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### Trial series Standard CPU card T6xxx

#### Users Manual

T6206 (RX24T (A version) 100pin)

T6207 (RX24T (B version) 100pin)

T6209 (RX63T 144pin)

T6211/T6211B (RX66T 112pin)

T6214 (RX72T 144pin)

T6224 (RX26T 100pin)

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## 1. At first

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### 1.1. At first

This user's manual is for the Trial series standard CPU card T6xxx.

Trial series CPU cards are available in the T5xxx series and T6xxx series.

The differences between the T5xxx series and the T6xxx series are as follows:

The T6xxx series is exclusive to the T2006 special inverter. As is, it cannot be connected to our other Trial series inverters. Please note.

1) T5xxx series:

- Can be directly connected to Trial series inverters (except T2006)
  - Only one inverter can be driven.
  - The connection connector to the inverter is 2 20-pin board-to-board connectors.

2) T6xxx series:

- Direct connection with Trial series inverter T2006 only. (There are exceptions)
  - \*Note: It can be connected to other inverters by using the T6X5X conversion connector.
  - Two or more inverters can be driven.
  - The connection connector to the inverter is 2 40pin board-to-board connectors

### 1.2. Applicable Users

The CPU card is designed as an inverter for the Trial series for the research and prototyping phases of the product.

### 1.3. Notes

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### 1.4. Warnings



#### **danger**

- **There is a risk of fire.**

If the inverter feels fire, smoke, abnormal noise, or other abnormalities, stop the inverter immediately. After that, disconnect the power supply connected to the inverter and make sure that the remaining energy in the electrolytic capacitor inside is gone, and then disconnect the load.



#### **danger**

- **There is a risk of electric shock.**

Inside the inverter case, there is a high-voltage part that is close to 400 V even under normal conditions. Voltage may be applied to the high-voltage part inside not only during operation, but also after operation. Do not touch the interior directly, such as if the inverter is damaged after operation. **Electric shock can result in death or serious injury.**



#### **danger**

- **There is a risk of blindness.**

The inverter has a case, but if the inside of the inverter ruptures while the lid of the case is

open, the liquid contained in the capacitor inside or damaged parts may get into the eyes and cause blindness. Do not open the lid of the case immediately while driving, even after stopping. Also, when opening the lid, make sure to wear protective goggles like the one in the photo below.



### **caution**

- **There is a risk of burns.**

The inverter may be exposed to high temperatures during and after operation, sometimes exceeding 100° C. When touching, please be very careful.

### **caution**

- **Do not block the vents of the case.**

The inverter has a vent to cool the interior, but blocking this vent will reduce the cooling capacity, causing the inverter to break and catch fire.

### **caution**

- **Make sure to run the fan while operating.**

The inverter has a fan to cool the inside, but if the fan is not run while the inverter is running, the temperature of the inverter will rise, which will cause the inverter to break and catch fire.

### **caution**

- **When creating software, please create various protection software such as overcurrent and overheating first.**

The inverter does not have a mechanism to protect the inverter with hardware alone. The design philosophy is to use CPU software and CPU internal functions to protect it. Before creating application software for driving motors and other equipment, be sure to create protective software. If the protection does not work, it will cause the inverter to break and catch fire.

### **caution**

- **Do not operate in environments such as high temperature or high humidity.**

The inverter is designed for experimental use. It is not designed to operate in any of the following special environments: Please do not use it in an environment that deviates from the operating environment of this manual. It can cause malfunction, ignition or damage.

- Environments with vibration and shock
- Corrosive gases, flammable gases, and environments with a humidity of 80% or more
- High and low temperature environments



### caution

- **This product handles high voltage. Please use it if you are aware of the dangers of high voltage.**

Some models in this product series include reference wiring materials, but they may not necessarily be the right wiring materials for your application. Please be sure to check the application before using it.

When wiring, please do not turn on electricity to avoid danger.

When wiring, avoid handling with wet hands.



### caution

- **The rating of this product is measured under specific conditions.**

The power capacity that can be handled varies greatly depending on the input voltage, output voltage, output current, load conditions, operating conditions, temperature environment, etc. used by the customer. To prevent damage to the inverter, monitor and protect the temperature, current, voltage, etc. with the CPU or external sensors.



## 2. CPU Card Overview

### 2.1. feature

- The CPU card for this inverter unit is specifically designed for research and development of consumer equipment.
- This is a CPU card of the Trial series inverter made by Desktop Labs.
- Designed for non-isolated configurations based on inexpensive mass-produced circuits
  - Considering the mass production principle prototype, the circuit configuration allows the free use of empty pins of the CPU
- Support for overcurrent detection circuits using CPU hardware protection for mass production (CPU dependent)

### 2.2. Common Specifications

item	specification	remarks
Operating temperature range	0°C~35°C	
Operating Humidity Range	90% or less (non-condensation)	
Dimensions	94 x76 x20 mm	Connector height included
weight	Around 45g	

### 3. DTL Standard CPU Card Specifications

#### 3.1. Inverter Connection Connector (CN-A, CN-B)

It complies with DTL standard CPU card specifications. The connectors of DTL standard CPU cards are only standardized for connectors CN-A, CN-B, ICS and E1 connectors that connect directly to the inverter. The following is the pinout specification of DTL standard CPU cards.

##### 3.1.1. CN-A Connector Pin Definition

Common parts of T5xxx/T6xxx series

Pin	Dir	STD Pin name	
1	To INV	(/LED1)	LED control signal. Low voltage inverter only valid for T2001 / T2006. Other inverters do not connect
2	To INV	(/LED2)	LED control signal. Low voltage inverter only valid for T2001 / T2006. Other inverters do not connect
3	To INV	PFCG1	PFC gate signal. In low-voltage inverters, LED3 output
4	To INV	VRL	Control signal for the anti-entry circuit. HIGH and the relay or TRIAC is turned on.
5	To CPU	/FO1	Overcurrent detection terminals. When an overcurrent occurs in the inverter, this terminal becomes LOW.
6	To INV	/INVRES	Future Reservations: Signal to cancel the inverter error (unused on the current inverter)
7	To INV	WN1	3-phase PWM
8	To INV	VN1	3-phase PWM
9	To INV	UN1	3-phase PWM
10	To INV	WP1	3-phase PWM
11	To INV	VP1	3-phase PWM
12	To INV	UP1	3-phase PWM
13	To CPU	(/SW1)	Switch input signal. Low voltage inverter only valid for T2001 / T2002. Not connected on other inverters
14	To CPU	(/SW2)	Switch input signal. Low voltage inverter only valid for T2001 / T2002. Not connected on other inverters
15	To CPU	5V	Power supply terminal
16	To CPU	5V	Power supply terminal
17	To CPU	GND	Power supply terminal
18	To CPU	GND	Power supply terminal
19	To CPU	3.3V	Power supply terminal
20	To CPU	3.3V	Power supply terminal

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21	To INV	WN2	3-phase PWM
22	To INV	VN2	3-phase PWM
23	To INV	UN2	3-phase PWM
24	To INV	WP2	3-phase PWM
25	To CPU	VP2	3-phase PWM

26	To INV	UP2	3-phase PWM
27	To INV	/FO2	Overcurrent detection terminals. When an overcurrent occurs in the inverter, this terminal becomes LOW.
28	To INV	GND	Power supply terminal
29	To INV	WN3	3-phase PWM
30	To INV	VN3	3-phase PWM
31	To INV	UN3	3-phase PWM
32	To INV	WP3	3-phase PWM
33	To CPU	VP3	3-phase PWM
34	To CPU	UP3	3-phase PWM
35	To CPU	/FO3	Overcurrent detection terminals. When an overcurrent occurs in the inverter, this terminal becomes LOW.
36	To CPU	GND	Power supply terminal
37	To CPU	RSV5	Extended reservations for the future
38	To CPU	RSV6	Extended reservations for the future
39	To CPU	RSV7	Extended reservations for the future
40	To CPU	RSV8	Extended reservations for the future

