USB Evaluation Board R0K866597D020BR Hardware Instruction Manual

Introduction

This book is an instruction manual for the hardware used with evaluation board R0K866597D020BR, which operates the USB Host function and peripheral function.

Target Device

RX62N RSK

Contents

1. Preface

The R0K866597D020BR is the evaluation board of the USB Host function and built-in functions. This instruction manual explains how to setup up and operate the related hardware and offers cautionary notes concerning usage.

All components of the R0K866597D020BR are listed under "Table 6.2 Assembly Components and Quantity." If you have any question about the R0K866597D020BR, contact your local distributor.

2. Important

Before using this product, be sure to read this user's manual carefully.

Keep this user's manual, and refer to it when you have questions about this product.

Product:
"Product" in this document collectively refers to the following products manufactured by Renesas Electronics Corporation
(1) R8A66597FP USB Evaluation Board R0K866597D020BR
"Product" herein encompasses neither the customer's user system nor the host machine.

Purpose of use of the product:
This product is a device to support the development of systems that uses the R8A66597FP. It provides support for system development in both software and hardware.
Be sure to use this product correctly according to said purpose of use. Please avoid using this product other than for its intended purpose of use.

For those who use this product:
This product can only be used by those who have carefully read the user's manual and know how to use it.
Use of this product requires basic knowledge of electric circuits, logical circuits, and MCUs.

When using this product:
(1) This product is a development-support unit for use in your program development and evaluation stages. When a program you have finished developing is to be incorporated in a mass-produced product, the judgment as to whether it can be put to practical use is entirely your own responsibility, and should be based on evaluation of the device on which it is installed and other experiments.

(2) In no event shall Renesas Electronics Corporation be liable for any consequence arising from the use of this product.

(3) Renesas Electronics Corporation strives to provide workarounds for and correct trouble with products malfunctions, with some free and some incurring charges. However, this does not necessarily mean that Renesas Electronics Corporation guarantees the provision of a workaround or correction under any circumstances.

(4) This product covered by this document has been developed on the assumption that it will be used for program development and evaluation in laboratories. Therefore, it does not fall within the scope of applicability of the Electrical Appliance and Material Safety Law and protection against electromagnetic interference when used in Japan.

(5) Renesas Electronics Corporation cannot predict all possible situations and possible cases of misuse that carry a potential for danger. Therefore, the warnings in this user's manual and the warning labels attached to this product do not necessarily cover all such possible situations and cases. The customer is responsible for correctly and safely using this product.

(6) The product covered by this document has not been through the process of checking conformance with UL or other safety standards and IEC or other industry standards. This fact must be taken into account when the product is taken from Japan to some other country.

(7) This product is a product used for development of a program, and an evaluation stage. It cannot include in a user's product and cannot mass-produce.

(8) Even if it is the case where fault is in the device carried in this product, it does not exchange for the fault repair article of a device.

(9) Operation of all USB peripheral devices cannot be guaranteed.

(10) The sample programs of this product are all references, and no one to guarantee the operation. Please use this sample program as a technological reference when customer's software is developed.

Usage restrictions:

This product has been developed as a means of supporting system development by users. Therefore, do not use it as an embedded device in other equipment. Also, do not use it to develop systems or equipment for use in the following fields.

> (1) Transportation and vehicular
>
> (2) Medical (equipment that has an involvement in human life)
>
> (3) Aerospace
>
> (4) Nuclear power control
>
> (5) Undersea repeaters

If you are considering the use of this product for one of the above purposes, please be sure to consult your local distributor.

About product changes:

We are constantly making efforts to improve the design and performance of our product. Therefore, the specification or design of the product, or this user's manual, may be changed without prior notice.

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(2) The information or data in this user's manual does not implicitly or otherwise grant a license to patent rights or any other rights belonging to Renesas or to a third party.

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About diagrams:

Some diagrams in this user's manual may differ from the objects they represent.

Warranty:

Renesas will exchange this board free of charge only due to manufacturing defects.

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3. Precautions for Safety

3.1. Definitions of Signal Words

This chapter describes the precautions which should be taken in order to use this product safely and properly. Be sure to read and understand this chapter before using this product.

Contact us if you have any questions about the precautions described here.

This chapter describes the precautions which should be taken in order to use this product safely and properly. Be sure to read this chapter before using this product.

⚠WARNING	WARNING indicates a potentially dangerous situation that will cause death or heavy wound unless it is avoided.
⚠CAUTION	CAUTION indicates a potentially dangerous situation that will cause a slight injury or a medium-degree injury or property damage unless it is avoided.

In addition to the two above, the following are also used as appropriate to indicate additional precautions.

[Notice]   Point out the attention for the malfunction by wrong setting.

means WARNING or CAUTION.

Example: ⚠ CAUTION AGAINST AN ELECTRIC SHOCK

🚫 means PROHIBITION.

Example: 🚫 DISASSEMBLY PROHIBITED

● means A FORCIBLE ACTION.

Example: 🔌 UNPLUG THE POWER CABLE FROM THE RECEPTACLE.

3.2. Warning

⚠ WARNING
Warnings for Power Supply: If you connect the attached power cable with the stabilized power supply, be sure to connect it with the appropriate polarity (the red cable is connected to the power line. The black cable is connected to the ground). Use this product within the appropriate voltage range. This product does NOT have a built in over voltage protection. Do not touch the plug of the power cable when your hands are wet. This may cause electric shock. If you need to use an AC adaptor, please confirm the connector shape, voltage and polarity. In addition, use an AC power cable which complies with the safety standard of the country. Do NOT use the power supply function on the emulator, when both the emulator and another power supply are connected to this product at the same time. When installing this equipment, insure that a reliable ground connection is maintained. If you smell a strange odor, hear an unusual sound, or see smoke coming from this product, then disconnect power immediately Do not use this as it is because of the danger of electric shock and/or fire. In this case, contact your local distributor. Before setting up this product and connecting it to other devices, turn off power or remove a power cable to prevent injury or product damage.
Warnings to Be Taken for Handling: Do not break down this product. Breaking down the product will void your warranty.
Warning for Installation: Do not set this product in water or areas of high humidity. Make sure that the product does not get wet. Spilling water or some other liquid into the product may cause un-repairable damage.
Warning for Use temperature: This equipment is to be used in an environment with a maximum ambient temperature of 35°C. Care should be taken that this temperature is not exceeded.

3.3. Caution

<table>
<tr><td colspan="2" align="center">⚠️CAUTION</td></tr>
<tr><td colspan="2">Cautions to Be Taken for Handling This Product:

Use caution when handling the product. Be careful not to apply a mechanical shock.

Do not touch the connector pins of this product directly. Static electricity may damage the internal circuits.

When attaching and removing the cable, hold the plug of the cable and do not pull on the cable. Do not pull this product by the communications interface cable. Excessive flexing or force may break conductors.

When you connect an external board to this product through test pins, be careful not to short signal lines or between power line and ground. If this product is revised by the user, operation cannot be guaranteed.</td></tr>
<tr><td colspan="2">Note on Transporting the Product:

When sending your product for repair, use the packing box and cushioning material supplied with the product when it was delivered to you and specify caution in handling (handling as precision equipment). If packing of your product is not complete, it may be damaged during transportation. When you pack your product in a bag, make sure to use the conductive plastic bag supplied with the product. If you use a different bag, it may lead to further trouble with your product due to static electricity.</td></tr>
<tr><td colspan="2">Caution to Be Taken for Disposal:

Penalties may be applicable for incorrect disposal of this waste, in accordance with your national legislation.

European Union regulatory notices:

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 European Union only. 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.
Renesas Electronics Europe GmbH can take back end of life equipment, register for this service at "http://www.renesas.eu/weee".</td></tr>
</table>

4. Function Overview

4.1. Overview

The R0K866597D020BR is an evaluation board for the Renesas Hi-Speed USB ASSP R8A66597FP. Two USB-A receptacles are mounted on the board for evaluation of USB host operations using USB port0 and USB port1 of R8A66597. CN1 can be used for evaluation of USB peripheral operations. Please refer to the data sheet "USB2.0 Dual Function Controller R8A66597FP" for detailed specifications of the R8A66597.

