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April 1st, 2010
Renesas Electronics Corporation

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User's Manual

Renesas Starter Kit for H8S/2472

User's Manual

RENESAS SINGLE-CHIP MICROCOMPUTER H8S FAMILY

Renesas Electronics
www.renesas.com

Rev.1.00 2008.08

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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.

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- 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 is 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.

Table of Contents

Chapter 1. Preface

Cautions

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Glossary

CPU	Central Processing Unit	HEW	High-performance Embedded Workshop
LED	Light Emitting Diode	RSK	Renesas Starter Kit
PC	Program Counter	E10A	On-chip debugger module
ESD	Electrostatic Discharge	EMC	Electromagnetic compatibility

Chapter 2. 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.

Features include:

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

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

Chapter 3. Power Supply

3.1. Requirements

This RSK operates from a 5V power supply.

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

All RSK boards are supplied with an E10A debugger. This product is able to power the RSK board with up to 300mA. When the RSK is connected to another system then that system should supply power to the RSK.

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

Warning

The RSK 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 RSK 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.

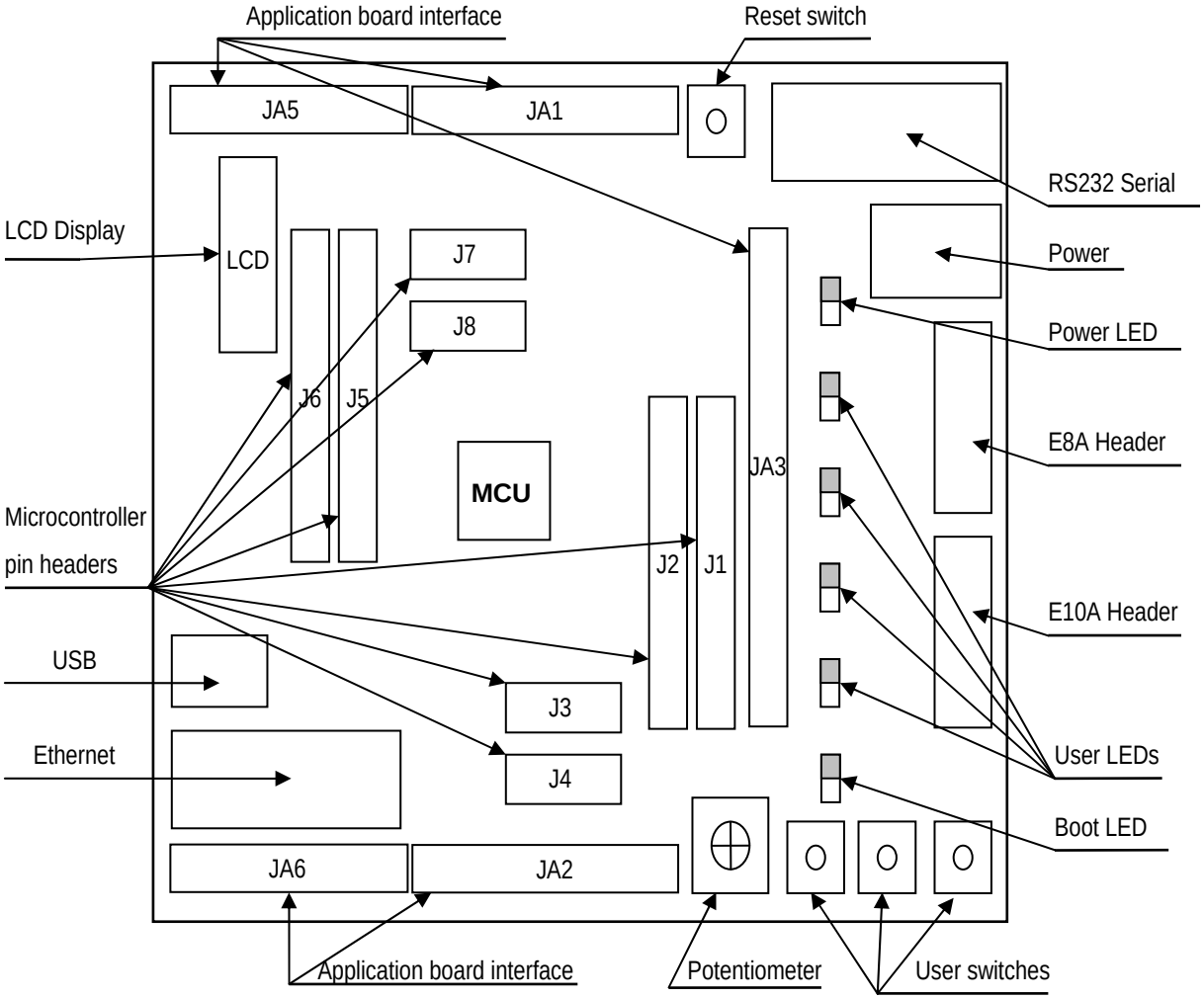


Figure 4-1: Board Layout

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.