## 3.1.2. CN-A Connector Pin Assignment per CPU

Pin	T6206 RX24T 100pin	T6207 RX24TH 100pin	T62093 RX63T 144pin
1	PA2	PA2	PE1
2	PA1	PA4	PE0
3	PD7	PD7	PB3
4	PB3	PB3	PB0
5	P70	P70	PE2
6	P55	PB4	P01
7	P76	P76	P76
8	P75	P75	P75
9	P74	P74	P74
10	P73	P73	P73
11	P72	P72	P72
12	P71	P71	P71
13	P80	PE4	PD1
14	P81	PE3	PD0
15	5V	5V	5V
16	5V	5V	5V
17	GND	GND	GND
18	GND	GND	GND
19	3.3V	3.3V	3.3V
20	3.3V	3.3V	3.3V
21	P90	P90	P90
22	P91	P91	P91
23	P92	P92	P92

24	P93	P93	P93
25	P94	P94	P94
26	P95	P95	P95
27	P01	P01	PB4
28	GND	GND	GND
29	—	—	PD2
30	—	—	PD4
31	—	—	PD6
32	—	—	PD3
33	—	—	PD5
34	—	—	PD7
35	—	—	P96
36	GND	GND	GND
37	RSV	RSV	RSV
38	RSV	RSV	RSV
39	RSV	RSV	RSV
40	RSV	RSV	RSV

## 3.1.3. CN-B Connector Pin Definition

### T5xxx / T6xxx Series Common Parts

pin	Dir	Pin name	
1	To INV	AVCC	Power supply terminal for analog circuits in inverters (CPU board determines supply voltage)
2	To INV	AVCC	Power supply terminal for analog circuits in inverters (CPU board determines supply voltage)
3	To CPU	RSV2	Future Reservations
4	To CPU	RSV3	Future Reservations
5	To CPU	IU1	INV1 U-phase current detection signal
6	To CPU	IV1	INV1 V Phase Current Sensing Signal
7	To CPU	IW1	INV1 W Phase Current Sensing Signal
8	To CPU	VPN	DC Link Voltage Detection Signal
9	To CPU	TEMP1	INV1 Main Circuit Temperature Sensing Terminal (Installed on some inverters)
10	To CPU	VU1	INV1 U Phase Voltage Sensing Signal
11	To CPU	VV1	INV1 V Phase Voltage Detection Signal
12	To CPU	VW1	INV1 W Phase Voltage Detection Signal
13	To CPU	(VAC)	Grid voltage detection signal (installed on some inverters)
14	To CPU	(IPFC)	PFC current detection signal (installed on some inverters)
15	To CPU	(VR1)	Test volume signal (equipped with T2001 / T2002 / T2006 low voltage inverter)
16	To CPU	RSV1	Future Reservations
17	To INV	VCCIO	Power supply terminal for digital circuit in inverter (CPU board determines supply voltage)
18	To INV	VCCIO	Power supply terminal for digital circuit in inverter (CPU board determines supply voltage)
19	To CPU	GND	GND
20	To CPU	GND	GND

### T6xxx Series Extension

pin	Dir	Pin name	
21	To CPU	IU2	INV2 U-phase current detection signal
22	To CPU	IV2	INV2 V Phase Current Sensing Signal
23	To CPU	IW2	INV2 W Phase Current Sensing Signal
24	To CPU	VU2	INV2 U Phase Voltage Detection Signal
25	To CPU	VV2	INV2 V Phase Voltage Detection Signal
26	To CPU	VW2	INV2 W Phase Voltage Sensing Signal
27	To CPU	TEMP2	INV2 main circuit temperature sensing terminal (installed on some inverters)
28	To CPU	GND	
29	To CPU	IU3	INV3 U Phase Current Sensing Signal
30	To CPU	IV3	INV3 V Phase Current Sensing Signal
31	To CPU	IW3	INV3 W Phase Current Sensing Signal
32	To CPU	VU3	INV3 U Phase Voltage Sensing Signal
33	To CPU	VV3	INV3 V Phase Voltage Detection Signal
34	To CPU	VW3	INV3 W Phase Voltage Detection Signal
35	To CPU	TEMP3	INV3 main circuit temperature sensing terminal (installed on some inverters)
36	To CPU	GND	

37	To CPU	RSV	Future Reservations
38	To CPU	RSV	Future Reservations
39	To CPU	RSV	Future Reservations
40	To CPU	RSV	Future Reservations

## 3.1.4. CN-B Connector Pin Assignment per CPU

pin	T6206 RX24T 100pin	T6207 RX24TH 100pin	T6209 RX63T 144pin
1	5V	5V	5V
2	5V	5V	5V
3		P60_AN200	AN10
4	P43_AN003	P64_AN204	AN11
5	AN100	P44_AN100	AN000
6	AN101	P45_AN101	AN001
7	AN102	P46_AN102	AN002
8	AN204	P52_AN208	AN004
9	AN205	P20_AN016	AN8
10	AN201	P47_AN103	AN4
11	AN202	P50_AN206	AN5
12	AN203	P51_AN207	AN6
13	AN207	P43_AN003	AN9
14	AN208	P55_AN211	AN103
15	AN209	P53_AN209	AN7
16	AN210	P54_AN210	AN3
17	5V	5V	3.3V
18	5V	5V	3.3V
19	GND	GND	GND
20	GND	GND	GND
21	AN000	P40_AN000	AN100
22	AN001	P41_AN001	AN101
23	AN002	P42_AN002	AN102
24	AN200	P61_AN201	AN12
25	AN103	P62_AN202	AN13
26	AN206	P63_AN203	AN14
27	AN016	P65_AN205	AN18
28	GND	GND	GND
29	—	—	AN0
30	—	—	AN1
31	—	—	AN2
32	—	—	AN15
33	—	—	AN16
34	—	—	AN17
35	—	—	AN19

36	GND	GND	GND
37	—	—	—
38	—	—	—
39	—	—	—
40	—	—	—

### 3.2. Connecting with the E1 Emulator

When using the CPU card, be especially careful when connecting it to the E1 emulator.

\*Note 1 Inverter equipment is very dangerous, so it is not recommended to use the E1 emulator to debug while the inverter is energized. **Also, do not turn on the power of the main circuit while E1 is connected. The inverter, E1 emulator, and PC body are damaged. It may catch fire, catch fire, or even cause the operator to be electrocuted and killed.** It is strongly recommended to debug using ICS++ (In Circuit Scope), which is sold as an option for this inverter series. ICS++ can completely isolate the inverter side and the PC side, so even if the inverter is damaged, the PC side can be damaged and electric shock to the human body can be avoided.

\*Note 2 The inverter generates noise, so if you use the E1 emulator while operating the inverter, you may not be able to connect the PC to the E1 emulator. In this case, you will not be able to control it from your PC, so you need to be careful. This is often uncontrollable even with the E1 isolator described below.

\*Note 3 This Trial Series inverter is not isolated from the main circuit and the control circuit, so do not use the E1 emulator with the power on the main inverter circuit. If you touch your PC in this state, you may be electrocuted.

\*Note 4 This Trial series inverter is non-isolated from the main circuit and the control circuit. If you really want to use the E1 emulator while the inverter is energized, use the isolator for the E1 emulator.

○For RX series:

The isolator for the E1 emulator for the RX series is sold by Renesas Electronics in the model "R0E000010ACB10". However, the withstand voltage is guaranteed up to 60VDC.

○For RL series:

The isolator for the E1 emulator for the RL series is sold by Desktop Lab in the model "A1001". The withstand voltage is 1500VAC.

