User's Manual

RA2L2 Group

Evaluation Kit for RA2L2 Microcontroller Group
EK-RA2L2 v1
User's Manual

Renesas RA Family
RA2 Series

Renesas Electronics
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1. Precaution against Electrostatic Discharge (ESD)

   A strong electrical field, when exposed to a CMOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop the generation of static electricity as much as possible, and quickly dissipate it when it occurs. Environmental control must be adequate. When it is dry, a humidifier should be used. This is recommended to avoid using insulators that can easily build up static electricity. Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors must be grounded. The operator must also be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions must be taken for printed circuit boards with mounted semiconductor devices.
2. Processing at power-on

   The state of the product is undefined at the time when power is supplied. The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the time when power is supplied. In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the time when power is supplied until the reset process is completed. In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the time when power is supplied until the power reaches the level at which resetting is specified.
3. Input of signal during power-off state

   Do not input signals or an I/O pull-up power supply while the device is powered off. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Follow the guideline for input signal during power-off state as described in your product documentation.
4. Handling of unused pins

   Handle unused pins in accordance with the directions given under handling of unused pins in the manual. The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of the LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible.
5. Clock signals

   After applying a reset, only release the reset line after the operating clock signal becomes stable. When switching the clock signal during program execution, wait until the target clock signal is stabilized. When the clock signal is generated with an external resonator or from an external oscillator during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Additionally, when switching to a clock signal produced with an external resonator or by an external oscillator while program execution is in progress, wait until the target clock signal is stable.
6. Voltage application waveform at input pin

   Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between V_{IL} (Max.) and V_{IH} (Min.) due to noise, for example, the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between V_{IL} (Max.) and V_{IH} (Min.).
7. Prohibition of access to reserved addresses

   Access to reserved addresses is prohibited. The reserved addresses are provided for possible future expansion of functions. Do not access these addresses as the correct operation of the LSI is not guaranteed.
8. Differences between products

   Before changing from one product to another, for example to a product with a different part number, confirm that the change will not lead to problems. The characteristics of a microprocessing unit or microcontroller unit products in the same group but having a different part number might differ in terms of internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

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This Evaluation 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. 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 10 m of the product when in use.

• The user is advised to take ESD precautions when handling the equipment.

The Evaluation Kit does not represent an ideal reference design for an end product and does not fulfill the regulatory standards for an end product.

Proprietary Notice

Renesas RA Family

EK-RA2L2 v1

Contents

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Tables

1. Kit Overview

The EK-RA2L2, an Evaluation Kit for RA2L2 MCU Group, enables users to seamlessly evaluate the features of the RA2L2 MCU group and develop embedded systems applications using Flexible Software Package (FSP) and e^2 studio IDE. The users can use rich on-board features along with their choice of popular ecosystems add-ons to bring their big ideas to life.

The key features of the EK-RA2L2 board are categorized in three groups (consistent with the architecture of the kit) as follows:

MCU Native Pin Access

- R7FA2L2094CFM MCU (referred to as RA MCU)
- 48 MHz, Arm® Cortex®-M23 core
- 128 KB Code Flash, 16 KB SRAM
- 64 pins, LQFP package
- Native pin access through 2 x 24-pin and 1 x 40-pin male headers
- MCU current measurement points for precision current consumption measurement
- Multiple clock sources - Main-clock and sub-clock oscillators, providing precision 20.000 MHz and 32.768 kHz reference clocks. Internal oscillators of the RA MCU are also available.

System Control and Ecosystem Access

- Three 5 V input sources
  - USB (Debug)
  - USB (Full-speed)
  - External power supply (using surface mount clamp test points and power input vias)
- Three Debug modes
  - Debug on-board (SWD)
  - Debug in (SWD)
  - Debug out (JTAG, SWD)
- User LEDs and buttons
  - Three User LEDs (red, blue, green)
  - Power LED (white) indicating availability of regulated power
  - Debug LED (yellow) indicating the debug connection
  - Two User buttons
  - One Reset button
- Five most popular ecosystems expansions
  - 2 Seeed Grove® system (I^{2}C/Analog) connectors (not fitted)
  - SparkFun Qwiic® connector
  - 2 Digilent Pmod™ (SPI and I^{2}C) connectors
  - Arduino® (Uno R3) connector
  - MikroElektronika mikroBUS™ connector (not fitted)
- MCU boot configuration jumper
- USB 2.0 Type-C™ Sink (screw terminal)
- USB 2.0 Type-C™ VBUS monitoring circuit

Special Feature Access

- CAN (three-pin header)

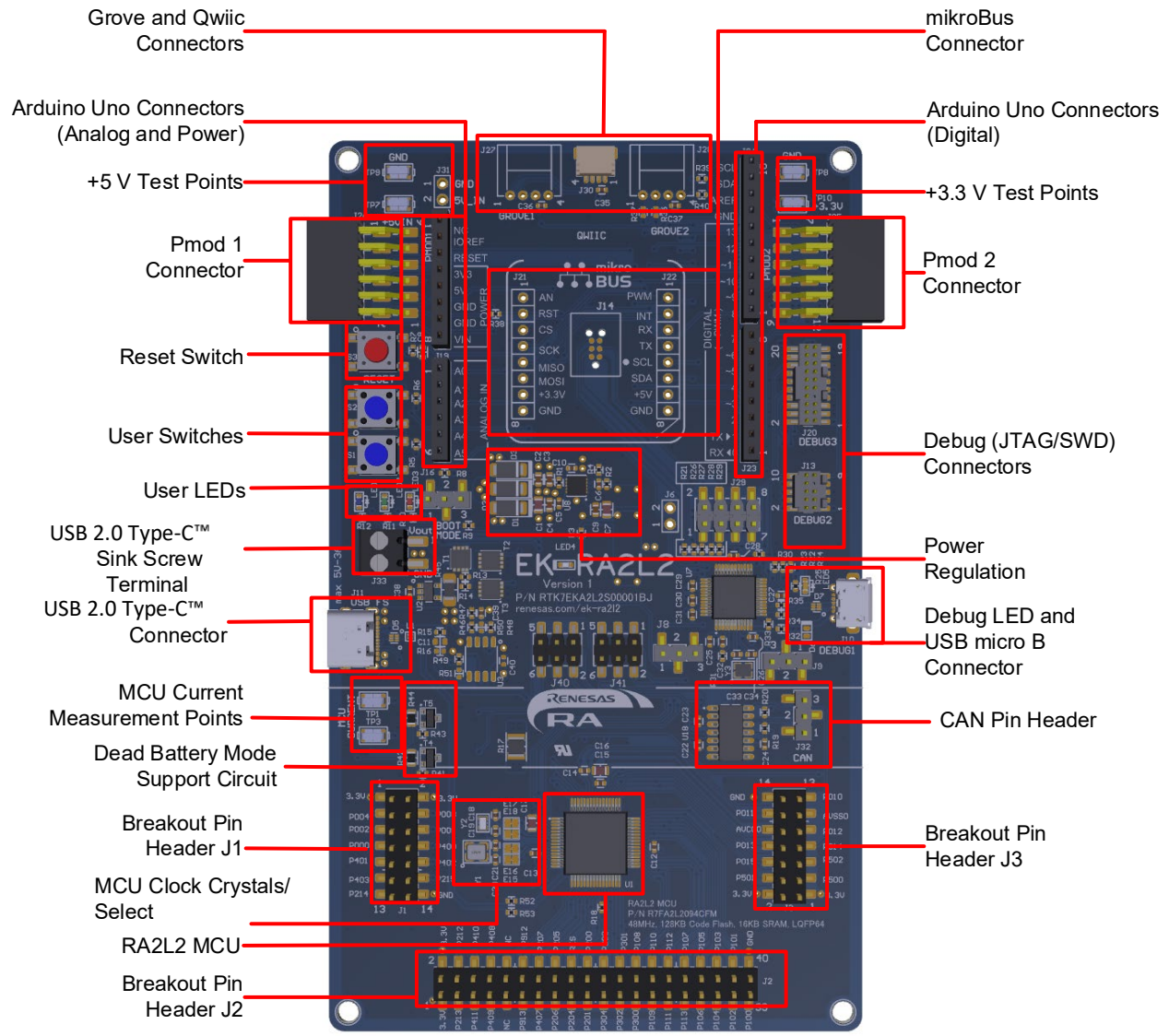

Figure 1. EK-RA2L2 Board Top Side

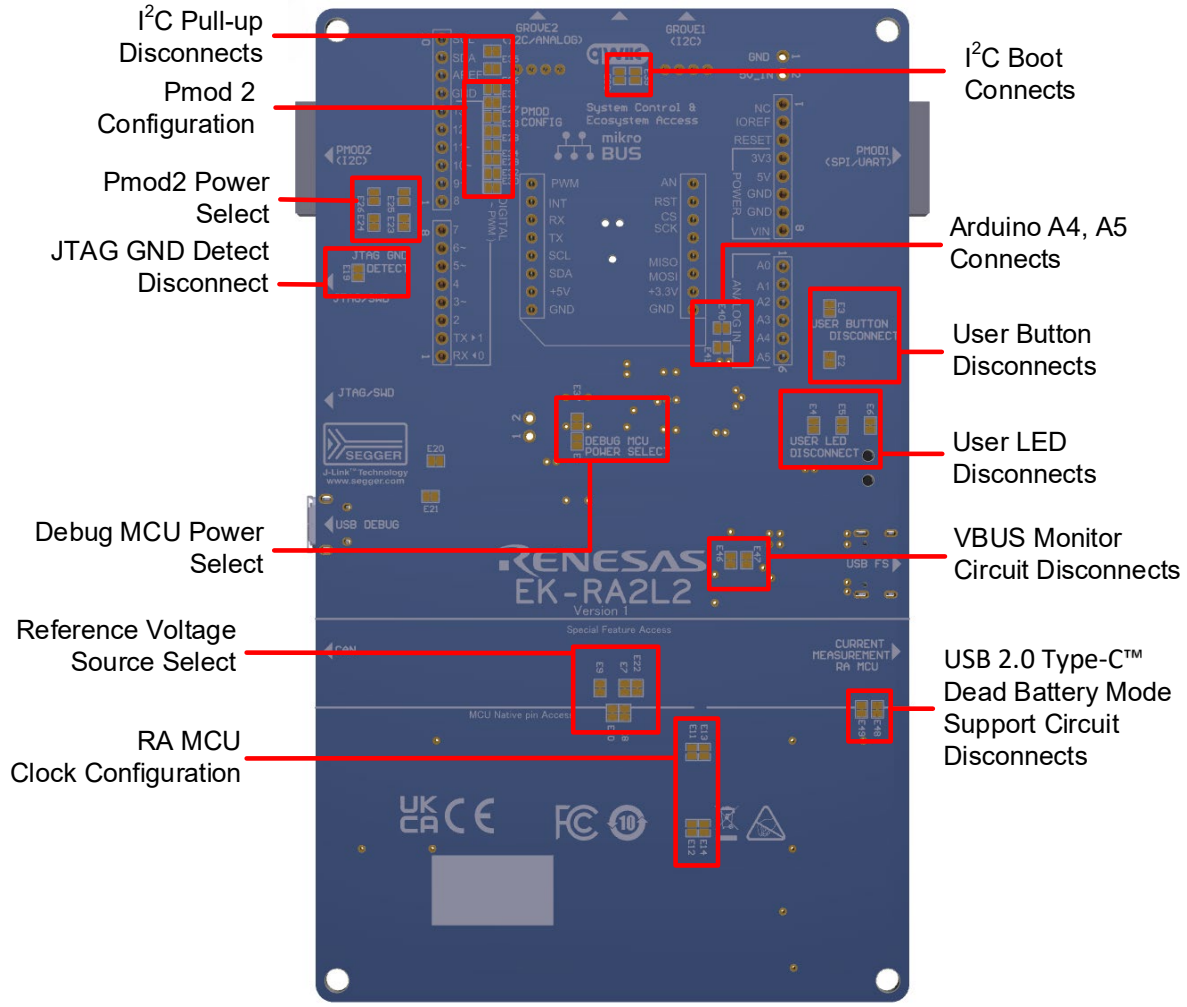

Figure 2. EK-RA2L2 Board Bottom Side

1.1 Assumptions and Advisory Notes

1. It is assumed that the user has a basic understanding of microcontrollers and embedded systems hardware.
2. It is recommended that the user refers to the *EK-RA2L2 Quick Start Guide* to get acquainted with the kit and the Quick Start example project that EK-RA2L2 board comes pre-programmed with.
3. Flexible Software Package (FSP) and Integrated Development Environment (IDE) such as e² studio is required to develop embedded applications on EK-RA2L2 kit.
   Instructions to download and install software, import example projects, build them and program the EK-RA2L2 board are provided in the quick start guide.
4. The MCU fitted to the EK board may not contain the latest version of the on-chip boot firmware.

