To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

Send any inquiries to http://www.renesas.com/inquiry.

Notice

1. All information included in this document is current as of the date this document is issued. Such information, however, is subject to change without any prior notice. Before purchasing or using any Renesas Electronics products listed herein, please confirm the latest product information with a Renesas Electronics sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas Electronics such as that disclosed through our website.
2. Renesas Electronics does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
3. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part.
4. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
5. When exporting the products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations. You should not use Renesas Electronics products or the technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations.
6. Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant that such information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
7. Renesas Electronics products are classified according to the following three quality grades: "Standard", "High Quality", and "Specific". The recommended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below. You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application categorized as "Specific" without the prior written consent of Renesas Electronics. Further, you may not use any Renesas Electronics product for any application for which it is not intended without the prior written consent of Renesas Electronics. Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for an application categorized as "Specific" or for which the product is not intended where you have failed to obtain the prior written consent of Renesas Electronics. The quality grade of each Renesas Electronics product is "Standard" unless otherwise expressly specified in a Renesas Electronics data sheets or data books, etc.

   "Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots.

   "High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; safety equipment; and medical equipment not specifically designed for life support.

   "Specific": Aircraft; aerospace equipment; submersible repeaters; nuclear reactor control systems; medical equipment or systems for life support (e.g. artificial life support devices or systems), surgical implantations, or healthcare intervention (e.g. excision, etc.), and any other applications or purposes that pose a direct threat to human life.
8. You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.
9. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.
10. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
11. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics.
12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.

(Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.

(Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.

User's Manual

Renesas Starter Kit

RSK M16C29 User's Manual

RENESAS SINGLE-CHIP MICROCOMPUTER M16C FAMILY

Renesas Electronics
www.renesas.com

Rev.2.00 2007.10

Table of Contents

Chapter 1. Preface

Cautions

This document may be, wholly or partially, subject to change without notice.

Trademarks

All brand or product names used in this manual are trademarks or registered trademarks of their respective companies or organisations.

Copyright

Website: http://www.renesas.com/

Glossary

CPU	Central Processing Unit	PC	Program Counter
HEW	High-performance Embedded Workshop	RSK	Renesas Starter Kit
LCD	Liquid Crystal Display	E8a	E8a On-chip debug module
LIN	Local Interconnect Network	LED	Light Emitting Diode

Chapter 2.Purpose

This RSK is an evaluation tool for Renesas microcontrollers.

Features include:

- Renesas Microcontroller Programming.
- User Code Debugging.
- User Circuitry such as Switches, LEDs and potentiometer(s).
- User or Example Application.
- Sample peripheral device initialisation code.

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

This manual provides the technical details of the RSK hardware. The Quick Start Guide and Tutorial Manual provide details of the software installation and debugging environment.

Chapter 3.Power Supply

3.1.Requirements

This CPU board operates from a 5V power supply.

A diode provides reverse polarity protection only if a current limiting power supply is used.

All CPU boards are supplied with an E8a debugger module. This product is able to power the CPU board with up to 300mA. When the CPU board is connected to another system then that system should supply power to the CPU board.

All CPU boards have an optional centre positive supply connector using a 2.0mm barrel power jack.

Warning

The CPU board is neither under nor over voltage protected. Use a centre positive supply for this board.

3.2.Power – Up Behaviour

When the RSK is purchased the CPU board has the ‘Release’ or stand alone code from the example tutorial code pre-programmed into the Renesas microcontroller. On powering up the board the user LEDs will start to flash. After 200 flashes, or after pressing a switch the LEDs will flash at a rate controlled by the potentiometer.

Chapter 4.Board Layout

4.1.Component Layout

The following diagram shows top layer component layout of the board.