\*Note 5 This Trial Series inverter is non-isolated from the main circuit and the control circuit. If the inverter is damaged for some reason, it is possible that the PC is also subject to high voltage. In this case, the PC may be destroyed or even electrocuted, so avoid directly controlling the inverter with the E1 emulator while the inverter is energized.

### 3.3. CPU voltage switching method

CPUs are available in 3.3V and 5V versions, but the Trial series inverters have a built-in mechanism that automatically switches the control voltages AVcc and Vio of the inverter board depending on the type of CPU. Therefore, there is no need to configure both the inverter board and the CPU board.

\*How to switch,

On the inverter side, AVcc determines the offset voltage of AD, and Vio determines the operating voltage of digital I/O are supplied by the CPU board. In other words, the 5V version of the CPU board supplies AVcc = 5V, Vio=5V, while the 3.3V version of the CPU board supports the inverter by supplying AVcc=3.3V, Vio=3.3V. However, for future CPUs, there is a possibility that they will be supported by other combinations.



## 4. T6206 RX24T (Chip version A) 100pin

### 4.1. T6206 Overview

The T6206 is a CPU board with two inverter ports that runs the same software as the T5206 (Renesas Electronics RX24T CPU card).

**\*Note 1: Please note that the pin assignment is different from our T6207 (RX24T (chip version B)).**

**\*Note 2 If your purpose is to use an 80-pin CPU, we recommend using the T6207 because the T5206 and T6206 use pins that are not assigned to the 80-pin type CPU.**

**\*Note 3 If you want to use CAN, please use T6207. The T6206 does not have a CAN port.**

item	specification	remarks
CPU Type	R5F524TAADFP	RX24T Series (A version)
clock	80MHz	
Power supply voltage	5V	
ROM size	256kB	
RAM size	16kB	
Compatible Emulators	E1 / E2 Lite	
Compatible Emulators Isolator	Desktop Lab 『A1002』  Made by RENESAS 『R0E000010ACB10』	<b>It is technically possible to use without an isolator, but it is strongly recommended to use it for safety reasons.</b>

### 4.2. Connecting with ICS

This CPU card can be connected to ICS via CN6, CN7, CN8.

connector	Connected SCI unit	TX Pin	RX Pins	Settings (e.g., resistance)	remarks
CN6	SCI6	PB2	PB1	without	
CN7	SCI5	PB5	PB6	without	
CN8	SCI1	PD3	PD5	without	Shared with E1 (cannot be used at the same time)

\*Notes

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## 4.3. External Connections

### 4.3.1. Inverter connector CN-A

Pin number	Pin name	function
1	PA2/LED1	
2	PA1/LED2	
3	PD7/PFC_G1	Gate signal output for software PFC
4	PB3 (VRL)	Intrusion prevention circuit control terminals
5	P70 / /FO1	Inverter fault input
6	P55 /INV_RESET	Inerter error reset
7	P76 / WN1	3 phase gate signal WN
8	P75 /VN1	3 phase gate signal VN
9	P74 / UN1	3 phase gate signal UN
10	P73 / WP1	3 phase gate signal WP
11	P72 / VP1	3 phase gate signal VP
12	P71 / UP1	3 phase gate signal UP
13	P80 / SW1	
14	P81 / SW2	
15	+5V in	
16	+5V in	
17	GND	
18	GND	
19	+3.3V in	
20	+3.3V in	
21	P90 / WN2	
22	P91 / VN2	
23	P92 / UN2	
24	P93 / WP2	
25	P94 / VP2	
26	P95 / UP2	
27	P01 / /FO0	
28	GND	
29	—	
30	—	
31	—	
32	—	
33	—	
34	—	
35	—	
36	GND	
37	—	
38	—	
39	—	
40	—	

## 4.3.2. Inverter connector CN-B

Pin number	Pin name	function
1	+AVcc out	Analog power supply from CPU board (+5V)
2	+AVcc out	Analog power supply from CPU board (+5V)
3	Reserved	
4	Reserved	AN003
5	Iu1	AN100
6	Iv1	AN101
7	Iw1	AN102
8	Vpn	AN204
9	TEMP1(Vot)	AN205
10	UV1	AN201
11	VV1	AN202
12	VW1	AN203
13	VAC	AN207
14	Ipf	AN208
15	VR1	AN209
16	RSVIN1	AN210
17	+Vio out	Digital power supply from CPU board (+5V)
18	+Vio out	Digital power supply from CPU board (+5V)
19	GND	
20	GND	
21	Iu2	AN000
22	Iv2	AN001
23	Iw2	AN002
24	Vu2	AN200
25	Vv2	AN103
26	Vw2	AN206
27	TEMP2	AN016
28	GND	
29	—	
30	—	
31	—	
32	—	
33	—	
34	—	
35	—	
36	GND	
37	—	
38	—	
39	—	
40	—	

## 4.3.3. ABZ1 encoder connector CN1

Pin number	Pin name	function
1	+5V	+5V power supply from CPU board
2	GND	GND
3	A	A P33
4	B	B P32
5	Z	Z PA5

## 4.3.4. Hall encoder connector CN2

Pin number	Pin name	function
1	+5V	+5V power supply from CPU board
2	GND	GND
3	HU	P10 IRQ0/HU1
4	HV	P11 IRQ1/HV1
5	HW	P96 IRQ4/HW1

## 4.3.5. ABZ2 encoder connector CN3

Pin number	Pin name	function
1	+5V	+5V power supply from CPU board
2	GND	GND
3	A	A PE4
4	B	B PE3
5	Z	Z PA3

## 4.3.6. CPU pin connector CN4

Pin number	Pin name	function
1	+AVcc	
2	+AVcc	
3	GND	
4	GND	
5	P82	
6	P21	
7	P22	
8	P23	
9	P24	
10	P30	
11	P31	
12		
13		

14		
15	PE5	
16	P02	
17	P00	
18	PE1	
19	PE0	
20	PD6	
21	PD4	
22	PD2	
23	PD1	
24	PD0	
25	PB7	
26	PB4	
27	PB0	
28	PA4	
29	PA0	
30		
31	UVCC	
32	UVCC	
33	GND	
34	GND	

## 4.3.7. E1 connector CN5

This connector is for the E1 emulator manufactured by Renesas Electronics. Connect with the E1 emulator with a standard cable.

Pin number	Pin name	function
1	--	
2	GND	
3	--	
4	--	
5	TXD1	
6	--	
7	FINED	
8	VCC	
9	--	
10	--	
11	RXD1	
12	GND	
13	/RESET	
14	GND	

## 4.3.8. ICS/UART connector CN6

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD6 out	TXD6(PB2)
3	RXD6 in	RXD6(PB1)
4	GND	GND

## 4.3.9. ICS/UART connector CN7

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD5 out	TXD5 (PB6)
3	RXD5 in	RXD5 (PB5)
4	GND	GND

## 4.3.10. ICS/UART connector CN8

TXD1 and RXD1 are also available in the E1 connector. Be careful not to collide with the signal.

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD1	TXD1(PD3)
3	RXD1	RXD1(PD5)
4	GND	GND

## 5. T6207 RX24T (Chip version B) 100pin

### 5.1. T6206 Overview

The T6207 is a CPU board designed for development when you want to use an 80pin version of the CPU or use CAN communication. The pin assignment is different from the T5206/T6206, so the same software cannot be run.

