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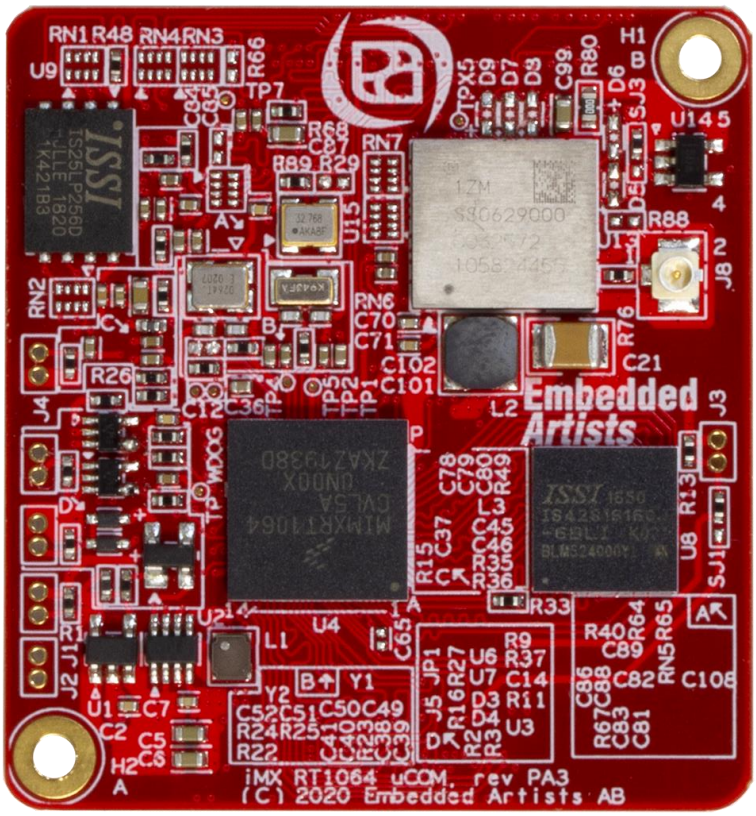
iMX RT1064 uCOM Board Datasheet



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1 Document Revision History

Revision	*Date*	*Description*
PA1	2021-08-18	First version.
PA2	2021-11-25	Various small updates and clarifications. Added information about I2C address used for on-board I2C-E2PROM in "Things to note" section.
PA3	2023-04-21	Updated information about boot control.
PA4	2023-06-15	Added information about powering architecture.

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2 Introduction

This document is a datasheet that specifies and describes the *iMX RT1064 uCOM Board* mainly from a hardware point of view. Some basic software related issues are also addressed, like booting and functional verification, but there are separate software development manuals that should also be consulted.

2.1 Hardware

The *iMX RT1064 uCOM Board* is a Computer-on-Module (COM) based on NXP's ARM Cortex-M7 i.MX RT1064 Crossover microcontroller. The board provides a quick and easy solution for implementing a high-performance ARM Cortex-M7 based design. The Cortex-M7 core runs at up to 600 MHz (528 MHz for industrial temperature version).

The *iMX RT1064 uCOM Board* has an small form factor and shields the user from a lot of complexity of designing a high performance system. It is a robust and proven design that allows the user to focus the product development, shorten time to market and minimize the development risk.

The *iMX RT1064 uCOM Board* targets a wide range of applications, such as:

- Industrial Computing Designs
  - PLCs
  - Factory automation
  - Test and measurement
  - M2M
  - assembly line robotics
- Home and Building Automation
  - HVAC climate control
  - Security
  - Lighting control panels
  - IoT gateways
- Motor Control and Power Conversion
- HMI/GUI solutions
- Connected vending machines
- Access control panels
- Audio Subsystem
- 3D printers, thermal printers, unmanned autonomous vehicles
- Audio
- Smart appliances
- Home energy management systems
- Smart Grid and Smart Metering
- Smart Toll Systems
- Data acquisition
- Communication gateway solutions
- Connected real-time systems
- ...and much more

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The picture below illustrates the block diagram of the *iMX RT1064 uCOM Board*.

