| REV | REF | DATE | DRAWN BY |
|---|---|---|---|
| 1.00 | Release | 01.10.2019 | KOS |

# Renesas Starter Kit+ for RX72M
# CPU Board Schematics

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## Note:

C : Capacitor
D : Diode
J : Connector, Jumper
L : Inductor
LED : Light Emitting Diode
MR : Resistor Array
PWR : Power Jack
R : Fixed Resistor
RES : Reset Switch
RV : Potentiometer
SW : Switch
T : Test Point
U : Integrated Circuit
X : Crystal, Oscillator

* "DNF" marking means that component is not fitted by default.
**The following off-page connectors used in this schematics do not indicate the signal direction.


## Board Code:

RTK5572MNDC00000BE : RSK+RX72M MP Board
RTK5572MNHC00000BE : RSK+RX72M MP Board (Encryption version)

## Abbreviations:

CAN : Controller Area Network
IIC : Philips(TM) Inter-Integrated Circuit Connection Bus
LED : Light Emitting Diode
MCU : Microcontroller Unit
PSU : Power Supply Unit
RSK : Renesas Starter Kit
USB : Universal Serial Bus
SDHI : SD (Secure Digital) Host Interface
DSMIF : Delta Sigma Modurator Interface

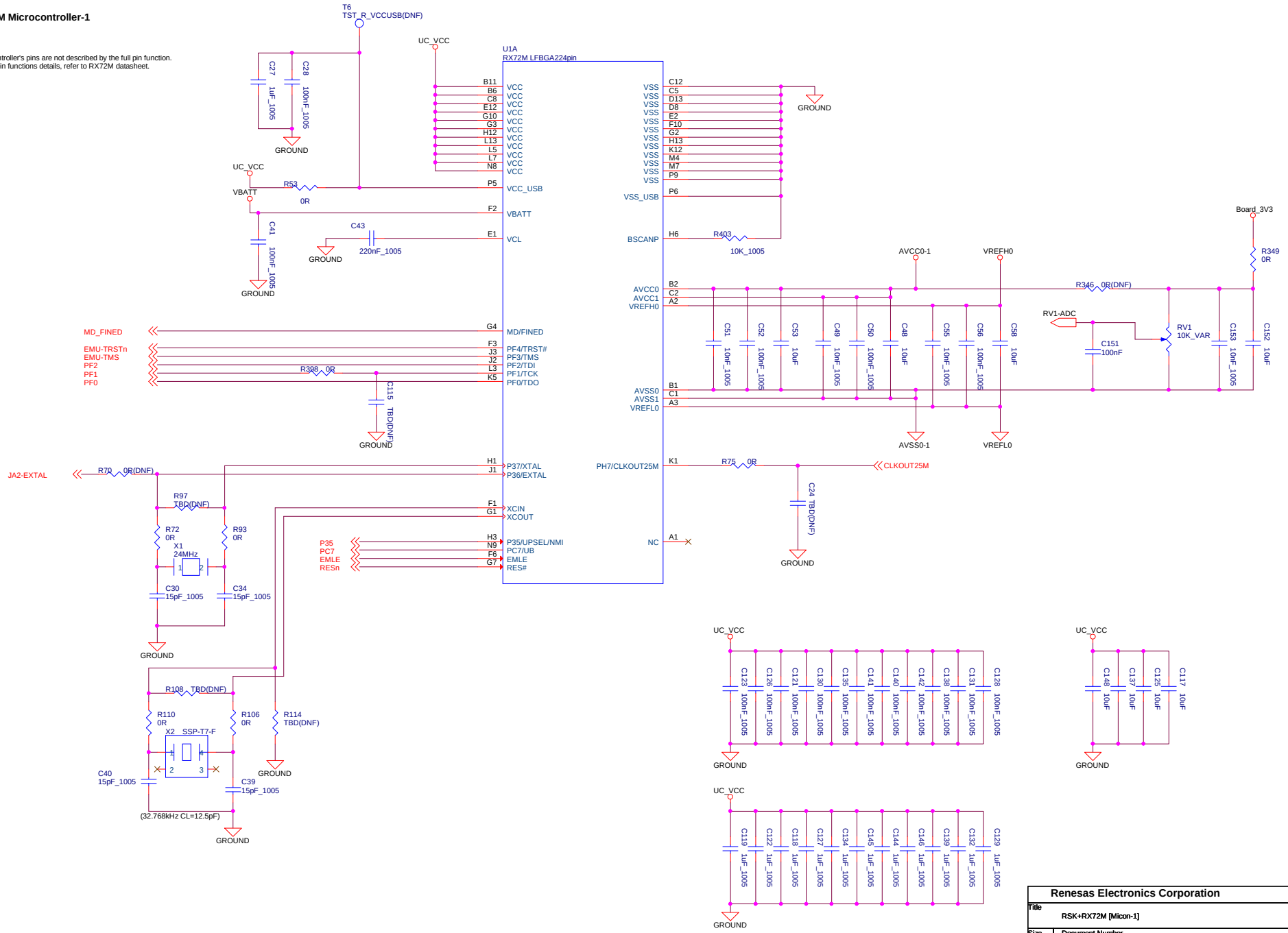
REE Drawing No. D016462_04

| Renesas Electronics Corporation | | |
|---|---|---|
| Title: RSK+RX72M [Index] | | |
| Size | Document Number R20UT4390EG0100 | Rev 1.00 |
| Date: Tuesday, October 01, 2019 | Sheet 1 of 20 | |

## RX72M Microcontroller-1

**Note:**

Microcontroller's pins are not described by the full pin function.
For full pin functions details, refer to RX72M datasheet.

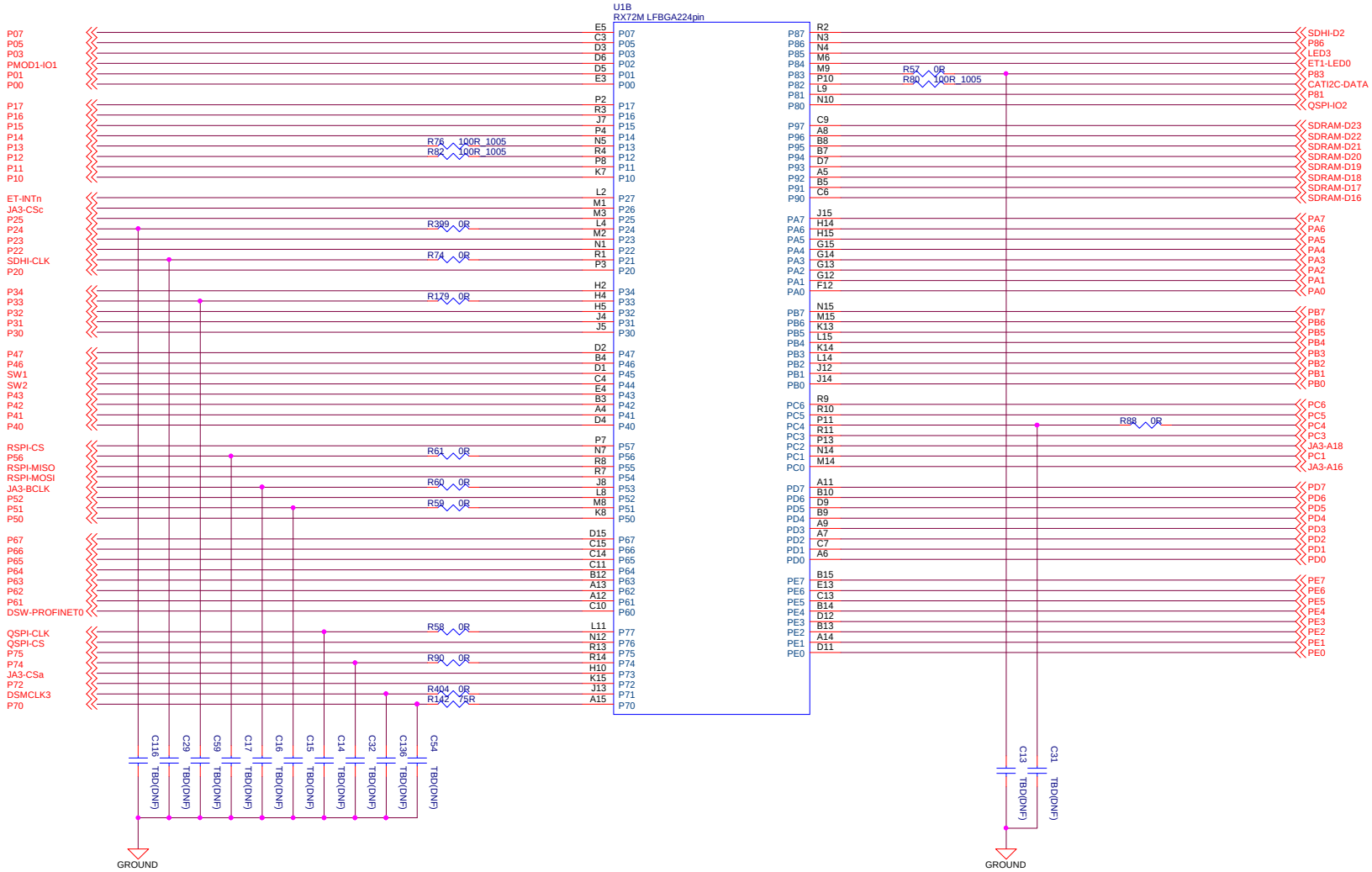



| | | |
|---|---|---|
| **Renesas Electronics Corporation** | | |
| Title | RSK+RX72M [Micon-1] | |
| Size | Document Number R20UT4390EG0100 | Rev 1.00 |
| Date: Tuesday, October 01, 2019 | Sheet 2 of 20 | |

## RX72M Microcontroller-2

**Note:**

Microcontroller's pins are not described by the full pin function.
For full pin functions details, refer to RX72M datasheet.