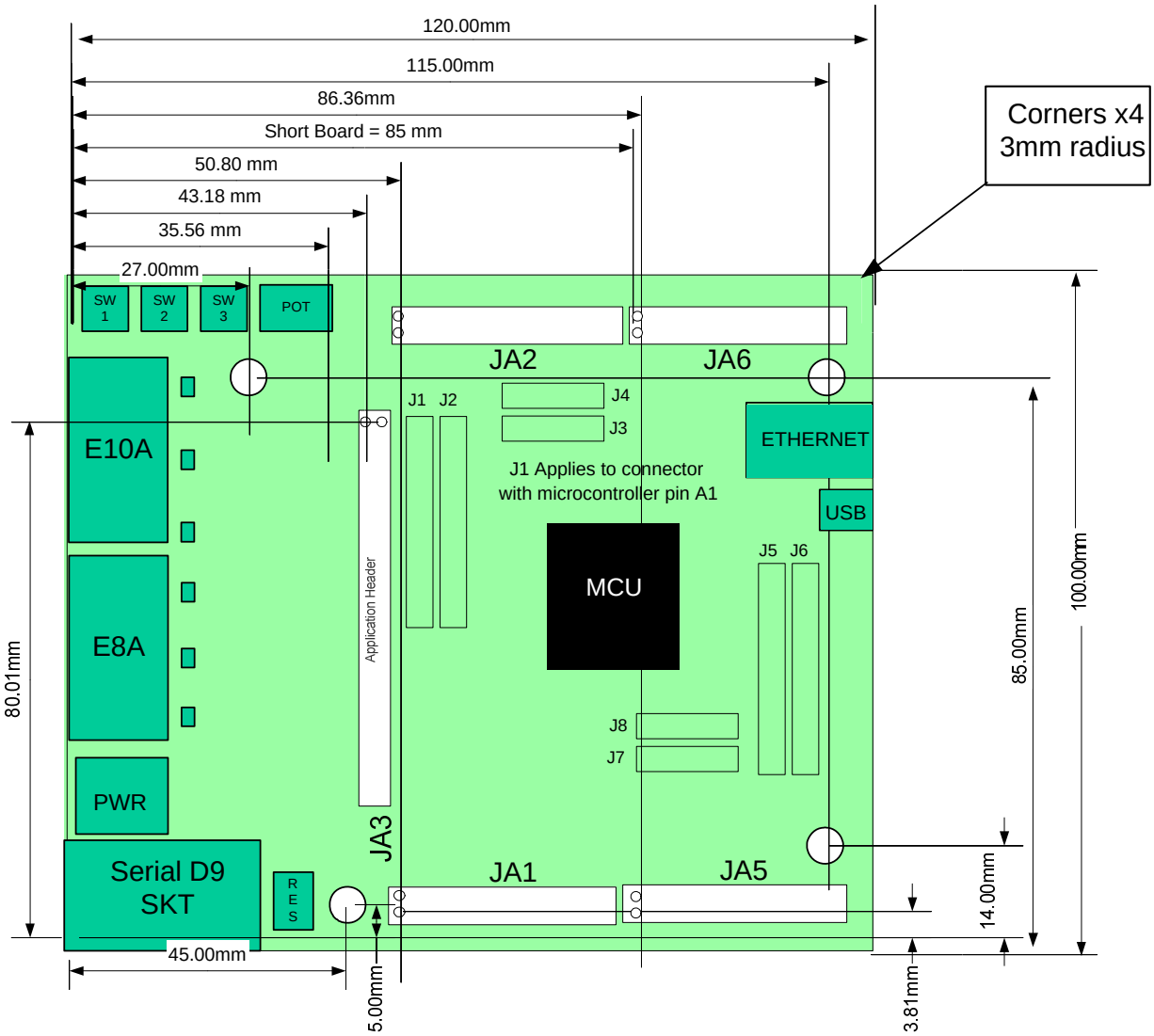


Figure 4-2: Board Dimensions

Chapter 5. Block Diagram

Figure 5-1 shows the CPU board components and their connectivity.

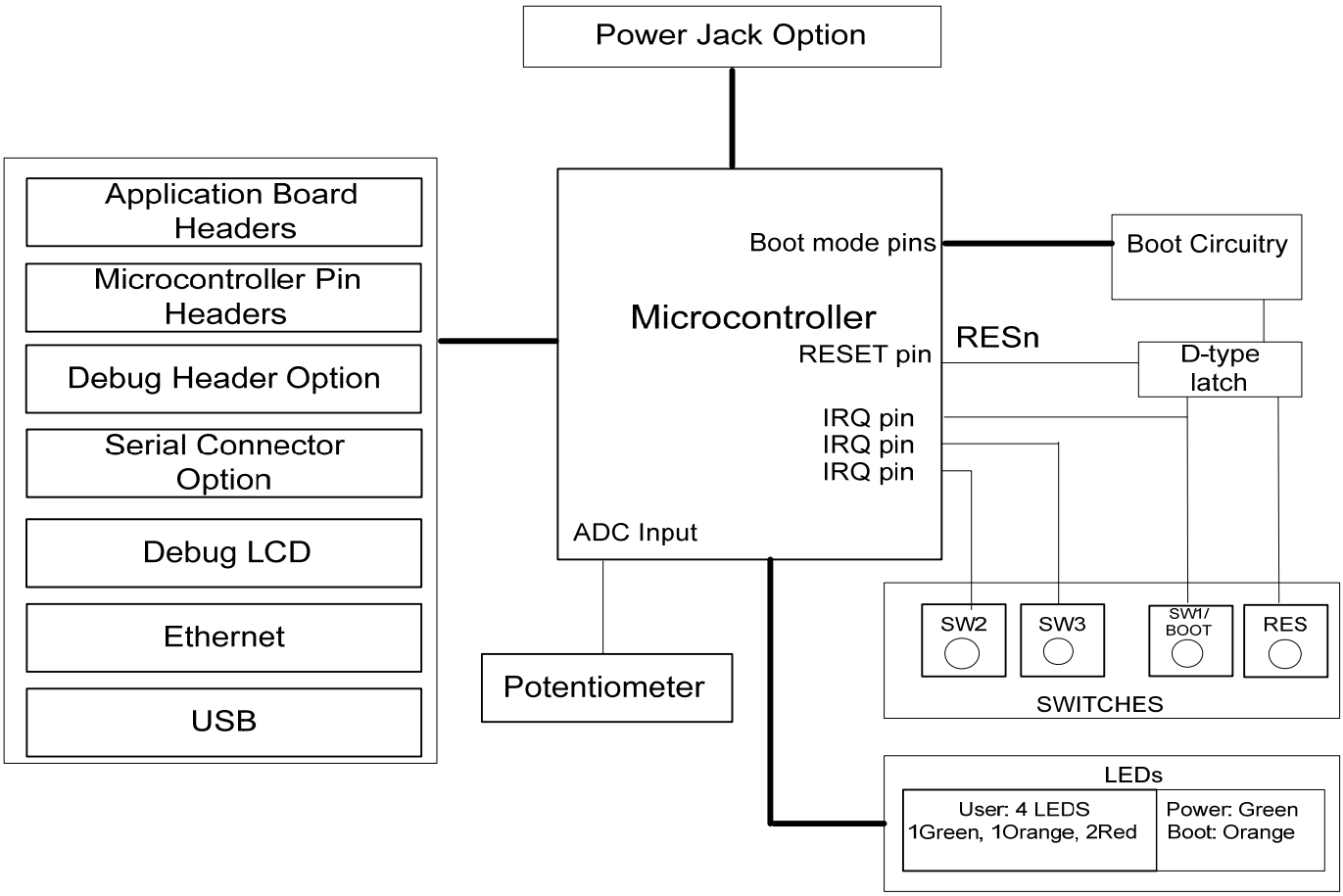


Figure 5-1: Block Diagram

Figure 5-2 shows the connections to the RSK.

