User's Manual

RA6T1 Group

RA6T1 CPU Card
User's Manual

Renesas RA Family
RA6 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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Renesas RA Family

RA6T1 CPU Card User's Manual

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1. Overview

RA6T1 CPU Card is the option board of Evaluation System for BLDC Motor (RTK0EMX270S00020BJ). By connecting this product to the inverter board, you can evaluate motor control with RA6T1.

Major functions of RA6T1 CPU Card are shown below.

- R7FA6T1AD3CFP MCU (hereinafter called “RA MCU”)
- Connector
  - Board to board connector (CNA, CNB)
  - USB connector for J-Link OB
  - SCI connector for Renesas Motor Workbench communication
  - Through hole for CAN communication
  - Through hole for SPI communication
  - Connector for hall sensor signal input
  - Connector for encoder signal input
  - 10/20 pin through hole for Arm debugger
  - Through hole for 2nd inverter
  - Connection pattern for J-Link 6pin Needle Adapter
- LED
  LED for user control x2

Switch
Switch for MCU external reset

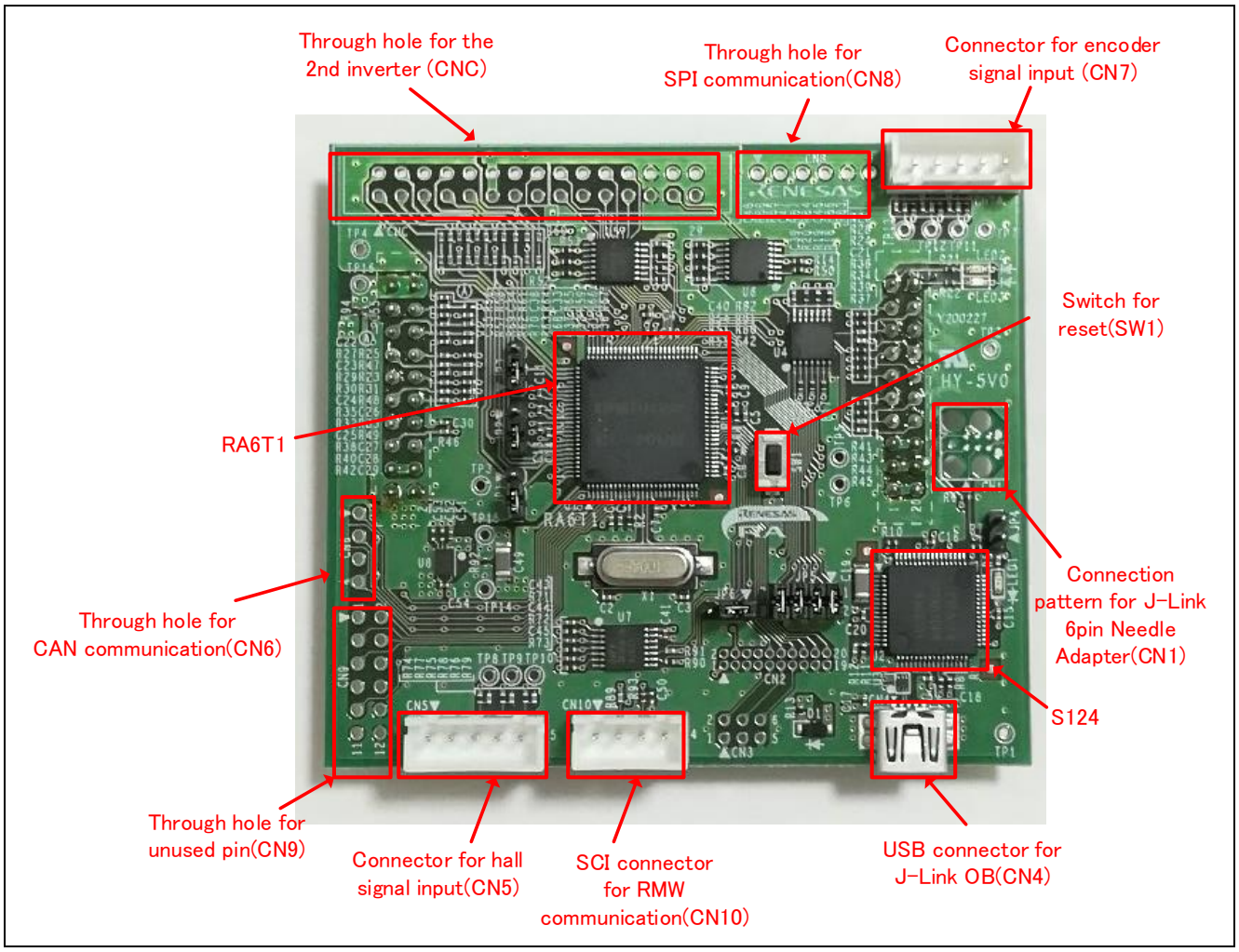

Figure 1-1 RA6T1 CPU Card (top view)

