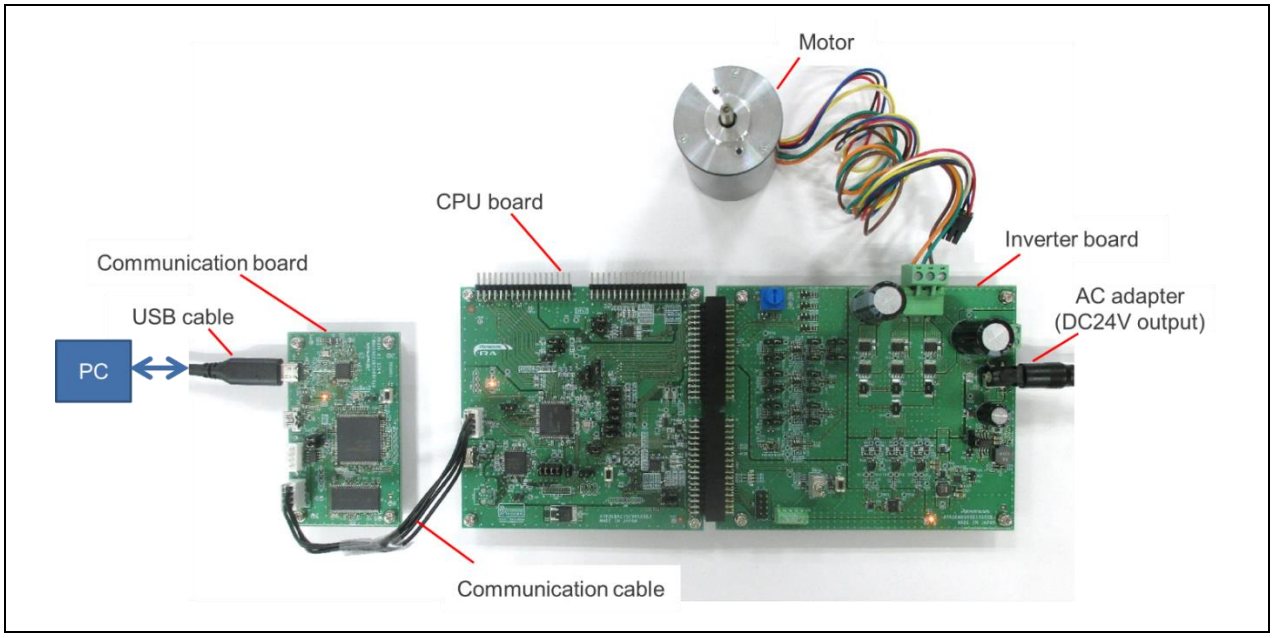


Figure 4-5 Connection Example

5. Communication Board Functions

This section describes the specification of the communication board.

5.1 Power Supply

Power of this product is supplied at 5V from USB connector.

5.2 USB communication

This product is equipped with a USB type-C connector for communication with a PC when using Renesas Motor Workbench, etc.

5.3 Serial Communication

This product has two SCI connectors for serial communication with the target MCU when using Renesas Motor Workbench, etc. The pin assignments are shown in Table 5-1and Table 5-2. When using the communication cable bundled with this product, use CN5. When using the communication cable bundled with RTK0EMX270S00020BJ or RTK0EMA170S00020BJ, use CN4.

The serial communication connector and the MCU (RX72N) are connected via a digital isolator, so the communication board and the CPU board with the target MCU are isolated.

Table 5-1 SCI connector (CN5) pin assignment

Pin No.	Function	Note
1	VCC	
2	RXD	Connect to TXD of target MCU
3	TXD	Connect to RXD of target MCU
4	GND	

Table 5-2 SCI connector (CN4) pin assignment

Pin No.	Function	Note
1	VCC	
2	RXD	Connect to TXD of target MCU
3	TXD	Connect to RXD of target MCU
4	GND	

6. Design and Manufacture Information

You can obtain information on the design and manufacture of this product from renesas.com.

7. Website and Support

In order to learn, download tools and documents, apply technical support for RA family MCU and its kit, visit the below Web site.

- RA Product Information renesas.com/ra
- RA Product Support Forum renesas.com/ra/forum
- Renesas Support renesas.com/support

Revision History	MC-COM User's Manual

Rev.	Date	Description	
		Page	Summary
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