2. Kit Contents

The following components are included in the kit:

1. EK-RA2L2 v1 board
2. micro USB device cable (USB Type-A male to micro-B male)
3. USB 2.0 Type-C™ device cable (USB 2.0 Type-C™ male to USB 2.0 Type-C™ male)
4. Welcome card
5. Chine RoHS document

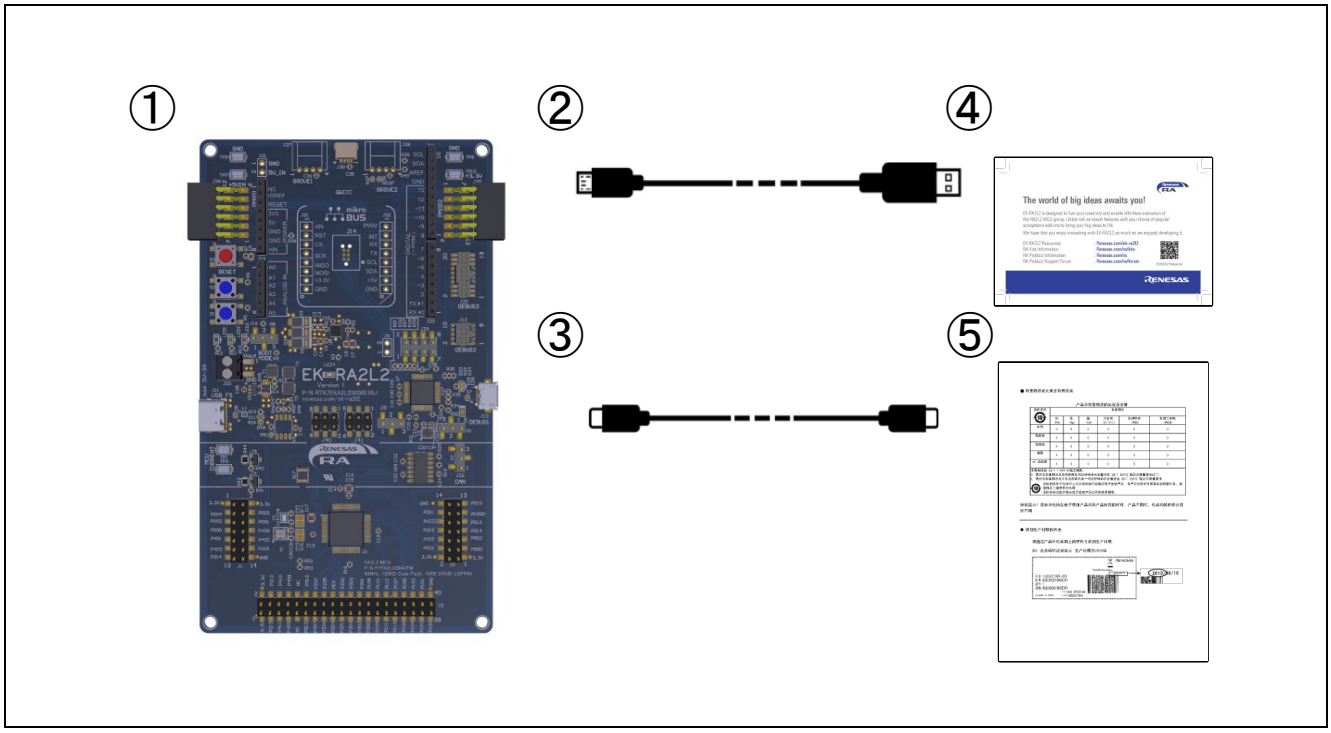

Figure 3. EK-RA2L2 Kit Contents

3. Ordering Information

- EK-RA2L2 v1 kit orderable part number: RTK7EKA2L2S00001BJ

  Note: The underlined character in the orderable part number represents the kit version.

- EK-RA2L2 board dimensions: 84 mm (width) x 140 mm (length)

4. Hardware Architecture and Default Configuration

4.1 Kit Architecture

The EK-RA2L2 board is designed with three sections or areas to help shorten the learning curve of the users and maximize the design and knowledge reuse among similar kits. The contents of these three areas are conceptually standardized among similar kits.

Table 1. Kit Architecture

Kit area	Area features	Area present on all similar kits	Functionality is:
MCU Native Pin Access Area	RA MCU, breakout pin headers for all MCU I/Os	Yes	MCU dependent
Special Feature Access Area	MCU special features: CAN and test point for MCU current measurement	Optional	MCU dependent
System Control and Ecosystem Access Area	Power, debug MCU, user LEDs and buttons, reset, ecosystem connectors, USB full speed, boot configuration, USB 2.0 Type-C™ Sink, USB 2.0 Type-C™ VBUS monitoring circuit	Yes	Same or similar across similar kits

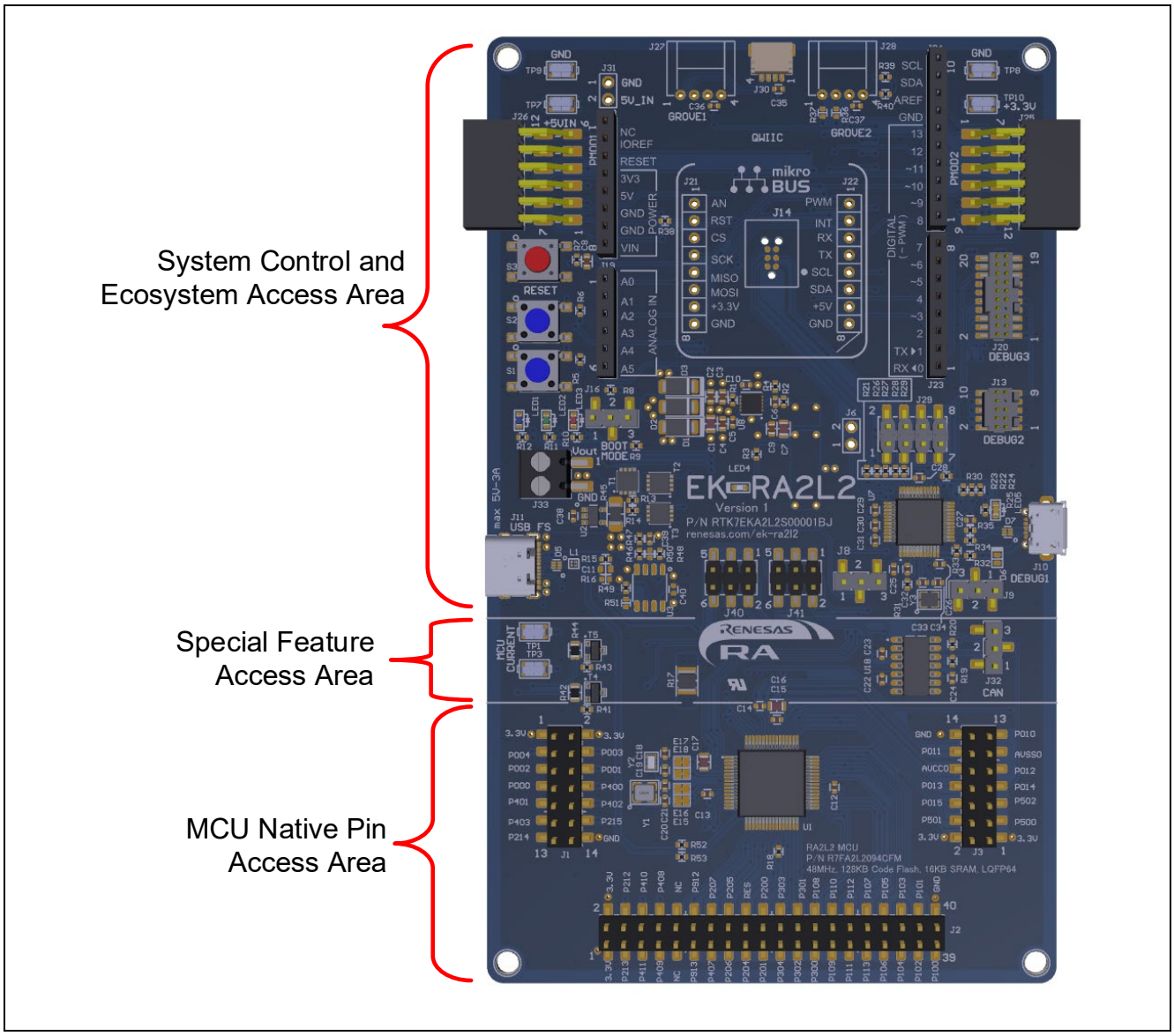

Figure 4. EK-RA2L2 Board Functional Area Definitions

4.2 System Block Diagram

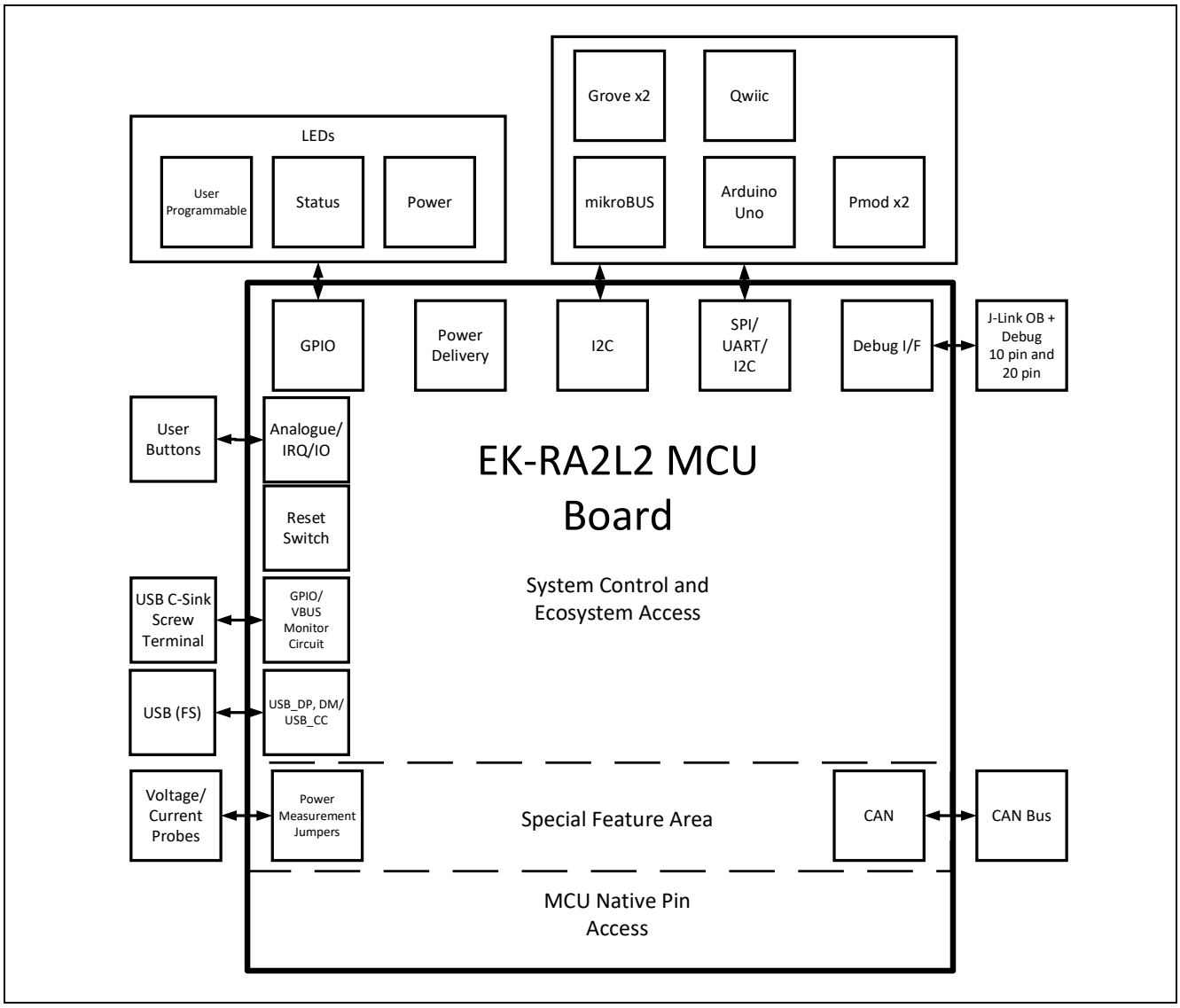

Figure 5. EK-RA2L2 Board Block Diagram

4.3 Jumper Settings

Two types of jumpers are provided on the EK-RA2L2 board.

