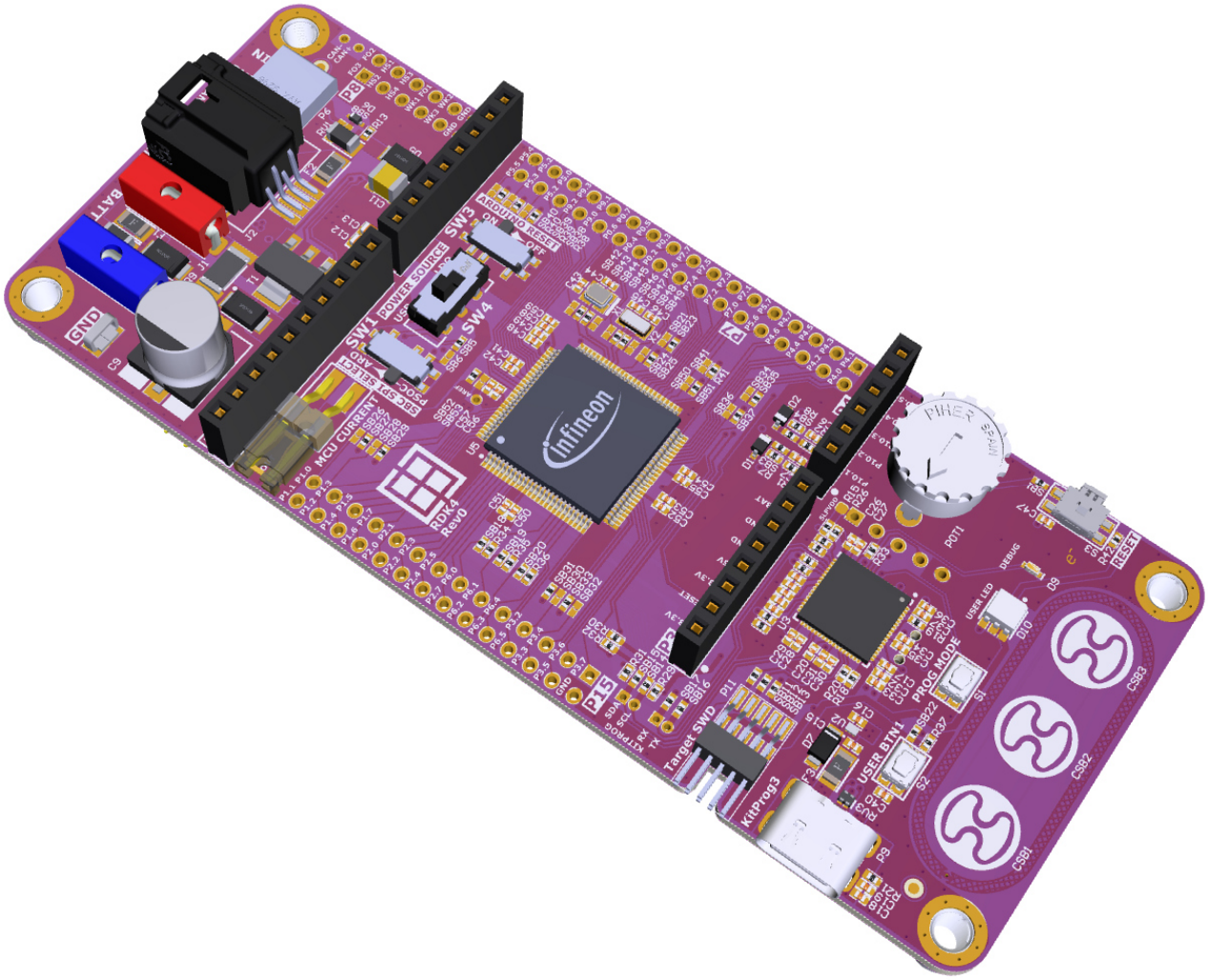
RDK4 User Manual



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Versions

Table 1

Version	Date	Rationale
0.1	November 07, 2022	First draft. Author: GDR

Introduction

The development kit RDK4 is based on an automotive PSoC 4100S Max microcontroller and TLE9262-3BQX System-Basis-Chip. The RDK4 is a solution created by Rutronik that enables developers to evaluate and implement their ideas into their automotive or industrial projects.