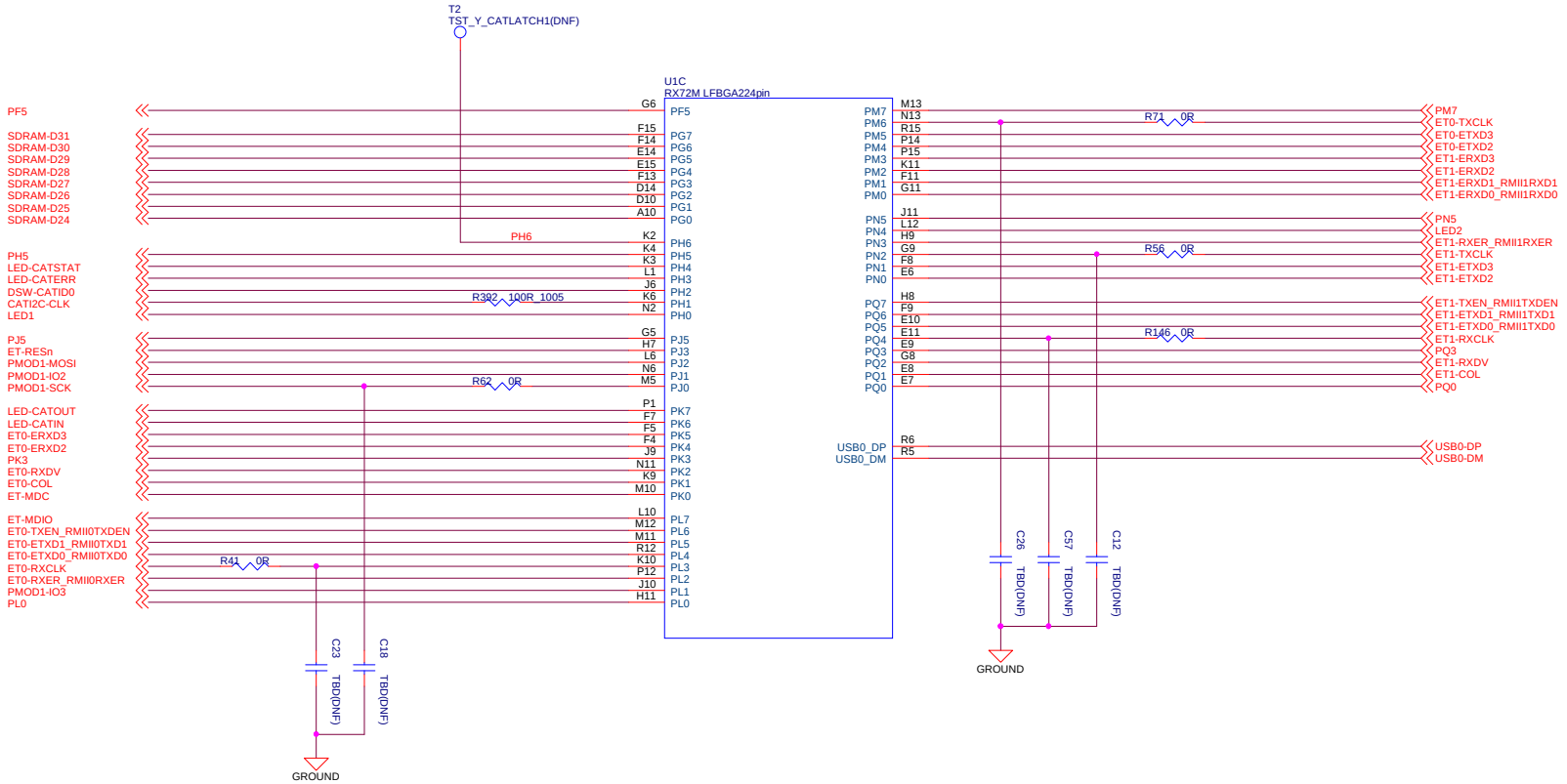



| | | |
|---|---|---|
| **Renesas Electronics Corporation** | | |
| Title: RSK+RX72M [Micon-2] | | |
| Size | Document Number: R20UT4390EG0100 | Rev: 1.00 |
| Date: Tuesday, October 01, 2019 | Sheet 3 of 20 | |

## RX72M Microcontroller-3

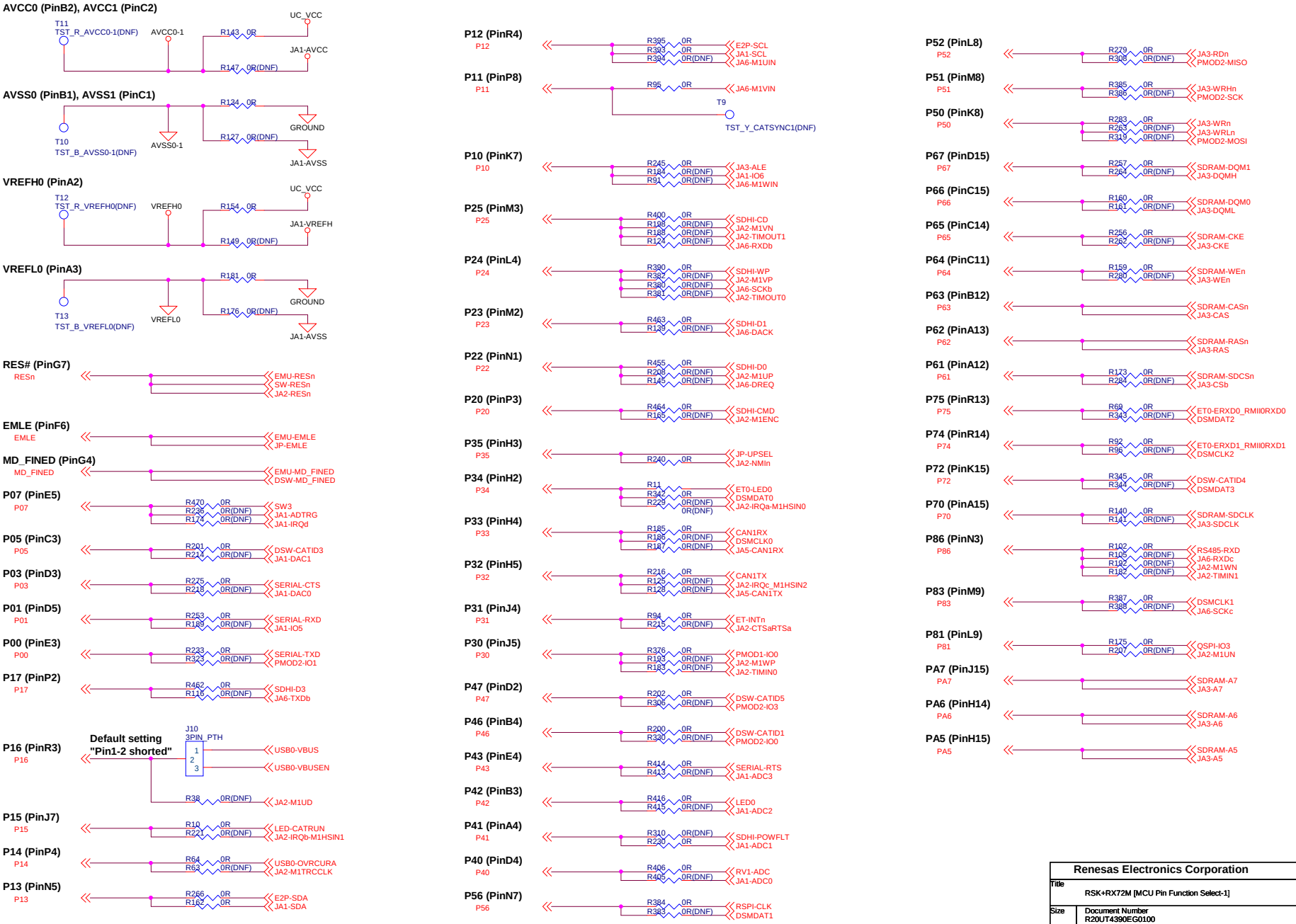
**Note:**

Microcontroller's pins are not described by the full pin function.
For full pin functions details, refer to RX72M datasheet.



