RENESAS

RX24T Group

Renesas Starter Kit User's Manual

RENESAS 32-Bit MCU
RX Family / RX200 Series

CAUTION

With reference to Directive 2014/30/EU Article 2, clause 2 (e) this is a custom built evaluation kit destined for professionals to be used solely at research and development facilities for such purposes. This equipment can cause radio frequency noise when used. In such cases, the user/operator of the equipment may be required to take appropriate countermeasures under his responsibility.

CAUTION

This equipment should be handled like a CMOS semiconductor device. The user must take all precautions to avoid build-up of static electricity while working with this equipment. All test and measurement tool including the workbench must be grounded. The user/operator must be grounded using the wrist strap. The connectors and/or device pins should not be touched with bare hands.

EEDT-ST-004-10

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Table of Toxic and Hazardous Substance and Elements

部品名称 Part Name 	有毒有害物質又は元素 Toxic and Hazardous Substance and Elements					
	鉛 Lead (Pb)	水銀 Mercury (Hg)	カドミウム Cadmium (Cd)	六価クロム Hexavalent Chromium (Cr(VI))	ポリ臭化ビフェニル Polybrominated biphenyls (PBB)	ポリ臭化ジフェニルエーテル Polybrominated diphenyl ethers (PBDE)
筐体 Case	O	O	O	O	O	O
ボード Board	X	O	O	O	O	O
ケーブル Cable	X	O	O	O	O	O
ソケット Socket	X	O	O	O	O	O
ＡＣアダプタ AC-Adapter	X	O	O	O	O	O

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Please confirm the produced year from nameplate label etc on product body or outer box.

Ex) 2007 年の場合 **Produced 2007**

● 有毒有害物质或元素 有情况表

Table of Toxic and Hazardous Substance and Elements

部件名称 Part Name 	有毒有害物质或元素 Toxic and Hazardous Substance and Elements					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr(VI))	多溴联苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
外壳 Case	O	O	O	O	O	O
电路板 Board	X	O	O	O	O	O
连接线 Cable	X	O	O	O	O	O
插座 Socket	X	O	O	O	O	O
AC 适配器 AC-Adapter	X	O	O	O	O	O

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使用年限是组装到整机中，通常情况下能使用的年限。图形中间的数字表示电子信息产品的环保使用期限。

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如**)** 生产日期为 **2007** 年   **Produced 2007**

Disclaimer

By using this Renesas Starter Kit (RSK), the user accepts the following terms:

The RSK is not guaranteed to be error free, and the entire risk as to the results and performance of the RSK is assumed by the User. The RSK is provided by Renesas on an "as is" basis without warranty of any kind whether express or implied, including but not limited to the implied warranties of satisfactory quality, fitness for a particular purpose, title and non-infringement of intellectual property rights with regard to the RSK. Renesas expressly disclaims all such warranties. Renesas or its affiliates shall in no event be liable for any loss of profit, loss of data, loss of contract, loss of business, damage to reputation or goodwill, any economic loss, any reprogramming or recall costs (whether the foregoing losses are direct or indirect) nor shall Renesas or its affiliates be liable for any other direct or indirect special, incidental or consequential damages arising out of or in relation to the use of this RSK, even if Renesas or its affiliates have been advised of the possibility of such damages.

Precautions

The following precautions should be observed when operating any RSK product:

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

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

- ensure attached cables do not lie across the equipment
- reorient the receiving antenna
- increase the distance between the equipment and the receiver
- connect the equipment into an outlet on a circuit different from that which the receiver is connected
- power down the equipment when not in use
- consult the dealer or an experienced radio/TV technician for help NOTE: It is recommended that wherever possible shielded interface cables are used.

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

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

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

How to Use This Manual

1.   Purpose and Target Readers

This manual is designed to provide the user with an understanding of the RSK hardware functionality, and electrical characteristics. It is intended for users designing sample code on the RSK platform, using the many different incorporated peripheral devices.

The manual comprises of an overview of the capabilities of the RSK product, but does not intend to be a guide to embedded programming or hardware design. Further details regarding setting up the RSK and development environment can be found in the tutorial manual.

> Particular attention should be paid to the precautionary notes when using the manual. These notes occur within the body of the text, at the end of each section, and in the Usage Notes section.

> The revision history summarizes the locations of revisions and additions. It does not list all revisions. Refer to the text of the manual for details.

The following documents apply to the RSKRX24T. Make sure to refer to the latest versions of these documents. The newest versions of the documents listed may be obtained from the Renesas Electronics Web site.

Document Type	Description	Document Title	Document No.
User's Manual	Describes the technical details of the RSK hardware.	RSKRX24T User's Manual	R20UT3436EG
Tutorial Manual	Provides a guide to setting up RSK environment, running sample code and debugging programs.	RSKRX24T Tutorial Manual	CS+: R20UT3437EG e^2 studio: R20UT3440EG
Quick Start Guide	Provides simple instructions to setup the RSK and run the first sample, on a single A4 sheet.	RSKRX24T Quick Start Guide	CS+: R20UT3438EG e^2 studio: R20UT3441EG
Code Generator Tutorial Manual	Provides a guide to code generation and importing into the IDE (Integrated Development Environment).	RSKRX24T Code Generator Tutorial Manual	CS+: R20UT3439EG e^2 studio: R20UT3442EG
Schematics	Full detail circuit schematics of the RSK.	RSKRX24T Schematics	R20UT3435EG
Hardware Manual	Provides technical details of the RX24T microcontroller.	RX24T Group Hardware Manual	R01UH0576EJ

2. List of Abbreviations and Acronyms

Abbreviation	Full Form
ADC	Analog-to-Digital Converter
BC	Battery Charging
bps	Bits per second
CAN	Controller Area Network
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check
DAC	Digital-to-Analog Converter
DIP	Dual In-line Package
DMA	Direct Memory Access
DMAC	Direct Memory Access Controller
DNF	Do Not Fit
E1/E2 Lite	Renesas On-chip Debugging Emulator
EEPROM	Electronically Erasable Programmable Read Only Memory
EMC	Electromagnetic Compatibility
ESD	Electrostatic Discharge
GPT	General PWM Timer
I²C (IIC)	Philips™ Inter-Integrated Circuit Connection Bus
IRQ	Interrupt Request
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LIN	Local Interconnect Network
MCU	Micro-controller Unit
MTU	Multi-Function Timer Pulse Unit
n/a (NA)	Not applicable
n/c (NC)	Not connected
NMI	Non-maskable Interrupt
OTG	On The Go™
PC	Personal Computer
PDC	Parallel Data Capture Unit
PLL	Phase Locked Loop
Pmod™	This is a Digilent Pmod™ Compatible connector. Pmod™ is registered to Digilent Inc. Digilent-Pmod_Interface_Specification
POE	Port Output Enable
PWM	Pulse Width Modulation
RAM	Random Access Memory
ROM	Read Only Memory
RSK	Renesas Starter Kit
RTC	Realtime Clock
SAU	Serial Array Unit
SCI	Serial Communications Interface
SFR	Special Function Registers
SPI	Serial Peripheral Interface
SSI	Serial Sound Interface
TAU	Timer Array Unit
TFT	Thin Film Transistor
TPU	Timer Pulse Unit
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus
WDT	Watchdog timer

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Table of Contents

1. Overview

1.1 Purpose

This RSK is an evaluation tool for Renesas microcontrollers. This manual describes the technical details of the RSK hardware. The Quick Start Guide and Tutorial Manual provide details of the software installation and debugging environment.

1.2 Features

This RSK provides an evaluation of the following features:
- Renesas microcontroller programming
- User code debugging
- User circuitry such as switches, LEDs and a potentiometer
- Sample application
- Sample peripheral device initialisation code

The RSK board contains all the circuitry required for microcontroller operation.

1.3   Board specification

Board specification was shown in **Table 1-1** below.

Item	Specification
Microcontroller	Part No : R5F524TAADFP
	Package : 100-pin LFQFP
	On-Chip Memory : ROM 256KB+8KB, RAM 16KB
On-Board Memory	I²C EEPROM : 2Kbit
Input Clock	RX24T Main : 20MHz
	RL78/G1C Main: 12MHz
Power Supply *1	DC Power Jack : 5 V Input
	Power Supply IC : 5V Input, 3.3V Output
Debug Interface	E1/E2 Lite 14-pin box header
Push Switch	Reset Switch x 1
	User Switch x 3
Potentiometer (for ADC)	Single-turn, 10kΩ
LED	Power indicator: green x 1
	User : green x 1, orange x 1, red x 2
USB to Serial Converter Interface	Connector : USB-MiniB
	Driver : RL78/G1C Microcontroller (Part No R5F10JBCANA)
Pmod™	PMOD1 : Angle type, 12-pin Connector
	PMOD2 *2 : Straight type, 12-pin Connector
Application Board Interface *2	2.54mm pitch, 26-pin x 2 (JA1, JA2), 24-pin x 2 (JA5, JA6)

Table 1-1: Board Specification

*1: Board can also supply 5V into RX24T microcontroller without LDO regulator.
*2: The Application Board & PMOD2 Interface connectors are not fitted on this product.

