User's Manual

32

RX72N Group

RX72N Envision Kit User's Manual

32-Bit MCU
RX Family/RX700 Series

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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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How to Use This Manual

1. Purpose and Target Readers

This manual is designed to provide the user with a hardware overview of the RX72N Envision Kit and an understanding of its electrical characteristics.

> Particular attention should be paid to the precautionary notes when using the manual. These notes occur within the body of the text, at the end of each section, and in the Usage Notes section.

> The revision history summarizes the locations of revisions and additions. It does not list all revisions. Refer to the text of the manual for details.

The following documents apply to the RX72N Envision Kit. Make sure to refer to the latest versions of these documents. The newest versions of the documents listed may be obtained from the Renesas Electronics website (www.renesas.com/envision2).

Document Type	Description	Document Title	Document No.
User's manual	Description of RX72N Envision Kit hardware specifications	RX72N Envision Kit User's Manual	R20UT4788EJ (this manual)
Circuit diagram	Description of RX72N Envision Kit board circuit diagram	RX72N Envision Kit board circuit diagram	R20UT4789EJ
Parts list	Description of RX72N Envision Kit board parts list	RX72N Envision Kit bill of materials	R20UT4790EJ
User's Manual: Hardware*1	Description of hardware specifications (pin assignments, memory map, specifications of peripheral functions, electrical characteristics, and timing) and operation	RX72N Group User's Manual: Hardware	R01UH0824EJ (Japanese: R01UH0824JJ)

Note: 1. Documents related to the RX72N are available for download on the RX72N product webpage.

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2. List of Abbreviations and Acronyms

Abbreviation	Full Form
CPU	Central Processing Unit
DIP	Dual In-line Package
DNF	Do Not Fit
IDE	Integrated Development Environment
IRQ	Interrupt Request
HOCO	High-Speed On-Chip Oscillator
LOCO	Low-Speed On-Chip Oscillator
LED	Light Emitting Diode
MCU	Micro-controller Unit
n/a (NA)	Not Applicable
n/c (NC)	Not Connected
PC	Personal Computer
Pmod™	Pmod™ is a trademark of Digilent Inc. The Pmod™ Interface Specification is the property of Digilent Inc. For more information on Pmod™, refer to the Digilent Inc. Pmod™ License Agreement page.
QSPI	Quad Serial Peripheral Interface
QVGA	Quarter Video Graphics Array
RAM	Random Access Memory
RFP	Renesas Flash Programmer
RMII	Reduced Media Independent Interface
ROM	Read Only Memory
SD Card	Secure Digital Card
SDHI	Secure Digital Host Interface
SPI	Serial Peripheral Interface
TFT	Thin Film Transistor
USB	Universal Serial Bus
WQVGA	Wide Quarter Video Graphics Array

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Table of Contents

1. Overview 1
1.1 Package Contents 1
1.2 Purpose 1
1.3 Features 1
1.4 Preparation 1
1.5 RX72N Envision Kit Specifications 2
1.6 Block Diagram 3

2. External View 4

3. Component Layout Diagram 6

4. Operating Environment 7

5. User Circuits 8
5.1 Power Supply Circuit 8
5.1.1 ECN1: USB Connector for On-Board Emulator 8
5.1.2 CN7: External Power Supply Connector 8
5.1.3 3.3 V Power supply 9
5.1.4 LCD Backlight Power Supply Circuit 9
5.2 Reset Circuit 10
5.3 Clock Circuit 10
5.4 Evaluation MCU 10
5.5 Emulator 10
5.6 DIP Switches 11
5.7 USB Serial Interface 12
5.8 Pmod™ Connectors 13
5.9 User Switch 14
5.10 Wi-Fi/BLE Interface 14
5.10.1 Module Programming Settings 14
5.11 Ethernet Interface 15
5.12 microSD Slot 16
5.12.1 SDHI Power Supply Control 16
5.13 USB Host Interface 17
5.13.1 USB Power Control 17
5.14 Serial Flash 18
5.15 D2Audio Processor and Amplifier for Active Speaker 19
5.15.1 Speakers Suitable for Connection 19
5.15.2 Clock Supply 19
5.15.3 DAE-4–Related Documents 19
5.15.4 DAE-4 Development Tools 19
5.15.5 DAE-4 Settings 19
5.16 MEMS Microphones 21
5.17 Light Sensor 22
5.18 LEDs 23

6. Usage Precautions 24
6.1 Additional Load 24
6.2 Modifying the Board 24
6.3 Limitation on Number of Envision Kits Connected 24

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7. Developing Code 25
7.1 Using e² studio 25
7.2 Using CS+ 26

8. Additional Information 27

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1. Overview

1.1 Package Contents

Thank you for purchasing the RX72N Envision Kit evaluation tool from Renesas (the product). The contents of the product package are as follows:

RX72N Envision Kit (RTK5RX72N0C00000BJ)

Note: USB cable not included.

1.2 Purpose

The product is an evaluation tool for Renesas MCUs. This manual describes the technical elements of the product's hardware.

1.3 Features

The product includes the following features:

- Simplified evaluation and development using RX72N MCU
- Support for new functions of the RX72N: LCD controller, 2D rendering engine, dual-bank flash memory, etc.
- Encryption key management functions of Trusted Secure IP, which incorporates encryption accelerators for multiple encryption standards
- 4.3-inch WQVGA TFT panel with capacitive touch functionality
- Wi-Fi/BLE, Ethernet, and USB interfaces
- SD card, on-board memory, and USB Host storage class as standard storage options
- Sound interface and light sensor
- On-board emulator circuit
- Sample application including firmware update function*1

Note: 1. Available for download on the following webpage:
https://www.renesas.com/envision2

1.4 Preparation

Install on the host PC the integrated development environment (IDE) and other necessary software, which are available on the following webpage:
https://www.renesas.com/development-tools

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1.5 RX72N Envision Kit Specifications

Table 1-1 lists the specifications of the product.

Table 1-1. RX72N Envision Kit Specifications

Item	Specification
Evaluation MCU	Model number: R5F572NNHDFB
	Package: 144-pin LFQFP
	On-chip memory: ROM 4 MB, Data Flash 32 KB, RAM 1 MB
Board size	Dimensions: 130.0 mm × 70.0 mm
	Thickness: 1.6 mm
Power supply	USB connector: 5 V input
	Power IC: 5 V input, 3.3 V output
	External power supply jack: 5.0 V input (2.1 mm diameter)
Main clock	16 MHz (crystal oscillator)
Subclock	Not implemented
Audio clock	24.576 MHz (5X35023 clock generator)
Wi-Fi/BLE combo	EPS32-WROOM2-32D
Ethernet	RJ45 connector × 1, support for MII mode only
SDHI*1	microSD slot × 1
USB Host	USB Type-A connector × 1
UART-USB conversion	USB Micro-B connector × 1
LCD interface	0.5 mm pitch, 40-pin × 1 (TFT)
LCD Panel	Manufacturer: EastRising Co. Part number: ER-TFT043-3
LCD touch panel interface	0.5 mm pitch, 6-pin × 1 (I^2C)
On-board memory	QSPI serial flash (Macronix, 32 Mbit)
Audio output	Audio DSP: D2Audio, stereo mini jack × 1
Audio input	MEMS microphone × 2 (LR stereo)
Light sensor	ISL29034
Pushbutton	User switch × 1
LED	Power: (green) × 1
	User: (blue) × 1
	ACT LED: (green) × 1
Emulator interface	E2 Lite on-board emulator circuit, USB Micro-B connector × 1
Pmod™ connector	Connector: Right angle, 12-pin × 2

Note: 1. It is necessary to enter into an SD Host/Ancillary Product License Agreement (SD HALA) in order to develop host devices conforming to the SD standard.

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1.6 Block Diagram

Figure 1-1 is a block diagram of the product.