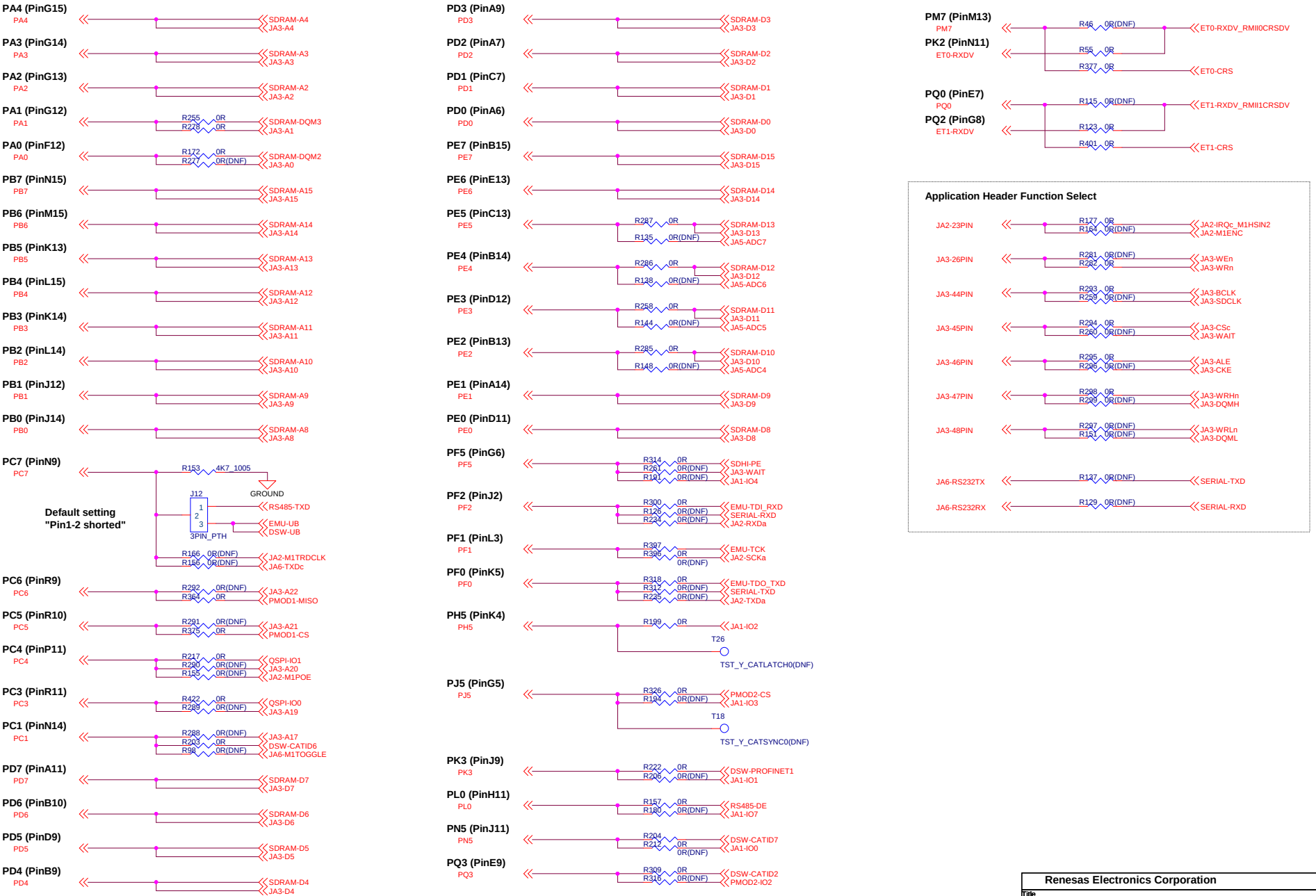

| | | |
|---|---|---|
| **Renesas Electronics Corporation** | | |
| Title: RSK+RX72M [Micon-3] | | |
| Size | Document Number: R20UT4390EG0100 | Rev: 1.00 |
| Date: Tuesday, October 01, 2019 | Sheet 4 of 20 | |

## MCU Pin Function Select-1



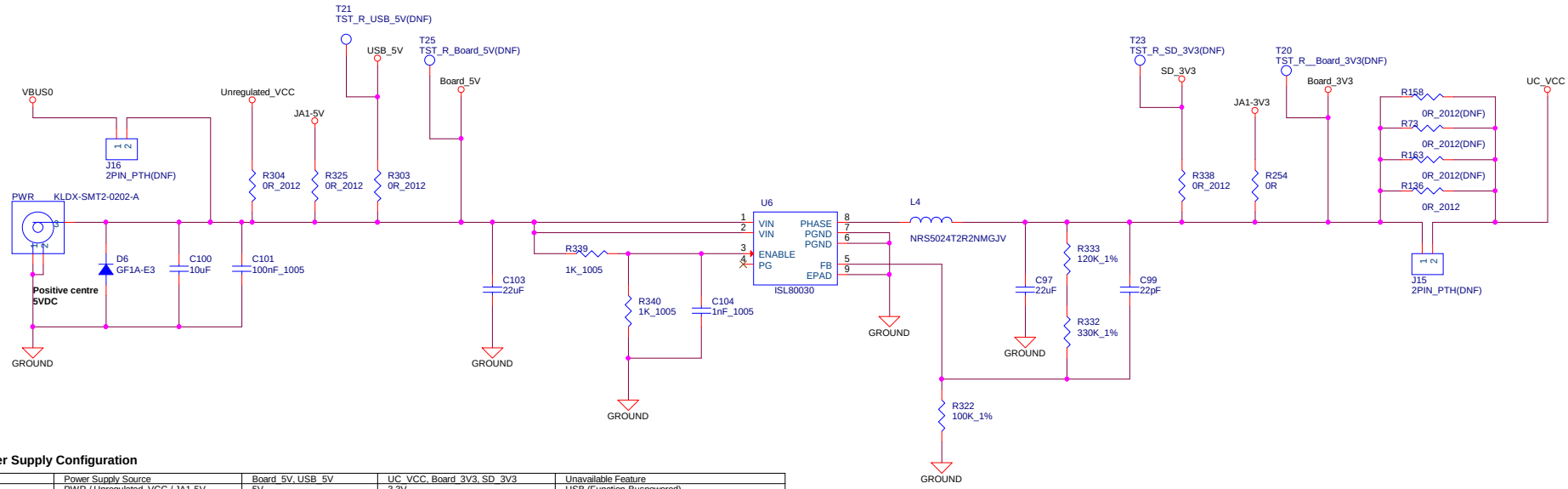

| | |
|---|---|
| Renesas Electronics Corporation | |
| Title | RSK+RX72M [MCU Pin Function Select-1] |
| Size | Document Number R20UT4390EG0100 — Rev 1.00 |
| Date: | Tuesday, October 01, 2019 — Sheet 5 of 20 |

## MCU Pin Function Select-2



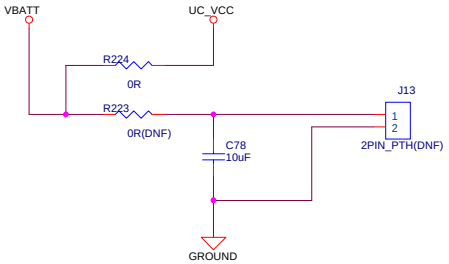

| | | |
|---|---|---|
| Renesas Electronics Corporation | | |
| Title: RSK+RX72M [MCU Pin Function Select-2] | | |
| Size | Document Number: R20UT4390EG0100 | Rev: 1.00 |
| Date: Tuesday, October 01, 2019 | Sheet 6 of 20 | |

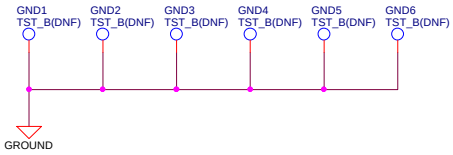
## Power Supply Unit




### Power Supply Configuration

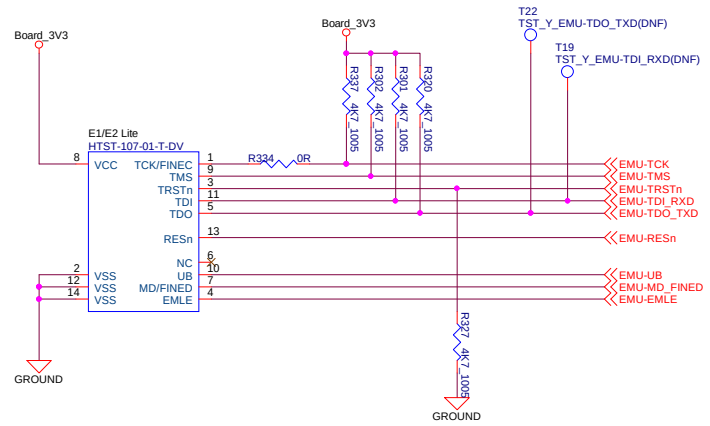
| J16 | Power Supply Source | Board_5V, USB_5V | UC_VCC, Board_3V3, SD_3V3 | Unavailable Feature |
|---|---|---|---|---|
| open | PWR / Unregulated_VCC / JA1-5V | 5V | 3.3V | USB (Function-Buspowered) |
| shorted pin | VBUS | 5V | 3.3V | USB (Host), USB (Function-Selfpowered) |



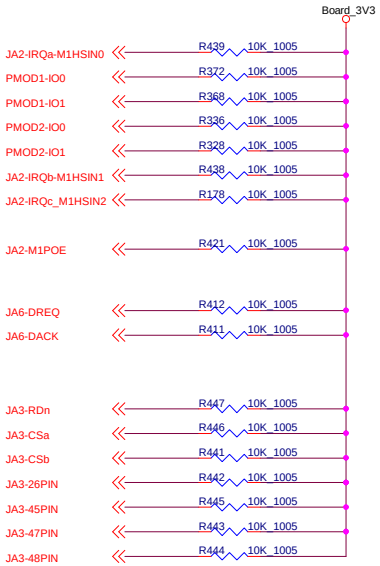




| Renesas Electronics Corporation | | |
|---|---|---|
| Title: RSK+RX72M [PSU] | | |
| Size | Document Number: R20UT4390EG0100 | Rev: 1.00 |
| Date: Tuesday, October 01, 2019 | Sheet 7 of 20 | |

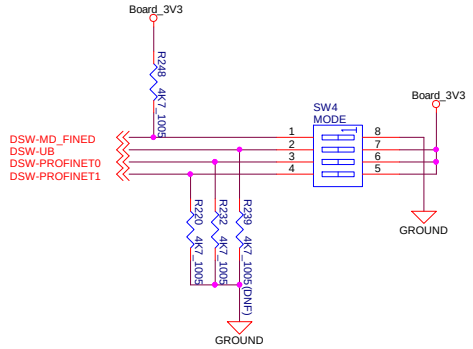
## E1/E2 Lite Emulator Interface




## Option pull-up resistor




## MCU & Emulator Mode Setting

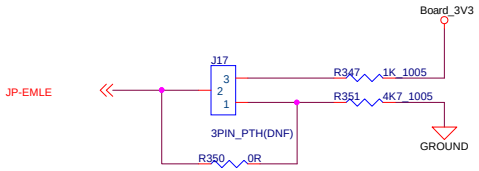



### MCU Operating Mode Configuration

| SW4 Pin1 | SW4 Pin2 | J14 | Operating Mode |
|---|---|---|---|
| OFF | Don't care | Don't care | Single Chip Mode |
| ON | OFF | Don't care | SCI Boot Mode |
| ON | ON | Open | USB Boot Mode (Bus Powered) |
| ON | ON | Shorted Pin | USB Boot Mode (Self Powered) |