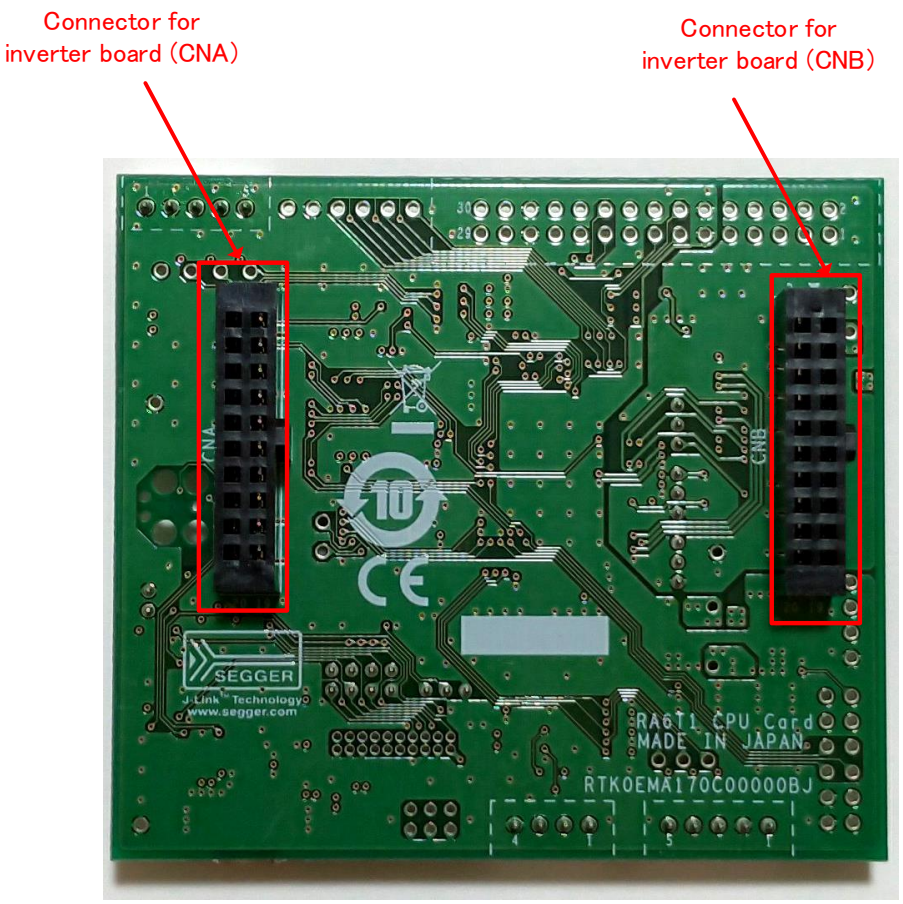

Figure 1-2 RA6T1 CPU Card (bottom view)

1.1 Presupposition and precautions of this document

1. Experience of using tools: This document assumes that the user has used terminal emulation program of Integrated Development Environment (IDE) such as e2 studio before.
2. Knowledge about the development subject: This document assumes that the user has a basic knowledge to modify the sample project regarding MCU and embedded system.
3. Before using this product, wear an antistatic wrist strap. If you touch this product with static charge on your body, a device failure may occur or operation may become unstable
4. To use this product prepare the following items, too.
   - Inverter board：
     Inverter bord supplied with “Motor Control Evaluation System for RA Family - RA6T1 Group” or “Evaluation System for BLDC Motor”
   - Brushless DC motor：
     Permanent Magnet Synchronous Motor “TG-55L-KA” by TSUKASA Electric Co.,LTD supplied with “Motor Control Evaluation System for RA Family - RA6T1 Group” or “Evaluation System for BLDC Motor”
   - Motor cable：
     “Motor cable supplied with “Motor Control Evaluation System for RA Family - RA6T1 Group” or “Evaluation System for BLDC Motor”
   - Ferrite core：
     Ferrite core supplied with “Motor Control Evaluation System for RA Family - RA6T1 Group” or “Evaluation System for BLDC Motor”
   - ・Stabilized power supply : Output voltage of DC24 V or higher, the upper limit of the output current can be set at 1A
   - ・Power supply cable (x2) : Cables which enable to apply the current of 1A or higher.
     (To connect the stabilized power supply and the inverter board)

5. All screen shots provided in this document is for reference. Actual screen displays may differ depending on the software and development tool version which you use.