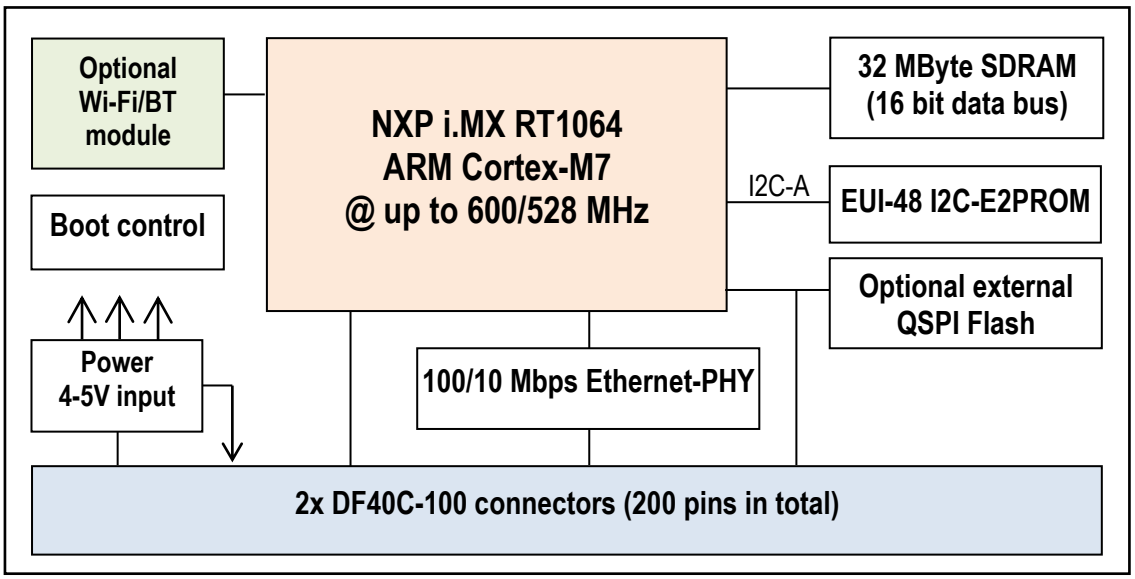

Figure 1 – iMX RT1064 uCOM Board Block Diagram

The *iMX RT1064 uCOM Board* pin assignment focus on direct connection to (carrier board) interface connectors and minimize trace and layer crossing. This is important for high speed, serial interfaces with impedance controlled differential pairs. As a result, carrier boards can be designed with few routing layers. In many cases, a four layer pcb is enough to implement advanced and compact carrier boards. The pin assignment is common for the *iMX RT/6/7/8/9 uCOM Boards* from Embedded Artists and the general, so called, EAuCOM specification is found in separate document.

2.2 Software

The *iMX RT1064 uCOM Developer's Kit* has a Board Support Package (BSP) that supports bare metal as well as FreeRTOS based architectures. It is based on NXP's SDK framework for the i.MX RT1064 with patches from Embedded Artists to support the specifics of the uCOM board.

This document has a hardware focus and does not cover software development. See the document *iMX RT1064 uCOM Developer's Kit Program Development Guide* for more information about software development.

2.3 Features and Functionality

The i.MX RT1064 is a powerful crossover microcontroller. The full specification can be found in NXP's *i.MX RT1064 Crossover Processor Datasheet* and *i.MX RT1064 Processor Reference Manual*. The table below lists the main features and functions of the *iMX RT1064 uCOM board,* which represents Embedded Artists' integration of the i.MX RT1064 Crossover microcontroller. Due to pin configuration some functions and interfaces of the i.MX RT1064 many not be available at the same time. See the *i.MX RT1064 Crossover Processor Datasheet* and reference manual for details. Also see pin multiplexing Excel sheet for details.

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Group	Feature	iMX RT1064 uCOM Board
CPUs	NXP MCU commercial temp. range industrial temp. range	MIMXRT1064DVL6 (0 - 70° C) MIMXRT1064CVL5 (-40 - 85° C)
	CPU Core	1x Cortex-M7 with full featured Floating Point Unit (FPU) with support of the VFPv5 architecture
	Maximum M7 core frequency	600 MHz (0 - 70° C) 528 MHz (-40 - 85° C)
	L1 Instruction cache	32 KByte
	L1 Data cache	32 KByte
	I-TCM, D-TCM	Configurable, up to 512 KByte
	On-chip SRAM	1024 MByte, of with 512 KByte shared with ITCM/DTCM and OCRAM. The remaining 512 KByte are dedicated to OCRAM
Security Functions	High Assurance Boot	✓
	Data Co-Processor (DCP) - AES-128, ECB, and CBC mode - SHA-1 and SHA-256 - CRC-32	✓
	Bus Encryption Engine (BEE) - AES-128, ECB, and CTR mode - On-the-fly QSPI Flash decryption	✓
	True random number generation (TRNG)	✓
	Secure Non-Volatile Storage - Secure real-time clock (RTC) - Zero Master Key (ZMK)	✓
	Secure JTAG Controller	✓
Memory	SDRAM RAM Size	32 MByte, default. Other on request.
	SDRAM Clock Speed	166 MHz
	SDRAM Memory Width	16 bit
	On-chip QSPI Flash	4MByte
	On-board (external) QSPI Flash	Mounted on request when larger flash size is needed.
Graphical Processing	PiXel Processing Pipeline (PXP)	✓
Graphical Output	Parallel RGB	Support 8/16-bit interface with up WXGA resolution (1280x800 px) Note that 24-bit interface is only supported if on-board Ethernet-Phy is not mounted. This mounting option is available on request.