2. Power Supply

2.1   Requirements

This RSK is supplied with an E1 debugger or E2 Lite debugger. The debugger is able to power the RSK board with up to 200mA. When the RSK is connected to another system then that system should supply power to the RSK. This board has an optional centre positive supply connector using a 2.0mm barrel power jack.

Details of the external power supply requirements for the RSK, and configuration are shown in **Table 2-1** , **Table 2-2** below. The default RSK power configuration is shown in **bold, blue text.**

Connector	Supply voltage
PWR	Input 5VDC

Table 2-1: PWR Connector Requirements

J6 Setting(DNF)	R144 Setting	Supply Source	Board_5V	Board_3V3	Board_VCC UC_VCC
All open	**Fit**	**E1(3V3) / E2 Lite(3V3) / CON_3V3**	**0V**	**3.3V**	**3.3V**
		PWR Connector / CON_5V / Unregulated_VCC	**5V**	**3.3V**	**3.3V**
Pin1-2 shorted	DNF	E1(3V3) / E2 Lite(3V3) / CON_3V3	0V	3.3V	3.3V
		PWR Connector / CON_5V / Unregulated_VCC	5V	3.3V	3.3V
Pin2-3 shorted	DNF	PWR Connector / Unregulated_VCC / CON_5V / E1(5V)	5V	3.3V [1]	5V

Table 2-2: Main Power Supply Requirements

[1]: Can not use Pmod™.

The main power supply connected to PWR should supply a minimum of 5W to ensure full functionality.

2.2   Power-Up Behaviour

When the RSK is purchased, the RSK board has the 'Release' build of the example tutorial software pre-programmed into the Renesas microcontroller. Please consult the 'Renesas Starter Kit Code Generator Tutorial Manual' for further information of this example.

3.   Board Layout

3.1   Component Layout

Figure 3-1 below shows the top component layout of the board.

Figure 3-1: Board Layout

3.2   Board Dimensions

Figure 3-2 below gives the board dimensions and connector positions. All the through-hole connectors are on a common 0.1 inch grid for easy interfacing.

Figure 3-2: Board Dimensions
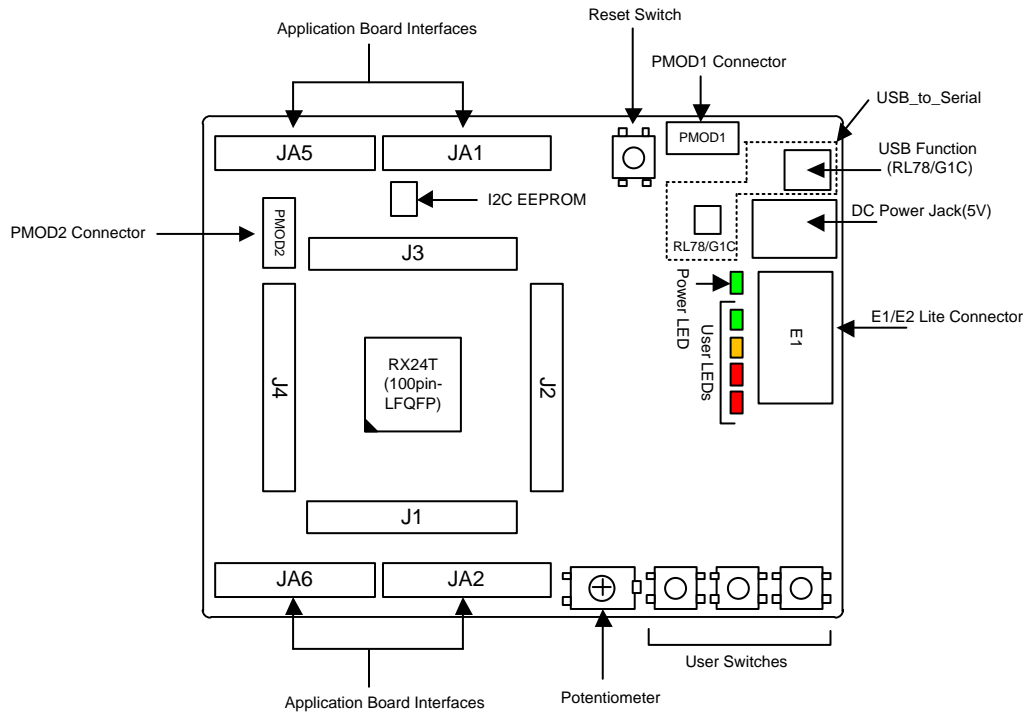
3.3   Component Placement

Figure 3-3 below shows placement of individual components on the top-side PCB – bottom-side component placement can be seen in **Figure 3-4**. Component types and values are shown on the board schematics.
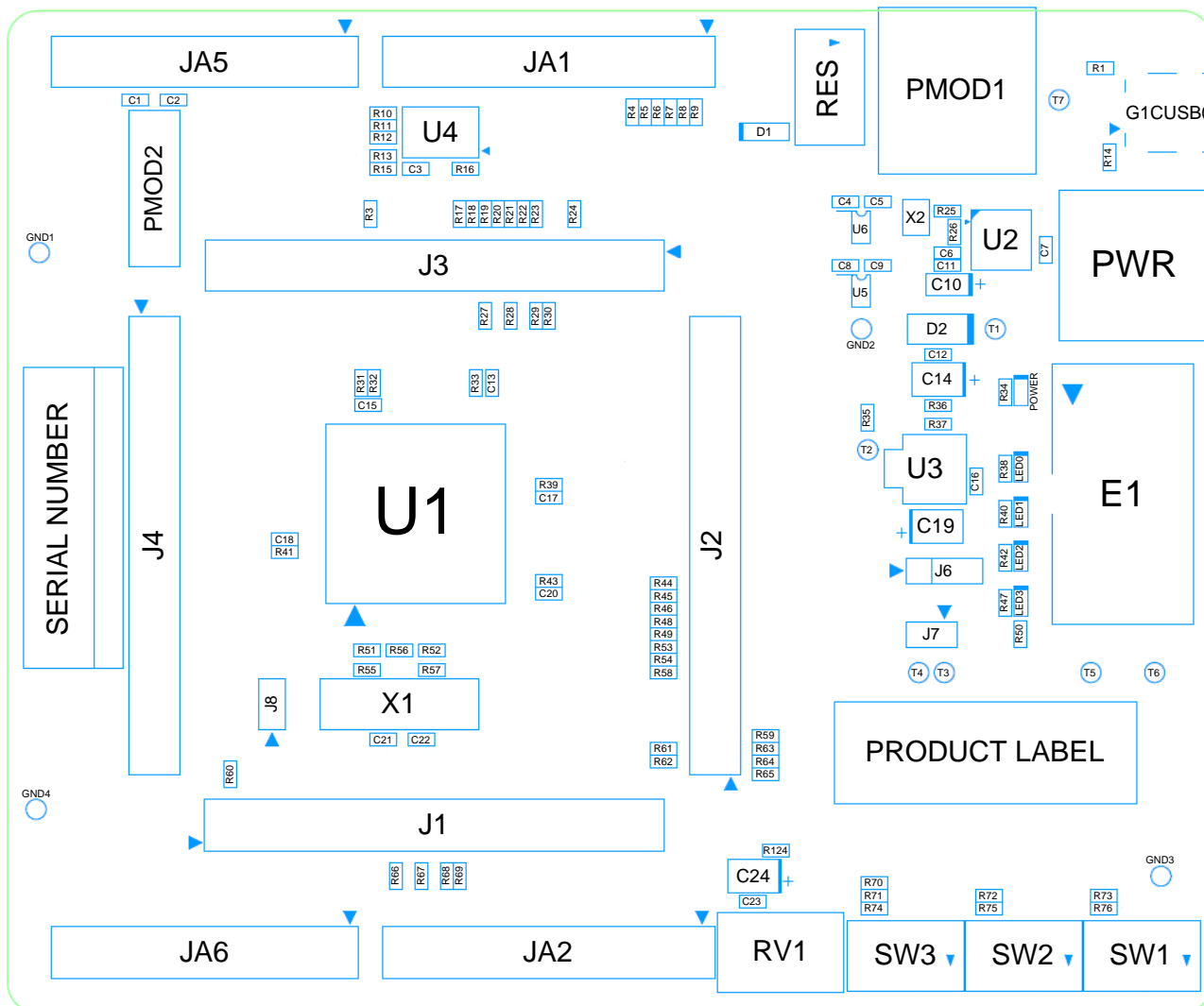
Figure 3-3 Top-Side Component Placement
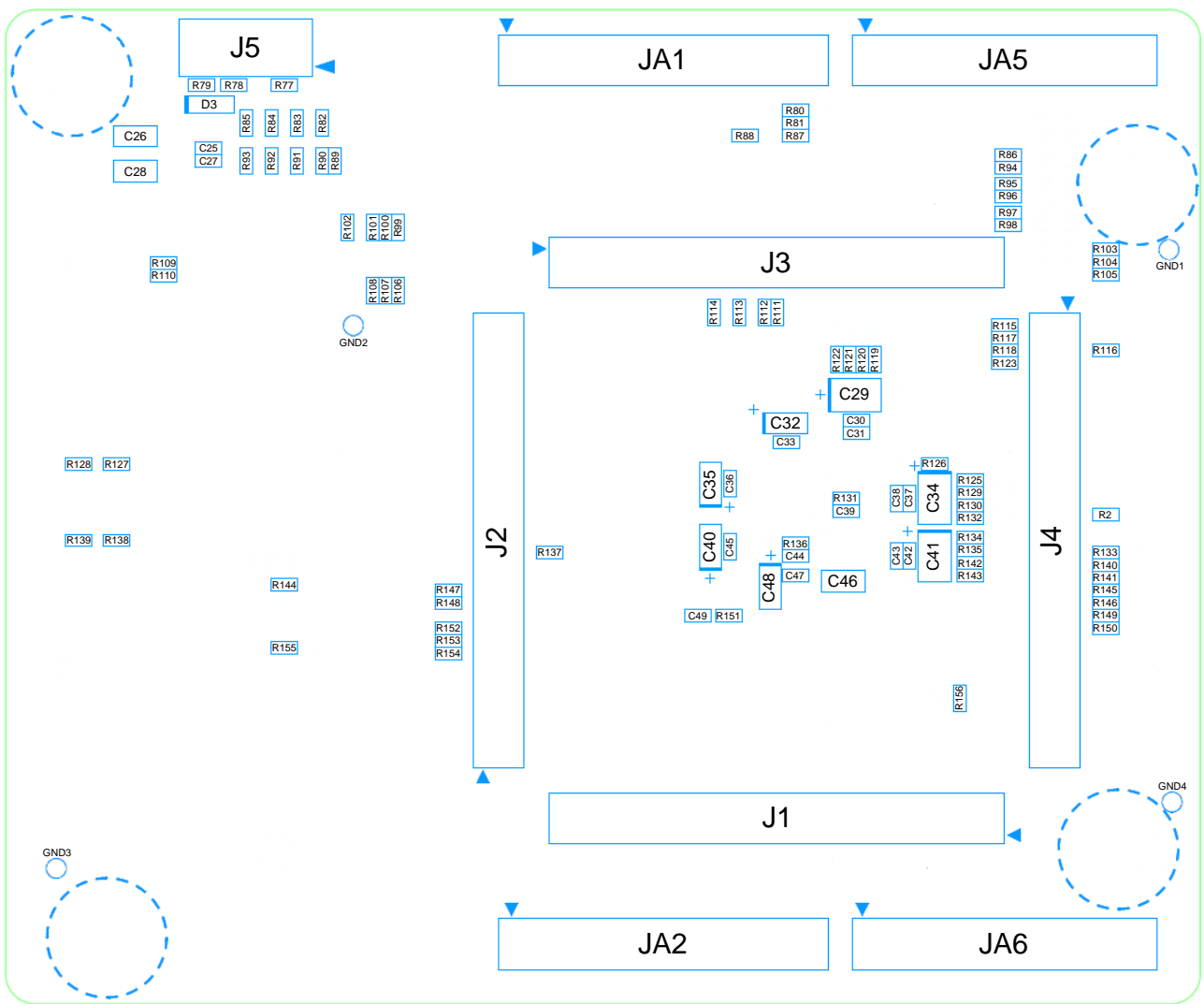
Figure 3-4 Bottom-Side Component Placement