1. Copper jumpers (Jumper Trace Cut (closed) and Jumper Solder Bridge (open))
2. Traditional pin header jumpers

The following sections describe each type and their default configuration.

4.3.1 Copper Jumpers

Copper jumpers are of two types, designated **Jumper Trace Cut (closed)** and **Jumper Solder Bridge (open)**.

A **Jumper Trace Cut (closed)** is provided with a narrow copper trace connecting its pads. The silk screen overlay printing around a trace-cut jumper is a solid box. To isolate the pads, cut the trace between pads adjacent to each pad, then remove the connecting copper foil either mechanically or with the assistance of heat. Once the etched copper trace is removed, the Jumper Trace Cut (closed) is turned into a Jumper Solder Bridge (open) for any later changes.

A **Jumper Solder Bridge (open)** is provided with two isolated pads that may be joined together by one of three methods:

- Solder may be applied to both pads to develop a bulge on each and the bulges joined by touching a soldering iron across the two pads.
- A small wire may be placed across the two pads and soldered in place.
- A SMT resistor, inch size 0805, 0603, or 0402, may be placed across the two pads and soldered in place. A zero-ohm resistor shorts the pads together.

For any copper jumper, the connection is considered **closed** if there is an electrical connection between the pads (default for Jumper Trace Cut (closed)). The connection is considered **open** if there is no electrical connection between the pads (default for Jumper Solder Bridge (open)).

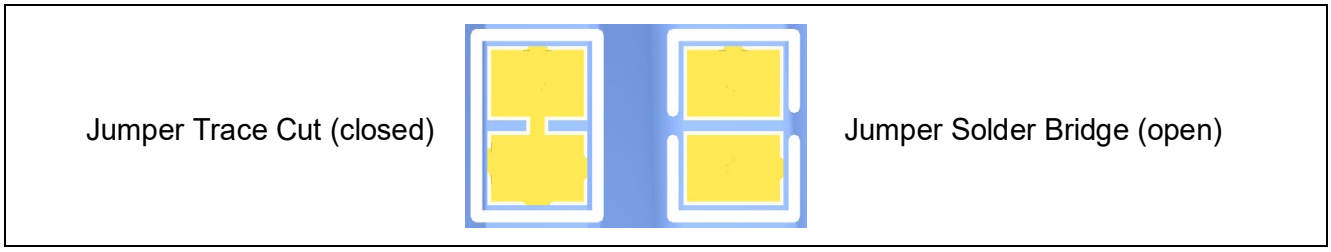

Figure 6. Copper Jumpers

4.3.2 Traditional Pin Header Jumpers

These jumpers are traditional small pitch jumpers that require an external shunt to open/close them. The traditional pin jumpers on the EK-RA2L2 board are 2.54 mm pitch headers and require compatible 2.54 mm shunt jumpers.

4.3.3 Default Jumper Configuration

The following table describes the default settings for each jumper on the EK-RA2L2 board. This includes copper jumpers (Ex designation) and traditional pin jumpers (Jx designation.)

The Circuit Group for each jumper is the designation found in the board schematic (available in the Design Package). Functional details for many of the listed jumpers may be found in sections associated with each functional area of the kits.

Table 2. Default Jumper Settings

Location	Circuit Group	Default Open/Closed	Function
J40	Debug MCU, CAN, USB (FS)	Pins 1-2 on jumper closed	Configures multiplexed functions of P109. • 1-2 closed: SCI boot • 3-4 closed: CAN • 5-6 closed: Support for USB 2.0 Type-C™
J41	Debug MCU, CAN, USB (FS)	Pins 1-2 on jumper closed	Configures multiplexed functions of P110. • 1-2 closed: SCI boot • 3-4 closed: CAN • 5-6 closed: Support for USB 2.0 Type-C™
J8	J-Link OB	Pins 1-2 on jumper closed	Configures the MCU for normal operation.
J9	J-Link OB	Pins 1-2 on jumper closed	Enables the on-board debugger.
J16	MCU boot mode	Pins 2-3 on jumper closed	Configures the MCU for normal boot mode.
J29	J-Link OB	Pins 1-2 on jumper closed Pins 3-4 on jumper closed Pins 5-6 on jumper closed Pins 7-8 on jumper closed	Connects the J-Link OB debugger to the RA MCU.
E1	Debug MCU Power	Closed	Connects the debug MCU to 3.3 V.
E2	User Switch	Closed	Connects P004 to user switch S1.
E3	User Switch	Closed	Connects P015 to user switch S2.
E4	User LED	Closed	Connects P303 to user LED3.
E5	User LED	Closed	Connects P304 to user LED2.
E6	User LED	Closed	Connects P204 to user LED1.
E7	MCU Power	Closed	Connects P010/VREFH0 to 3.3 V.
E8	MCU Power	Closed	Connects P011/VREFL0 to GND.
E9	MCU Power	Closed	Connects AVCC0 to 3.3 V.
E10	MCU Power	Closed	Connects AVSS0 to GND.
E11	MCU Clock	Open	Connects P215 to the MCU pin header.
E12	MCU Clock	Open	Connects P212/EXTAL to the MCU pin header.
E13	MCU Clock	Open	Connects P214 to the MCU pin header.
E14	MCU Clock	Open	Connects P213 to the MCU pin header.
E15	MCU Clock	Closed	Connects P212/EXTAL to the 20-MHz crystal oscillator.
E16	MCU Clock	Closed	Connects P213/XTAL to the 20-MHz crystal oscillator.
E17	MCU Clock	Closed	Connects P215/XCIN to the 32.768-kHz crystal oscillator.
E18	MCU Clock	Closed	Connects P214/XCOUT to the 32.768-kHz crystal oscillator.
E19	JTAG	Closed	Connects the JTAG GND detect pin on J20 and J13 to GND.
E20	J-Link OB	Closed	Connects the debugger TRST signal.
E21	J-Link OB	Closed	Connects the J-Link OB to the MCU via VCOM.
E22	Arduino	Closed	Connects AREF of the Arduino connector to 3.3 V.
E23	Pmod 2	Closed	Connects 3.3 V to pin 6 of Pmod 2.
E24	Pmod 2	Closed	Connects 3.3 V to pin 12 of Pmod 2.
E25	Pmod 2	Open	Connects 5.0 V to pin 6 of Pmod 2.
E26	Pmod 2	Open	Connects 5.0 V to pin 12 of Pmod 2.
E27	Pmod 2	Closed	Connects P206 (IRQ0) to pin 1 of Pmod 2.

Location	Circuit Group	Default Open/Closed	Function
E28	Pmod 2	Closed	Connects P403 to pin 2 of Pmod 2.
E29	Pmod 2	Closed	Connects P400 (SCL0) to pin 3 of Pmod 2.
E30	Pmod 2	Closed	Connects P401 (SDA0) to pin 1 of Pmod 2.
E31	Pmod 2	Open	Connects P403 (CTS1) to pin 1 of Pmod 2.
E32	Pmod 2	Open	Connects P400 (SCK1) to pin 4 of Pmod 2.
E33	Pmod 2	Open	Connects P401 (TXD1 or MOSIA) to pin 2 of Pmod 2.
E34	Pmod 2	Open	Connects P402 (RXD1 or MISOA) to pin 3 of Pmod 2.
E35	I^2C	Closed	Connects P400 (SCL0) to a pull-up resistor.
E36	I^2C	Closed	Connects P401 (SDA0) to a pull-up resistor.
E37	Power	Closed	Connects a regulator to 3.3 V.
E38	Qwiic	Open	Connects P912 (SDA0) to pin 3 of Qwiic.
E39	Qwiic	Open	Connects P913 (SCL0) to pin 4 of Qwiic.
E40	Arduino	Open	Connects P012 to A4 of the Arduino connector.
E41	Arduino	Open	Connects P013 to A5 of the Arduino connector.
E46	VBUS Monitor Circuit	Closed	Connects P012 to the VBUS monitoring circuit.
E47	VBUS Monitor Circuit	Closed	Connects P013 to the VBUS monitoring circuit.
E48	USB 2.0 Type-C™ Support Circuit	Closed	Connects P913/USB_CC1 to the USB 2.0 Type-C™ connector.
E49	USB 2.0 Type-C™ Support Circuit	Closed	Connects P912/USB_CC2 to the USB 2.0 Type-C™ connector.

5. System Control and Ecosystem Access Area

The following figure shows the System Control and Ecosystem Access area on the EK-RA2L2 board. Subsequent sections detail the features and functionality provided in this area.

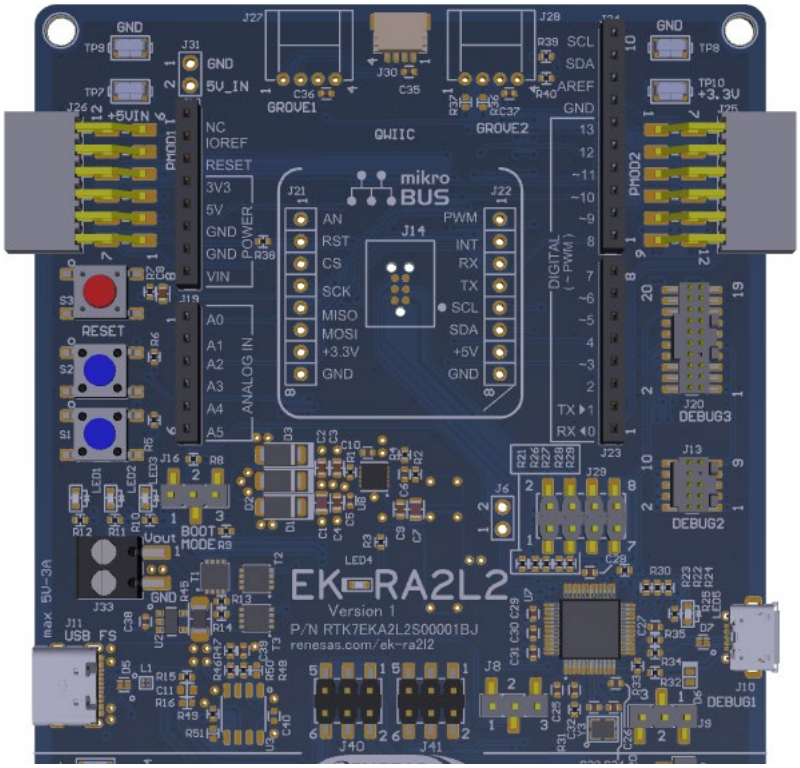

Figure 7. System Control and Ecosystem Access Area

5.1 Power

The EK-RA2L2 kit is designed for 5-V operation. An on-board Low Dropout Regulator (LDO) is used to convert the 5-V supply to a 3.3-V supply. The 3.3-V supply is used to power the RA MCU and other peripheral features.

5.1.1 Power Supply Options

This section describes the different ways in which EK-RA2L2 kit can be powered.