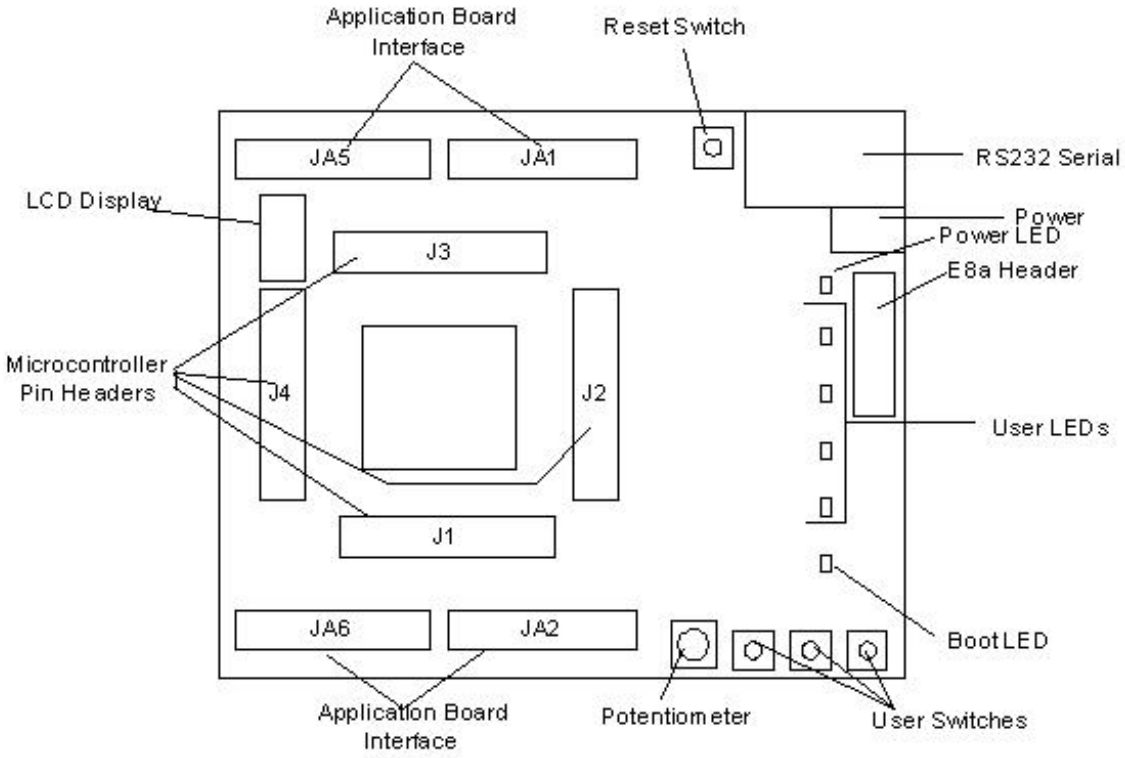


Figure 4-1: Board Layout

4.2.Board Dimensions

The following diagram gives the board dimensions and connector positions. All through hole connectors are on a common 0.1” grid for easy interfacing.

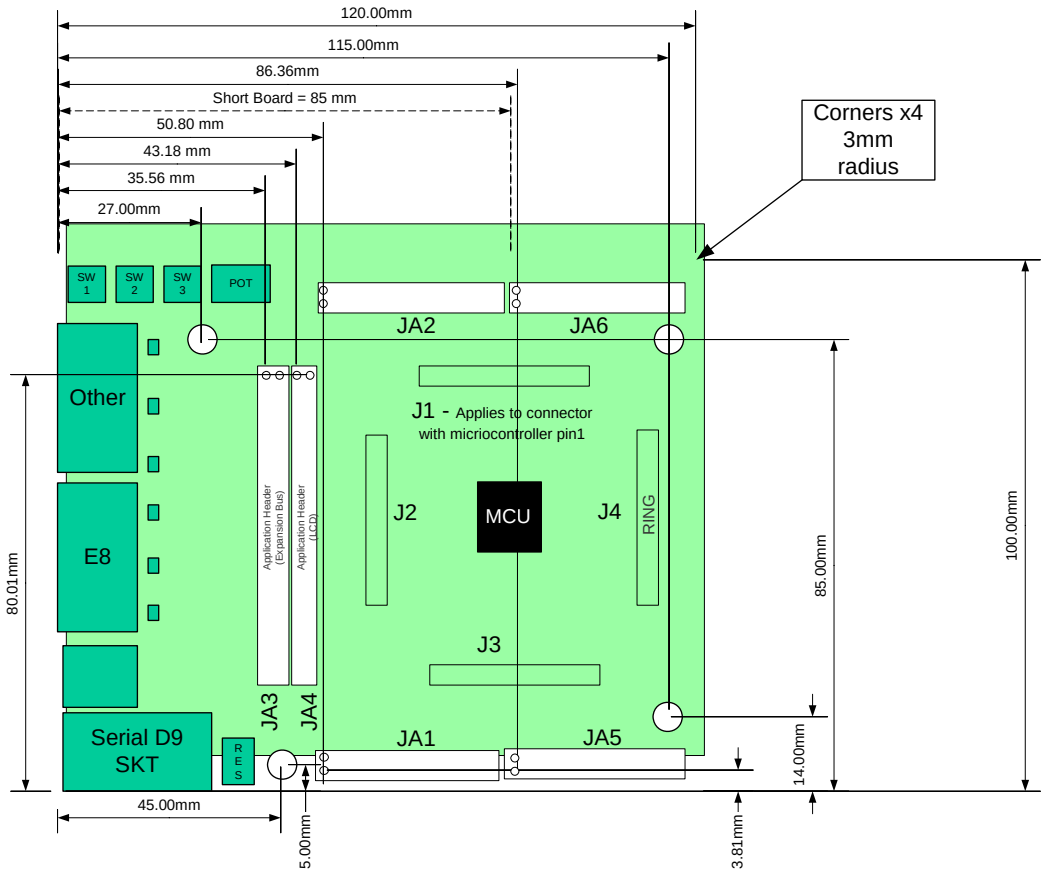


Figure 4-2 : Board Dimensions

Chapter 5.Block Diagram

Figure 5-1 is representative of the CPU board components and their connectivity.