2. Product Contents

This product consists of the following parts.

1. RA6T1 CPU Card (RTK0EMA170C00000BJ)

Figure 2-1 RA6T1 CPU Card product contents

3. Product Order Information

Product model name to order RA6T1 CPU Card : RTK0EMA170C00000BJ

4. Hardware Configuration and Default Setting

4.1 Hardware configuration

Specification of this product is listed below.

Table 4-1 RA6T1 CPU Card Specification List

item		Specification
Product name		RA6T1 CPU Card
Board product name		RTK0EMA170C00000BJ
Compatible inverter board / product name		Inverter board supplied with Evaluation System for BLDC Motor /RTK0EM0000B10020BJ
External view		 Note: The actual product may differ from this photo.
Mounted MCU	Product group	RA6T1 group
	Product name	R7FA6T1AD3CFP
	CPU maximum operating frequency	120MHz
	Bit number	32 bit
	Package / Pin number	LFQFP / 100 pin
	Code Flash / RAM	512K byte / 64K byte
MCU input clock		10MHz (Generate with external crystal oscillator)
Input power supply voltage		DC 5V (±5%) Select one from the below ● Power is supplied from compatible inverter board ● Power is supplied from USB connector
Compatible sensor		Hall sensor, Encoder
Compatible emulator		J-Link-OB (Onboard emulator circuit)
Connector		● Inverter board connector x2 ● USB connector for J-Link OB ● SCI connector for Renesas Motor Workbench communication ● Through hole for CAN communication ● Through hole for SPI communication ● Connector for hall sensor signal input ● Connector for encoder signal input ● 10/20 pin through hole for Arm debugger ● Through hole for 2nd inverter ● Connection pattern for J-Link 6pin Needle Adapter
Switch		Switch for MCU external reset
LED		LED for user control x2
Operating temperature		Room temperature
Operating humid		No condensation allowed