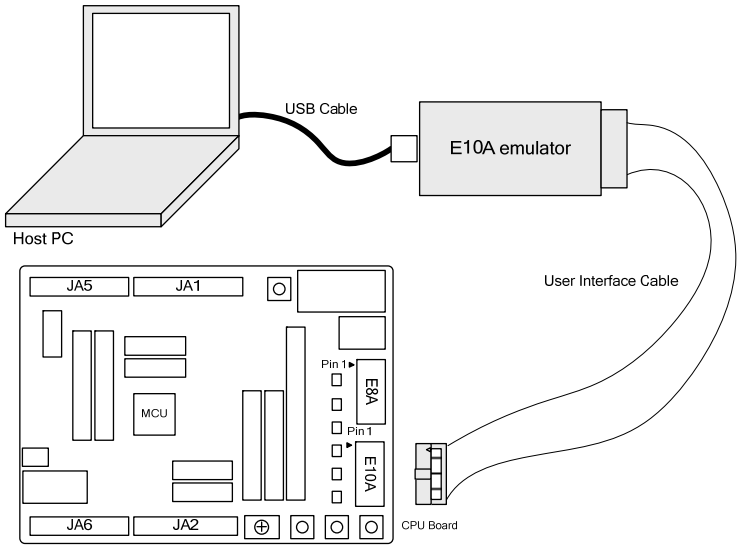


Figure 5-2: RSK Connections

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, Pin E4
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 E10A debugger.	IRQ8n, Pin L15 (Port 6 pin 7)
SW2*	Connects to an IRQ line for user controls.	IRQ9n, Pin L14 (Port 6, pin 6)
SW3*	Connects to the ADC trigger input. Option link allows connection to IRQ line. The option is a pair of 0R links. For more details on option links, please refer to Sec 6.8.	IRQ10, Pin L13 (Port 6, pin 5)

Table 6-1: Switch Functions

*Refer to schematic for detailed connectivity information.

6.2. LEDs

There are six LEDs on the RSK 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)	Colour	Microcontroller Port Pin	Microcontroller Pin Number
LED0	Green	Port F2	G13
LED1	Orange	Port F3	D4
LED2	Red	Port F4	B4
LED3	Red	Port F6	E3

Table 6-2: LED Port

6.3. Potentiometer

A single turn potentiometer is connected to channel AN0 (P7.0) of the microcontroller. This may be used to vary the input analogue voltage value to this pin between AVCC and Ground.

6.4. Serial port

Serial port SCIF is connected to the standard RS232 header. Serial port SCI3 can optionally be connected to the RS232 header. The connections to be fitted are listed in the Table 6-3.

Description	Function	Microcontroller Port Pin	Fit for RS232	Remove for RS232
SCIF	Default serial port	G4	R31	R34
SCIF	Default serial port	F2	R30	R35
SCI3	Spare Serial Port	N5	R15, R34	R31
SCI3	Spare Serial Port	P5	R28, R35	R30

Table 6-3: Serial Port settings

The SCIF port is also available on J7/J8 and JA2. The SCI3 port is available on J5/J6 and JA6.

6.5.USB

The USB module can be used for USB communication with host.

Table 6-4 contains details of the signal descriptions and pin connections.

Description	Function	Microcontroller Pin Number	Header Pins
VBUS	USB cable connection monitor pin	J14	J3-10
USD+	USB data I/O pin	K14	-
USD-	USB data I/O pin	K15	-
DrVcc	Power supply pin for USB built-in transceiver	K13	J4-14
DrVss	Ground pin for USB built-in transceiver	J13	-
PUPDPLS	Pull-up control pin	J15	J3-9
CON_UXTAL	USB clock pin	A5	J1-9
CON_UEXTAL	USB clock pin	B5	J1-10
UXSEL	USB clock select pin	D5	J2-10

Table 6-4: USB module settings

6.6.Ethernet

The Ethernet module conforms to the Ethernet or IEEE802.3 media access control (MAC) standard. Ethernet controller is connected to the direct memory access controller for Ethernet controller (E-DMAC) and carries out high-speed data transfer to and from the memory. In addition, Ethernet controller is connected to SMSC LAN8700i physical layer chip enabling it to perform transmission and reception of Ethernet frames.

Table 6-5 contains details of the signal descriptions and pin connections.

Description	Function	Microcontroller Pin Number	Header Pins
RM_REF-CLK	Transmit/Receive clock	A13	-
RM_TX-EN	Transmit enable	B12	J1-24
RM_TXD1	Transmit data, Bit 1	C11	J2-21
RM_TXD0	Transmit data, Bit 0	B11	J1-22
RM_CRS-DV	Carrier detection/Receive data valid	C12	J2-23
RM_RXD1	Receive data, Bit 1	D11	J2-22
RM_RXD0	Receive data, Bit 0	A12	J1-23
RM_RX-ER	Receive error	B13	J1-26
MDC	Management data clock	G15	J3-5
MDIO	Management data I/O	G14	J3-6
LINKSTA_A22	Link status	N1	J6-29
WOL	Wake-on-LAN	-	-

Table 6-5: Ethernet module settings

6.7.Debug LCD Module

A debug LCD module is supplied to be connected to the connector LCD. This should be fitted so that the debug LCD module lies over J3. Care should be taken to ensure the pins are inserted correctly into LCD. The debug LCD module uses a 4 bit interface to reduce the pin allocation. No contrast control is provided; this is set by a resistor on the supplied display module. The module supplied with the RSK only supports 5V operation.