**\*Note 1 Please note that the pin assignment is different from our T6206 (RX24T (chip version A)).**

item	specification	remarks
CPU Type	R5F524TEADFP	RX24T Series (B version)
clock	80MHz	
Power supply voltage	5V	
ROM size	512kB	
RAM size	32kB	
Compatible Emulators	E1	
Compatible Emulators Isolator	Desktop Lab 『A1002』  Made by RENESAS 『R0E000010ACB10』	<b>It is technically possible to use without an isolator, but it is strongly recommended to use it for safety reasons.</b>

### 5.2. Connecting with ICS

This CPU card can be connected to ICS via CN1, CN3, CN9, CN10.

connector	Connected SCI unit	TX Pin	RX Pins	Settings (e.g., resistance)	remarks
CN1	SCI6	P81	P80	without	
CN3	SCI1	PD3	PD5	without	Shared with E1 (cannot be used at the same time)
CN9	SCI6	PB2	PB1	without	
CN10	SCI5	PB5	PB6	without	

#### \*Notes

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## 5.3. External Connections

### 5.3.1. Inverter connector CN-A

Pin number	Pin name	function
1	PA2/LED1	
2	PA4/LED2	
3	PD7/PFC_G1	Gate signal output for software PFC
4	PB3 (VRL)	Intrusion prevention circuit control terminals
5	P70 / /FO1	Inverter fault input
6	PB4 /INV_RESET	Inerter error reset
7	P76 / WN1	3 phase gate signal WN
8	P75 /VN1	3 phase gate signal VN
9	P74 / UN1	3 phase gate signal UN
10	P73 / WP1	3 phase gate signal WP
11	P72 / VP1	3 phase gate signal VP
12	P71 / UP1	3 phase gate signal UP
13	PE4 / SW1	
14	PE3 / SW2	
15	+5V in	
16	+5V in	
17	GND	
18	GND	
19	+3.3V in	
20	+3.3V in	
21	P90 / WN2	
22	P91 / VN2	
23	P92 / UN2	
24	P93 / WP2	
25	P94 / VP2	
26	P95 / UP2	
27	P01 / /FO0	
28	GND	
29	—	
30	—	
31	—	
32	—	
33	—	
34	—	
35	—	
36	GND	
37	—	
38	—	
39	—	
40	—	





## 5.3.2. Inverter connector CN-B

Pin number	Pin name	function
1	+AVcc out	Analog power supply from CPU board (+5V)
2	+AVcc out	Analog power supply from CPU board (+5V)
3	Reserved	AN200
4	Reserved	AN204
5	Iu1	AN100
6	Iv1	AN101
7	Iw1	AN102
8	Vpn	AN208
9	TEMP1(Vot)	AN016
10	UV1	AN103
11	VV1	AN206
12	VW1	AN207
13	VAC	AN003
14	Ipf	AN211
15	VR1	AN209
16	RSVIN1	AN210
17	+Vio out	Digital power supply from CPU board (+5V)
18	+Vio out	Digital power supply from CPU board (+5V)
19	GND	
20	GND	
21	Iu2	AN000
22	Iv2	AN001
23	Iw2	AN002
24	Vu2	AN201
25	Vv2	AN202
26	Vw2	AN203
27	TEMP2	AN205
28	GND	
29	—	
30	—	
31	—	
32	—	
33	—	
34	—	
35	—	
36	GND	
37	—	
38	—	
39	—	
40	—	

## 5.3.3. ICS/UART connector CN1

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD6 out	TXD6(P81)
3	RXD6 in	RXD6(P80)
4	GND	GND

## 5.3.4. Hall encoder connector CN2

Pin number	Pin name	function
1	+5V	+5V power supply fromCPU board
2	GND	GND
3	HU	P10 IRQ0/HU1
4	HV	P11 IRQ1/HV1
5	HW	P96 IRQ4/HW1

## 5.3.5. ICS/UART connector CN3

TXD1 and RXD1 are also available in the E1 connector. Be careful not to collide with the signal.

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD1	TXD1(PD3)
3	RXD1	RXD1(PD5)
4	GND	GND

## 5.3.6. CPU pin connector CN4

Pin number	Pin name	function
1	+AV <sub>cc</sub>	
2	+AV <sub>cc</sub>	
3	GND	
4	GND	
5	P21	
6	P22	
7	P23	
8	P24	
9	P82	
10	PE5	
11	P02	
12	P00	
13	P01	
14	PE1	
15	PE0	
16	PD6	
17	PD4	
18	PD2	
19	PD1	
20	PD0	
21	PB7	
22	PB0	
23	UVCC	
24	UVCC	
25	GND	
26	GND	

## 5.3.7. E1 connector CN5

This connector is for the E1 emulator manufactured by Renesas Electronics. Connect with the E1 emulator with a standard cable.

Pin number	Pin name	function
1	--	
2	GND	
3	--	
4	--	
5	TXD1	
6	--	
7	FINED	
8	VCC	
9	--	
10	--	
11	RXD1	
12	GND	
13	/RESET	
14	GND	

## 5.3.8. ABZ2 encoder connector CN6

Pin number	Pin name	function
1	+5V	+5V power supply from CPU board
2	GND	GND
3	A	A P31
4	B	B P30
5	Z	Z PA3

## 5.3.9. ABZ1 encoder connector CN7

Pin number	Pin name	function
1	+5V	+5V power supply from CPU board
2	GND	GND
3	A	A P33
4	B	B P32
5	Z	Z PA5

### 5.3.10. CAN connector CN8

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	CANRX	CRXD PA1
3	CANTX	CTXD PA0
4	GND	GND

### 5.3.11. ICS/UART connector CN9

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD6 out	TXD6(PB2)
3	RXD6 in	RXD6(PB1)
4	GND	GND

### 5.3.12. ICS/UART connector CN10

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD5 out	TXD5 (PB6)
3	RXD5 in	RXD5 (PB5)
4	GND	GND

## 6. T6224 RX26T 100pin

### 6.1. T6224 Overview

item	specification	remarks
CPU Type	R5F526TFDGFP	RX26T Series 100pin
clock	120MHz	
Power supply voltage	5V	
ROM size	512kB	
RAM size	64kB	
Compatible Emulators	E1 / E2 / E2 Lite	
Compatible Emulators Isolator	Desktop Lab 『A1002』  Made by RENESAS 『R0E000010ACB10』	<b>It is technically possible to use without an isolator, but it is strongly recommended to use it for safety reasons.</b>

### 6.2. Connecting with ICS

connector	Connected SCI unit	TX Pin	RX Pins	Settings (e.g., resistance)	remarks
CN2	SCI9/12	P01	P00		
CN3	SCI8	PD0	PD1		
CN4	SCI5/11/12	PB5	PB6		
CN7	SCI9	PB3	PB4		
CN8	SCI6	PB2	PB1		
CN9	SCI6/8	PB0	PA5		
CN10	SCI11	PA0	PA1		
CN11	SCI12	P23	P22		
CN12	SCI6/12	P81	P80		

\*Notes

For the latest schematics and manuals, please download them from the download page of Desktop Lab Co., Ltd.