4.2 Block diagram

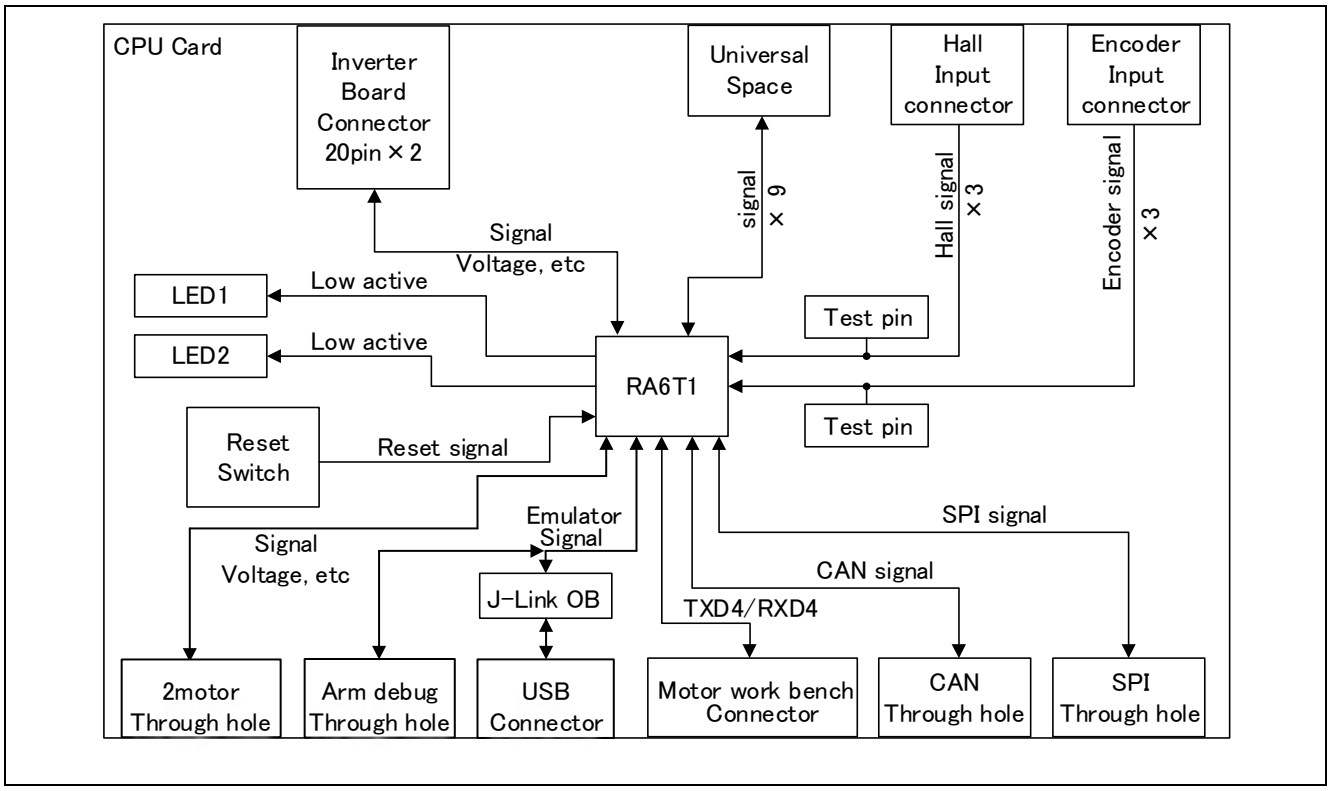

Table 4-2 RA6T1 CPU Card block diagram

5. Describe Functions

This section describes the functions of RA6T1 CPU Card.

5.1 Overview

RA6T1 CPU Card is the option board for the Evaluation System for BLDC Motor. This product operates the motor by connecting to the Evaluation System for BLDC Motor

5.2 Functions

5.2.1 Supply power

This product does not have a connector dedicated for power supply. If you do not connect it to the inverter board, the power needs to be supplied from the USB connector. However, if you connect it to the inverter board, the power is supplied from the inverter board, accordingly, in this case, you are not allowed to supply power from the USB connector.

5.2.2 Onboard emulator

This product has the onboard emulator circuit, J-Link On-Board (hereinafter called “J-Link-OB”). The program of RA6T1 is rewritten by J-Link-OB, which can be done by connecting the USB connector of this product and USB of the PC. J-Link-OB operates as emulator equivalent to J-Link with SWD I/F. When connecting from Integrated Development Environment (e.g. e2studio) or flash programming tool (e.g. J-Flash Lite by SEGGER), set the type of emulator (tool) to “J-Link” and SWD I/F, power supply to “not supply power” at the time of setting. In addition, since J-Link-OB is operated in the onboard debug mode, set JP4 to “open”, JP6, “1-2pin short”.

5.2.3 Inverter board connector

This product can be connected to an inverter board via the inverter board connectors (CNA, CNB). Pin assignment for the inverter board connectors is listed in the Table 5-1 and Table 5-2.

Table 5-1 Inverter board connector (CNA) pin assignment

Pin No	Pin function	RA6T1 pin	Pin No	Pin function	RA6T1 pin
1	LED1#	P408	2	LED2#	P407
3	LED3#	P207	4	VRL	P201
5	FO#	P503/GTETRGC	6	INVRES	-
7	WN	P112/GTIOC3B	8	VN	P114/GTIOC2B
9	UN	P414/GTIOC0B	10	WP	P111/GTIOC3A
11	VP	P113/GTIOC2A	12	UP	P415/GTIOC0A
13	SW1#	P302	14	SW2#	P301
15	+5VA	- (+5VA)	16	+5VA	- (+5VA)
17	GND	GND	18	GND	GND
19	VCC33_A	VCC	20	VCC33_A	VCC

Table 5-2 Inverter Board Connector (CNB) pin assignment

Pin No	Pin function	RA6T1 pin	Pin No	Pin function	RA6T1 pin
1	AVCC	- (AVCC)	2	AVCC	- (AVCC)
3	-	-	4	PGAVSS1	P003/PGAVSS000(*1)
5	IU	P000/AN000	6	IV	P001/AN001
7	IW	P002/AN002	8	VPN	P014/AN005
9	TEMP	-	10	VU	P504/AN018
11	VV	P508/AN020	12	VW	P015/AN006
13	VAC	-	14	IPFC	-
15	VR	P502/AN017(*2)	16	RSVIN	-
17	VCC	- (UVCC)	18	VCC	- (UVCC)
19	GND	GND	20	GND	GND

*1 Default is connecting to “4pin” on CNB. Can connect to GND by jumper switch.