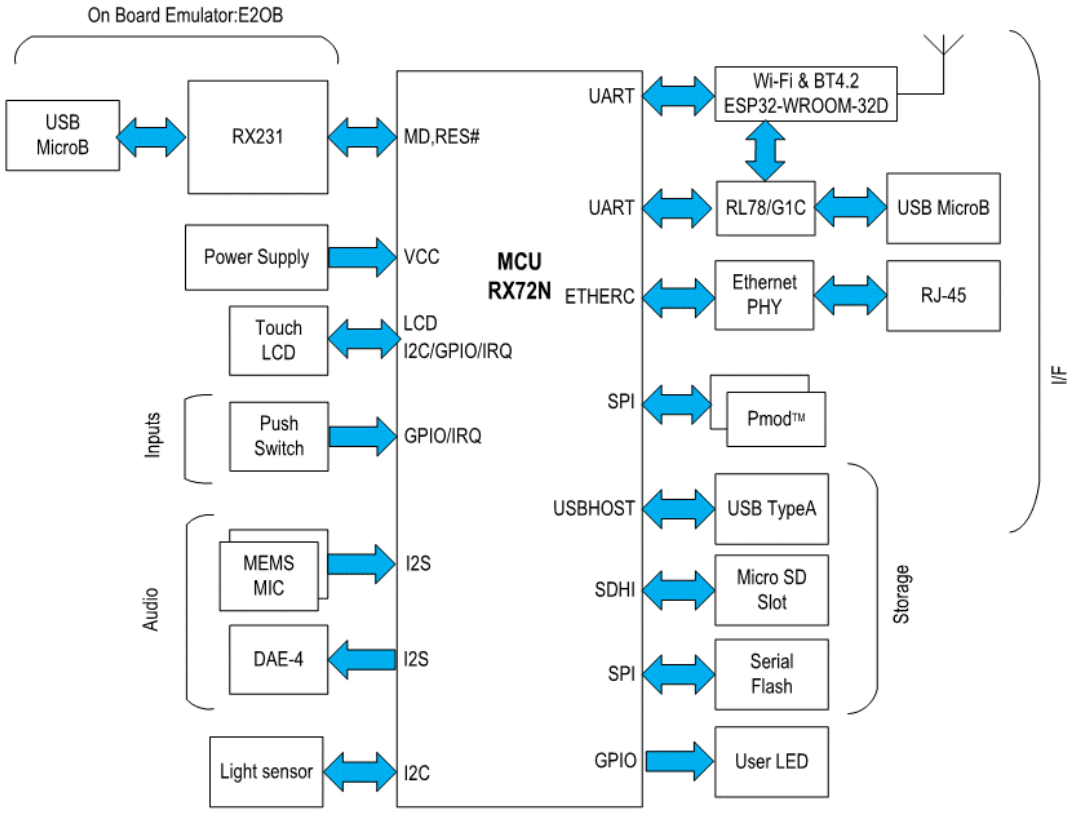


Figure 1-1. Block Diagram

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2. External View

Figure 2-1 is an external view of the LCD side of the product, Figure 2-2 is an external view of the component side (as shipped from the factory), and Figure 2-3 is an external view of the component side (without LCD).

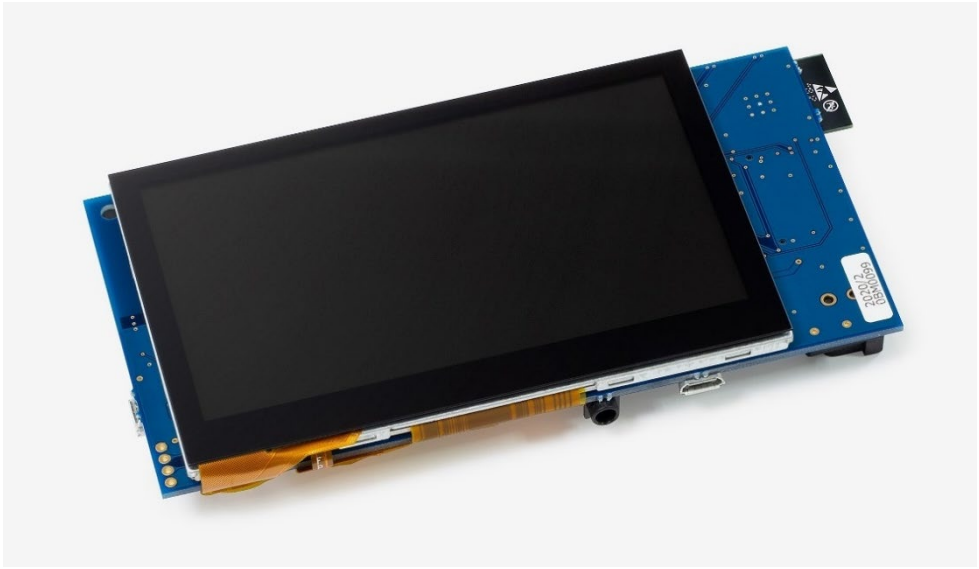


Figure 2-1. External View of LCD Side

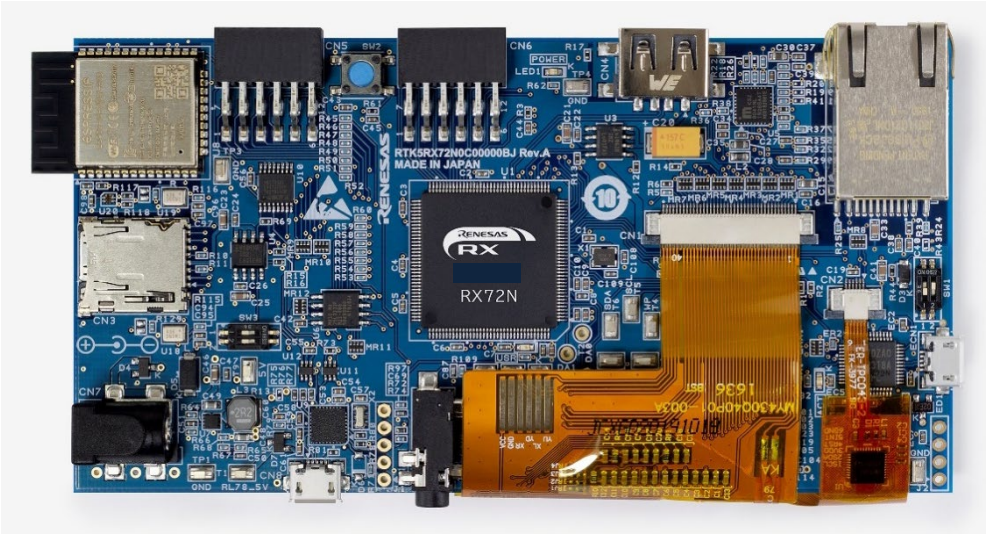


Figure 2-2. External View of Component Side (as Shipped from the Factory)

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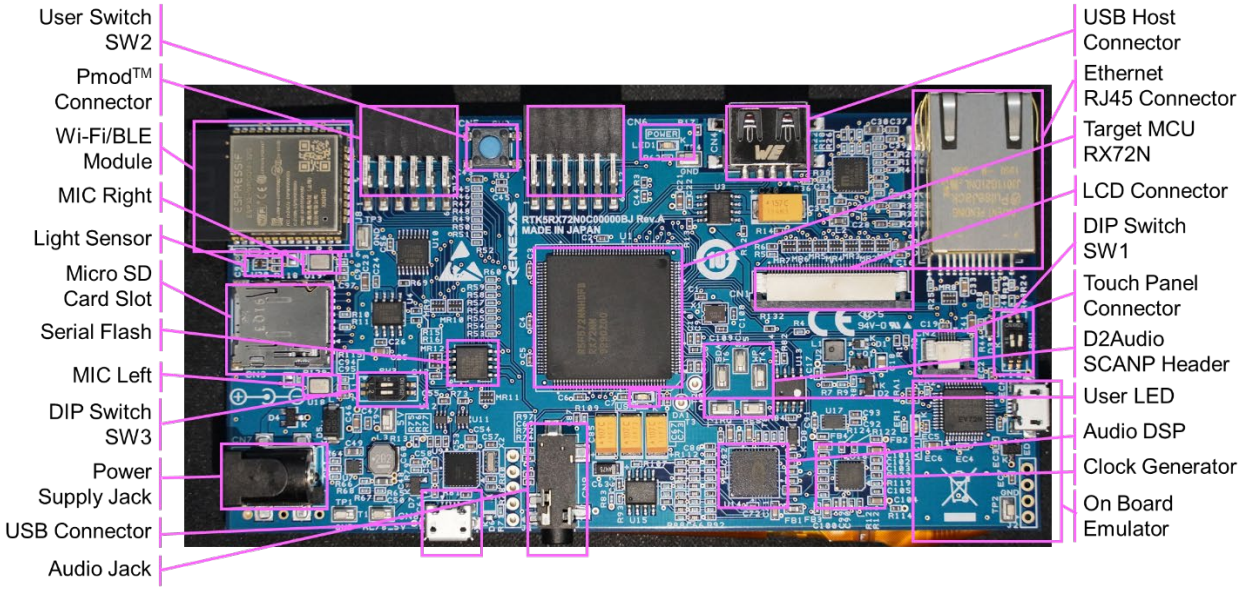


Figure 2-3. External View of Component Side (without LCD)

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3. Component Layout Diagram

Figure 3-1 is a component layout diagram of the product.