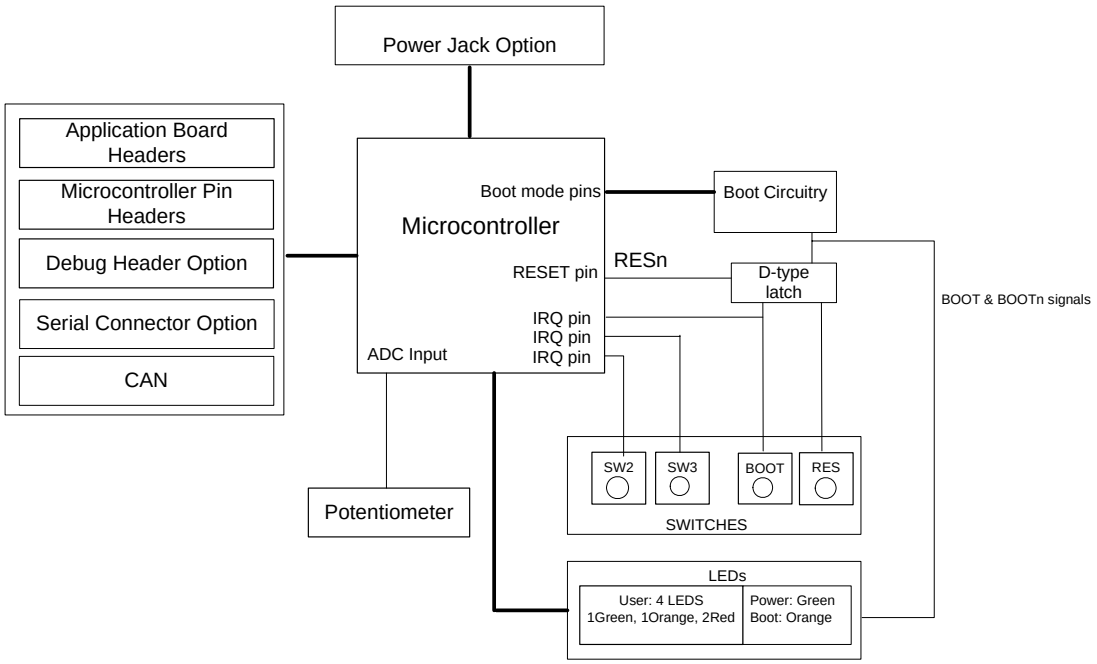


Figure 5-1: Block Diagram

Figure 5-2 is representative of the connections required to the RSK.

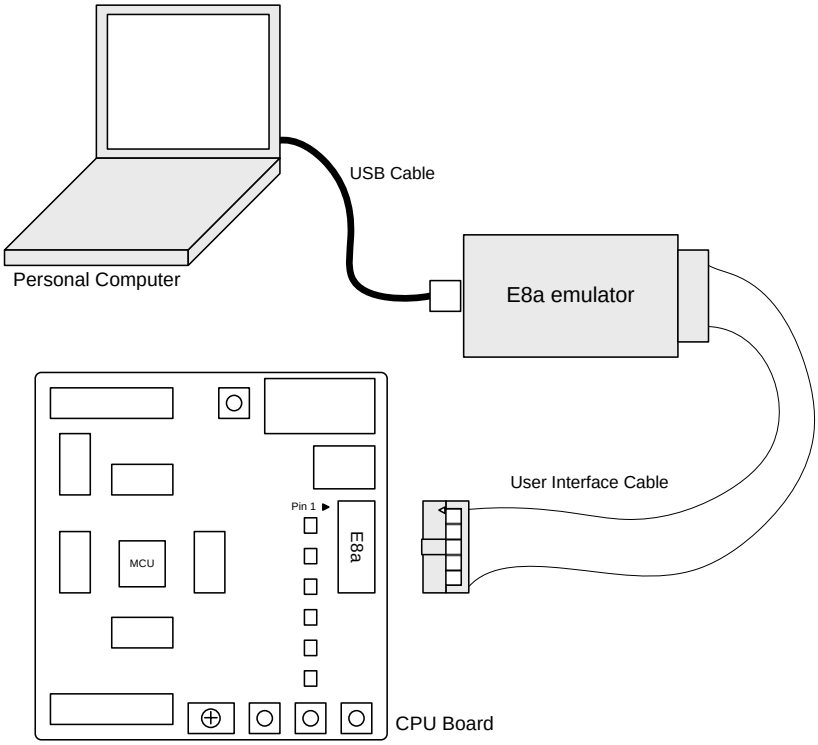


Figure 5-2 : RSK Connctions

Chapter 6.User Circuitry

6.1.Switches

There are four switches located on the CPU board. The function of each switch and its connection are shown in Table 6-1.

Switch	Function	Microcontroller
RES	When pressed, the RSK microcontroller is reset.	RESn
SW1/BOOT*	Connects to an IRQ input for user controls. The switch is also used in conjunction with the RES switch to place the device in BOOT mode when not using the E8a debugger module.	INT0 Pin17 (Port 8, pin 2)
SW2*	Connects to an IRQ line for user controls.	INT1 Pin16 (Port 8, pin 3)
SW3*	Connects to the ADC trigger input. Option link allows connection to IRQ line. The option is a pair of 0R links.	ADTRG/INT5, Pin 54 (Port 1, pin 5) *OR* INT2 Pin15(Port 8, pin 4)

Table 6-1: Switch Functions

*Refer to schematic for detailed connectivity information.

6.2.LEDs

There are six LEDs on the CPU board. The green 'POWER' LED lights when the board is powered. The orange BOOT LED indicates the device is in BOOT mode when lit. The four user LEDs are connected to an IO port and will light when their corresponding port pin is set low.