4. Connectivity

4.1   Internal RSK Connections

Figure 4-1 below shows the RSK board components and their connectivity to the MCU.
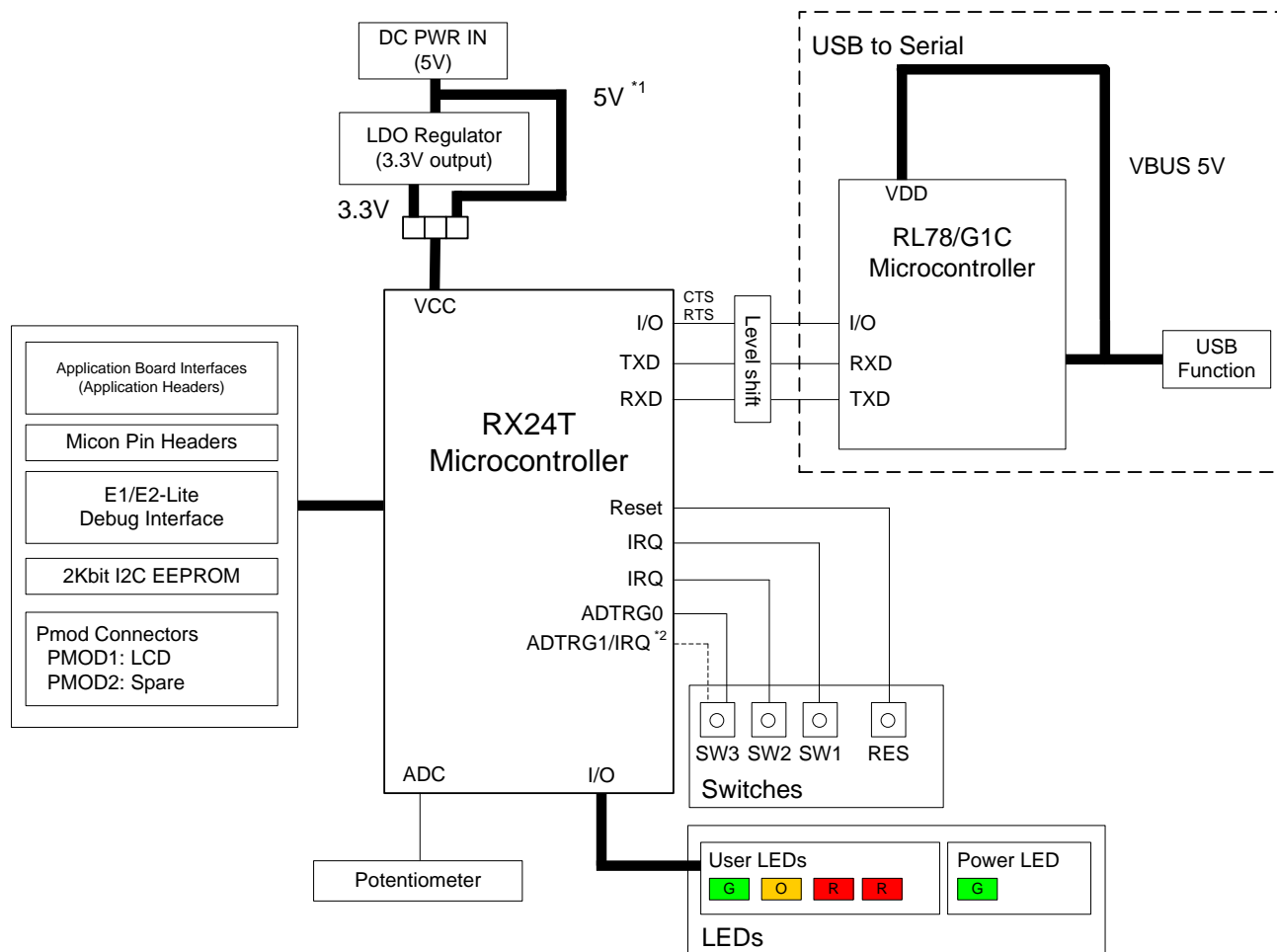
Figure 4-1: Internal RSK Block Diagram

*[1]: Default setting is 3.3V - output refer to §2.1 or §6.3 for the required modifications.

*[2]: Default is not connected. Refer to §6.5 for the required modifications.