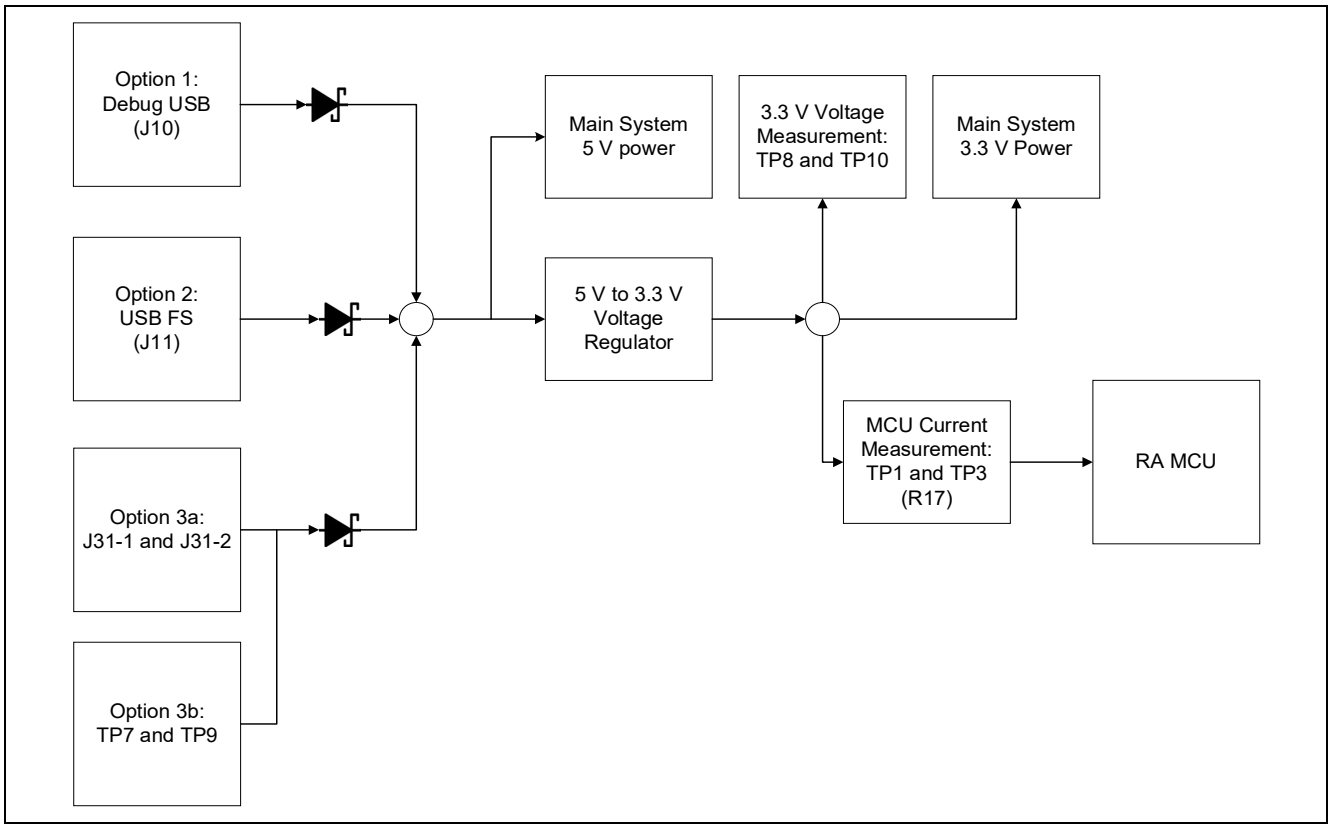

Figure 8. Power Supply Options

5.1.1.1 Option 1: Debug USB

5 V may be supplied from an external USB host to the USB debug connector (J10) labelled DEBUG1 on the board. Power from this source is connected to the main system 5 V power. Reverse current protection is provided between this connector and the main system 5 V power.

5.1.1.2 Option 2: USB FS

5 V may be supplied from an external USB host to the USB 2.0 Type-C™ connector (J11) labelled USB FS on the board. Power from this source is connected to the main system 5 V power. Reverse current protection is provided between this connector and the main system 5 V power.

To use this option, the USB 2.0 Type-C™ support circuit must be enabled. See 5.4.4 for details.

5.1.1.3 Option 3: 5 V Input Test Points

5 V may be supplied from an external power supply to test points on the board. TP7 (5 V) and TP9 (GND) are loop-style test points, and J31 (not fitted) is a through hole test point. The two types of test points are electrically equivalent, and both are provided for user convenience. Power from this source is connected to the main system 5 V power. Reverse current protection is provided between the 5 V test points and the main system 5 V power. These test points can be found at the top left of the board above Pmod 1.

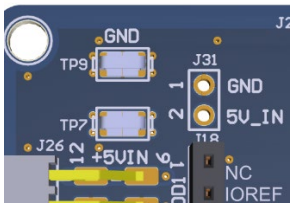

Figure 9. Test Point Location

5.1.2 Power Supply Considerations

The on-board LDO regulator which supplies +3.3 V has a built-in current limit of 2.0 A. Make sure the total current required by the RA MCU, any active on-board features, and any connected peripheral devices does not exceed this limit.

Note: The total current available from a typical USB host is 500 mA maximum. Depending on the configuration of the kit, multiple power sources may be required.

5.1.3 Power-up Behavior

When powered, the white LED near the center of the board (the “dash” in the EK-RA2L2 name) will light up. For more details on initial power up behavior, see the *EK-RA2L2 Quick Start Guide*.

5.2 Debug

The EK-RA2L2 board supports the following three debug modes.

Table 3. Debug Modes

Debug Mode	Debug MCU (the device to be connected to the IDE on your PC)	Target MCU (the device to be debugged)	Debugging Interface/Protocol	Connector Used
Debug on-board	RA4M2 (on-board)	RA2L2 (on-board)	SWD	USB debug (J10)
Debug in	External debugging tools	RA2L2 (on-board)	SWD	20-pin connector (J20) or 10-pin connector (J13)
Debug out	RA4M2 (on-board)	Any external RA MCU	SWD, JTAG	USB debug (J10) plus either 20-pin connector (J20) or 10-pin connector (J13)

Notes:

- See Table 5 for the debug USB connector pin definitions.
- See Table 8 for the 20-pin JTAG/SWD connector pin definitions.
- See Table 9 for the 10-pin JTAG/SWD connector pin definitions.

The following table summarizes the jumper setting for each of the debug modes.

Table 4. Jumper Connection Summary for Different Debug Modes

Debug Mode	J8	J9	J29
Debug on-board	Pins 1-2 on jumper closed	Pins 1-2 on jumper closed	Pins 1-2, 3-4, 5-6, and 7-8 on jumper closed
Debug in	Pins 1-2 on jumper closed	Pins 2-3 on jumper closed	Pins 1-2, 3-4, 5-6, and 7-8 on jumper closed
Debug out	Pins 2-3 on jumper closed	Pins 1-2 on jumper closed	All pins open

5.2.1 On-Board Debug

The on-board debug functionality is provided using Renesas RA4M2 debug MCU and SEGGER J-Link® firmware. Debug USB micro-B connector (J10) connects the RA4M2 debug MCU to an external USB Full Speed Host, allowing re-programming and debugging of the target RA MCU firmware. This connection is the default debug mode for the EK-RA2L2 board.

The RA4M2 debug MCU is connected to the target RA MCU using the SWD interface.

Table 5. Debug USB Connector

Debug USB Connector		EK-RA2L2
Pin	**Description**	**Signal/Bus**
J10-1	+5VDC	+5V_USB_DBG
J10-2	Data-	USB_DM (U7 pin 14)
J10-3	Data+	USB_DP (U7 pin 15)
J10-4	USB ID, jack internal switch, cable inserted	NC
J10-5	Ground	GND

Yellow indicator LED5 shows the visual status of the debug interface. When the EK-RA2L2 board is powered on, and LED5 is blinking, it indicates that the RA4M2 debug MCU is not connected to a programming host. When LED5 is on solid, it indicates that the RA4M2 debug MCU is connected to a programming interface.

To configure the EK-RA2L2 board to use the Debug On-Board mode, configure the jumpers using the following table.

Table 6. Debug On-Board Jumper Configuration

Location	Default Open/Closed	Function
J8	Pins 1-2 on jumper closed	Target RA MCU RES connected to RESET# signal
J9	Pins 1-2 on jumper closed	RA4M2 debug MCU in normal operation mode
J29	Pins 1-2, 3-4, 5-6, and 7-8 on jumper closed	Target RA MCU debug signals connected to the debug interface

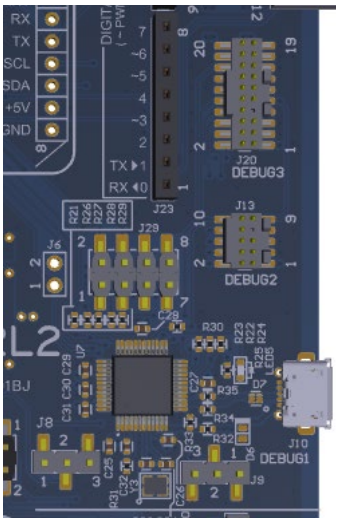

Figure 10. EK-RA2L2 Debug Interface

5.2.2 Debug In

One 20-pin Cortex® Debug Connector at J20 supports JTAG and SWD debug. One 10-pin Cortex® Debug Connector at J13 supports JTAG and SWD. Either of these connectors may be used for external debug of the target RA MCU.

To configure the EK-RA2L2 board to use the Debug In mode, configure the jumpers using the following table.

Table 7. Debug In Mode Jumper Configuration

Location	Default Open/Closed	Function
J8	Pins 1-2 on jumper closed	Target RA MCU RES connected to RESET# signal
J9	Pins 2-3 on jumper closed	RA4M2 debug MCU is held in RESET
J29	Pins 1-2, 3-4, 5-6, and 7-8 on jumper closed	Target RA MCU debug signals connected to the debug interface

Table 8. JTAG/SWD Connector (J20)

JTAG Connector			EK-RA2L2
Pin	JTAG Pin Name	SWD Pin Name	Signal/Bus
J20-1	Vtref	Vtref	3.3V
J20-2	TMS	SWDIO	P108/SWDIO
J20-3	GND	GND	GND
J20-4	TCK	SWCLK	P300/SWCLK
J20-5	GND	GND	GND
J20-6	TDO	SWO	P109/TXD9
J20-7	Key	Key	NC
J20-8	TDI	NC/EXTb	P110/RXD9
J20-9	GND Detect	GND Detect	GND (cut E19 to open)
J20-10	nSRST	nSRST	RES (via J8)
J20-11	N/A	N/A	NC
J20-12	N/A	N/A	NC
J20-13	N/A	N/A	NC
J20-14	N/A	N/A	NC
J20-15	N/A	N/A	GND
J20-16	N/A	N/A	TRST
J20-17	N/A	N/A	GND
J20-18	N/A	N/A	NC
J20-19	N/A	N/A	GND
J20-20	N/A	N/A	NC

Table 9. JTAG/SWD Connector (J13)

JTAG Connector			EK-RA2L2
Pin	JTAG Pin Name	SWD Pin Name	Signal/Bus
J13-1	Vtref	Vtref	3V3
J13-2	TMS	SWDIO	P108/SWDIO
J13-3	GND	GND	GND
J13-4	TCK	SWCLK	P300/SWCLK
J13-5	GND	GND	GND
J13-6	TDO	SWO	P109/TXD9
J13-7	Key	Key	NC
J13-8	TDI	NC/EXTb	P110/RXD9
J13-9	GND Detect	GND Detect	GND (cut E19 to open)

JTAG Connector			EK-RA2L2
Pin	**JTAG Pin Name**	**SWD Pin Name**	**Signal/Bus**
J13-10	nSRST	nSRST	RES (via J8)

Note: The Cortex® Debug Connector is fully described in the Arm® CoreSight™ Architecture Specification.

5.2.3 Debug Out

The EK-RA2L2 board can be configured to use the RA4M2 debug MCU to debug target RA MCU on an external board.

Yellow indicator LED5 shows the visual status of the debug interface. When the EK-RA2L2 board is powered on, and LED5 is blinking, it indicates that the RA4M2 debug MCU is not connected to a programming host. When LED5 is on solid, it indicates that the RA4M2 debug MCU is connected to a programming interface.