Table 6-2, below, shows the LED pin references and their corresponding microcontroller port pin connections.

LED Reference (As shown on silkscreen)	Microcontroller Port Pin function	Microcontroller Pin Number
LED0	Port 2 4	47
LED1	Port 2 5	46
LED2	Port 2 6	45
LED3	Port 2 7	44

Table 6-2:LED Port

6.3.Potentiometer

A single turn potentiometer is connected to AN2.7 (P9.7) of the microcontroller. This may be used to vary the input analog voltage value to this pin between AVCC and Ground.

6.4.Serial port

The microcontroller programming serial port 1 is connected to the RS232 connector. This serial port can optionally be connected to the RS232 transceiver by moving option resistors and fitting the D connector. The connections to be moved are listed in the following table.

Description	Function	Fit For E8a	Remove for E8a	Fit for RS232	Remove for RS232
TxD1	Programming Serial Port	R11	R24	R24	R11
RxD1	Programming Serial Port	R8	R25	R25	R8
CLK1	Programming Serial Port	R13	NA	NA	NA

Table 6-3: Serial port connections

The board is designed to accept a straight through RS232 cable. A secondary microcontroller serial port is available and connected to the application headers. Please refer to the schematic diagram for more details on the available connections.

6.5.LCD Module

An LCD module is supplied to be fitted to the connector J9. The LCD module uses a 4-bit interface. The supplied display module has the contrast control set by a fixed resistor. Any module that conforms to the pin connections and has a KS0066u compatible controller can be used with the CPU board

Table 6-4 shows the pin allocation and signal names used on this connector.

The module supplied with the RSK only supports 5V operation.

J9					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	Ground	-	2	5V Only	-
3	No Connection	-	4	DLCDRS	55
5	R/W (Wired to Write only)	-	6	DLCDE	52
7	No Connection	-	8	No Connection	-
9	No Connection	-	10	No Connection	-
11	DLCD4	59	12	DLCD5	58
13	DLCD6	57	14	DLCD7	56

Table 6-4 LCD Module Connections

6.6.Option Links

Table 6-5 below describes the function of the option links associated with Power configuration. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R14	Board VCC	**Supply to board from J6**	Fit Low ohm resistor to measure current	
R52	Micon VCC	**Supply to microcontroller**	Power from external pins	R50,R51
R51	Connector 3V3	Board VCC connected to Connector 3V3	**Disconnected**	R50,R52
R50	Connector 5V	**Board VCC connected to Connector 5V**	Disconnected	R51,R52

Table 6-5: Power Configuration Links

Table 6-6 below describes the function of the option links associated with Clock configuration. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R61	External Oscillator	Connects External Ring header pins to Microcontroller	**Disconnects sensitive microcontroller signals from external pins.**	R56
R56	External Oscillator	Connects External Ring header pins to Microcontroller	**Disconnects sensitive microcontroller signals from external pins.**	R61
R57	External Oscillator	Parallel resistor for crystal	**Not fitted**	
R73	External Subclock Oscillator	Connects External Ring header pins to Microcontroller	**Disconnects sensitive microcontroller signals from external pins.**	R66
R66	External Subclock Oscillator	Connects External Ring header pins to Microcontroller	**Disconnects sensitive microcontroller signals from external pins.**	R73
R67	External Subclock Oscillator	Parallel resistor for crystal	**Not fitted**	

Table 6-6: Clock Configuration Links

Table 6-7 below describes the function of the option links associated with Serial configuration. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R13	Programming Serial Port	**Connects SCK to E8a**	SCK disconnected from E8a	
R8	Programming Serial Port	**Connects E8a to Programming Serial port.**	MUST be removed if R25 fitted.	R25
R11	Programming Serial Port	**Connects E8a to Programming Serial port.**	Should be removed if R24 fitted.	R24
R25	Programming Serial Port	Connects RS232 port to Programming SCI port	**MUST be removed if R8, R26 or R17 fitted.**	R8, R26, R15
R24	Programming Serial Port	Connects RS232 port to Programming SCI port	**MUST be removed if R11, R34 or R32 fitted.**	R11, R34, R32
R18	RS232 Driver	Enables RS232 Serial Transceiver	**MUST be removed if R19 Fitted**	R19
R19	RS232 Driver	**Disables RS232 Serial Transceiver**	MUST be removed if R18 Fitted	R18
R36	Serial Connector	Connects Alternate serial (CH2) to D connector	**Disconnects Alternate serial from D connector.**	R37
R37	Serial Connector	Connects Alternate serial (CH2) to D connector	**Disconnects Alternate serial from D connector.**	R36
R35	Alternate Serial	Connects Alternate Serial (CH2 - SCIb) to RS232 Transceiver	**MUST be removed if SCIb not used for RS232.**	R46
R46	Alternate Serial	Connects Alternate Serial (CH2 - SCIb) to RS232 Transceiver	**MUST be removed if SCIb not used for RS232.**	R35
R17	RS232 Serial on Application Header	Connects Application Header to RS232 Transceiver	**MUST be removed if R25 or R26 fitted.**	R25, R26
R32	RS232 Serial on Application Header	Connects Application Header to RS232 Transceiver	**MUST be removed if R24 or R34 fitted.**	R24, R34
R26	RS232 Serial on SCIa CH0	Connects Serial Channel 0 to RS232 Transceiver	**MUST be removed if R25 or R17 fitted.**	R25, R17
R34	RS232 Serial on SCIa CH0	Connects Serial Channel 0 to RS232 Transceiver	**MUST be removed if R24 or R32 fitted.**	R24, R32

