

RZ/V2N Fast Prototyping Board

Evaluation Board Manual

Renesas Microprocessor
RZ Family RZ/V Series

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(Rev.5.0-1 October 2020)

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1. Precaution against Electrostatic Discharge (ESD)

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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

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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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This product is only intended for use in a laboratory environment under ambient temperature and humidity conditions. A safe separation distance should be used between this and any sensitive equipment. Its use outside the laboratory, classroom, study area, or similar such area invalidates conformity with the protection requirements of the Electromagnetic Compatibility Directive and could lead to prosecution.

The product generates, uses, and can radiate radio frequency energy and may cause harmful interference to radio communications. There is no guarantee that interference will not occur in a particular installation. If this equipment causes harmful interference to radio or television reception, which can be determined by turning the equipment off or on, you are encouraged to try to correct the interference by one or more of the following measures:

- Ensure attached cables do not lie across the equipment.
- Reorient the receiving antenna.
- Increase the distance between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that which the receiver is connected.
- Power down the equipment when not in use.
- Consult the dealer or an experienced radio/TV technician for help.

Note: It is recommended that wherever possible shielded interface cables are used.

The product is potentially susceptible to certain EMC phenomena. To mitigate against them it is recommended that the following measures be undertaken:

- The user is advised that mobile phones should not be used within 10 m of the product when in use.
- The user is advised to take ESD precautions when handling the equipment.

The Evaluation Kit does not represent an ideal reference design for an end product and does not fulfil the regulatory standards for an end product.

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How to Use This Manual

1. Purpose and Target Readers

The intention of this manual is to assist users in understanding the hardware functionality and electrical characteristics of the evaluation board in overview. The target users of this manual are engineers designing sample code that runs on the platform of the evaluation board, with the use of various peripheral devices.

Though this manual includes an overview of the functionality of the evaluation board, it is not intended to be a guide for embedded programming or hardware design.

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 Handling Precautions 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 RZ/V2N Fast Prototyping Board. Be sure to refer to the latest versions of these documents. The newest versions of the listed documents are available on the Renesas Electronics Web site.

Document Type	Description	Document Title	Document No.
Evaluation board manual	Explanation of the hardware specifications of the evaluation board	RZ/V2N Fast Prototyping Board Evaluation Board Manual	R01UH1199EJ (this manual)
Quick start guide	Explanation of the flow from turning on the power to confirming initial operation	RZ/V2N Fast Prototyping Board Quick Start Guide	R20QS0100EJ
User's manual for the hardware	Hardware specifications (pin assignments, memory maps, peripheral function specifications, electrical characteristics, timing charts) and descriptions of operation	RZ/V2N Group User's Manual: Hardware	R01UH1071EJ

2. List of Abbreviations and Acronyms

Abbreviation	Full Form
ADC	Analog-to-Digital Converter
CPU	Central Processing Unit
DNF	Do Not Fit
ESD	Electrostatic Discharge
I2C (IIC)	Inter-Integrated Circuit Connection bus
IRQ	Interrupt Request
LED	Light Emitting Diode
MAC	Media Access Control
MPU	Micro Processor Unit
n/c (NC)	Not Connected
OTG	On-The-Go
PC	Personal Computer
PWM	Pulse Width Modulation
RAM	Random Access Memory
RGMII	Reduced Gigabit Media-Independent Interface
MII	Media-Independent Interface
SCIF	Serial Communication Interface with FIFO
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus

Table of Contents

1.	Overview	10
1.1	Purpose.....	10
1.2	Features.....	10
1.3	Board Specifications	11
2.	Box Contents	12
3.	Ordering Information	13
4.	Board Layout	14
4.1	Component Layout	14
4.2	Board Dimensions	16
5.	Power Supply	17
5.1	Power Supply Specifications	17
5.2	Turning Power On and Off.....	17
6.	Hardware Architecture & Default Configuration	18
6.1	Internal Connections on the Board	18
6.2	Pin Functions	19
6.3	Mode Setting.....	21
7.	Use Interfaces	22
7.1	Reset Circuit	22
7.2	Switch	23
7.3	LED	24
7.4	Debug Serial Interface.....	25
7.5	SD Card Interface	26
7.6	MIPI CSI-2 Interface	27
7.7	HDMI (MIPI DSI) Interface.....	28
7.8	USB Interface	30
7.9	Ethernet Interface	32
7.10	Pin Header	33
7.11	Test Pad.....	34
8.	Handling Precautions	36
8.1	Notes when Turning Power On and Off.....	36
8.2	Note on Use of Ethernet	36
8.3	Note on Care while Inserting an SD Card	36

8.4	Others	36
Appendix A	Certifications	37
A.1	EMC/EMI Standards	37
A.2	Material Selection, Waste, Recycling and Disposal Standards	37
A.3	Safety Standards	37
Appendix B	Web & Support.....	38
REVISION HISTORY		39

1. Overview

1.1 Purpose

The RZ/V2N Fast Prototyping Board is designed to make it easy to evaluate and experiment with AI applications based on Renesas' high-performance Arm®-based RZ/V2N MPU.

By providing essential interfaces and ready-to-use hardware, this board allows developers to quickly bring up the system and start exploring vision AI and edge AI use cases with minimal setup effort.

This manual describes the board hardware and its main features. Instructions for initial software setup are provided in the Quick Start Guide included with the product package.

1.2 Features

This board has the following features.

- MPU: RZ/V2N (R9A09G056N44GBG) × 1
- LPDDR4X: 8 GB × 1
- MIPI® CSI-2® connector: 1 ch.
- Gigabit Ethernet connector: 1 ch.
- USB3.2 Gen 2 Type-A: 1 ch.
- USB2.0 Micro-AB: 1 ch.
- microSD card slot: 1
- Debug serial interface (USB Type-C® connector): 1 ch.
- HDMI® Type-A connector: 1 ch.
- USB-PD Type-C® (power supply): 1 ch.

1.3 Board Specifications

Table 1.1 lists the board specifications.

Table 1.1 Board Specification Table

Item	Specification
Microprocessor (RZ/V2N)	Part number: R9A09G056N44GBG
	Package: 840-pin FCBGA, 15-mm square, 0.50-mm pitch
	On-chip memory: 1.5 MB RAM
On-board memory	8 GB LPDDR4X (Micron MT53E2G32D4DE-046 AIT:C)
Input clock	Main: 24 MHz
	Audio: 24.576 MHz, 22.5792 MHz
	RTC: 32.768 kHz
	Gigabit Ethernet PHY: 25 MHz
	DSI to HDMI transmitter: 12 MHz
	PMIC: 32.768 kHz
Power supply	USB-PD Type-C® (45 W or more)
Switches	Power switch (slide) × 1, reset switch (push) × 1
LED	Power supply (green) × 2
Ethernet	RJ-45 × 1
USB	USB2.0 Micro-AB × 1
	USB3.2 Type-A × 1
Display	HDMI Type-A × 1 (MIPI-DSI to HDMI)
Camera	MIPI CSI-2 (FFC 22-pin) × 1
Debug serial	USB Type-C® × 1
SD card slot	microSD card slot × 1
Pin header (2.54-mm pitch)	GPIO: 40-pin × 1
	ADC: 10-pin (DNF) × 1
Board size	85 × 56 × 1.7 mm

2. Box Contents

The following components are included in the box.

1. FPB-RZV2N board
2. FPB-RZV2N Quick Start Guide
3. Hazardous substances content table



Figure 2.1 FPB-RZV2N Board

3. Ordering Information

- FPB-RZV2N orderable part number: RTK9FPV2N0C00001BJ

Note: The underlined character in the orderable part number represents the kit version.

4. Board Layout

4.1 Component Layout

Figure 4.1 and **Figure 4.2** show the layout of the main components on this board, including the user interfaces.

For details of the component placement on this board, refer to the design package described in “Design and Manufacturing Information” in **Appendix B, Web & Support**.

