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User's Manual

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Renesas Starter Kit for H8/38099

User's Manual

Renesas 16-Bit Single-Chip Microcomputer
H8 Family / H8/300H Super Low Power Series

Renesas Electronics
www.renesas.com

Rev.1.00 2007.07

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Chapter 1. Preface

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Glossary

ADC	Analog to Digital Converter	LCD	Liquid Crystal Display
CPU	Central Processing Unit	LED	Light Emitting Diode
DAC	Digital to Analog Converter	LSI	Large Scale Integration
E8a	E8a On-chip debugger module	MCU	Microcontroller
HEW	High-performance Embedded Workshop	PC	Program Counter
IRQ	Interrupt ReQuest		

Chapter 2. Purpose

This Renesas Starter Kit 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 Renesas Starter Kit board contains all the circuitry required for microcontroller operation.

NOTE: This manual describes the technical details of the Renesas Starter Kit for H8/38099 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 Renesas Starter Kit operates from a 5V power supply.

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

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

All Renesas Starter Kit boards have an optional centre positive supply connector using a 2.1mm barrel power jack.

Warning

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

3.2. Power – Up Behaviour

When the Renesas Starter Kit is purchased the Renesas Starter Kit 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 the top layer component layout of the board.

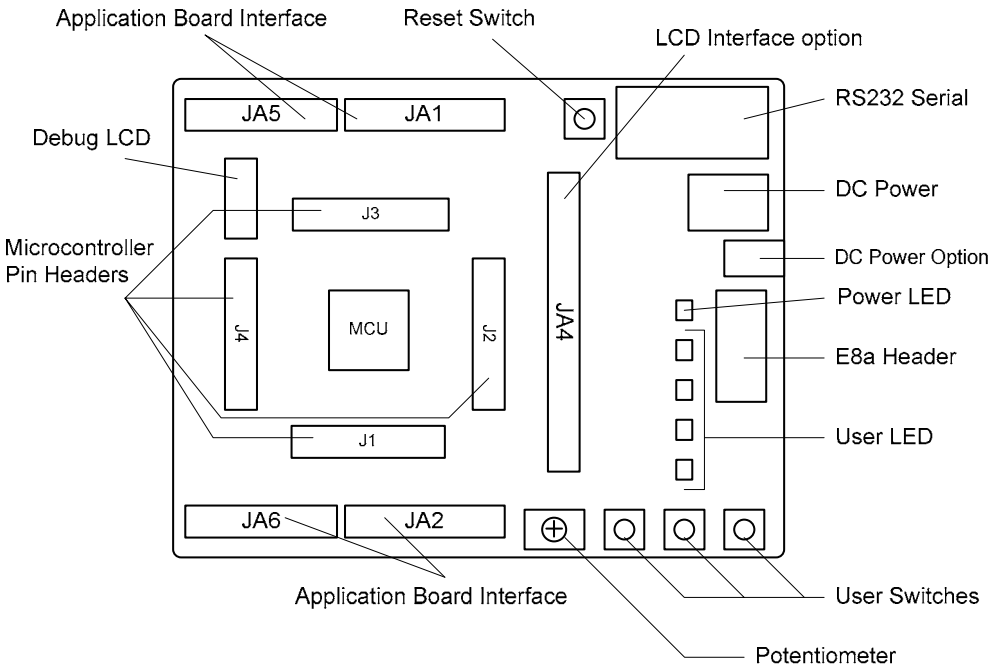

Figure 4-1: Board Layout

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.