Features

- CY8C4149AZE-S598 – Infineon's Arm® Cortex™-M0+ AEC-Q100 compliant MCU.
- All CY8C4149AZE-S598 GPIOs are accessible via onboard headers.
- TLE9262-3BQXV33 - Infineon's System Basis Chip for automotive applications.
- On-board debugger KitProg3 with I2C and UART USB bridge.
- 10-pin Amphenol ICC SWD header for J-Link.
- JAE USB Type-C connector for the KitProg3 debugger.
- Minitek MicroSpace™ CAN FD connector.
- On-board capacitive buttons based on CapSense® CSX technology.
- TOPLED® E1608 and OSIRE® E3635 OSRAM LEDs.
- Diodes Inc. automotive PNP Power Transistor BCP5216TA for the SBC LDO circuit.
- Keystone Electronics Corp. P/N5019 GND test point.
- TOSHIBA Load Switch (with the current limiting capability) TCK22946G,LF.
- NISSHINBO low power amplifier NJU77001F.
- DIPTRONICS tactile buttons.
- Panasonic Right-angled RESET switch.
- C&K Slider switches for power supply selection and hardware configuration.
- PIHER Potentiometer for ADC peripheral evaluation.
- Passive components from Samsung EM, Yageo, and ASJ.

Overview

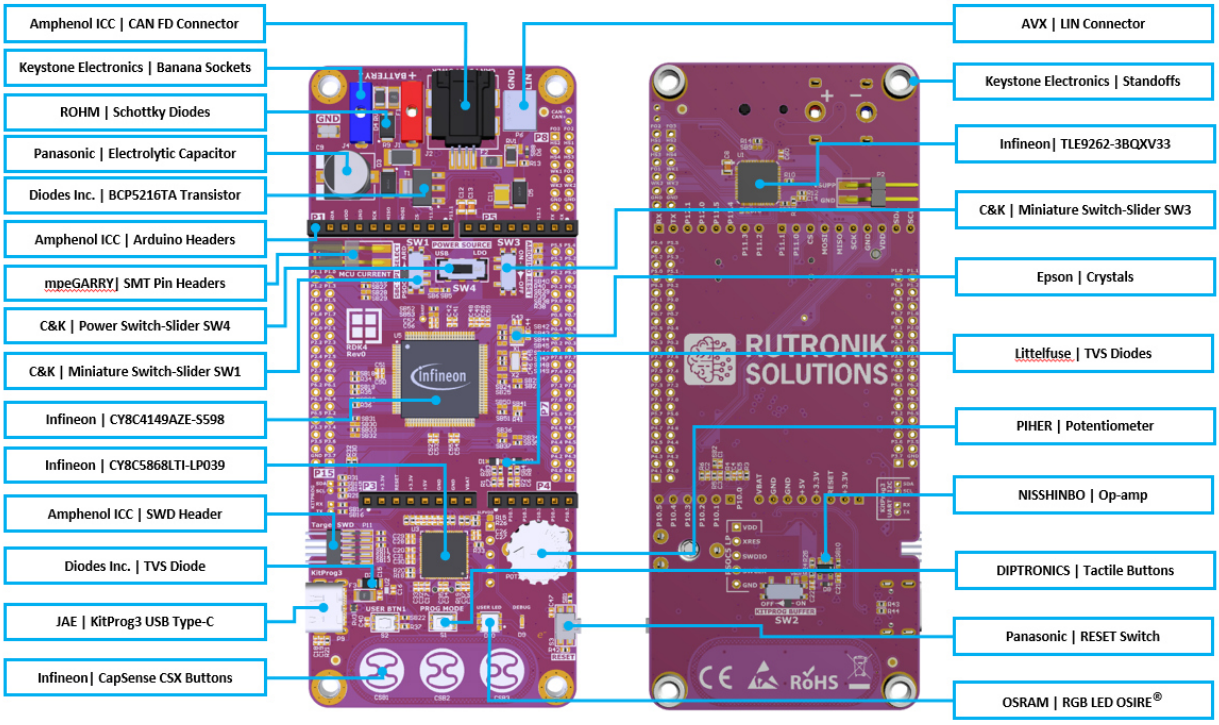


Fig. 1. RDK4 Board's layout.