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## 6.3. External Connections

### 6.3.1. Inverter connector CN-A

Pin number	Pin name	function
1	PE1 / LED1	
2	PE0 / LED2	
3	P70/ PFC_G1	Gate signal output for software PFC
4	P24 (VRL)	Intrusion prevention circuit control terminals
5	PE2 / FO1#	Inverter fault input
6	P80/INV_RESET#	Inerter error reset (No connection)
7	P76 / WN1	3 phase gate signal WN1
8	P75 /VN1	3 phase gate signal VN1
9	P74 / UN1	3 phase gate signal UN1
10	P73 / WP1	3 phase gate signal WP1
11	P72 / VP1	3 phase gate signal VP1
12	P71 / UP1	3 phase gate signal UP1
13	PE5 / SW1	
14	P10 / SW2	
15	+5V in	
16	+5V in	
17	GND	
18	GND	
19	+3.3V in	
20	+3.3V in	
21	P90 / WN2	3 phase gate signal WN2
22	P91 / VN2	3 phase gate signal VN2
23	P92 / UN2	3 phase gate signal UN2
24	P93 / WP2	3 phase gate signal WP2
25	P94 / VP2	3 phase gate signal VP2
26	P95 / UP2	3 phase gate signal UP2
27	P96 / FO2#	
28	GND	
29	PD2 / WN3	3 phase gate signal WN3
30	PD4 / VN3	3 phase gate signal VN3
31	PD6 / VN3	3 phase gate signal UN3
32	PD3 / WP3	3 phase gate signal WP3
33	PD5 / VP3	3 phase gate signal VP3
34	PD7 / UP3	3 phase gate signal UP3
35	P11 / FO3#	
36	GND	
37	—	
38	—	
39	—	
40	—	



## 6.3.2. Inverter connector CN-B

Pin number	Pin name	function
1	+AVcc out	Analog power supply from CPU board (+5V)
2	+AVcc out	Analog power supply from CPU board (+5V)
3	Reserved	NC
4	Reserved	NC
5	Iu1	AN000
6	Iv1	AN001
7	Iw1	AN002
8	Vpn	AN209
9	TEMP1(Vot)	AN103
10	UV1	AN200
11	VV1	AN201
12	VW1	AN202
13	VAC	AN209
14	Ipfc / Idc	AN207
15	VR1	AN206
16	RSVIN1	AN208
17	+Vio out	Digital power supply from CPU board (+3.3V)
18	+Vio out	Digital power supply from CPU board (+3.3V)
19	GND	
20	GND	
21	Iu2	AN100
22	Iv2	AN101
23	Iw2	AN102
24	Vu2	AN203
25	Vv2	AN204
26	Vw2	AN205
27	TEMP2	NC
28	GND	
29	Iu3	AN210
30	Iv3	AN211
31	Iw3	NC
32	Vu3	NC
33	Vv3	NC
34	Vw3	NC
35	TEMP3	NC
36	GND	
37	—	
38	—	
39	—	
40	—	

## 6.3.3. ICS/UART connector CN2

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD9/12 out	P01
3	RXD9/12 in	P00
4	GND	GND

## 6.3.4. ICS/UART connector CN3

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD8 out	PD1
3	RXD8 in	PD0
4	GND	GND

## 6.3.5. ICS/UART connector CN4

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD5/11//12 out	PB5
3	RXD5/11/12 in	PB6
4	GND	GND

## 6.3.1. ICS/UART connector CN7

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD12 out	PB3
3	RXD12 in	PB4
4	GND	GND

## 6.3.2. ICS/UART connector CN8

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD6 out	PB2
3	RXD6 in	PB1
4	GND	GND

## 6.3.3. HALL connector CN5

Pin number	Pin name	function
1	Vio out	+5V power supply from CPU board
2	HU	P31 / MTIOC0A / IRQ6
3	HV	P30 / MTIOC0B / IRQ7
4	HW	P27 / MTIOC0C / IRQ15
5	GND	GND

## 6.3.4. ABZ connector CN6

Pin number	Pin name	function
1	Vio out	+5V power supply from CPU board
2	A1	P33 / MTCLKA
3	B1	P32 / MTCLKB
4	Z1	PA4 / MTIOC1B
5	GND	GND

## 6.3.5. ABZ connector CN14

Pin number	Pin name	function
1	Vio out	+5V power supply from CPU board
2	A2	PE4 / MTCLKC
3	B2	PE3 / MTCLKD
4	Z2	PA2 / MTIOC2B
5	GND	GND

## 6.3.6. CPU pin connector1 CN13

Pin number	Pin name	function
1	5V	
2	GND	
3	PN7/EMLE	
4	PB7	
5	PA3	

### 6.3.7. connector CN1

This connector is for the E1/E2/E2 Lite emulator manufactured by Renesas Electronics. Connect to the E1/E2/E2 Lite emulator with a standard cable.

Pin number	Pin name	function
1	NC	
2	GND	
3	NC	
4	NC	
5	NC	
6	NC	
7	MD/FINED	
8	VCC	
9	NC	
10	NC	
11	NC	
12	GND	
13	/RESET	
14	GND	

## 7. T6209 RX63T 144pin

### 7.1. T6209 Overview

item	specification	remarks
CPU Type	R5F563TEBDFB	RX63T Series
clock	100MHz	
Power supply voltage	3.3V	
ROM size	512kB	
RAM size	48kB	
Compatible Emulators	E1	
Compatible Emulators Isolator	Made by RENESAS 『R0E000010ACB10』	<b>It is technically possible to use without an isolator, but it is strongly recommended to use it for safety reasons.</b>

### 7.2. Connecting with ICS

This CPU card can be connected to ICS via CN1, CN2, CN3, CN4, CN8, CN9, CN10, CN11, CN12, CN13, CN14.

connector	Connected SCI unit	TX Pin	RX Pins	Settings (e.g., resistance)	remarks
CN1	SCI3	P35	P34	without	
CN2	SCI0	P23	P22	without	
CN3	SCI12	P81	P80	without	
CN4	SCI2	P02	P03	without	
CN8	SCI2	PA1	PA2	without	
CN9	SCI12	PB5	PB6	without	
CN10	SCI0	PA4	PA5	without	
CN11	SCI0	PB2	PB1	without	
CN12	SCI2	PG0	PG1	without	
CN13	SCI3	PG3	PG4	without	
CN14	SCI1	PF3	PF2	without	

**\*Notes**

For the latest libraries and manuals, please download them from the download page of Desktop Lab Co., Ltd.

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## 7.3. External Connections

### 7.3.1. Inverter connector CN-A

Pin number	Pin name	function
1	PE1/LED1	
2	PE0/LED2	
3	PB3/PFC_G1	Gate signal output for software PFC
4	PB0 (VRL)	Intrusion prevention circuit control terminals
5	PE2 / /FO1	Inverter fault input
6	P01 /INV_RESET	Inerter error reset
7	P76 / WN1	3 phase gate signal WN
8	P75 /VN1	3 phase gate signal VN
9	P74 / UN1	3 phase gate signal UN
10	P73 / WP1	3 phase gate signal WP
11	P72 / VP1	3 phase gate signal VP
12	P71 / UP1	3 phase gate signal UP
13	PD1 / SW1	
14	PD0 / SW2	
15	+5V in	
16	+5V in	
17	GND	
18	GND	
19	+3.3V in	
20	+3.3V in	
21	P90 / WN2	
22	P91 / VN2	
23	P92 / UN2	
24	P93 / WP2	
25	P94 / VP2	
26	P95 / UP2	
27	PB4 / /FO0	
28	GND	
29	PD2	
30	PD4	
31	PD6	
32	PD3	
33	PD5	
34	PD7	
35	P96	
36	GND	
37	—	
38	—	
39	—	
40	—	

## 7.3.2. Inverter connector CN-B

Pin number	Pin name	function
1	+AVcc out	Analog power supply from CPU board (+5V)
2	+AVcc out	Analog power supply from CPU board (+5V)
3	Reserved	AN10
4	Reserved	AN11
5	Iu1	AN000
6	Iv1	AN001
7	Iw1	AN002
8	Vpn	AN003
9	TEMP1(Vot)	AN8
10	UV1	AN4
11	VV1	AN5
12	VW1	AN6
13	VAC	AN9
14	Ipf	AN103
15	VR1	AN7
16	RSVIN1	AN3
17	+Vio out	Digital power supply from CPU board (+3.3V)
18	+Vio out	Digital power supply from CPU board (+3.3V)
19	GND	
20	GND	
21	Iu2	AN100
22	Iv2	AN101
23	Iw2	AN102
24	Vu2	AN12
25	Vv2	AN13
26	Vw2	AN14
27	TEMP2	AN18
28	GND	
29	Iu3	AN0
30	Iv3	AN1
31	Iw3	AN2
32	Vu3	AN15
33	Vv3	AN16
34	Vw3	AN17
35	TEMP3	AN19
36	GND	
37	—	
38	—	
39	—	
40	—	