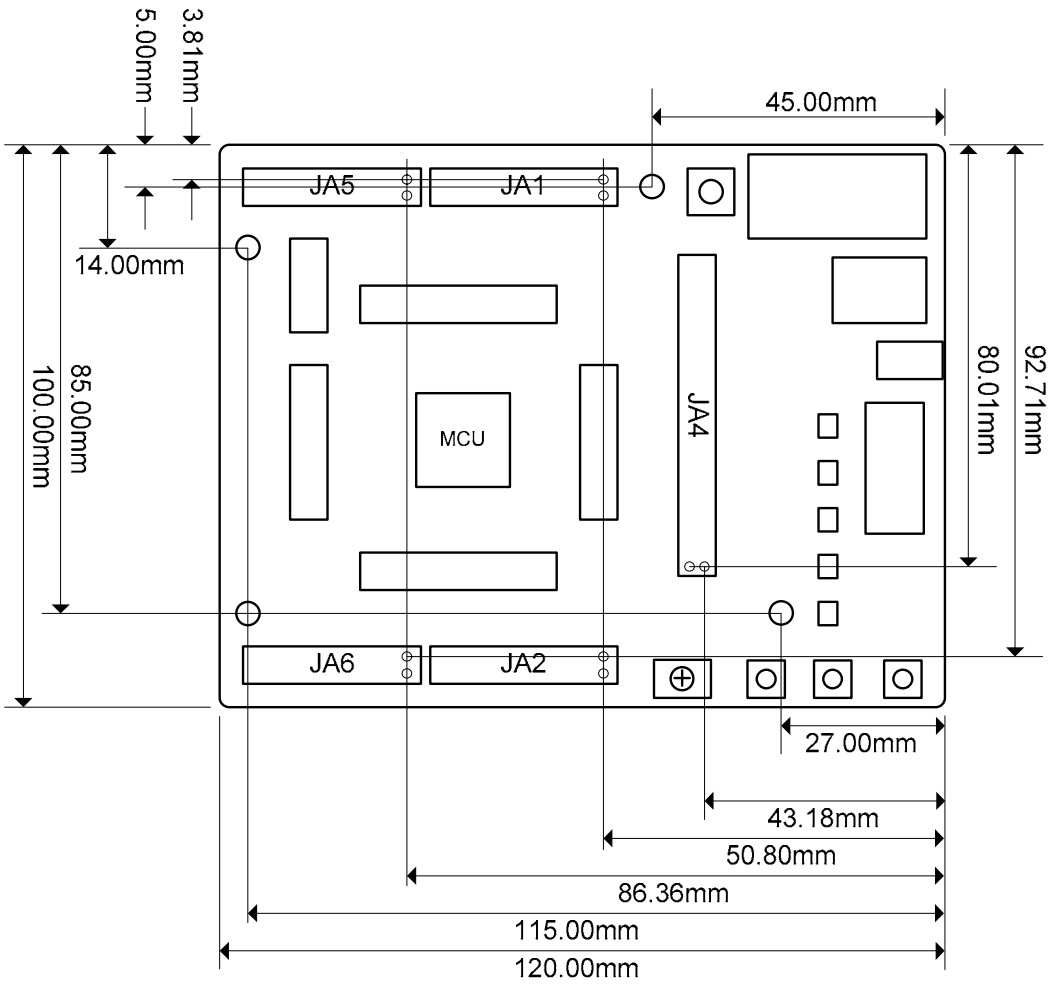

Figure 4-2 : Board Dimensions

Chapter 5. Block Diagram

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

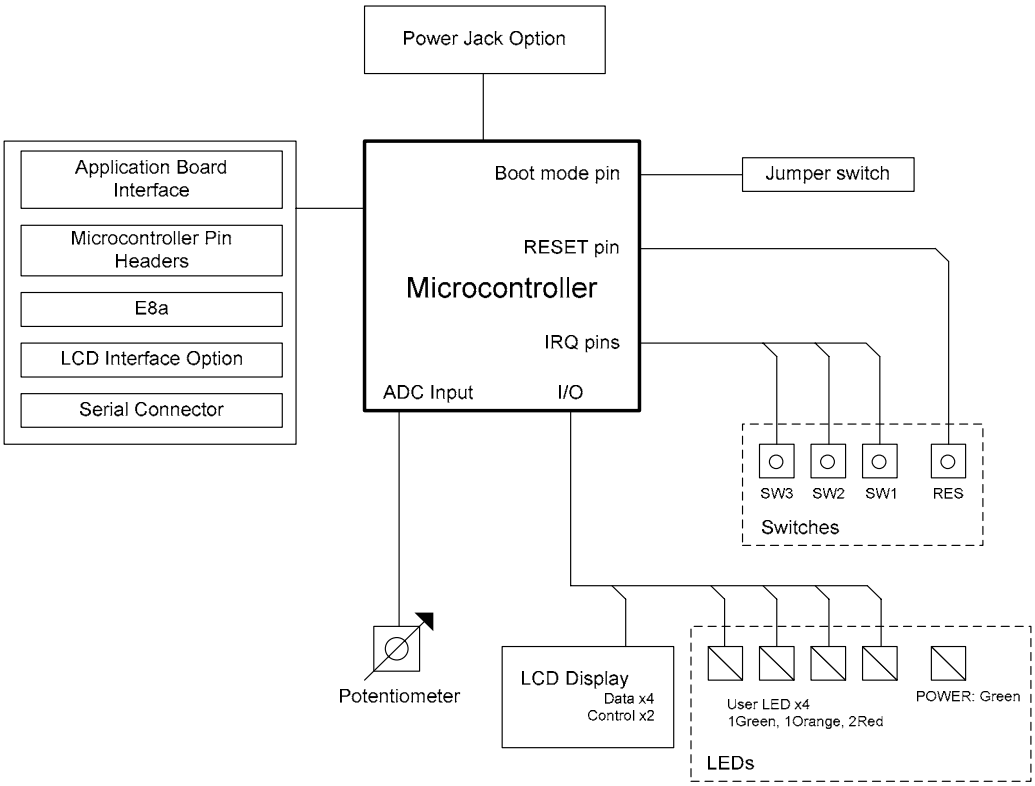

Figure 5-1: Block Diagram

Figure 5-2 is representative of the connections required to the Renesas Starter Kit.

