

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.

Renesas Starter Kit for M16C6C

User's Manual

RENEASAS SINGLE-CHIP MICROCOMPUTER
M16C FAMILY

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

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.

Table of Contents

| | |
|--|----|
| Chapter 1. Preface | 4 |
| Chapter 2. Purpose | 5 |
| Chapter 3. Power Supply | 6 |
| 3.1. Requirements | 6 |
| 3.2. Power – Up Behaviour..... | 6 |
| Chapter 4. Board Layout..... | 7 |
| 4.1. Component Layout..... | 7 |
| 4.2. Board Dimensions | 8 |
| Chapter 5. Block Diagram..... | 9 |
| Chapter 6. User Circuitry | 10 |
| 6.1. Switches..... | 10 |
| 6.2. LEDs | 10 |
| 6.3. Potentiometer..... | 10 |
| 6.4. Serial port..... | 10 |
| 6.5. Debug LCD Module..... | 11 |
| 6.6. USB Module | 11 |
| 6.7. Option Links..... | 12 |
| 6.8. Oscillator Sources | 20 |
| 6.9. Reset Circuit..... | 20 |
| Chapter 7. Modes..... | 21 |
| 7.1. Boot mode | 21 |
| 7.2. Single-Chip mode | 21 |
| Chapter 8. Programming Methods | 22 |
| Chapter 9. Headers..... | 23 |
| 9.1. Microcontroller Headers | 23 |
| 9.2. Application Headers..... | 25 |
| Chapter 10. Code Development | 29 |
| 10.1. Overview..... | 29 |
| 10.2. Compiler Restrictions | 29 |
| 10.3. Mode Support | 29 |
| 10.4. Breakpoint Support | 29 |
| 10.5. Memory Map | 30 |
| Chapter 11. Component Placement..... | 31 |
| Chapter 12. Additional Information | 32 |

Chapter 1. Preface

Cautions

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

All rights reserved. Duplication of this document, either in whole or part is prohibited without the written permission of Renesas Technology Europe Limited.

Trademarks

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

Copyright

© 2009 Renesas Technology Europe Ltd. All rights reserved.

© 2009 Renesas Technology Corporation. All rights reserved.

© 2009 Renesas Solutions Corporation. All rights reserved.

Website: <http://www.eu.renesas.com/>

Glossary

| | | | |
|------|---|-----|------------------------------------|
| CPU | Central Processing Unit | HEW | High-performance Embedded Workshop |
| LED | Light Emitting Diode | RSK | Renesas Starter Kit |
| PC | Personal Computer | E8A | E8A on-chip debugger module |
| ESD | Electrostatic Discharge | EMC | Electromagnetic compatibility |
| LCD | Liquid Crystal Display | MCU | Microcontroller Unit |
| ADC | Analog to Digital Converter | USB | Universal Serial Bus |
| UART | Universal Asynchronous Receiver/Transmitter | ROM | Read Only Memory |
| RAM | Random Access Memory | CD | Compact Disc |

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 E8A 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.

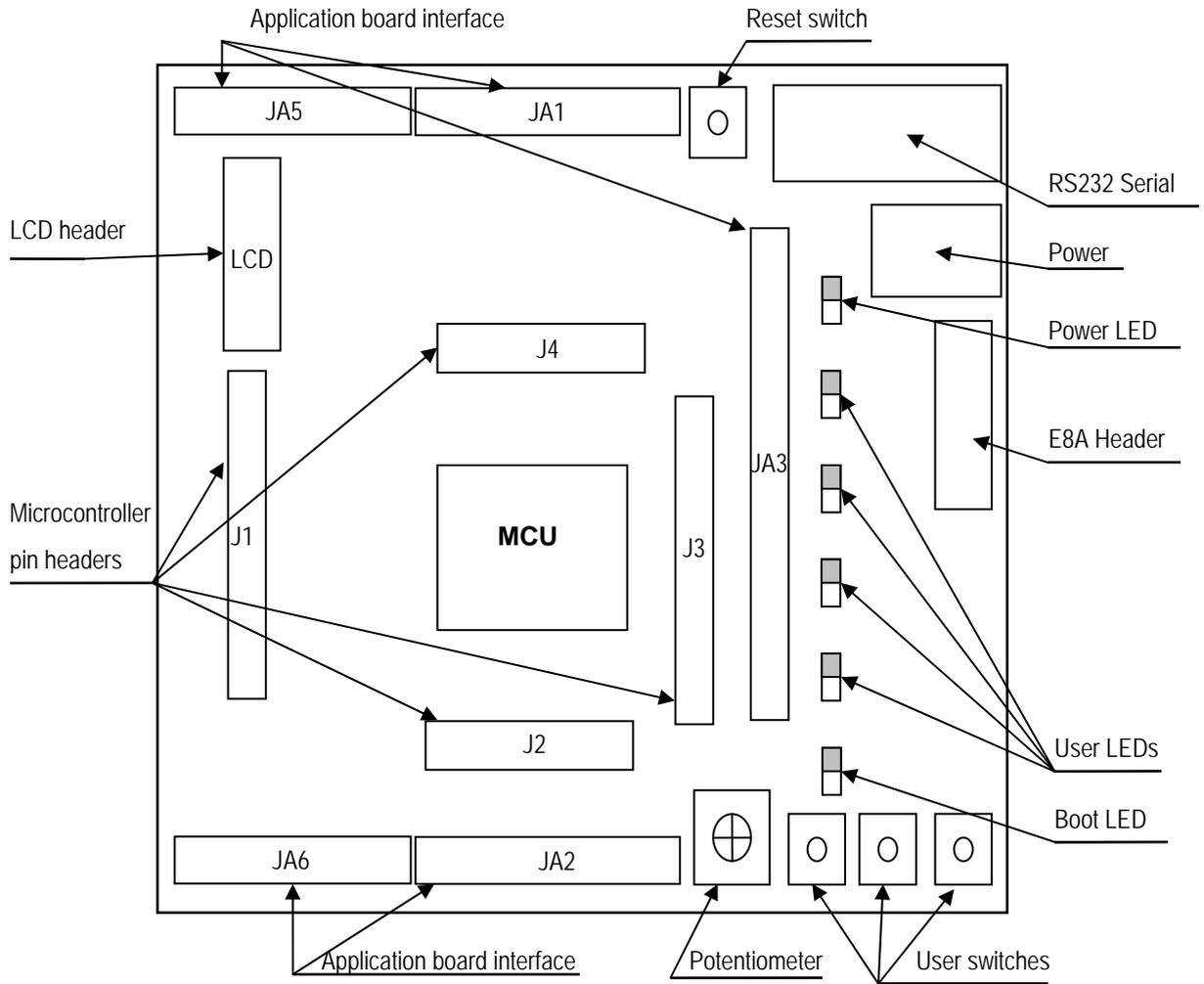


Figure 4-1: Board Layout

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.