4.2 Debugger Connections

Figure 4-2 below shows the connections between the RSK, E1/E2 Lite debugger and the host PC.
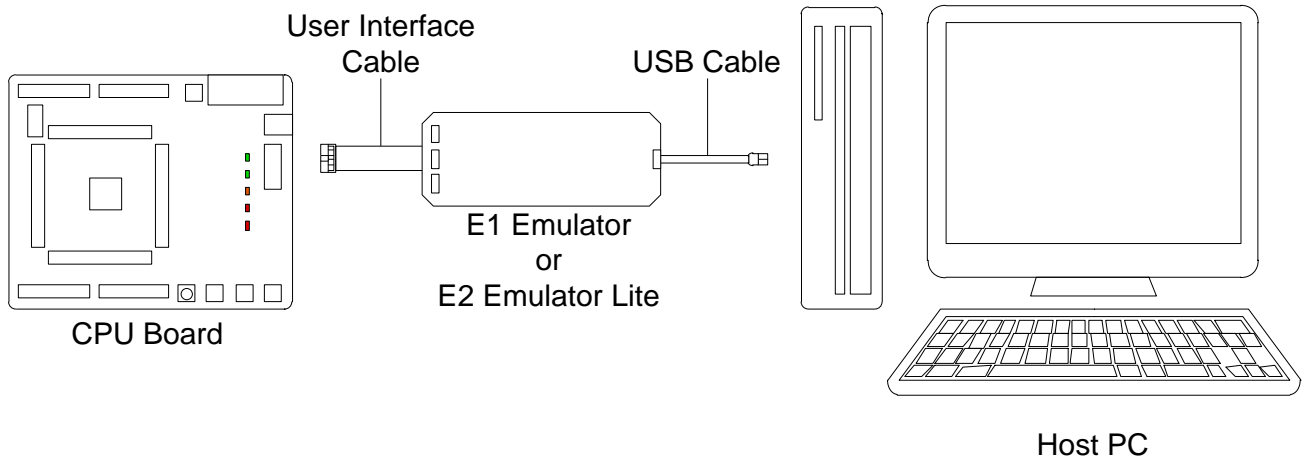
Figure 4-2: Debugger Connection Diagram

5.   User Circuitry

5.1   Reset Circuit

A reset control circuit is fitted to the RSK to generate a reset signal from the RES switch. Refer to the RX24T hardware manual for details regarding the reset signal timing requirements, and the RSK schematics for information regarding the reset circuitry in use on the board.

5.2   Clock Circuit

A clock circuit is fitted to the RSK to generate the required clock signal to drive the MCU, and associated peripherals. Refer to the RX24T Group Hardware Manual for details regarding the clock signal requirements, and the RSKRX24T board schematics for information regarding the clock circuitry in use on the RSK. Details of the oscillators fitted to the board are listed in **Table 5-1** below.

Crystal	Function	Default Placement	Frequency	Device Package
X1	RX24T Main oscillator	Fitted	20MHz	Encapsulated, SMT
X2	RL78/G1C Main oscillator	Fitted	12MHz	Encapsulated, SMT

Table 5-1: Oscillators

5.3   Switches

There are four switches located on the RSK board. The function of each switch and its connection is shown in **Table 5-2**. For further information regarding switch connectivity, refer to the RSK schematics.

Switch	Function	MCU	
		Signal (Port)	Pin
RES	When pressed, the microcontroller is reset.	RESn	10
SW1	Connects to an IRQ input for user controls.	MTIOC9B_IRQ0 (P10)	100
SW2	Connects to an IRQ input for user controls.	MTIOC9D_IRQ5 (P02)	2
SW3	Connects to an ADTRG0 input, and is used to trigger AD conversions.	ADTRG0n_MTIOC1B (PA4)	37
	Connects to an IRQ input for user controls. The switch is also connected to an ADTRG input, and is used to trigger AD conversions. [1]	ADTRG1n_IRQ1(PA5)	36

Table 5-2: Switch Connections

[1]: This connection is a not available in the default RSK configuration - refer to §6 for the required modifications.

5.4   LEDs

There are five LEDs on the RSK. The function of each LED, its colour, and its connections are shown in **Table 5-3**.

LED	Colour	Function	MCU	
			Port	Pin
POWER	Green	Indicates the status of the Board_VCC power rail	-	-
LED0	Green	User operated LED	PB3	32
LED1	Orange	User operated LED	PE5	1
LED2	Red	User operated LED	P53	80
LED3	Red	User operated LED	P52	81

Table 5-3: LED Connections

5.5   Potentiometer

A single-turn potentiometer is connected as a potential divider to analog input AN000 (Port P40, Pin 91). The potentiometer can be used to create a voltage between Board_VCC and ground.
Refer to the maker site for specification of the potentiometer (PIHER with part number N6 series).

The potentiometer offers an easy method of supplying a variable analog input to the microcontroller. It does not necessarily reflect the accuracy of the controller's ADC. Refer to the RX24T Group Hardware Manual for further details.

5.6   Pmod™

The RSK board are equipped with connectors for Digilent Pmod™ interface. Please connect the PMOD1 connector that is compatible with Debug LCD.

> Care should be taken when installing the LCD module to ensure pins are not bent or damaged. The LCD module is vulnerable to electrostatic discharge (ESD); therefore appropriate ESD protection should be used.

The Digilent Pmod™ Compatible headers uses an SPI interface. **Figure 5-1** below shows Digilent Pmod™ Compatible Header Pin Numbering. Connection information for the Digilent Pmod™ Compatible header is provided in **Table 5-4 and Table 5-5** below.

Please note that the connector numbering adheres to the Digilent Pmod™ standard and is different from all other connectors on the RSK designs. Details can be found in the Digilent Pmod™ Interface Specification Revision: November 20, 2011.
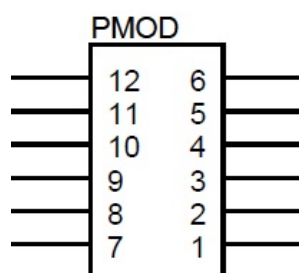
Figure 5-1: Digilent Pmod™ Compatible Header Pin Numbering

Digilent Pmod™ Compatible Header (PMOD1) Connections							
Pin	Circuit Net Name	MCU		Pin	Circuit Net Name	MCU	
		Port	Pin			Port	Pin
1	CTS5RTS5	PB4	30	7	IRQ2	P54	79
2	P-TXD5	PB5	28	8	IRQ3	P55	78
3	P-RXD5	PB6	27	9	PD1	PD1	24
4	P-SCK5	PB7	26	10	PD0	PD0	25
5	GROUND	-	-	11	GROUND	-	-
6	Board_3V3	-	-	12	Board_3V3	-	-

Table 5-4: Pmod™1 Header Connections

Digilent Pmod™ Compatible Header (PMOD2) Connections							
Pin	Circuit Net Name	MCU		Pin	Circuit Net Name	MCU	
		Port	Pin			Port	Pin
1	CTS6RTS6	PA2	39	7	IRQ6	P31	61
2	P-TXD6	P81	97	8	IRQ7	P30	63
3	P-RXD6	P80	98	9	P63	P63	74
4	P-SCK6	P82	96	10	P62	P62	75
5	GROUND	-	-	11	GROUND	-	-
6	Board_3V3	-	-	12	Board_3V3	-	-

Table 5-5: Pmod™2 Header Connections

5.7   USB Serial Port

A USB serial port is implemented in a Renesas low power microcontroller (RL78/G1C) and is connected to the RX24T Serial Communications Interface (SCI) module. Multiple options are provided to allow the selection of the connected SCI1 port. Connections between the USB to Serial converter and the microcontroller are listed in **Table 5-6** below.

Signal Name	Function	MCU	
		Port	Pin
TXD1	SCI1 Transmit Signal	PD3	22
RXD1	SCI1 Receive Signal	PD5	20
A-TXD6_P-TXD6 [1]	SCI6 Transmit Signal	P81	97
A-RXD6_P-RXD6 [1]	SCI6 Receive Signal	P80	98
RS232TX [1]	External SCI Transmit Signal	-	-
RS232RX [1]	External SCI Receive Signal	-	-
RL78G1CCTS	Clear To Send	P61	76
RL78G1CRTS	Request to Send	PE0	17

Table 5-6: Serial Port Connections

[1]: This connection is a not available in the default RSK configuration - refer to §6 for the required modifications.

When the RSK board is first connected to a PC running Windows™ with the USB/Serial connection, the PC will look for a driver. This driver is installed during the installation process, so the PC should be able to find it. The PC will report that it is installing for a driver and then report that a driver has been installed successfully, as shown in **Figure 5-2**. The exact messages may vary depending upon operating system.
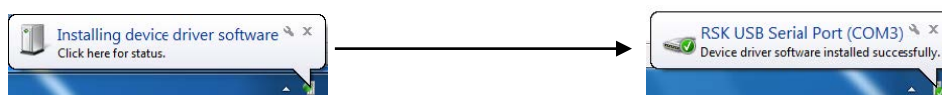
Figure 5-2: USB-Serial Windows™ Installation message

5.8   I²C Bus (Inter-IC Bus)

The RX24T features one I²C (Inter-IC Bus) interface modules. RIIC is connected to a 2Kbit EEPROM. Specific details of the EEPROM device and the connections can be found in the board schematics.

6.   Configuration

6.1   Modifying the RSK

This section lists the option links that are used to modify the way RSK operates in order to access different configurations. Configurations are made by modifying link resistors or headers with movable jumpers.

A link resistor is a 0Ω surface mount resistor, which is used to connect or isolate parts of a circuit. Option links are listed in the following sections, detailing their function when fitted or removed. **Bold, blue text** indicates the default configuration that the RSK is supplied with. Refer to the component placement diagram (§3) to locate the option links and jumpers.