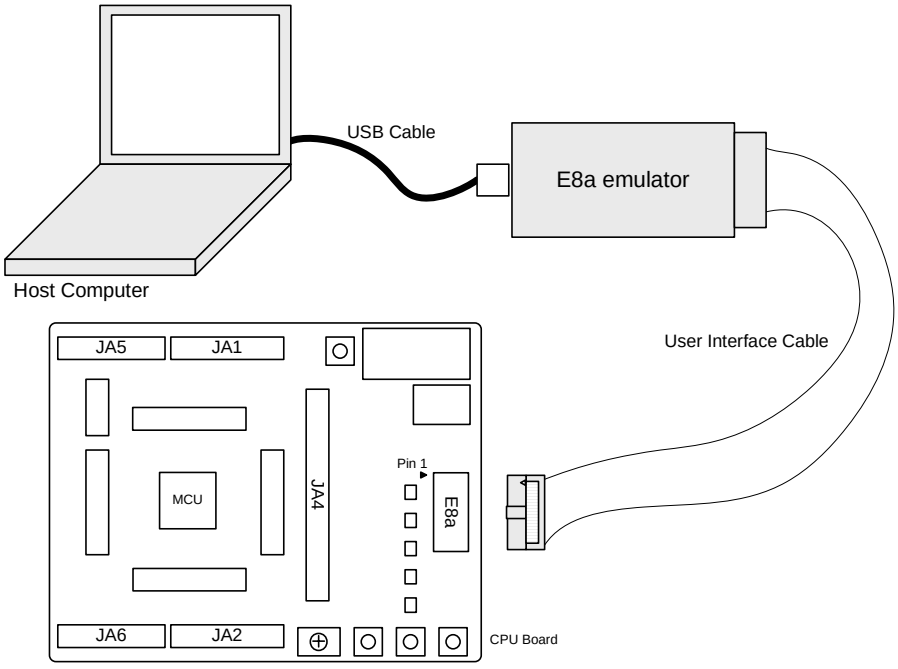

Figure 5-2 : Renesas Starter Kit Connections

Chapter 6. User Circuitry

6.1. Switches

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

Switch	Function	Microcontroller
RES	When pressed, the board microcontroller is reset.	RES Pin86
SW1*	Connects to an IRQ input for user controls.	IRQ0 Pin74 (Port B, pin 0)
SW2*	Connects to an IRQ input for user controls.	IRQ1 Pin60 (Port E, pin 3)
SW3*	Connects to an IQR input for user controls	IRQ3 Pin72 (Port B, pin 2)
	Connects to an ADTRG input line for AD trigger controls.	ADTRG Pin65

Table 6-1: Switch Functions

*Refer to schematic for detailed connectivity information.

6.2. LEDs

There are five LEDs on the CPU board. The green 'POWER' LED lights when the board is powered. 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 function	Microcontroller Pin Number
LED0	Green	Port 9.0	97
LED1	Orange	Port 9.1	98
LED2	Red	Port 9.2	99
LED3	Red	Port 9.3	100

Table 6-2: LED Port

6.3. Potentiometer

A single turn potentiometer is connected to AN4 (PB.4) 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 3_1 is connected to the RS232 transceiver. This serial port can optionally be connected to the RS232 transceiver as well by fitting option resistors. The connections to be fitted are listed in the Table 6-3.

Description	Function	Fit for RS232	Remove for RS232
TXD31	Programming Serial Port	R49, R55	R51, R53
RXD31	Programming Serial Port	R50, R56	R52, R54

Table 6-3: Serial Port settings

A Secondary serial port is connected to the application headers.

6.5. LCD Module

An LCD module is supplied to be connected to the connector 'LCD'. This should be fitted so that the LCD module lies over J3. Care should be taken to ensure the pins are inserted correctly into 'LCD'. The 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 Renesas Starter Kit only supports 5V operation.

Table 6-4 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	LCD_VCC (5V Only)	-
3	No Connection	-	4	LCD_RS	81
5	R/W (Wired to Write only)	-	6	LCD_E	82
7	No Connection	-	8	No Connection	-
9	No Connection	-	10	No Connection	-
11	LCD_D4/IO_4	77	12	LCD_5/IO_5	78
13	LCD_D6/IO_6	79	14	LCD_7/IO_7	80

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
R25	Power Source	**Connects DC power input (PWR1) to the regulator input**	Disconnects DC power input to the regulator input	
R26	Power Source	**Connects CON_5V to the regulator input**	Disconnects CON_5V from the regulator input	
R27	Power Source	**Connects E8_VCC to the regulator input**	Disconnects E8_VCC from the regulator input	
R28	Power Source	**Connects LCD module power to internal 5V**	Disconnects LCD module power from internal 5V	
R29	Power Source	**Connects the regulator output to Board_VCC**	Disconnects the regulator output from Board_VCC	J6
R30	Power Source	**Connects UC_VCC to Board_VCC**	Disconnects UC_VCC from Board_VCC	J7
R31	Power Source	**Connects Board_VCC to CON_3V3**	Disconnects Board_VCC from CON_3V3	
R32	User I/O Power Source	**Connects Board_VCC supply to SW1-3 and LED0-3**	Disconnects Board_VCC from SW1-3 and LED0-3	J8