The model name, package and package description of the chip that is mounted on the board is as follows:

Board	Chip Model Name	Package Description
R0K866597D020BR	R8A66597FP	Plastic 80-pin LQFP (0.4mm pitch 10×10mm body)

The board has the following features:

(1) Evaluate the system by connecting this board and a control board using the interface connector of this board.
(2) A solder pattern is prepared on the USB signal lines for chip common mode choke coils. For EMI suppression evaluation.
(3) A solder pattern is prepared on the USB signal lines for ESD protection devices. For ESD protection evaluation.
(4) Supply 3.3V or 1.8V to the interface power VIF of R8A66597FP.
(5) Test R8A66597FP's functions (excluding split bus) by connecting with Renesas Starter Kits[1] board.
   *1: Renesas Starter Kits are the latest development from Renesas in low-cost evaluation development toolkits.

(6) Supply 5V, 500mA to the VBUS.

4.2. Related Data Sheets and Application Notes

The R8A66597FP comes with "USB Sample Firmware" for evaluation. For details, please contact Renesas Electronics, your distributor, or check the information on the homepage below.

R8A66597 Datasheet (Doc. No. REJ03F0229-0101)

   http://www.renesas.com/products/mpumcu/usb_device/assp_usb/m66596/Documentation.jsp

5. Outline
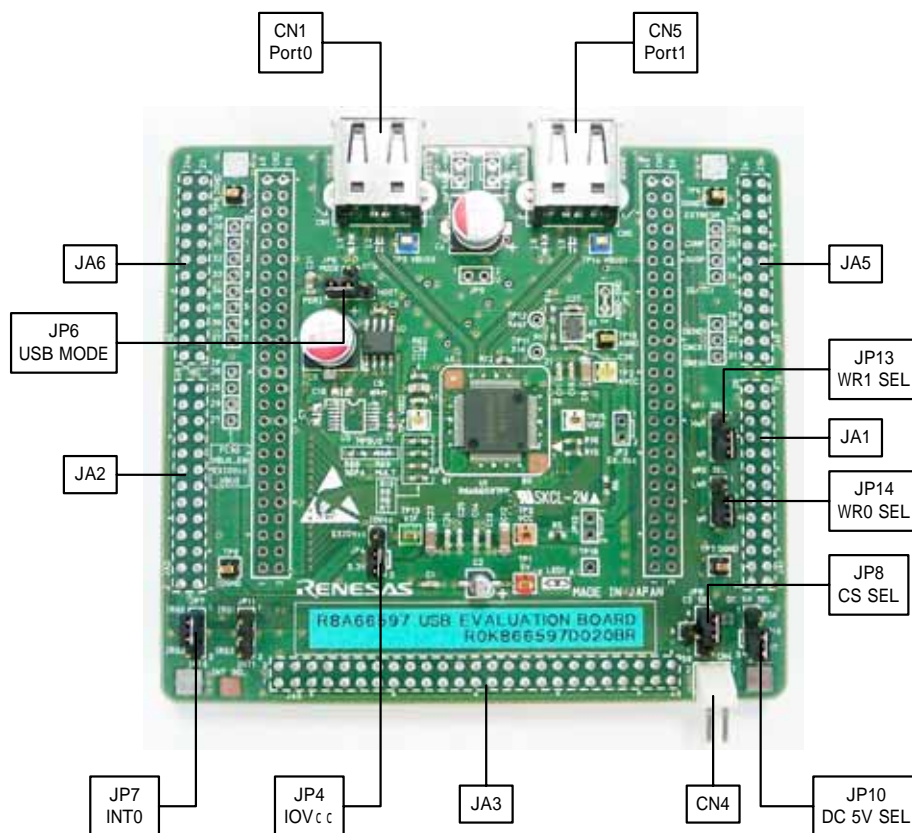
Figure 5.1 R0K866597D020BR Board (Top View)

6. Evaluation Board Specifications

Table 6.1 Board Specifications

	Specifications
Board Size	98 mm × 88 mm
Supply power	AVCC , VCC : 3.3 V , VIF : 3.3 V or 1.8 V
Interface	50 Pin Connector * 1 , 24 Pin Connector * 2 , 26 Pin Connector * 2 (Specification of all connectors : 2.54mm pitch, dual straight header, male type) USB Receptacle (Type A, DIP, normal) * 2

Table 6.2 Assembly Components and Quantity

Component Name	QTY
Evaluation board (R0K866597D020BR)	1
Power supply cable (incl. 2P connector)	1
Table of Toxic and Hazardous Substance and Elements	1
Release Note (English)	1
Release Note (Japanese)	1

6.1. Connector Description (View from R8A66597)

Connectors JA1, JA2, JA4 and JA6 provide all bus interface pins of the chip, such as processor bus interface and DMA interface. Therefore, these pins provide the same pin characteristics of the R8A66597FP such as electric characteristic, I/O direction, and functions except for the signal with *. Note: All pins on JA5 are unconnected.

The following table shows the pin number and function correspondences.

Table 6.1.1 Connector Description (View from R8A66597)

Pin Description of R8A66597FP	Connector	Pin Number of Connector	Function of R8A66597FP
D15　8	JA3	36　29 (D15　8)	Data bus (I/O)
D7/AD7　D1/AD1	JA3	24　18 (D7/AD7　D1/AD1)	Multiplex bus (I/O)
D0	JA3	17	Data bus (I/O)
A6　1	JA3	7　2	Address bus (I)
A7/ALE	JA3	8	Address bus or ALE (I/I)
WR0_N*	JA3	48	Write strobe (I)
WR1_N*	JA3	47	Write strobe (I)
RD_N*	JA3	25	Read strobe (I)
CS_N*	JA3	27 (In case of CS1)	Chip select (I)
RST_N***	JA2	1	Reset (I)
DREQ0_N,	JA6	1	DMA request (O)
DACK0_N**	JA6	2	DMA acknowledge (I)
INT_N	JA2	7	Interrupt (O)
DEND0_N	JA6	3	End of DMA transfer (I/O)
VDD(EX_VCC)	JA1	3	Power supply (3.3V) (I)
GND	JA1	2,4	GND
GND	JA2	4	GND
NC	JA1	5　22,24　26	Unused pin
NC	JA2	2,3,5,6,8,10　22,24　26	Unused pin
NC	JA3	1,9　16,26,28,37 46,49.50	Unused pin
NC	JA5	1　24	Unused pin
NC	JA6	2　24	Unused pin

*: Pulled up with 10kΩ
**: Pulled up 1MΩ
***: Connected to GND with 0.1μF

6.2. Connector Description (View from RSK board)

There are five connecters (JA1, JA2, JA4, JA5, and JA6) to connect with RSK boards.

The following table shows the pin number and function correspondences of RSK boards.

Table 6.2.1 JA1 Expansion connector

Pin#	Functions	Signal	I/O	Pin# of R8A66597	Notes
1	5 V Power supply	5V	-	NC	Connect to the VBUS Supply IC
2	GND	GND	-	GND, AGND	
3	3.3 V Power supply	3V3	-	VCC,VIF, VCC	
4	GND	GND	-	GND, AGND	
5	Analog Power Supply	AVCC	-	NC	
6	Analog GND	AVSS	-	NC	
7	Analog reference voltage	VREF	-	NC	
8	A/D trigger	ADTRG	I	NC	
9	A/D converter	ADC0	I	NC	
10	A/D converter	ADC1	I	NC	
11	A/D converter	ADC2	I	NC	
12	A/D converter	ADC3	I	NC	
13	A/D converter	DAC0	O	NC	
14	A/D converter	DAC1	O	NC	
15	I/O Port	IO_0	I/O	NC	
16	I/O Port	IO_1	I/O	NC	
17	I/O Port	IO_2	I/O	NC	
18	I/O Port	IO_3	I/O	NC	
19	I/O Port	IO_4	I/O	NC	
20	I/O Port	IO_5	I/O	NC	
21	I/O Port	IO_6	I/O	NC	
22	I/O Port	IO_7	I/O	NC	
23	External interrupt request	IRQ3	I	NC (SOF_N)	Default = NC Can be connected with Jumper Pin
	M2_HSIN0	M2_HSIN0	I		
25	I2C Bus Data Send/receive	IIC_SDA	I/O	NC	
26	I2C Bus Clock	IIC_SCL	I/O	NC	