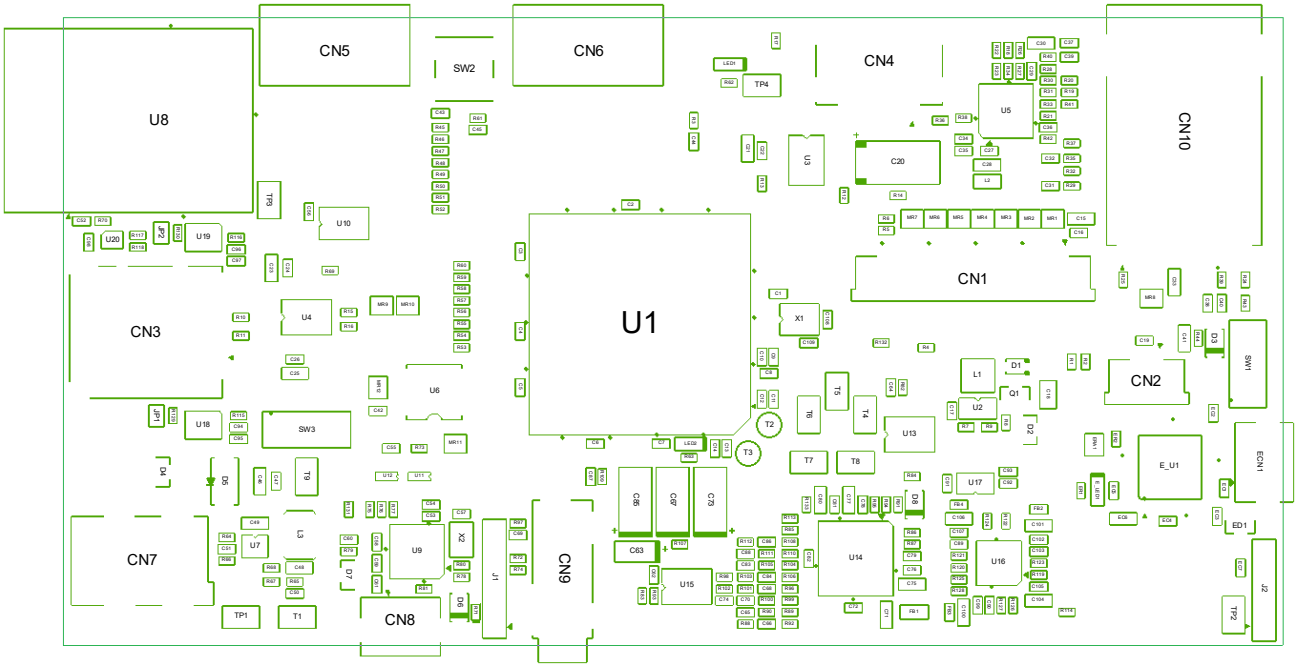


Figure 3-1. Component Layout Diagram

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4. Operating Environment

Figure 4-1 shows the operating environment of the product. Install the integrated development environment (IDE), available on the following webpage, on the host PC. The necessary drivers will be installed as part of the IDE install process.
https://www.renesas.com/development-tools

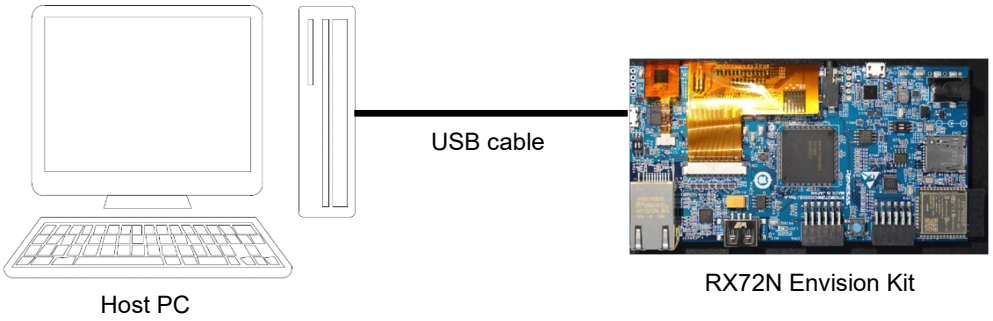


Figure 4-1. Operating Environment

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5. User Circuits

5.1 Power Supply Circuit

The board operates on 5 V of power supplied via USB Micro-B connector ECN1 or DC jack CN7. Figure 5-1 is a power supply system diagram.

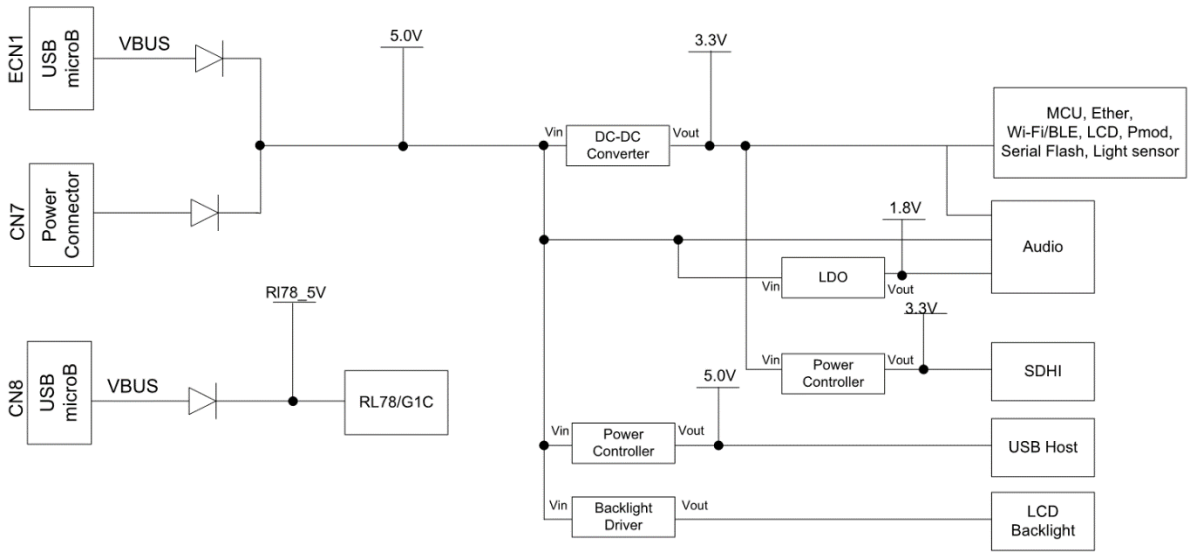


Figure 5-1. RX72N Envision Kit Power Supply System Diagram

5.1.1 ECN1: USB Connector for On-Board Emulator

USB Micro-B connector ECN1 provides an interface for communication between the PC and a programmer or emulator. Power is supplied to the board via the USB connector by default. Use of a USB port capable of supplying at least 500 mA is recommended.

5.1.2 CN7: External Power Supply Connector

If the current capacity of the USB connector is insufficient, use CN7 (2.1 mm diameter connector, center +) to supply power to the board. A voltage of 5.0 V can be supplied via this connector.

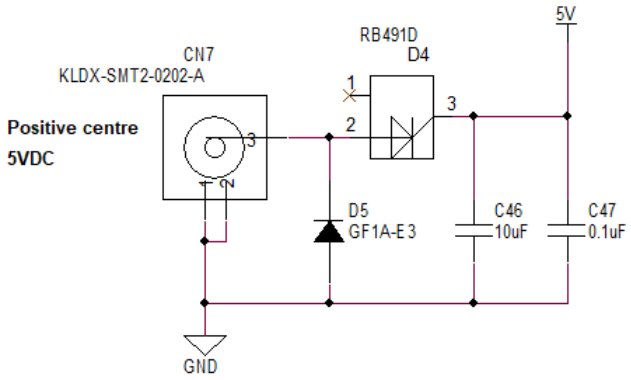


Figure 5-2. CN7 External Power Supply Connector Circuit

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5.1.3 3.3 V Power supply

The MCU, Ethernet PHY, Wi-Fi/BLE module, etc., on the board operate on 3.3 V. A 3.3 V power supply is generated from the 5 V power supply by the ISL80030 on-chip regulator with FET. Refer to the www.renesas.com website for details of the ISL80030. Figure 5-3 shows the 3.3 V power supply circuit.