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
R2	Main Clock Oscillator	Parallel resistor for main clock X1	**Not fitted**	R3, R4
R3	Main Clock Oscillator	**Connects main clock X1 to microcontroller**	Connects optional main clock X2 or external clock to microcontroller	R2, R6, R11, R13
R4	Main Clock Oscillator	**Connects main clock X1 to microcontroller**	Connects optional main clock X2 or external clock to microcontroller	R2, R7, R12, R13
R5	Main Clock Oscillator	Parallel resistor for optional main clock X2	**Not fitted**	R6, R7
R6	Main Clock Oscillator	Connects optional main clock X2 to microcontroller	**Connects main clock X1 or external clock to microcontroller**	R3, R5, R11, R13
R7	Main Clock Oscillator	Connects optional main clock X2 to microcontroller	**Connects main clock X1 or external clock to microcontroller**	R4, R5, R12, R13
R11	Main Clock Oscillator	Connects external clock to microcontroller	**Connects main clock X1 or optional main clock X2 to microcontroller**	R3, R6, R13
R12	Main Clock Oscillator	Connects external clock to microcontroller	**Connects main clock X1 or optional main clock X2 to microcontroller**	R4, R7, R13
R13	Main Clock Oscillator	Selects On-chip oscillator * If R13 fits, remove R3, R4, R6, R7, R11 and R12	**Connects X1, X2 or external clock to microcontroller**	R3, R4, R6, R7, R11, R12, IRQAEC
R8	Sub Clock Oscillator	Parallel resistor for sub clock X3	**Not fitted**	R9, R10
R9	Sub Clock Oscillator	**Connects sub clock X3 to microcontroller**	Connects external clock to microcontroller	R8, R14, R16
R10	Sub Clock Oscillator	**Connects sub clock X3 to microcontroller**	Connects external clock to microcontroller	R8, R15, R16
R14	Sub Clock Oscillator	Connects external clock to microcontroller	**Connects sub clock X3 to microcontroller**	R9, R16
R15	Sub Clock Oscillator	Connects external clock to microcontroller	**Connects sub clock X3 to microcontroller**	R10, R16
R16	Sub Clock Oscillator	Disables sub clock input * If R16 fits, remove R9, R10, R14 and R15	**Connects sub clock X3 or external clock to microcontroller**	R9, R10, R14, R15

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
R46	RS232 Transceiver	Disables RS232 Serial Transceiver	**Enables RS232 Serial Transceiver**	
R47	Serial Port	Connects SCIbRX (RXD33) to 'SERIAL' connector	**Disconnects SCIbRX from 'SERIAL' connector**	J9, J13
R48	Serial Port	Connects SCIbTX (TXD33) to 'SERIAL' connector	**Disconnects SCIbTX from 'SERIAL' connector**	J9, J12
R49	Serial Port	**Connects serial port signals to RS232 Transceiver**	Disconnects serial port signals from RS232 Transceiver	R51, R53, R55, J10
R50	Serial Port	**Connects serial port signals to RS232 Transceiver**	Disconnects serial port signals from RS232 Transceiver	R52, R54, R56, J11
R51	Serial Port	Connects RS232TX to RS232 Transceiver	**Disconnects RS232TX from RS232 Transceiver**	R49, R53, R55
R52	Serial Port	Connects RS232RX to RS232 Transceiver	**Disconnects RS323RX from RS232 Transceiver**	R50, R54, R56
R53	Serial Port	**Connects SCIaTX (P3.2-TXD32) to RS232 Transceiver**	Disconnects SCIaTX from RS232 Transceiver	R49, R51, R55
R54	Serial Port	**Connects SCIaRX (P3.1-RXD32) to RS232 Transceiver**	Disconnects SCIaRX from RS232 Transceiver	R50, R52, R56
R55	Programming Serial Port	Connects TMR0/PTTX (P4.2-TXD31) to RS232 Transceiver	**Disconnects TMR0/PTTX from RS232 Transceiver**	R49, R51, R53
R56	Programming Serial Port	Connects PTRX (P4.1-RXD31) to RS232 Transceiver	**Disconnects PTRX from RS232 Transceiver**	R50, R52, R54

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
R21	Analog Voltage Source	**Connects AVCC to UC_VCC**	Disconnects AVCC from UC_VCC	R22
R22	External Analog Voltage Source	Connects AVCC to external AVCC pin CON_AVCC	**Disconnects AVCC from external AVCC pin CON_AVCC**	R21
R23	Ground Signals	**Links analog ground to digital ground**	Isolates analog ground from digital ground	
R24	AD_POT	**Connects AD_POT to microcontroller's AN4 pin**	Disconnects AD_POT from AN4 pin	

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
R64	MCU Pin Function Select	Connects microcontroller pin 95 to IIC_SDA	**MUST be removed if R65 fitted**	R65
R65	MCU Pin Function Select	**Connects microcontroller pin 95 to SCIaRX**	Should be removed if R64 fitted	R64
R66	MCU Pin Function Select	Connects microcontroller pin 94 to IIC_SCL	**MUST be removed if R67 fitted**	R67
R67	MCU Pin Function Select	**Connects microcontroller pin 94 to SCIaTX**	Should be removed if R66 fitted	R66
R68	MCU Pin Function Select	Connects microcontroller pin 74 to AD0	**MUST be removed if R69 fitted**	R69
R69	MCU Pin Function Select	**Connects microcontroller pin 74 to IRQ0**	Should be removed if R68 fitted	R68
R70	MCU Pin Function Select	Connects microcontroller pin 72 to AD2	**MUST be removed if R71 fitted**	R71
R71	MCU Pin Function Select	**Connects microcontroller pin 72 to IRQ2**	Should be removed if R70 fitted	R70