> When removing soldered components, always ensure that the RSK is not exposed to a soldering iron for intervals greater than 5 seconds. This is to avoid damage to nearby components mounted on the board.

> When modifying a link resistor, always check the related option links to ensure there is no possible signal contention or short circuits. Because many of the MCU's pins are multiplexed, some of the peripherals must be used exclusively. Refer to the RX24T Group Hardware Manual and RSKRX24T schematics for further information.

6.2   MCU Operating Modes

Table 6-1 below details the option links associated with configuring the MCU operating modes.

Reference	Configuration	Explanation	Related Ref.
J8 [*1]	All open	Single Chip Mode	-
	Shorted Pin1-2	Boot Mode (SCI)	-

Table 6-1: MCU Option Links

[*1]: By default, jumper J8 is not fitted to the RSK. Therefore, it becomes the same setting as 'J8 All open'.

Items shown in **bold** are the Fit / Do Not Fit (DNF) default configuration that the RSK is supplied with.

6.3   Power Supply Configuration

Table 6-2 and Table 6-3 below details the function of the option links associated with power supply configuration.

Reference	Configuration	Explanation	Related Ref.
J7 *1	Shorted Pin1-2	Connects Board_VCC to UC_VCC.	R155
	All open	Enables current probe for MCU current consumption.	R155
J6 *2	Shorted Pin1-2	Connects regulator output to Board_VCC.	U3, R144
	Shorted Pin2-3	Disconnects regulator output from Board_VCC.	U3, R144
	All open	Do not use, when R144 has not been fitted.	U3, R144

Table 6-2: Power Supply Option Links (1)

*1: By default, jumper J7 is not fitted to the RSK. R155 is fitted by default and becomes the same setting as 'J7 Shorted Pin1-2'.

*2: By default, jumper J6 is not fitted to the RSK. R144 is fitted by default and becomes the same setting as 'J6 Shorted Pin1-2'.

Reference	Explanation	Fit	DNF	Related Ref.
Unregulated_VCC	Connects Unregulated_VCC to Board_5V.	R37	-	U3, JA6.23
	Disconnects Unregulated_VCC from Board_5V.	-	R37	-
CON_5V	Connects CON_5V to Board_5V.	R36	-	U3, JA1.1
	Disconnects CON_5V from Board_5V.	-	R36	-
CON_3V3	Connects CON_3V3 to Board_3V3.	R35	-	J6, JA1.3
	Disconnects CON_3V3 from Board_3V3.	-	R35	-
Board_VCC	Connects Board_VCC to UC_VCC.	R155/J7.1-2	-	U1(VCC, AVCC0-2, VREF)
	Disconnects Board_VCC from UC_VCC. Enables current probe for MCU current consumption.	J7.Open	R155	U1(VCC, AVCC0-2, VREF)

Table 6-3: Power Supply Option Links (2)

6.4   Clock Configuration

Table 6-4 below details the function of the option links associated with clock configuration.

Reference	Explanation	Fit	DNF	Related Ref.
XTAL, EXTAL, CON_EXTAL	Connects 20MHz crystal (X1) to RX24T.	R57, R55	R52, R51	U1(EXTAL, XTAL)
	Connects CON_EXTAL to RX24T.	R52	R57, R55	U1(EXTAL), JA2.2

Table 6-4: Clock Option Links

Items shown in **bold** are the Fit / Do Not Fit (DNF) default configuration that the RSK is supplied with.

6.5 Analog Power & ADC Configuration

Table 6-5 below details the function of the option links associated with Analog Power & ADC configuration.

Signal name	MCU Pin	MCU Port	MCU Peripheral Selection Signal	Fit	DNF	Destination Selection Interface /Function	Fit	DNF
ADTRG0n_MTIOC1B	37	PA4	ADTRG0n_MTIOC1B	-	R48	SW3	R70	R71
						JA1.8	R49	R53
			MTIOC1B	R48	-	JA2.21	-	-
ADTRG1n_MTIOC1A_IRQ1	36	PA5	ADTRG1n_IRQ1	R152	R154	SW3	R71	R70
						JA1.8	R53	R49
			MTIOC1A_IRQ1	R154	R152	JA2.23	R54	R58
AN000	91	P40	AN000	-	-	RV1	R131	-
						JA1.9	R2	-
AN001	90	P41	AN001	-	-	JA1.10	-	-
AN002	89	P42	AN002	-	-	JA1.11	-	-
AN003	88	P43	AN003	-	-	JA1.12	-	-
AN100	87	P44	AN100	-	-	JA5.1	-	-
AN101	86	P45	AN101	-	-	JA5.2	-	-
AN102	85	P46	AN102	-	-	JA5.3	-	-
AN103	84	P47	AN103	-	-	JA5.4	-	-
VREF	72	-	UC_VCC	R31	R32	-	-	-
			CON_VREF	R32	R31	JA1.7	R3	-
AVCC0	93	-	UC_VCC	R129	R125, R126	-	-	-
			CON_AVCC0	R125	R129, R126	JA1.5	R6	R5, R4
			Board_VCC	R126, R124	R125, R129	-	-	-
AVCC1	92	-	UC_VCC	R135	R134	-	-	-
			CON_AVCC1	R134	R135	JA1.5	R5	R6, R4
AVCC2	71	-	UC_VCC	R121	R122	-	-	-
			CON_AVCC2	R122	R121	JA1.5	R4	R6, R5
AVSS0	94	-	GROUND	R130	R132	-	-	-
			CON_AVSS0	R132	R130	JA1.6	R8	R9, R7
AVSS1	95	-	GROUND	R142	R143	-	-	-
			CON_AVSS1	R143	R142	JA1.6	R9	R8, R7
AVSS2	73	-	GROUND	R120	R119	-	-	-
			CON_AVSS2	R119	R120	JA1.6	R7	R8, R9
MTCLKB_CVREF0	68	P20	MTCLKB	R112	R111	JA2.26	-	-
			CVREF0	R111	R112	JA6.18	-	-
CVREF1	67	P21	CVREF1	-	-	JA6.20	-	-

Table 6-5: Analog Power & ADC Option Links

6.6 E1 / E2 Lite Debugger Configuration

Table 6-6 below details the function of the option links associated with E1 / E2 Lite Debugger configuration.

Signal name	MCU Pin	MCU Port	MCU Peripheral Selection Signal	Fit	DNF	Destination Selection Interface /Function	Fit	DNF
TXD1	22	PD3	TXD1	-	-	E1.5	R127	R100
						U6.3	R100	R127, R99, R101
						JA2.6	-	-
RXD1	20	PD5	RXD1	-	-	E1.11	R138	R107
						U5.3	R107	R138, R106, R108
						JA2.8	-	-

Table 6-6: E1 / E2 Lite Debugger Option Links

Items shown in **bold** are the Fit / Do Not Fit (DNF) default configuration that the RSK is supplied with.

6.7   General I/O & LED Configuration

Table 6-7 below details the function of the option links associated with the General I/O & LED configuration.

Signal name	MCU		MCU Peripheral Selection			Destination Selection		
	Pin	Port	Signal	Fit	DNF	Interface /Function	Fit	DNF
IO0	69	P65	IO0	-	-	JA1.15	-	-
IO1	70	P64	IO1	-	-	JA1.16	-	-
IO2	82	P51	IO2	-	-	JA1.17	-	-
IO3	83	P50	IO3	-	-	JA1.18	-	-
IO4	16	PE1	IO4	-	-	JA1.19	-	-
IO5	4	P00	IO5	-	-	JA1.20	-	-
IO6	7	P01	IO6	-	-	JA1.21	-	-
IO7	23	PD2	IO7	-	-	JA1.22	-	-
LED0	32	PB3	LED0	-	-	LED0	R50	-
LED1	1	PE5	LED1	-	-	LED1	R50	-
LED2	80	P53	LED2	-	-	LED2	R50	-
LED3	81	P52	LED3	-	-	LED3	R50	-

Table 6-7: General I/O & LED Option Links

6.8   I²C & EEPROM Configuration

Table 6-8 below details the function of the option links associated with I²C & EEPROM configuration.

Signal name /Reference	MCU		MCU Peripheral Selection			Destination Selection		
	Pin	Port	Signal	Fit	DNF	Interface /Function	Fit	DNF
SCL	34	PB1	SCL	-	-	U4.6	-	-
						JA1.26	-	-
SDA	33	PB2	SDA	-	-	U4.5	-	-
						JA1.25	-	-
Board_5V (Pull-up)	-	-	-	-	-	SDA, SCL, U4	R15	R13
Board_3V3 (Pull-up)	-	-	-	-	-	SDA, SCL, U4	R13	R15
Write Protect enable	-	-	-	-	-	U4.7	R87	-
Write Protect disable	-	-	-	-	-	U4.7	-	R87
Device Address = 0xA6	-	-	-	-	-	U4.1	R88	R16
Device Address = 0xA4	-	-	-	-	-	U4.1	R16	R88

Table 6-8: I²C & EEPROM Option Links

Items shown in **bold** are the Fit / Do Not Fit (DNF) default configuration that the RSK is supplied with.