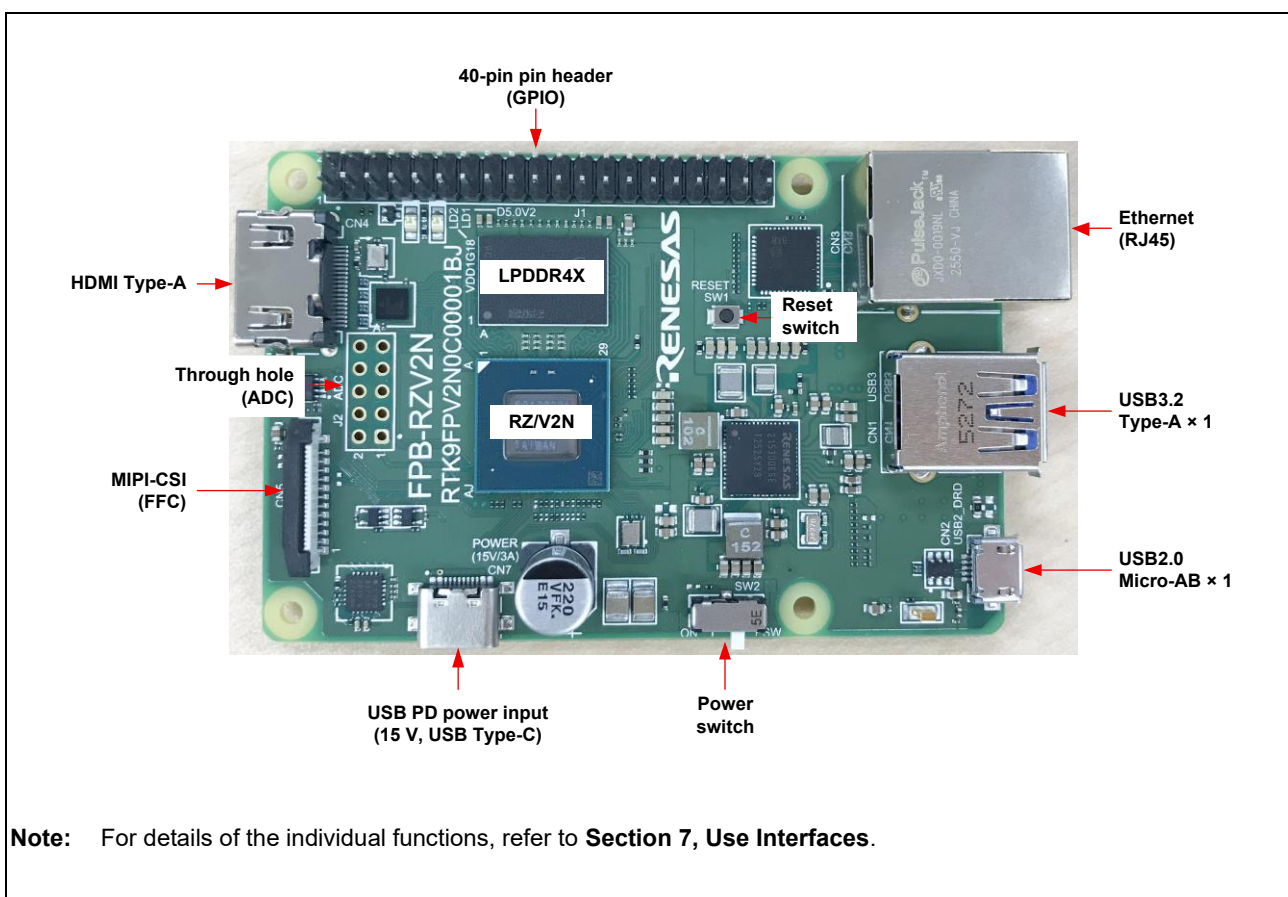
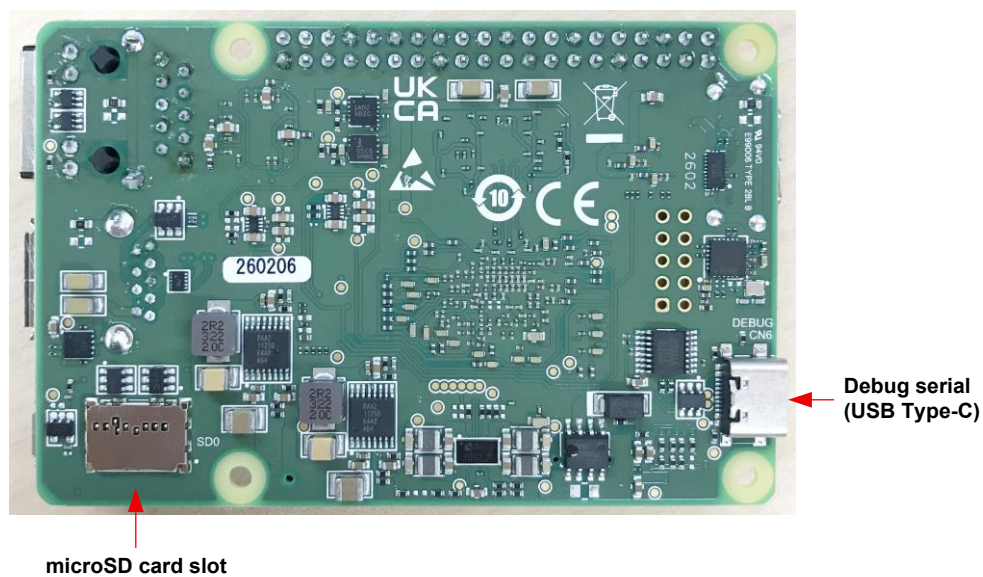


Figure 4.1 Board Layout (Component Side)



Note: The serial number (260206) is an example.

Figure 4.2 Board Layout (Solder Side)

4.2 Board Dimensions

Figure 4.3 shows the dimensions and connector positions of this board.