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Graphical Input	Parallel Camera Sensor Interface	8 data bits available Note that 16-bit interface is only supported if on-board Ethernet-Phy is not mounted. This mounting option is available on request.
Connectivity Interfaces (all functions are not available at the same time)	2x USB2.0 OTG port with Phy	✓
	100/10 Mbps Ethernet-Phy (IEEE1588 compliant) One additional Ethernet interface available and requires an external PHY	✓ with on-board PHY
	3x FlexIO	✓
	8 ch 12-bit ADC, 4x ACMP	✓
	2x USB 2.0 OTG ports	✓
	2x SD/SDIO3.0, MMC 4.5	✓
	4x SPI, 8x UART, 4x I²C, 3x I²S/AC97	✓
	2x FlexCAN, CAN-FD bus 2.0B	✓
	4x FlexPWM, 4xQuadrature Encoder/Decoder	✓
Other	i.MX RT1064 on-chip PMIC integration with DCDC and LDO	✓
	1 Kbit I2C-E2PROM with EUI-48 number for unique Ethernet-MAC address	✓ connected to I2C-A, 7-bit address 0x55, 8-bit address 0xAA/0xAB
	On-board RTC via i.MX RT1064	✓
	On-board watchdog functionality	✓

2.4 Reference Documents

The following documents are important reference documents and should be consulted when integrating the *iMX RT1064 uCOM board*:

- EAuCOM Board Specification

The following NXP documents are also important reference documents and should be consulted for functional details:

- IMXRT1064CEC, i.MX RT1064 Crossover Processors Data Sheet for Consumer Products, latest revision
- IMXRT1064IEC, i.MX RT1064 Crossover Processors Data Sheet for Industrial Products, latest revision
- IMXRT1064RM, i.MX RT1064 Processor Reference Manual, latest revision
- IMXRT106XSRM, Security Reference Manual for i.MX RT106x, latest revision
- Chip Errata for the i.MX RT1064, latest revision
  Note: It is the user's responsibility to make sure all errata published by the manufacturer are taken note of. The manufacturer's advice should be followed.

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- AN12245, Power consumption and measurement of i.MXRT1060, latest revision
- AN12253, i.MXRT1060 Product Lifetime Usage Estimates, latest revision
- AN12077, Using the i.MX RT FlexRAM, latest revision
- AN12800, i.MX RT10xx Fuse Provisioning for Security
- AN12437, i.MX RT Series Performance Optimization
- AN12681, How to use HAB secure boot in i.MX RT10xx
- AN12255, How to Use Flash Remapping Function

The following documents are external industry standard reference documents and should also be consulted when applicable:

- The I2C Specification, Version 2.1, January 2000, Philips Semiconductor (now NXP) (www.nxp.com)
- I2S Bus Specification, Feb. 1986 and Revised June 5, 1996, Philips Semiconductor (now NXP) (www.nxp.com)
- JTAG (Joint Test Action Group) defined by IEEE 1149.1-2001 - IEEE Standard Test Access Port and Boundary Scan Architecture (www.ieee.org)
- SD Specifications Part 1 Physical Layer Simplified Specification, Version 3.01, May 18, 2010, © 2010 SD Group and SD Card Association (Secure Digital) (www.sdcard.org)
- SPI Bus – “Serial Peripheral Interface” – de-facto serial interface standard defined by Motorola. A good description may be found on Wikipedia (http://en.wikipedia.org/wiki/Serial_Peripheral_Interface_Bus)
- USB Specifications (www.usb.org)

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3 Board Pinning

Embedded Artists has defined the EAuCOM board standard with 42 x 45 mm boards that use Hirose DF40C connectors. Note that this is not the same as the EACOM board standard with module size 82 x 50 mm. See the *EAuCOM Board specification* document for details and background information. Hereafter this standard will be referred to as **EAuCOM**.

There are two 100 pos Hirose DF40C expansion connectors. The EAuCOM standard also define two optional 40 pos DF40C connectors but these are not needed for this board. The 0.4mm pitch connectors have a board-to-board stacking height of only 1.5mm. There are also versions of the receptacle connectors that gives 3.0mm stacking height.