Table 6.2.2 JA2 Expansion connector

Pin#	Functions	Name	I/O	Pin# of R8A66597	Notes
1	Reset	RESET	I	RST_N	
2	External Clock Input	EXTAL	I	NC	
3	Non-Maskable Interrupt	NMI	I	NC	
4	GND	GND	-	GND	
5	WDT Overflow	WDT_OVF	O	NC	
6	Serial port transmit	SCIaTX	O	NC	
7	External interrupt request	IRQ0	I	INT_N	
	M1_HSIN0	M1_HSIN0	I		
8	Serial port receive	SCIaRX	I	NC	
9	External interrupt request	IRQ1	I	NC (SOF_N)	Default = NC Can be connected with Jumper Pin
	M1_HSIN1	M1_HSIN1	I		
10	Serial Port Clock	SCIaCK	I/O	NC	
11	Motor control 1 Up/Down count	M1_UD	I	NC	
12	Serial port handshake	CTSRTS	I/O	NC	
13	Motor control 1 three-phase PWM output 1 positive	M1_Up	O	NC	
14	Motor control 1 three-phase PWM output 1 negative	M1_Un	O	NC	
15	Motor control 1 three-phase PWM output 2 positive	M1_Vp	O	NC	
16	Motor control 1 three-phase PWM output 2 negative	M1_Vn	O	NC	
17	Motor control 1 three-phase PWM output 3 positive	M1_Wp	O	NC	
18	Motor control 1 three-phase PWM output 3 negative	M1_Wn	O	NC	
19	Timer output	TMR0	O	NC	
20	Timer output	TMR1	O	NC	
21	Timer input	TRIGa	I	NC	
22	Timer input	TRIGb	I	NC	
23	External interrupt request	IRQ2	I	NC (INT_N)	Default = NC Can be connected with Jumper Pin
	Reset on Index (Motor Control)	M1_EncZ	I		
	M1_HSIN2	M1_HSIN2	I		
24	Motor Control 1 POE	M1_POE	I	NC	
25	Motor Control 1 TRCCLK	M1_TRCCLK	I	NC	
26	Motor Control 1 TRDCLK	M1_TRDCLK	I	NC	

Table 6.2.3 JA3 Expansion connector

Pin#	Functions	Name	I/O	Pin# of R8A66597	Notes
1	Address signal	A0	O	NC	
2	Address signal	A1	O	A1	
3	Address signal	A2	O	A2	
4	Address signal	A3	O	A3	
5	Address signal	A4	O	A4	
6	Address signal	A5	O	A5	
7	Address signal	A6	O	A6	
8	Address signal	A7	O	A7	
9	Address signal	A8	O	NC	
10	Address signal	A9	O	NC	
11	Address signal	A10	O	NC	
12	Address signal	A11	O	NC	
13	Address signal	A12	O	NC	
14	Address signal	A13	O	NC	
15	Address signal	A14	O	NC	
16	Address signal	A15	O	NC	
17	Data signal	D0	I/O	D0	
18	Data signal	D1	I/O	D1	
19	Data signal	D2	I/O	D2	
20	Data signal	D3	I/O	D3	
21	Data signal	D4	I/O	D4	
22	Data signal	D5	I/O	D5	
23	Data signal	D6	I/O	D6	
24	Data signal	D7	I/O	D7	
25	Data read	RDn	O	RD_N	
26	Data write	WRn	O	NC	
	SDRAM Write Enable	WEn	O		
27	Chip select	CSa	O	CS_N	
28	Chip select	CSb	O	NC(CS_N)	Default = NC Can be connected with Jumper Pin
29	Data signal	D8	I/O	D8	
30	Data signal	D9	I/O	D9	
31	Data signal	D10	I/O	D10	
32	Data signal	D11	I/O	D11	
33	Data signal	D12	I/O	D12	
34	Data signal	D13	I/O	D13	
35	Data signal	D14	I/O	D14	
36	Data signal	D15	I/O	D15	
37	Address signal	A16	O	NC	
38	Address signal	A17	O	NC	
39	Address signal	A18	O	NC	
40	Address signal	A19	O	NC	
	SDRAM Bank 0	B0	O		
41	Address signal	A20	O	NC	
	SDRAM Bank 1	B1	O		
42	Address signal	A21	O	NC	
	SDRAM Bank 2	B2	O		

43	Address signal	A22	O	NC	
	SDRAM Bank 3	B3	O		
44	Clock output	SDCLK	O	NC	
45	Chip select	CSc	O	NC(CS_N)	Default = NC Can be connected with Jumper Pin
	Wait	Wait	O		
46	Address line enable	ALE	O	NC	
	SDRAM SDCLK Enable	CKE	O		
47	Higher-order byte data write	HWRn	O	WR1_N	
	SDRAM Data Mask Enable	DQM1	O		
48	Lower-order byte data write	LWRn	O	WR0_N	
	SDRAM Data Mask Enable	DQM0	O		
49	Column address select	CAS	O	NC	
50	Row address select	RAS	O	NC	

Table 6.2.4 JA5 Expansion connector

Pin#	Functions	Name	I/O	Pin# of R8A66597	Notes
1	A/D converter	ADC4	I	NC	
2	A/D converter	ADC5	I	NC	
3	A/D converter	ADC6	I	NC	
4	A/D converter	ADC7	I	NC	
5	CAN data transmit	CAN1TX	O	NC	
6	CAN data receive	CAN1RX	I	NC	
7	CAN data transmit	CAN2TX	O	NC	
8	CAN data receive	CAN2RX	I	NC	
9	External interrupt request	IRQ4	I	NC	
	Reset on Index	M2_EncZ	I		
	M2_HSIN1	M2_HSIN1	I		
10	External interrupt request	IRQ5	I	NC	
	M2_HSIN2	M2_HSIN2	I		
11	Motor control 2 Up/Down count	M2_UD	I	NC	
12	Motor Control 2 Uin	M2_Uin	I	NC	
13	Motor Control 2 Vin	M2_Vin	I	NC	
14	Motor Control 2 Win	M2_Win	I	NC	
15	Motor Control 2 Toggle	M2_Toggle	I	NC	
16	Motor Control 2 POE	M2_POE	I	NC	
17	Motor control 2 external input clock	M2_TRCCLK	I	NC	
18	Motor control 2 external input clock	M2_TRDCLK	I	NC	
19	Motor control 2 three-phase PWM output 1 positive	M2_Up	O	NC	
20	Motor control 2 three-phase PWM output 1 negative	M2_Un	O	NC	
21	Motor control 2 three-phase PWM output 2 positive	M2_Vp	O	NC	
22	Motor control 2 three-phase PWM output 2 negative	M2_Vn	O	NC	
23	Motor control 2 three-phase PWM output 3 positive	M2_Wp	O	NC	
24	Motor control 2 three-phase PWM output 3 negative	M2_Wn	O	NC	

Table 6.2.5 JA6 Expansion connector

Pin#	Functions	Name	I/O	Pin# of R8A66597	Notes
1	DMA transfer request input	DREQ	I	DREQ0_N	
2	DMA transfer discernment signal output	DACK	O	DACK0_N	
3	DMA transfer end signal input	TEND	I	DEND0_N	
4	DMA Standby input	STBYn	I	NC	
5	UART transmit	RS232TX	O	NC	
6	UART receive	RS232RX	I	NC	
7	Serial port receive	SCIbRX	I	NC	
8	Serial port transmit	SCIbTX	O	NC	
9	Serial port transmit	SCIcTX	O	NC	
10	Serial port clock	SCIbCK	I/O	NC	
11	Serial port clock	SCIcCK	I/O	NC	
12	Serial port receive	SCIcRX	I	NC	
13	Motor control 1 toggle	M1_Toggle	I	NC	
14	Motor control 1 Uin	M1_Uin	I	NC	
15	Motor control 1 Vin	M1_Vin	I	NC	
16	Motor control 1 Win	M1_Win	I	NC	
17	Reserved	-	-	NC	
18	Reserved	-	-	NC	
19	Reserved	-	-	NC	
20	Reserved	-	-	NC	
21	Reserved	-	-	NC	
22	Reserved	-	-	NC	
23	Unregulated supply	Unregulated VCC	-	NC	
24	GND	GND	-	NC	

7. Jumper and Switch Setting

Table 7.1 Power supply / GND jumper setting

JP Name	Factory Settings	Function
JP1	Shorted by pattern	Connecting between frame ground of CN5 and signal ground. It is necessary to cut JP1's pattern when dividing frame ground and signal ground.
JP2	Shorted by pattern	Jumper for measurement of 3.3V current. It is necessary to cut JP2's pattern when measuring 3.3 V current.
JP3	Shorted by wire	Connecting between AGND and DGND
JP5	Shorted by pattern	Connecting between frame ground of CN1 and signal ground. It is necessary to cut JP5's pattern when dividing frame ground and signal ground.