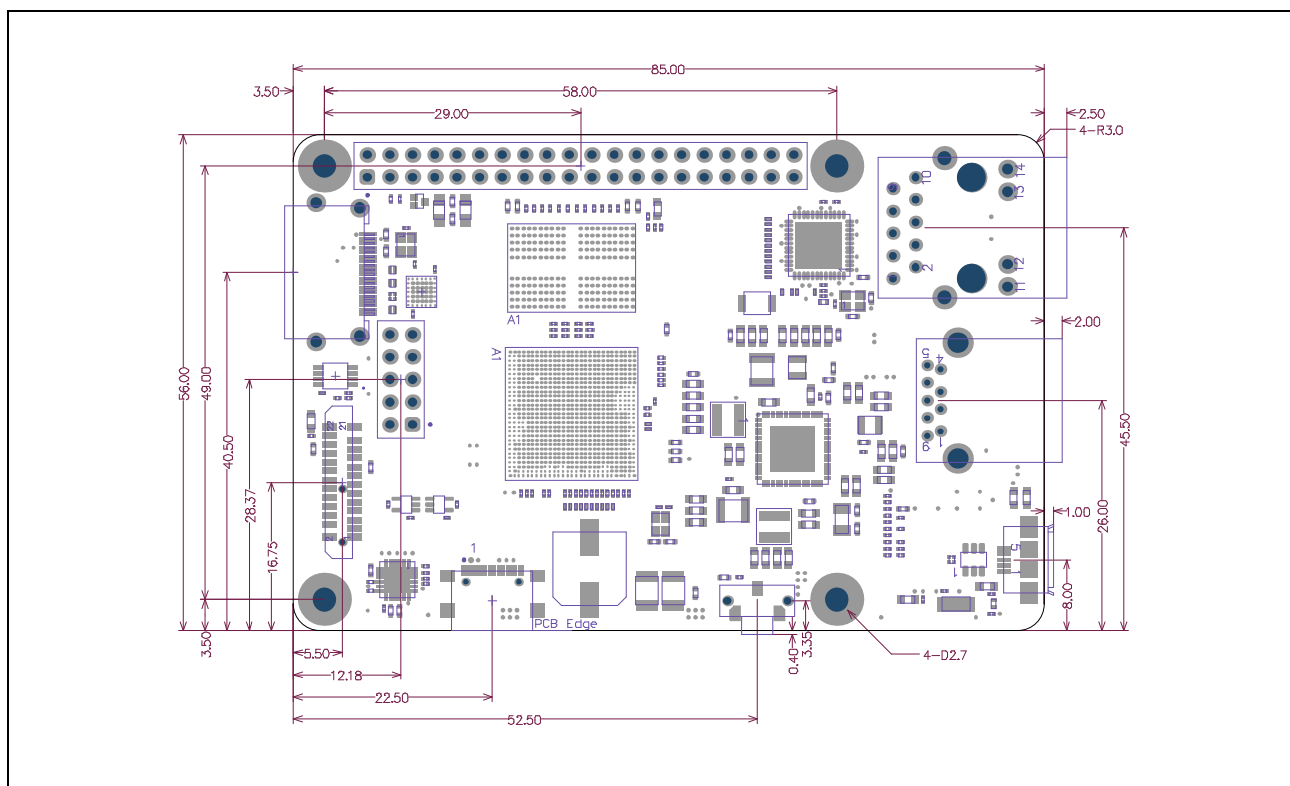


Figure 4.3 Board Dimension Drawing (Unit: mm)

5. Power Supply

5.1 Power Supply Specifications

This board has a USB Type-C® connector (CN7) which is capable of supplying power. **Table 5.1** lists the specifications of the connector’s power supply.

Table 5.1 Power Supply Specifications

Connector	Specification and Supply Voltage
CN7	USB PD-compatible USB Type-C® 15-V/3-A DC*1

Note 1. When supplying power from CN7, be sure to use a suitable USB Power Delivery (PD) adapter and cable supporting 15 V/3 A. Depending on the USB PD power adapter, it may take some time for the output voltage to stabilize. If the board operation is unstable, please wait approximately 10 seconds after the USB PD connection has been established before turning on the board.

5.2 Turning Power On and Off

This board has a power switch (POWER_SW slide switch). When turning power on, connect CN7 to the target for power supply*1 with the power switch turned off, and then turn the power switch on to start the supply of power. To end the supply of power, turn the power switch off, and then remove the connector through which power was supplied from CN7. **Figure 5.1** shows the location of the power switch and its method of operation.

Note 1. When a target for USB PD is connected to CN7, some circuits start to operate and LD1 lights up.

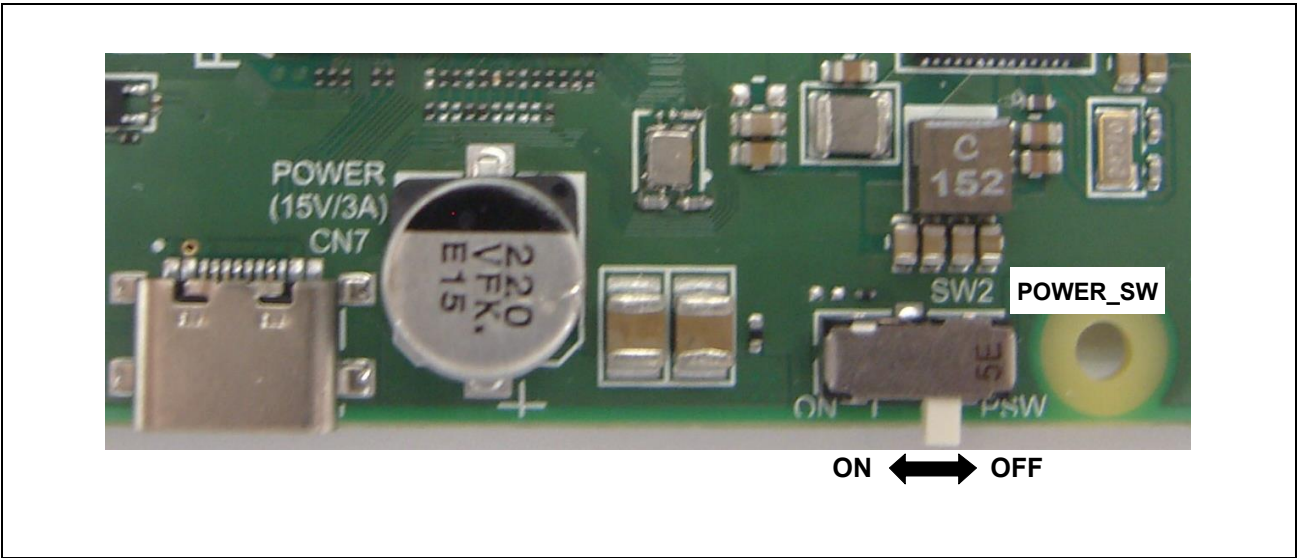


Figure 5.1 Power Switch Location and Its Operation Method

6. Hardware Architecture & Default Configuration

6.1 Internal Connections on the Board

Figure 6.1 shows the connections between the individual components of this board and the RZ/V2N.

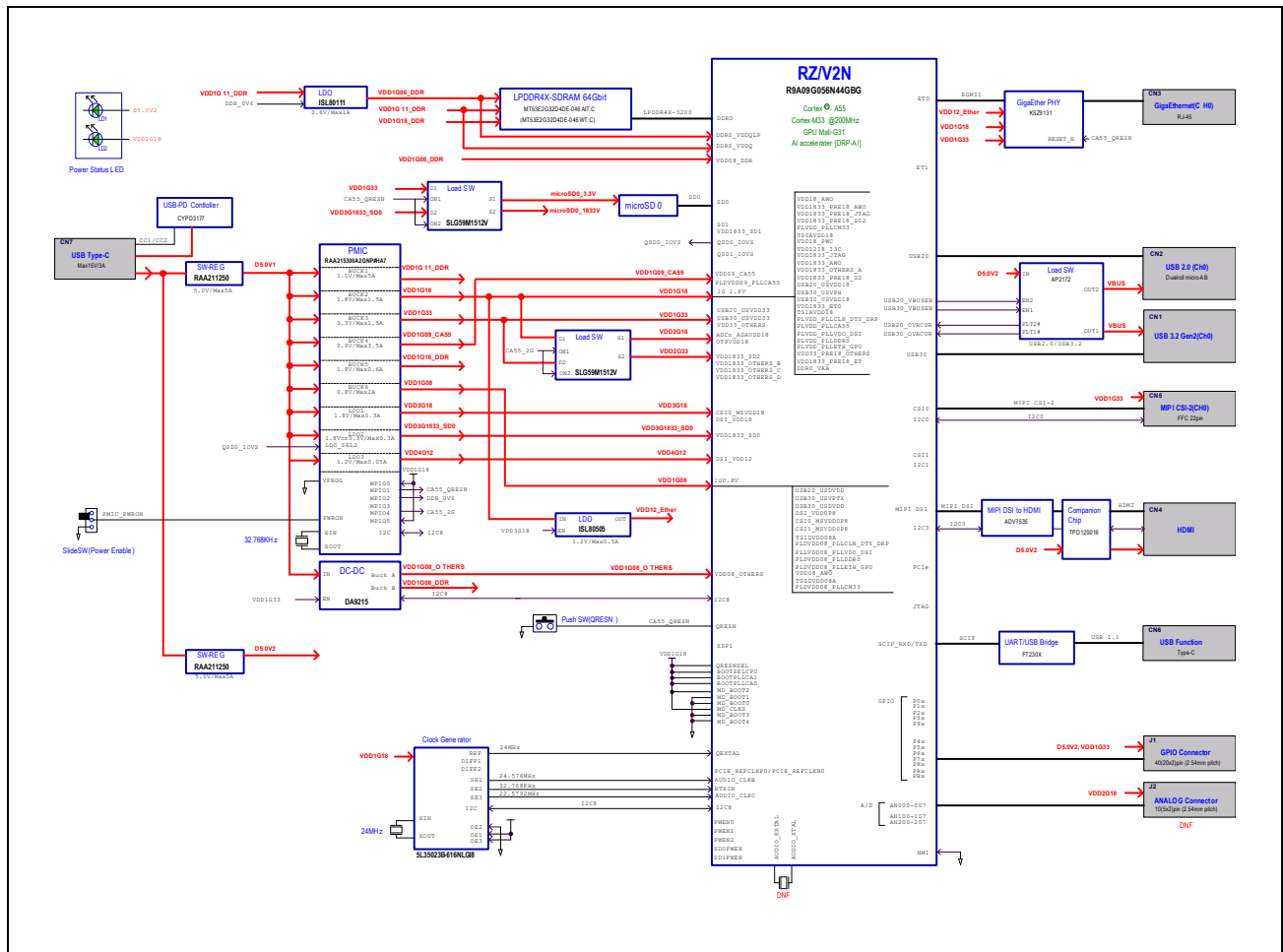


Figure 6.1 Internal Connections on the Board

6.2 Pin Functions

Table 6.1 lists the pin functions of the RZ/V2N for use with this board.