Table 6-7: Serial Configuration Links

Table 6-8 below describes the function of the option links associated with Analog configuration. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R70	Analogue Power	**Connects Board VCC supply to Analogue supply**	Analogue supply MUST be provided from external interface pins. (Fit R49)	JA1,R49
R49	Analogue Power	Connects AVCC supply to Application headers	**R70 must be fitted**	R70
R69	VREF	**Connects AVCC supply to VREF**	VREF can be provided from external interface pins. (Fit R75)	JA1,R75
R75	VREF	VREF to Application headers	**R69 should be fitted**	R69

Table 6-8: Analog Configuration Links

Table 6-9 below describes the function of the option links associated with microcontroller pin function select configuration. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R65	CAN	**Connects CAN to application header**	Disconnected	R71
R71	CAN	**Connects CAN to application header**	Disconnected	R65
R76	CAN	**Connects CAN transceiver to micon**	Disconnected	R72
R72	CAN	**Connects CAN transceiver to micon**	Disconnected	R76
R81	CAN	**Connects CAN terminator**	Disconnected	
R54	Micon pin function select	**Connects micon pin 25 to M0_Vp pin**	MUST be removed if R55 fitted.	R55
R55	Micon pin function select	Connects micon pin 25 to SCIb pin	**Should be removed if R54 fitted.**	R54

Table 6-9: MCU Pin Function Select Configuration Links

Table 6-10 below describes the function of the option links associated with other options. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R27	SW3	Connects SW3 to Analogue Trigger input	Disconnected	R28
R28	SW3	Connects SW3 to INT2 input	Disconnected	R27

Table 6-10: Other Option Links

6.7.Oscillator Sources

A crystal oscillator is fitted on the CPU board and used to supply the main clock input to the Renesas microcontroller. Table 6-11 details the oscillators that are fitted and alternative footprints provided on this CPU board:

Component					
		Value : Package	Manufacturer		
Crystal (X1)	Fitted	20MHz : HC/49U	Approved	See www.renesas.com for details	
			CPU board	Magna Frequency Components C-Mac	X20M000GCBE494SM* XTAL017162
Crystal (X2)	Fitted	32.7628KHz : 90SMX	Approved	See www.renesas.com for details	
			CPU board	Magna Frequency Components AEL	X32K768SM104* X32K768S234

Table 6-11: Oscillators / Resonators

Warning: The user is responsible for code written to support operating speeds other than the default.

6.8.Reset Circuit

The CPU Board includes a simple latch circuit that links the mode selection and reset circuit. This provides an easy method for swapping the device between Boot Mode, User Boot Mode and User mode. This circuit is not required on customers boards as it is intended for providing easy evaluation of the operating modes of the device on the RSK. Please refer to the hardware manual for more information on the requirements of the reset circuit.

The Reset circuit operates by latching the state of the boot switch on pressing the reset button. This control is subsequently used to modify the mode pin states as required.

The mode pins should change state only while the reset signal is active to avoid possible device damage.

The reset is held in the active state for a fixed period by a pair of resistors and a capacitor. Please check the reset requirements carefully to ensure the reset circuit on the user's board meets all the reset timing requirements.

Chapter 7.Modes

The RSK supports Single chip mode and Boot mode.

When using the E8a debugger module supplied with the RSK the mode transitions are executed automatically. The CPU board provides the capability of changing between User and Boot / User Boot modes using a simple latch circuit. This is only to provide a simple mode control on this board when the E8a is not in use.

More information on the operating modes can be found in the M16C/29 Group Hardware Manual.

7.1.1.Boot mode

The boot mode settings for this RSK are shown in Table 7-1 below:

CNVSS	RP	P1.6	**LSI State after Reset End**
1	0	1	Boot Mode

Table 7-1: Mode pin settings

The software supplied with this RSK does not support Boot mode, except by using the E8a and HEW. However, hardware exists to enter boot mode manually, do not connect the E8a in this case. Press and hold the SW1/BOOT. The mode pins above are held in their boot states while reset is pressed and released. Release the boot button. The BOOT LED will be illuminated to indicate that the microcontroller is in boot mode.

When the E8a is not fitted the CNVSS pin is pulled low by a 100k resistor and the RP pin is pulled high by a 10k resistor, unless the board is placed in boot mode as above, when they are actively driven. P1.6 is pulled up by 100k when the E8a is not fitted.

When an E8a is used these three pins are controlled by the E8a.

7.1.2.Single chip mode

Refer to M16C/29 Group Hardware Manual for details of Single chip mode

Chapter 8.Programming Methods

The board is intended for use with HEW and the supplied E8a debugger module. Refer to M16C/29 Group Hardware Manual for details of programming the micon without using these tools.