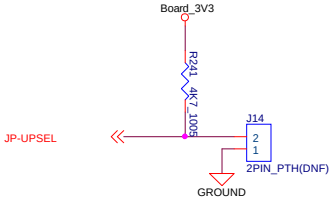
### Default setting of SW4.

| SW4 | Default |
|---|---|
| Pin1 | OFF |
| Pin2 | OFF |
| Pin3 | OFF |
| Pin4 | OFF |




### Emulator Configuration

| J17 | Emulator Configuration |
|---|---|
| Shorted Pin1-2 | E1/E2 Lite normal debugging<br>Microcontroller single operation (without emulator) |
| Shorted Pin2-3 | E1/E2 Lite debugging with Hot plug-in |
| All open | DO NOT SET |

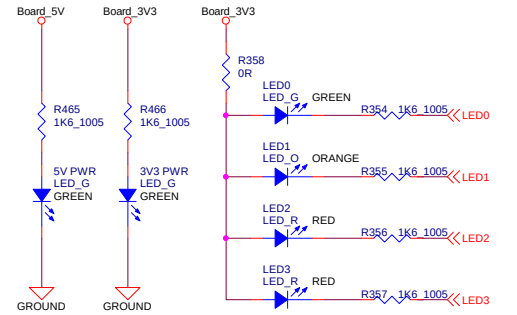


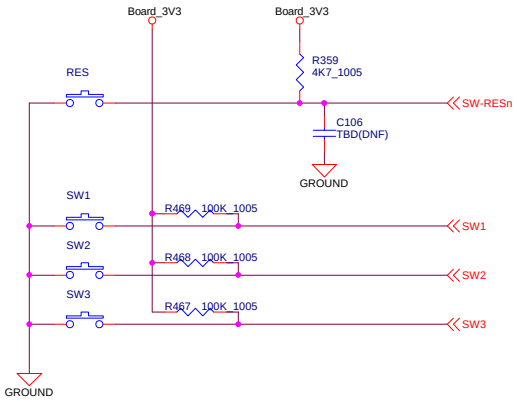

### Power Configuration for USB Boot Mode

| J14 | Power Configuration |
|---|---|
| Open | Bus Powered |
| Shorted | Self Powered |

| Renesas Electronics Corporation | | |
|---|---|---|
| Title: RSK+RX72M [E1/E2 Lite, MCU & Emulator Mode Setting, Pull-up resistors] | | |
| Size | Document Number: R20UT4390EG0100 | Rev: 1.00 |
| Date: Tuesday, October 01, 2019 | Sheet 8 of 20 | |

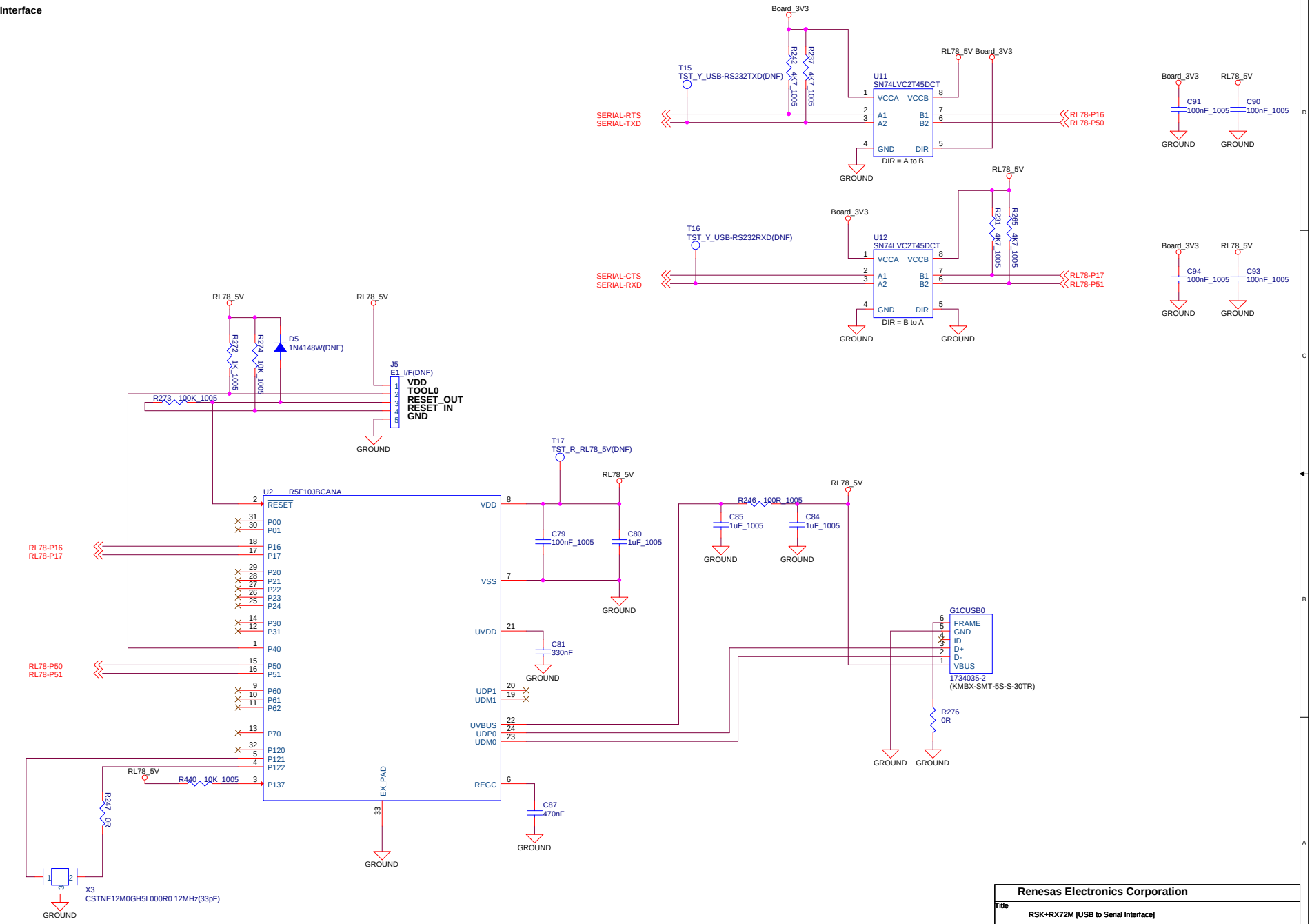
## Switches, LEDs, RESET




| | | |
|---|---|---|
| **Renesas Electronics Corporation** | | |
| Title: RSK+RX72M [RESET, Switches, LEDs] | | |
| Size | Document Number: R20UT4390EG0100 | Rev: 1.00 |
| Date: Tuesday, October 01, 2019 | Sheet 9 of 20 | |

## USB to Serial Interface

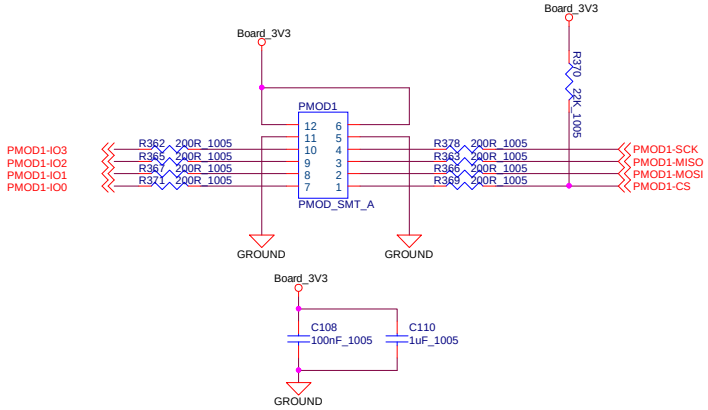


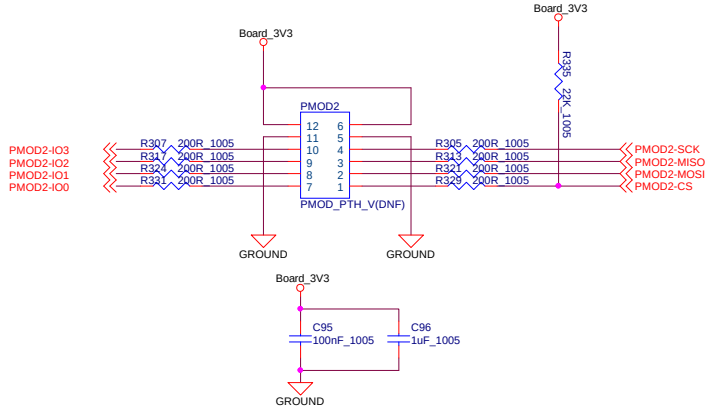

| | | |
|---|---|---|
| **Renesas Electronics Corporation** | | |
| Title: RSK+RX72M [USB to Serial Interface] | | |
| Size | Document Number: R20UT4390EG0100 | Rev: 1.00 |
| Date: Tuesday, October 01, 2019 | Sheet 10 of 20 | |

## Pmod connectors

**PMOD1: Angle type connector**

**PMOD2: Vertical type connector (spare)**

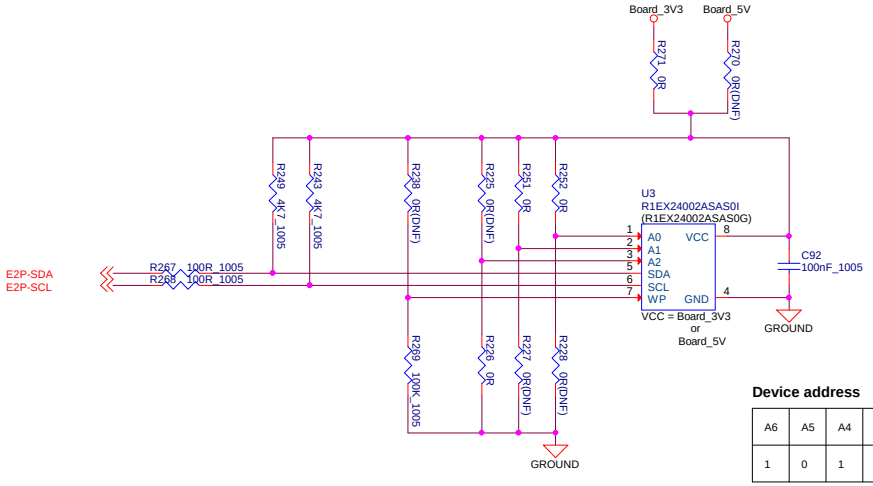



## IIC EEPROM(2Kbits) - RIIC

**Warning:**

NEVER FIT R271 and R270 simultaneously.