Power Source Select

There are four ways to provide power for the MCU in RDK4:

1. KitProg3 USB Type-C port - +5.5V maximum.
2. Arduino connector P3 pin 8 (VIN) +26V maximum.
3. VS AUX header P2 +26V maximum
4. Battery banana sockets J1 and J4 +26V maximum.

Select the main power supply using SW4 – the KitProg3 USB Type-C port "**USB**" or the 3.3V System Basis Chip LDO "**LDO**".

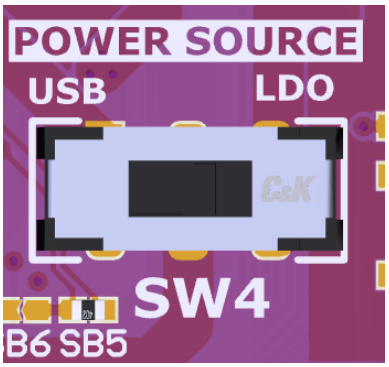


Fig. 2. Power source selector SW4.

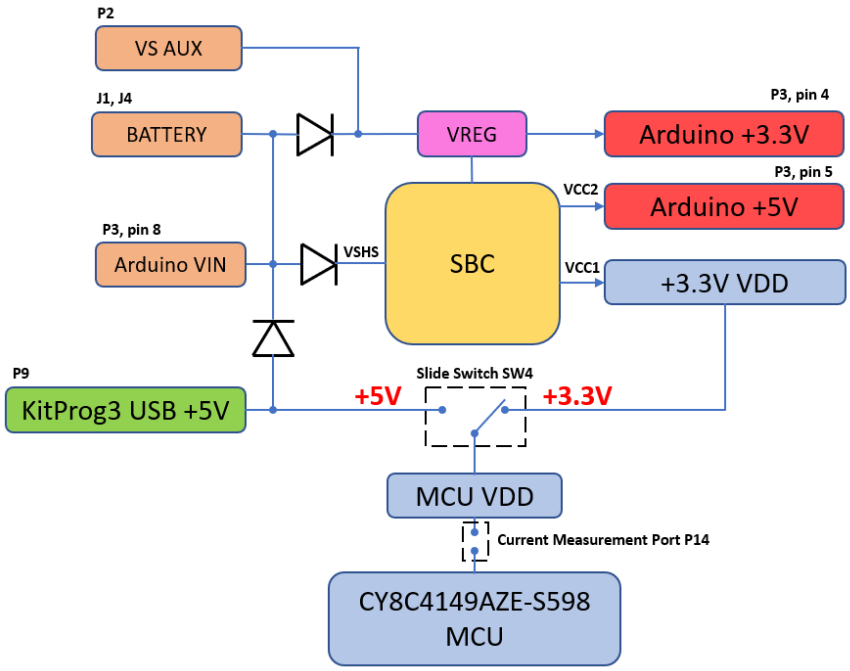


Fig. 3. RDK4 Power Distribution Diagram.

Programming Using External Connector

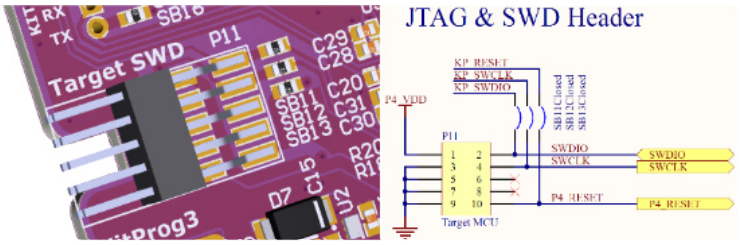


Fig. 4. 10-pin male 1.27mm pitch, SWD connector.

Users may use third-party programming devices to connect the CY8C4149AZE-S598 target via the P11 SWD connector. The onboard “KitProg3” debugger should not be powered while using an external JTAG connector.