6.9   IRQ & Switch Configuration

Table 6-9 below details the function of the option links associated with the IRQ & Switches configuration.

Signal name	MCU Pin	MCU Port	MCU Peripheral Selection Signal	Fit	DNF	Destination Selection Interface /Function	Fit	DNF
MTIOC0B_IRQ7	63	P30	JA2-MTIOC0B_IRQ7	R28	R20	JA2.9	-	-
			IRQ7	R20	R28	PMOD2.8	-	-
MTIOC0A_IRQ6	61	P31	JA2-MTIOC0A_IRQ6	R30	R23, R29	JA2.7	-	-
			IRQ6	R23	R30, R29	PMOD2.7	-	-
			JA2-MTIOC0A	R29	R23, R30	JA2.19	-	-
MTIOC9D_IRQ5	2	P02	MTIOC9D_IRQ5	-	-	SW2	R72	-
						JA5.10	-	-
IRQ4	77	P60	IRQ4	-	-	JA1.23	R117	R118
IRQ3	78	P55	IRQ3	-	-	PMOD1.8	-	-
IRQ2	79	P54	IRQ2	-	-	PMOD1.7	-	-
ADTRG1n_MTIOC1A_IRQ1	36	PA5	ADTRG1n_IRQ1	R152	R154	SW3	R71	R70
						JA1.8	R53	R49
			MTIOC1A_IRQ1	R154	R152	JA2.23	R54	R58
MTIOC9B_IRQ0	100	P10	MTIOC9B_IRQ0	-	-	SW1	R73	-
						JA5.9	R147	R148
ADTRG0n_MTIOC1B	37	PA4	ADTRG0n_MTIOC1B	-	R48	SW3	R70	R71
						JA1.8	R49	R53
			MTIOC1B	R48	-	JA2.21	-	-
NMIn	15	PE2	NMIn	-	-	JA2.3	-	-

Table 6-9: IRQ & Switch Option Links

6.10   MTU & POE Configuration

Table 6-10 and Table 6-11 below details the function of the option links associated with MTU & POE configuration.

Signal name	MCU Pin	MCU Port	MCU Peripheral Selection Signal	Fit	DNF	Destination Selection Interface /Function	Fit	DNF
MTIOC0A_IRQ6	61	P31	JA2-MTIOC0A_IRQ6	R30	R23, R29	JA2.7	-	-
			IRQ6	R23	R30, R29	PMOD2.7	-	-
			JA2-MTIOC0A	R29	R23, R30	JA2.19	-	-
MTIOC0B_IRQ7	63	P30	JA2-MTIOC0B_IRQ7	R28	R20	JA2.9	-	-
			IRQ7	R20	R28	PMOD2.8	-	-
MTIOC0D	35	PB0	MTIOC0D	-	-	JA2.23	R58	R54
ADTRG1n_MTIOC1A_IRQ1	36	PA5	ADTRG1n_IRQ1	R152	R154	SW3	R71	R70
						JA1.8	R53	R49
			MTIOC1A_IRQ1	R154	R152	JA2.23	R54	R58
ADTRG0n_MTIOC1B	37	PA4	ADTRG0n_MTIOC1B	-	R48	SW3	R70	R71
						JA1.8	R49	R53
			MTIOC1B	R48	-	JA2.21	-	-
MTIOC2A	38	PA3	MTIOC2A	-	-	JA5.9	R148	R147
CTS6RTS6_MTIOC2B	39	PA2	CTS6RTS6	R44	R45	PMOD2.1	-	-
			MTIOC2B	R45	R44	JA2.22	-	-
MTIOC3A	99	P11	MTIOC3A	-	-	JA6.13	-	-
MTIOC3B	56	P71	MTIOC3B	-	-	JA2.13	-	-
MTIOC3C	59	P32	MTIOC3C	-	-	JA2.11	-	-
MTIOC3D	53	P74	MTIOC3D	-	-	JA2.14	-	-

Table 6-10: MTU & POE Option Links(1/2)

Items shown in **bold** are the Fit / Do Not Fit (DNF) default configuration that the RSK is supplied with.

Signal name	MCU		MCU Peripheral Selection			Destination Selection		
	Pin	Port	Signal	Fit	DNF	Interface /Function	Fit	DNF
MTIOC4A	55	P72	MTIOC4A	-	-	JA2.15	-	-
MTIOC4B	54	P73	MTIOC4B	-	-	JA2.17	-	-
MTIOC4C	52	P75	MTIOC4C	-	-	JA2.16	-	-
MTIOC4D	51	P76	MTIOC4D	-	-	JA2.18	-	-
MTIC5U	64	P24	JA5-MTIC5U	-	-	JA5.12	R114	R19
			JA6-MTIC5U			JA6.14	R19	R114
MTIC5V	65	P23	JA5-MTIC5V	-	-	JA5.13	R27	R18
			JA6-MTIC5V			JA6.15	R18	R27
MTIC5W	66	P22	JA5-MTIC5W	-	-	JA5.14	R113	R17
			JA6-MTIC5W			JA6.16	R17	R113
MTIOC6A	40	PA1	MTIOC6A	-	-	JA5.13	-	-
MTIOC6B	45	P95	MTIOC6B	-	-	JA5.19	-	-
MTIOC6C	41	PA0	MTIOC6C	-	-	JA5.11	-	-
MTIOC6D	48	P92	MTIOC6D	-	-	JA5.20	-	-
MTIOC7A	46	P94	MTIOC7A	-	-	JA5.21	-	-
MTIOC7B	48	P93	MTIOC7B	-	-	JA5.23	-	-
MTIOC7C	49	P91	MTIOC7C	-	-	JA5.22	-	-
MTIOC7D	50	P90	MTIOC7D	-	-	JA5.24	-	-
MTIOC9A	18	PD7	MTIOC9A	-	-	JA1.23	R118	R117
MTIOC9B_IRQ0	100	P10	MTIOC9B_IRQ0	-	-	SW1	R73	-
						JA5.9	R147	R148
CTS1RTS1_MTIOC9C	19	PD6	CTS1RTS1	R69	R68	JA2.12	-	-
			MTIOC9C	R68	R69	JA2.20	-	-
MTIOC9D_IRQ5	2	P02	MTIOC9D_IRQ5	-	-	SW2	R72	-
						JA5.10	-	-
POE0n	57	P70	POE0n	R33	-	JA2.24	-	-
POE4n	43	P96	POE4n	R39	-	JA5.16	-	-
MTCLKA	58	P33	MTCLKA	-	-	JA2.25	-	-
MTCLKB_CVREF0	68	P20	MTCLKB	R112	R111	JA2.26	-	-
			CVREF0	R111	R112	JA6.18	-	-
MTCLKC	8	PE4	MTCLKC	-	-	JA5.17	-	-
MTCLKD	9	PE3	MTCLKD	-	-	JA5.18	-	-

Table 6-11: MTU & POE Option Links(2/2)

Items shown in **bold** are the Fit / Do Not Fit (DNF) default configuration that the RSK is supplied with.

## 6.11	PMOD1 Interface Configuration

Table 6-12 below details the function of the option links associated with PMOD1 Interface configuration.

Signal name	MCU		MCU Peripheral Selection			Destination Selection		
	Pin	Port	Signal	Fit	DNF	Interface /Function	Fit	DNF
CTS5RTS5	30	PB4	CTS5RTS5	-	-	PMOD1.1	-	-
A-TXD5_P-TXD5	28	PB5	A-TXD5	R63	R59	JA6.8	-	-
			P-TXD5	R59	R63	PMOD1.2	-	-
A-RXD5_P-RXD5	27	PB6	A-RXD5	R62	R61	JA6.7	-	-
			P-RXD5	R61	R62	PMOD1.3	-	-
A-SCK5_P-SCK5	26	PB7	A-SCK5	R43, R65	R64	JA6.10	-	-
			P-SCK5	R43, R64	R65	PMOD1.4	-	-
IRQ2	79	P54	IRQ2	-	-	PMOD1.7	-	-
IRQ3	78	P55	IRQ3	-	-	PMOD1.8	-	-
PD1	24	PD1	PD1	-	-	PMOD1.9	-	-
PD0	25	PD0	PD0	-	-	PMOD1.10	-	-

Table 6-12: PMOD1 Interface Option Links

## 6.12	PMOD2 Interface Configuration

Table 6-13 below details the function of the option links associated with PMOD2 Interface configuration.