*2 Default is connecting to “15pin” on CNB. Decide which pin to connect, “15pin” on CNB or “9pin” on CNC, depending on jumper.

5.2.4 Serial communication

Since this product communicates using Renesas Motor Workbench, it has pins for serial communication connection. Pin assignment for the serial communication connector is listed in Table 5-3.

Table 5-3 Serial communication connector (CN10) pin assignment

Pin No.	Pin function	RA6T1 pin
1	VCC	- (UVCC)
2	MCU transmitter side	P205/TXD4
3	MCU receiver side	P206/RXD4
4	GND	VSS

5.2.5 Hall sensor signal input

This product has a connector for hall sensor signal input. Hall sensor signal can be entered directly into this product from the motor supplied with Motor RSSK. If signal is entered into this product, the signal is entered into RA6T1 via pull-up resistor, RC filter and level shifter. Pin assignment for hall sensor signal input is listed in Table 5-4.

Table 5-4 Connector for Hall Sensor signal input (CN5) pin assignment

Pin No.	Pin function	RA6T1 pin
1	VCC	- (UVCC)
2	GND	GND
3	HALL_U	P411/IRQ4
4	HALL_V	P410/IRQ5
5	HALL_W	P409/IRQ6

5.2.6 Encoder signal input

This product has a connector for encoder signal input. Encoder signal can be entered into RA6T1. If signal is entered into this product, the signal is entered into RA6T1 via pull-up resistor, RC filter and level shifter. Pin assignment for pins for encoder signal input is listed in Table 5-5.

Table 5-5 Connector for encoder signal input (CN7) pin assignment

Pin No.	Pin function	RA6T1 pin
1	VCC	- (UVCC)
2	GND	GND
3	ENC_A	P107/GTIOC8A
4	ENC_B	P106/GTIOC8B
5	ENC_Z	P105/GTETRGA

5.2.7 Unused pins

For general-purpose use, this product leads out unused pins of RA6T1 into the through holes for unused pins on the board. Pin assignment for the through holes for unused pins is listed in Table 5-6.

Table 5-6 Through holes for unused pin (CN9) pin assignment

Pin No	RA6T1 Connection Pin	Pin No	RA6T1 Connection Pin
1	P400	2	P403
3	P404	4	P405
5	P406	6	P708
7	P413	8	P412
9	P200	10	GND
11	VDD33_D	12	GND

5.2.8 Reset circuit

This product has a reset circuit to enable power-on reset or external reset on MCU. Press the tact switch (SW1) to externally reset MCU.

5.2.9 LED

This product has two ports and LEDs, so that they can be used for program debug and the system. LED switches on when output from the corresponding port is “Low”, and switches off when output is “High”. Pin assignment for corresponding LEDs is listed Table 5-7.

Table 5-7 RA6T1 CPU Card LED connection pin assignment

RA6T1 Corresponding Port		LED2	LED3
P408	High output	Off	-
	Low output	On	-
P407	High output	-	Off
	Low output	-	On

5.2.10 CAN communication

This product has through holes for CAN communication. Pin assignment for CAN communication connector is listed in Table 5-8.

Table 5-8 CAN communication through holes (CN9) pin assignment

Pin No	RA6T1 connection pin
1	P401/CTX0
2	P402/CRX0
3	VCC (VCC33_D)
4	GND

5.2.11 SPI Communication

This product has through holes for SPI communication. Pin assignment for SPI communication through holes is listed in Table 5-9.

Table 5-9 SPI communication through holes (CN8) pin assignment

Pin No	RA6T1 Connection Pin
1	P103/SS0
2	P101/MOSI0
3	P100/MISO0
4	P102/SCK0
5	VCC (VCC33_D)
6	GND

5.2.12 2nd inverter board connector

This product has a connector for the second inverter board (CNC) on the surface of the RA6T1 CPU Card. The connector consists of the through holes of 30 pins (2 rows of 15 pins). The connector has not been installed yet. Pin function necessary to rotate the 2nd motor is assigned to the pins corresponding to MCU. pin assignment for the connector and corresponding pin are listed on Table 5-10. In addition, regarding SW1#_2, SW2#_2, LED1#_2, LED2#_2, LED3#_2, FO#_2, VRL2, IO voltage for inverter board side is 5V. Therefore, MCU and connector is connected via open drain buffer.