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
R1	LCD Panel	Connects V2 to V3	**Disconnects V2 from V3**	
R36	SW3 (IRQ)	**Connects SW3 to IRQ3 input (microcontroller pin 72)**	Disconnects SW3 from IRQ3 input	R37
R37	SW3 (ADTRG)	Connects SW3 to microcontroller's TEST/ADTRG pin	**Disconnects SW3 from TEST/ADTRG pin**	R36, R75, J15
R57	E8a	**Enables E8a Connection**	Do not connect an option resister	
R72	IRQAEC	Connects external CON_IRQAEC to microcontroller's IRQAEC pin	**Disconnects CON_IRQAEC from IRQAEC pin**	R73
R73	IRQAEC	**Connects on-board level selector to microcontroller's IRQAEC pin**	Disconnects on-board level selector from IRQAEC pin	R72, R74, J14
R74	IRQAEC	**Connects ground signal to microcontroller's IRQAEC pin**	Disconnects ground signal from IRQAEC pin	R73, J14
R75	TEST/ADTRG	**Connects ground signal to microcontroller's TEST/ADTRG pin**	Disconnects ground signal from TEST/ADTRG pin	R37, J15

Table 6-10: Other Option Links

6.7. Oscillator Sources

Crystal oscillators are fitted on the board and used to supply the main/sub clock input to the Renesas microcontroller.

Table 6-11 details the oscillators that are fitted and alternative footprints provided on CPU board:

Component		
Main clock (X1)	Fitted	10 MHz (HC49/4H package)
Main clock (X2)	Not fitted	User define
Sub clock (X3)	Fitted	32.768 kHz (90SMX package)

Table 6-11: Oscillator

6.8. Reset Circuit

Because the H8/38099 microcontroller has an on-chip power-on reset circuit, the CPU board includes a capacitor.

Please refer to the hardware manual for more information on the requirements of the reset circuit. Please check the reset requirements carefully to ensure the reset circuit on the user's board meets all the reset timing requirements.

6.9. LCD Controller Interface

This Renesas Starter Kit should be soldered on top of the LCD application board in JA1, JA2, JA5, JA6 and JA4 positions. These application headers are detailed in section 9.2 in this user manual.

For more details on LCD application board please refer to LCD application board user manual.

Chapter 7. Modes

This Renesas Starter Kit supports Boot mode and User mode.

Details of programming the FLASH memory is described in the H8/38099 Group Hardware Manual.

7.1. Boot mode

The Boot mode settings for this Renesas Starter Kit are shown in Table 7-1 below:

TEST	NMI	P3.6	LSI State after Reset End
Low	Low	High	Boot Mode

Table 7-1: Boot Mode pin settings

The software supplied with this Renesas Starter Kit supports Boot mode using an E8a and High-performance Embedded Workshop only. However, hardware exists to enter boot mode manually, do not connect the E8a in this case. Short-circuit 'J5' jumper, then the NMI pin is held low.

When neither the E8a is connected nor the board is placed in boot mode as above, the TEST pin is connected Ground, the NMI pin is pulled high by a 10k resistor, the P3.6 pin is pulled high a 4.7k resistor.

When an E8a is used the NMI pin and the P3.6 pin are controlled by the E8a.

7.2. User mode

Because the NMI pin is pulled high, this Renesas Starter Kit will always boot in User mode when the E8a is not connected and the 'J5' jumper is not fitted. Refer to H8/38099 Group Hardware Manual for details of User mode.

TEST	NMI	P3.6	LSI State after Reset End
Low	High	X	User Mode

X: Don't care

Table 7-2: User Mode pin settings

Chapter 8. Programming Methods

The board is intended for use with High-performance Embedded Workshop and the supplied E8a debugger. Refer to H8/38099 Group Hardware Manual for details of programming the microcontroller 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 pins. * Marked pins are subject to option links.

J1					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	SEG1	1	2	SEG2	2
3	SEG3	3	4	SEG4	4
5	SEG5	5	6	SEG6	6
7	SEG7	7	8	SEG8	8
9	SEG9	9	10	SEG10	10
11	SEG11	11	12	SEG12	12
13	SEG13	13	14	SEG14	14
15	SEG15	15	16	SEG16	16
17	SEG17	17	18	SEG18	18
19	SEG19	19	20	SEG20	20
21	SEG21	21	22	SEG22	22
23	SEG23	23	24	SEG24	24
25	SEG25	25	26	No Connection	-

Table 9-1: J1

J2					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	SEG26	26	2	SEG27	27
3	SEG28	28	4	SEG29	29
5	SEG30	30	6	SEG31	31
7	SEG32	32	8	SEG33	33
9	SEG34	34	10	SEG35	35
11	SEG36	36	12	SEG37	37
13	SEG38	38	14	SEG39	39
15	SEG40	40	16	COM1	41
17	COM2	42	18	COM3	43
19	COM4	44	20	V1	45
21	V2	46	22	V3	47
23	No Connection	-	24	No Connection	-
25	TRIGa	50	26	No Connection	-

Table 9-2: J2

J3					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	PTRX	51	2	TMR0/PTTX*	52
3	TRIGb	53	4	SCIcCK	54
5	SCIcRX	55	6	SCIcTX	56
7	SCIbCK	57	8	SCIbRX	58
9	SCIbTX	59	10	SW2/IRQ1	60
11	IO_0	61	12	IO_1	62
13	IO_2	63	14	IO_3	64
15	TEST/SW3/ADTRG*	65	16	AVSS	66
17	AD7	67	18	AD6	68
19	AD5	69	20	AD_POT/AD4*	70
21	AD3	71	22	SW3/AD2/IRQ2*	72
23	AD1	73	24	SW1/AD0/IRQ0*	74
25	AVCC	75	26	No Connection	-