Chapter 9.Headers

9.1.Microcontroller Headers

Table 9-1 to Table 9-4 show the microcontroller pin headers and their corresponding microcontroller connections. The header pins connect directly to the microcontroller pin unless otherwise stated.

J1					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	PIN1	1	2	CAN1_TX	2
3	CAN1_RX	3	4	PIN4	4
5	PIN5	5	6	E8_CNVSS	6
7	CON_XCIN	7	8	CON_XCOUT	8
9	RESn	9	10	CON_XOUT	10
11	GROUND	11	12	CON_XIN	12
13	UC_VCC	13	14	E8_RP_NMI	14
15	INT2	15	16	INT1	16
17	INT0	17	18	MO_Un	18
19	MO_Up	19	20	TRIGa	20

Table 9-1: J1 Microcontroller Header

J2					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	TMR0	21	2	MO_Wn	22
3	MO_Wp	23	4	MO_Vn	24
5	SCIbCK_MO_Vp	25	6	SCIbRX	26
7	SCIbTX	27	8	PTRX	28
9	PTRX	29	10	PTCK	30
11	E8_BUSY	31	12	PIN32	32
13	PIN33	33	14	MO_UD	34
15	TRISTn	35	16	PIN36	36
17	SCIcTX	37	18	SCIcRX	38
19	SCIcCK	39	20	SCIaTX	40

Table 9-2: J2 Microcontroller Header

J3					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	SCIaRX	41	2	SCIaCK	42
3	CTSRTS	43	4	LED3	44
5	LED2	45	6	LED1	46
7	LED0	47	8	TRIGb	48
9	TMR1	49	10	IIC_SCL	50
11	IIC_SDA	51	12	DLCDE	52
13	E8_P16_INT4	53	14	ADTRG	54
15	DLCDRS	55	16	DLCD7	56
17	DLCD6	57	18	DLCD5	58
19	DLCD4	59	20	IO_7	60

Table 9-3: J3 Microcontroller Header

J4					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	IO_6	61	2	IO_5	62
3	IO_4	63	4	IO_3	64
5	IO_2	65	6	IO_1	66
7	IO_0	67	8	AD7	68
9	AD6	69	10	AD5	70
11	AD4	71	12	AD3	72
13	AD2	73	14	AS1	74
15	AVSS	75	16	AD0	76
17	CON_VREF	77	18	CON_AVCC	78
19	AD_POT	79	20	PIN80	80

Table 9-4: J4 Microcontroller Header

9.2.Application Headers

Table 9-5 and Table 9-6 below show the standard application header connections.

JA1								
Pin	Generic Header Name		RSK Signal Name	Device Pin	Pin	Generic Header Name	RSK Signal Name	Device Pin
1	Regulated Supply 1		5V		2	Regulated Supply 1	GROUND	
3	Regulated Supply 2		3V3		4	Regulated Supply 2	GROUND	
5	Analogue Supply		AVcc	70	6	Analogue Supply	AVss	75
7	Analogue Reference		AVref	77	8	ADTRG	ADTRG	56
9	ADC0	I0	AD0	76	10	ADC1 I1	AD1	74
11	ADC2	I2	AD2	73	12	ADC3 I3	AD3	72
13	DAC0		DAC0	-	14	DAC1	DAC1	-
15	IOPort		IO_0	67	16	IOPort	IO_1	66
17	IOPort		IO_2	65	18	IOPort	IO_3	64
19	IOPort		IO_4	63	20	IOPort	IO_5	62
21	IOPort		IO_6	61	22	IOPort	IO_7	60
23	Open drain	IRQAEC	E8_P16_INT4	53	24	I²C Bus - (3rd pin)	IIC_EX	-
25	I²C Bus		IIC_SDA	51	26	I²C Bus	IIC_SCL	50

Table 9-5: JA1 Standard Generic Header

JA2							
Pin	Generic Header Name	RSK Signal Name	Device Pin	Pin	Generic Header Name	RSK Signal Name	Device Pin
1	Open drain	RESn	9	2	External Clock Input	EXTAL	-
3	Open drain	E8_RP_NMI	14	4	Regulated Supply 1	Vss1	
5	Open drain	WDT_OVF	-	6	Serial Port	SCIaTX	41
7	Open drain	IRQ0	17	8	Serial Port	SCIaRX	39
9	Open drain	IRQ1	16	10	Serial Port	SCIaCK	42
11	Motor control	MO_UD	34	12	Serial Port Handshake	CTSRTS	43
13	Motor control	MO_Up	19	14	Motor control	MO_Un	18
15	Output	MO_Vp*	25	16	Motor control	MO_Vn	24
17	Input	MO_Wp	23	18	Motor control	MO_Wn	22
19	Output	TMR0	21	20	Output	TMR1	49
21	Input	TRIGa	20	22	Input	TRIGb	48
23	Open drain	IRQ2	15	24	Tristate Control	TRSTn	15
25	SPARE	-		26	SPARE	-	