3.1 Pin Numbering

The figure below illustrates the location of the four expansion connectors and their respective pin numbering on the bottom side of the *iMX RT1064 uCOM Board*.

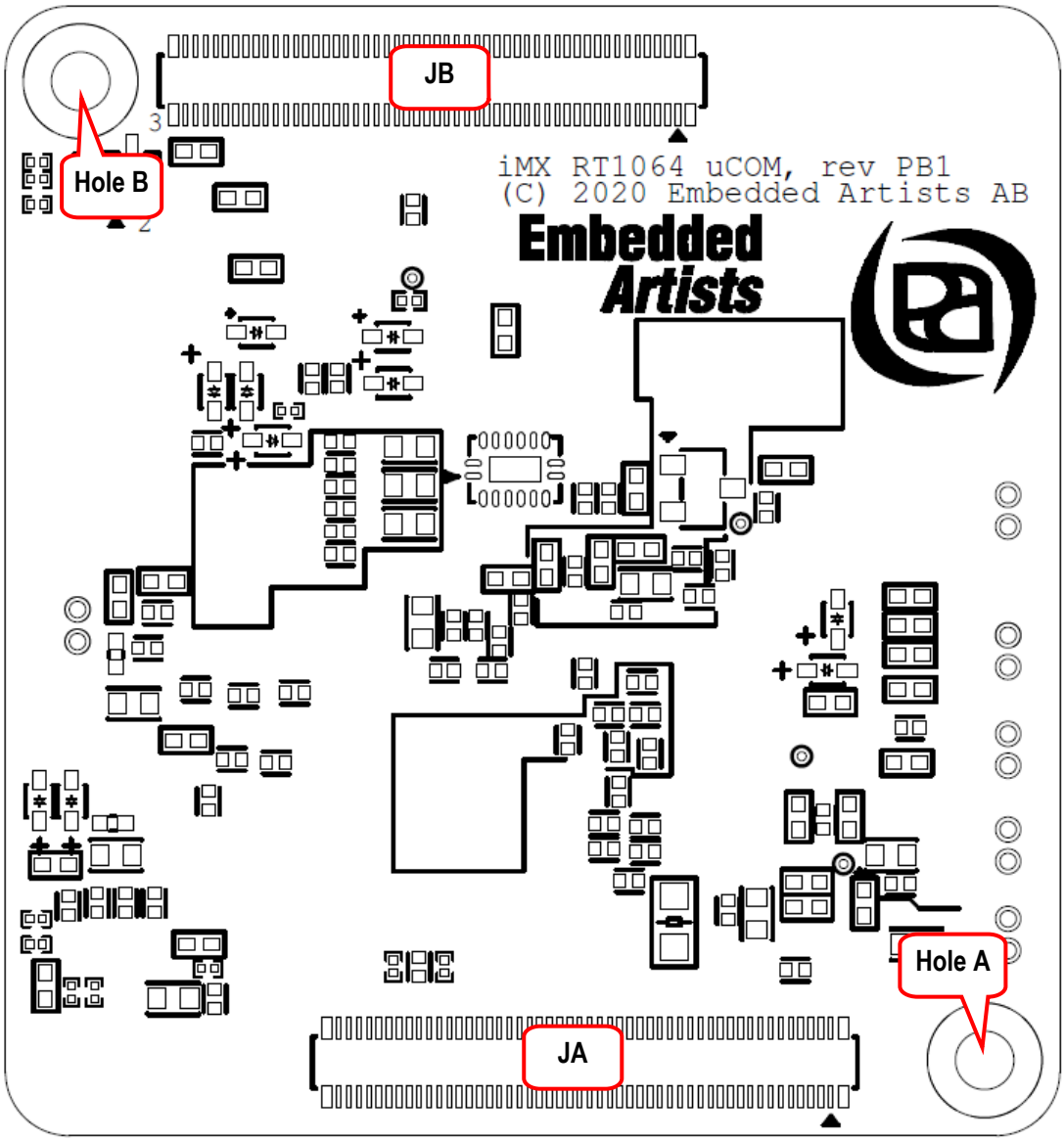

Figure 2 – iMX RT1064 uCOM (EAuCOM standard) Board Pin Numbering, Bottom Side

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3.2 Pin Assignment

This section describes the pin assignment of the board, with the following columns:

Connector and Pin number	The pin numbers are listed in consecutive order. Odd pin numbers are on one row and even numbers on the other row.
Non-i.MX RT1064 signals	Lists signals that are not directly connected to the i.MX RT1064 MCU. These signals are typically related to powering and connected to the on-board Power Management.
i.MX RT1064 Ball Name	The name of the ball of the i.MX RT1064 MCU that is connected to this pin.
Alternative Pin Function	Information if the signal is a dedicated interface or a general pin that can multiples different signals. See separate Excel sheet for details about available multiplexing alternatives.
Notes	When relevant, the preferred pin function is listed.