Table 9-3: J3

J4					
Pin	Circuit Net Name	Device Pin	Pin	Circuit Net Name	Device Pin
1	IRQAEC*	76	2	LCD_D4/IO_4	77
3	LCD_D5/IO_5	78	4	LCD_D6/IO_6	79
5	LCD_D7/IO_7	80	6	LCD_RS	81
7	LCD_E	82	8	E8B_NMI	83
9	CON_X1	84	10	CON_X2	85
11	RESn	86	12	CON_OSC1	87
13	UC_VCC	88	14	CON_OSC2	89
15	VSS (Ground)	90	16	E8_SCLK	91
17	E8_TTX	92	18	E8_TRX	93
19	SCIaTX/IIC_SCL*	94	20	SCIaRX/IIC_SDA*	95
21	SCIaCK	96	22	LED0/TMR1*	97
23	LED1	98	24	LED2	99
25	LED3	100	26	No Connection	-

Table 9-4: J4

9.2. Application Headers

Table 9-5 and Table 9-6 below show the standard application header connections. * Marked pins are subject to option links.

JA1								
Pin	Header Name		Circuit Net Name	Device Pin	Pin	Header Name	Circuit Net Name	Device Pin
1	Regulated Supply 1		CON_5V	-	2	Regulated Supply 1	Ground	-
3	Regulated Supply 2		CON_3V3	-	4	Regulated Supply 2	Ground	-
5	Analog Supply		CON_AVCC*	75	6	Analog Supply	AVSS	66
7	Analog Reference		NC	-	8	ADTRG	SW3/ADTRG*	65
9	ADC0	I0	AD0*	74	10	ADC1 I1	AD1	73
11	ADC2	I2	AD2*	72	12	ADC3 I3	AD3	71
13	DAC0		NC	-	14	DAC1	NC	-
15	IOPort0		IO_0	61	16	IOPort1	IO_1	62
17	IOPort2		IO_2	63	18	IOPort3	IO_3	64
19	IOPort4		LCD_D4/IO_4	77	20	IOPort5	LCD_D5/IO_5	78
21	IOPort8		LCD_D6/IO_6	79	22	IOPort7	LCD_D7/IO_7	80
23	Open drain	IRQAEC	CON_IRQAEC*	76	24	I²C Bus (3rd pin)	NC	-
25	I²C Bus		IIC_SDA*	95	26	I²C Bus	IIC_SCL*	94

Table 9-5: JA1 Standard Generic Header

JA2							
Pin	Header Name	Circuit Net Name	Device Pin	Pin	Header Name	Circuit Net Name	Device Pin
1	Reset	RESn	86	2	External Clock Input	CON_OSC1	87
3	Interrupt	E8B_NMI	83	4	Regulated Supply 1	Ground	-
5	WDT overflow	NC	-	6	Serial Port	SCIaTX*	94
7	Interrupt	IRQ0*	74	8	Serial Port	SCIaRX*	95
9	Interrupt	SW2/IRQ1	60	10	Serial Port	SCIaCK	96
11	Motor up/down	NC	-	12	Serial Port Handshake	NC	-
13	Motor control	NC	-	14	Motor control	NC	-
15	Motor control	NC	-	16	Motor control	NC	-
17	Motor control	NC	-	18	Motor control	NC	-
19	Timer Output	TMR0/PTTX*	52	20	Timer Output	LED0/TMR1*	97
21	Timer Input	TRIGa	50	22	Timer Input	TRIGb	53
23	Interrupt	IRQ2*	72	24	Tristate Control	NC	-
25	SPARE	NC	-	26	SPARE	NC	-

Table 9-6: JA2 Standard Generic Header

Table 9-7 below show the LCD application header connections. The LCD application board need to be mounted on Renesas Starter Kit for H8/38099 board in order to make use of the LCD panel. The following header (i.e. header JA4) will be connected to JA4B header on LCD application board.

JA4							
Pin	Header Name	Circuit Net Name	Device Pin	Pin	Header Name	Circuit Net Name	Device Pin
1	V0	NC	-	2	V1	V1	45
3	V2	V2	46	4	V3	V3	47
5	Ground	Ground	-	6	Ground	Ground	-
7	COM1	COM1	41	8	COM2	COM2	42
9	COM3	COM3	43	10	COM4	COM4	44
11	SEG1	SEG1	1	12	SEG2	SEG2	2
13	SEG3	SEG3	3	14	SEG4	SEG4	4
15	SEG5	SEG5	5	16	SEG6	SEG6	6
17	SEG7	SEG7	7	18	SEG8	SEG8	8
19	SEG9	SEG9	9	20	SEG10	SEG10	10
21	SEG11	SEG11	11	22	SEG12	SEG12	12
23	SEG13	SEG13	13	24	SEG14	SEG14	14
25	SEG15	SEG15	15	26	SEG16	SEG16	16
27	SEG17	SEG17	17	28	SEG18	SEG18	18
29	SEG19	SEG19	19	30	SEG20	SEG20	20
31	SEG21	SEG21	21	32	SEG22	SEG22	22
33	SEG23	SEG23	23	34	SEG24	SEG24	24
35	SEG25	SEG25	25	36	SEG26	SEG26	26
37	SEG27	SEG27	27	38	SEG28	SEG28	28
39	SEG29	SEG29	29	40	SEG30	SEG30	30
41	SEG31	SEG31	31	42	SEG32	SEG32	32
43	SEG32	SEG33	33	44	SEG34	SEG34	34
45	SEG35	SEG35	35	46	SEG36	SEG36	36
47	SEG37	SEG37	37	48	SEG38	SEG38	38
49	SEG39	SEG39	39	50	SEG40	SEG40	40

Table 9-7: JA4 Optional Generic Header

Table 9-8 and Table 9-9 below show the optional application header connections. * Marked pins are subject to option links.