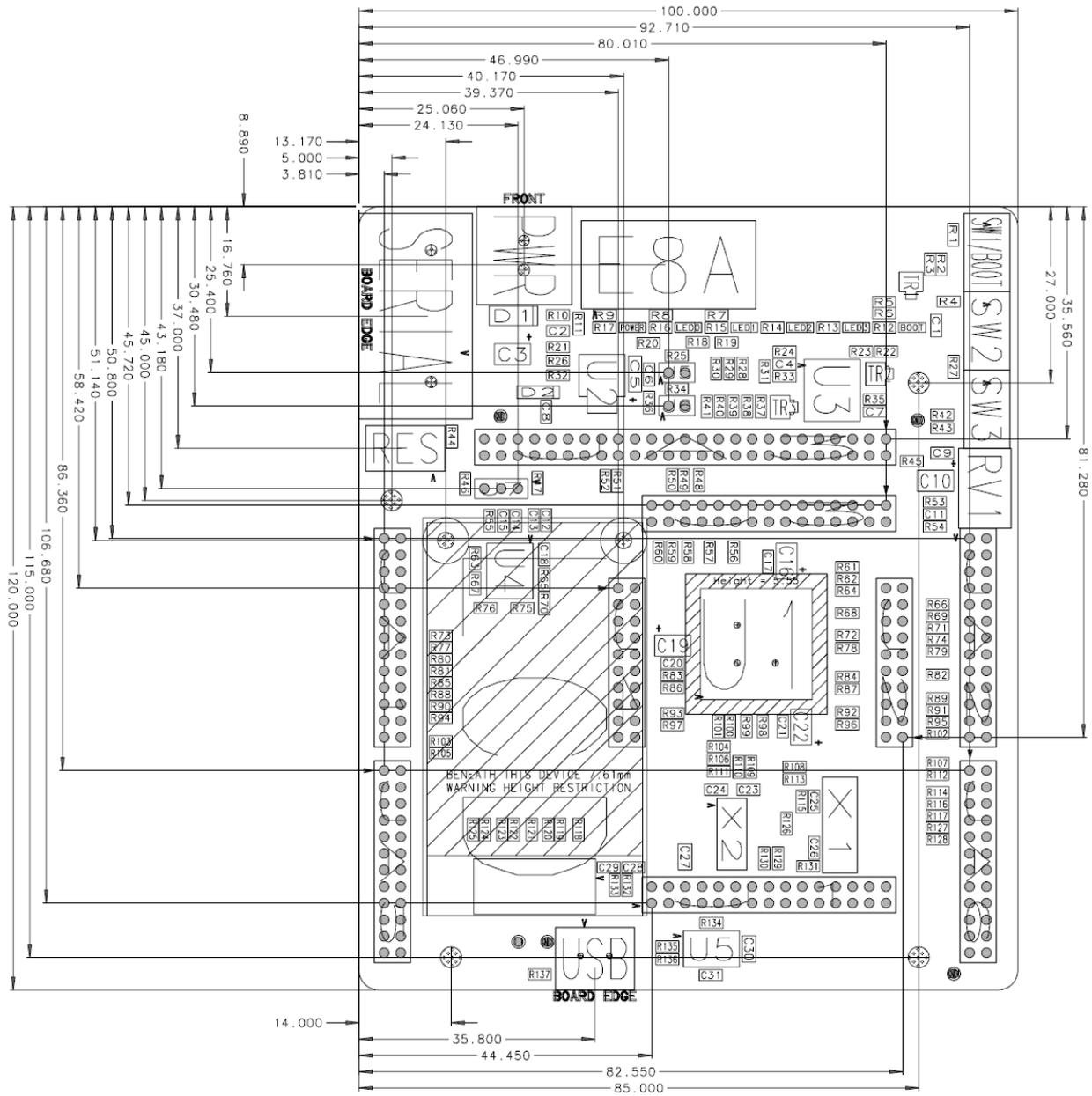


Figure 4-2: Board Dimensions

Chapter 5. Block Diagram

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

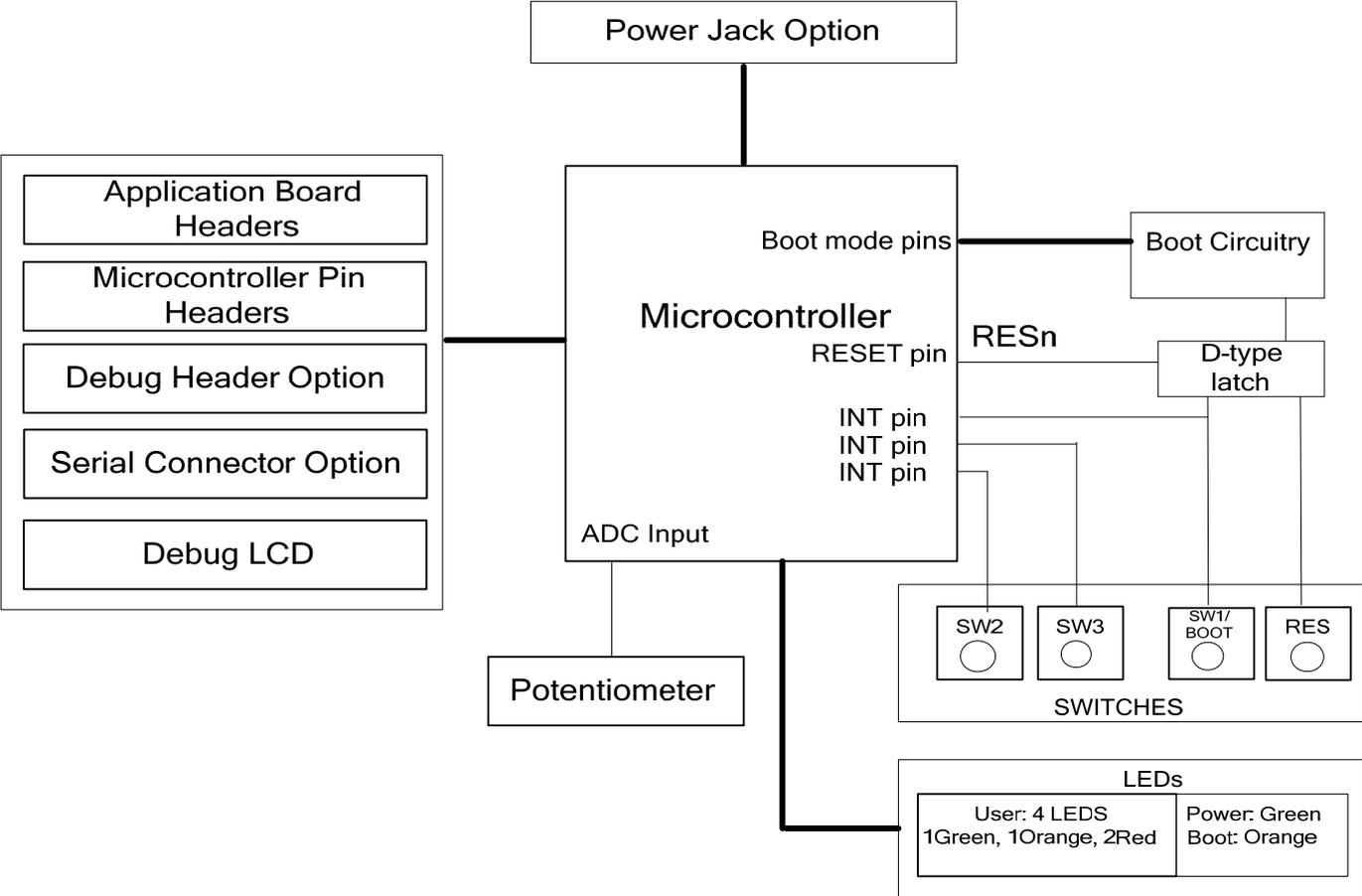


Figure 5-1: Block Diagram

Figure 5-2 shows the connections to the RSK.