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

LCD					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	Ground	-	2	5V Only	-
3	No Connection	-	4	DLCDRS (PC5)	K3
5	R/W (Wired to Write only)	-	6	DLCDE + 100k pull down to ground (PC4)	K1
7	No Connection	-	8	No connection	-
9	No Connection	-	10	No connection	-
11	DLCDD4 (PC0)	M2	12	DLCDD5 (PC1)	L4
13	DLCDD6 (PC2)	L1	14	DLCDD7 (PC3)	K2

Table 6-6 Debug LCD Module Connections

6.8. Option Links

Table 6-7 below describes the function of the option links contained on this RSK board and associated with Serial Port Configuration. The default configuration is indicated by **BOLD** text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R15	Serial Port Configuration	Connects serial port SCI3 (Tx) to D-type connector (SERIAL).	**Disconnects serial port SCI3 (Rx) from D-type connector (SERIAL).**	R28
R19	Serial Port configuration	Disables RS232 Serial Transceiver	**Enables RS232 Serial Transceiver**	
R28	Serial Port Configuration	Connects serial port SCI3 (Tx) to D-type connector (SERIAL).	**Disconnects serial port SCI3 (Tx) from D-type connector (SERIAL).**	R15
R30	Serial Port Configuration	**Routes serial port SCI0 (Rx) to microcontroller pins.**	Disconnects serial port SCI0 (Rx) from microcontroller pins.	R31, R32, R33
R31	Serial Port Configuration	**Routes serial port SCI0 (Tx) to microcontroller pins.**	Disconnects serial port SCI0 (Tx) from microcontroller pins.	R30, R32, R33
R32	Serial Port Configuration	Routes serial port to JA6 pins.	**Disconnects serial port from JA6 pins.**	R30, R31, R33
R33	Serial Port Configuration	Routes serial port to JA6 pins.	**Disconnects serial port from JA6 pins.**	R30, R31, R32
R34	Serial Port Configuration	Routes serial port SCI3 (Rx) to microcontroller pins.	**Disconnects serial port SCI3 (Rx) from microcontroller pins.**	R35
R35	Serial Port Configuration	Routes serial port SCI3 (Tx) to microcontroller pins.	**Disconnects serial port SCI3 (Tx) from microcontroller pins.**	R34
R36	Serial Port Configuration	Connects programming port SCI1 (Rx) to D-type connector (SERIAL).	**Disconnects programming port SCI1 (Rx) from D-type connector (SERIAL).**	R37, R6
R37	Serial Port Configuration	Connects programming port SCI1 (Tx) to D-type connector (SERIAL).	**Disconnects programming port SCI1 (Tx) from D-type connector (SERIAL).**	R36, R5

Table 6-7: Serial port configuration links.

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

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R56	Application board interface	Use ADTRGn of application board interface.	**Use TxD3 of application board interface.**	R95
R60	Application board interface	Use AN0 of application board interface.	**Use AD_POT of application board interface.**	R96
R69	Application board interface	Use HWRn of application board interface.	**Use WRn of application board interface.**	R114
R95	Application board interface	**Use TxD3 of application board interface.**	Use ADTRGn of application board interface.	R56
R96	Application board interface	**Use AD_POT of application board interface.**	Use AN0 of application board interface.	R60
R114	Application board interface	**Use WRn of application board interface.**	Use HWRn of application board interface.	R69
R115	Application board interface	Use A22 of application board interface.	**Use LINKSTA of application board interface.**	R116
R116	Application board interface	**Use LINKSTA of application board interface.**	Use A22 of application board interface.	R115

Table 6-8: Application board interface links.

Table 6-9 below describes the function of the option links associated with E8 and E10A debuggers. The default configuration is indicated by **BOLD** text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R4	E8	**E8 enabled.**	E8 disabled.	
R5	E8	**E8 Tx enabled.**	E8 Tx disabled.	R6, R36
R6	E8	**E8 Rx enabled.**	E8 Rx disabled.	R5, R37
R161	E8	If J9 or R161 is fitted the Flash is protected from writing.	**If both J9 and R161 are removed, writing to Flash is enabled.**	
R203	E10A	Enables E10A, also can be enabled by fitting E10A_EN.	**E10A is disabled, can be enabled if J5 is set.**	

Table 6-9: E8 and E10A debugger links.

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

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R125	Power source	**Enables power to board from E8_VCC.**	Disable power to board from E8_VCC.	R131, R158, R129, R130
R126	MCU power supply	**Supply to MCU.**	CPU current can be measured across R126	
R127	Ground	**Connects Analog & Digital grounds together.**	Separates Analog & Digital grounds.	
R128	Power source	**Fitted if board is not powered from external source CON_3V3.**	Removed if board is powered from external source CON_3V3.	R157
R129	Power source	**5V source signal will be powered from E8_VCC.**	5V source signal will not be powered from E8_VCC.	R130, R153, R154, R155, R156
R130	Power source	**CON_5V source signal will be powered from E8_VCC.**	CON_5V source signal will not be powered from E8_VCC.	R129, R153, R154, R155, R156
R131	Power source	**Enables power to board from external source.**	Disable external power to board from connector.	R125, R158, R153, R154
R153	Power source	CON_5V source signal will be powered from external source.	**CON_5V source signal will not be powered from PWR connector.**	R129, R130, R154, R155, R156
R154	Power source	5V source signal will be powered from PWR connector.	**5V source signal will not be powered from PWR connector.**	R129, R130, R153, R155, R156
R155	Power source	CON_5V source signal will be powered from VBUS connector.	**CON_5V source signal will not be powered from VBUS connector**	R129, R130, R153, R154, R156
R156	Power source	5V source signal will be powered from VBUS connector.	**5V source signal will not be powered from VBUS connector.**	R129, R130, R153, R154, R155
R157	Power source	**Board can be powered from external source CON_3V3.**	Board can't be powered from external source CON_3V3.	R128
R158	Power source	Enables power to board from VBUS.	**Disable power to board from VBUS.**	R125, R131, R155, R156

Table 6-10: Power configuration links.