Table 6.1 List of RZ/V2N Pin Function Selections (1/2)

Pin No.	Pin Name	Function	Description
AD5	P06	SDA8	Connected to the RAA215300 and DA9215
AH4	P07	SCL8	Connected to the RAA215300 and DA9215
AF7	P10	AUDIO_CLKB	Connected to the 5L35023B (24.576-MHz clock input)
AJ6	P11	AUDIO_CLKC	Connected to the 5L35023B (22.5792-MHz clock input)
AH7	P30	SDA0	Connected to MIPI CSI-2 ch. 0 (CN5)
AJ7	P31	SCL0	Connected to MIPI CSI-2 ch. 0 (CN5)
AG7	P36	SDA3	Connected to the ADV7535
AH8	P37	SCL3	Connected to the ADV7535
AJ10	P40	SSI0_SCK	Connected to the ADV7535
AJ9	P41	SSI0_WS	Connected to the ADV7535
AD8	P42	SSI0_SDATA	Connected to the ADV7535
AJ8	P44	GPIO (SDA6)	Connected to J1 connector pin 3, pulled up to 3.3 V
AF8	P45	GPIO (SCL6)	Connected to J1 connector pin 5, pulled up to 3.3 V
AE10	P50	GPIO (TXD0)	Connected to J1 connector pin 8
AD10	P51	GPIO (RXD0)	Connected to J1 connector pin 10
AC11	P52	GPIO	Connected to J1 connector pin 11
AD11	P53	GPIO	Connected to J1 connector pin 13
AG10	P54	GPIO	Connected to J1 connector pin 15
AG11	P55	GPIO	Connected to J1 connector pin 16
AG12	P56	GPIO	Connected to J1 connector pin 18
AJ11	P57	GPIO	Connected to J1 connector pin 22
AH11	P60	GPIO	Connected to J1 connector pin 29
AF12	P61	GPIO	Connected to J1 connector pin 31
AD12	P62	GPIO	Connected to J1 connector pin 36
AH12	P63	GPIO	Connected to J1 connector pin 37
AF10	P64	CAM0_RST#	MIPI_Camera_Reset: Connected to MIPI CSI-2 ch. 0 (CN5) via the level shifter
AE12	P66	GPIO (SDA7)	Connected to J1 connector pin 27
AC12	P67	GPIO (SCL7)	Connected to J1 connector pin 28
AD14	P70	GPIO (SSI6_SDATA)	Connected to J1 connector pin 38
AC14	P71	HDMI_INT#	Interrupt: Connected to the ADV7535
AH13	P72	GPIO (SSI5_SDATA)	Connected to J1 connector pin 40
AJ14	P73	GPIO (GTIOC2B)	Connected to J1 connector pin 32
AE14	P74	GPIO (GTIOC4A)	Connected to J1 connector pin 33
AG14	P76	GPIO (SSI5_SCK)	Connected to J1 connector pin 12
AF14	P77	GPIO (SSI5_WS)	Connected to J1 connector pin 35
AD13	P80	GPIO (GTIOC1A)	Connected to J1 connector pin 7
AJ16	P95	USB20_VBUSEN	USB 2.0 ch. 0 (CN2) VBUS enable pin: Connected to the AP2172
AF17	P96	USB20_OVRCURN	USB 2.0 ch. 0 (CN2) overcurrent detection pin: Connected to the AP2172
AE16	PA0	SD0IOVS	SD0 IO voltage selection pin: Connected to the RAA215300
AH15	PA5	SD0CD	SD0 card detection pin: Connected to the microSD card slot (SD0)

Table 6.1 List of RZ/V2N Pin Function Selections (2/2)

Pin No.	Pin Name	Function	Description
AG15	PA6	GPIO (SSLC1)	Connected to J1 connector pin 26
AF15	PA7	GPIO (SSLC0)	Connected to J1 connector pin 24
AE25	PB0	USB30_VBUSEN	USB3.0 (CN1) VBUS enable pin: Connected to the AP2172
AG25	PB1	USB30_OVRCUR	USB3.0 (CN1) overcurrent detection pin: Connected to the AP2172
AG26	PB2	CAM0_PWR	MIPI_Camera_Power_Enable: Connected to MIPI CSI-2 ch. 0 (CN5) via the level shifter
AG27	PB3	GPIO (MISOC)	Connected to J1 connector pin 21
AF25	PB4	GPIO (MOSIC)	Connected to J1 connector pin 19
AF27	PB5	GPIO (RSPCKC)	Connected to J1 connector pin 23

6.3 Mode Setting

The respective dedicated setting pins determine the operating mode when the RZ/V2N is started.

On this board, the mounting or non-mounting of pull-up and pull-down resistors make the settings for these pins. **Table 6.2** lists the settings for the operating mode.

Table 6.2 Operating Mode Settings

Setting Item	Pin No.	Pin Name	Setting	Remark
Boot CPU	AD20	BOOTSELCPU	High	CA55 boot
CPU clock PLL (CA55)	AE20	BOOTPLLCA_1_[1..0]	High	1.7 GHz (0.9 V)
	AC20	BOOTPLLCA_0		
Reserved	AD22	MD_BOOT4	Low	Fix the pin to the low level
Debug mode	AF22	MD_BOOT3	Low	Normal mode
IO voltage	AG20	MD_BOOT2	High	1.8 V
Boot device	AF20	MD_BOOT1	Low	eSD0
	AG21	MD_BOOT0		
SSCG	AJ22	MD_CLKS	High	On
Main CLK oscillation	AE21	QBYPASS	High	External clock
Boundary scan	AC21	BSCANP	Low	Not selected
Internal reset signal	AJ23	QRESNSEL	High	Generated by QRESN

7. Use Interfaces

This section describes the circuits on the board per type of functionality.

7.1 Reset Circuit

A reset switch to allow hardware resetting of the RZ/V2N is mounted on this board.

Figure 7.1 shows the configuration of the reset circuit.