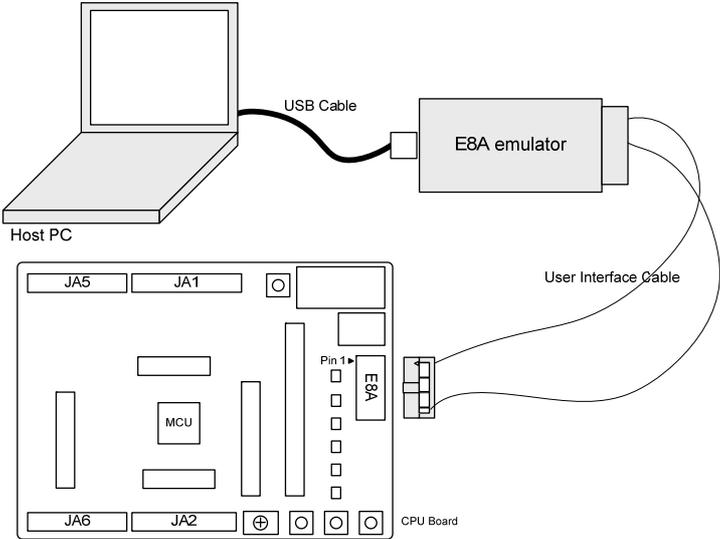


Figure 5-2: RSK Connections

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 10 |
| 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. | INT0n, Pin 18 (Port 8, pin 2) |
| SW2* | Connects to an IRQ line for user controls. | INT1n, Pin 17 (Port 8, pin 3) |
| SW3* | Connects to the IRQ input line. Option link allows connection to ADC trigger input. For more details on option links, please refer to Sec 6.6. | INT2n, Pin 16 (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 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 4_0 | 52 |
| LED1 | Orange | Port 4_1 | 51 |
| LED2 | Red | Port 4_2 | 50 |
| LED3 | Red | Port 4_3 | 49 |

Table 6-2: LED Port

6.3. Potentiometer

A single turn potentiometer is connected to channel AN0 (Port 10_0) 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 (UART1) is connected to the E8A 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 Table 6-3

| Description | Function | Microcontroller Port Pin | Fit for RS232 | Remove for RS232 |
|-------------|--------------------------|-----------------------------|---------------|------------------|
| UART0 | Default serial port (TX) | Port 6_3 | R128 | R127, R76 |
| UART0 | Default serial port (RX) | Port 6_2 | R114 | R116, R75 |
| UART1 | Spare Serial Port (TX) | Port 6_7 | R76 | R127, R128 |
| UART1 | Spare Serial Port (RX) | Port 6_6 | R75 | R114, R116 |

Table 6-3: Serial Port settings

The UART0 port is also available on J2 and JA2. The UART1 port is available on J1.

The board is designed to accept a straight-through RS-232 male-to-female cable.

6.5. 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 J4. 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 6-4 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 | 5V | - |
| 3 | No Connection | - | 4 | DLCDRS (Port 2_0) | 70 |
| 5 | R/W (Wired to write only using 10K pull down) | - | 6 | DLCDE (Port 2_1) (+ 100k pull down to ground) | 69 |
| 7 | No Connection | - | 8 | No connection | - |
| 9 | No Connection | - | 10 | No connection | - |
| 11 | DLCD4 (Port 2_4) | 66 | 12 | DLCD5 (Port 2_5) | 65 |
| 13 | DLCD6 (Port 2_6) | 64 | 14 | DLCD7 (Port 2_7) | 63 |

Table 6-4: Debug LCD Module Connections

6.6.USB Module

The USB module can be used for USB device modes at full speed. Table 6-5: USB connections contain details of the signal descriptions and pin connections.

| LCD | | | | | |
|-----|------------------|------------|-----|------------------|------------|
| Pin | Circuit Net Name | Device Pin | Pin | Circuit Net Name | Device Pin |
| 1 | VbusDTCT | 15 | 2 | SOUT3 | 3 |
| 3 | USD+ | 4 | 4 | USD- | 5 |

Table 6-5: USB Module Connections

6.7.Option Links

Table 6-6 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.

| Serial port option link settings | | | | |
|----------------------------------|---------------------------|---|--|---------------|
| Reference | Function | Fitted | Alternative (Removed) | Related To |
| R46 | Serial Port Configuration | Connects Channel 2 (RX pin) of the RS232 transceiver to the 9-pin D-type serial port connector | Disconnects Channel 2 (RX pin) of the RS232 transceiver from the 9-pin D-type serial port connector | R47, R55, R67 |
| R47 | Serial Port Configuration | Connects Channel 2 (TX pin) of the RS232 transceiver to the 9-pin D-type serial port connector | Disconnects Channel 2 (TX pin) of the RS232 transceiver from the 9-pin D-type serial port connector | R46, R55, R67 |
| R55 | Serial Port configuration | Connects Channel 2 (TX pin) of the RS232 transceiver to the TX pin of the UART2 port of the microcontroller | Disconnects Channel 2 (TX pin) of the RS232 transceiver from the TX pin of the UART2 port of the microcontroller | R46, R47, R67 |
| R67 | Serial Port configuration | Connects Channel 2 (RX pin) of the RS232 transceiver to the RX pin of the UART2 port of the microcontroller | Disconnects Channel 2 (RX pin) of the RS232 transceiver from the RX pin of the UART2 port of the microcontroller | R46, R47, R55 |
| R70 | Serial Port configuration | Disables the RS232 Serial Transceiver | Enables the RS232 Serial Transceiver | - |
| R128 | Serial Port Configuration | Connects Channel 1 (TX pin) of the RS232 transceiver to the UART0 port of the microcontroller | Disconnects Channel 1 (TX pin) of the RS232 transceiver from the UART0 port of the microcontroller | R114, R75 |
| R114 | Serial Port Configuration | Connects Channel 1 (RX pin) of the RS232 transceiver to the UART0 port of the microcontroller | Disconnects Channel 1 (RX pin) of the RS232 transceiver from the UART0 port of the microcontroller | R128, R76 |
| R127 | Serial Port Configuration | Connects Channel 1 (TX In pin) of RS232 transceiver to JA6-5 (RS232TX) | Disconnects channel 1 (TX In pin) of RS232 transceiver from JA6-5 (RS232TX) | R116, R76 |
| R116 | Serial Port Configuration | Connects Channel 1 (RX pin) of the RS232 transceiver to JA6-6 (RS232RX) | Disconnects Channel 1 (RX pin) of the RS232 transceiver from JA6-6 (RS232RX) | R127, R75 |
| R75 | Serial Port Configuration | Connects Channel 1 (RX pin) of the RS232 transceiver to the UART1 port of the microcontroller | Disconnects Channel 1 (RX pin) of the RS232 transceiver from the UART1 port of the microcontroller | R114, R116 |
| R76 | Serial Port Configuration | Connects Channel 1 (TX pin) of the RS232 transceiver to the UART1 port of the microcontroller | Disconnects Channel 1 (TX pin) of the RS232 transceiver from the UART1 port of the microcontroller | R127, R128 |