Table 7.2 VIF jumper setting

JP Name	Position	Factory Settings	Function
JP6 (VBUS)	EXIOVcc		Power is supplied to VIF through TP29
	3.3V	O	VCC and VIF of R8A66597 are supplied from same source.

Table 7.3 USB mode jumper setting

JP Name	Position	Factory Settings	Function
JP6 (VBUS)	HOST		CN1-1 (VBUS of USB A receptacle) is connected to VBUS output of U2-5
	OTG		This position is for internal evaluation mode
	PERI	O	CN1-1 (VBUS of USB A receptacle) is connected to VBUS pin of R8A66597 and CN2-24.

Table 7.4 IRQ0 / IRQ2 jumper setting

JP Name	Position	Factory Settings	Function
JP7 (INT SEL0)	IRQ 0	O	Connect JA2-7 pin and INT_N pin on R8A66597
	IRQ 2		Connect JA2-23 pin and INT_N pin on R8A66597

Table 7.5 IRQ1 / IRQ3 jumper setting

JP Name	Position	Factory Settings	Function
JP11 (INT SEL1)	IRQ 1	-	Not used with this board
	IRQ 3	-	Not used with this board

Table 7.6 CS select jumper setting

JP Name	Position	Factory Settings	Function
JP8 (CS SEL)	CSa	O	Connect JA3-27 pin and CS_N pin on R8A66597
	CSb		Connect JA3-28 pin and CS_N pin on R8A66597
	CSc		Connect JA3-45 pin and CS_N pin on R8A66597

Table 7.7 DC5V select jumper setting

JP Name	Position	Factory Settings	Function
JP10 (DC5VSEL)	EXT	O	Connect CN4 and VBus supply device
	RSK		Connect JA1-1 Pin and VBus supply device

Table 7.8 WR0 select jumper setting

JP Name	Position	Factory Settings	Function
JP14 (WR0 SEL)	WR	O	Connect WR on RSK and WR0 on R8A66597
	LWR		Connect LWR on RSK and WR0 on R8A66597

Table 7.9 DC5V select jumper setting

JP Name	Position	Factory Settings	Function
JP13 (WR1 SEL)	WR	O	Connect WR on RSK and WR1 on R8A66597
	HWR		Connect HWR on RSK and WR1 on R8A66597
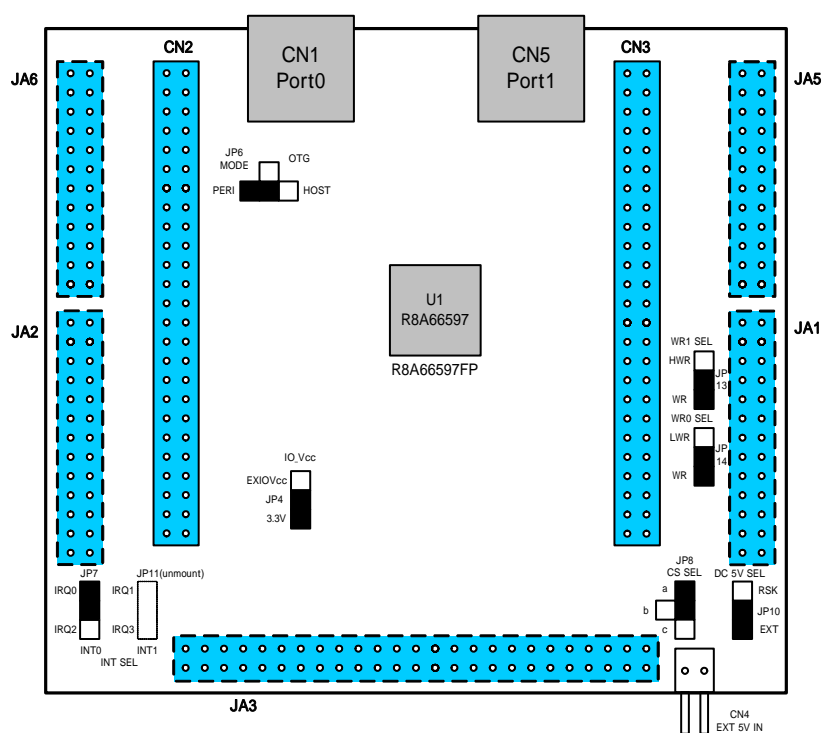
Figure 7.1 Default jumpers setting (Top view)

8.   Setup

The board combined with this board (R0K866597D020BR) is called a target board in the description below.

This section illustrates how to use this board with a target board to connect to a USB device.

8.1 Using with RSK

Renesas Starter Kits are the latest development from Renesas in low-cost evaluation development toolkits. It is possible to test the R8A66597FP easily by combining it with this board and the RSK. But, it isn't possible to test the R8A66597FP's split bus.
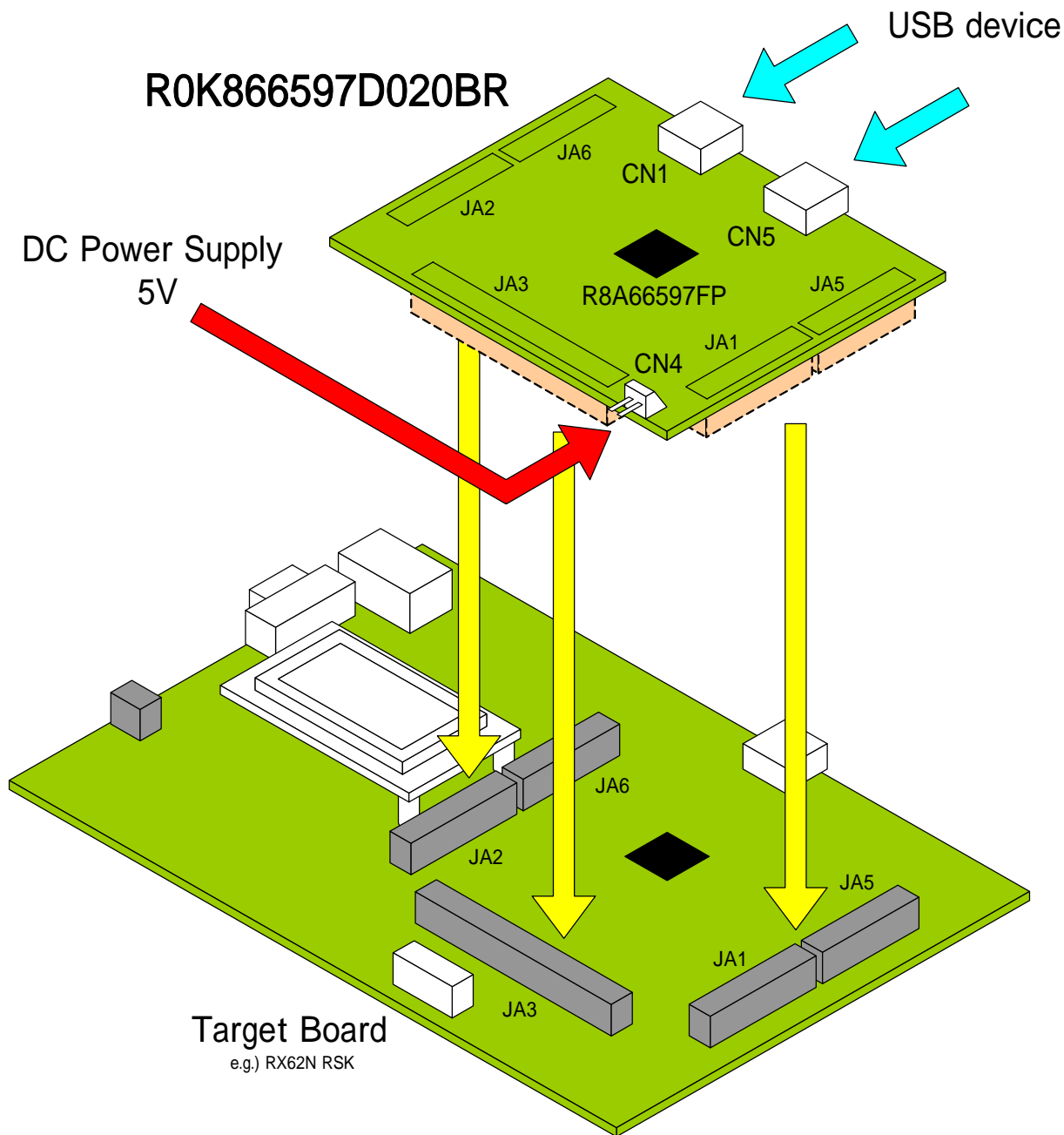