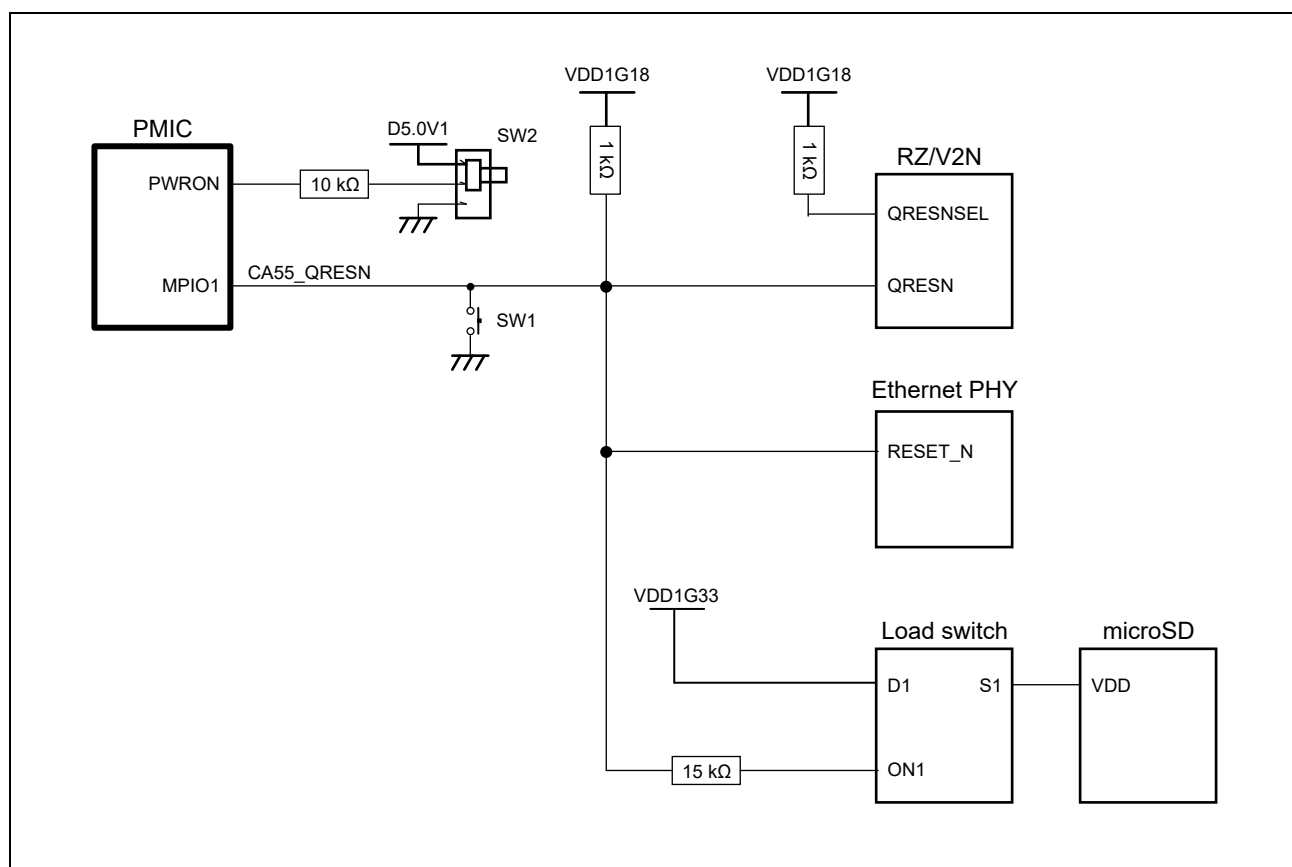


Figure 7.1 Reset Circuit

7.2 Switch

In addition to the power switch described in **Section 5.1, Power Supply Specifications**, this board has a single push switch. **Table 7.1** lists the functions and signal connections of the switches.

Table 7.1 Signal Connections of Switches

Switch	Function/Usage	RZ/V2N		Remark
		Pin Name	Pin No.	
RES (SW1)	Reset switch	QRESN	AD21	Connected to the Ethernet PHY chip as well as to the load SW for microSD
PWR (SW2)	Power switch	—	—	

7.3 LED

This board has two LEDs. **Table 7.2** lists the functions, colors, and signal connections of the LEDs.

Table 7.2 Signal Connections of LEDs

LED	Color	Function/Usage	RZ/V2N		Remark
			Pin Name	Pin No.	
LD1	Green	Indicator for the 5-V power line: lights up after a USB PD connection has been made.	—	—	
LD2	Green	Indicator for the 1.8-V power line: lights up after the power switch (SW2) is turned on.	—	—	

7.5 SD Card Interface

This card has a microSD card slot (SD0). **Figure 7.3** shows the configuration of the SD card interface circuit, and **Table 7.4** lists the signal connections.

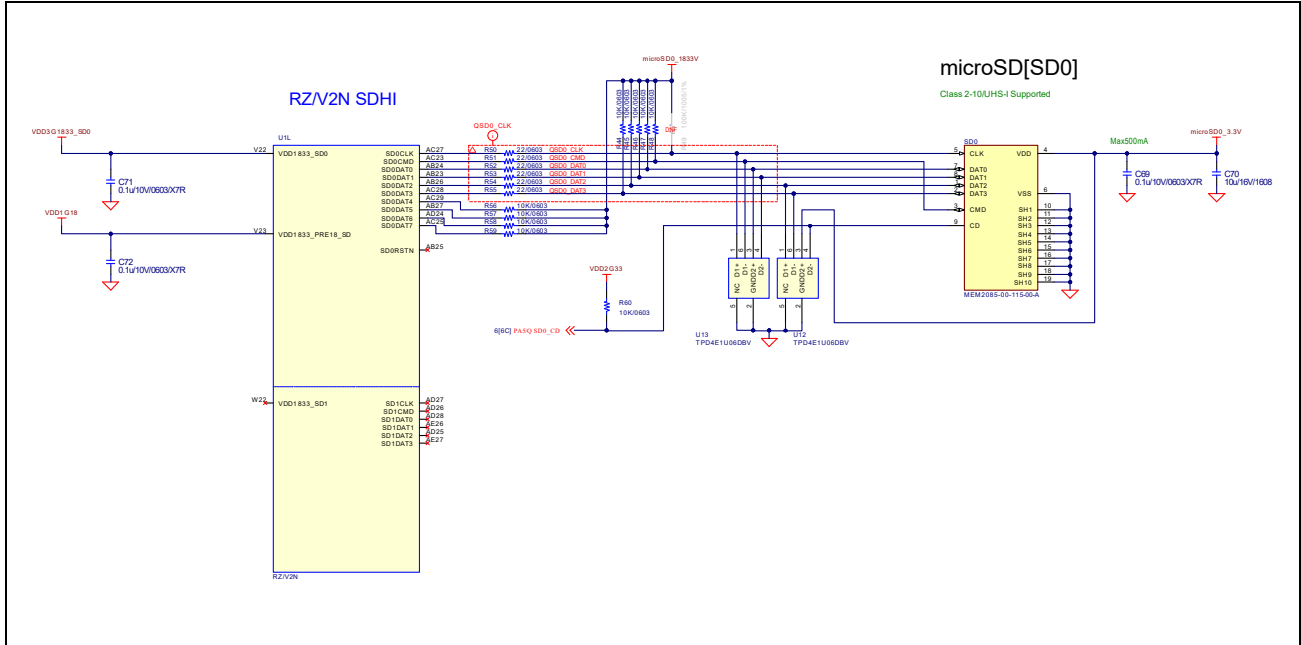


Figure 7.3 SD Card Interface Circuit

Table 7.4 Signal Connections of SD Card Interface

Signal Name	Function/Usage	RZ/V2N		Remark
		Pin Name	Pin No.	
QSD0_CMD	Command	SD0CMD	AC23	
QSD0_CLK	Clock	SD0CLK	AC27	
QSD0_DAT0	Data 0	SD0DAT0	AB24	
QSD0_DAT1	Data 1	SD0DAT1	AB23	
QSD0_DAT2	Data 2	SD0DAT2	AB26	
QSD0_DAT3	Data 3	SD0DAT3	AC28	
PA5/QSD0_CD	Card detection	PA5	AH15	

7.6 MIPI CSI-2 Interface

This board has a MIPI CSI-2 connector (CN5). **Figure 7.4** shows the configuration of the MIPI CSI-2 circuit, and **Table 7.5** lists the signal connections.