Table 6-6: Serial port configuration links

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

| Application board interface option link settings | | | | |
|--|-----------------------------|--|--|------------|
| Reference | Function | Fitted | Alternative (Removed) | Related To |
| R93 | Application board interface | Connects the microcontroller port pin p10_0 to AN0 (JA1-9) of application board interface. | Disconnects the microcontroller port pin p10_0 from AN0 (JA1-9) of application board interface. | R97 |
| R97 | Application board interface | Connects the microcontroller port pin p10_0 to ADPOT. | Disconnects the microcontroller port pin p10_0 from ADPOT. | R93 |
| R49 | Application board interface | Connects the microcontroller port pin p5_0 to WRn (JA3-26) of application board interface. | Disconnects the microcontroller port pin p5_0 from WRn (JA3-26) of application board interface. | R50 |
| R50 | Application board interface | Connects the microcontroller port pin p5_0 to WRLn (JA3-48) of application board interface. | Disconnects the microcontroller port pin p5_0 from WRLn (JA3-48) of application board interface. | R49 |
| R51 | Application board interface | Connects the microcontroller port pin p1_5 to D13 (JA3-34) of application board interface. | Disconnects the microcontroller port pin p1_5 from D13 (JA3-34) of application board interface. | R52 |
| R52 | Application board interface | Connects the microcontroller port pin p1_5 to INT3n (JA1-23) of application board interface. | Disconnects the microcontroller port pin p1_5 from INT3n (JA1-23) of application board interface. | R51 |
| R66 | Application board interface | Connects the microcontroller port pin p8_0 to Up (JA2-13) of application board interface. | Disconnects the microcontroller port pin p8_0 from Up (JA2-13) of application board interface. | R69 |
| R69 | Application board interface | Connects the microcontroller port pin p8_0 to TA4OUT (JA2-20) of application board interface. | Disconnects the microcontroller port pin p8_0 from TA4OUT (JA2-20) of application board interface. | R66 |
| R89 | Application board interface | Connects the microcontroller port pin p8_1 to TA4IN (JA2-22) of application board interface. | Disconnects the microcontroller port pin p8_1 from TA4IN (JA2-22) of application board interface. | R91 |
| R91 | Application board interface | Connects the microcontroller port pin p8_1 to Un (JA2-14) of application board interface. | Disconnects the microcontroller port pin p8_1 from Un (JA2-14) of application board interface. | R89 |
| R71 | Application board interface | Connects the microcontroller port pin p7_4 to Wp (JA2-17) of application board interface. | Disconnects the microcontroller port pin p7_4 from Wp (JA2-17) of application board interface. | R74 |

| Application board interface option link settings | | | | |
|--|-----------------------------|---|--|------------|
| Reference | Function | Fitted | Alternative (Removed) | Related To |
| | | | board interface. | |
| R74 | Application board interface | Connects the microcontroller port pin p7_4 to TA2OUT (JA2-19) of application board interface. | Disconnects the microcontroller port pin p7_4 from TA2OUT (JA2-19) of application board interface. | R71 |
| R95 | Application board interface | Connects the microcontroller port pin p7_5 to Wn (JA2-18) of application board interface. | Disconnects the microcontroller port pin p7_5 from Wn (JA2-18) of application board interface. | R102 |
| R102 | Application board interface | Connects the microcontroller port pin p7_5 to TA2IN (JA2-21) of application board interface. | Disconnects the microcontroller port pin p7_5 from TA2IN (JA2-21) of application board interface. | R95 |
| R59 | Application board interface | Connects the microcontroller port pin p5_3 to TRISTn (JA2-24) of application board interface. | Disconnects the microcontroller port pin p5_3 from TRISTn (JA2-24) of application board interface. | R60 |
| R60 | Application board interface | Connects the microcontroller port pin p5_3 to BCLK (JA3-44) of application board interface. | Disconnects the microcontroller port pin p5_3 from BCLK (JA3-44) of application board interface. | R59 |
| R73 | Application board interface | Connects the microcontroller port pin p3_0 to IO0 (JA1-15) of application board interface. | Disconnects the microcontroller port pin p3_0 from IO0 (JA1-15) of application board interface. | - |
| R77 | Application board interface | Connects the microcontroller port pin p3_1 to IO1 (JA1-16) of application board interface. | Disconnects the microcontroller port pin p3_1 from IO1 (JA1-16) of application board interface. | - |
| R80 | Application board interface | Connects the microcontroller port pin p3_2 to IO2 (JA1-17) of application board interface. | Disconnects the microcontroller port pin p3_2 from IO2 (JA1-17) of application board interface. | - |
| R81 | Application board interface | Connects the microcontroller port pin p3_3 to IO3 (JA1-18) of application board interface. | Disconnects the microcontroller port pin p3_3 from IO3 (JA1-18) of application board interface. | - |
| R85 | Application board interface | Connects the microcontroller port pin p3_4 to IO4 (JA1-19) of application | Disconnects the microcontroller port pin p3_4 | - |

| Application board interface option link settings | | | | |
|--|-----------------------------|---|---|------------|
| Reference | Function | Fitted | Alternative (Removed) | Related To |
| | | board interface. | from IO4 (JA1-19) of application board interface. | |
| R88 | Application board interface | Connects the microcontroller port pin p3_5 to IO5 (JA1-20) of application board interface. | Disconnects the microcontroller port pin p3_5 from IO5 (JA1-20) of application board interface. | - |
| R94 | Application board interface | Connects the microcontroller port pin p3_6 to IO6 (JA1-21) of application board interface. | Disconnects the microcontroller port pin p3_6 from IO6 (JA1-21) of application board interface. | - |
| R90 | Application board interface | Connects the microcontroller port pin p3_7 to IO7 (JA1-22) of application board interface. | Disconnects the microcontroller port pin p3_7 from IO7 (JA1-22) of application board interface. | - |
| R105 | Application board interface | Connects the microcontroller port pin p7_0 to IICSDA (JA1-25) of application board interface. | Disconnects the microcontroller port pin p7_0 from IICSDA (JA1-25) of application board interface. | R103 |
| R103 | Application board interface | Connects the microcontroller port pin p7_1 to IIC SCL (JA1-26) of application board interface. | Disconnects the microcontroller port pin p7_1 from IIC SCL (JA1-26) of application board interface. | R105 |
| R107 | Application board interface | Connects the microcontroller port pin p7_2 to Vp (JA2-15) of application board interface. | Disconnects the microcontroller port pin p7_2 from Vp (JA2-15) of application board interface. | R112 |
| R112 | Application board interface | Connects the microcontroller port pin p7_2 to CLK2 (JA6-10) of application board interface. | Disconnects the microcontroller port pin p7_2 from CLK2 (JA6-10) of application board interface. | R107 |
| R130 | Application board interface | Connects the microcontroller port pin p8_5 to NMIn (JA2-3) of application board interface. | Disconnects the microcontroller port pin p8_5 from NMIn (JA2-3) of application board interface. | - |