Figure 8.1.1 Connected image chart

How to use the R0K866597D020BR with the RSK is shown as below.

(1) Setting of switch and jumper.

    (a) Set JP4 to "3.3 V". ("3.3V" is factory setting)

    (b) Set JP7 to "IRQ 0". ("IRQ 0" is factory setting)

    (c) Set JP8 to "CSa". ("CSa" is factory setting)

    (d) Set JP10 to "EXT". ("EXT" is factory setting)

(2) Connecting the R0K866597D020BR to the RSK.

Insert JA1's #1-pin and #2-pin of the R0K866597D020BR board to JA1's #1-pin and #2-pin of the RSK to connect the two boards together.

(3) VBUS output for host function

Apply 5V to CN4 of the R0K866597D020BR board using the power supply cable included. The red wire is 5V and the black one is GND.

    (a) When output VBUS to CN1:
        (i)   Set high level output to VBOUT0 pin of the R8A66597 by software.
        (ii) Set JP6 to "HOST".
    (b) When output VBUS to CN5:
        (i)   Set high level output to VBOUT1 pin of the R8A66597 by software.

It is possible to operate the R8A66597FP using the remote debugger RSK that is attached to the RSK. Please refer to the RSK's Instruction Manual".

8.2   Using with other boards

This evaluation board supports separate bus mode only. (Does not support multiplex bus mode)
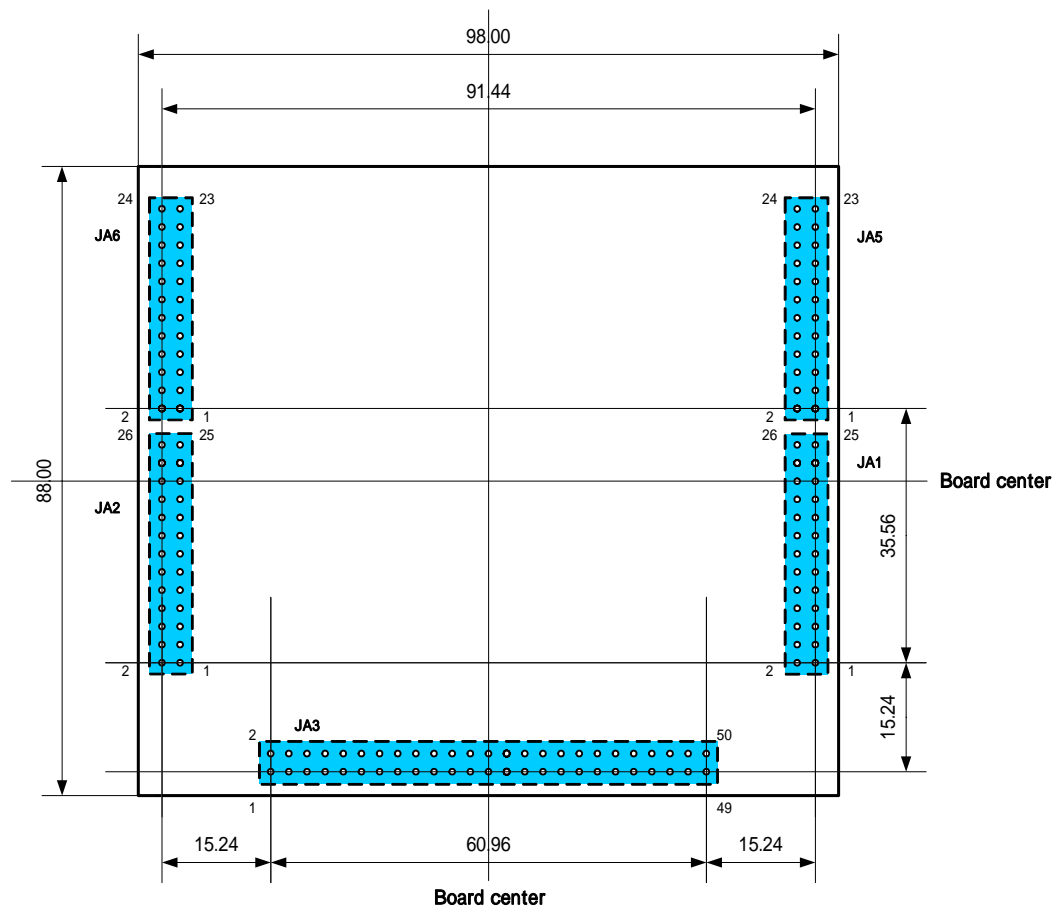
Below are notes for target board design.

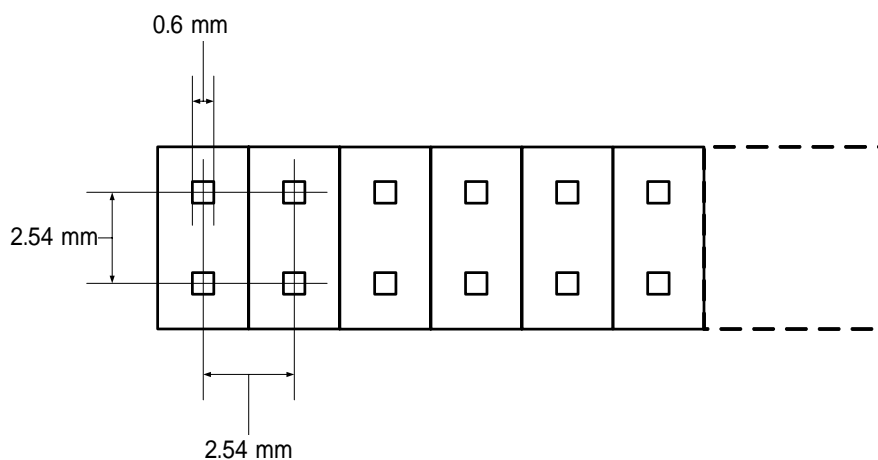**Figure 8.2.1 Position of connectors chart**

Figure 8.2.2 Detail view of connectors

(1) The receptacle of the target board should suit the size of this board (refer to Figure 3 and Figure 4). Make pin arrangement the same as this board (refer to Table 1 and Table 2). Please refer to Appendix 1: the R0K866597D020BR Part List and Appendix 2: the Circuit Diagram, when selecting connector and pin arrangement. The HKP-50FD2 from Honda Tsushin Kogyo is applicable to the target board.