Table 9-6: JA2 Standard Generic Header

JA5									
Pin	Generic Header Name		RSK Signal Name	Device Pin	Pin	Generic Header Name		RSK Signal Name	Device Pin
1	ADC4	I4	AD4	71	2	ADC5	I5	AD5	70
3	ADC6	I6	AD6	69	4	ADC7	I7	AD7	68
5	CAN		CAN1TX	2	6	CAN		CAN1RX	3
7	CAN		CAN2TX	-	8	CAN		CAN2RX	-
9	Reserved				10	Reserved			
11	Reserved				12	Reserved			
13	Reserved				14	Reserved			
15	Reserved				16	Reserved			
17	Reserved				18	Reserved			
19	Reserved				20	Reserved			
21	Reserved				22	Reserved			
23	Reserved				24	Reserved			

Table 9-7: JA5 Optional Generic Header

JA6									
Pin	Generic Header Name		RSK Signal Name	Device Pin	Pin	Generic Header Name		RSK Signal Name	Device Pin
1	DMA		DREQ	-	2	DMA		DACK	-
3	DMA		TEND	-	4	Standby (Open drain)		STBYn	-
5	Host Serial	SCIdTX	RS232TX		6	Host Serial	SCIdRX	RS232RX	
7	Serial Port		SCIbRX	26	8	Serial Port		SCIbTX	27
9	Serial Port	Synchronous	SCIcTX	37	10	Serial Port		SCIbCK*	26
11	Serial Port	Synchronous	SCIcCK	39	12	Serial Port	Synchronous	SCIcRX	38
13	Reserved				14	Reserved			
15	Reserved				16	Reserved			
17	Reserved				18	Reserved			
19	Reserved				20	Reserved			
21	Reserved				22	Reserved			
23	Reserved				24	Reserved			
25	Reserved				26	Reserved			

Table 9-8: JA6 Optional Generic Header

* Marked pins are subject to option links.

J11		
Pin	Function	Signal Name
1	CAN Positive	CANH
2	GROUND	
3	CAN Negative	CANL

Table 9-9: J11 CAN Header

Chapter 10.Code Development

10.1.Overview

Note: For all code debugging using Renesas software tools, the RSK board must be connected to a PC USB port via an E8a. An E8a is supplied with the RSK product.

10.2.Mode Support

HEW connects to the Micon and programs it via the E8a. Mode support is handled transparently to the user.

10.3.Breakpoint Support

HEW supports breakpoints on the user code, both in RAM and ROM.

Double clicking in the breakpoint column in the code sets the breakpoint. Breakpoints will remain unless they are double clicked to remove them.