## 7.3.3. ICS/UART connector CN1

Pin number	Pin name	function
1	Vio out	+3.3V power supply fromCPU board
2	TXD3 out	TXD3(P35)
3	RXD3 in	RXD3(P34)
4	GND	GND

## 7.3.4. ICS/UART connector CN2

Pin number	Pin name	function
1	Vio out	+3.3V power supply fromCPU board
2	TXD0 out	TXD0(P23)
3	RXD0 in	RXD0(P22)
4	GND	GND

## 7.3.5. ICS/UART connector CN3

Pin number	Pin name	function
1	Vio out	+3.3V power supply fromCPU board
2	TXD12 out	TXD12(P81)
3	RXD12 in	RXD12(P80)
4	GND	GND

## 7.3.6. ICS/UART connector CN4

Pin number	Pin name	function
1	Vio out	+3.3V power supply fromCPU board
2	TXD2 out	TXD2(P02)
3	RXD2 in	RXD2(P03)
4	GND	GND

## 7.3.7. ABZ2 encoder connector CN5

Pin number	Pin name	function
1	+5V	+3.3V power supply fromCPU board
2	GND	GND
3	A	A P11
4	B	B P10
5	Z	Z PA3



## 7.3.8. CPU pin connector CN6

Pin number	Pin name	function
1	UVCC	
2	UVCC	
3	GND	
4	GND	
5	PF4	
6	PB7	
7	PA6	
8	PA0	
9	PG6	
10	PG5	
11	PG2	
12	P70	
13	P33	
14	P32	
15	P31	
16	P30	
17	P26	
18	P25	
19	P24	
20	P21	
21	P20	
22	P82	
23	P12	
24	P05	
25	P04	
26	USB0_DPUE	
27	USB0_DM	
28	USB0_DP	
29	PE5	
30	P00	
31	PE4	
32	PE3	
33	P14	
34	P13	

## 7.3.9. E1 connector CN7

This connector is for the E1 emulator manufactured by Renesas Electronics. Connect with the E1 emulator with a standard cable.

Pin number	Pin name	function
1	TCK/FINEC	
2	GND	
3	/TRST	
4	EMLE	
5	TDO	
6	--	
7	MD/FINED	
8	VCC	
9	TMS	
10	--	
11	TDI	
12	GND	
13	/RESET	
14	GND	

## 7.3.10. ICS/UART connector CN8

Pin number	Pin name	function
1	Vio out	+3.3V power supply fromCPU board
2	TXD2	TXD1(PA1)
3	RXD2	RXD1(PA2)
4	GND	GND

## 7.3.11. ICS/UART connector CN9

Pin number	Pin name	function
1	Vio out	+3.3V power supply fromCPU board
2	TXD12 out	TXD12(PB5)
3	RXD12 in	RXD12(PB6)
4	GND	GND

**7.3.12. ICS/UART connector CN10**

Pin number	Pin name	function
1	Vio out	+3.3V power supply fromCPU board
2	TXD0 out	TXD0 (PA4)
3	RXD0 in	RXD0 (PA5)
4	GND	GND

**7.3.13. ICS/UART connector CN11**

Pin number	Pin name	function
1	Vio out	+3.3V power supply fromCPU board
2	TXD0 out	TXD0 (PB2)
3	RXD0 in	RXD0 (PB1)
4	GND	GND

**7.3.14. ICS/UART connector CN12**

Pin number	Pin name	function
1	Vio out	+3.3V power supply fromCPU board
2	TXD2 out	TXD2 (PG0)
3	RXD2 in	RXD2 (PG1)
4	GND	GND

**7.3.15. ICS/UART connector CN13**

Pin number	Pin name	function
1	Vio out	+3.3V power supply fromCPU board
2	TXD3 out	TXD3 (PG3)
3	RXD3 in	RXD3 (PG4)
4	GND	GND

**7.3.16. ICS/UART connector CN14**

Pin number	Pin name	function
1	Vio out	+3.3V power supply fromCPU board
2	TXD1 out	TXD1 (PF3)
3	RXD1 in	RXD1 (PF2)
4	GND	GND

## 8. T6211/T6211B RX66T 112pin

The CPU card currently on sale is T6211B. The T6211 is only two units of the RX66T in the early stages of sales.

### 8.1. T6211 /T6211B Overview

item	specification	remarks
CPU Type	R5F566TEADFH	RX66T Series 112pin
clock	160MHz	
Power supply voltage	5V	
ROM size	512kB	
RAM size	64kB	
Compatible Emulators	E1 / E2 Lite	
Compatible Emulators Isolator	Desktop Lab 『A1002』  Made by RENESAS 『R0E000010ACB10』	<b>It is technically possible to use without an isolator, but it is strongly recommended to use it for safety reasons.</b>

### 8.2. Connecting with ICS

This CPU card can be connected to ICS via CN2, CN4, CN5, CN6, CN7, CN8, CN9, CN10, CN11, CN12, CN14, CN15.

connector	Connected SCI unit	TX Pin	RX Pins	Settings (e.g., resistance)	remarks
CN2	SCI9	PA0	PA1	without	
CN4	SCI9	PA3	PA2	without	
CN5	SCI6	PB0	PB1	without	
CN6	SCI8	PA4	PA5	without	Shared with ABZ-Z1
CN7	SCI8	PC1	PC0	without	
CN8	SCI5/11/12	PB5	PB6	without	
CN9	SCI9	PG0	PG1	without	
CN10	SCI11	PD3	PD5	without	Shared with E1, INV3-WP3, VP3
CN11	SCI8	PD0	PD1	without	
CN12	SCI8/12	P23	P22	without	
CN14	SCI5	PD7	PE0	without	Shared with INV3-UP3 and UVW-U1
CN15	SCI9/12	P01	P00	without	Shared with E1

\*Notes

For the latest libraries and manuals, please download them from the download page of Desktop Lab Co., Ltd.

<http://desktoplab.co.jp>

## 8.3. External Connections

### 8.3.1. Inverter connector CN-A

Pin number	Pin name	function
1	PE3 / LED1	
2	PB7 / LED2	
3	PB3 / PFC_G1	Gate signal output for software PFC
4	P24 (VRL)	Intrusion prevention circuit control terminals
5	P70 / FO1#	Inverter fault input
6	P27 /INV_RESET#	Inverter error reset
7	P76 / WN1	3 phase gate signal WN
8	P75 /VN1	3 phase gate signal VN
9	P74 / UN1	3 phase gate signal UN
10	P73 / WP1	3 phase gate signal WP
11	P72 / VP1	3 phase gate signal VP
12	P71 / UP1	3 phase gate signal UP
13	P80 / SW1	
14	P81 / SW2	
15	+5V in	
16	+5V in	
17	GND	
18	GND	
19	+3.3V in	
20	+3.3V in	
21	P90 / WN2	
22	P91 / VN2	
23	P92 / UN2	
24	P93 / WP2	
25	P94 / VP2	
26	P95 / UP2	
27	P96 / FO2#	
28	GND	
29	PD2 / WN3	T6211: R78 Required, T6211B Always-On
30	PD4 / VN3 / FINEC	T6211: Requires R79 mounting/shared with E1, T6211B always-on connection
31	PD6 / VN3 / TMS	T6211: Requires R80 mounting/shared with E1, T6211B always-on connection
32	PD3 / WP3 / TDO	T6211: Requires R81 mounting/shared with E1, T6211B always-on connection
33	PD5 / VP3 / TDI	T6211: Requires R82 mounting/shared with E1, T6211B always-on connection
34	PD7 / UP3 / TRST#	T6211 requires R83 mounting/shared with E1, T6211B