To configure the EK-RA2L2 board to use the Debug Out mode, configure the jumpers according to the following table.

Table 10. Debug Out Jumper Configuration

Location	Default Open/Closed	Function
J8	Pins 2-3 on jumper closed	On-board RA MCU is held in RESET
J9	Pins 1-2 on jumper closed	RA4M2 debug MCU in normal operation mode
J29	All jumpers removed	Disconnects the on-board RA MCU debug signals from the debug interface

5.3 Ecosystem

The System Control and Ecosystem area provides users the option to connect several third-party add-on modules compatible with five most popular ecosystems using the following connectors:

1. Two Seeed Grove® system (I²C/ANALOG) connectors (not fitted)
2. SparkFun Qwiic® connector
3. Two Digilent Pmod™ (SPI, UART, and I²C) connectors
4. Arduino® (Uno R3) connector
5. MikroElektronika mikroBUS™ connector (not fitted)

5.3.1 Seeed Grove® Connectors

Seeed Grove® connectors J27 and J28 are not fitted. To make use of the Seeed Grove® functionality, fit J27 and J28 (recommended component: Seeed Studio 110990037).

5.3.1.1 Grove 1

A Seeed Grove I²C connector is provided at J27. The RA MCU acts as a two-wire serial master, and a connected module acts as a two-wire serial slave.

Table 11. Grove 1 Connector

Grove 1 Connector		EK-RA2L2
Pin	**Description**	**Signal/Bus**
J27-1	SCL	P400 (SCL0)
J27-2	SDA	P401 (SDA0)
J27-3	VCC	3.3V
J27-4	GND	GND

5.3.1.2 Grove 2

A Seeed Grove Analog/I²C connector is provided at J28. The RA MCU acts as two analog (ADC) inputs. When R36 (not fitted) and R37 (not fitted) are fitted, the RA MCU acts as a two-wire serial master, and a connected module acts as a two-wire serial slave.

Table 12. Grove 2 Connector

Grove 2 Connector			EK-RA2L2	
Pin	**Description**		**Signal/Bus**	
	Default (Analog)	**Option (I²C)**	**Default (Analog)**	**Option (I²C)**
J28-1	An	SCL	P502 (AN018)	P502 (SCL1)
J28-2	An+1	SDA	P501 (AN017)	P501 (SDA1)
J28-3	VCC		3.3V	
J28-4	GND		GND	

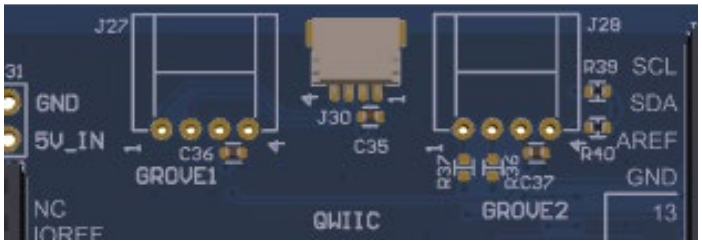

Figure 11. Seeed Grove® and SparkFun Qwiic® Connectors

5.3.2 SparkFun Qwiic® Connector

A SparkFun Qwiic® connector is provided at J30. The RA MCU acts as a two-wire serial master, and a connected module acts as a two-wire serial slave (data lines are shared with Grove 1).

Table 13. Qwiic Connector

Qwiic Connector		EK-RA2L2
Pin	**Description**	**Signal/Bus**
J30-1	GND	GND
J30-2	VCC	3.3V
J30-3	SDA	P400 (SDA0)
J30-4	SCL	P401 (SCL0)

5.3.3 Digilent Pmod™ Connectors

Two 12-pin connectors are provided to support Pmod modules where the RA MCU acts as the master, and the connected module acts as a slave device.

These interfaces may be configured in firmware to support several Pmod types such as Type-2A (expanded SPI), Type-3A (expanded UART), and Type-6A (expanded I^2C).

The default 12-pin Pmod interface supports +3.3-V devices. Please ensure that any Pmod device installed is compatible with a +3.3-V supply.

The Pmod interface option for Type-6A (expanded I^2C) may also support +5.0-V devices. Please ensure that only 5-V capable modules are used when this option is selected.

5.3.3.1 Pmod 1

The 12-pin Pmod Type-2A (expanded SPI) and Type-3A (expanded UART) connectors are provided at J26, Pmod 1. The RA MCU acts as the SPI master, and the connected module acts as an SPI slave device. This interface may additionally be re-configured in firmware as several other Pmod types.

P411, which is assigned to Pmod 1-7, is multiplexed with the USB 2.0 Type-C™ sink control pin; this usage is exclusive of use with USB 2.0 Type-C™ functions.

Table 14. Pmod 1 Connector

Pmod 1 Connector			EK-RA2L2
Pin	**Type-2A (SPI)**	**Type-3A (UART)**	**Signal/Bus**
J26-1	SS	CTS	P103 (SSLA0/CTS0)
J26-2	MOSI	TXD	P101 (MOSIA/TXD0)
J26-3	MISO	RXD	P100 (MISOA/RXD0)
J26-4	SCK	RTS	P102 (RSPCKA)
J26-5	GND		GND
J26-6	VCC		3.3V
J26-7	GPIO/INT (slave to master)		P411 (IRQ4)
J26-8	GPIO/RESET (master to slave)		P205
J26-9	GPIO/CS2	GPIO	P105 (SSLA3A)
J26-10	GPIO/CS3	GPIO	P106 (SSLA2A)
J26-11	GND		GND
J26-12	VCC		3.3V

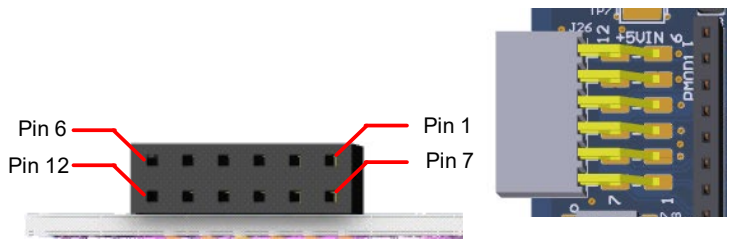

Figure 12. Pmod 1 Connector

5.3.3.2 Pmod 2

The 12-pin Pmod Type-6A (expanded I²C), Type-2A (expanded SPI), and Type-3A (expanded UART) connectors are provided at J25, Pmod 2. This Pmod interface can supply +5.0 V by changing Jumper Trace Cut and Jumper Solder Bridge (E23, E24, E25, and E26).

Exercise caution while modifying power-source Jumper Trace Cut and Jumper Solder Bridge (E23, E24, E25, and E26). Permanent damage to the EK-RA2L2 board and/or connected modules may result.

P410, which is assigned to Pmod 2-7, is multiplexed with the USB 2.0 Type-C™ sink control pin; this usage is exclusive of use with USB 2.0 Type-C™ functions.

Table 15. Pmod 2 Connector

Pmod 2 Connector				EK-RA2L2	Pmod 2 Configuration	
Pin	**Option Type-2A (SPI)**	**Option Type-3A (UART)**	**Default Type-6A (I²C)**	**Signal/Bus**	**Short**	**Open**
J25-1	NC	NC	INT	P206 (IRQ0)	E27	E31
	SS	CTS	NC	P403 (CTS1)	E31	E27
J25-2	NC	NC	RESET	P403	E28	E33
	MOSI	TXD	NC	P401 (MOSIA/TXD1)	E33	E28
J25-3	NC	NC	SCL	P400 (SCL0)	E29	E34
	MISO	RXD	NC	P402 (MISOA/RXD1)	E34	E29
J25-4	NC	NC	SDA	P401 (SDA0)	E30	E32
	SCK	RTS	NC	P400 (SCK1)	E32	E30
J25-5	GND			GND		
J25-6	VCC			3.3V	E23	E25
				5.0V	E25	E23
J25-7	GPIO/INT (slave to master)		GPIO	P410 (IRQ5)		
J25-8	GPIO/RESET (master to slave)		GPIO	P409		
J25-9	GPIO			P408		
J25-10	GPIO			P207		
J25-11	GND			GND		
J25-12	VCC			3.3V	E24	E26
				5.0V	E26	E24

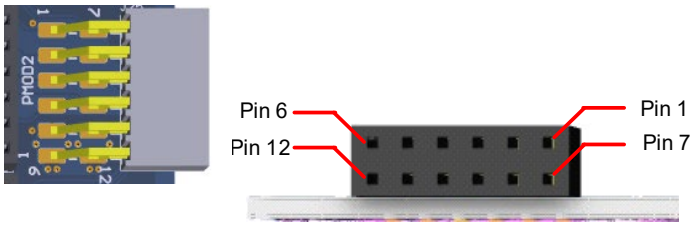

Figure 13. Pmod 2 Connector

5.3.4 Arduino® Connector

Near the center of the System Control and Ecosystem Access area is an Arduino Uno R3 compatible connector interface.

Table 16. Arduino Uno Connections

Arduino Compatible Connector				**EK-RA2L2**
Pin	**Description**			**Signal/Bus**
J18-1	NC			NC
J18-2	IOREF			3.3V
J18-3	RESET			P207
J18-4	3.3V			3.3V
J18-5	5 V			5.0V
J18-6	GND			GND
J18-7	GND			GND
J18-8	VIN			NC
J19-1	A0			P000 (AN000)
J19-2	A1			P001 (AN001)
J19-3	A2			P002 (AN002)
J19-4	A3			P003 (AN003)
J19-5	A4			*P012 (AN007)
J19-6	A5			*P013 (AN008)
J23-1	D0	RXD		P107 (GPIO/RXD2)
J23-2	D1	TXD		P106 (GPIO/TXD2)
J23-3	D2	INT0		P306 (GPIO/IRQ0)
J23-4	D3	INT1	PWM	P210 (GPIO/IRQ8/GTIOC5B)
J23-5	D4			P302 (GPIO)
J23-6	D5		PWM	P111 (GPIO/GTIOC5A)
J23-7	D6		PWM	P104 (GPIO/GTIOC8A)
J23-8	D7			P301 (GPIO)
J24-1	D8		CLKOUT	P205 (GPIO/CLKOUT_A)
J24-2	D9		PWM	P112 (GPIO/GTIOC6B)
J24-3	D10	SPI_SS	PWM	P103 (GPIO/SSLA0/GTIOC5A)
J24-4	D11	SPI_MOSI	PWM	P101 (GPIO/MOSIA/GTIOC8A)
J24-5	D12	SPI_MISO		P100 (GPIO/MISOA)
J24-6	D13	SPI_SCK		P102 (GPIO/RSPCKA)
J24-7	GND			GND
J24-8	AREF			3.3V
J24-9	SDA			P401 (SDA0)
J24-10	SCL			P400 (SCL0)

*: These signals are not connected by default. To connect P012 and P013 to Arduino A4 and A5, short-circuit E40 and E41 of the Jumper Solder Bridge.