Table 6-11 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
R93	Clock Oscillator	External Clock Source for USB	**On-board Clock Source for USB**	R94, R103, R105
R94	Clock Oscillator	External Clock Source for USB	**On-board Clock Source for USB**	R93, R103, R105
R98	Clock Oscillator	Parallel resistor for a crystal	**Not fitted**	
R99	Clock Oscillator	External Clock Source	**On-board Clock Source**	R101, R102
R100	Clock Oscillator	Parallel resistor for a crystal	**Not fitted**	
R101	Clock Oscillator	**On-board clock source is used**	External clock source is used	R99, R102
R102	Clock Oscillator	External Clock Source	**On-board Clock Source**	R99, R101
R103	Clock Oscillator	**On-board clock source is used**	External clock source is used	R93, R94, R105
R105	Clock Oscillator	**On-board clock source is used**	External clock source is used	R93, R94, R103
R199	Clock Oscillator	RM_REF-CLK signal will be available on J1 connector	**RM_REF-CLK signal will not be available on J1 connector**	

Table 6-11: Clock configuration links.

Table 6-12 below describes the function of the option links associated with reference voltage source. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R64	Voltage Reference Source	**Voltage Reference set to board Vcc signal.**	Voltage Reference taken from external connector (JA1 pin 7).	R83
R83	Voltage Reference Source	Voltage Reference is taken from external connector (JA1 pin 7).	**Voltage Reference set to board Vcc signal.**	R64

Table 6-12: Voltage reference links.

Table 6-13 below describes the function of the option links associated with analog power supply. The default configuration is indicated by BOLD text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R46	Analog Voltage Source	Analog voltage source from external connector.	**Analog voltage source from on board Vcc.**	
R189	Analog Voltage Source	Analog voltage source from external connector.	**Analog voltage source from on-board Vcc.**	R198
R198	Analog Voltage Source	**Analog voltage source from on-board Vcc.**	Analog Voltage Source from external connector.	R189

Table 6-13: Analog power supply links.

Table 6-14 below describes the function of the option links associated with MCU modes. The default configuration is indicated by **BOLD** text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R160	MCU Mode	MCU User Boot Mode enabled, also can be enabled by fitting jumper in J10	**MCU User Boot mode disabled**	

Table 6-14: MCU mode links.

Table 6-15 below describes the function of the option links associated with switches configuration. The default configuration is indicated by **BOLD** text.

Option Link Settings				
Reference	Function	Fitted	Alternative (Removed)	Related To
R132	Switches configuration	SW3 can be used for ADTRGn	SW3 can not be used for ADTRGn	R133
R133	Switches configuration	SW3 can be used for IRQ10n	SW3 can not be used for IRQ10n	R132

Table 6-15: Switches configuration links.

6.9. Oscillator Sources

A crystal oscillator is fitted on the RSK and used to supply the main clock input to the Renesas microcontroller. Table 6-16 details the oscillators that are fitted and alternative footprints provided on this RSK:

Component		
Crystal (X1)	Fitted	8.5 MHz (HC49/4H package)
Crystal (X2)	Fitted	8 MHz (HC49/4H package)
Crystal (X3)	Fitted	50 MHz

Table 6-16: Oscillators / Resonators

6.10. 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 and User mode. This circuit is not required on customer's 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

This RSK supports Boot mode, User Boot mode, User Program Mode and User mode.

Details of programming the FLASH memory is described in the H8S/2472 Group Hardware Manual.

7.1.User Boot mode

Refer to H8S/2472 Group Hardware Manual for details of User Boot Mode. The user mode settings for this RSK are shown in Table 7-2: user Boot Mode pin settings below:

FWE	MD2n	MD1	NMI	LSI State after Reset End
1	0	0	0	User Boot Mode

Table 7-1: User Boot Mode pin settings

7.2. User Program mode

This is default operating mode of this RSK. Refer to H8S/2472 Group Hardware Manual for details of User Program Mode. The User Program Mode settings for this RSK are shown in Table 7-3: User Program Mode pin settings below:

FWE	MD2n	MD1	NMI	LSI State after Reset End
1	1	1	X	User Program Mode

Table 7-2: User Program Mode pin settings

7.3. Boot mode

Refer to H8S/2472 Group Hardware Manual for details of User Mode. The User Mode settings for this RSK are shown in Table 7-4: User Mode pin settings below:

FWE	MD2n	MD1	NMI	PF5	LSI State after Reset End
1	0	0	1	0*	SC1 Boot Mode
1	0	0	1	1*	USB Boot Mode

* When USB cable is plugged in USB connector PF5 will read as “1” otherwise “0”.

Table 7-3: User Mode pin settings

Chapter 8. Programming Methods

The board is intended for use with HEW and the supplied E10A debugger. Refer to H8S/2472 Group Hardware Manual for details of programming the microcontroller without using these tools. Please note that to use E10A debugger, jumper E10A_EN must be fitted.

Chapter 9. Headers

9.1. Microcontroller Headers

Table 9-1 to Table 9-8 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	UC_VCC	A1	2	A14	B1
3	CON_XTAL	A2	4	CON_EXTAL	B2
5	GROUND	A3	6	RESOn	B3
7	LED3	A4	8	LED2	B4
9	CON_UXTAL	A5	10	CON_UEXTAL	B5
11	PIN_A6	A6	12	A12	B6
13	PTTX	A7	14	PTRX	B7
15	D6	A8	16	D7	B8
17	D14	A9	18	D15	B9
19	D10	A10	20	D11	B10
21	UC_VCC	A11	22	RM_TxD0	B11
23	RM_RXD0	A12	24	RM_TX-EN	B12
25	CON_RM_REF_CLK	A13	26	RM_RX-ER	B13
27	A0	A14	28	A2	B14
29	A1	A15	30	A3	B15