Table 6-7: Application board interface configuration links

Table 6-8 below describes the function of the option links associated with E8A debugger. The default configuration is indicated by **BOLD** text.

| E8A debugger option link settings | | | | |
|-----------------------------------|----------|---------------------------|------------------------|------------|
| Reference | Function | Fitted | Alternative (Removed) | Related To |
| R19 | E8A | E8A_A enabled. | E8A_A disabled. | - |
| R8 | E8A | E8A Tx enabled. | E8A Tx disabled. | - |
| R7 | E8A | E8A Rx enabled. | E8A Rx disabled. | - |
| R11 | E8A | E8A_SCLK enabled. | E8A_SCLK disabled. | - |
| R9 | E8A | E8A_CNVSS enabled. | E8A_CNVSS disabled. | - |
| R20 | E8A | E8A_B enabled. | E8A_B disabled. | - |
| R18 | E8A | E8A_BUSY enabled. | E8A_BUSY disabled. | - |

Table 6-8: E8A debugger configuration links

Table 6-9 below describes the function of the option links associated with power source. The default configuration is indicated by **BOLD** text.

| Power option link settings | | | | |
|----------------------------|------------------|--|---|------------|
| Reference | Function | Fitted | Alternative (Removed) | Related To |
| R26 | Power source | CON_5V source signal will be powered from PWR connector via R10. | CON_5V source signal will not be powered from PWR connector. | R10, R32 |
| R32 | Power source | CON_5V source signal will be powered from external source. | CON_5V source signal will not be powered from external source. | R10, R26 |
| R10 | Power source | Enables power to board from PWR connector. | Disables power to board from PWR connector. | R26, R32 |
| R21 | Power source | 5V supply to on-board 3.3v regulator is enabled. | Disconnects PWR connector from on board 3.3v voltage regulator. | - |
| R36 | Power source | Connects on board 3.3v output of voltage regulator to Board_VCC1 via R41 and Board_VCC2 via R30. | Disconnects on board 3.3v output of voltage regulator from Board_VCC1 and Board_VCC2. | R30, R41 |
| R30 | Power source | Connects on board 3.3v output of the voltage regulator to Board_VCC2. | Disconnects on board 3.3v output of the voltage regulator from Board_VCC2. | R36 |
| R41 | Power source | Connects on board 3.3v output of the voltage regulator to Board_VCC1. | Disconnects on board 3.3v output of the voltage regulator from Board_VCC1. | R36 |
| R38 | Power source | Connects E8A_VCC to Board_VCC1. | Disconnects E8A_VCC from Board_VCC1. | - |
| R40 | Power source | Connects 5V supply to Board_VCC1 | Disconnects Board_VCC1 from PWR connector | R10 |
| R39 | Power source | Connects CON_3V3 to Board_VCC1 | Disconnects CON_3V3 from Board_VCC1. | - |
| R28 | Power source | Connects CON_3V3 to Board_VCC2 | Disconnects CON_3V3 from Board_VCC2. | - |
| R29 | Power source | Connects 5V supply to Board_VCC2 | Disconnects Board_VCC2 from PWR connector | R10 |
| R34 | MCU power supply | Supply to MCU. | CPU current can be measured across R34 | - |
| R45 | Ground | Connects Analog & Digital grounds together. | Separates Analog & Digital grounds. | - |

Table 6-9: Power configuration links

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

| Clock option link settings | | | | |
|----------------------------|------------------|---------------------------------------|---|------------------|
| Reference | Function | Fitted | Alternative (Removed) | Related To |
| R115 | Clock Oscillator | Parallel resistor for crystal X1 | Not fitted | - |
| R108 | Clock Oscillator | On-board clock source is used. | External clock source can be used. | R131, R113,R126 |
| R131 | Clock Oscillator | On-board clock source is used. | External clock source can be used. | R108, R113, R126 |
| R113 | Clock Oscillator | External clock source is used. | On-board clock source can be used. | R108, R131, R126 |
| R126 | Clock Oscillator | External clock source is used. | On-board clock source can be used. | R108, R113, R131 |
| R111 | Clock Oscillator | Parallel resistor for crystal X2 | Not fitted | - |
| R106 | Clock Oscillator | On-board clock source is used. | External clock source can be used | R109, R104, R110 |
| R110 | Clock Oscillator | On-board clock source is used | External clock source can be used | R106, R109, R104 |
| R109 | Clock Oscillator | External clock source can be used | On-board clock source is used | R104, R106, R110 |
| R104 | Clock Oscillator | External clock source can be used | On-board clock source is used | R106, R110, R109 |

Table 6-10: Clock configuration links

Table 6-11 below describes the function of the option links associated with reference voltage source. The default configuration is indicated by BOLD text.

| Voltage reference option link settings | | | | |
|--|--------------------------|--|--|------------|
| Reference | Function | Fitted | Alternative (Removed) | Related To |
| R86 | Voltage Reference Source | VREF is set to Board_VCC1. | VREF is not set to Board_VCC1. | R83 |
| R83 | Voltage Reference Source | VREF to be supplied from external source (JA1- 7). | VREF is not supplied from external source (JA1- 7). | R86 |

Table 6-11: Voltage reference configuration links

Table 6-12 below describes the function of the option links associated with analog power supply. The default configuration is indicated by BOLD text.

| Analog power supply option link settings | | | | |
|--|-----------------------|---|---|------------|
| Reference | Function | Fitted | Alternative (Removed) | Related To |
| R54 | Analog Voltage Source | AVCC to be supplied from external source (JA1-5). | AVCC is not supplied from external source (JA1-5). | R53 |
| R53 | Analog Voltage Source | AVCC is set to Board_VCC1. | AVCC is not set to Board_VCC1. | R54 |

Table 6-12: Analog power supply configuration links

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

| Switches option link settings | | | | |
|-------------------------------|----------|--|--|------------|
| Reference | Function | Fitted | Alternative (Removed) | Related To |
| R42 | Switch | Connects INT2n (MCU port pin p8_4) to SW3 | Disconnects INT2n (MCU port pin p8_4) from SW3. | R43 |
| R43 | Switch | Connects ADTRGn (MCU port pin p9_7) to SW3 | Disconnects ADTRGn (MCU port pin p9_7) from SW3 | R42 |

Table 6-13: Switches configuration links

6.8. Oscillator Sources

A crystal oscillator is fitted on the RSK and used to supply the main clock input to the Renesas microcontroller. Table 6-14 details the oscillators that are fitted and alternative footprints provided on this RSK:

| Component | | |
|--------------|--------|-----------------------------|
| Crystal (X1) | Fitted | 6 MHz (HC49/4H package) |
| Crystal (X2) | Fitted | 32.768KHz (HC49/4H package) |

Table 6-14: Oscillators / Resonators

6.9. 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

The RSK supports Boot mode and Single chip mode.