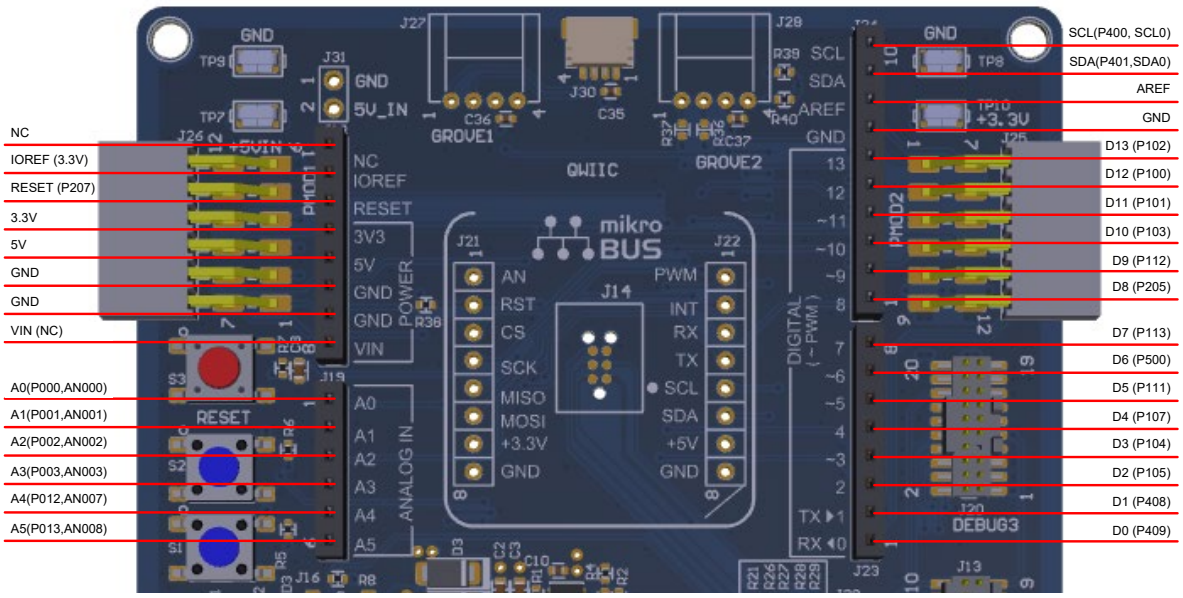

Figure 14. Arduino Uno Connectors

5.3.5 MikroElektronika mikroBUS™ Connector

Connector interfaces J21 and J22 compatible with mikroBUS are present in the center of the System Control and Ecosystem Access area (not fitted). These interfaces are compliant with mikroBUS Standard Specifications revision 2.00.

Table 17. mikroBUS Connector

mikroBUS Connector		**EK-RA2L2**
Pin	**Description**	**Signal/Bus**
J21-1	AN (Analog)	P000 (AN000)
J21-2	RST (Reset)	P207
J21-3	CS (SPI Chip Select)	P103 (SSLA0)
J21-4	SCK (SPI Clock)	P102 (RSPCKA)
J21-5	MISO	P100 (MISOA)
J21-6	MOSI	P101 (MOSIA)
J21-7	+3.3 V	3.3V
J21-8	GND	GND
J22-1	PWM	P105 (GTIOC4A)
J22-2	INT (Hardware Interrupt)	P002 (IRQ2)
J22-3	RX (UART Receive)	P206 (RXD0)
J22-4	TX (UART Transmit)	P205 (TXD0)
J22-5	SCL (I^2C Clock)	P400 (SCL0)
J22-6	SDA(I^2C Data)	P401 (SDA0)
J22-7	+5 V	5.0V
J22-8	GND	GND

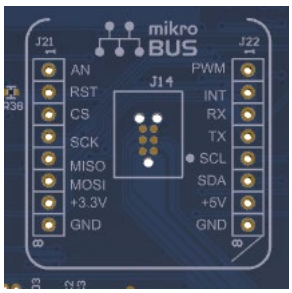

Figure 15. mikroBUS Connector

5.4 Miscellaneous

5.4.1 User and Power LEDs

Five LEDs are provided on the EK-RA2L2 board.

Behavior of the LEDs on the EK-RA2L2 board is described in the following table.

Table 18. EK-RA2L2 Board LED Functions

Designator	Color	Function	MCU Control Port
LED1	Blue	User LED	P204
LED2	Green	User LED	P304
LED3	Red	User LED	P303
LED4	White	Power on indicator	3.3V
LED5	Yellow	Debug LED	J-Link OB MCU

The user LEDs may be isolated from the RA MCU so the associated ports can be used for other purposes. To separate LED1 from P204, Jumper Trace Cut E6 must be open. To separate LED2 from P304, Jumper Trace Cut E5 must be open. To separate LED3 from P303, Jumper Trace Cut E4 must be open.

Figure 16. User LEDs

Figure 17. Power LED

5.4.2 User and Reset Switches

Three miniature, momentary, mechanical push-button type SMT switches are mounted on the EK-RA2L2 board.

Pressing the reset switch (S3) generates a reset signal to restart the RA MCU.

Table 19. EK-RA2L2 Board Switches

Designator	Function	MCU Control Port	Button Color
S3	MCU Reset Switch	RESET#	Red
S2	User Switch	P015 (IRQ7)	Blue
S1	User Switch	P004 (IRQ3)	Blue

The User Switches S1 and S2 may be isolated from the RA MCU, so the associated ports can be used for other purposes. To separate S1 from P004, Jumper Trace Cut E2 must be open. To separate S2 from P015, Jumper Trace Cut E3 must be open.

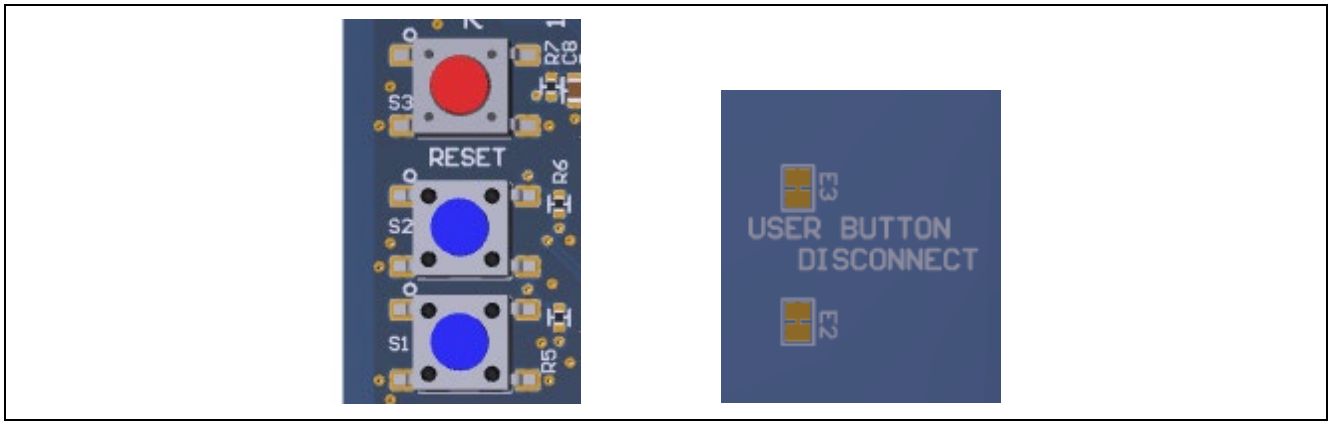

Figure 18. Reset and User Switches

5.4.3 MCU Boot Mode

A two-pin header (J16) is provided to select the Boot mode (P201) of the RA MCU. For normal operation, or Single-Chip mode, short-circuit pins 2-3 on J16. To enter SCI Boot mode, short-circuit pins 1-2 on J16, J40, and J41.

To use I²C boot mode, short-circuit E38 and E39 of the Jumper Solder Bridge and cut E48 and E49 of the Jumper Trace Cut to make them open-circuit. P912/SDA0_C and P913/SCL0_C can be used with the breakout pin headers or the SparkFun Qwiic® connector (J30).

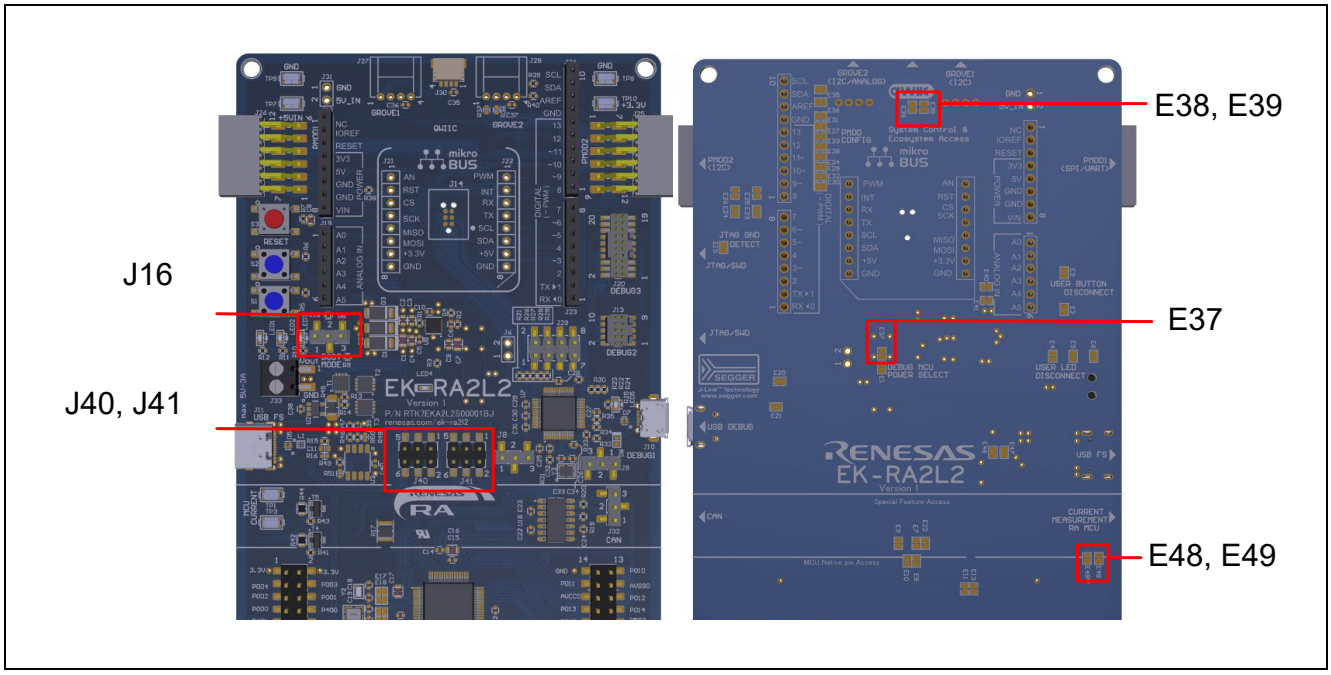

Figure 19. Boot Mode Configuration Jumpers

Notes: 1. The RA MCU fitted to the EK-RA2L2 board may not contain the latest version of the on-chip boot firmware.
2. Use of the USB 2.0 Type-C™ connector (J11) is exclusive of use with I²C boot mode. In I²C boot mode, do not connect any cable to the USB 2.0 Type-C™ connector. In addition, when power is to be supplied from the I2C-USB serial converter, cut Jumper Trace Cut E37.

5.4.4 USB 2.0 Type-C™

To use the USB 2.0 Type-C™ function, pins 5-6 of J40 and J41 must be shorted and the external Rd (5.1kΩ pull-down) on the CC1 and CC2 signal lines must be disabled with a low level output from P109 and P110.

EK-RA2L2 supports 5V/3A and 5V/1.5A.