Table 9-1: J1

J2					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	WRn_HWRn	C1		MD1	D1
	A15	C2	4	GROUND	D2
5	A13	C3	6	BCLK	D3
7	NC	C4	8	LED1	D4
9	UC_VCC	C5	10	UXSEL	D5
11	PIN_C6	C6	12	FWE	D6
13	NC	C7	14	GROUND	D7
15	D5	C8	16	D4	D8
17	D13	C9	18	D12	D9
19	D9	C10	20	D8	D10
21	RM_TXD1	C11	22	RM_RXD1	D11
23	RM_CRS-DV	C12	24	A5	D12
25	GROUND	C13	26	A7	D13
27	A4	C14	28	A8	D14
29	A6	C15	30	A9	D15

Table 9-2: J2

J3					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	PIN_E15	E15	2	A11	E14
3	PIN_F15	F15	4	PIN_F14	F14
5	MDC	G15		MDIO	G14
7	TDI	H15	8	TCK	H14
9	PUPDPLS	J15	10	VBUS_DET	J14
11	NC	K15	12	NC	K14
13	IRQ8n	L15	14	IRQ9n	L14

Table 9-3: J3

J4					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	PIN_E13	E13	2	A10	E12
3	GROUND	F13	4	NC	F12
5	LED0	G13	6	ETRSTn	G12
7	TDO	H13	8	TMS	H12
9	GROUND	J13	10	NC	J12
11	BOARD_VCC	K13	12	UC_VCC	K12
13	IRQ10n	L13	14	D3	L12

Table 9-4: J4

J5					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	AN6	R15	2	CON_AVCC	P15
3	AN4	R14	4	AN5	P14
5	AN1	R13	6	AN3	P13
7	NC	R12		CON_AVSS	P12
9	IO2	R11	10	IO1	P11
11	IO5	R10	12	IO4	P10
13	PIN_R9	R9	14	UC_VCC	P9
15	PIN_R8	R8	16	PIN_P8	P8
17	PIN_R7	R7	18	NC	P7
19	PIN_R6	R6	20	PIN_M7	P6
21	SCK1	R5	22	RxD3	P5
23	NC	R4	24	NC	P4
25	A16	R3	26	A17	P3
27	NC	R2	28	A19	P2
29	NC	R1		A20	P1

Table 9-5: J5

J6					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	D1	N15	2	IRQ11n	M15
3	CON_AVREF	N14	4	D2	M14
5	AN7	N13	6	D0	M13
7	ADPOT_AN0	N12	8	AN2	M12
9	IO3	N11	10	IO0	M11
11	IO6	N10	12	IO7	M10
13	PIN_N9	N9	14	PIN_M9	M9
15	PIN_N8	N8	16	PIN_M8	M8
17	NC	N7		PIN_P6	M7
19	PIN_N6	N6	20	PIN_M6	M6
21	ADTRGn_TxD3	N5	22	GROUND	M5
23	NC	N4	24	A21	M4
25	A18	N3	26	A23	M3
27	UC_VCC	N2	28	DLCDD4	M2
29	LINKSTA_A22	N1	30	NC	M1

Table 9-6: J6

J7					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	DLCDD6	L1	2	NC	L2
3	DLCDE	K1	4	DLCCD7	K2
5	NC	J1	6	RDn	J2
7	NC	H1	8	PIN_H2	H2
9	PIN_G1	G1	10	IOSn	G2
11	MD2n	F1	12	TxD0	F2
13	STBYn	E1	14	NMI	E2

Table 9-7: J7

J8					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	NC	L3	2	DLCDD5	L4
3	DLCDRS	K3	4	LWRn	K4
5	PIN_J3	J3	6	AHn	J4
7	EXPWX0	H3	8	EXPWX1	H4
9	CS256n	G3	10	RxD0	G4
11	NC	F3	12	NC	F4
13	PIN_E3	E3	14	RESn	E4

Table 9-8: J8

9.2.Application Headers

Table 9-9 to Table 9-13 below show the standard application header connections.

JA1							
Pin	Generic Header Name	CPU board Signal Name	Device Pin	Pin	Generic Header Name	CPU board Signal Name	Device Pin
1	5V	CON_5V	-	2	0V	GROUND	-
3	3V3	CON_3V3	-	4	0V	GROUND	-
5	AVCC	CON_AVCC	P15	6	AVss	CON_AVSS	P12
7	AVref	CON_AVREF	N14	8	ADTRG	ADTRGn	N5
9	AD0	AN0	N12	10	AD1	AN1	R13
11	AD2	AN2	M12	12	AD3	AN3	P13
13	DAC0	NC	-	14	DAC1	NC	-
15	IO_0	IO0	M11	16	IO_1	IO1	P11
17	IO_2	IO2	R11	18	IO_3	IO3	N11
19	IO_4	IO4	P10	20	IO_5	IO5	R10
21	IO_6	IO6	N10	22	IO_7	IO7	M10
23	IRQ3	IRQ11n	M15	24	IIC_EX	NC	-
25	IIC_SDA	SDA0	P6	26	IIC_SCL	SCL0	M7

Table 9-9: JA1 Standard Generic Header

JA2							
Pin	Generic Header Name	CPU board Signal Name	Device Pin	Pin	Generic Header Name	CPU board Signal Name	Device Pin
1	RESn	RESn	E4	2	EXTAL	CON_EXTAL	B2
3	NMIn	NMI	E2	4	VSS1	GROUND	-
5	WDT_OVF	RESOn	B3	6	SCIaTX	TxD0	G4
7	IRQ0	IRQ8n	L15	8	SCIaRX	RxD0	F2
9	IRQ1	IRQ9n	L14	10	SCIaCK	NC	-
11	UD	NC	-	12	CTSRTS	NC	-
13	Up	NC	-	14	Un	NC	-
15	Vp	NC	-	16	Vn	NC	-
17	Wp	NC	-	18	Wn	NC	-
19	TMR0	EXPWX0	H3	20	TMR1	EXPWX1	H4
21	TRIGa	NC	-	22	TRIGb	NC	-
23	IRQ2	IRQ10n	L13	24	TRISTn	NC	-
25	-	NC	-	26	-	NC	-