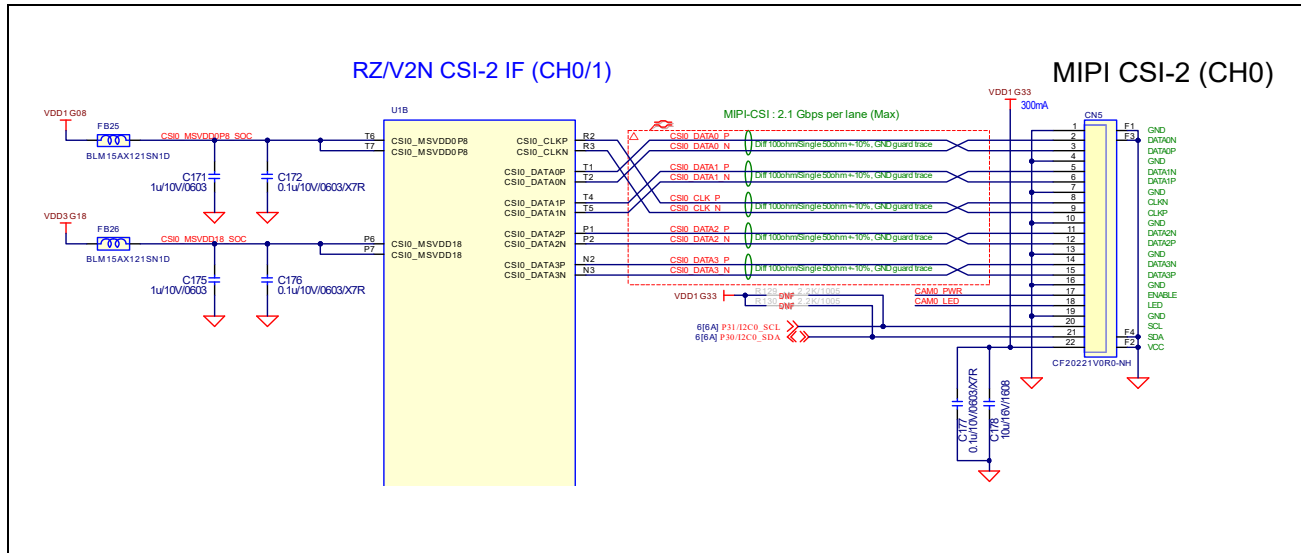


Figure 7.4 MIPI CSI-2 Interface Circuit

Table 7.5 Signal Connections of MIPI CSI-2 Interface

Signal Name	Function/Usage	RZ/V2N		Remark
		Pin Name	Pin No.	
CSIO_CLK_P	Clock+	CSIO_CLKP	R2	
CSIO_CLK_N	Clock-	CSIO_CLKN	R3	
CSIO_DATA0_P	Data 0+	CSIO_DATA0P	T1	
CSIO_DATA0_N	Data 0-	CSIO_DATA0N	T2	
CSIO_DATA1_P	Data 1+	CSIO_DATA1P	T4	
CSIO_DATA1_N	Data 1-	CSIO_DATA1N	T5	
CSIO_DATA2_P	Data 2+	CSIO_DATA2P	P1	
CSIO_DATA2_N	Data 2-	CSIO_DATA2N	P2	
CSIO_DATA3_P	Data 3+	CSIO_DATA3P	N2	
CSIO_DATA3_N	Data 3-	CSIO_DATA3N	N3	
P31/I2C0_SCL	I2C clock	P31	AJ7	
P30/I2C0_SDA	I2C data	P30	AH7	

This board has a high-definition multimedia interface (HDMI). The HDMI Type-A connector (CN4) is connected to the MIPI DSI interface of the RZ/V2N via the DSI-to-HDMI conversion IC. **Figure 7.5** shows the configuration of the HDMI circuit, and **Table 7.6** lists the signal connections.



Table 7.6 Signal Connections of MIPI DSI Interface

Signal Name	Function/Usage	RZ/V2N		Remark
		Pin Name	Pin No.	
DSI_CLK_P	Clock+	DSI_DPCLK	G2	
DSI_CLK_N	Clock-	DSI_DNCLK	G3	
DSI_DATA0_P	Data 0+	DSI_DPDATA0	H1	
DSI_DATA0_N	Data 0-	DSI_DNDATA0	H2	
DSI_DATA1_P	Data 1+	DSI_DPDATA1	F1	
DSI_DATA1_N	Data 1-	DSI_DNDATA1	F2	
DSI_DATA2_P	Data 2+	DSI_DPDATA2	D1	
DSI_DATA2_N	Data 2-	DSI_DNDATA2	D2	
DSI_DATA3_P	Data 3+	DSI_DPDATA3	E2	
DSI_DATA3_N	Data 3-	DSI_DNDATA3	E3	
P40/SSI0_SCK	Serial clock	P40	AJ10	
P41/SSI0_WS	Word select	P41	AJ9	
P42/SSI0_SDATA	Serial sound data	P42	AD8	
P71/HDMI_INT#	Interrupt	P71	AC14	
P37/I2C3_SCL	I2C clock	P37	AH8	
P36/I2C3_SDA	I2C data	P36	AG7	

Table 7.7 Signal Connections of USB3.2 (Gen2x1) Interface

Signal Name	Function/Usage	RZ/V2N		Remark
		Pin Name	Pin No.	
USB30_USD_P	USB2.0 USB D+	USB30_DP	AA29	
USB30_USD_N	USB2.0 USB D-	USB30_DM	AA28	
USB30_USRX0_P	USB3.2 SS+ reception+	USB30_RX0P	Y28	
USB30_USRX0_N	USB3.2 SS+ reception-	USB30_RX0M	Y27	
USB30_USTX0_P	USB3.2 SS+ transmission+	USB30_TX0P	W29	
USB30_USTX0_N	USB3.2 SS+ transmission-	USB30_TX0M	W28	
PB0/USB30_VBUSEN	VBUS enable	PB0	AE25	
PB1/USB30_OVRCUR	Overcurrent detection	PB1	AG25	

Table 7.8 Signal Connections of USB2.0 Interface

Signal Name	Function/Usage	RZ/V2N		Remark
		Pin Name	Pin No.	
USB20_QD_P	D+ data input/output	USB20_DP	V28	
USB20_QD_N	D- data input/output	USB20_DM	V27	
USB20_VUBUSIN	VBUS detection peripheral VBUS input	USB20_VUBUSIN	V25	
USB20_OTGID	OTG ID input	USB20_OTGID	V24	
P95/USB20_VBUSEN	VBUS output enable	P95	AJ16	
P96/USB20_OVRCUR	Overcurrent detection	P96	AF17	

7.9 Ethernet Interface

CAUTION

The RJ45 connector (CN3) is connected to the Ethernet MAC interface of the RZ/V2N via the Ethernet PHY IC. Connecting this interface to a public line is prohibited.

This board has an Ethernet PHY device and an Ethernet connector (CN3). **Figure 7.7** shows the configuration of the Ethernet interface circuit, and **Table 7.9** lists the signal connections.