Table 5-10 2nd inverter board connector (CNC) pin assignment

Pin No	Pin function	RA6T1 pin	Pin No	Pin function	RA6T1 pin
1	PGAVSS_2	P007/PGAVSS100(*1)	2	VPN_2	P008/AN003
3	IU_2	P004/AN100	4	IV_2	P005/AN101
5	IW_2	P006/AN102	6	TEMP_2	—
7	VU_2	P500/AN016	8	VV_2	P501/AN116
9	VW_2	P502/AN017(*2)	10	VR_2	—
11	GND	VSS	12	GND	AVSS
13	LED1#_2	P305	14	LED2#_2	P304
15	LED3#_2	P303	16	FO#_2	P104/GTETRGB
17	WN_2	P600/GTIOC6B	18	VN_2	P610/GTIOC5B
19	UN_2	P608/GTIOC4B	20	WP_2	P601/GTIOC6A
21	VP_2	P609/GTIOC5A	22	UP_2	P115/GTIOC4A
23	SW1#_2	P307	24	SW2#_2	P306
25	GND	VSS	26	GND	VSS
27	VRL2	P602	28	-	—
29	-	—	30	-	—

*1 Default is connecting to 1pin on CNC. Can connect to GND by jumper switch.

*2 Default is connecting to 15pin on CNB. Decide which pin to connect, 15pin on CNB or 9pin on CNC depending on jumper

5.2.13 RA6T1 pin function list

Table 5-11 RA6T1 pin function list

Pin Number	RA6T1 pin function	CPU Card connection	Function
1	IRQ0/P400/AGTIO1/GTIOC6A/SCK4/SCL0_A/ADTRG1		
2	IRQ5-DS/P401/GTETRGA/GTIOC6B/CTX0/CTS4_RTS4/SS4/SDA0_A		CAN
3	CACREF/IRQ4-DS/P402/AGTIO0/AGTIO1/CRX0		CAN
4	P403/AGTIO0/AGTIO1/GTIOC3A		
5	P404/GTIOC3B		
6	P405/GTIOC1A		
7	P406/GTIOC1B		
8	VBATT		
9	VCL0		
10	XCIN		
11	XCOUT		
12	VSS	VSS	
13	XTAL/IRQ2/P213/GTETRGC/GTIOC0A/TXD1/MOSI1/SDA1/ADTRG1	Crystal Oscillator	
14	EXTAL/IRQ3/P212/AGTEE1/GTETRGD/GTIOC0B/RXD1/MISO1/SCL1	Crystal Oscillator	
15	VCC	VCC	
16	CACREF/IRQ11/P708/RXD1/MISO1/SCL1/SSLA3_B		
17	IRQ8/P415/GTIOC0A/SSLA2_B		U Phase Upper Arm for the 1st INV board
18	IRQ9/P414/GTIOC0B/SSLA1_B/		U Phase Lower Arm for the 1st INV board
19	P413/GTOUUP/CTS0_RTS0/SS0/SSLA0_B		
20	P412/AGTEE1/GTOULO/SCK0/RSPCKA_B		
21	IRQ4/P411/AGTOA1/GTOVUP/GTIOC9A/TXD0/MOSI0/SDA0/CTS3_RTS3/SS3/MOSIA_B		Hall Sensor U Phase
22	IRQ5/P410/AGTOB1/GTOVLO/GTIOC9B/RXD0/MISO0/SCL0/SCK3/MISOA_B		Hall Sensor V Phase
23	IRQ6/P409/GTOWUP/GTIOC10A/TXD3/MOSI3/SDA3		Hall Sensor W Phase
24	IRQ7/P408/GTOWLO/GTIOC10B/RXD3/MISO3/SCL3/SCL0_B		LED1 for the 1st INV board
25	P407/AGTIO0/CTS4_RTS4/SS4/SDA0_B/ADTRG0		LED2 for the 1st INV board
26	VSS_USB	VSS	
27	NC	-	
28	NC	-	
29	VCC_USB	VCC	
30	P207		LED3 for the 1st INV board
31	IRQ0-DS/P206/GTIU/RXD4/MISO4/SCL4/SDA1_A		RMW Communication TXD
32	CLKOUT/IRQ1-DS/P205/AGTO1/GTIV/GTIOC4A/TXD4/MOSI4/SDA4/CTS9_RTS9/SS9/SCL1_A		RMW Communication RXD
33	TRCLK/P214/GTIU		Debugger
34	TRDATA0/P211/GTIV/		Debugger
35	TRDATA1/P210/GTIW/		Debugger
36	TRDATA2/P209/GTOVUP/		Debugger
37	TRDATA3/P208/GTOVLO/		Debugger
38	RES		Debugger
39	MD/P201		Relay Operation for the 1st INV board (Not used)
40	NMI/P200/		