Table 9-10: JA2 Standard Generic Header

JA5							
Pin	Generic Header Name	CPU board Signal Name	Device	Pin	Generic Header Name	CPU board Signal Name	Device Pin
1	AD4	AN4	R14	2	AD5	AN5	P14
3	AD6	AN6	R15	4	AD7	AN7	N13
5	CAN1TX	NC	-	6	CAN1RX	NC	-
7	CAN2TX	NC	-	8	CAN2RX	NC	-
9	AD8	NC	-	10	AD9	NC	-
11	AD10	NC	-	12	AD11	NC	-
13	TIOC0A	NC	-	14	TIOC0B	NC	-
15	TIOC0C	NC	-	16	M2_TRISTn	NC	-
17	TCLKC	NC	-	18	TCLKD	NC	-
19	M2_Up	NC	-	20	M2_Un	NC	-
21	M2_Vp	NC	-	22	M2_Vn	NC	-
23	M2_Wp	NC	-	24	M2_Wn	NC	-

Table 9-11: JA5 Standard Generic Header

JA6							
Pin	Generic Header Name	CPU board Signal Name	Pin		er Name	CPU board Signal Name	Device Pin
1	DREQ	NC	-	2	DACK	NC	-
3	TEND	NC	-	4	STBYn	STBYn	E1
5	RS232TX	RS232TX	-	6	RS232RX	RS232RX	-
7	SCIbRX	RxD3	P5	8	SCIbTX	TXD3	N5
9	SCIcTX	PTTX	A7	10	SCIbCK	NC	-
11	SCIcCK	SCK1	R5	12	SCIcRX	PTRX	B7
13	-	-	-	14	-	-	-
15	-	-	-	16	-	-	-
17	-	-	-	18	-	-	-
19	-	-	-	20	-	-	-
21	-	-	-	22	-	-	-
23	-	-	-	24	-	-	-

Table 9-12: JA6 Standard Generic Header

JA3							
Pin	Generic Header Name	CPU board Signal Name	Device Pin	Pin	Generic Header Name	CPU board Signal Name	Device Pin
1	A0	A0	A14	2	A1	A1	A15
3	A2	A2	B14	4	A3	A3	B15
5	A4	A4	C14	6	A5	A5	D12
7	A6	A6	C15	8	A7	A7	D13
9	A8	A8	D14	10	A9	A9	D15
11	A10	A10	E12	12	A11	A11	E14
13	A12	A12	B6	14	A13	A13	C3
15	A14	A14	B1	16	A15	A15	C2
17	D0	D0	M13	18	D1	D1	N15
19	D2	D2	M14	20	D3	D3	L12
21	D4	D4	D8	22	D5	D5	C8
23	D6	D6	A8	24	D7	D7	B8
25	RDn	RDn	J2		WRn	WRn	C1
27	CS0n	CS256n	G3	28	CS1n	IOSn	G2
29	D8	D8	D10	30	D9	D9	C10
31	D10	D10	A10	32	D11	D11	B10
33	D12	D12	D9	34	D13	D13	C9
35	D14	D14	A9	36	D15	D15	B9
37	A16	A16	R3	38	A17	A17	P3
39	A18	A18	N3	40	A19	A19	P2
41	A20	A20	P1	42	A21	A21	M4
43	A22	A22	N1	44	SDCLK	BCLK	D3
45	CS2n	Board_VCC	K13	46	ALE	AHn	J4
47	WRHn	HWRn	C1	48	WRLn	LWRn	K4
49	CASn	NC	-	50	RASn	NC	-

Table 9-13: JA3 Standard Generic 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 E10A. An E10A pod is supplied with the RSK product.

10.2. 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 64k code and data. To use the compiler with programs greater than this size you need to purchase the full tools from your distributor.

Warning: 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.

10.3. Mode Support

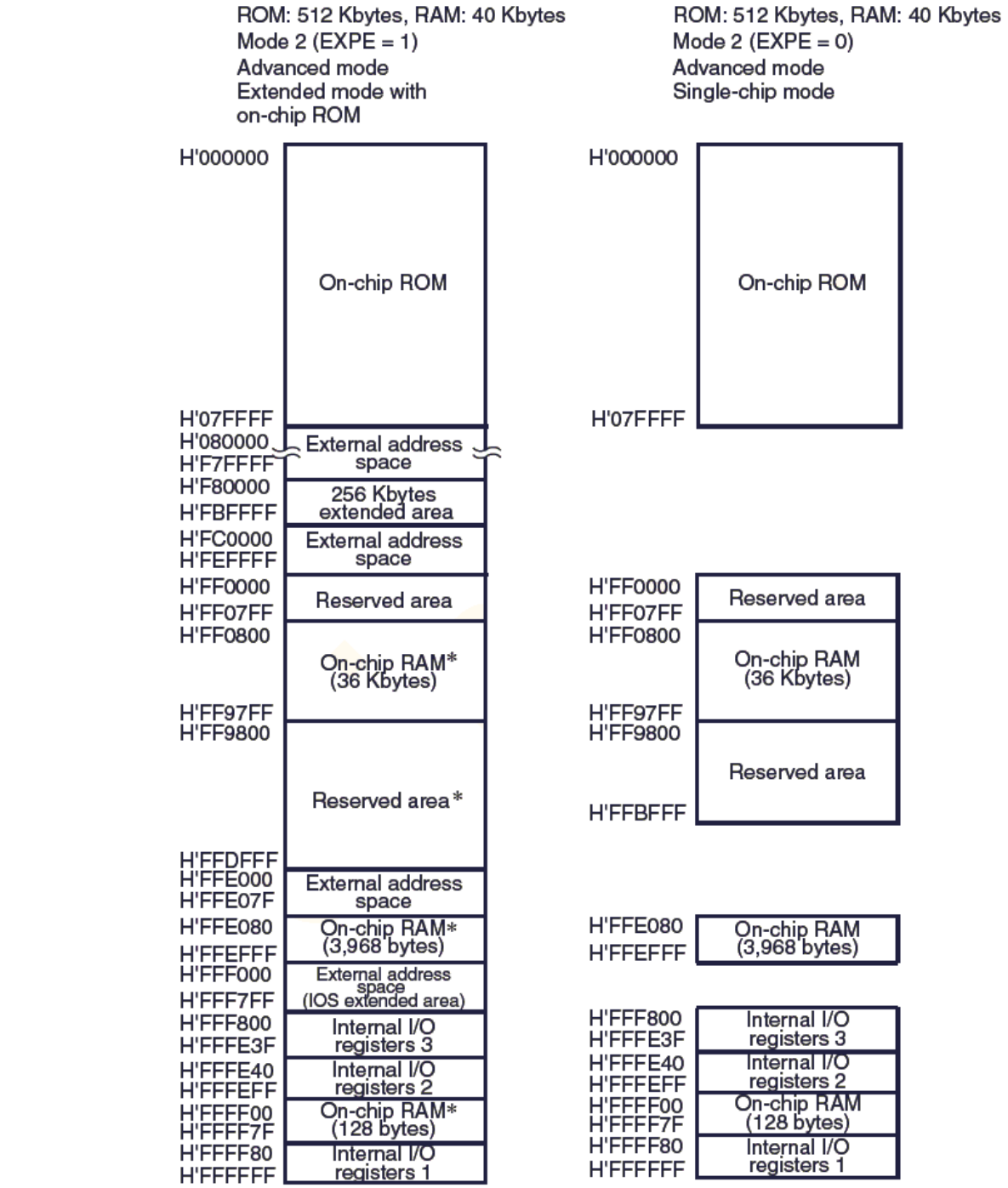
HEW connects to the Microcontroller and programs it via the E10A. Mode support is handled transparently to the user.