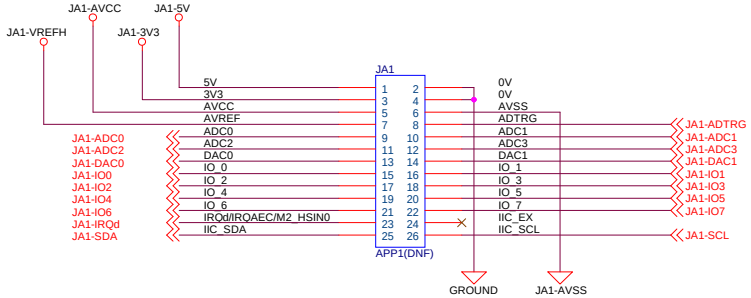


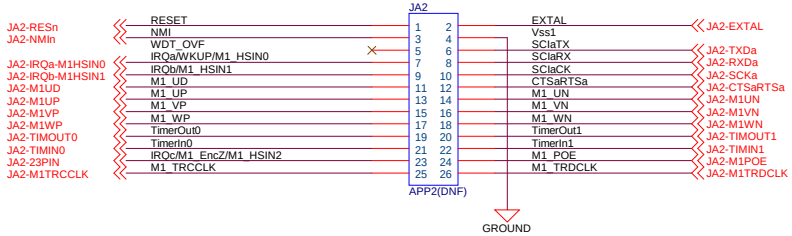

**Device address**

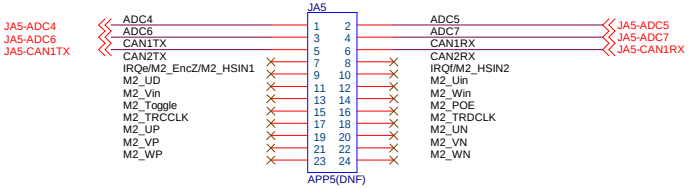
| A6 | A5 | A4 | A3 | A2 | A1 | A0 |
|---|---|---|---|---|---|---|
| 1 | 0 | 1 | 0 | 0 | 1 | 1 |

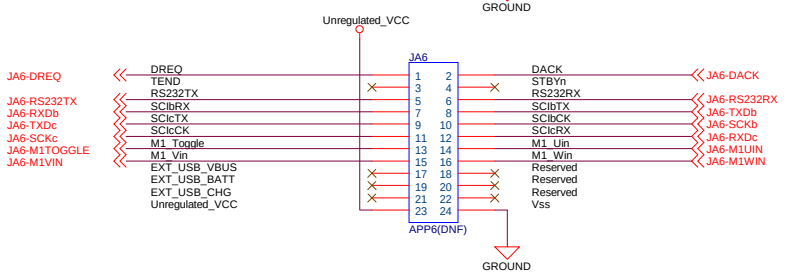
| | | |
|---|---|---|
| **Renesas Electronics Corporation** | | |
| Title: RSK+RX72M [Pmod, IIC EEPROM] | | |
| Size | Document Number: R20UT4390EG0100 | Rev: 1.00 |
| Date: Tuesday, October 01, 2019 | Sheet 11 of 20 | |

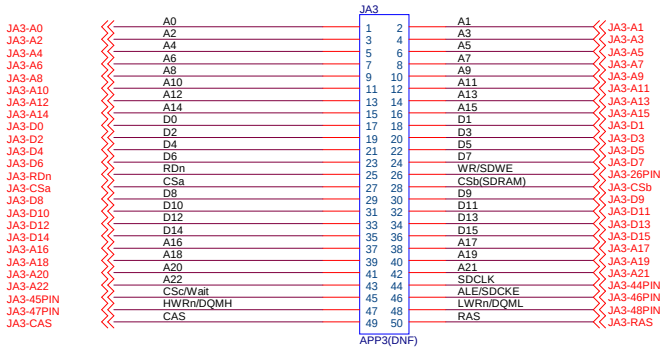
## Application Headers



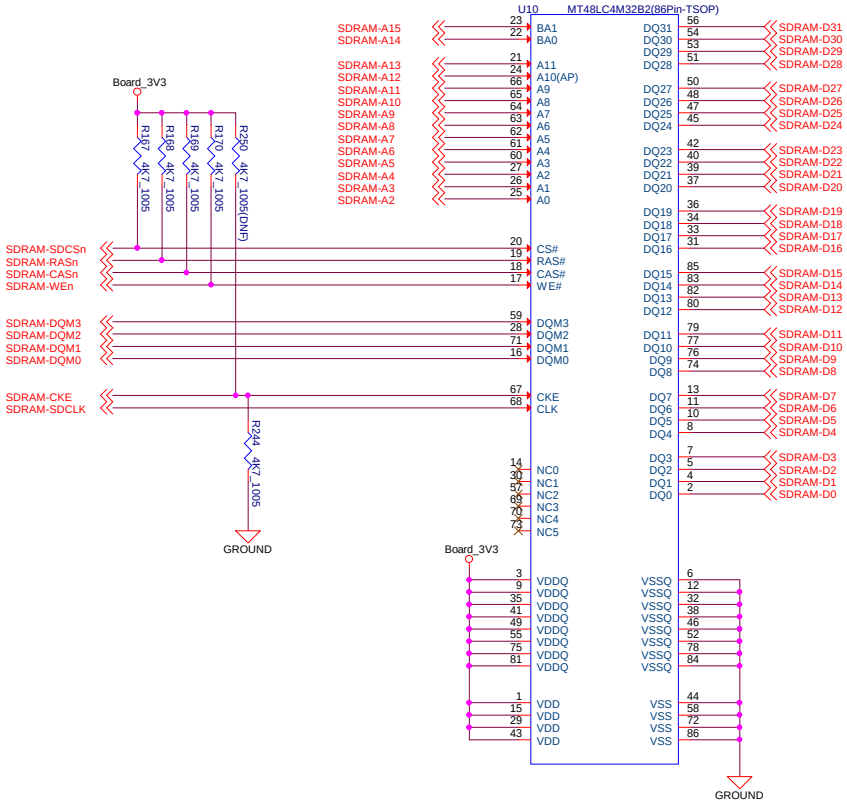



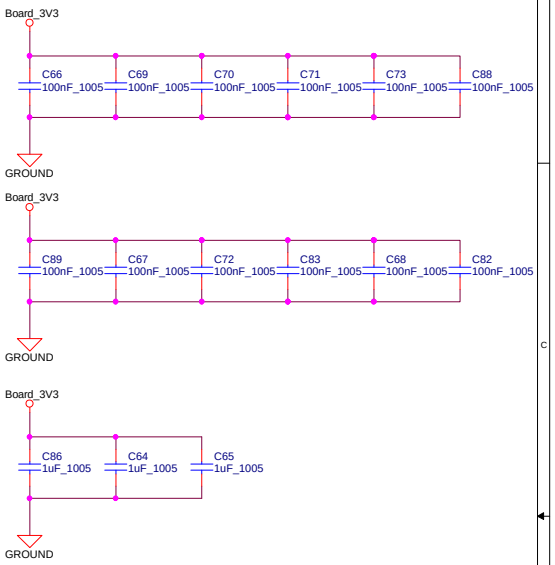




| Renesas Electronics Corporation | | |
|---|---|---|
| Title: RSK+RX72M [Application Headers] | | |
| Size | Document Number: R20UT4390EG0100 | Rev: 1.00 |
| Date: Tuesday, October 01, 2019 | Sheet 12 of 20 | |