Note that some pins are EAuCOM board *type specific*, meaning that these pins might not be compatible with other EAuCOM boards. Using these may result in lost compatibility between EAuCOM boards, but not always. Check details between EAuCOM boards of interest.

The table below lists the pins on expansion connector JA (100-pos connector).

JA Pin Number	EAuCOM Board Signal	i.MX RT1064 Ball Name	Alternative Pin Function?	Notes
1-8	VSYS_5V			System supply voltage, see chapter 7 and 8 for more details.
9-16	GND			
17	VDD_SNVS	VDD_SNVS_IN via series diode		Internal 3.3V power supply rail that is always on, generated from the VSYS_5V supply input. Do not connect to this pin.
18	VDD_RTC	VDD_SNVS_IN via series diode		Power supply input for on-chip RTC. See chapter 7 and 8 for more details.
19, 21, 23, 25, 27, 29	VDD_1V8			Not connected
20, 22, 24, 26, 28, 30	VDD_3V3			3.3V voltage rail output, see chapter 7 and 8 for more details.
31-32	GND			
33	LCD_CLK	GPIO_DISP_B0_00	Yes	
34, 36, 38, 40, 42	VDD_RF			**Default supply input for on-board Wi-Fi/BT module (when mounted)**
35	LCD_HSYNC	GPIO_DISP_B0_02	Yes	
37	LCD_VSYNC	GPIO_DISP_B0_03	Yes	
39	LCD_ENABLE	GPIO_DISP_B0_01	Yes	
41	GND			
43	LCD_D0	GPIO_DISP_B0_04	Yes	
44	GND			
45	LCD_D1	GPIO_DISP_B0_05	Yes	
46	GND			
47	LCD_D2	GPIO_DISP_B0_06	Yes	
48	VBAT_TEMP	-		Not connected
49	LCD_D3	GPIO_DISP_B0_07	Yes	

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50	VBAT_CURRP	-		Not connected
51	GND			
52	VBAT_CURRN	-		Not connected
53	LCD_D4	GPIO_DISP_B0_08	Yes	
54, 56, 58, 60	PSU_5V	-		Not connected
55	LCD_D5	GPIO_DISP_B0_09	Yes	
57	LCD_D6	GPIO_DISP_B0_10	Yes	
59	LCD_D7	GPIO_DISP_B0_11	Yes	
61	GND			
62, 64, 66, 68	VBUS_USB	-		Not connected
63	LCD_D8	GPIO_DISP_B0_12	Yes	
65	LCD_D9	GPIO_DISP_B0_13	Yes	
67	LCD_D10	GPIO_DISP_B0_14	Yes	
69	LCD_D11	GPIO_DISP_B0_15	Yes	
70-71	GND			
72	Board specific	PMIC_ON_REQ	No	Do not connect to this signal
73	LCD_D12	GPIO_DISP_B1_00	Yes	
74	Board specific	GPIO_AD_B0_14	Yes	
75	LCD_D13	GPIO_DISP_B1_01	Yes	
76	Board specific	GPIO_AD_B0_15	Yes	
77	LCD_D14	GPIO_DISP_B1_02	Yes	
78	Board specific	GPIO_AD_B1_08	Yes	
79	LCD_D15	GPIO_DISP_B1_03	Yes	
80	Board specific	GPIO_AD_B1_09	Yes	
81-82	GND			
83	LCD_D16	GPIO_DISP_B1_04	Yes	Not connected when on-board Ethernet-Phy is mounted, which it is in the default mounting option.
84	Board specific	GPIO_B1_13	Yes	Internal watchdog signal (pin function: WDOG_B). Do not connect to this signal.
85	LCD_D17	GPIO_DISP_B1_05	Yes	Not connected when on-board Ethernet-Phy is mounted, which it is in the default mounting option.
86	Board specific	OTG1_CHD	Yes	
87	LCD_D18	GPIO_DISP_B1_06	Yes	Not connected when on-board Ethernet-Phy is mounted, which it is in the default mounting option.
88	Board specific	WAKEUP	Yes	
89	LCD_D19	GPIO_DISP_B1_07	Yes	Not connected when on-board Ethernet-Phy is mounted, which it is in the default mounting option.
90	Board specific	NVCC_SD2_EXT	No	Optional supply input for the SD2 interface. Not connected in the default mounting version.
91-92	GND			
93	LCD_D20	GPIO_DISP_B1_08	Yes	Not connected when on-board Ethernet-Phy is mounted, which it is in the default mounting option.
94	Board specific	Wi-Fi/BT module: BT_PCM_IN		**Connected to on-board BT audio interface, when Wi-Fi/BT module is mounted. 1.8V signaling level.**
95	LCD_D21	GPIO_DISP_B1_09	Yes	Not connected when on-board Ethernet-Phy is mounted, which it is in the default mounting option.