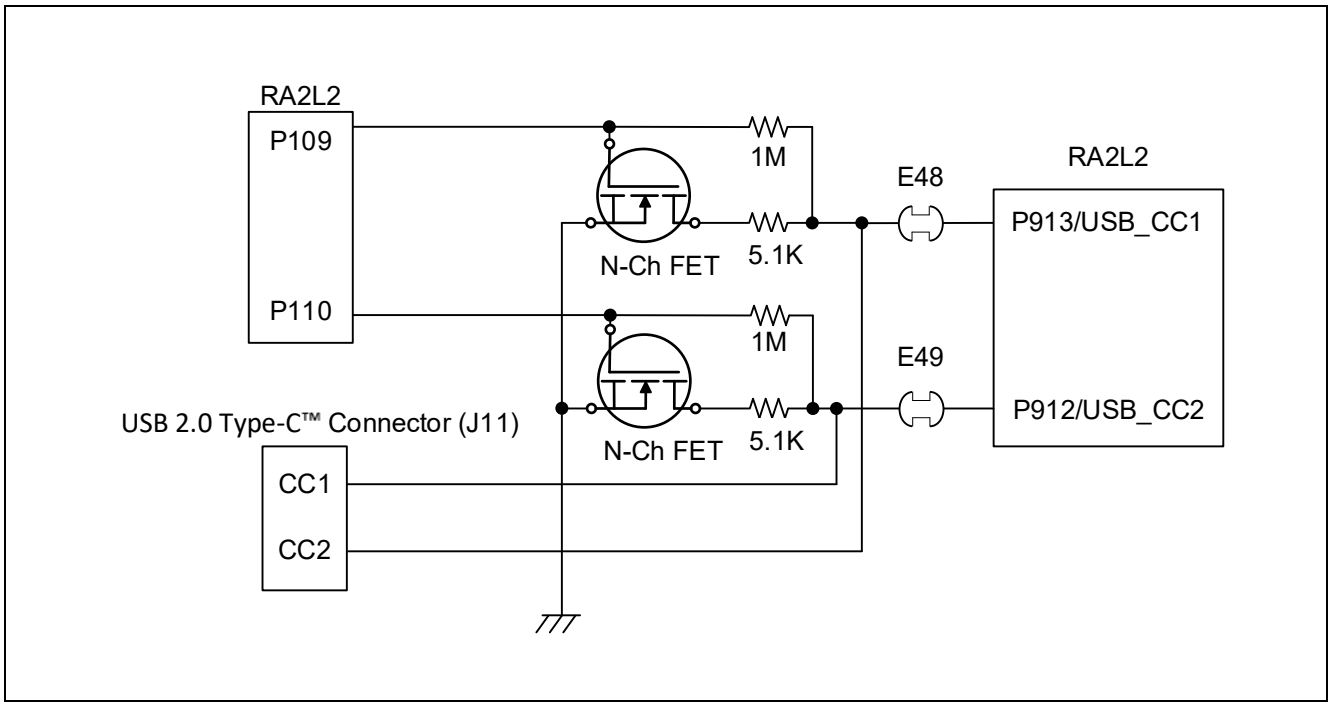

Figure 20. Block Diagram of USB 2.0 Type-C™ Support Circuit

5.4.4.1 USB 2.0 Type-C™Sink

A USB 2.0 Type-C™ sink screw terminal (J33) is mounted on the EK-RA2L2 board. It is for supplying power to an external device (max. 5 V/3 A, 15 W).

The supply of power is enabled when a high level is output from P410 and the discharge is enabled when a high level is output to P411.

P410 and P411 are multiplexed with Pmod 1-7 and Pmod 2-7; this usage is exclusive of use with USB 2.0 Type-C™ functions.

P410 and P411 become Hi-Z during a reset. Fix the potential by using a pull-down resistor as required during control of the USB 2.0 Type-C™ Sink.

Table 20. Pin Assignments of the USB 2.0 Type-C™ Sink

J33 Pin	Function
1	Vout
2	GND

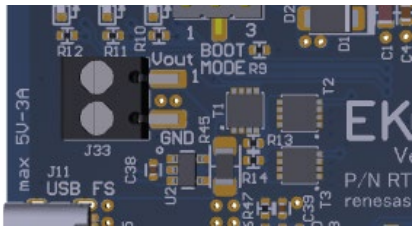

Figure 21. USB 2.0 Type-C™ Sink Output Screw Terminal

5.4.4.2 VBUS Monitoring Circuit

A VBUS monitoring circuit is mounted on the EK-RA2L2 board. It is used to monitor the voltage and amount of current through the USB 2.0 Type-C™ VBUS with P012 (AN007) and P013 (AN008). The circuit consists of ISL28006FH20Z (a high-side current sense operational amplifier, providing multiplication by 20) as the main component and provides a precision 50-mΩ resistor (Vishay, part number WSLP1206R0500FEA), so the associated ports can be used for other purposes. To separate P012 and P013 from the VBUS monitoring circuit, cut E46 and E47 of the Jumper Trace Cut to make them open-circuit.

Table 21. Assignments of the VBUS Monitoring Circuit

VBUS	EK-RA2L2 Port
Voltage	P012 (AN007)
Current	P013 (AN008)

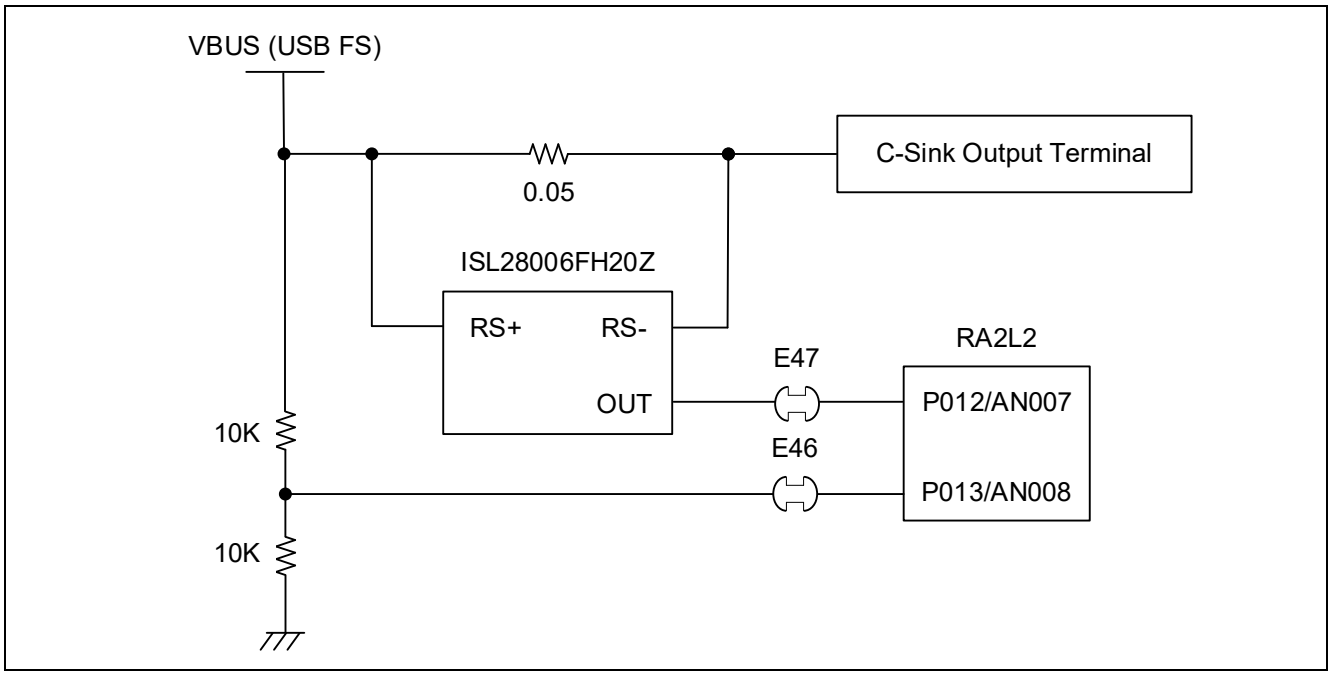

Figure 22. Block Diagram of the VBUS Monitoring Circuit

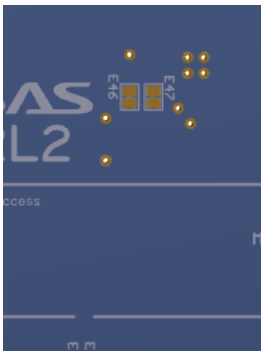

Figure 23. VBUS Monitoring Configuration Jumpers

6. Special Feature Access Area

Functions such as CAN and current measurement that are specific to the RA2L2 MCU group are provided in the Special Feature Access area.

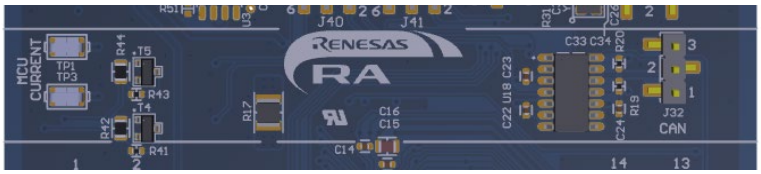

Figure 24. Special Feature Access Area

6.1 CAN

A CAN bus transceiver (TJA1043T or 118) is mounted on the EK-RA2L2 board and directly connected to the RA MCU. A 2.54-mm-pitch 3-pin male header (J32) is used for the external connection to the CAN bus. To use CAN, short-circuit pins 3-4 of J40 and J41.

Table 22. Assignments of CAN Bus Ports

CAN Signal Name	EK-RA2L2 Port
RXD	P109
TXD	P110
STB	P014

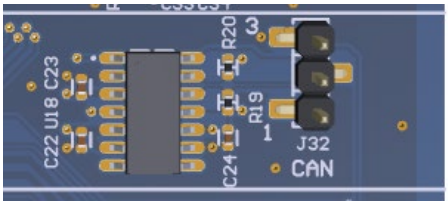

Figure 25. CAN Bus Header

Table 23. Pin Assignments of the CAN Bus

J32 Pin	Function
1	CANL
2	CANH
3	GND

6.2 Current Measurement

The EK-RA2L2 board provides a precision 680-mΩ resistor (Vishay, part number RCWE1210R680FKEA) for current measurement of the main 3.3-V MCU power. Measure the voltage drop across these resistors and use Ohm's Law to calculate the current. For convenience, TP1 and TP3 are provided to measure the main 3.3-V MCU power. See Figure 27 for the location of TP1 and TP3.

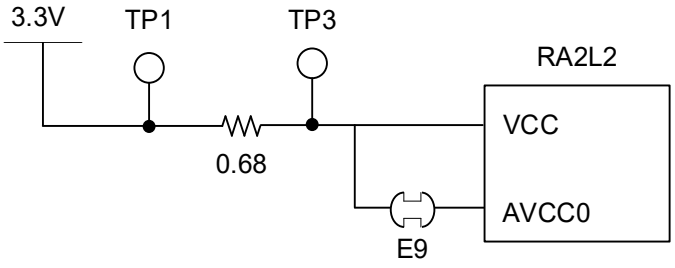

Figure 26. Block Diagram of the RA +3.3-V Current Measurement Circuit

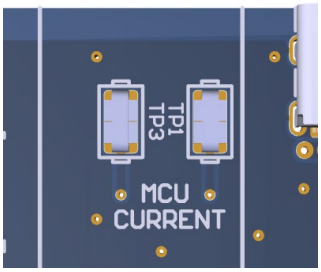

Figure 27. RA MCU Current Measurement Test Point

7. MCU Native Pin Access Area

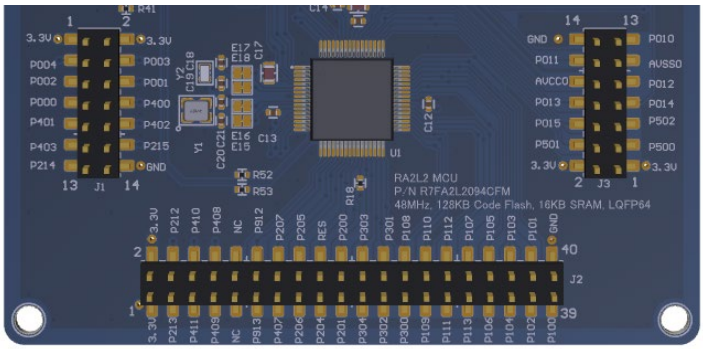

Figure 28. MCU Native Pin Access Area

7.1 Breakout Pin Headers

The EK-RA2L2 board pin headers, J1, J2, and J3, provide access to all RA MCU interface signals, and to voltages for all RA MCU power ports. Each header pin is labeled with the voltage or port connected to that pin. Refer to the RA2L2 MCU Group User's Manual for details of each port function, and the EK-RA2L2 board schematic for pin header port assignments.

The placement of the breakout pin headers allows for a standard 2.54-mm (0.100") center breadboard to be placed on all three pin headers simultaneously. This can be used for prototyping and testing of custom circuitry for use with the RA2L2 MCU.