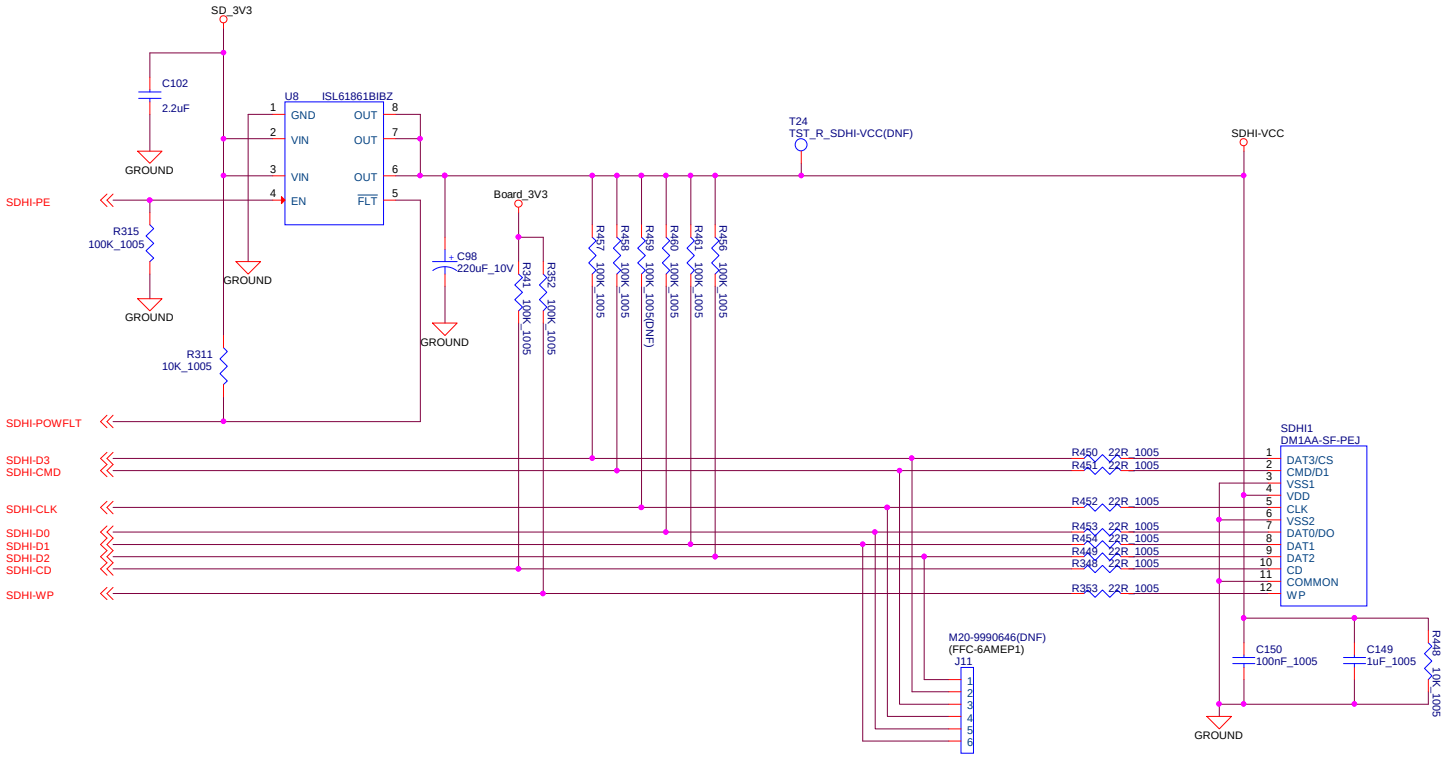
**SDRAM(128Mbits)**



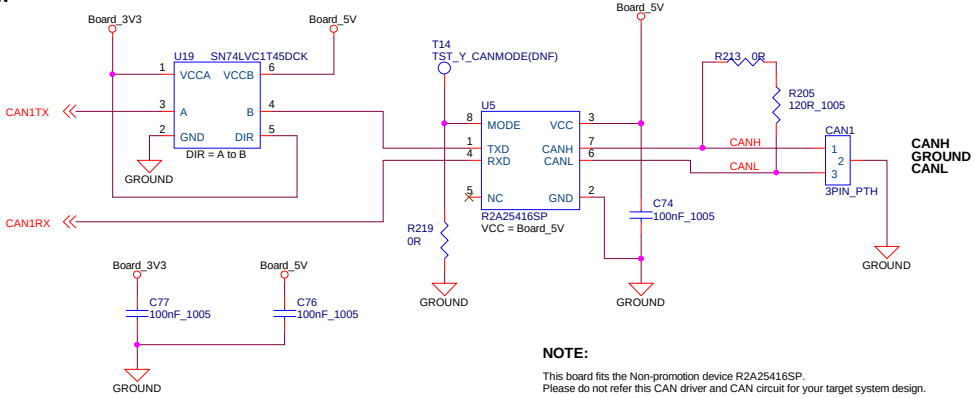

| | | |
|---|---|---|
| **Renesas Electronics Corporation** | | |
| Title: RSK+RX72M [On-board SDRAM] | | |
| Size | Document Number: R20UT4390EG0100 | Rev: 1.00 |
| Date: Tuesday, October 01, 2019 | Sheet 13 of 20 | |

## SDHI




| | | |
|---|---|---|
| **Renesas Electronics Corporation** | | |
| Title: RSK+RX72M [SDHI] | | |
| Size | Document Number R20UT4390EG0100 | Rev 1.00 |
| Date: Tuesday, October 01, 2019 | Sheet 14 of 20 | |

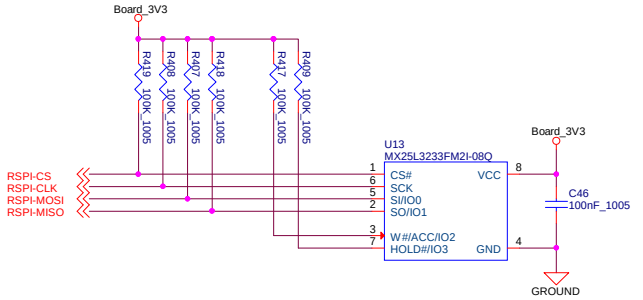
## CAN



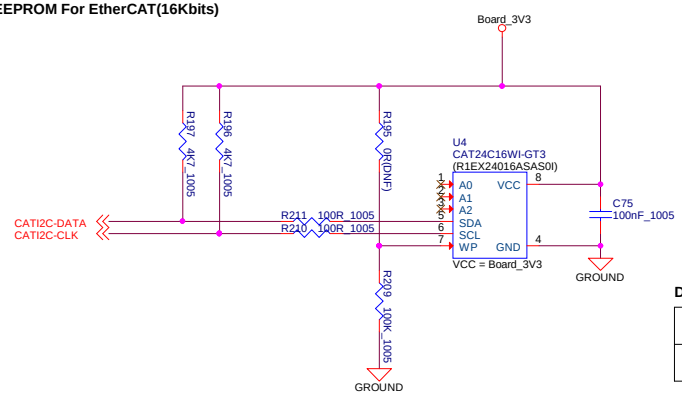

**NOTE:**

This board fits the Non-promotion device R2A25416SP.
Please do not refer this CAN driver and CAN circuit for your target system design.

## RSPI- SPI Serial Flash(32Mbits)



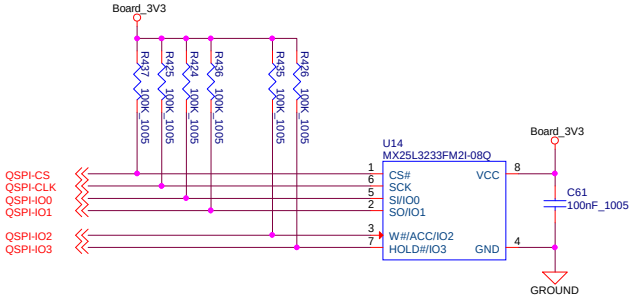

## Serial EEPROM For EtherCAT(16Kbits)



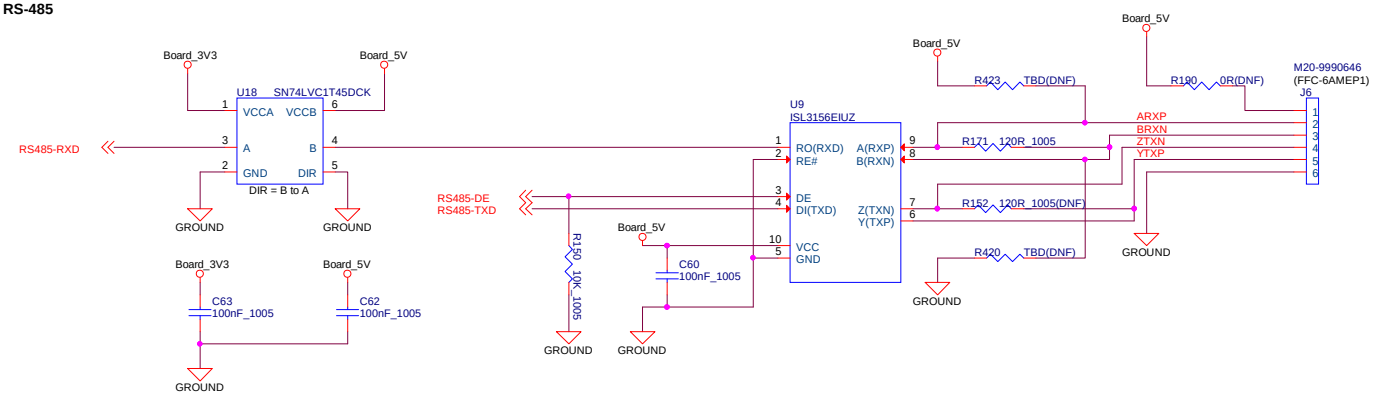

**Device address**

| A6 | A5 | A4 | A3 | A2 | A1 | A0 |
|---|---|---|---|---|---|---|
| 1 | 0 | 1 | 0 | x | x | x |

## QSPI- SPI Serial Flash(32Mbits)

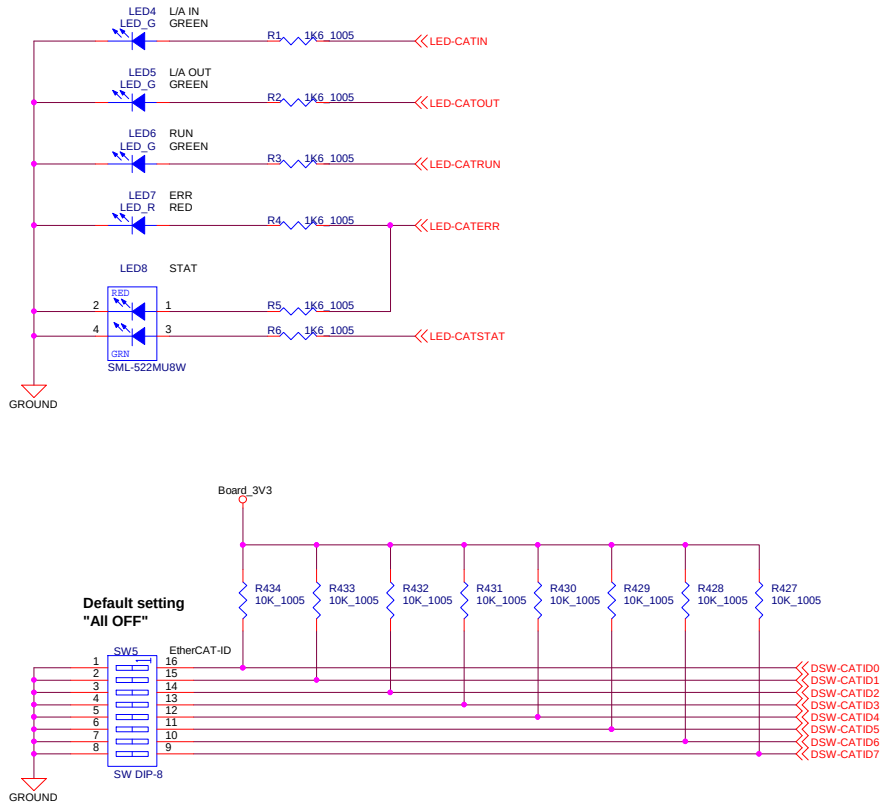



## RS-485

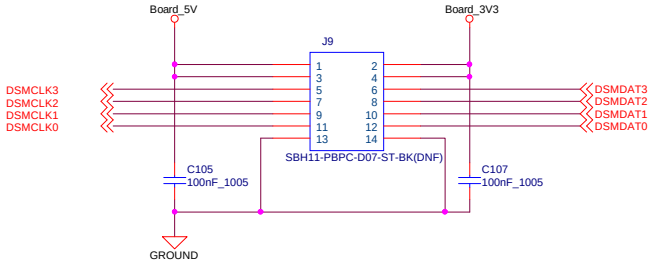



| Renesas Electronics Corporation | | |
|---|---|---|
| Title | RSK+RX72M [CAN, RSPI, QSPI, IIC EEPROM(For EtherCAT), RS-485] | |
| Size | Document Number R20UT4390EG0100 | Rev 1.00 |
| Date: Tuesday, October 01, 2019 | Sheet 15 of 20 | |