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96	Board specific	Wi-Fi/BT module: BT_PCM_OUT		**Connected to on-board BT audio interface, when Wi-Fi/BT module is mounted. 1.8V signaling level.**
97	LCD_D22	GPIO_DISP_B1_10	Yes	Not connected when on-board Ethernet-Phy is mounted, which it is in the default mounting option.
98	Board specific	Wi-Fi/BT module: BT_PCM_CLK		**Connected to on-board BT audio interface, when Wi-Fi/BT module is mounted. 1.8V signaling level.**
99	LCD_D23	GPIO_DISP_B1_11	Yes	Not connected when on-board Ethernet-Phy is mounted, which it is in the default mounting option.
100	Board specific	Wi-Fi/BT module: BT_PCM_SYNC		**Connected to on-board BT audio interface, when Wi-Fi/BT module is mounted. 1.8V signaling level.**

The table below lists the pins on expansion connector JB (100-pos connector).

JB Pin Number	EAuCOM Board Signal	i.MX RT1064 Ball Name	Alternative Pin Function?	Notes
1	UART-B_RXD	GPIO_AD_B1_07	Yes	**Not connected if Wi-Fi/BT module mounted**
2	GPIO-A	Optional: GPIO_EMC_40	Yes	Not connected when on-board Ethernet-Phy is mounted, which it is in the default mounting option.
3	UART-B_TXD	GPIO_AD_B1_06	Yes	**Not connected if Wi-Fi/BT module mounted**
4	GPIO-B	Optional: GPIO_EMC_41	Yes	Not connected when on-board Ethernet-Phy is mounted, which it is in the default mounting option.
5	UART-A_RXD	GPIO_AD_B0_13	Yes	Note that this signal has a 100K ohm pullup resistor.
6	GPIO-C	GPIO_SD_B1_00	Yes	
7	UART-A_TXD	GPIO_AD_B0_12	Yes	Note that this signal has a 100K ohm pullup resistor.
8	GPIO-D	GPIO_SD_B1_01	Yes	
9	UART-B_CTS	GPIO_AD_B1_04	Yes	**Not connected if Wi-Fi/BT module mounted**
10	GPIO-E	GPIO_SD_B1_02	Yes	
11	UART-B_RTS	GPIO_AD_B1_05	Yes	**Not connected if Wi-Fi/BT module mounted**
12	GPIO-F	GPIO_SD_B1_03	Yes	
13	UART-C_RXD	GPIO_AD_B1_03	Yes	
14	GPIO-G	GPIO_SD_B1_04	Yes	
15	UART-C_TXD	GPIO_AD_B1_02	Yes	
16	GPIO-H	GPIO_SD_B1_05	Yes	
17	GND			
18	GPIO-J	GPIO_AD_B1_10	Yes	Not connected when (extra) on-board QSPI flash is mounted
19	SD-A_VDD	NVCC_SD1		SD1 interface supply voltage output ((1.8V or 3.3V controlled by GPIO_B1_14-SD1_VSEL). Only use this supply voltage for pull-up resistors on SD1 SDIO signals (if needed).
20	GPIO-K	GPIO_AD_B1_11	Yes	Not connected when (extra) on-board QSPI flash is mounted
21	GND			
22	GPIO-L	GPIO_B1_14 (fixed at function: SD1_VSEL)	No	Internal signal connected to SD1_VSEL, controlling voltage level on SD1 interface. Do not connect to this signal.
23	SD-A_CLK	GPIO_SD_B0_01		Signaling voltage level can be 1.8V or 3.3V, controlled by GPIO_B1_14-SD1_VSEL **Not connected if Wi-Fi/BT module mounted**
24	GPIO-M	Oscillator signal: W_OSC32K768		**Signal only available when Wi-Fi/BT module mounted**
25	SD-A_CMD	GPIO_SD_B0_00	Yes	Signaling voltage level can be 1.8V or 3.3V, controlled by