Signal name	MCU		MCU Peripheral Selection			Destination Selection		
	Pin	Port	Signal	Fit	DNF	Interface /Function	Fit	DNF
CTS6RTS6_MTIOC2B	39	PA2	CTS6RTS6	R44	R45	PMOD2.1	-	-
			MTIOC2B	R45	R44	JA2.22	-	-
A-TXD6_P-TXD6	97	P81	A-TXD6	R140	R133	JA6.9	-	R101
			P-TXD6	R133	R140	PMOD2.2	-	R101
			A-TXD6_P-TXD6	-	R140, R133	U6.3	R101	R99, R100
A-RXD6_P-RXD6	98	P80	A-RXD6	R149	R146	JA6.12	-	R108
			P-RXD6	R146	R149	PMOD2.3	-	R108
			A-RXD6_P-RXD6	-	R149, R146	U5.3	R108	R106, R107
A-SCK6_P-SCK6	96	P82	A-SCK6	R145, R41	R141	JA6.11	-	-
			P-SCK6	R141, R41	R145	PMOD2.4	-	-
MTIOC0A_IRQ6	61	P31	JA2-MTIOC0A_IRQ6	R30	R23, R29	JA2.7	-	-
			IRQ6	R23	R30, R29	PMOD2.7	-	-
			JA2-MTIOC0A	R29	R23, R30	JA2.19	-	-
MTIOC0B_IRQ7	63	P30	JA2-MTIOC0B_IRQ7	R28	R20	JA2.9	-	-
			IRQ7	R20	R28	PMOD2.8	-	-
P63	74	P63	P63	-	-	PMOD2.9	-	-
P62	75	P62	P62	-	-	PMOD2.10	-	-

Table 6-13: PMOD2 Interface Option Links

Items shown in **bold** are the Fit / Do Not Fit (DNF) default configuration that the RSK is supplied with.

6.13   Serial & USB to Serial Configuration

Table 6-14 below details the function of the option links associated with Serial & USB to Serial configuration.

Signal name /Reference	MCU		MCU Peripheral Selection			Destination Selection		
	Pin	Port	Signal	Fit	DNF	Interface /Function	Fit	DNF
RL78G1CCTS	76	P61	RL78G1CCTS	-	-	U5.2	-	-
RL78G1CRTS	17	PE0	RL78G1CRTS	-	-	U6.2	-	-
TXD1	22	PD3	TXD1	-	-	E1.5	R127	R100
						U6.3	R100	R127, R99, R101
						JA2.6	-	-
RXD1	20	PD5	RXD1	-	-	E1.11	R138	R107
						U5.3	R107	R138, R106, 108
						JA2.8	-	-
SCK1	21	PD4	SCK1	R151	-	JA2.10	-	-
CTS1RTS1_MTIOC9C	19	PD6	CTS1RTS1	R69	R68	JA2.12	-	-
			MTIOC9C	R68	R69	JA2.20	-	-
A-TXD5_P-TXD5	28	PB5	A-TXD5	R63	R59	JA6.8	-	-
			P-TXD5	R59	R63	PMOD1.2	-	-
A-RXD5_P-RXD5	27	PB6	A-RXD5	R62	R61	JA6.7	-	-
			P-RXD5	R61	R62	PMOD1.3	-	-
A-SCK5_P-SCK5	26	PB7	A-SCK5	R43, R65	R64	JA6.10	-	-
			P-SCK5	R43, R64	R65	PMOD1.4	-	-
CTS5RTS5	30	PB4	CTS5RTS5	-	-	PMOD1.1	-	-
A-TXD6_P-TXD6	97	P81	A-TXD6	R140	R133	JA6.9	-	R101
			P-TXD6	R133	R140	PMOD2.2	-	R101
			A-TXD6_P-TXD6	-	R140, R133	U6.3	R101	R99, R100
A-RXD6_P-RXD6	98	P80	A-RXD6	R149	R146	JA6.12	-	R108
			P-RXD6	R146	R149	PMOD2.3	-	R108
			A-RXD6_P-RXD6	-	R149, R146	U5.3	R108	R106, R107
A-SCK6_P-SCK6	96	P82	A-SCK6	R145, R41	R141	JA6.11	-	-
			P-SCK6	R141, R41	R145	PMOD2.4	-	-
CTS6RTS6_MTIOC2B	39	PA2	CTS6RTS6	R44	R45	PMOD2.1	-	-
			MTIOC2B	R45	R44	JA2.22	-	-
RS232TX(JA6.5)	-	-	-	-	-	U6.3	R99	R100, R101
RS232RX(JA6.6)	-	-	-	-	-	U5.3	R106	R107, R108

Table 6-14: Serial & USB to Serial Option Links

Items shown in **bold** are the Fit / Do Not Fit (DNF) default configuration that the RSK is supplied with.

7. Headers

7.1   Application Headers

This RSK is fitted with application headers, which can be used to connect compatible Renesas application devices or as easy access to MCU pins.

Table 7-1 below lists the connections of the application header, JA1.

Application Header JA1					
Pin	**Header Name**	**MCU Pin**	**Pin**	**Header Name**	**MCU Pin**
	Circuit Net Name			**Circuit Net Name**	
1	5V	-	2	0V	-
	CON_5V			GROUND	
3	3V3	-	4	0V	-
	CON_3V3			GROUND	
5	AVCC	93/92/71	6	AVSS	94/95/73
	CON_AVCC0/CON_AVCC1/ CON_AVCC2			CON_AVSS0/CON_AVSS1/ CON_AVSS2	
7	AVREF	72	8	ADTRG	37/36
	CON_VREF			ADTRG0n_MTIOC1B/ ADTRG1n_IRQ1	
9	ADC0	91	10	ADC1	90
	AN000			AN001	
11	ADC2	89	12	ADC3	88
	AN002			AN003	
13	DAC0	NC	14	DAC1	NC
	NC			NC	
15	IO_0	69	16	IO_1	70
	IO0			IO1	
17	IO_2	82	18	IO_3	83
	IO2			IO3	
19	IO_4	16	20	IO_5	4
	IO4			IO5	
21	IO_6	7	22	IO_7	23
	IO6			IO7	
23	IRQ3/IRQAEC/M2_HSIN0	77/NC/18	24	IIC_EX	NC
	MTIOC9A/IRQ4			NC	
25	IIC_SDA	33	26	IIC_SCL	34
	JA1_SDA (SDA)			JA1_SCL (SCL)	

Table 7-1: Application Header JA1 Connections

Table 7-2 below lists the connections of the application header, JA2.

Pin	Header Name / Circuit Net Name	MCU Pin	Pin	Header Name / Circuit Net Name	MCU Pin
	Application Header JA2				
Pin	**Header Name** **Circuit Net Name**	**MCU Pin**	**Pin**	**Header Name** **Circuit Net Name**	**MCU Pin**
1	RESET / RESn	10	2	EXTAL / CON_EXTAL	13
3	NMI / NMIn	15	4	Vss1 / GROUND	-
5	WDT_OVF / NC	NC	6	SCIaTX / TXD1	22
7	IRQ0/WKUP/M1_HSIN0 / JA2-MTIOC0A_IRQ6	61/NC/61	8	SCIaRX / RXD1	20
9	IRQ1/M1_HSIN1 / JA2-MTIOC0B_IRQ7	63/63	10	SCIaCK / SCK1	21
11	M1_UD / MTIOC3C	59	12	CTSRTS / CTS1RTS1	19
13	M1_UP / MTIOC3B	56	14	M1_UN / MTIOC3D	53
15	M1_VP / MTIOC4A	55	16	M1_VN / MTIOC4C	52
17	M1_WP / MTIOC4B	54	18	M1_WN / MTIOC4D	51
19	TimerOut / JA2-MTIOC0A	61	20	TimerOut / MTIOC9C	19
21	TimerIn / MTIOC1B	37	22	TimerIn / MTIOC2B	39
23	IRQ2/M1_EncZ/M1_HSIN2 / MTIOC1A_IRQ1/MTIOC0D	36/36/35	24	M1_POE / POE0n	57
25	M1_TRCCLK / MTCLKA	58	26	M1_TRDCLK / MTCLKB	68

Table 7-2: Application Header JA2 Connections

Table 7-3 below lists the connections of the application header, JA5.

	Header Name	MCU Pin	Pin	Header Name	MCU Pin
Pin	Circuit Net Name			Circuit Net Name	
1	ADC4	87	2	ADC5	86
	AN100			AN101	
3	ADC6	85	4	ADC7	84
	AN102			AN103	
5	CAN1TX	NC	6	CAN1RX	NC
	NC			NC	
7	CAN2TX	NC	8	CAN2RX	NC
	NC			NC	
9	IRQ4/M2_EncZ/M2_HSIN1	100/38/100	10	IRQ5/M2_HSIN2	2/2
	MTIOC9B_IRQ0/MTIOC2A			MTIOC9D_IRQ5	
11	M2_UD	41	12	M2_Uin	64
	MTIOC6C			JA5-MTIC5U	
13	M2_Vin	65	14	M2_Win	66
	JA5-MTIC5V			JA5-MTIC5W	
15	M2_Toggle	40	16	M2_POE	43
	MTIOC6A			POE4n	
17	M2_TRCCLK	8	18	M2_TRDCLK	9
	MTCLKC			MTCLKD	
19	M2_UP	45	20	M2_UN	48
	MTIOC6B			MTIOC6D	
21	M2_VP	46	22	M2_VN	49
	MTIOC7A			MTIOC7C	
23	M2_WP	47	24	M2_WN	50
	MTIOC7B			MTIOC7D	

Table 7-3: Application Header JA5 Connections

Table 7-4 below lists the connections of the application header, JA6.