## EtherCAT-LEDs, EtherCAT-ID




## DSMIF




| | | |
|---|---|---|
| **Renesas Electronics Corporation** | | |
| Title: RSK+RX72M [EtherCAT-ID, EtherCAT-LED, DSMIF] | | |
| Size | Document Number: R20UT4390EG0100 | Rev: 1.00 |
| Date: Tuesday, October 01, 2019 | Sheet 16 of 20 | |

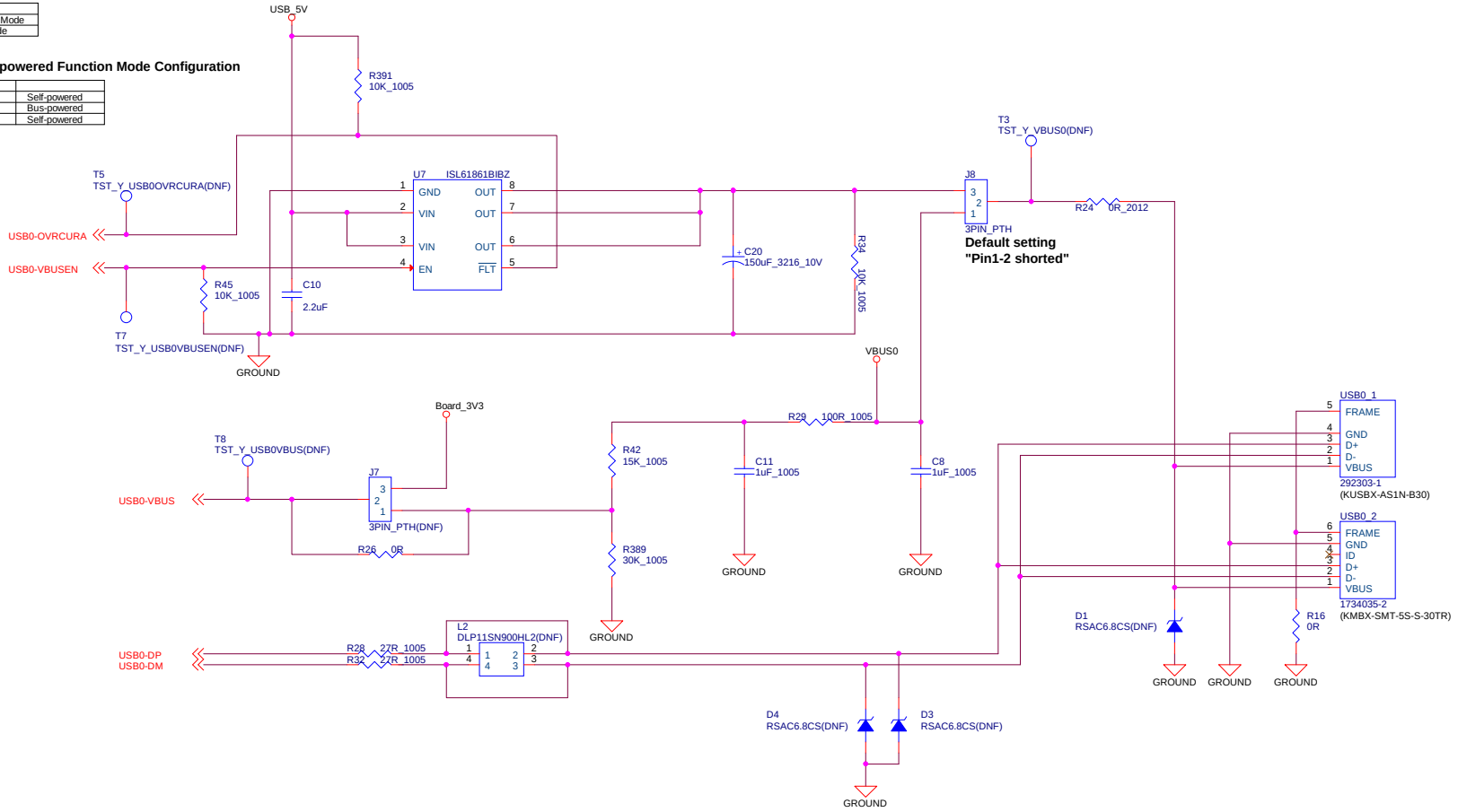
## USB0 Host/Function

### USB0 Host/Function Select

| J8 | |
|---|---|
| 1-2 shorted | Function Mode |
| 2-3 shorted | Host Mode |

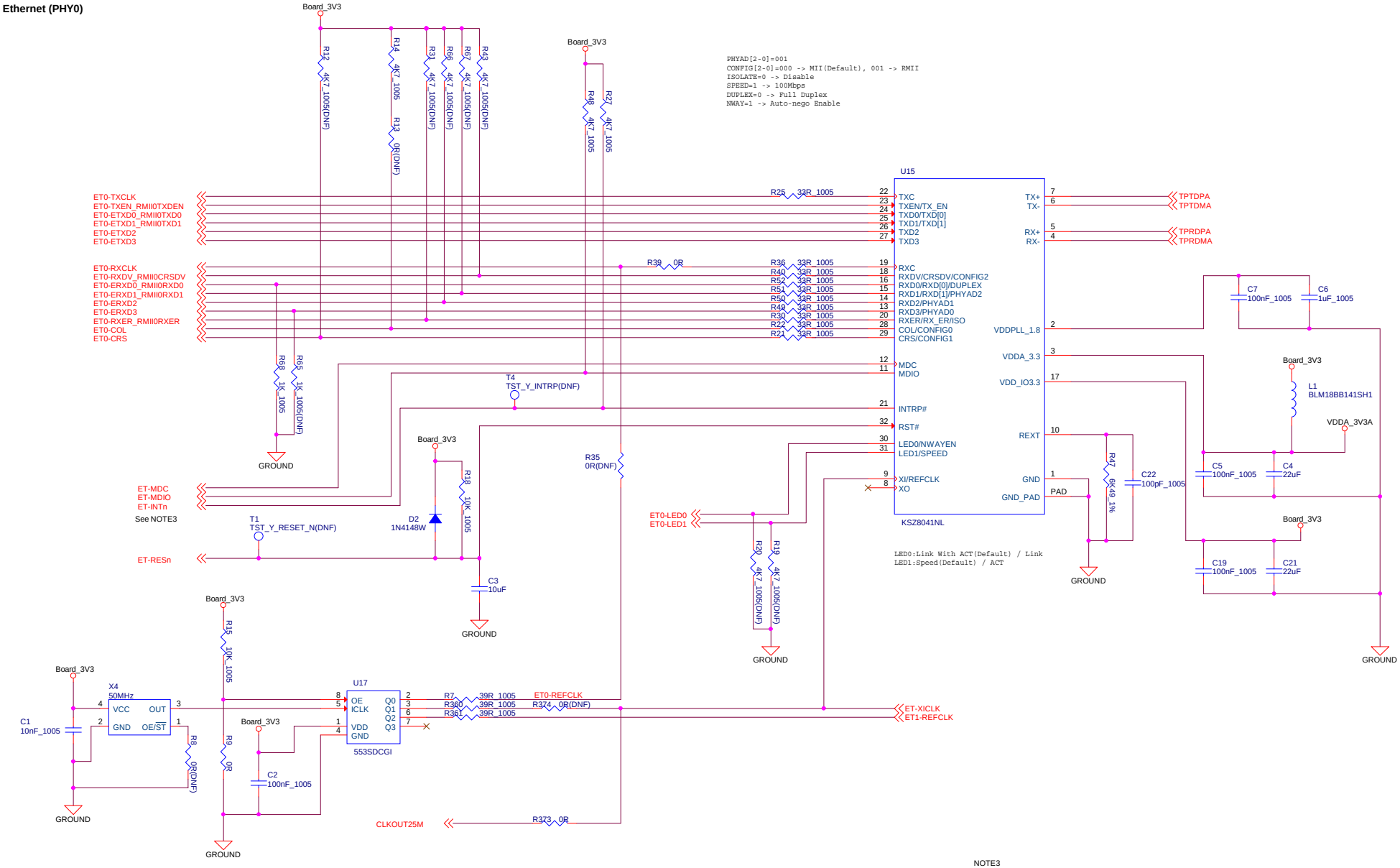
### Self-powered/Bus-powered Function Mode Configuration

| J7 | R26 | |
|---|---|---|
| 1-2 shorted | Remove | Self-powered |
| 2-3 shorted | Remove | Bus-powered |
| Open | Fit | Self-powered |




| Renesas Electronics Corporation | | |
|---|---|---|
| Title: RSK+RX72M [USB0 Host/Function] | | |
| Size | Document Number: R20UT4390EG0100 | Rev: 1.00 |
| Date: Tuesday, October 01, 2019 | Sheet 17 of 20 | |

## Ethernet (PHY0)




| PHY Mode | R35, R374, R103, R13, R78, R46, R115 | R9, R39, R373, R109, R55, R377, R123, R401 |
|---|---|---|
| MII (Default) | DNF | Fit |
| RMII | Fit | DNF |

NOTE1: R103, R109, R78 Refers to page 19.
NOTE2: R46, R55, R377, R115, R123, R401 Refers to page 6.