41	P307/GTOUUP		External Switch1 for the 2nd INV board
42	P306/GTOULO		External Switch2 for the 2nd INV board
43	IRQ8/P305/GTOWUP		LED1 for the 2nd INV board
44	IRQ9/P304/GTOWLO/GTIOC7A		LED2 for the 2nd INV board
45	VSS	VSS	
46	VCC	VCC	
47	P303/GTIOC7B		LED3 for the 2nd INV board
48	IRQ5/P302/GTOUUP/GTIOC4A/TXD2/MOSI2/SDA2/ SSLB3_B		External Switch1 for the 1st INV board
49	IRQ6/P301/AGTIO0/GTOULO/GTIOC4B/RXD2/MISO2/ SCL2/CTS9_RTS9/SS9/SSLB2_B		External Switch2 for the 1st INV board
50	TCK/SWCLK/P300/GTOUUP/GTIOC0A_A/SSLB1_B		Debugger
51	TMS/SWDIO/P108/GTOULO/GTIOC0B_A/CTS9_RTS9/ SS9/SSLB0_B		Debugger
52	CLKOUT/TDO/SWO/P109/GTOVUP/GTIOC1A_A/TXD9/ MOSI9/SDA9/MOSIB_B		Debugger
53	TDI/IRQ3/P110/GTOVLO/GTIOC1B_A/CRX1/CTS2_RTS2/ SS2/RXD9/MIS O9/SCL9/MISOB_B/VCOUT		Debugger
54	IRQ4/P111/GTIOC3A_A/SCK2/SCK9/RSPCKB_B		W Phase Upper Arm for the 1st INV board
55	P112/GTIOC3B_A/TXD2/MOSI2/SDA2/SCK1/SSLB0_ B		W Phase Lower Arm for the 1st INV board
56	P113/GTIOC2A/RXD2/MISO2/SCL2/		V Phase Upper Arm for the 1st INV board
57	P114/GTIOC2B		V Phase Under Arm for the 1st INV board
58	P115/GTIOC4A/		U Phase Upper Arm for the 2nd INV board
59	P608/GTIOC4B		U Phase Under Arm for the 2nd INV board
60	P609/GTIOC5A		V Phase Upper Arm for the 2nd INV board
61	P610/GTIOC5B		V Phase Under Arm for the 2nd INV board
62	VCC	VCC	
63	VSS	VSS	
64	VCL		
65	P602/GTIOC7B/TXD9		Relay Operation for the 2nd INV board (Not Used)
66	P601/GTIOC6A/RXD9		W Phase Upper Arm for the 2nd INV board
67	CLKOUT/CACREF/P600/GTIOC6B/SCK9/		W Phase Under Arm for the 2nd INV board
68	KR07/P107/AGTOA0/GTIOC8A/CTS8_RTS8/SS8/		Encoder A Phase
69	KR06/P106/AGTOB0/GTIOC8B/SCK8/SSLA3_A/QIO2		Encoder B Phase
70	IRQ0/KR05/P105/GTETRGA/GTIOC1A/TXD8/MOSI8/ SDA8/SSLA2_A/QIO1		Encoder Z Phase
71	IRQ1/KR04/P104/GTETRGB/GTIOC1B/RXD8/MISO8/ SCL8/SSLA1_A/QIO0/		Overcurrent for the 2nd INV board
72	KR03/P103/GTOWUP/GTIOC2A_A/CTX0/CTS0_RTS0/ SS0/SSLA0_ A		SPI
73	KR02/P102/AGTO0/GTOWLO/GTIOC2B_A/CRX0/SCK0/ RSPCKA_A/ADTRG0		SPI
74	IRQ1/KR01/P101/AGTEE0/GTETRGB/GTIOC5A/TXD0/ MOSI0/SDA0/CTS1_RTS1/SS1/SDA1_B/MOSIA_A		SPI