		always-on connection
35	PB4 / FO3 #	
36	GND	
37	—	
38	—	
39	—	
40	—	

## 8.3.2. Inverter connector CN-B

Pin number	Pin name	function
1	+AVcc out	Analog power supply from CPU board (+5V)
2	+AVcc out	Analog power supply from CPU board (+5V)
3	Reserved	NC
4	Reserved	AN007
5	Iu1	AN000
6	Iv1	AN001
7	Iw1	AN002
8	Vpn	AN206
9	TEMP1(Vot)	AN209
10	UV1	AN200
11	VV1	AN201
12	VW1	AN202
13	VAC	AN216
14	Ipf	AN210
15	VR1	AN217
16	RSVIN1	NC
17	+Vio out	Digital power supply from CPU board (+3.3V)
18	+Vio out	Digital power supply from CPU board (+3.3V)
19	GND	
20	GND	
21	Iu2	AN100
22	Iv2	AN101
23	Iw2	AN102
24	Vu2	AN203
25	Vv2	AN206
26	Vw2	AN207
27	TEMP2	NC
28	GND	
29	Iu3	AN003
30	Iv3	AN103
31	Iw3	AN211
32	Vu3	NC
33	Vv3	NC
34	Vw3	NC
35	TEMP3	NC
36	GND	
37	—	
38	—	
39	—	
40	—	

## 8.3.3. ICS/UART connector CN2

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD11 out	TXD11(PA0)
3	RXD11 in	RXD11(PA1)
4	GND	GND

## 8.3.4. ICS/UART connector CN4

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD9 out	TXD9 (PA3)
3	RXD9 in	RXD9 (PA2)
4	GND	GND

## 8.3.5. ICS/UART connector CN5

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD6 out	TXD6 (PB0)
3	RXD6 in	RXD6 (PB1)
4	GND	GND

## 8.3.6. ICS/UART connector CN6

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD8 out	TXD8 (PA4)
3	RXD8 in	RXD8 (PA5)
4	GND	GND

## 8.3.7. ICS/UART connector CN7

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD8 out	TXD8 (PC1)
3	RXD8 in	RXD8 (PC0)
4	GND	GND



## 8.3.8. ICS/UART connector CN8

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD5/11/12 out	TXD5/11/12 (PB5)
3	RXD5/11/12 in	RXD5/11/12 (PB6)
4	GND	GND

## 8.3.9. ICS/UART connector CN9

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD9 out	TXD9 (PG1)
3	RXD9 in	RXD9 (PG0)
4	GND	GND

## 8.3.10. ICS/UART connector CN10

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD11 out	TXD11 (PD3)
3	RXD11 in	RXD11 (PD5)
4	GND	GND

## 8.3.11. ICS/UART connector CN11

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD8 out	TXD8 (PD0)
3	RXD8 in	RXD8 (PD1)
4	GND	GND

## 8.3.12. ICS/UART connector CN12

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD8/12 out	TXD8/12 (P23)
3	RXD8/12 in	RXD8/12 (P22)
4	GND	GND

## 8.3.13. ICS/UART connector CN14

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD5 out	TXD5 (PD7)
3	RXD5 in	RXD5 (PE0)
4	GND	GND

## 8.3.14. ICS/UART connector CN15

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD9/12 out	TXD9/12 (P01)
3	RXD9/12 in	RXD9/12 (P00)
4	GND	GND

## 8.3.15. ABZ1 encoder connector CN3

Pin number	Pin name	function
1	+5V	+5V power supply fromCPU board
2	GND	GND
3	A1	A P33
4	B1	B P32
5	Z1	Z PA5

## 8.3.16. HALL1 sensor input connector CN13

Pin number	Pin name	function
1	+5V	+5V power supply fromCPU board
2	GND	GND
3	HU1	HU PE0
4	HV1	HV PE1
5	HW1	HW PE5

## 8.3.17. CPU pin connector CN6

Pin number	Pin name	function
1	UVCC	
2	UVCC	
3	GND	
4	GND	
5	PG2	
6	P31	
7	P30	
8	PC2	
9	PB2	
10	PH4/AN107	
11	P82	
12	P11	
13	P10	
14	P17	
15	P16	
16	P15	
17	PE4	
18	P14	
19	P13	
20	P12	

## 8.3.18. connector CN16

This connector is for the E1 emulator manufactured by Renesas Electronics. Connect with the E1 emulator with a standard cable.

Pin number	Pin name	function
1	TCK/FINEC	
2	GND	
3	/TRST	
4	EMLE	
5	TDO	
6	--	
7	MD/FINED	
8	VCC	
9	TMS	
10	UB	
11	TDI	
12	GND	
13	/RESET	
14	GND	

### 8.4. Differences between T6211 and T6211B (only two units at the beginning of sales)

Only two T6211 units were sold, and only the very early customers were sold.

There are no defects with the T6211, but we have changed it to improve usability.

The differences are as follows.

When using the third port of INV3 on the T6211, there are the following limitations:

Since the ports of E1 and INV3 are shared, debugging with E1 while INV3 is in use in the inverter may destroy INV3. This is because the signal from E1 is output to INV3.

By default, the resistance of the part that connects the port of INV3 to the CPU is not implemented, so this is usually fine.

## 9. T6214 RX72T 144pin

### 9.1. T6214 Overview

item	specification	remarks
CPU Type	R5F572TKCDFB	RX72T Series 144pin
clock	200MHz	
Power supply voltage	5V	
ROM size	1MB	
RAM size	128kB	
Compatible Emulators	E1 / E2 Lite	
Compatible Emulators Isolator	Desktop Lab 『A1002』  Made by RENESAS 『R0E000010ACB10』	<b>It is technically possible to use without an isolator, but it is strongly recommended to use it for safety reasons.</b>

### 9.2. Connecting with ICS

This CPU card can be connected to ICS via CN2, CN3, CN5, CN6, CN7, CN10, CN11, CN13, CN14, CN15, CN16, CN17, CN18, CN19, CN20.

connector	Connected SCI unit	TX Pin	RX Pins	Settings (e.g., resistance)	remarks
CN2	SCI1/12	PC4	PC3	without	
CN3	SCI6/12	PB1	PB0	without	
CN5	SCI8/12	P23	P22	Requires R29 implementation	Shared with HU1
CN6	SCI5	PK1	PK0	R31, R35 Mounting Required	Shared with INV3
CN7	SCI9	PG1	PG0	R38, R40 mounting required	Shared with INV3
CN10	SCI9	PA3	PA2	without	
CN11	SCI8	PA4	PA5	Requires R48 implementation	Shared with ABZ
CN13	SCI6	PB0	PB1	without	
CN14	SCI9/12	P01	P00	R33 implementation required	/FO2
CN15	SCI1/11	PD3	PD5	without	Also connected to E1
CN16	SCI8	PD0	PD1	without	
CN17	SCI8	PC1	PC0	without	
CN18	SCI5/11/12	PB5	PB6	without	
CN19	SCI11	PF0	PF1	without	

CN20	SCI9/12	PD7	PE0	without	
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\*Notes

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## 9.3. External Connections