JA5									
Pin	Header Name		Circuit Net Name	Device Pin	Pin	Header Name		Circuit Net Name	Device Pin
1	ADC4	I4	AD_POT/AD4*	70	2	ADC5	I5	AD5	69
3	ADC6	I6	AD6	68	4	ADC7	I7	AD7	67
5	CAN		NC	-	6	CAN		NC	-
7	CAN		NC	-	8	CAN		NC	-
9	Reserved		NC	-	10	Reserved		NC	-
11	Reserved		NC	-	12	Reserved		NC	-
13	Reserved		NC	-	14	Reserved		NC	-
15	Reserved		NC	-	16	Reserved		NC	-
17	Reserved		NC	-	18	Reserved		NC	-
19	Reserved		NC	-	20	Reserved		NC	-
21	Reserved		NC	-	22	Reserved		NC	-
23	Reserved		NC	-	24	Reserved		NC	-

Table 9-8: JA5 Optional Generic Header

JA6									
Pin	Header Name		Circuit Net Name	Device Pin	Pin	Header Name		Circuit Net Name	Device Pin
1	DMA		NC	-	2	DMA		NC	-
3	DMA		NC	-	4	Standby (Open drain)		NC	-
5	Host Serial	SCIdTX	RS232TX*	-	6	Host Serial	SCIdRX	RS232RX*	-
7	Serial Port		SCIbRX	58	8	Serial Port		SCIbTX	59
9	Serial Port	Synchronous	SCIcTX	56	10	Serial Port		SCIbCK	57
11	Serial Port	Synchronous	SCIcCK	54	12	Serial Port	Synchronous	SCIcRX	55
13	Reserved		NC	-	14	Reserved		NC	-
15	Reserved		NC	-	16	Reserved		NC	-
17	Reserved		NC	-	18	Reserved		NC	-
19	Reserved		NC	-	20	Reserved		NC	-
21	Reserved		NC	-	22	Reserved		NC	-
23	Reserved		NC	-	24	Reserved		NC	-

Table 9-9: JA6 Optional Generic Header

Chapter 10.Code Development

10.1. Overview

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

10.2. Compiler Restrictions

The compiler supplied with this Renesas Starter Kit 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 will 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

High-performance Embedded Workspace connects to the Microcontroller and programs it via the E8a. Mode support is handled transparently to the user.

10.4. Breakpoint Support

High-performance Embedded Workshop 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