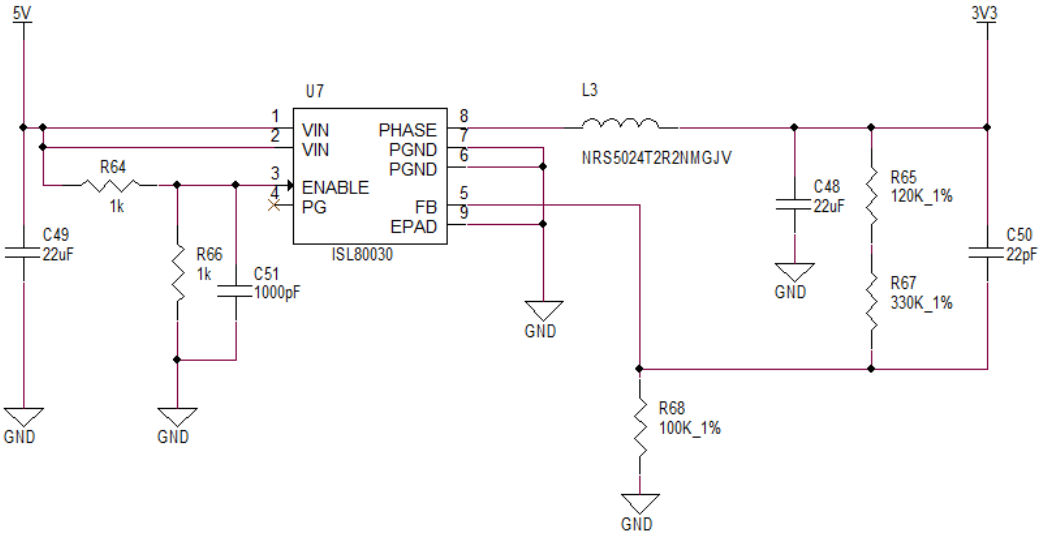


Figure 5-3. 3.3 V Power Supply Circuit

5.1.4 LCD Backlight Power Supply Circuit

The board is provided with an LCD backlight power supply to drive the backlight of the TFT LCD panel. The backlight comprises a large number of white LEDs connected in series. (Since they share the same drive current, uniform brightness is maintained.) The backlight requires 15 mA at 25 V while the board's display is operating. The ISL97634 is used to supply power to the backlight. Refer to the www.renesas.com website for details of the ISL97634. Figure 5-4 shows the backlight power supply circuit.

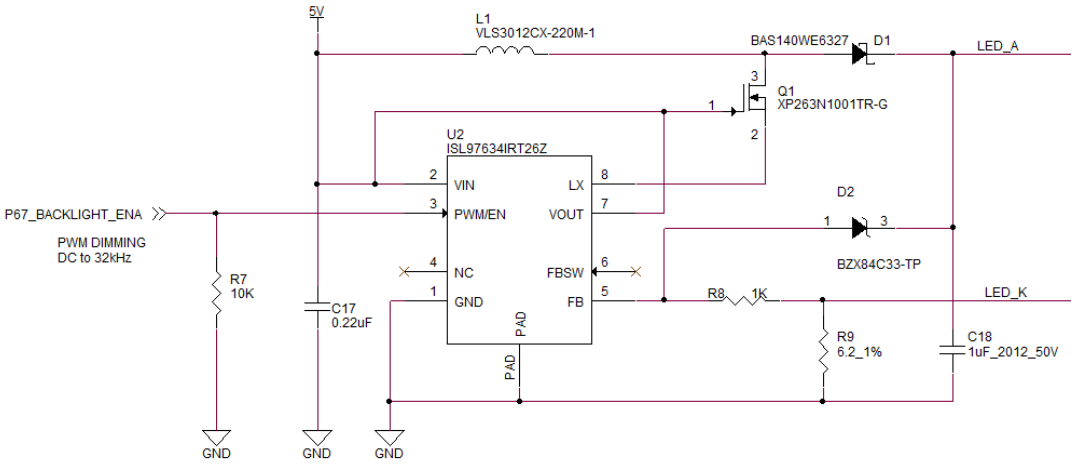


Figure 5-4. LCD Backlight Power Supply Circuit

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5.2 Reset Circuit

The board utilizes the power-on reset circuit incorporated into the MCU. For details of the MCU's reset specifications, refer to RX72N Group, RX72N Group User's Manual: Hardware, and for details of the board's reset circuit, refer to the board circuit diagram.

5.3 Clock Circuit

The board is provided with a clock circuit for use as the clock source of the MCU. For details of the MCU's clock specifications, refer to RX72N Group User's Manual: Hardware and RL78/G1C User's Manual: Hardware, and for details of the board's clock circuit, refer to the board circuit diagram.

5.4 Evaluation MCU

As shipped from the factory, the power supply, system clock, and reset specifications of the evaluation MCU are as follows:

- Power supply: Fixed at 3.3 V (including analog power supply)
- System clock: Operates on 16 MHz external oscillator
- Reset: Triggered by power-on reset

5.5 Emulator

The board is provided with an emulator. The emulator connector (ECN1) has a USB Micro-B configuration, and it serves as an interface for the integrated development environment (IDE) and Renesas Flash Programmer (RFP). Use a USB cable to connect the board to your PC. When the host PC is powered on, power is supplied to the board via the USB cable connection.

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5.6 DIP Switches

DIP switches SW1 and SW3 on the board are used to make a variety of settings. Figure 5-5 shows the locations of the DIP switches, and Table 5-1 and Table 5-2 list the settings of each switch.

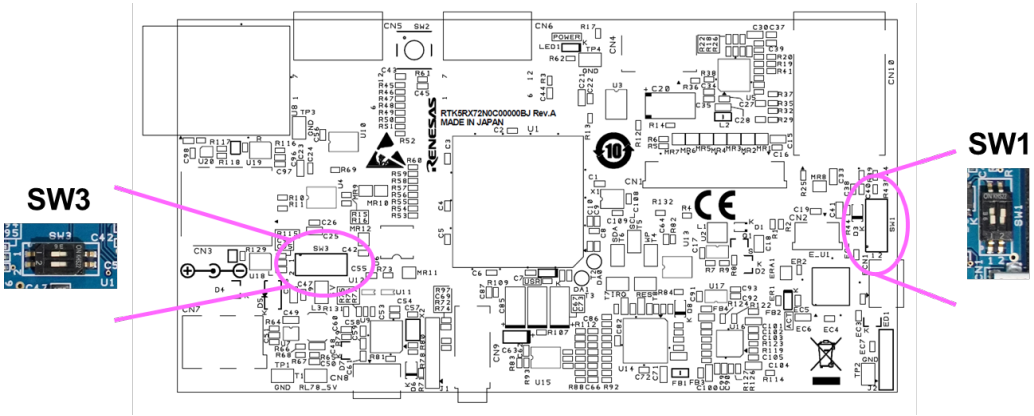


Figure 5-5. RX72N Envision Kit DIP Switches

Table 5-1. SW1 Settings

SW1	Function	Setting	
1ch	Ethernet PHY reset	Off	PHY reset negate (default)
		On	PHY reset assert
2ch	Emulator reset	Off	Emulator use enabled
		On	Emulator reset (default) Emulator use disabled

Table 5-2. SW3 Settings

SW3	Function	Setting	
1ch	D2Audio reset	Off	D2Audio reset negate (default)
		On	D2Audio reset assert
2ch	USB serial interface switching	Off	Connected to UART pins of MCU (default)
		On	Connected to UART of Wi-Fi/BLE module Note: Wi-Fi module download mode

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5.7 USB Serial Interface

USB connector CN8 can be connected to the RL78/G1C and used as a virtual COM port. The USB serial interface supports the following functions:

1. Evaluation MCU UART conversion, allowing connection via USB to a device such as a PC.
2. Connection to the ESP32-WROOM-32D Wi-Fi module, allowing programming of the on-chip flash memory from a PC.

The RL78/G1C power supply (5 V) is isolated from other 5 V power supplies, so when using the above functions it is necessary to connect an external power supply or plug a USB cable into ECN1.

Figure 5-6 and Table 5-3 illustrate USB serial connections.