Details of programming the FLASH memory is described in the M16C6C Group Hardware Manual.

7.1. Boot mode

The Boot mode settings for this RSK are shown in Table 7-1.

| CVSS | P5.0 | P5.5 | LSI State after Reset End |
|------|------|------|---------------------------|
| 1 | 1 | 0 | Boot Mode |

Table 7-1: Boot Mode pin settings

The software supplied with this RSK only supports Boot mode using an 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 switch. The BOOT LED will be illuminated to indicate that the microcontroller is in Boot mode.

When neither the E8A is connected nor the board is placed in Boot mode (with CVSS and P5.5 being pulled low during reset) as above, the P5.5 pin is pulled high by a 10k resistor, the P5.0 pin is pulled high by a 4k7 resistor and the CVSS is pulled low by a 4k7 resistor.

When an E8A is used these three pins are controlled by the E8A.

7.2. Single-Chip mode

As CVSS is being pulled down by a 4k7 resistor, this RSK will always boot in Single-Chip mode when the E8A is not connected and the Boot switch is not depressed. Refer to M16C6C Group Hardware Manual for details of Single-Chip mode

| CVSS | P5.0 | P5.5 | LSI State after Reset End |
|------|------|------|---------------------------|
| 0 | 1 | 1 | Single-Chip Mode |

Table 7-2: Single-Chip Mode pin settings

Chapter 8. Programming Methods

The board is intended for use with HEW and the supplied E8A debugger. Refer to M16C6C 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 pin unless otherwise stated.

| J1 | | | | | |
|-----|------------------|------------|-----|------------------|------------|
| Pin | Circuit Net Name | Device Pin | Pin | Circuit Net Name | Device Pin |
| 1 | DA1 | 1 | 2 | DA0 | 2 |
| 3 | NC | - | 4 | NC | - |
| 5 | NC | - | 6 | BYTE | 6 |
| 7 | CNVSS | 7 | 8 | CON_XCIN | 8 |
| 9 | CON_XCOUT | 9 | 10 | RESn | 10 |
| 11 | CON_XOUT | 11 | 12 | GROUND | 12 |
| 13 | CON_XIN | 13 | 14 | UC_VCC1 | 14 |
| 15 | NMIIn | 15 | 16 | INT2n | 16 |
| 17 | INT1n | 17 | 18 | INT0n | 18 |
| 19 | TA4IN_Un | 19 | 20 | TA4OUT_Up | 20 |
| 21 | P77 | 21 | 22 | P76 | 22 |
| 23 | TA2IN_Wn | 23 | 24 | TA2OUT_Wp | 24 |
| 25 | Vn | 25 | 26 | CLK2_Vp | 26 |
| 27 | IIC_SCL_RxD2 | 27 | 28 | IIC_SDA_TxD2 | 28 |
| 29 | PTTX | 29 | 30 | PTRX | 30 |

Table 9-1: J1

| J2 | | | | | |
|-----|------------------|------------|-----|------------------|------------|
| Pin | Circuit Net Name | Device Pin | Pin | Circuit Net Name | Device Pin |
| 1 | PTCK | 31 | 2 | BUSY | 32 |
| 3 | TxD0 | 33 | 4 | RxD0 | 34 |
| 5 | CLK0 | 35 | 6 | CTSRTS | 36 |
| 7 | RDYn | 37 | 8 | ALE | 38 |
| 9 | EPM | 39 | 10 | UD | 40 |
| 11 | TRISTn_BCLK | 41 | 12 | RDn | 42 |
| 13 | WRHn | 43 | 14 | WRLn_WRn | 44 |
| 15 | CS3n | 45 | 16 | CS2n | 46 |
| 17 | CS1n | 47 | 18 | CS0n | 48 |
| 19 | A19_LED3 | 49 | 20 | A18_LED2 | 50 |

Table 9-2: J2

| J3 | | | | | |
|-----|------------------|------------|-----|------------------|------------|
| Pin | Circuit Net Name | Device Pin | Pin | Circuit Net Name | Device Pin |
| 1 | A17_LED1 | 51 | 2 | A16_LED0 | 52 |
| 3 | A15_IO7 | 53 | 4 | A14_IO6 | 54 |
| 5 | A13_IO5 | 55 | 6 | A12_IO4 | 56 |
| 7 | A11_IO3 | 57 | 8 | A10_IO2 | 58 |
| 9 | A9_IO1 | 59 | 10 | UC_VCC2 | 60 |
| 11 | A8_IO0 | 61 | 12 | GROUND | 62 |
| 13 | A7_DLCD7 | 63 | 14 | A6_DLCD6 | 64 |
| 15 | A5_DLCD5 | 65 | 16 | A4_DLCD4 | 66 |
| 17 | A3 | 67 | 18 | A2 | 68 |
| 19 | A1_DLCD E | 69 | 20 | A0_DLCD RS | 70 |
| 21 | D15 | 71 | 22 | D14 | 72 |
| 23 | D13_INT3n | 73 | 24 | D12 | 74 |
| 25 | D11 | 75 | 26 | D10 | 76 |
| 27 | D9 | 77 | 28 | D8 | 78 |
| 29 | D7 | 79 | 30 | D6 | 80 |

Table 9-3: J3

| J4 | | | | | |
|-----|------------------|------------|-----|------------------|------------|
| Pin | Circuit Net Name | Device Pin | Pin | Circuit Net Name | Device Pin |
| 1 | D5 | 81 | 2 | D4 | 82 |
| 3 | D3 | 83 | 4 | D2 | 84 |
| 5 | D1 | 85 | 6 | D0 | 86 |
| 7 | AN7 | 87 | 8 | AN6 | 88 |
| 9 | AN5 | 89 | 10 | AN4 | 90 |
| 11 | AN3 | 91 | 12 | AN2 | 92 |
| 13 | AN1 | 93 | 14 | AVss | 94 |
| 15 | ADPOT_AN0 | 95 | 16 | CON_VREF | - |
| 17 | CON_AVCC | - | 18 | ADTRGn | 98 |
| 19 | P96 | 99 | 20 | P95 | 100 |