(2) The R8A66597FP generates a core power 1.5V from VCC 3.3V. An internal regulator makes 1.5V from 3.3V through the #19-pin and #20-pin of CN3 and outputs 1.5V to VDD pin. On the R0K866597D020BR, 4.7uF and 0.1uF capacitors are mounted as smoothing capacitors for VDD.

(3) The interface power supply VIF is 1.8V or 3.3V.
  (a) Short JP4 to "EXIOVcc" and supply 1.8V by the #25-pin and #26-pin of CN2 , when VIF is 1.8V.
  (b) Short JP4 to "3.3V", when VIF is 3.3V. In this case, power supply to VIF is the same as VCC.

(4) Use SD0-SD7 of CN2 when using split bus for DMA. SD0-SD7 can be used also as a general-purpose port.

(5) Processing for unused pin : Please refer to the R8A66597 datasheet, USB2.0 Dual Function Controller R8A66597FP/DFP, for details.

VBUS circuit

Note: When the peripheral device connected to the USB connector is in an unusual state due to a short circuit, or an over current causes an over current in VBUS, the over current protection circuit of a USB power switch IC turns on, and it turns the VBUS power supply off. But after turning off, current around 0.4A continues flowing, and the USB power switch IC runs hot. Remove the unusual state promptly for the sake of safety. To start/stop supply VBUS to the peripheral device, the MCU should operate the R8A66597 to turn on/off the VBUS output of the USB power switch IC (U2). When the USB power switch IC detects over current, it outputs a low pulse to the FLG output pin connected to the R8A66597FP, and it issues an interrupt to MCU to notice the over current state. Monitor the FLG output pin status and turn off the VBUS output when the over current state is detected by the R8A66597 control software.
Confirm that the USB device is in usual state before connecting.

(1) To supply 5V to VBUS of CN1:
  (a) Apply 5V to CN4.
  (b) Set JP6 to "HOST".
  (c) Output high signal from VBOUT0-pin by a R8A66597 control software.

(2) To supply 5V to VBUS of CN5
  (a) Apply 5V to CN4.
  (b) Output high signal from VBOUT1-pin by a R8A66597 control software.

Note: When the R8A66597 control software turn off VBUS supply from the USB power switch IC, VBUS is not shutdown immediately but slowly because of 150uF capacitor.

8.3   Using R0K866597D020BR as a peripheral

When the R0K866597D020BR is operated as a peripheral controller, please pay attention to following notes:

(1) Set JP6 to "PERI"
(2) Connect a USB host, such as a PC to CN1
(3) To connect a USB host to CN1, an adapter is needed to convert the A-plug into the B-receptacle.
(4) CN5 is not available as a peripheral.

9. Connectors Pin Assignment

Table 9. R0K866597D020BR JA1 Pin Assignment

J A 1			
PIN	Function	PIN	Function
1	5V	2	GND
3	3V3	4	GND
5		6	
7		8	
9		10	
11		12	
13		14	
15		16	
17		18	
19		20	
21		22	
23	(SOF_N)*	24	

* : Can be connected depending on JP setting.

Table 10. R0K866597D020BR JA2 Pin Assignment

J A 2			
PIN	Function	PIN	Function
1	RESET	2	
3		4	GND
5		6	
7	INT_N	8	
9	(SOF_N)*	10	
11		12	
13		14	
15		16	
17		18	
19		20	
21		22	
23	(INT_N)*	24	
25		26	

* : Can be connected depending on JP setting.

Table 11. R0K866597D020BR JA3 Pin Assignment

PIN	Function	PIN	Function
	J A 3		
PIN	Function	PIN	Function
1		2	A1
3	A2	4	A3
5	A4	6	A5
7	A6	8	A7
9		10	
11		12	
13		14	
15		16	
17	D0	18	D1
19	D2	20	D3
21	D4	22	D5
23	D6	24	D7
25	RD_N	26	
27	CS_N	28	(CS_N)*
29	D8	30	D9
31	D10	32	D11
33	D12	34	D13
35	D14	36	D15
37		38	
39		40	
41		42	
43		44	
45	(CS_N)*	46	
47	WR1_N	48	WR0_N
49		50	

* : Can be connected depending on JP setting.

Table 12. R0K866597D020BR JA6 Pin Assignment

PIN	Function	PIN	Function
	J A 6		
PIN	Function	PIN	Function
1	DREQ0_N	2	DACK0_N
3	DEND0_N	4	
5		6	
7		8	
9		10	
11		12	
13		14	
15		16	
17		18	
19		20	
21		22	
23		24	

*: Because the signal wire of JA5 is not used in this board, the table is omitted.

10.   Circuit Diagram

See attached document. (Appendix 1)

11.   Parts Layout Diagram

See attached document. (Appendix 2)

12.   Parts List

See attached document. (Appendix 3)

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Revision Record

		Description	
Rev.	**Date**	**Page**	**Summary**
1.00	Jan 10.2012	—	First edition issued

General Precautions in the Handling of MPU/MCU Products

The following usage notes are applicable to all MPU/MCU products from Renesas. For detailed usage notes on the products covered by this manual, refer to the relevant sections of the manual. If the descriptions under General Precautions in the Handling of MPU/MCU Products and in the body of the manual differ from each other, the description in the body of the manual takes precedence.

1. Handling of Unused Pins

   Handle unused pins in accord 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 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. Unused pins should be handled as described under Handling of Unused Pins in the manual.

2. Processing at Power-on

   The state of the product is undefined at the moment 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 moment 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 moment 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 moment when power is supplied until the power reaches the level at which resetting has been specified.

3. Prohibition of Access to Reserved Addresses

   Access to reserved addresses is prohibited.

   — The reserved addresses are provided for the possible future expansion of functions. Do not access these addresses; the correct operation of LSI is not guaranteed if they are accessed.

4. Clock Signals

   After applying a reset, only release the reset line after the operating clock signal has become stable. When switching the clock signal during program execution, wait until the target clock signal has 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. Moreover, 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.

5. Differences between Products

   Before changing from one product to another, i.e. to one with a different type number, confirm that the change will not lead to problems.

   — The characteristics of MPU/MCU in the same group but having different type numbers may differ because of the differences in internal memory capacity and layout pattern. When changing to products of different type numbers, implement a system-evaluation test for each of the products.