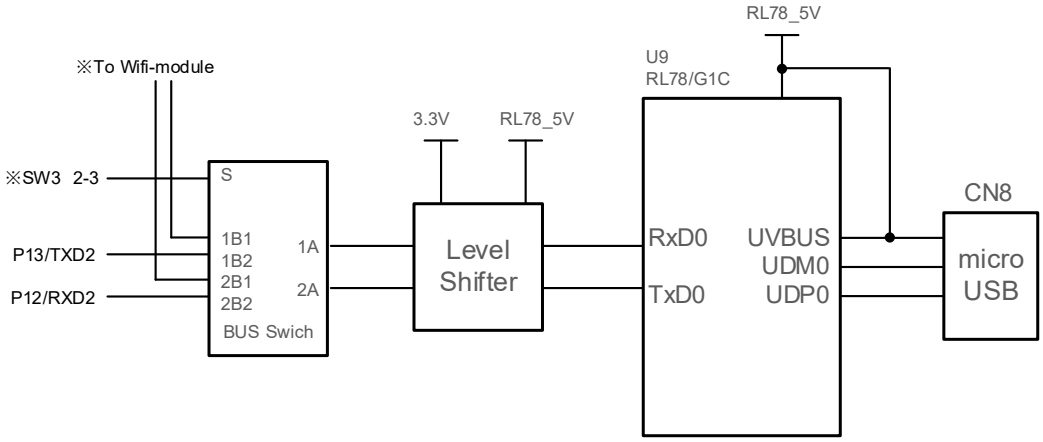


Figure 5-6. USB Serial Interface

Table 5-3. USB Serial Interface

Signal	Function/Application	RX72N	
		Port	Pin
TXD	Transmit data signal	P13/TXD2	44
RXD	Receive data signal	P12/RXD2	45

When you first connect the board to a PC using the USB port, a message prompting you to install a driver appears on the screen of the PC, as shown in Figure 5-7. After that, a message reporting that installation of the driver is complete appears on the PC screen. The messages displayed may differ from those shown here depending on the version of the operating system installed on the host PC.



Figure 5-7. USB Serial Driver Install Messages

If you do not have a copy of the driver installer, you can download it from the following webpage:
https://www.renesas.com/us/en/software/D6000699.html

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5.8 Pmod™ Connectors

Connectors CN5 and CN6 are compliant with Pmod Interface Type 2A and provide connections to the evaluation MCU.

Be careful not to bend or damage the pins when installing a Pmod™ module. The Pmod™ module is susceptible to damage from electrostatic discharge (ESD). Therefore, protection against ESD is essential.

Figure 5-8 lists Pmod™ connector pin assignments, and Table 5-4 and Table 5-5 list the signal specifications of the Pmod™ connectors. The connector numbering complies with the Digilent Pmod™ standard. For details, refer to Digilent Pmod™ Interface Specification, Revision: November 20, 2011.

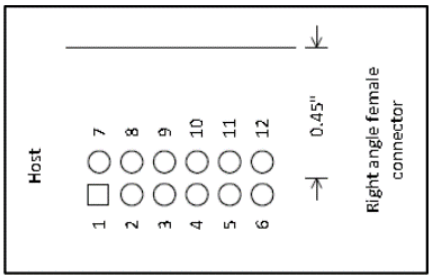


Figure 5-8. Pmod™ Connector Pin Assignments (Top View)

Table 5-4. Pmod™ Connector CN5 Pin Assignments

CN5 Pin No.	Signal	RX72N		CN5 Pin No.	Signal	RX72N	
		Port	Pin			Port	Pin
1	SS	P54	52	7	IRQ	P55	51
2	MOSI	P50	56	8	RST	P86	41
3	MISO	P52	54	9	IO0	P53	53
4	SCK	P51	55	10	IO1	P15	42
5	GND	—	—	11	GND	—	—
6	VCC	—	—	12	VCC	—	—

Table 5-5. Pmod™ Connector CN6 Pin Assignments

CN6 Pin No.	Signal	Evaluation MCU		CN6 Pin No.	Signal	Evaluation MCU	
		Port	Pin			Port	Pin
1	SS	P93	127	7	IRQ	PD0	126
2	MOSI	P90	131	8	RST	PD1	125
3	MISO	P92	128	9	IO0	P46	134
4	SCK	P91	129	10	IO1	P47	133
5	GND	—	—	11	GND	—	—
6	VCC	—	—	12	VCC	—	—

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5.9 User Switch

The board is provided with a user switch (SW2) that you can utilize as you like. The user switch is connected to the P07/IRQ15 port of the 144-pin evaluation MCU.

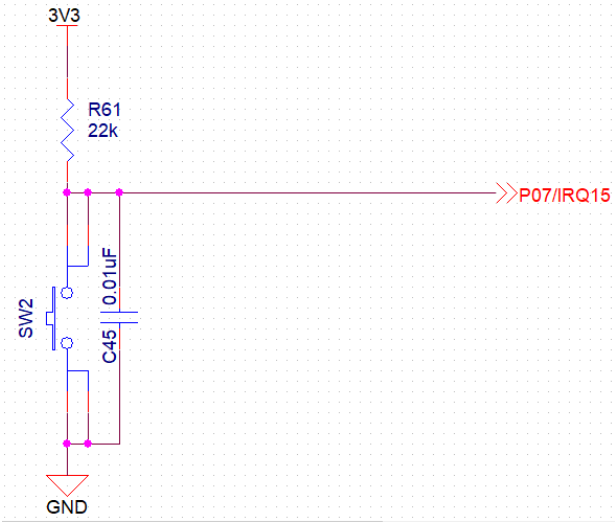


Figure 5-9. User Switch SW2

5.10 Wi-Fi/BLE Interface

The board is provided with the ESP32-WROOM-32D from Espressif Systems as its Wi-Fi module. It is connected to the MCU via a UART.

Table 5-6. Wi-Fi Interface Pin Assignments

Signal	Function/Application	RX72N	
		Port	Pin
RXD	Transmit data signal	P26/TXD1	31
TXD	Receive data signal	P30/RXD1	29
CTS	Transmit enable	P27_RTS#	30
RTS	Transmit request	P31/CTS1#	28
EN	Wi-Fi enable	P43	137

5.10.1 Module Programming Settings

Switch Ch2 of SW3 on the board to the ON position to isolate the target MCU and enable a UART connection to the USB serial interface in order to program the on-chip flash memory of the ESP32-WROOM-32D. For instructions on programming the ESP32-WROOM-32D, visit the website of Espressif Systems.

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5.11 Ethernet Interface

The board is provided with an Ethernet controller, which is connected to the MCU's Ethernet module. The MCU supports full-duplex and half-duplex modes and transfer rates of 10 Mbps and 100 Mbps. Table 5-7 lists information related to Ethernet connections. Table 5-8 lists the states of the status LEDs.

Table 5-7. Ethernet

Signal	Function	RX72N	
		Port	Pin
ETXD3	4-bit transmit data	PC6/ET0_ETXD3	61
ETXD2	4-bit transmit data	PC5/ET0_ETXD2	62
ETXD1	4-bit transmit data	P82/ET0_ETXD1	63
ETXD0	4-bit transmit data	P81/ET0_ETXD0	64
TX_EN	Transmit enable	P80/ET0_TX_EN	65
TX_CLK	Transmit clock	PC4/ET0_TX_CLK	66
MDC	Management data clock	P72/ET0_MDC	85
MDIO	Management data serial I/O	P71/ET0_MDIO	86
ERXD3	4-bit receive data	PC0/ET0_ERXD3	75
ERXD2	4-bit receive data	PC1/ET0_ERXD2	73
ERXD1	4-bit receive data	P74/ET0_ERXD1	72
ERXD0	4-bit receive data	P75/ET0_ERXD0	71
RX_CLK	Receive clock	P76/ET0_RX_CLK	69
CRS	Carrier detect	P83/ET0_CRS	58
COL	Collision detect	PC7/ET0_COL	60
RX_DV	Receive data valid	PC2/ET0_RX_DV	70
RX_ER	Receive data error	P77/ET0_RX_ER	68
REFCLK	Reference clock	P56/CLKOUT25M	50
RES	PHY reset	P73_SW-PHYRESn	77
INTRP	Interrupt output	PC3_ET-INTn	67

Table 5-8. Ethernet Status LED States

Number	Green	Orange	State
1	Off	Off	Link broken
2	On (flashing)	Off	10 Mbps link state (data transmit/receive state)
3	On (flashing)	On	100 Mbps link state (data transmit/receive state)

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5.12 microSD Slot

The microSD slot is connected to the MCU via the SDHI interface. The data bus width is wide bus (4-bit), and compatible devices are SD memory cards (SD, SDHI, and SDXC) and SDIO cards.