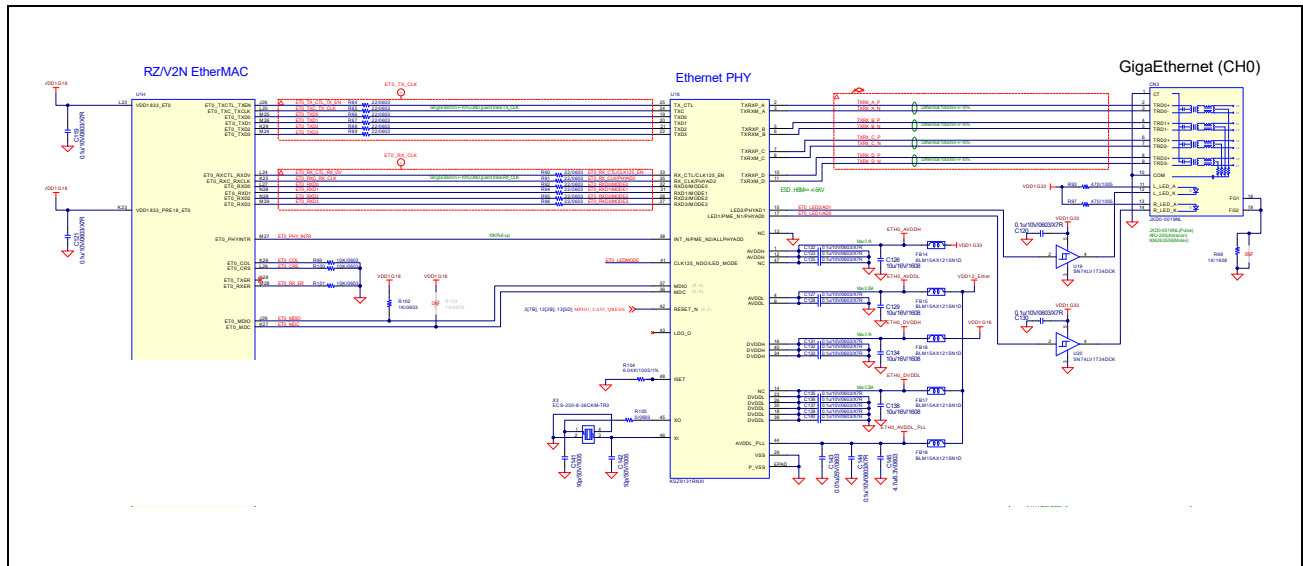


Figure 7.7 Ethernet Interface Circuit

Table 7.9 Signal Connections of Ethernet Interface

Signal Name	Function/Usage	RZ/V2N		Remark
		Pin Name	Pin No.	
ET0_TXC_TX_CLK	TX clock	ET0_TXC_TXCLK	L25	
ET0_TXD0	TX data 0	ET0_TXD0	M25	
ET0_TXD1	TX data 1	ET0_TXD1	M26	
ET0_TXD2	TX data 2	ET0_TXD2	K29	
ET0_TXD3	TX data 3	ET0_TXD3	M24	
ET0_TX_CTL_TX_EN	TX control/data enable	ET0_TXCTL_TXEN	J26	
ET0_RXC_RX_CLK	RX clock	ET0_RXC_RXCLK	K25	
ET0_RXD0	RX data 0	ET0_RXD0	D18	
ET0_RXD1	RX data 1	ET0_RXD1	E18	
ET0_RXD2	RX data 2	ET0_RXD2	G17	
ET0_RXD3	RX data 3	ET0_RXD3	B19	
ET0_RX_CTL_RX_DV	RX control/data valid	ET0_RXCTL_RXDV	L24	
ET0_MDC	MD clock	ET0_MDC	K27	
ET0_MDIO	MD data	ET0_MDIO	J29	

7.10 Pin Header

This board has 2.54-mm pitch pin headers listed in **Table 7.10**. **Table 7.11** and **Table 7.12** list the signal connections of the respective pin headers.

Table 7.10 List of Pin Headers

Function	Reference	Number of Pins	Description
GPIO	J1	40 (20 × 2)	GPIO pin header
ADC	J2	10 (5 × 2)	ADC pin header (not mounted)

Table 7.11 Signal Connections of GPIO (J1)

Pin	Signal Name	RZ/V2N	
		Pin Name	Pin No.
1	VDD1G33	—	—
3	P44/SDA6	P44	AJ8
5	P45/SCL6	P45	AF8
7	P80/GTIOC1A	P80	AD13
9	GROUND	—	—
11	P52/GPIO	P52	AC11
13	P53/GPIO	P53	AD11
15	P54/GPIO	P54	AG10
17	VDD1G33	—	—
19	PB4/MOSIC	PB4	AF25
21	PB3/MISOC	PB3	AG27
23	PB5/RSPCKC	PB5	AF27
25	GROUND	—	—
27	P66/SDA7	P66	AE12
29	P60/GPIO	P60	AH11
31	P61/GPIO	P61	AF12
33	P74/GTIOC4A	P74	AE14
35	P77/SSI5_WS	P77	AF14
37	P63/GPIO	P63	AH12
39	GROUND	—	—

Pin	Signal Name	RZ/V2N	
		Pin Name	Pin No.
2	D5.0V2	—	—
4	D5.0V2	—	—
6	GROUND	—	—
8	P50/TXD0	P50	AE10
10	P51/RXD0	P51	AD10
12	P76/SSI5_SCK	P76	AG14
14	GROUND	—	—
16	P55/GPIO	P55	AG11
18	P56/GPIO	P56	AG12
20	GROUND	—	—
22	P57/GPIO	P57	AJ11
24	PA7/SSLC0	PA7	AF15
26	PA6/SSLC1	PA6	AG15
28	P67/SCL7	P67	AC12
30	GROUND	—	—
32	P73/GTIOC2B	P73	AJ14
34	GROUND	—	—
36	P62/GPIO	P62	AD12
38	P70/SSI6_SDATA	P70	AD14
40	P72/SSI5_SDATA	P72	AH13

Table 7.12 Signal Connections of ADC (J2)

Pin	Signal Name	RZ/V2N	
		Pin Name	Pin No.
1	ADAVDD18	—	—
3	ANI000	ADC_ANI000	AE1
5	ANI002	ADC_ANI002	AE2
7	ANI004	ADC_ANI004	AG1
9	ANI006	ADC_ANI006	AF3

Pin	Signal Name	RZ/V2N	
		Pin Name	Pin No.
2	ADAVSS	—	—
4	ANI001	ADC_ANI001	AF1
6	ANI003	ADC_ANI003	AG2
8	ANI005	ADC_ANI005	AE3
10	ANI007	ADC_ANI007	AF2

7.11 Test Pad

This board has test pads listed in **Table 7.13** and **Figure 7.8**.

Table 7.13 List of Test Pads

Reference	Description
TP1	For QRESN signal monitoring
TP2	For testing
TP3	For VDD1G18 power monitoring
TP4	For testing
TP5	For testing
TP6	For testing
TP7	For testing
TP8	For testing
TP9	Ground
TP10	For testing
TP11	For testing
TP12	For WDTUDFCA signal monitoring
TP13	For WDTUDFCM signal monitoring
TP14	For USB*_VBUS power monitoring
TP15	For USB*_D1_N signal monitoring
TP16	For USB*_D1_P signal monitoring
TP17	Ground
TP18	For VDD1G11_DDR power monitoring
TP19	For VDD1G18 power monitoring
TP20	For VDD1G33 power monitoring

Reference	Description
TP21	For VDD1G09_CA55 power monitoring
TP22	For VDD1G18_DDR power monitoring
TP23	For VDD1G08 power monitoring
TP24	For VDD3G18 power monitoring
TP25	For VDD3G1833_SD0 power monitoring
TP26	For VDD4G12 power monitoring
TP27	For VDD2G18 power monitoring
TP28	For microSD0_3.3V power monitoring
TP29	For VDD2G33 power monitoring
TP30	For microSD0_1833V power monitoring
TP31	For VDD1G08_OTHERS power monitoring
TP32	For VDD1G08_DDR power monitoring
TP33	For testing
TP34	For VDD12_Ether power monitoring
TP35	For VDD1G06_DDR power monitoring
TP36	For USB*_VBUS_OUT power monitoring
TP37	For D5.0V1 power monitoring
TP38	For D5.0V2 power monitoring
TP39	Ground
GP1	Ground (pin for checking mounted)