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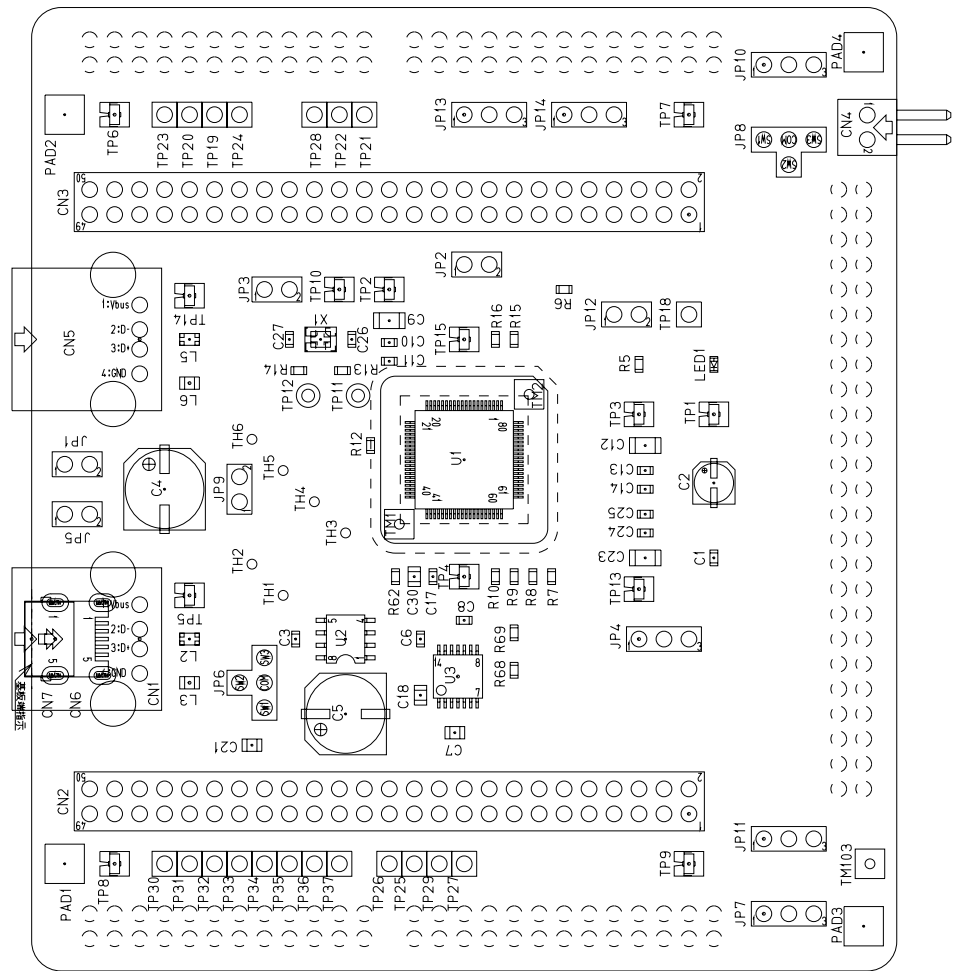
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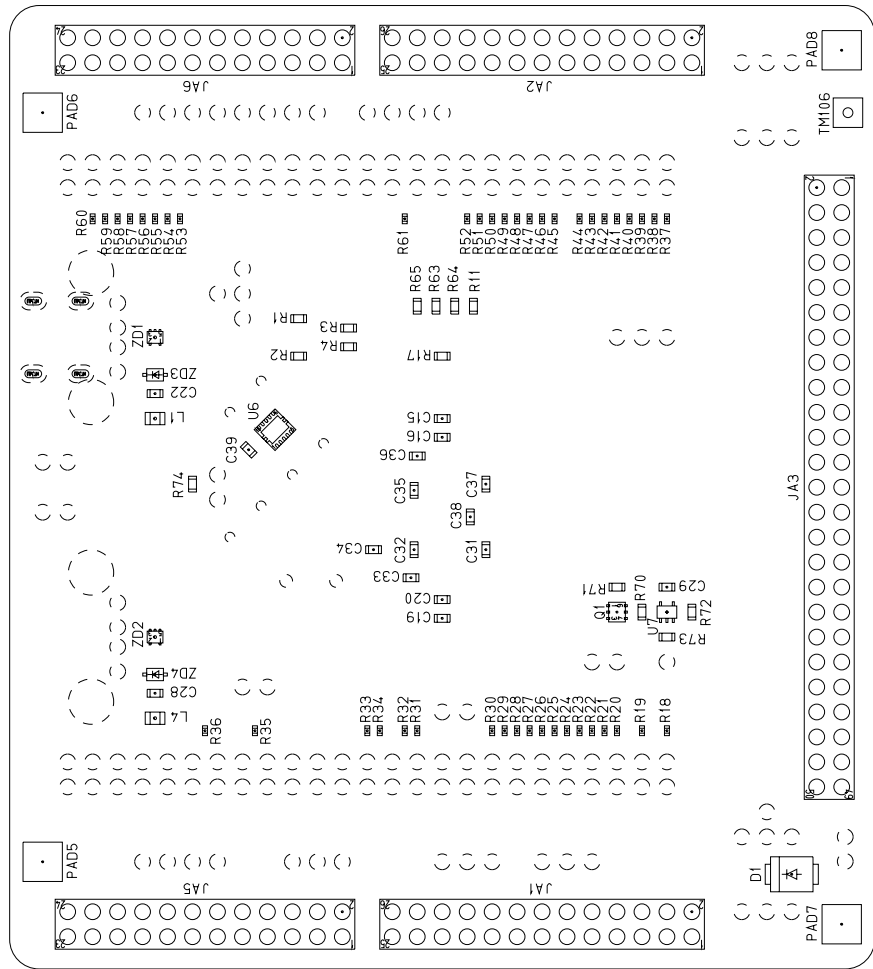Circuit Diagram
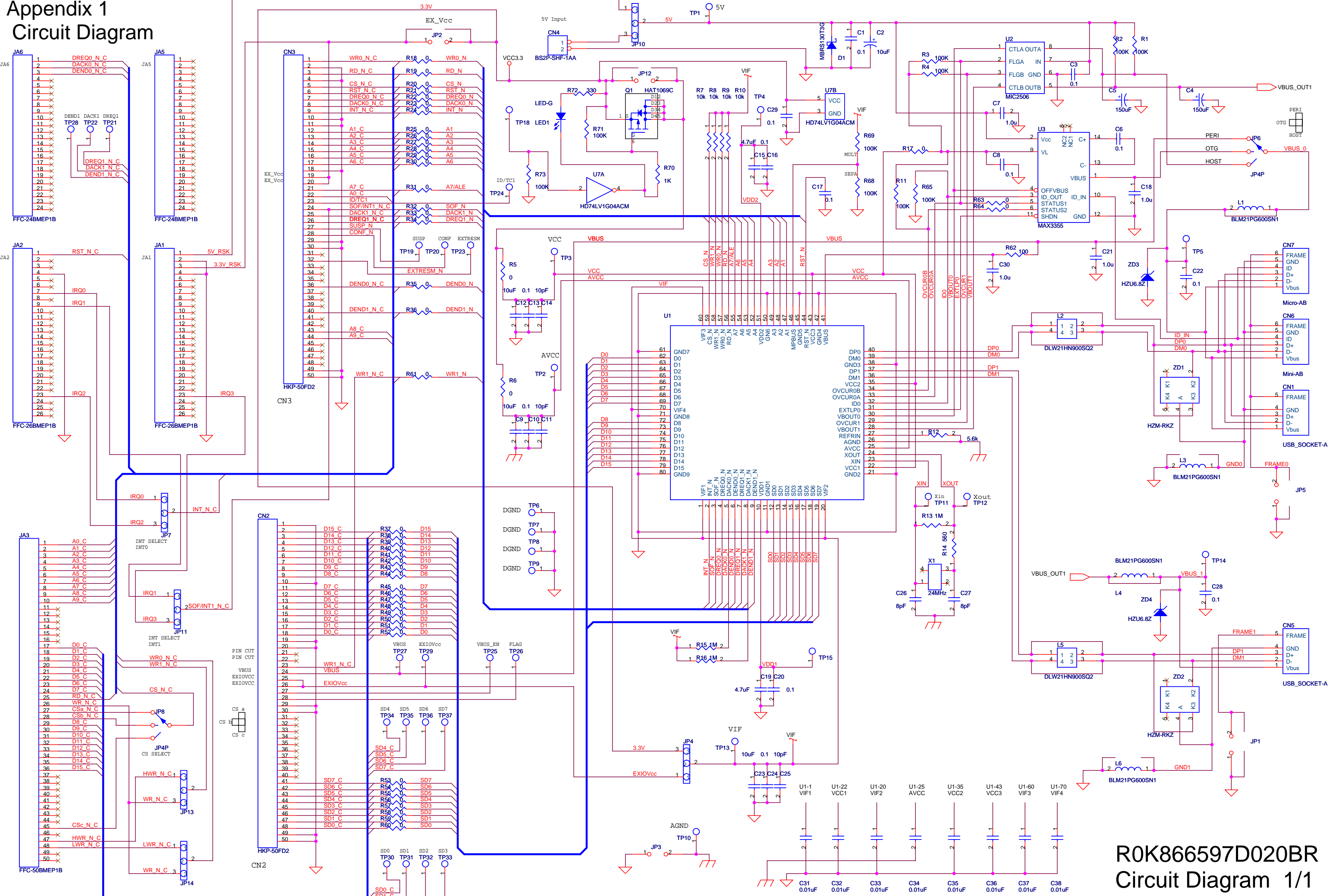
R0K866597D020BR
Circuit Diagram 1/1