NOTE3
The PHY interrupt is connected to IRQ1 and CATIRQ.
IRQ1 and CATIRQ can't be locked exclusively by hardware.
Therefore only enable one of the interrupts.

**Renesas Electronics Corporation**

| | | |
|---|---|---|
| Title | RSK+RX72M [Ethernet PHY(0)] | |
| Size | Document Number R20UT4390EG0100 | Rev 1.00 |
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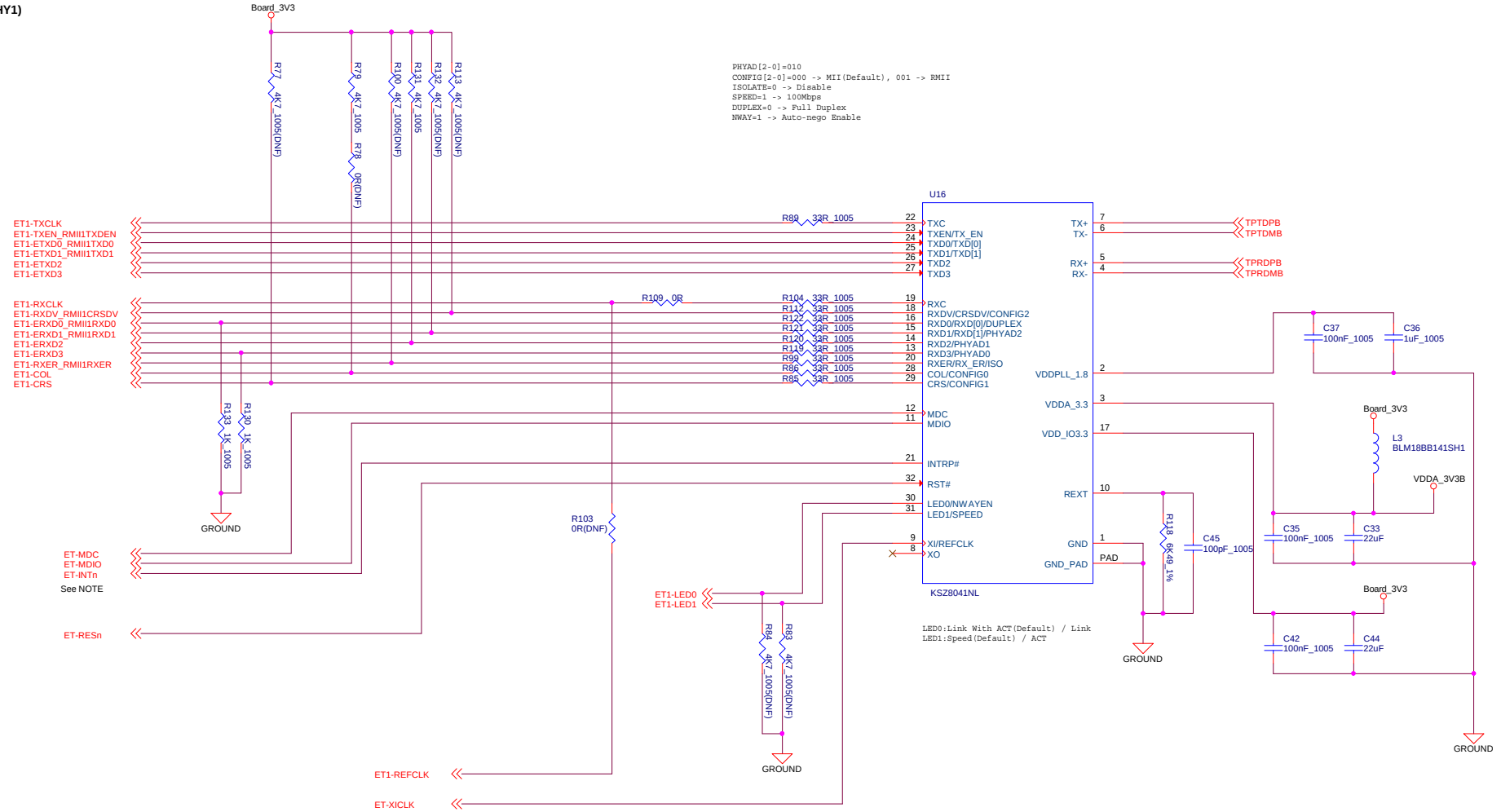
## Ethernet (PHY1)




NOTE
The PHY interrupt is connected to IRQ1 and CATIRQ.
IRQ1 and CATIRQ can't be locked exclusively by hardware.
Therefore only enable one of the interrupts.

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|---|---|---|
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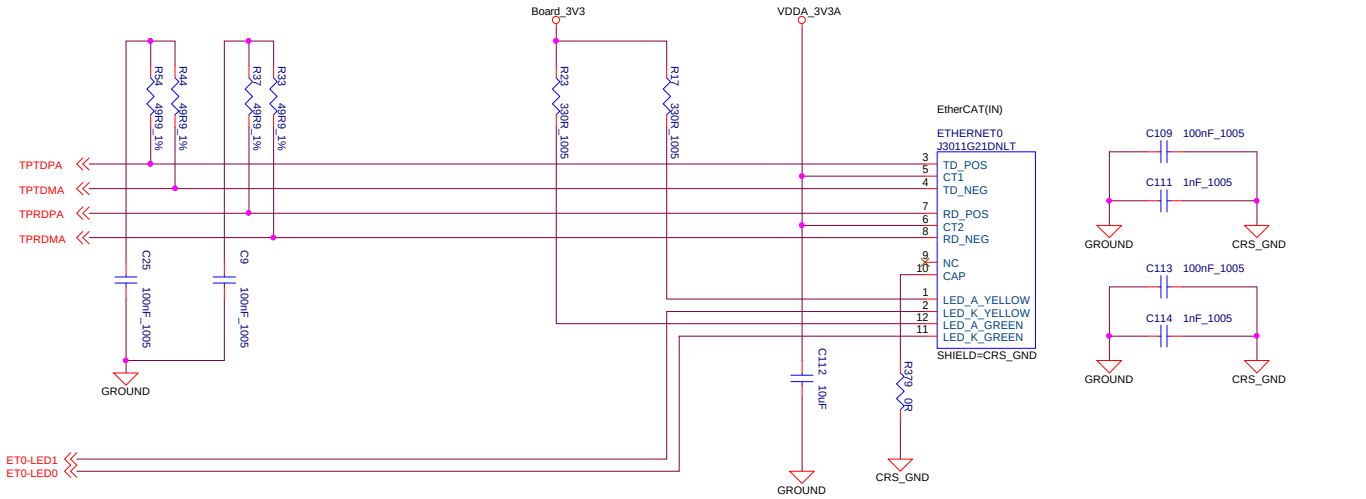
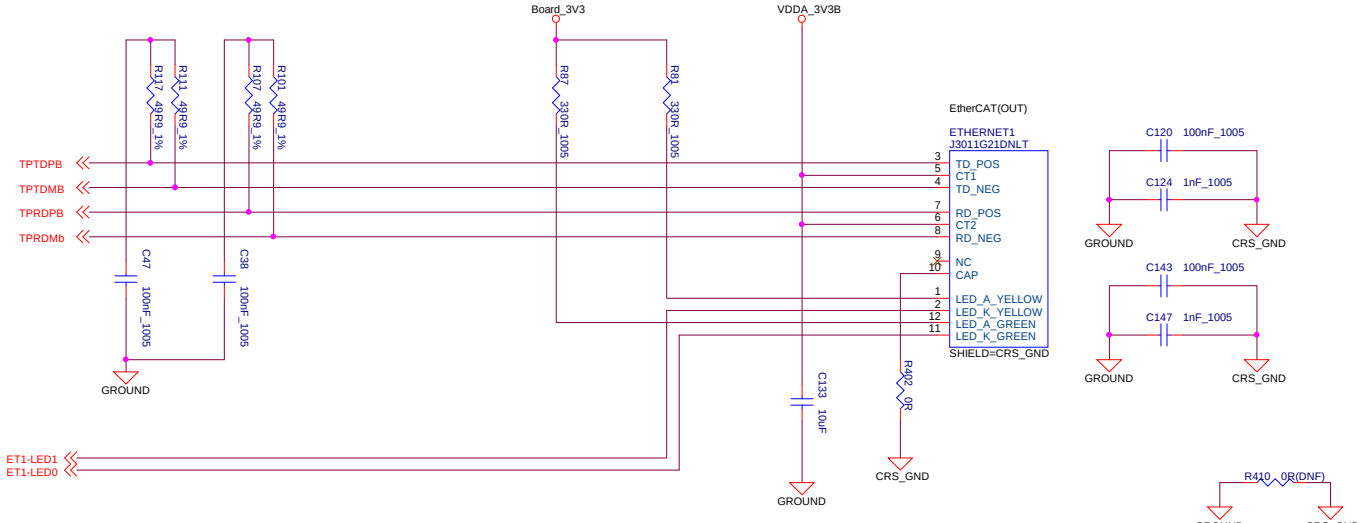
**Ethernet (RJ45)**

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# Revision History

| REV | DATE | PAGE | DESCRIPTION |
|---|---|---|---|
| 1.00 | 01.10.2019 | --- | 1st release edition. |

| | | |
|---|---|---|
| Renesas Electronics Corporation | | |
| Title: RSK+RX72M [Revision History] | | |
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