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				GPIO_B1_14-SD1_VSEL **Not connected if Wi-Fi/BT module mounted**
26	GND			
27	SD-A_DATA0	GPIO_SD_B0_02	Yes	Signaling voltage level can be 1.8V or 3.3V, controlled by GPIO_B1_14-SD1_VSEL **Not connected if Wi-Fi/BT module mounted**
28	SPI-A_SCLK	GPIO_SD_B1_07	Yes	
29	SD-A_DATA1	GPIO_SD_B0_03	Yes	Signaling voltage level can be 1.8V or 3.3V, controlled by GPIO_B1_14-SD1_VSEL **Not connected if Wi-Fi/BT module mounted**
30	SPI-A_MISO	GPIO_SD_B1_09	Yes	
31	SD-A_DATA2	GPIO_SD_B0_04	Yes	Signaling voltage level can be 1.8V or 3.3V, controlled by GPIO_B1_14-SD1_VSEL **Not connected if Wi-Fi/BT module mounted**
32	SPI-A_MOSI	GPIO_SD_B1_08	Yes	
33	SD-A_DATA3	GPIO_SD_B0_05	Yes	Signaling voltage level can be 1.8V or 3.3V, controlled by GPIO_B1_14-SD1_VSEL **Not connected if Wi-Fi/BT module mounted**
34	SPI-A_SS0	GPIO_SD_B1_06	Yes	
35	GND			
36	GND			
37	SD-A_WP	Ethernet-Phy: OPT_ENET_RST		Alternative input signal to reset the on-board Ethernet-Phy (pull low to reset).
38	SPI-B_SCLK	GPIO_AD_B1_15	Yes	Not connected when (extra) on-board QSPI flash is mounted
39	SD-A_NCD	GPIO_B1_12	Yes	
40	SPI-B_MISO	GPIO_AD_B1_13	Yes	Not connected when (extra) on-board QSPI flash is mounted
41	SD-A_NRST	PMIC_STBY_REQ	Yes	This signal can be programmed as GPIO5_IO2.
42	SPI-B_MOSI	GPIO_AD_B1_14	Yes	Not connected when (extra) on-board QSPI flash is mounted
43	USB-A_OC	GPIO_AD_B0_03	Yes	
44	SPI-B_SS0	GPIO_AD_B1_12	Yes	Not connected when (extra) on-board QSPI flash is mounted
45	USB-A_PWR	GPIO_AD_B0_02	Yes	
46	GND			
47	USB-A_VBUS	5V_USB_OTG	No	
48	I2C-A_SCL	GPIO_AD_B1_00 (func: I2C1_SCL)	No	Note: Do not change pin function. Must be an I2C channel (I2C1_SCL) since the interface is used on-board. **Note: This pin has a 2.2 Kohm pull-up resistor to 3.3V.**
49	USB-A_DN	OTG1_DN	No	
50	I2C-A_SDA	GPIO_AD_B1_01 (func: I2C1_SDA)	No	Note: Do not change pin function. Must be an I2C channel (I2C1_SDA) since the interface is used on-board. **Note: This pin has a 2.2 Kohm pull-up resistor to 3.3V.**
51	USB-A_DP	OTG1_DP	No	
52	I2C-B_SCL	GPIO_SD_B1_11	Yes	**Note: This pin has a 2.2 Kohm pull-up resistor to 3.3V.**
53	USB-A_ID	GPIO_AD_B0_01	Yes	
54	I2C-B_SDA	GPIO_SD_B1_10	Yes	**Note: This pin has a 2.2 Kohm pull-up resistor to 3.3V.**
55	GND			
56	I2C-C_SCL	-		Not connected