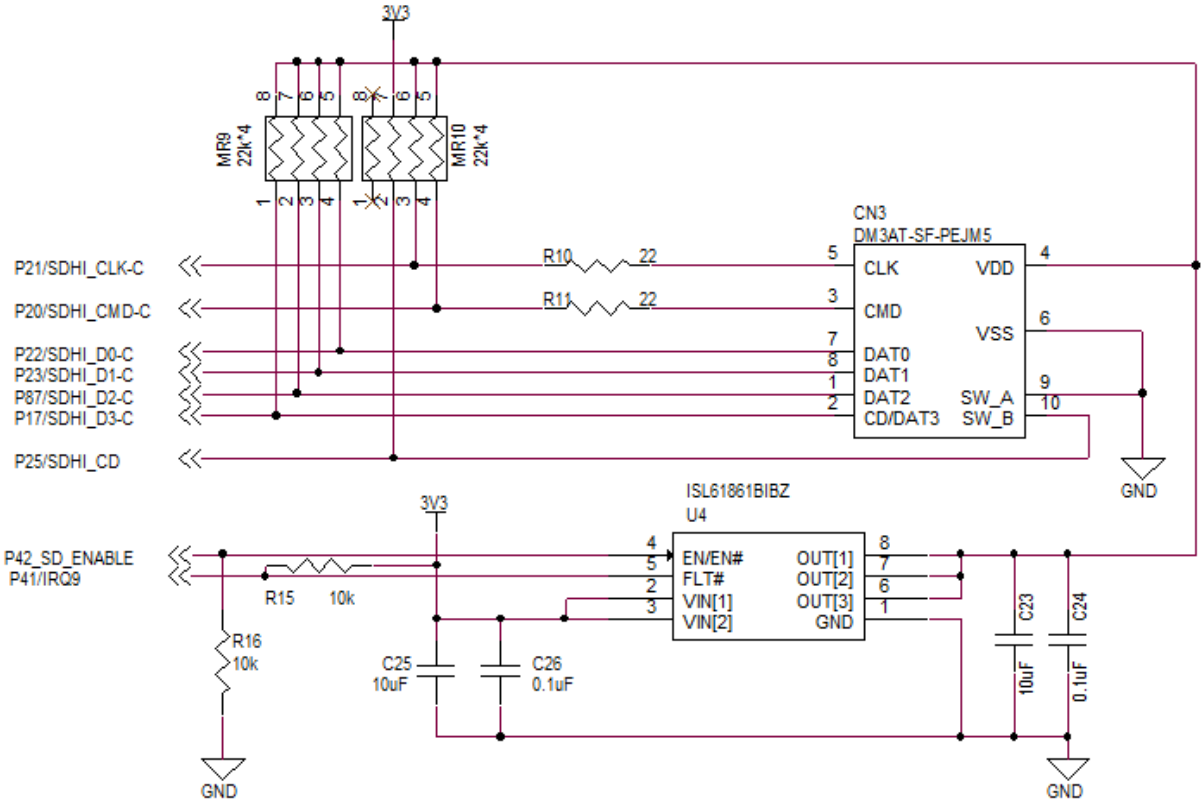


Figure 5-10. microSD Slot Connection Diagram

Table 5-9. microSD Slot Pin Assignments

Signal	Function/Application	RX72N	
		Port	Pin
CLK	SDHI clock	P21/SDHI_CLK-C	36
CMD	Command output, response input	P20/SDHI_CMD-C	37
DATA0	Data 0	P22/SDHI_D0-C	35
DATA1	Data 1, SDIO access interrupt	P23/SDHI_D1-C	34
DATA2	Data 2, read wait	P87/SDHI_D2-C	39
CD/DATA3	Data 3, SD card detect	P17/SDHI_D3-C	38
SW_A	—	—	—
SW_B	SD card detect	P25/SDHI_CD	32

5.12.1 SDHI Power Supply Control

The SDHI power supply is connected to enable overcurrent monitoring by the MCU. The 3.3 V power supply output to the SDHI is controlled by the evaluation MCU using the power management circuit in order to protect against overloads and short circuits. This circuit is based on the ISL61861 power management IC. The IC has an active-high enable input and (asserted low) fault output, and it can supply 3.3 V of power at up to 1.5 A.

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5.13 USB Host Interface

The USB Host interface connects the evaluation MCU and the USB Host connector (type A). USB connections to devices compatible with version 2.0 are supported. The supported transfer rates are full speed (12 Mbps) and low speed (1.5 Mbps).

Table 5-10. USB Host Interface Pin Assignments

Signal	Function	RX72N	
		Port	Pin
USB0DP	D+ I/O signal	USB0_DP	48
USB0DM	D− I/O signal	USB0_DM	47
USB0VBUSEN	VBUS supply enable	P16_USB0_VBUSEN	40
USB0OVRCURA	Overcurrent detect	P14_USB0_OVR_CURA	43

5.13.1 USB Power Control

The USB power supply is connected to enable overcurrent monitoring by the MCU. The 5 V power supply output to the USB Host is controlled by the evaluation MCU using the power management circuit in order to protect against overloads and short circuits. A circuit diagram is shown in Figure 5-11. This circuit is based on the ISL61861 power management IC. The IC has an active-high enable input and (asserted low) fault output, and it can supply 5 V of power at up to 1.5 A.

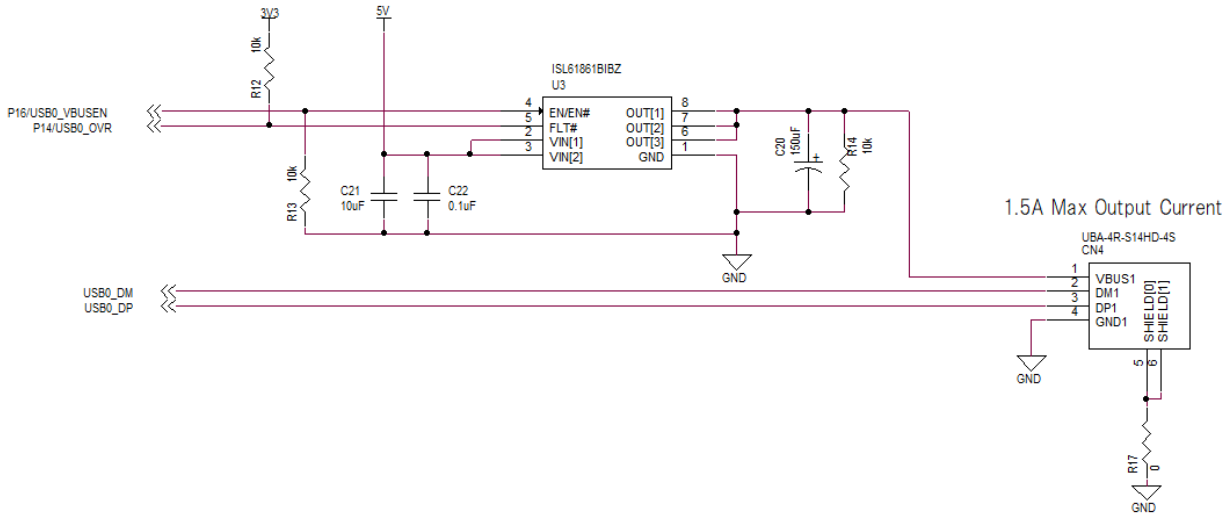


Figure 5-11. USB Host Interface Connection Diagram

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5.14 Serial Flash

The board is mounted with a MX25L3233F (32 Mbit) serial flash memory chip from MACRONIX. It is connected to the MCU via the QSPI interface. It supports the MCU's SPI operation modes 0 and 3.

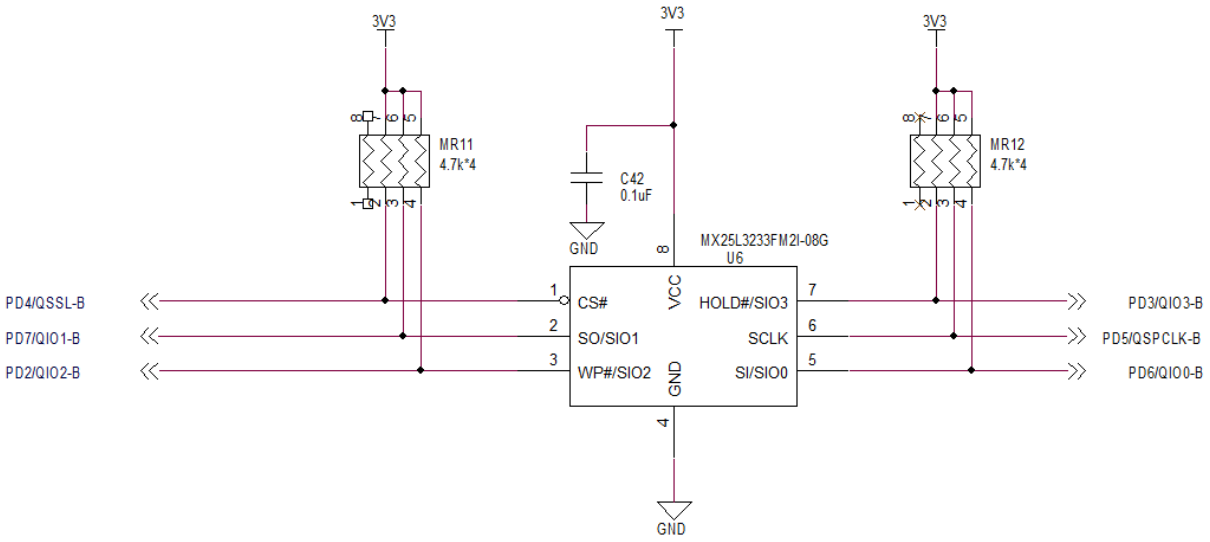


Figure 5-12. Serial Flash Connection Diagram

Table 5-11. QSPI Serial Flash Pin Assignments

Signal	Function/Application	RX72N	
		Port	Pin
CS#	Chip select	PD4/QSSL	122
SO/SIO1	Data 1	PD7/QIO1	119
WP#/SIO2	Data 2	PD2/QIO2	124
SI/SIO0	Data 0	PD6/QIO0	120
SCLK	Clock supply	PD5/QSPCLK	121
HOLD#/SIO3	Data 3	PD3/QIO3	123

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5.15 D2Audio Processor and Amplifier for Active Speaker

The D2Audio Series D2-41051 is used as the audio processor, and it is connected to the evaluation MCU via the I²S interface. In addition, the board is provided with an amplifier circuit for use with an active speaker, which can be connected to a speaker by means of a stereo jack to enable audio playback. The D2-41051 mounted on the board is a simple DSP that supports I²S and S/PDIF input and is limited to the basic functions of the D2Audio family.