Table 24. Breakout Pin Header J1

J1 Pin No.	Circuit Net Name	RA2L2 MCU	J1 Pin No.	Circuit Net Name	RA2L2 MCU
1	3.3V	—	2	3.3V	—
3	P004	U1-60	4	P003	U-61
5	P002	U1-62	6	P001	U-63
7	P000	U1-64	8	P400	U1-1
9	P401	U1-2	10	P402	U1-3
11	P403	U1-4	12	P215	U1-6
13	P214	U1-7	14	GND	—

Table 25. Breakout Pin Header J2

J2 Pin No.	Circuit Net Name	RA2L2 MCU	J2 Pin No.	Circuit Net Name	RA2L2 MCU
1	3.3V	—	2	3.3V	—
3	P213	U1-9	4	P212/XTAL	U1-10
5	P411	U1-12	6	P410	U1-13
7	P409	U1-14	8	P408	U1-15
9	—	—	10	—	—
11	P913/USB_CC1	U1-18	12	P912/USB_CC2	U1-19
13	P407	U1-1	14	P207	U1-21
15	P206	U1-22	16	P205	U1-23
17	P204	U1-24	18	RES	U1-25
19	P201/MD	U1-26	20	P200	U1-27
21	P304	U1-28	22	P303	U1-29
23	P302	U1-30	24	P301	U1-31
25	P300/SWCLK	U1-32	26	P108/SWDIO	U1-33
27	P109	U1-34	28	P110	U1-35
29	P111	U1-36	30	P112	U1-37
31	P113	U1-38	32	P107	U1-39
33	P106	U1-42	34	P105	U1-41
35	P104	U1-44	36	P103	U1-43
37	P102	U1-46	38	P101	U1-47
39	P100	U1-48	40	GND	—

Table 26. Breakout Pin Header J3

J3 Pin No.	Circuit Net Name	RA2L2 MCU	J3 Pin No.	Circuit Net Name	RA2L2 MCU
1	3.3V	—	2	3.3V	—
3	P500	U1-49	4	P501	U1-50
5	P502	U1-51	6	P015	U1-52
7	P014	U1-53	8	P013	U1-54
9	P012	U1-55	10	AVCC0	U1-56
11	AVSS0	U1-57	12	P011/VREFL0	U1-58
13	P010/VREFH0	U1-59	14	GND	—

7.2 Crystal Oscillators

If the main high-precision crystal oscillator (20 MHz) or sub high-precision crystal oscillator (32.768 kHz) is not needed, then the ports that it is connected to can be used for other purposes.

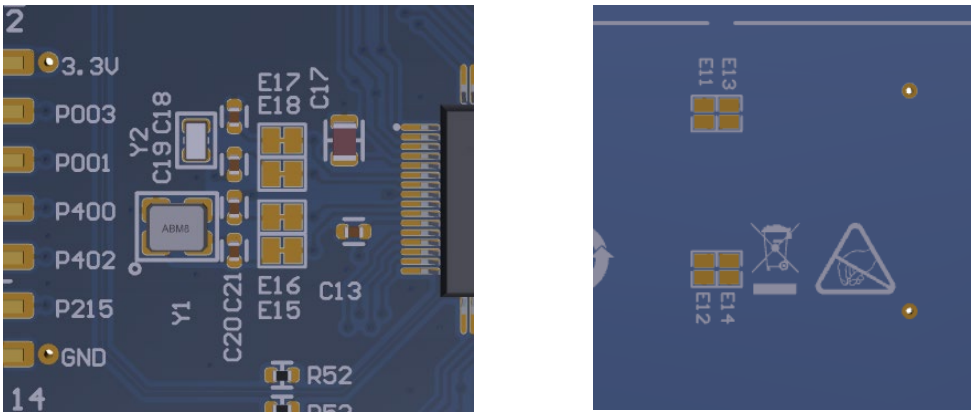

Figure 29. Jumpers for Configuring Crystal Oscillators

Table 27. Selection of Crystal Oscillators

Crystal Oscillator		**Setting**	
		Short	**Open**
32.768 kHz	Connected (default)	E17, E18	E11, E13
	Disconnected (option)	E11, E13	E17, E18
20 MHz	Connected (default)	E15, E16	E12, E14
	Disconnected (option)	E12, E14	E15, E16

8. Certifications

The EK-RA2L2 v1 kit meets the following certifications/standards. See page 4 of this user's manual for the disclaimer and precautions.

8.1 EMC/EMI Standards

- FCC Notice (Class A)

  This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

  NOTE- This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
  - Reorient or relocate the receiving antenna.
  - Increase the separation between the equipment and receiver.
  - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
  - Consult the dealer or an experienced radio/television technician for help.
- Innovation, Science and Economic Development Canada ICES-003 Compliance:

  CAN ICES-3 (A)/NMB-3(A)
- CE Class A (EMC)

  This product is herewith confirmed to comply with the requirements set out in the Council Directives on the Approximation of the laws of the Member States relating to Electromagnetic Compatibility Directive 2014/30/EU.

  Warning – This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be requried to take adequate measures to correct this interference.
- UKCA Class A (EMC)

  This product is in conformity with the following relevant UK Statutory Instrument(s) (and its amendments): 2016 No. 1091 Electromagnetic Compatibility Regulations 2016.

  Warning – This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures to correct this interference.
- Taiwan: Chinese National Standard 13438, C6357 compliance, Class A limits
- Australia/New Zealand AS/NZS CISPR 32:2015, Class A

8.2 Material Selection, Waste, Recycling and Disposal Standards

- EU RoHS
- China SJ/T 113642014, 10-year environmental protection use period.
- WEEE Directive (2012/19/EU) & The Waste Electrical and Electronic Equipment Regulations 2013

The WEEE (Waste Electrical and Electronic Equipment) regulations put responsibilities on producers for the collection and recycling or disposal of electrical and electronic waste. Return of WEEE under these regulations is applicable in the UK and European Union.

This equipment (including all accessories) is not intended for household use. After use the equipment cannot be disposed of as household waste, and the WEEE must be treated, recycled and disposed of in an environmentally sound manner.

Renesas Electronics Europe GmbH can take back end of life equipment. Register for this service at;
https://www.renesas.com/eu/en/support/regional-customer-support/weee

8.3 Safety Standards

- UL 94V-0

9. Design and Manufacturing Information

The design and manufacturing information for the EK-RA2L2 v1 kit is available in the “EK-RA2L2 v1 Design Package” available on renesas.com/ek-ra2l2.

- Design package file name: ek-ra2l2-v1-designpackage.zip
- Design package contents

Table 28. EK-RA2L2 Board Design Package Contents

File Type	Content	File/Folder Name
File (PDF)	Schematics	ek-ra2l2-v1-schematics
File (PDF)	Mechanical Drawing	ek-ra2l2-v1-mechdwg
File (PDF)	3D Drawing	ek-ra2l2-v1-3d
File (PDF)	BOM	ek-ra2l2-v1-bom
Folder	Manufacturing Files	Manufacturing Files
Folder	Design Files	Design Files – Altium Designer

10. Website and Support

Visit the following URLs to learn about the kit and the RA family of microcontrollers, download tools and documentation, and get support.

EK-RA2L2 Resources	renesas.com/ek-ra2l2
RA Kit Information	renesas.com/ra/kits
RA Product Information	renesas.com/ra
RA Product Support Forum	community.renesas.com/mcu-mpu/ra/
RA Videos	renesas.com/ra/videos
Renesas Support	renesas.com/support

11. Appendix

11.1 Layout Diagram of Components on the EK-RA2L2 Board

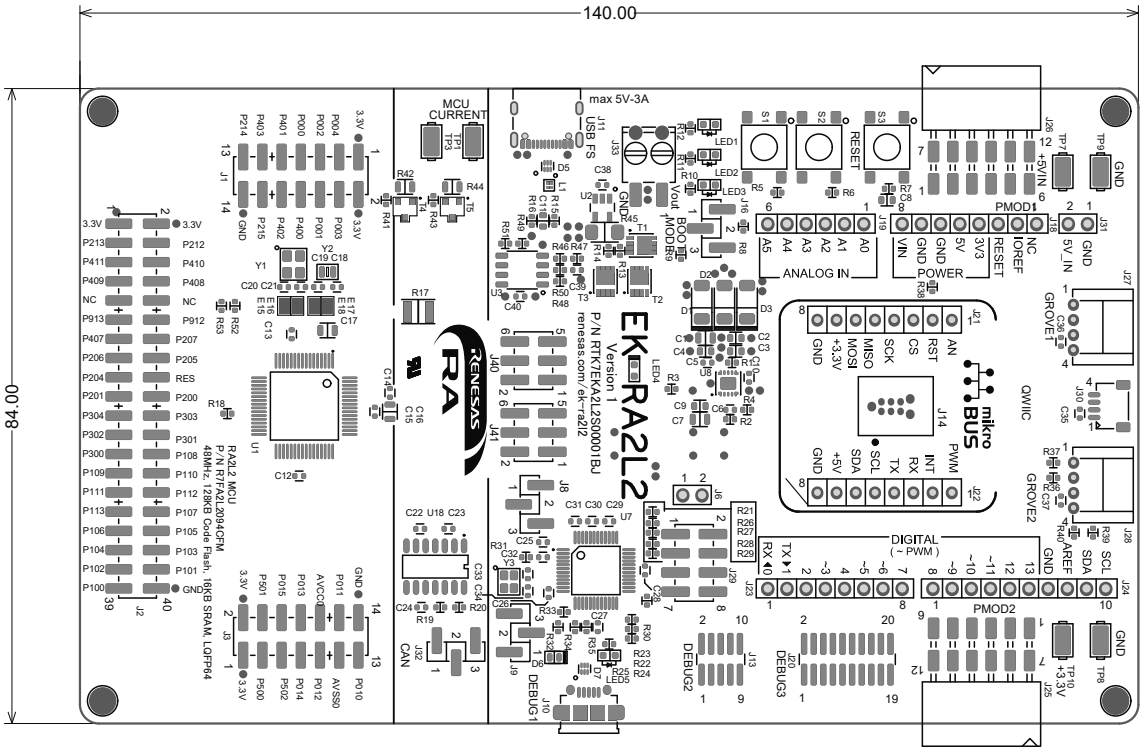

Figure 30. Layout Diagram of Components on the EK-RA2L2 Board (Top View)

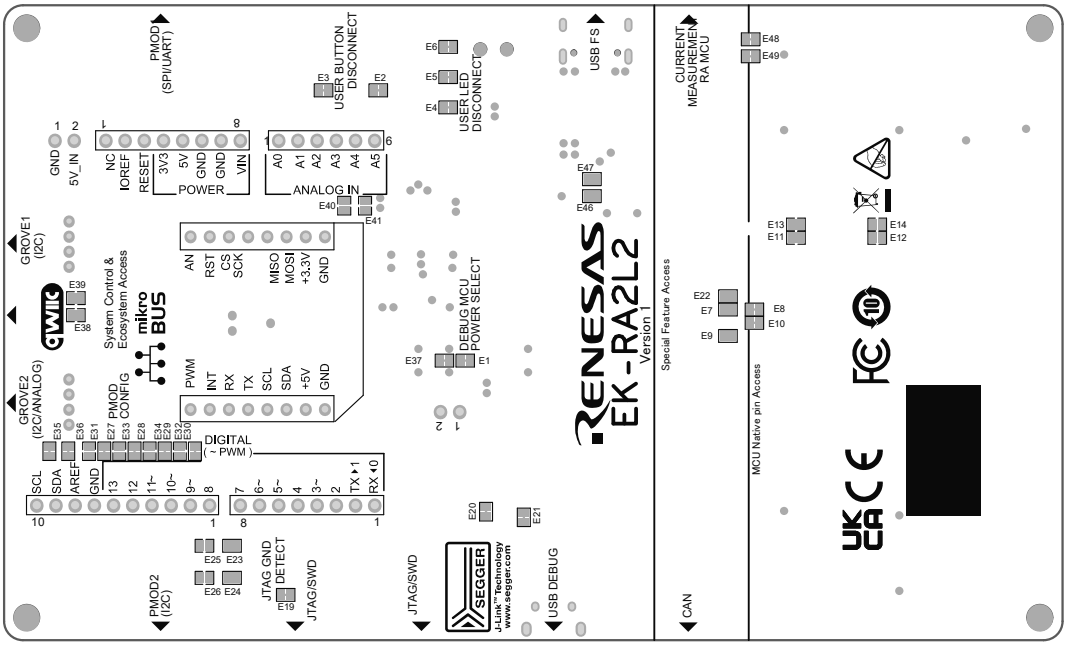

Figure 31. Layout Diagram of Components on the EK-RA2L2 Board (Bottom View)

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	May.01.25	—	First Edition issued

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