D-R0K866597D020BR_C

Appendix2: Parts Layout Diagram

1.Front Surface

2.Rear Surface

基板部品立面図

Appendix3 Parts List

	PPL-R0K866597D020BR	Title	R0K866597D020BR Part List

No.	Component Name		Component Specification			Qty/set	Notes
	Type	Symbol on Board	Product Number (specification)	Manufacture	Mount/ unmount		
1	USB_SOCKET-A	CN1,CN5	UBA-4R-D14-4D(LF)(SN)	JST		2	
2	HEADER	CN4	BS2P-SHF-1AA(LF)(SN)	JST		1	
3	Ceramic Capacitor	C1,C3,C10,C13,C16,C17,C20,C22, C24,C28	GRM188B11E104KA01D	Murata Manufacturing		10	
4	Aluminum Electrolytic Capacitor	C2	UWT1C100MCL1GB	Nichicom		1	
5	Ceramic Capacitor	C9,C12,C23	GRM31CB11A106KA01	Murata Manufacturing		3	
6	Aluminum Electrolytic Capacitor	C4,C5	RHA1C151MCN1GS	Nichicom		2	
7	Ceramic Capacitor	C21,C30	GRM21BB11C105KA01L	Murata Manufacturing		2	
8	Ceramic Capacitor	C11,C14,C25	GRM1885C1H100JA01D	Murata Manufacturing		3	
9	Ceramic Capacitor	C15,C19	GRM188B30J475KE18D	Murata Manufacturing		2	
10	Ceramic Capacitor	C26,C27	GRM1885C1H8R0DZ01D	Murata Manufacturing		2	
11	Ceramic Capacitor	C31,C32,C33,C34,C35,C36,C37, C38	GRM188B11H103KA01D	Murata Manufacturing		8	
12	Schottky barrier diode	D1	MBRS130LT3G	OnSemi		1	
13	-	JP3	-	-		1	Short
14	Jumper Pin 1P	JP6,JP8	WL-1	MAC8		2	
15	Jumper Pin 3P	JP4,JP6,JP7,JP8,JP10,JP13,JP14	WL-1	MAC8		7	

No.	Component Name		Component Specification			Qty/set	Notes
	Type	Symbol on Board	Product Number (specification)	Manufacture	Mount/ unmount		
16	Thick Film Resistors	R3,R4,R11,R65,R68	MCR03EZPJ104	ROHM		5	
17	Thick Film Resistors	R5,R6,R17	MCR03EZPJ000	ROHM		3	
18	Thick Film Resistors	R18,R19,R20,R21,R22,R23,R24, R25,R26,R27,R28,R29,R30,R31, R32,R33,R34,R35,R36,R37,R38, R39,R40,R41, R42,R43,R44,R45,R46,R47,R48, R49,R50,R51,R52,R53,R54,R55, R56,R57,R58,R59,R60,R61	MCR01MZPJ000	ROHM		44	1005 type
19	Thick Film Resistors	R7,R8,R9,R10	MCR03EZPJ103	ROHM		4	
20	Thick Film Resistors	R12	MCR03EZPFX5601	ROHM		1	
21	Thick Film Resistors	R13,R15,R16	MCR03EZPJ105	ROHM		3	
22	Thick Film Resistors	R14	MCR03EZPFX5600	ROHM		1	
23	Thick Film Resistors	R62	MCR03EZPJ101	ROHM		1	
24	USB ASSP	U1	R8A66597FP	Renesas Electronics		1	
25	USB Power Switch IC	U2	MIC2506YM	MICREL		1	
26	Crystal Oscillator	X1	DSX321G（24.0000MHz）	Daishinku		1	
27	TP（SMD）	TP1	HK-5-G（RED）	MAC8		1	
28	TP（SMD）	TP2	HK-5-G（YELLOW）	MAC8		1	
29	TP（SMD）	TP3	HK-5-G（ORANGE）	MAC8		1	
30	TP（SMD）	TP6,TP7,TP8,TP9,TP10	HK-5-G（BLACK）	MAC8		5	
31	TP（SMD）	TP5,TP14	HK-5-G（BLUE）	MAC8		2	
32	TP（SMD）	TP13	HK-5-G（GREEN）	MAC8		1	
33	TP（SMD）	TP4,TP15	HK-5-G（WHITE）	MAC8		2	

No.	Component Name		Component Specification			Qty/set	Notes
	Type	Symbol on Board	Product Number (specification)	Manufacture	Mount/ unmount		
34	PCB header connector(13x2)	JA1,JA2	FFC-26BSM1B	HONDA CONNECTORS		2	
35	PCB header connector(25x2)	JA3	FFC-50BSM1B	HONDA CONNECTORS		1	
36	PCB header connector(12x2)	JA5,JA6	FFC-24BSM1B	HONDA CONNECTORS		2	
37	USB mini AB Socket	(CN6)	CAM-E48F-005-8620A	MITSUMI	unmount	0	
38	USB micro AB Socket	(CN7)	ZX62-AB-5PA	HIROSE	unmount	0	
39	Ceramic Capacitor	(C6),(C8),(C29),(C39)	GRM188B11E104KA01D	Murata Manufacturing	unmount	0	
40	Ceramic Capacitor	(C7),(C18)	GRM21BB11C105KA01L	Murata Manufacturing	unmount	0	
41	Jumper Pin 2P	(JP1),(JP2),(JP5),(JP9),(JP12)	WL-1	MAC8	unmount	0	
42	Jumper Pin 3P	(JP11)	WL-1	MAC8	unmount	0	
43	LED	(LED1)	SML-310MT	ROHM	unmount	0	
44	Chip Ferrite Beads	(L1),(L3),(L4),(L6)	BLM21PG600SN1	Murata Manufacturing	unmount	0	
45	Common Mode Choke Coils	(L2),(L5)	DLW21HN900SQ2	Murata Manufacturing	unmount	0	
46	FET	(Q1)	HAT1069C	Renesas Electronics	unmount	0	
47	Thick Film Resistors	(R1),(R2),(R69),(R71),(R73),(R74)	MCR03EZPJ104	ROHM	unmount	0	
48	Thick Film Resistors	(R63),(R64)	MCR03EZPJ000	ROHM	unmount	0	
49	Thick Film Resistors	(R70)	MCR03EZPJ102	ROHM	unmount	0	
50	Thick Film Resistors	(R72)	MCR03EZPJ331	ROHM	unmount	0	
51	OTG Control IC	(U3)	MAX3355EEUD+	MAXIM	unmount	0	
52	USB SWITCH DUAL	(U6)	TS3USB221DRCR	TI	unmount	0	
53	Uni-logic IC	(U7)	HD74LV1G04ACM	Renesas Electronics	unmount	0	
54	Zener Diode	(ZD1),(ZD2)	HZN6.2Z4MFA	Renesas Electronics	unmount	0	

No.	Component Name		Component Specification			Qty/set	Notes
	Type	Symbol on Board	Product Number (specification)	Manufacture	Mount/ unmount		
55	Zener Diode	(ZD3),(ZD4)	HZU6.8Z	Renesas Electronics	unmount	0	
56	TP	(TP11),(TP12)	ST-4-1	MAC8	unmount	0	
57	TP	(TP18),(TP19),(TP20),(TP21), (TP22),(TP23),(TP24),(TP25), (TP26),(TP27),(TP28),(TP29), (TP30),(TP31),(TP32),(TP33), (TP34),(TP35),(TP36),(TP37)	WL-1	MAC8	unmount	0	
58	PCB receptacle(12x2)	(CN2),(CN3)	HIF3H-50DA-2.54DSA(71)	HIROSE	unmount	0	
59	PCB Board	—	R0K866597	SANYO KOGYO	—	1	
	Assembly parts						
60	Jumper Socket		XJ8A-0241	OMRON	-	7	
61	Housing for Power Cable		H2P-SHF-AA	JST	-	1	
62	Contact for Power Cable		SHF-001T-0.8BS	JST	-	2	
63	Power Cable(Red)		UL1007-AWG24-RED	SHINAGAWA ELECTRIC WIRE	-	1	
64	Power Cable(Black)		UL1007-AWG24-BLACK	SHINAGAWA ELECTRIC WIRE	-	1	
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