5.15.1 Speakers Suitable for Connection

You can connect an amplifier-equipped speaker to the audio output jack. It is also possible to connect an 8 Ω speaker without an amplifier, but high-impedance devices such as headphones are not suitable for connection.

5.15.2 Clock Supply

The board is provided with the 5X35023 programable clock generator that supplies a 24.576 MHz, 1.8 V clock as the main clock of the D2-41051 and a 24.576 MHz, 3.3 V clock as AUDIO_CLK for I²S communication by the RX72N.

5.15.3 DAE-4–Related Documents

The latest documents are available on the following webpage:
https://www.renesas.com/products/audio-video/audio/digital-sound-processors.html#documents

5.15.4 DAE-4 Development Tools

The development tools are available for download on the following webpage. Renesas would collect my Renesas accounts for rights protection to manage who download the tool. Please note that anyone needs to accept above to download.
https://www.renesas.com/products/audio-video/audio/digital-sound-processors.html#documents

5.15.5 DAE-4 Settings

The board's default settings enable output of the PCM sound source input via I²S. The settings are stored in the EEPROM, but if you need to reprogram the settings in the EEPROM because they were somehow erased or in order to change them, it is possible to do so by purchasing the SCAMP-7EVALZ dongle tool, which is available separately. In this case you will need to prepare yourself a cable with the pin assignments listed in Table 5-12 to connect the SCAMP-7EVALZ to the board. To purchase the SCAMP-7EVALZ, contact a Renesas sales agent or international distributor. You can search for a Renesas sales agent or distributor from the following webpage:
https://www.renesas.com/support/contact/locations.html?category=Distributors

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Table 5-12. Dongle Tool Connection Correspondences

Dongle (Female Socket)	EVB (IC Clip)
EEWP (12)	WP (T4)
SCL (3)	SCL (T5)
SDA (4)	SDA (T6)
BOOT_EE/I²C (11)	IRQA (T7)
EEWP (7)	RES (T8)
+5V (13)	5V (T9)
GND (14)	GND

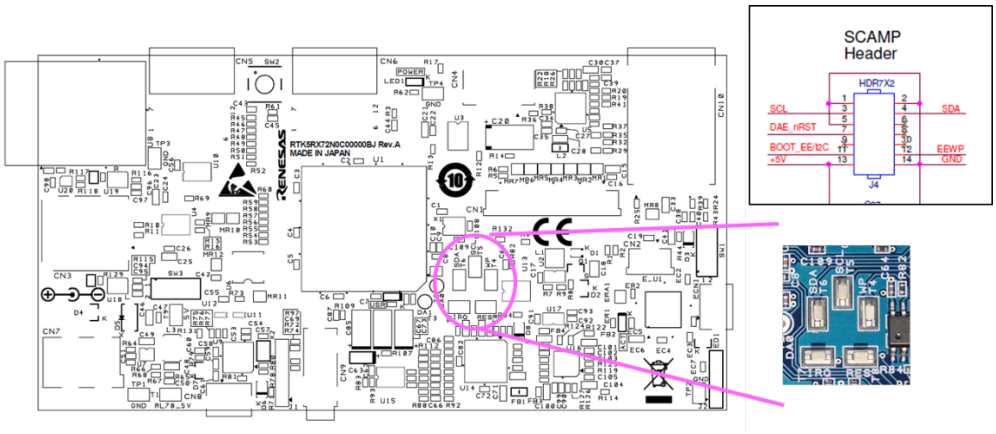


Figure 5-13. Dongle Tool Connection Target

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5.16 MEMS Microphones

The microphones used are the ICS-43434 from TDK, and they are connected to the evaluation MCU via the I²S interface. Since the microphones for sound input are on the component side, sound is input from the panel side.

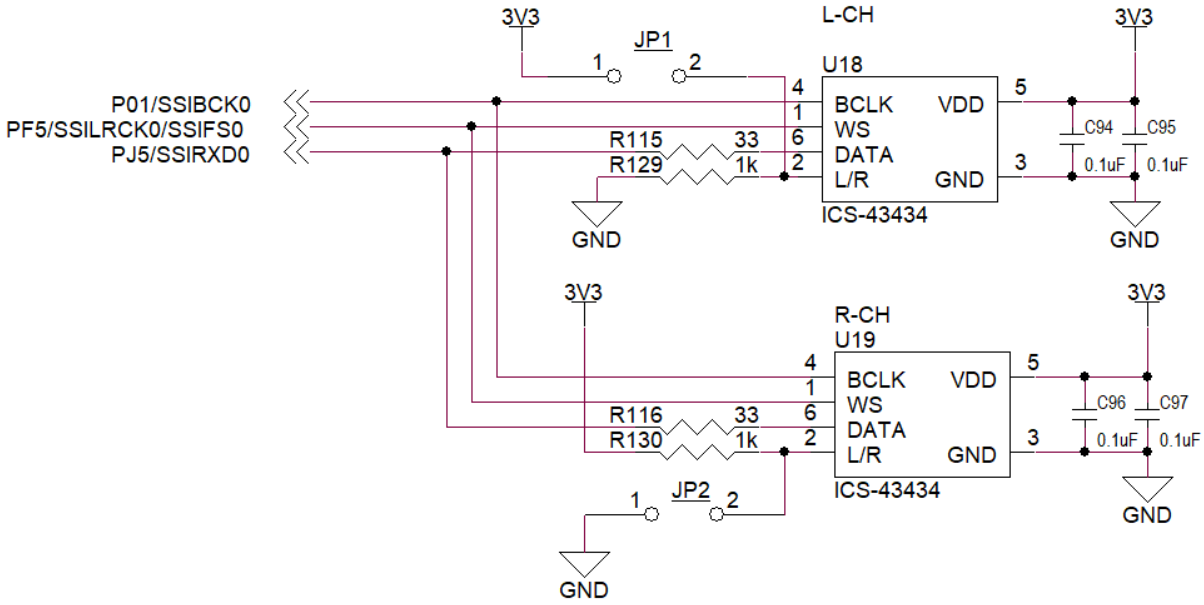


Figure 5-14. MEMS Microphone Connection Diagram

Table 5-13. MEMS Microphone Pin Assignments

Signal	Function/Application	RX72N	
		Port	Pin
BCLK	I²S serial clock signal	P01/SSIBCK0	7
WS	Serial data select signal	PF5/SSILRCK0	9
DATA	I²S receive data signal	PJ5/SSIRXD0	11

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5.17 Light Sensor

The ISL29034 is used as the light sensor, and it is connected to the evaluation MCU via the I²C interface.