### 9.3.1. Inverter connector CN-A

Pin number	Pin name	function
1	PC5 / LED1	
2	PC6 / LED2	
3	P34 / PFC_G1	Gate signal output for software PFC
4	PA1 (VRL)	Intrusion prevention circuit control terminals
5	P70 / FO1#	Inverter fault input
6	/INV_RESET#	Inerter error reset (No connection)
7	P76 / WN1	3 phase gate signal WN1
8	P75 / VN1	3 phase gate signal VN1
9	P74 / UN1	3 phase gate signal UN1
10	P73 / WP1	3 phase gate signal WP1
11	P72 / VP1	3 phase gate signal VP1
12	P71 / UP1	3 phase gate signal UP1
13	P35 / SW1	
14	PA0 / SW2	
15	+5V in	
16	+5V in	
17	GND	
18	GND	
19	+3.3V in	
20	+3.3V in	
21	P90 / WN2	3 phase gate signal WN2
22	P91 / VN2	3 phase gate signal VN2
23	P92 / UN2	3 phase gate signal UN2
24	P93 / WP2	3 phase gate signal WP2
25	P94 / VP2	3 phase gate signal VP2
26	P95 / UP2	3 phase gate signal UP2
27	P01 / FO2#	
28	GND	
29	PK1 / WN3	3 phase gate signal WN3
30	PG0 / VN3	3 phase gate signal VN3
31	PG2 / VN3	3 phase gate signal UN3
32	PK0 / WP3	3 phase gate signal WP3
33	PK2 / VP3	3 phase gate signal VP3
34	PG1 / UP3	3 phase gate signal UP3
35	PE4 / FO3 #	
36	GND	
37	—	

38	—	
39	—	
40	—	

## 9.3.2. Inverter connector CN-B

Pin number	Pin name	function
1	+AVcc out	Analog power supply from CPU board (+5V)
2	+AVcc out	Analog power supply from CPU board (+5V)
3	Reserved	NC
4	Reserved	NC
5	Iu1	AN000
6	Iv1	AN001
7	Iw1	AN002
8	Vpn	AN209
9	TEMP1(Vot)	AN006
10	UV1	AN206
11	VV1	AN207
12	VW1	AN208
13	VAC	AN216
14	Ipf	AN210
15	VR1	AN003
16	RSVIN1	AN203
17	+Vio out	Digital power supply from CPU board (+3.3V)
18	+Vio out	Digital power supply from CPU board (+3.3V)
19	GND	
20	GND	
21	Iu2	AN100
22	Iv2	AN101
23	Iw2	AN102
24	Vu2	AN200
25	Vv2	AN201
26	Vw2	AN202
27	TEMP2	NC
28	GND	
29	Iu3	AN004
30	Iv3	AN103
31	Iw3	AN204
32	Vu3	AN104
33	Vv3	AN105
34	Vw3	AN106
35	TEMP3	AN211
36	GND	
37	—	
38	—	
39	—	
40	—	



## 9.3.3. ICS/UART connector CN2

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD1/12 out	PC4
3	RXD1/12 in	PC3
4	GND	GND

## 9.3.4. ICS/UART connector CN3

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD6/12 out	P81
3	RXD6/12 in	P80
4	GND	GND

## 9.3.5. ICS/UART connector CN5

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD8/12 out	P23
3	RXD8/12 in	P22
4	GND	GND

## 9.3.6. ICS/UART connector CN6

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD5 out	PK1
3	RXD5 in	PK0
4	GND	GND

## 9.3.7. ICS/UART connector CN7

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD9 out	PG1
3	RXD9 in	PG0
4	GND	GND

## 9.3.8. ICS/UART connector CN10

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD9 out	PA3
3	RXD9 in	PA2
4	GND	GND

## 9.3.9. ICS/UART connector CN11

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD8 out	PA4
3	RXD8 in	PA5
4	GND	GND

## 9.3.10. ICS/UART connector CN13

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD6 out	PB0
3	RXD6 in	PB1
4	GND	GND

## 9.3.11. ICS/UART connector CN14

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD9/12 out	P01
3	RXD9/12 in	P00
4	GND	GND

## 9.3.12. ICS/UART connector CN15

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD1/11 out	PD3
3	RXD1/11 in	PD5
4	GND	GND

## 9.3.13. ICS/UART connector CN16

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD8 out	PD0
3	RXD8 in	PD1
4	GND	GND

## 9.3.14. ICS/UART connector CN17

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD8 out	PC1
3	RXD8 in	PC0
4	GND	GND

## 9.3.1. ICS/UART connector CN18

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD5/11/12 out	PB5
3	RXD5/11/12 in	PB6
4	GND	GND

## 9.3.1. ICS/UART connector CN19

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD11 out	PF0
3	RXD11 in	PF1
4	GND	GND

## 9.3.1. ICS/UART connector CN20

Pin number	Pin name	function
1	Vio out	+5V power supply fromCPU board
2	TXD5 out	PD7
3	RXD5 in	PE0
4	GND	GND

## 9.3.2. ABZ1 encoder connector CN12

Pin number	Pin name	function
1	+5V	+5V power supply fromCPU board
2	GND	GND
3	A1	A PA7
4	B1	B PA6
5	Z1	Z PA5

## 9.3.3. HALL1 sensor input connector CN1

Pin number	Pin name	function
1	+5V	+5V power supply fromCPU board
2	GND	GND
3	HU1	HU P23/IRQ11
4	HV1	HV P24/IRQ4
5	HW1	HW P25/IRQ10

## 9.3.4. CPU pin connector1 CN4

Pin number	Pin name	function
1	P51 / AN205	
2	PH4 / AN107	
3	PH2 / AN005	
4	PH0 / AN007	
5	P82	
6	P11	
7	P10	
8	P17	
9	P16	
10	P15	
11	P14	
12	P13	
13	P12	
14	PE6	
15	PE5	
16	PE3	
17	PE1	
18	PD2	
19	PF3	
20	PF2	
21	USB0_DM	
22	USB0_DP	

## 9.3.1. CPU pin connector1 CN9

Pin number	Pin name	function
1	UVCC	
2	UVCC	
3	GND	
4	GND	
5	PB7	
6	PB4	
7	PC2	
8	PB3	
9	PB2	
10	P96	
11	P33	
12	P32	
13	P31	
14	P30	
15	P27	
16	P26	
17	P21	
18	PE2	

## 9.3.2. connector CN8

This connector is for the E1 emulator manufactured by Renesas Electronics. Connect with the E1 emulator with a standard cable.

Pin number	Pin name	function
1	TCK/FINEC	
2	GND	
3	/TRST	
4	EMLE	
5	TDO	
6	--	
7	MD/FINED	
8	VCC	
9	TMS	
10	UB	
11	TDI	
12	GND	
13	/RESET	
14	GND	

## 10. Ordering Information

### 10.1. Model number list

Part number	
Single 3phase PWM port series (STANDARD type) 20pin x 2 type 16bit fixed point	
T5101A	RL78/G14 64pin R5F104LEAFP
T5102	RL78/F14 80pin R5F10PMFKFB
T5103	RL78/G1F 64pin R5F11BLEAFB
T5104	RL78/G1G 32pin
T5105	RL78/G14 32pin
Single 3phase PWM port series (STANDARD type) 20pin x 2 type 32bit floating point	
T5201A	RX62T 100pin R5F562TAADFP
T5205	RX23T 64pin
T5206	RX24T 100pin Trial series CPU card
T5210	RX71M 144pin
T5216	RX13T
Single 3phase PWM port series (STANDARD type) 20pin x 2 type 32bit fixed point	
T5304	RA2E1
T5306	RA2E3
T5307	RA2T1
Multi 3phase PWM port series 40pin x 2 type (T2006 multi-inverter compatible board)	
T6206	RX24T (A version) 100pin R5F524TAADFP (pin assign compatible to T5206)
T6207	RX24T (B version) 100pin R5F524TEADFP (not compatible to T5206)
T6209	RX63T 144pin extended
T6211B	RX66T 112pin
T6214	RX72T 144pin
T6219	RA6T1 100pin
T6223	RA6T2 100pin
T6224	RX26T 100pin
T6xxx Series T5xxx Series Connector Conversion Card	
T6X5X	Conversion board for use with T6xxx series CPUs with DTL standard inverters

The gray part is not available for general sale at this time.

The green part will be sold.

# 11. Revision history

Version	Date	
1.02EN	2019-07-14	・ T6214 RX72T added
1.03EN	2025-09-25	・ T6224 RX26T added

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