10.4. 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.

10.5. Memory Map



Notes: * These areas can be used as an external address space by clearing bit RAME in SYSCR to 0.

Figure 10-1: Memory Map

Chapter 11.Component Placement

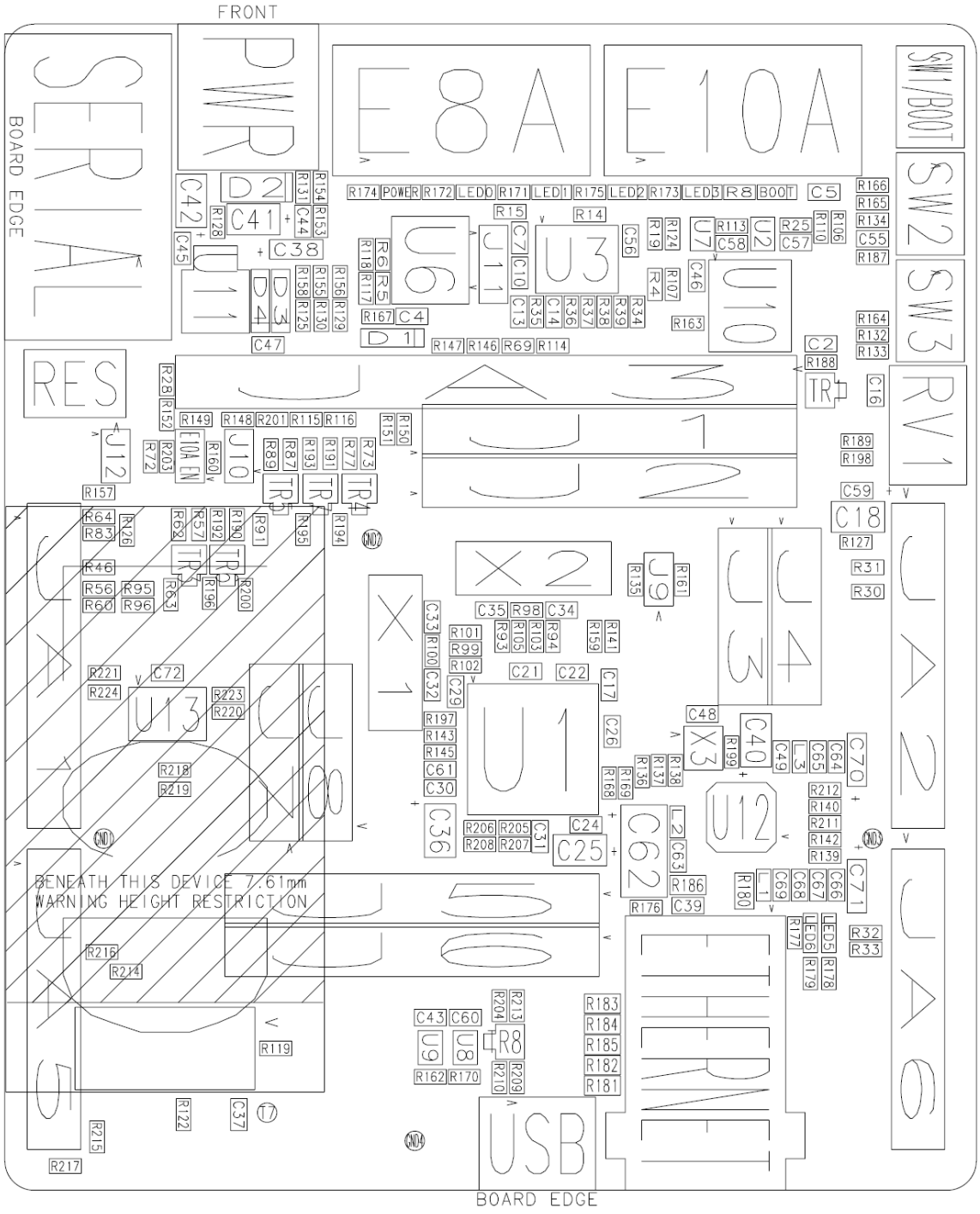


Figure 11-1: Component Placement – Front view

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 H8S/2472 series microcontrollers refer to the H8S/2472 Group hardware manual.

For information about the H8S/2472 assembly language, refer to the H8S Series Software Manual.

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

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

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