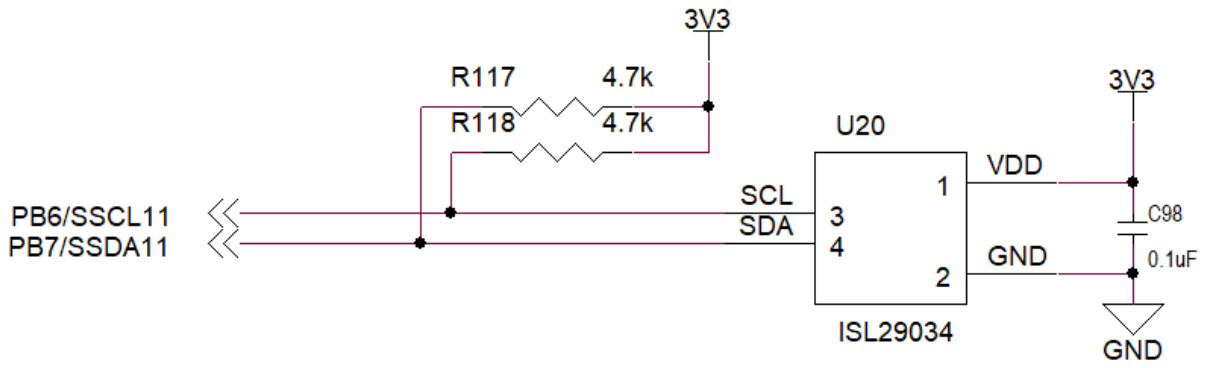


Figure 5-15. Light Sensor Connection Diagram

Table 5-14. Light Sensor Pin Assignments

Signal	Function/Application	RX72N	
		Port	Pin
SCL	Transmit clock signal	PB6/SSCL11	79
SDA	Data signal	PB7/SSDA11	78

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5.18 LEDs

There are five LEDs mounted on the board. Table 5-15 lists the colors and functions of the LEDs.

Table 5-15. LED Connection States

LED	Color	Function	RX72N	
			Port	Pin
LED1	Green	3.3 V power LED on: 3.3 V power supply status	NC	NC
ACT	Green	On-board debugger status	NC	NC
LED2	Blue	User LED	P40	141
ETHERNET connector CN10	Green	Ethernet LED (on: link, flashing: activity)	NC	NC
	Orange	Ethernet LED (speed)	NC	NC

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6. Usage Precautions

6.1 Additional Load

When adding additional load while using the USB connection to supply power to the board, be aware that the maximum capacity when operating at 3.3 V is 300 mA. When adding additional load while using an external power supply, the maximum capacity is 500 mA regardless of the operating voltage.

6.2 Modifying the Board

All effects of modifications made to the board are the responsibility of the customer.

6.3 Limitation on Number of Envision Kits Connected

It is not possible to connect more than one Envision Kit to a single host PC at the same time.

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7. Developing Code

7.1 Using e² studio

Figure 7-1 shows the settings to use in e² studio when creating a new project for use with the RX72N Envision Kit.

- Debug hardware: Select **E2 Lite (RX)**.
- Extal Frequency[MHz]: Input **16.000**
- Connection Type: Select **Fine**.
- Supply power from emulator: Select **No**.

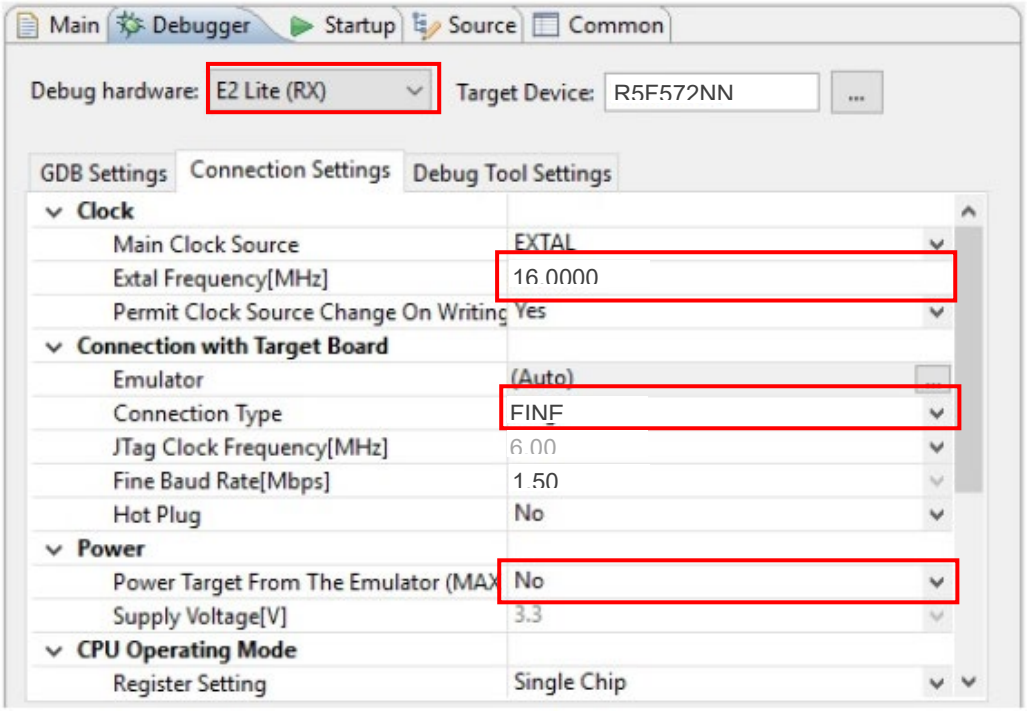


Figure 7-1. e² studio Settings

Note: Do not connect another RX72N Envision Kit to the PC while the product is connected.

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7.2 Using CS+

Figure 7-2 and Figure 7-3 show the settings to use in CS+ when creating a new project for use with the RX72N Envision Kit.

- Debug tool used: Select **Debug** → **Debug Tool Used** → **RX E2 Lite**.

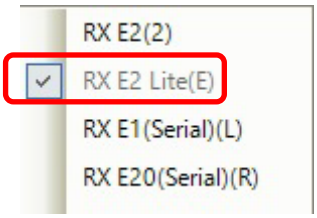


Figure 7-2. Debug Tool Selection Panel

- Main clock frequency[MHz]: Input **16.0000**
- Supply power from emulator: Select **No**.

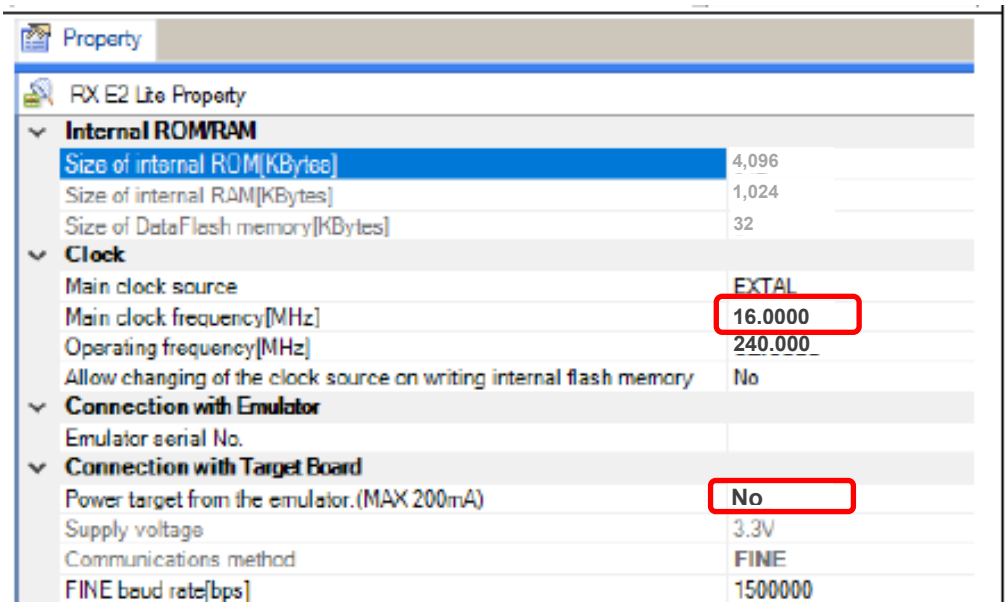


Figure 7-3. CS+ Connection Settings Tab

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8. Additional Information

Support

For detailed information on RX72N Group MCUs, refer to RX72N Group User's Manual: Hardware.

For detailed information on assembly language, refer to RX Family User's Manual: Software.

The latest information is available on our website at https://www.renesas.com/envision2.

Online Technical Support

You may send technical questions to us via https://www.renesas.com/support/contact.html. For general information on Renesas MCUs, visit https://www.renesas.com/.

Caution

Customers should not incorporate the RX72N Envision Kit or the sample code into their products. The operation of the sample code is not guaranteed. If you wish to make use of it, be aware that it is the customer's responsibility to confirm that it operates properly.

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Revision History	RX72N Envision Kit User's Manual

Rev.	Date	Description	
		Page	Summary
1.00	Mar.27.20	—	First Edition issued
1.01	Dec.29.22	2	Table 1-1.RX72N Envision Kit Specifications Table corrected Package: LQFP → LFQFP corrected On-chip Memory: Data Flash 64KB → 32KB corrected LCD panel added
		6	Figure 3-1. Component Layout Diagram updated Supports all component reference number display.
		14	Corrected P107/IRQ15 to P07/IRQ15
		34	Copyright updated © 2020 (2022) Renesas Electronics Corporation. All rights reserved.

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