Spare GPIOs

All GPIOs of CY8C4149AZE-S598 MCU are available at sockets P7, P8, and P15. Some may need to be configured using solder bridges.

Table 1

Socket P7 Pinout			
Pin No.	**Name**	**Name**	**Pin No.**
1	P4.1	P4.0	2
3	P4.3	P4.2	4
5	P4.5	P4.4	6
7	P4.7	P4.6	8
9	P5.7	P5.6	10
11	P7.1	P7.0	12
13	P7.3	P7.2	14
15	P7.5	P7.4	16
17	P7.7	P7.6	18
19	P0.3	P0.2	20
21	P0.5	P0.4	22
23	P0.7	P0.6	24
25	P9.1	P9.0	26
27	P9.3	P9.2	28
29	P5.0	P5.1	30
31	P5.2	P5.3	32
33	P5.4	P5.5	34

Table 2

Socket P8 Pinout			
Pin No.	**Name**	**Name**	**Pin No.**
1	FO_OUT3	FO_OUT2	2
3	HS_OUT2	HS_OUT1	4
5	HS_OUT4	HS_OUT3	6
7	WAKEUP1	FO_OUT1	8
9	WAKEUP3	WAKEUP2	10
11	GND	GND	12

Table 3

Socket P15 Pinout			
Pin No.	**Name**	**Name**	**Pin No.**
1	P3.7	GND	2
3	P3.6	P3.5	4
5	P3.4	P3.3	6
7	P3.2	P6.5	8
9	P6.4	P6.3	10
11	P6.1	P6.2	12
13	P6.0	P2.7	14
15	P2.5	P2.4	16
17	P2.3	P2.2	18
19	P2.1	P2.0	20
21	P1.7	P1.6	22
23	P1.5	P1.4	24
25	P1.3	P1.2	26
27	P1.0	P1.1	28