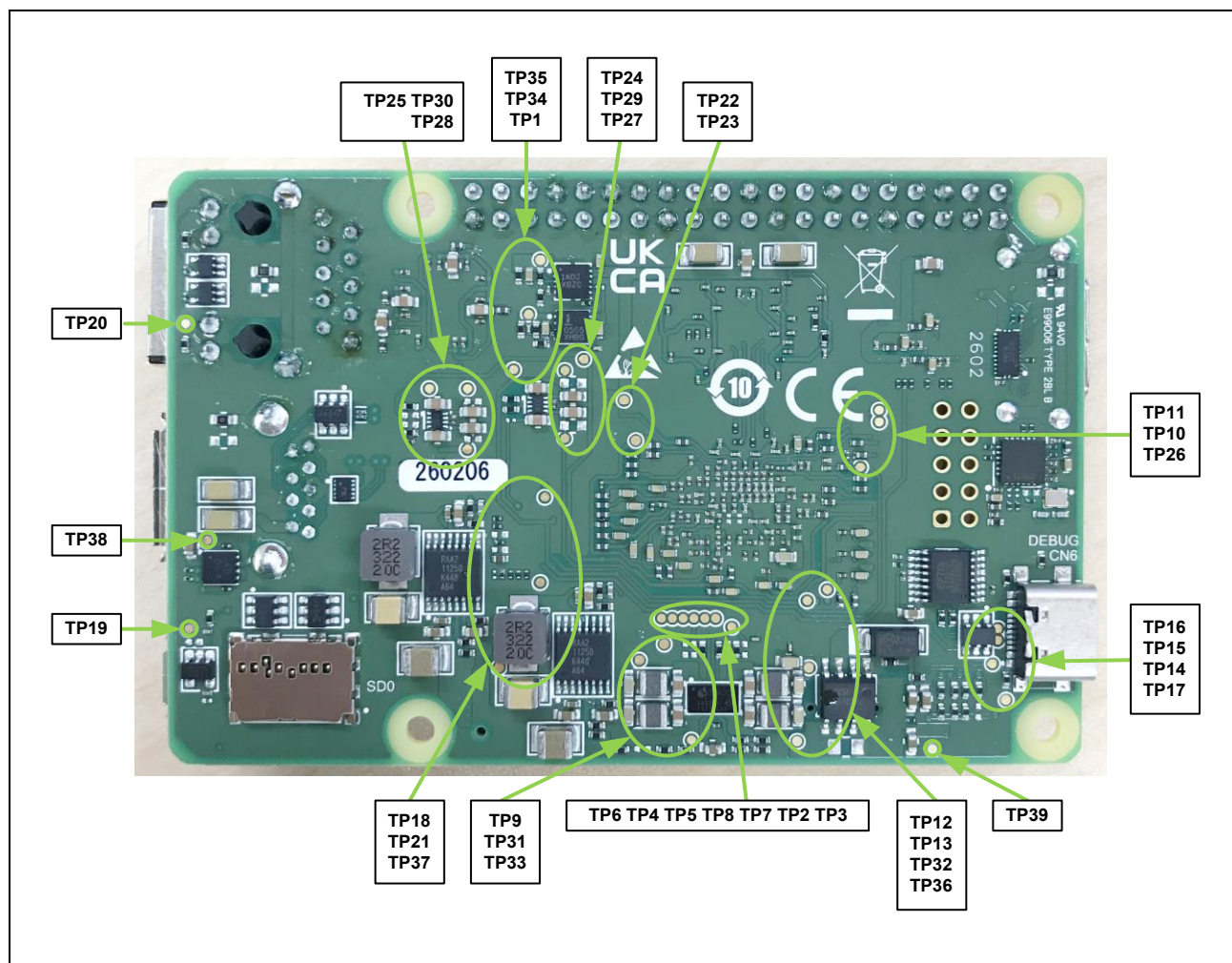


Figure 7.8 Location of Test Pads

8. Handling Precautions

8.1 Notes when Turning Power On and Off

(1) When turning power on

Be sure to check that the power slide switch SW2 is turned off before connecting the USB-PD Type-C cable to the Type-C connector (CN7).

Connecting the USB Type-C cable to the Type-C connector while the power slide switch SW2 is on is prohibited.

When the USB-PD Type-C cable is connected to the Type-C connector, LD1 lights up and some circuits start to operate.

When the power slide switch SW2 is turned on, LD2 lights up and all circuits start to operate.

(2) When turning power off

After the power slide switch SW2 is turned off, remove the USB-PD Type-C cable from the Type-C connector (CN7).

Removing the USB-PD Type-C cable from the Type-C connector (CN7) while the power slide switch SW2 is on is prohibited. Doing so may cause damage to devices.

8.2 Note on Use of Ethernet

Do not connect the Ethernet connector (CN3) to a public line. Connection with a public line is not supported. Note that the MAC address is not set in this evaluation kit.

8.3 Note on Care while Inserting an SD Card

Take care to avoid damage while inserting a microSD card into the microSD card slot (SD0), since part of the microSD card is intended to protrude beyond the board.

8.4 Others

- Do not expose this product to water or moisture, and do not place it on a conductive surface while it is operating.
- Do not expose this product to heat from any source; it is designed for reliable operation at normal room temperatures.
- Operate this product in a well-ventilated environment, and do not cover it during use.
- Place this product on a stable, flat, non-conductive surface while in use, and do not let it contact conductive items.
- Take care while handling this product to avoid mechanical or electrical damage to the printed circuit board and connectors.
- Avoid handling this product while it is powered.

Appendix A Certifications

This board complies with the following certifications and standards. For important disclaimers and safety precautions, please refer to the page following the cover page of this manual.

A.1 EMC/EMI Standards

- CE Class A (EMC)



This product is herewith confirmed to comply with the requirements set out in the Council Directives on the Approximation of the laws of the Member States relating to Electromagnetic Compatibility Directive 2014/30/EU.

[Warning] — This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures to correct this interference.

- UKCA Class A (EMC)



This product is in conformity with the following relevant UK Statutory Instrument(s) (and its amendments): 2016 No.1091 Electromagnetic Compatibility Regulations 2016.

[Warning] — This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures to correct this interference.

A.2 Material Selection, Waste, Recycling and Disposal Standards

- EU RoHS
- China SJ/T 113642014, 10-year environmental protection use period.



- WEEE Directive (2012/19/EU) & The Waste Electrical and Electronic Equipment Regulations 2013
- For customers in the UK & European Union the WEEE (Waste Electrical and Electronic Equipment) regulations put responsibilities on producers for the collection and recycling or disposal of electrical and electronic waste. Return of WEEE under these regulations is applicable in the UK and European Union.

- This equipment (including all accessories) is not intended for household use. After use the equipment cannot be disposed of as household waste, and the WEEE must be treated, recycled and disposed of in an environmentally sound manner.

A.3 Safety Standards

- UL 94V-0

Appendix B Web & Support

For details on the RZ/V2N microprocessors, refer to the RZ/V2N Group User's Manual: Hardware (R01UH1071EJ).

Online technical support and information are available from this Web page: <https://www.renesas.com/en/support>.

Technical Contact Details

America: techsupport.america@renesas.com

Europe: <https://www.renesas.com/en-eu/support/contact.html>

Global & Japan: <https://www.renesas.com/support/contact.html>

General information on Renesas microprocessors can be found on the Renesas website at: <https://www.renesas.com/>.

Design and Manufacturing Information

The design and manufacturing information on this board “RZ/V2N Fast Prototyping Board Design Package” can be obtained from: <https://www.renesas.com/fpb-rzv2n>.

- File name: fpb-rzv2n-v1-designpackage.zip
- File contents

Table B.1 Contents of the RZ/V2N Fast Prototyping Board Design Package

File Type	Description	File Name or Folder Name
File (PDF)	Schematics	fpb-rzv2n-v1-schematics.pdf
File (PDF)	Mechanical drawings	fpb-rzv2n-v1-mechdwg.pdf
File (PDF)	3D drawings	fpb-rzv2n-v1-3d.pdf
File (xlsx)	Bill of materials (BOM)	fpb-rzv2n-v1-bom.xlsx
Folder	Manufacturing files	Manufacturing Files
Folder	Design files	Design Files - Altium

REVISION HISTORY	RZ/V2N Fast Prototyping Board Evaluation Board Manual
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Rev.	Date	Description	
		Page	Summary
1.00	May 20, 2026	—	First edition, issued

RZ/V2N Fast Prototyping Board
Evaluation Board Manual

Publication Date: Rev.1.00 May 20, 2026

Published by: Renesas Electronics Corporation

RZ/V2N Fast Prototyping Board



Renesas Electronics Corporation

R01UH1199EJ0100