Pin	Header Name	MCU Pin	Pin	Header Name	MCU Pin
	Circuit Net Name			Circuit Net Name	
1	DREQ	NC	2	DACK	NC
	NC			NC	
3	TEND	NC	4	STBYn	NC
	NC			NC	
5	RS232TX	NC	6	RS232RX	NC
	RS232TX			RS232RX	
7	SCIbRX	27	8	SCIbTX	28
	A-RXD5			A-TXD5	
9	SCIcTX	97	10	SCIbCK	26
	A-TXD6			A-SCK5	
11	SCIcCK	96	12	SCIcRX	98
	A-SCK6			A-RXD6	
13	M1_Toggle	99	14	M1_Uin	64
	MTIOC3A			JA6-MTIC5U	
15	M1_Vin	65	16	M1_Win	66
	JA6-MTIC5V			JA6-MTIC5W	
17	Reserved	NC	18	Reserved	68
	NC			CVREF0	
19	Reserved	NC	20	Reserved	67
	NC			CVREF1	
21	Reserved	NC	22	Reserved	NC
	NC			NC	
23	Unregulated_VCC	-	24	Vss	-
	Unregulated_VCC			GROUND	

Table 7-4: Application Header JA6 Connections

7.2   Microcontroller Pin Headers

This RSK is fitted with MCU pin headers, which are used to access all the MCU's pins.

Table 7-5 below lists the connections of the microcontroller pin header, J1.

Microcontroller Pin Header J1					
Pin	Circuit Net Name	MCU Pin	Pin	Circuit Net Name	MCU Pin
1	LED1	1	2	MTIOC9D_IRQ5	2
3	GROUND	-	4	IO5	4
5	NC	NC	6	MD_FINED	6
7	IO6	7	8	MTCLKC	8
9	MTCLKD	9	10	RESn	10
11	CON_XTAL	11	12	GROUND	-
13	CON_EXTAL	13	14	UC_VCC	-
15	NMIn	15	16	IO4	16
17	RL78G1CRTS	17	18	MTIOC9A	18
19	CTS1RTS1_MTIOC9C	19	20	RXD1	20
21	SCK1	21	22	TXD1	22
23	IO7	23	24	PD1	24
25	PD0	25	26	NC	NC
27	NC	NC	28	NC	NC
29	NC	NC	30	NC	NC
31	NC	NC	32	NC	NC
33	NC	NC	34	NC	NC
35	NC	NC	36	NC	NC

Table 7-5: Microcontroller Pin Header, J1

Table 7-6 below lists the connections of the microcontroller pin header, J2.

Microcontroller Pin Header J2					
Pin	Circuit Net Name	MCU Pin	Pin	Circuit Net Name	MCU Pin
1	A-SCK5_P-SCK5	26	2	A-RXD5_P-RXD5	27
3	A-TXD5_P-TXD5	28	4	UC_VCC	-
5	CTS5RTS5	30	6	GROUND	-
7	LED0	32	8	SDA	33
9	SCL	34	10	MTIOC0D	35
11	ADTRG1n_MTIOC1A_IRQ1	36	12	ADTRG0n_MTIOC1B	37
13	MTIOC2A	38	14	CTS6RTS6_MTIOC2B	39
15	MTIOC6A	40	16	MTIOC6C	41
17	UC_VCC	-	18	POE4n	43
19	GROUND	-	20	MTIOC6B	45
21	MTIOC7A	46	22	MTIOC7B	47
23	MTIOC6D	48	24	MTIOC7C	49
25	MTIOC7D	50	26	NC	NC
27	NC	NC	28	NC	NC
29	NC	NC	30	NC	NC
31	NC	NC	32	NC	NC
33	NC	NC	34	NC	NC
35	NC	NC	36	NC	NC

Table 7-6: Microcontroller Pin Header, J2

Table 7-7 below lists the connections of the microcontroller pin header, J3.

Microcontroller Pin Header J3					
Pin	Circuit Net Name	MCU Pin	Pin	Circuit Net Name	MCU Pin
1	MTIOC4D	51	2	MTIOC4C	52
3	MTIOC3D	53	4	MTIOC4B	54
5	MTIOC4A	55	6	MTIOC3B	56
7	POE0n	57	8	MTCLKA	58
9	MTIOC3C	59	10	UC_VCC	-
11	MTIOC0A_IRQ6	61	12	GROUND	-
13	MTIOC0B_IRQ7	63	14	MTIC5U	64
15	MTIC5V	65	16	MTIC5W	66
17	CVREF1	67	18	MTCLKB_CVREF0	68
19	IO0	69	20	IO1	70
21	CON_AVCC2	71	22	CON_VREF	72
23	CON_AVSS2	73	24	P63	74
25	P62	75	26	NC	NC
27	NC	NC	28	NC	NC
29	NC	NC	30	NC	NC
31	NC	NC	32	NC	NC
33	NC	NC	34	NC	NC
35	NC	NC	36	NC	NC

Table 7-7: Microcontroller Pin Header, J3

Table 7-8 below lists the connections of the microcontroller pin header, J4.

Microcontroller Pin Header J4					
Pin	Circuit Net Name	MCU Pin	Pin	Circuit Net Name	MCU Pin
1	RL78G1CCTS	76	2	IRQ4	77
3	IRQ3	78	4	IRQ2	79
5	LED2	80	6	LED3	81
7	IO2	82	8	IO3	83
9	AN103	84	10	AN102	85
11	AN101	86	12	AN100	87
13	AN003	88	14	AN002	89
15	AN001	90	16	AN000	91
17	CON_AVCC1	92	18	CON_AVCC0	93
19	CON_AVSS0	94	20	CON_AVSS1	95
21	A-SCK6_P-SCK6	96	22	A-TXD6_P-TXD6	97
23	A-RXD6_P-RXD6	98	24	MTIOC3A	99
25	MTIOC9B_IRQ0	100	26	NC	NC
27	NC	NC	28	NC	NC
29	NC	NC	30	NC	NC
31	NC	NC	32	NC	NC
33	NC	NC	34	NC	NC
35	NC	NC	36	NC	NC

Table 7-8: Microcontroller Pin Header, J4

8.   Code Development

8.1   Overview

For all code debugging using Renesas software tools, the RSK board must be connected to a PC via an E1/E20/E2 Lite debugger. An E1/E2 Lite debugger is supplied with this RSK product.

For further information regarding the debugging capabilities of the E1/E20/E2 Lite debuggers, refer to E1/E20 Emulator, E2 Emulator Lite Additional Document for User's Manual (R20UT0399EJ).

8.2   Compiler Restrictions

The compiler supplied with this RSK is fully functional for a period of 60 days from first use. After the first 60 days of use have expired, the compiler will default to a maximum of 128k code and data. To use the compiler with programs greater than this size you need to purchase the full tools from your distributor.

> The protection software for the compiler will detect changes to the system clock. Changes to the system clock back in time may cause the trial period to expire prematurely.

8.3   Mode Support

The MCU supports Single Chip and Boot modes (SCI), which are configured on the RSK board. Details of the modifications required can be found in §6.2. All other MCU operating modes are configured within the MCU's registers, which are listed in the RX24T Group Hardware Manual.

> Only change the MCU operating mode whilst the RSK is in reset, or turned off; otherwise the MCU may become damaged as a result.

8.4   Debugging Support

The E1 Emulator or E2 Emulator Lite (as supplied with this RSK) supports break points, event points (including mid-execution insertion) and basic trace functionality. It is limited to a maximum of 8 on-chip event points, 256 software breaks and 256 branch/cycle trace. For further details, refer RX Family E1/E20 Emulator User's Manual (R20UT0398EJ) or E2 Emulator Lite User's Manual (R20UT3240EJ).

8.5   Address Space

For the MCU address space details, refer to the 'Address Space' section of RX24T Group Hardware Manual.

9. Additional Information

Technical Support

For information about the RX24T Group microcontrollers refer to the RX24T Group Hardware Manual.

For information about the RX assembly language, refer to the RX Family Software Manual.

Technical Contact Details

Please refer to the contact details listed in section 8 of the "Quick Start Guide"

General information on Renesas Microcontrollers can be found on the Renesas website at:
http://www.renesas.com/

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