Solder Bridges

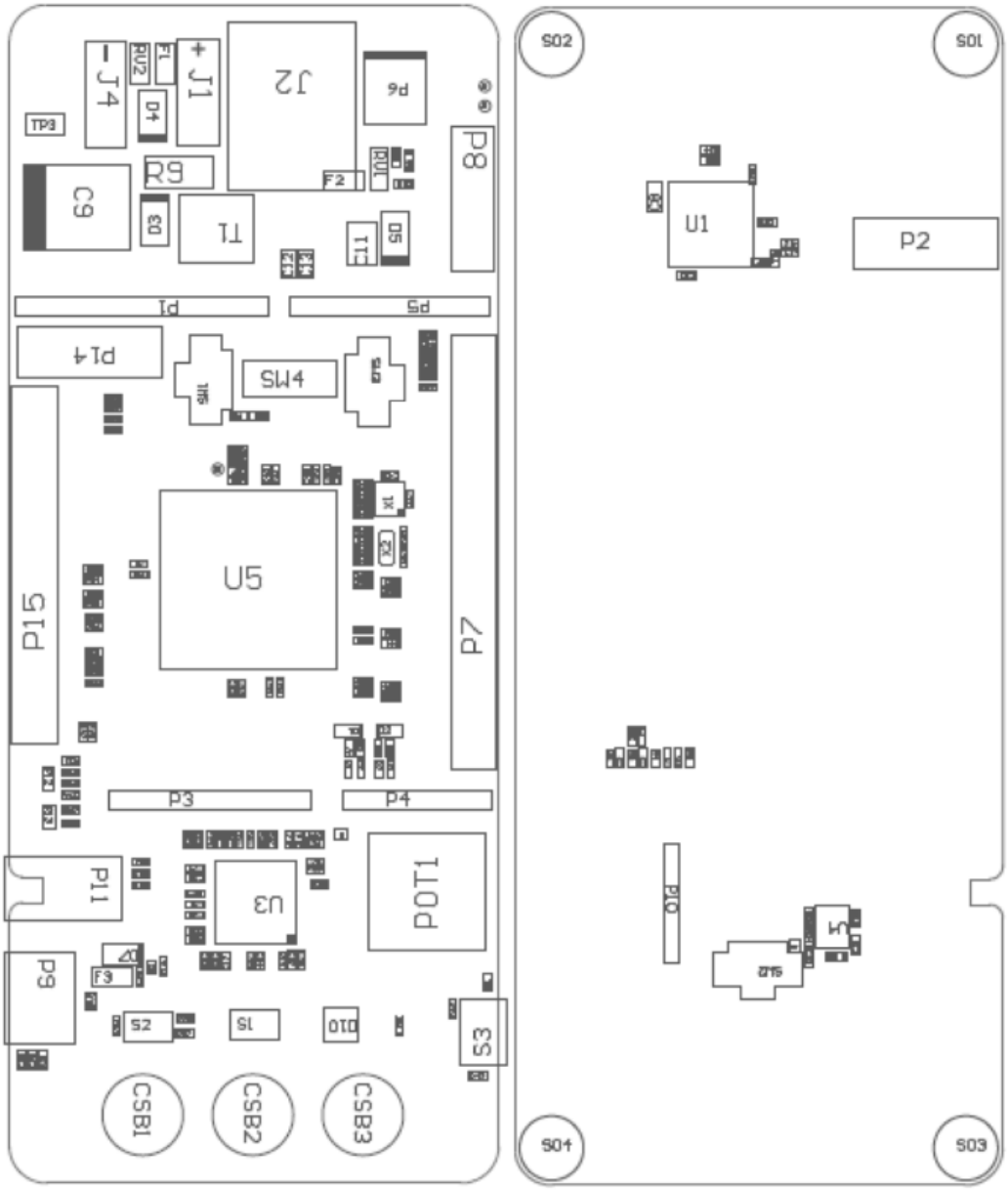


Fig. 5. Locations of the Solder Bridges [SBxx] (please check the assembly document to see in detail).

Table 4

Solder Bridge	Circuit	Default
SB1	P4_VDD_BUF Supply for the Potentiometer.	Closed
SB2	Potentiometer Output with ADC5 P10.4	Closed
SB3	TVS protector with ADC1 P10.0	Closed
SB4	TVS protector with ADC2 P10.1	Closed
SB5	Arduino SPI CS with SBC CS (over SW1)	Closed
SB6	MCU SPI CS with Arduino SPI CS	Opened
SB7	Ignition Circuit with SBC WK3 pin	Closed
SB8	LIN 1K pull-up resistor	Opened
SB9	CAN FD Termination	Opened
SB10	Op-amp NJU77001F (U4) +Input	Closed
SB11	KitProg3 SWDIO with MCU SWDIO	Closed
SB12	KitProg3 SWCLK with MCU SWCLK	Closed
SB13	KitProg3 RESET with MCU RESET	Closed
SB14	KitProg3 I2C SCL with MCU I2C SCL	Closed
SB15	KitProg3 I2C SDA with MCU I2C SDA	Closed
SB16	KitProg3 UART TX with MCU UART RX	Closed
SB17	KitProg3 UART RX with MCU UART TX	Closed
SB18	D10 RGB GREEN LED with P6.0	Closed
SB19	D10 RGB RED LED with P6.1	Closed
SB20	D10 RGB BLUE LED with P6.2	Closed
SB21	Header P7 pin 20 with MCU P0.2	Opened
SB22	USER BUTTON Circuit with MCU P6.3	Closed
SB23	CAN FD RX with MCU P0.2	Closed
SB24	Header P7 pin 19 with MCU P0.3	Opened
SB25	CAN FD TX with MCU P0.3	Closed
SB26	Header P15 pin 27 with MCU P1.0	Opened
SB27	MCU P1.0 with KitProg3 UART TX	Closed
SB28	Header P15 pin 28 with MCU P1.1	Opened
SB29	MCU P1.1 with KitProg3 UART RX	Closed
SB30	Header P15 pin 7 with MCU P3.2	Opened
SB31	KitProg3 SWDIO with MCU P3.2	Closed
SB32	Header P15 pin 6 with MCU P3.3	Opened
SB33	KitProg3 SWCLK with MCU P3.3	Closed
SB34	Header P7 pin 2 with MCU P4.0	Opened
SB35	LIN RX with MCU P4.0	Closed
SB36	Header P7 pin 2 with MCU P4.1	Opened
SB37	LIN TX with MCU P4.0	Closed
SB38	Header P7 pin 32 with MCU P5.3	Opened
SB39	Header P7 pin 33 with MCU P5.4	Opened
SB40	Header P7 pin 34 with MCU P5.5	Opened