Table 9-4: J4

9.2. Application Headers

Table 9-5 to Table 9-9 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 | - | 6 | AVss | AVSS | 94 |
| 7 | AVref | CON_VREF | - | 8 | ADTRG | ADTRGn | 98 |
| 9 | AD0 | AN0 | 95 | 10 | AD1 | AN1 | 93 |
| 11 | AD2 | AN2 | 92 | 12 | AD3 | AN3 | 91 |
| 13 | DAC0 | DA0 | 2 | 14 | DAC1 | DA1 | 1 |
| 15 | IO_0 | IO0 | 61 | 16 | IO_1 | IO1 | 59 |
| 17 | IO_2 | IO2 | 58 | 18 | IO_3 | IO3 | 57 |
| 19 | IO_4 | IO4 | 56 | 20 | IO_5 | IO5 | 55 |
| 21 | IO_6 | IO6 | 54 | 22 | IO_7 | IO7 | 53 |
| 23 | IRQ3 | INT3n | 73 | 24 | IIC_EX | NC | - |
| 25 | IIC_SDA | IICSDA | 28 | 26 | IIC_SCL | IIC_SCL | 27 |

Table 9-5: 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 | 10 | 2 | EXTAL | CON_XIN | - |
| 3 | NMIIn | NMIIn | 15 | 4 | Vss1 | GROUND | - |
| 5 | WDT_OVF | NC | - | 6 | SClATX | TxD0 | 33 |
| 7 | IRQ0 | INT0n | 18 | 8 | SClARX | RxD0 | 34 |
| 9 | IRQ1 | INT1n | 17 | 10 | SClACK | CLK0 | 35 |
| 11 | UD | UD | 40 | 12 | CTSRTS | CTSRTS | 36 |
| 13 | Up | Up | 20 | 14 | Un | Un | 19 |
| 15 | Vp | Vp | 26 | 16 | Vn | Vn | 25 |
| 17 | Wp | Wp | 24 | 18 | Wn | Wn | 23 |
| 19 | TMR0 | TA2OUT | 24 | 20 | TMR1 | TA4OUT | 20 |
| 21 | TRIGa | TA2IN | 23 | 22 | TRIGb | TA4IN | 19 |
| 23 | IRQ2 | INT2n | 16 | 24 | TRISTn | TRISTn | 41 |
| 25 | - | NC | - | 26 | - | NC | - |

Table 9-6: JA2 Standard Generic Header

| JA5 | | | | | | | |
|-----|---------------------|--------------------------|---------------|-----|---------------------|--------------------------|---------------|
| Pin | Generic Header Name | CPU board Signal Name | Device Pin | Pin | Generic Header Name | CPU board Signal Name | Device Pin |
| 1 | AD4 | AN4 | 90 | 2 | AD5 | AN5 | 89 |
| 3 | AD6 | AN6 | 88 | 4 | AD7 | AN7 | 87 |
| 5 | CAN1TX | NC | - | 6 | CAN1RX | NC | - |
| 7 | CAN2TX | NC | - | 8 | CAN2RX | 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 9-7: JA5 Standard Generic Header

| JA6 | | | | | | | |
|-----|---------------------|--------------------------|---------------|-----|---------------------|--------------------------|---------------|
| Pin | Generic Header Name | CPU board Signal Name | Device Pin | Pin | Generic Header Name | CPU board Signal Name | Device Pin |
| 1 | DREQ | NC | - | 2 | DACK | NC | - |
| 3 | TEND | NC | - | 4 | STBYn | NC | |
| 5 | RS232TX | RS232TX | - | 6 | RS232RX | RS232RX | - |
| 7 | SCIbRX | IIC_SCL_RxD2 | 27 | 8 | SCIbTX | IIC_SDA_TxD2 | 28 |
| 9 | SClTX | NC | - | 10 | SCIbCK | CLK2 | 26 |
| 11 | SClCK | NC | - | 12 | SClRX | 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: 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_DLCDRS | 70 | 2 | A1 | A1_DLCDE | 69 |
| 3 | A2 | A2 | 68 | 4 | A3 | A3 | 67 |
| 5 | A4 | A4_DLCD4 | 66 | 6 | A5 | A5_DLCD5 | 65 |
| 7 | A6 | A6_DLCD6 | 64 | 8 | A7 | A7_DLCD7 | 63 |
| 9 | A8 | A8_IO0 | 61 | 10 | A9 | A9_IO1 | 59 |
| 11 | A10 | A10_IO2 | 58 | 12 | A11 | A11_IO3 | 57 |
| 13 | A12 | A12_IO4 | 56 | 14 | A13 | A13_IO5 | 55 |
| 15 | A14 | A14_IO6 | 54 | 16 | A15 | A15_IO7 | 53 |
| 17 | D0 | D0 | 86 | 18 | D1 | D1 | 85 |
| 19 | D2 | D2 | 84 | 20 | D3 | D3 | 83 |
| 21 | D4 | D4 | 82 | 22 | D5 | D5 | 81 |
| 23 | D6 | D6 | 80 | 24 | D7 | D7 | 79 |
| 25 | RDn | RDn | 42 | 26 | WRn | WRn | 44 |
| 27 | CSan | CS0n | 48 | 28 | CSbn | CS1n | 47 |
| 29 | D8 | D8 | 78 | 30 | D9 | D9 | 77 |
| 31 | D10 | D10 | 76 | 32 | D11 | D11 | 75 |
| 33 | D12 | D12 | 74 | 34 | D13 | D13 | 73 |
| 35 | D14 | D14 | 72 | 36 | D15 | D15 | 71 |
| 37 | A16 | A16_LED0 | 52 | 38 | A17 | A17_LED1 | 51 |
| 39 | A18 | A18_LED2 | 50 | 40 | A19 | A19_LED3 | 49 |
| 41 | A20 | NC | - | 42 | A21 | NC | - |
| 43 | A22 | NC | - | 44 | BCLK | BCLK | 41 |
| 45 | CScn | CS2n | 46 | 46 | AHn | ALE | 38 |
| 47 | HWRn | WRHn | 43 | 48 | LWRn | WRLn | 44 |
| 49 | NC | NC | - | 50 | NC | NC | - |

Table 9-9: 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 E8A. An E8A emulator is supplied with the RSK product.

Due to the continuous process of improvements undertaken by Renesas the user is recommended to review the information provided on the Renesas website at www.renesas.com to check for the latest updates to the Compiler and Debugger manuals.