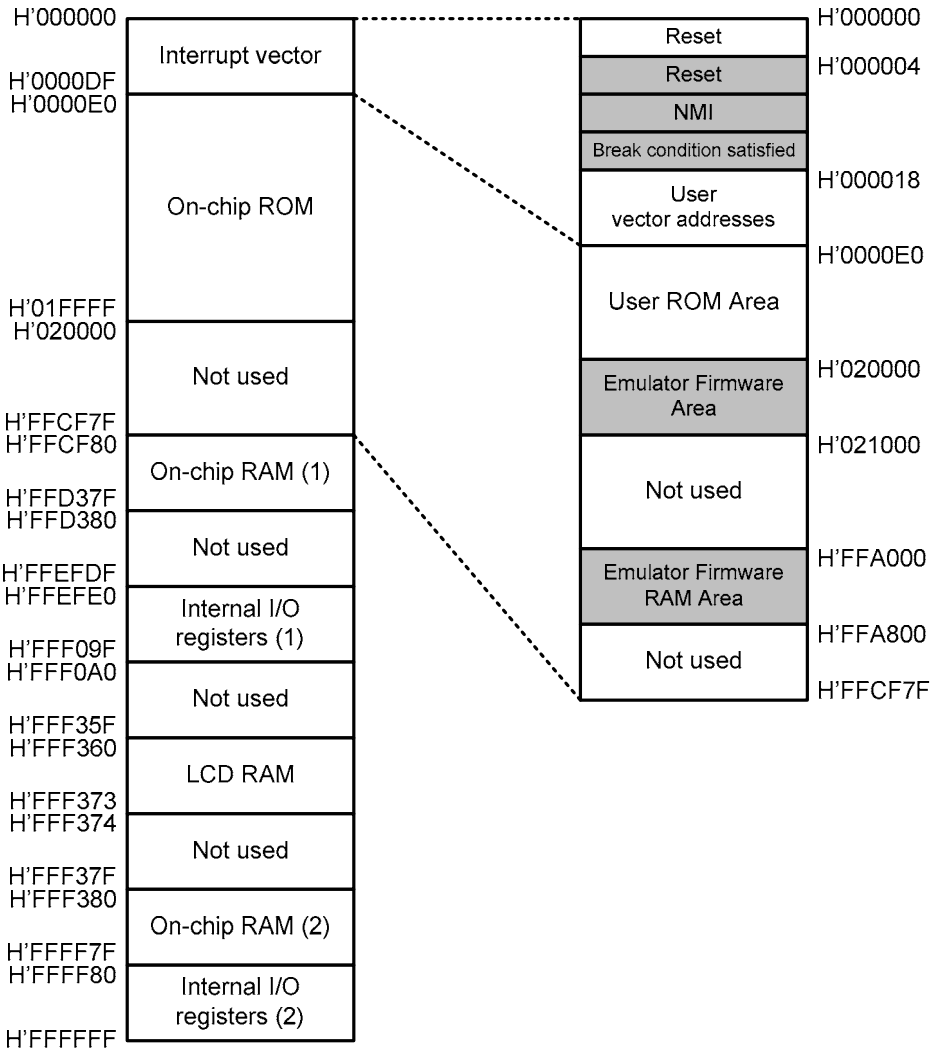

Figure 10-1 : Memory Map

Chapter 11. Component Placement

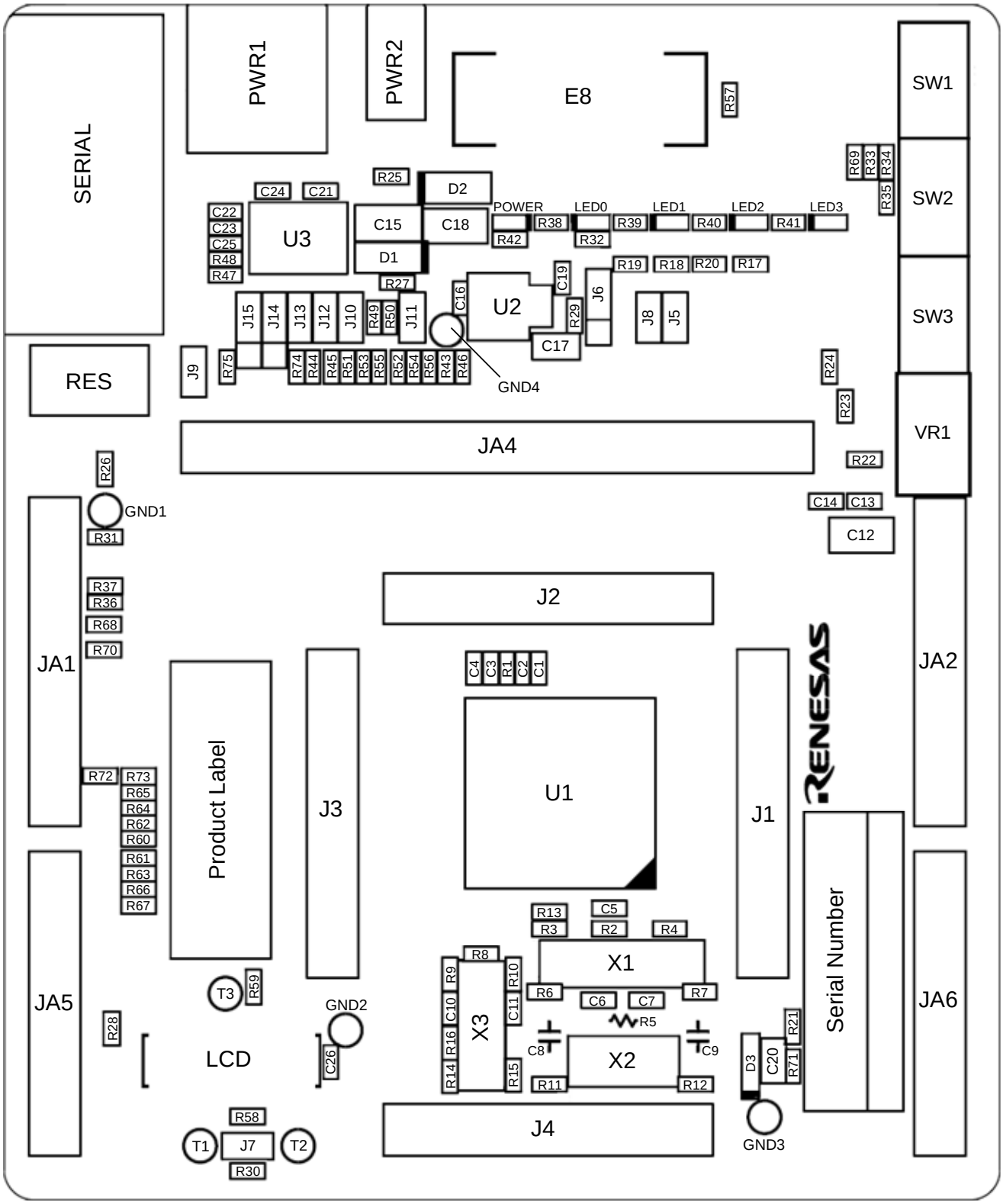

Figure 11-1 : Component Placement

Chapter 12. Additional Information

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

For information about the H8/38099 group microcontrollers, refer to the H8/38099 Group Hardware Manual.

For information about the H8/38099 assembly language, refer to the H8/300H Series Software Manual.

Online technical support and information is available at:

http://www.renesas.com/renesas_starter_kits

Technical Contact Details

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Japan: csc@renesas.com

General information on Renesas Microcontrollers can be found on the Renesas website at:

http://www.renesas.com/.

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