SB41	Header P7 pin 10 with MCU P5.6	Opened
SB42	Header P7 pin 23 with MCU P0.7	Opened
SB43	MCU P0.7 with X1 pin 3	Closed
SB44	MCU P0.6 with X1 pin 1	Closed
SB45	Header P7 pin 24 with MCU P0.6	Opened
SB46	Header P7 pin 21 with MCU P0.5	Opened
SB47	MCU P0.5 with X1 pin 2	Closed
SB48	MCU P0.5 with X1 pin 1	Closed
SB49	Header P7 pin 22 with MCU P0.4	Opened
SB50	Header P7 pin 9 with MCU P5.7	Opened
SB51	SBC Interrupt INT with MCU P5.7	Closed
SB52	MCU_VDD with MCU VDDA	Closed
SB53	AREF (analog reference) input with MCU VDDA	Opened

Fuses

The RDK4 board has three 2A fast-acting fuses F1, F2, and F3 in a 1206 package; Part No: CC12H2A-TR „Eaton“.

Changing the fuses or solder bridges

The SMD „Chipping Tool“ is recommended to use for SMD solder bridges or fuses soldering on the RDK4 development board.

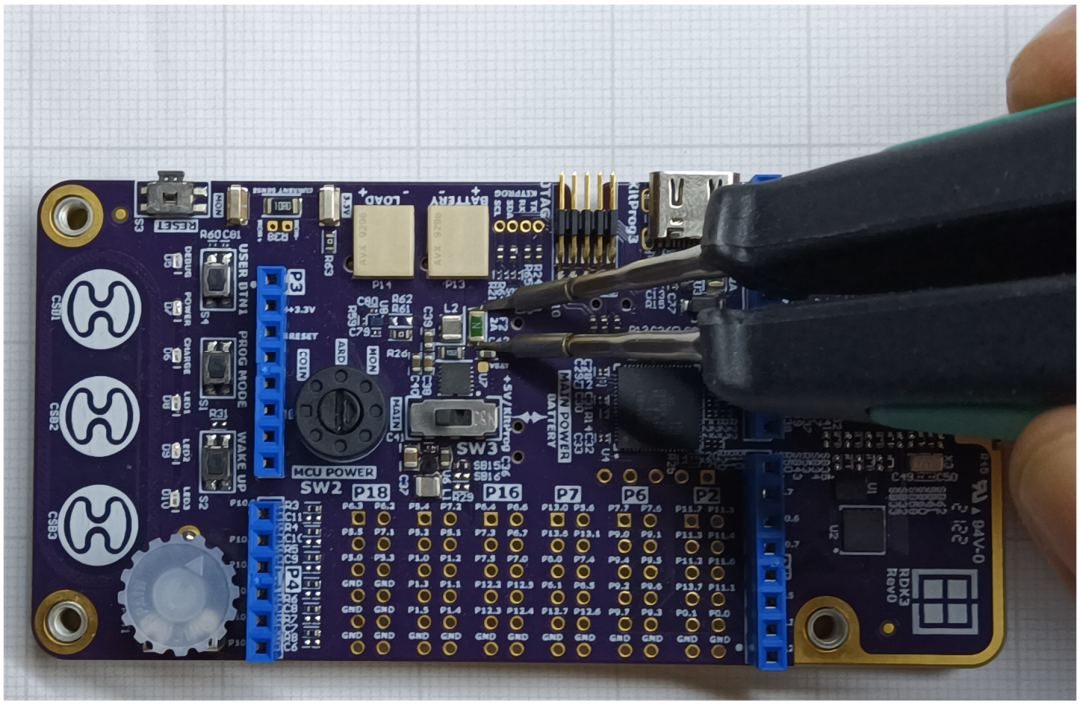


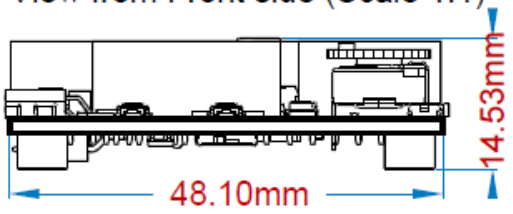
Fig. 6. Soldering the RDK3's fuse.