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 via the E8A. 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

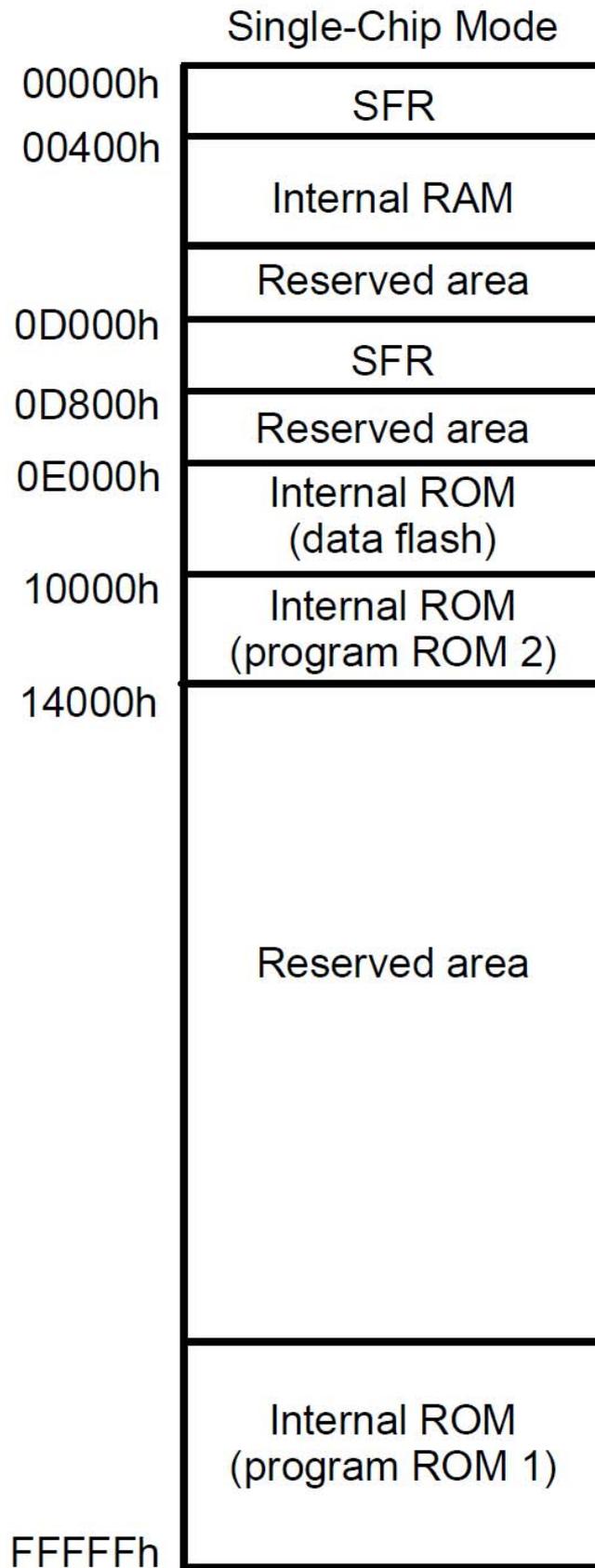


Figure 10-1: Memory Map

Chapter 11. Component Placement

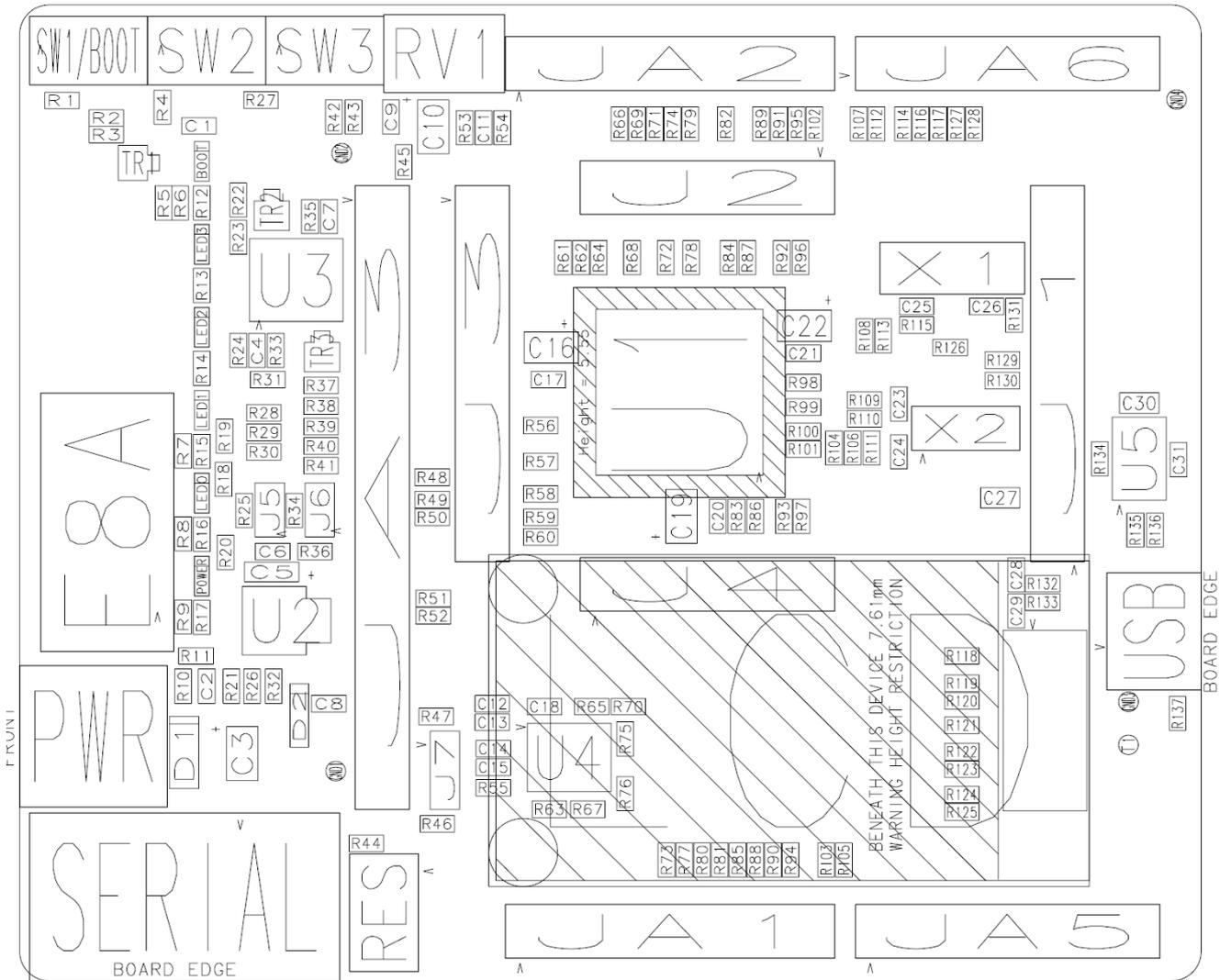


Figure 11-1: Component Placement

Chapter 12. Additional Information

For details on how to use High-performance Embedded Workshop (HEW), refer to the HEW manual available on the CD or installed in the Manual Navigator.

For information about the M16C6C series microcontrollers refer to the M16C6C Group hardware manual.

For information about the M16C6C assembly language, refer to the M16C Series Software Manual.

For information about the E8A Emulator, please refer to the *E8a Emulator User's Manual*.

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

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 on the Renesas website at: <http://www.renesas.com/>

Renesas Starter Kit for M16C6C

User's Manual

Publication Date Rev.1.00 13.JAN.2009

Published by: Renesas Technology Europe Ltd.

Duke's Meadow, Millboard Road, Bourne End

Buckinghamshire SL8 5FH, United Kingdom

©2009 Renesas Technology Europe and Renesas Solutions Corp., All Rights Reserved.

Renesas Starter Kit for M16C6C User's Manual



Renesas Electronics Corporation

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

REG10J0137-0100