10.4.Memory Map

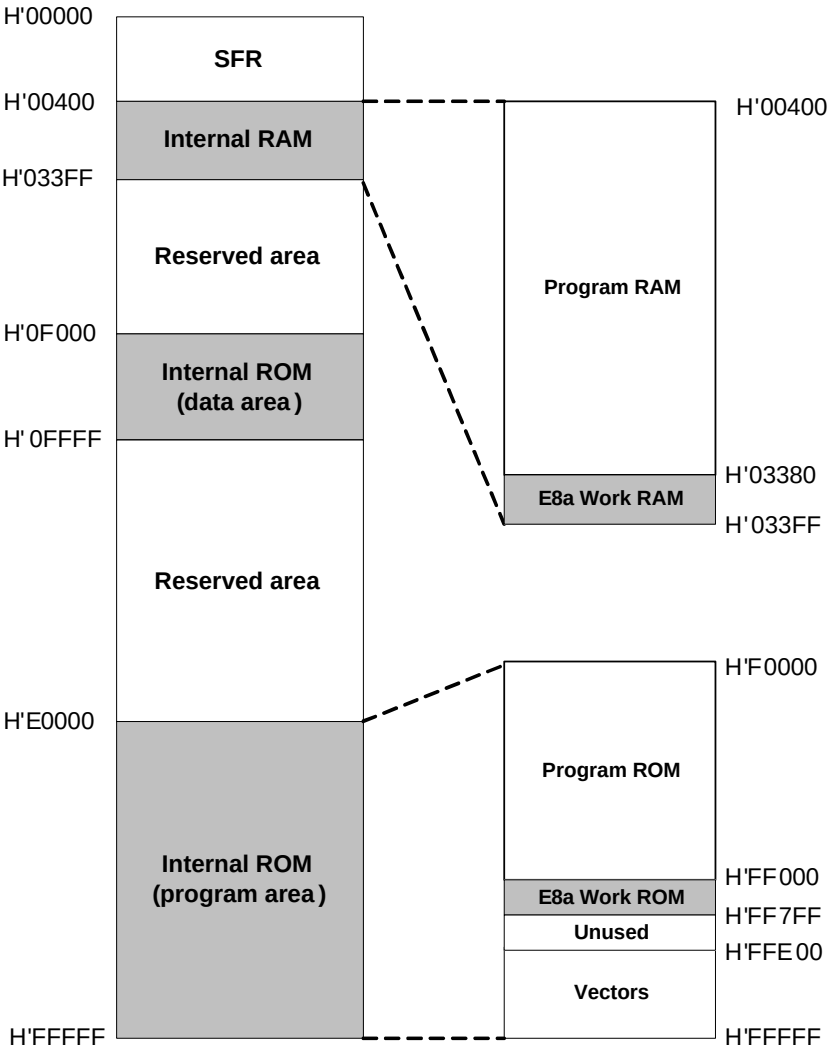
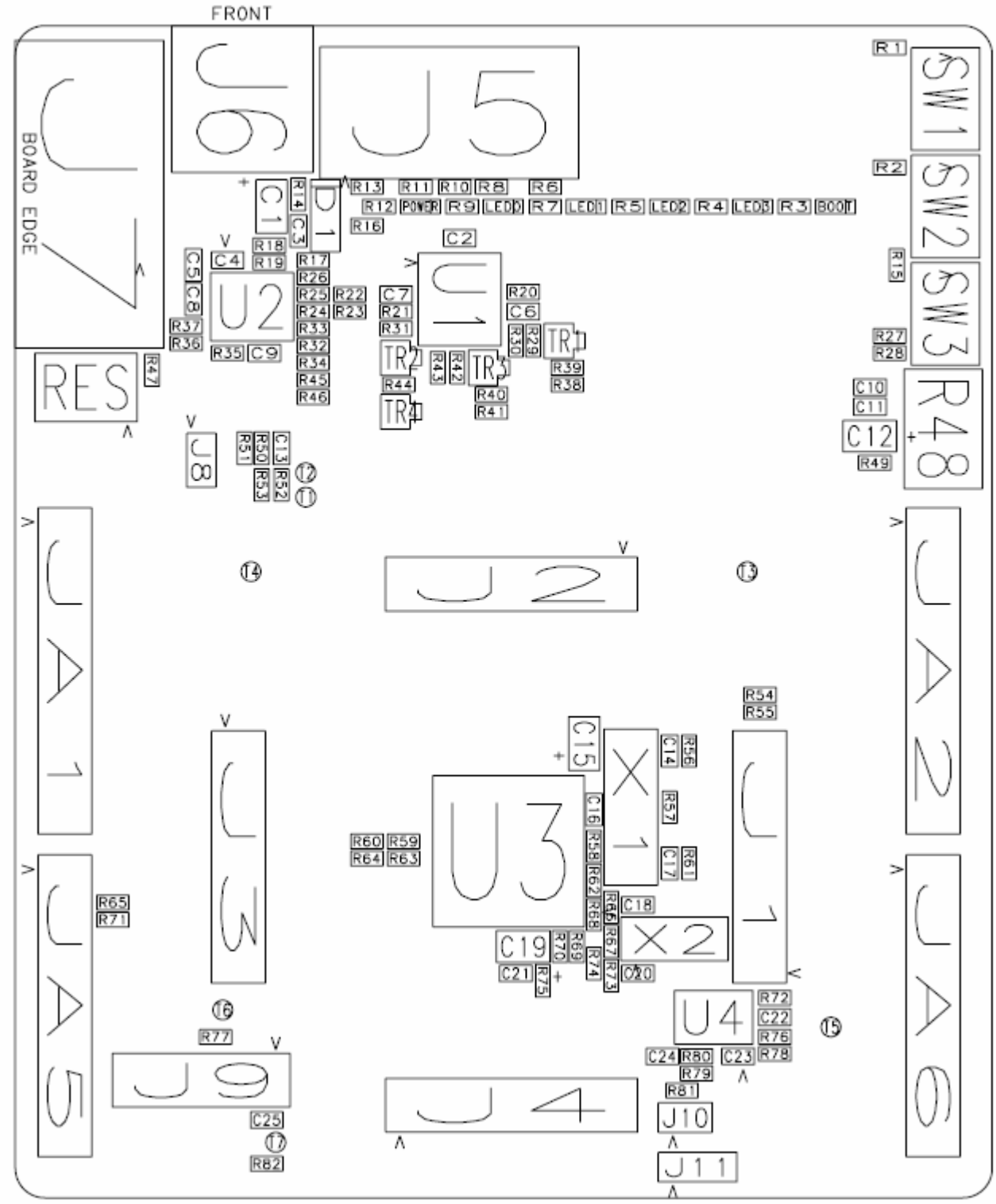


Figure 10-1: Memory Map

Chapter 11.Component Placement



Chapter 12.Additional Information

For details on how to use High-performance Embedded Workshop (HEW, refer to the HEW manual available on the CD or from the web site.

For information about the M16C/29 series microcontrollers refer to the M16C/29 Series Hardware Manual

For information about the M16C/29 assembly language, refer to the M16C/60, M16C/20, M16C/Tiny Series Software Programming Manual

Further information available for this product can be found on the Renesas web site at:

Online technical support and information is available at: http://www.renesas.com/rsk

Technical Contact Details

America: techsupport.rta@renesas.com

Europe: tools.support.eu@renesas.com

Japan: csc@renesas.com

General information on Renesas Microcontrollers can be found at the following URL.

Global: http://www.renesas.com/

Renesas Starter Kit for M16C/29
User's Manual
Publication Date Rev.2.00 26.OCT.2007
Published by: Renesas Technology Europe Ltd.
Duke’s Meadow, Millboard Road, Bourne End
Buckinghamshire SL8 5FH, United Kingdom

Renesas Starter Kit
RSK M16C29 User's Manual

Renesas Electronics Corporation
1753, Shimonumabe, Nakahara-ku, Kawasaki-shi, Kanagawa 211-8668 Japan

REG10J0004-0200