Insertion and extraction of wire from AVX 9296 connector

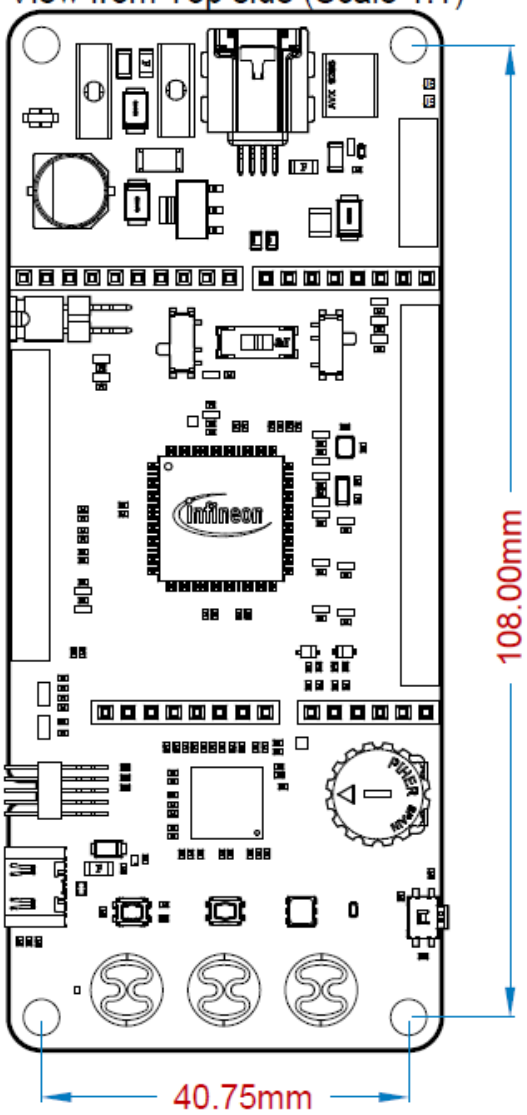
The RDK4 board has a single AVX 9296 2-pin connector for the LIN interface (P13 and P6). The 20/22/24/26AWG wires are recommended to be striped from 3.5mm to 4.5mm before insertion. Once inserted it can be extracted without any tools. Gently rotate the wire while pulling until the extraction is complete. Please refer to the application note **201-01-167** provided by the AVX for more detailed information.

Mechanical Layout

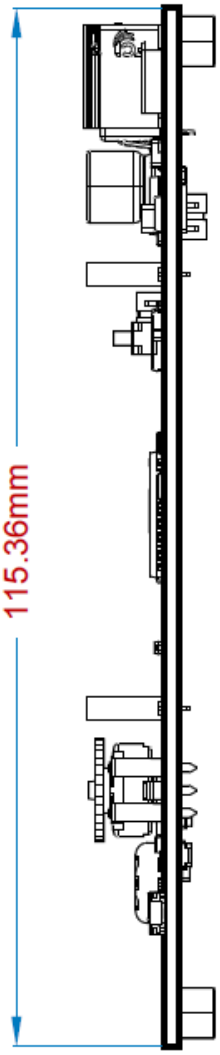
View from Front side (Scale 1:1)



View from Top side (Scale 1:1)



View from Right side (Scale 1:1)



Legal Disclaimer

The evaluation board is for testing purposes only and, because it has limited functions and limited resilience, is not suitable for permanent use under real conditions. If the evaluation board is nevertheless used under real conditions, this is done at one's responsibility; any liability of Rutronik is insofar excluded.