75	IRQ2/KR00/P100/AGTIO0/GTETRGA/GTIOC5B/RXD0/ MISO0/SCL0/SCK1/SCL1_B/MISOA_A		SPI
76	P500/AGTOA0/GTIU/GTIOC11A/AN016/IVREF0		U Phase Voltage for the 2nd INV board
77	IRQ11/P501/AGTOB0/GTIV/GTIOC11B/AN116/IVREF1		V Phase Voltage for the 2nd INV board
78	IRQ12/P502/GTIW/GTIOC12A/AN017/IVCMP0		Variable Resistance Voltage for the 1st INV board/W Phase Voltage for the 2nd INV board
79	P503/GTETRGC/GTIOC12B/AN117		Overcurrent for the 1st INV board
80	P504/GTETRGD/AN018		U Phase Voltage for the 1st INV board
81	P508/AN020		V Phase Voltage for the 1st INV board
82	VCC	VCC	
83	VSS	VSS	
84	IRQ13/P015/AN006/AN106/DA1/IVCMP1		W Phase Voltage for the 1st INV board
85	P014/AN005/AN105/DA0/IVREF3		Bus Voltage for the 1st INV board
86	VREFL	VREFL	
87	VREFH	VREFH	
88	AVCC0	AVCC	
89	AVSS0	AVSS	
90	VREFL0	VREFL0	
91	VREFH0	VREFH0	
92	IRQ12-DS/P008/AN003		Bus Voltage for the 2nd INV board
93	P007/PGAVSS100/AN107		GND for PGA for the 2nd INV board
94	IRQ11-DS/P006/AN102/IVCMP2		W Phase Current for the 2nd INV board
95	IRQ10-DS/P005/AN101/IVCMP2		V Phase Current for the 2nd INV board
96	IRQ9-DS/P004/AN100/IVCMP2		U Phase Current for the 2nd INV board
97	P003/PGAVSS000/AN007		GND for PGA for the 1st INV board
98	IRQ8-DS/P002/AN002/IVCMP2		W Phase Current for the 1st INV board
99	IRQ7-DS/P001/AN001/IVCMP2		V Phase Current for the 1st INV board
100	IRQ6-DS/P000/AN000/IVCMP2		U Phase Current for the 1st INV board

Notes
This product has some parts in which processing for unused pin has not been performed. See the hardware manual for each microcontroller for the correct processing method.

6. Certification

RA6T1 CPU Card conforms to the below certification and standard. As for exemption items and precautions, refer to page 6 of this user's manual.

6.1 European Union regulatory notices

This product complies with the following EU Directives. (These directives are only valid in the European Union.)

CE Certifications:

・Electromagnetic Compatibility (EMC) Directive 2014/30/EU

EN61326-1 : 2013 Class A

WARNING: This is a Class A product. This equipment can cause radio frequency noise when used in the residential area. In such cases, the user/operator of the equipment may be required to take appropriate countermeasures under his responsibility.

・Information for traceability

・Authorised representative

Name: Renesas Electronics Corporation

Address: Toyosu Foresia, 3-2-24, Toyosu, Koto-ku, Tokyo 135-0061, Japan

・Manufacturer

Name: Renesas Electronics Corporation

Address: Toyosu Foresia, 3-2-24, Toyosu, Koto-ku, Tokyo 135-0061, Japan

・Person responsible for placing on the market

Name: Renesas Electronics Europe GmbH

Address: Arcadiastrasse 10, 40472 Dusseldorf, Germany

・Trademark and Type name

Trademark: Renesas

Product name: RA6T1 CPU Card

Type name: RTK0EMA170C00000BJ

Environmental Compliance and Certifications:

・Waste Electrical and Electronic Equipment (WEEE) Directive 2012/19/EU

7. Design and Manufacture Information

You can obtain information on the design and manufacture of RA6T1 CPU Card from renesas.com/rssk/motor.

8. Website and Support

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

· RA Product Information renesas.com/ra

· RA Product Support Forum renesas.com/ra/forum

· Renesas Support renesas.com/support

Revision History	RA6T1 CPU Card User's Manual

Rev.	Date	Description	
		Page	Summary
1.00	May 8, 2020	-	First Edition
1.10	Jan. 28, 2021	10	Modified description of onboard emulator
1.20	Nov. 29, 2021	8	Modified RAM size

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