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57	USB-B_OC	GPIO_AD_B0_00	Yes	Do not connect to this pin. Connected to Ethernet-Phy interrupt signal.
58	I2C-C_SDA	-		Not connected
59	USB-B_PWR	GPIO_B1_15	Yes	
60	I2C-D_SCL	-		Not connected
61	USB-B_VBUS	5V_USB_HS	No	
62	I2C-D_SDA	Ethernet-Phy interrupt signal		Connects directly to the interrupt signal of the on-board Ethernet-Phy and is normally connected to signal GPIO_AD_B0_00 (found on JB pin 57). With special mounting option can signal GPIO_AD_B0_00 be disconnected and this pin can connect to an external signal.
63	USB-B_DN	OTG2_DN	No	
64	GND			
65	USB-B_DP	OTG2_DP	No	
66	GND			
67	USB-B_ID			Not connected
68	PERI_PWR_EN		No	**Power enable signal for external peripherals. No external must drive any signal to the i.MX RT1064 MCU before this signal is active.** The signal is active high and is connected to the on-board generate 3.3V supply rail. If all external circuits that can drive a signal to the i.MX1064 MCU are powered from the uCOM generated 3.3V supply, this gating signal can be ignored.
69	GND			
70	POR_B	POR_B		3.3V translated signal of the i.MX RT1064 MCU's POR_B. Signal shall normally only be used to connect to debug interface connector. **Use signals PWR_CYCLE_IN (JB pin 74) to power cycle reset of the board.**
71	ETH_LED_10/100	ETH_LED_10/100		Connected to on-board Ethernet PHY
72	ONOFF	ONOFF		Connected to ONOFF on the i.MX RT1064 MCU
73	ETH_LED_1000			Connected to GND
74	PWR_CYCLE_IN			A low pulse on this input cause a power cycle reset of the board.
75	ETH_LED_ACT	ETH_LED_ACT		Connected to on-board Ethernet PHY
76	BOOT_MODE0	GPIO_AD_B0_04	No	This signal shall be left unconnected under normal operation. The Boot Mode is controlled by signals ISP_ENABLE (JB pin 100) and BOOT_CTRL (JB pin 98). **Signal connected to WL_DEV_WAKE signal when Wi-Fi/BT module mounted.**
77	GND			
78	BOOT_MODE1	GPIO_AD_B0_05	No	This signal shall be left unconnected under normal operation. The Boot Mode is controlled by signals ISP_ENABLE (JB pin 100) and BOOT_CTRL (JB pin 98). **Signal connected to BT_DEV_WAKE signal when Wi-Fi/BT module mounted.**
79	ETH_TRXP1	ETH_TRXP1		Connected to on-board Ethernet-Phy
80	TEST_MODE	-		Not connected
81	ETH_TRXN1	ETH_TRXN1		Connected to on-board Ethernet-Phy
82	JTAG_VCC			The supply voltage of the JTAG debug interface, 3.3V
83	GND			
84	GND			

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85	ETH_TRXP0	ETH_TRXP0		Connected to on-board Ethernet-Phy
86	JTAG_TCK	GPIO_AD_B0_07	Yes	
87	ETH_TRXN0	ETH_TRXN0		Connected to on-board Ethernet-Phy
88	JTAG_TMS	GPIO_AD_B0_06	Yes	
89	GND			
90	JTAG_TDI	GPIO_AD_B0_09	Yes	
91	ETH_TRXN3	ETH_TRXN3		Not connected
92	JTAG_TDO	GPIO_AD_B0_10	Yes	**Signal connected to WL_HOST_WAKE signal when Wi-Fi/BT module mounted.**
93	ETH_TRXP3	ETH_TRXP3		Not connected
94	JTAG_TRST	GPIO_AD_B0_11	Yes	**Signal connected to BT_HOST_WAKE signal when Wi-Fi/BT module mounted.**
95	GND			
96	JTAG_MOD	GPIO_AD_B0_08	Yes	Note that this signal has a 10K ohm pulldown resistor. **Signal connected to RF_EN (power enable) signal when Wi-Fi/BT module mounted.**
97	ETH_TRXN2	ETH_TRXN2		Not connected
98	BOOT_CTRL			See section 10.3 for details about boot control and options. Leave pin floating, which means that the i.MX RT1064 MCU boots from on-chip OTP fuses (programmed to boot from on-board QSPI flash) but **connect this pin to the ground via a zero-ohm resistor that is not mounted**. This would make it easy to ground the pin, if ever needed in the future.
99	ETH_TRXP2	ETH_TRXP2		Not connected
100	ISP_ENABLE			Leave floating/open for normal boot. Pull low to ground to place i.MX RT1064 MCU in USB OTG boot mode (during next power cycle).

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4 Pin Mapping

4.1 Functional Multiplexing on I/O Pins

There are a lot of different peripherals inside the i.MX RT1064 MCU. Many of these peripherals are connected to the IOMUX block, that allows the I/O pins to be configured to carry one of many alternative functions. This leave great flexibility to select a function multiplexing scheme for the pins that satisfy the interface need for a particular application.

Some interfaces with specific voltage levels/drivers/transceivers have dedicated pins, like for example USB. Pins carrying these signals do not have any functional multiplexing possibilities. These interfaces are fixed.

To keep compatibility between uCOM boards keep the EAuCOM specified pin allocation, but in general there are no restrictions to select alternative pin multiplexing schemes on the *iMX RT1064 uCOM Board*.

Functional multiplexing is normally controlled via the SDK BSP. It can also be done directly via register `IOMUXC_SW_MUX_CTL_PAD_xxx` where `xxx` is the name of the i.MX RT1064 pin. For more information about the register settings, see the *i.MX RT1064 Processor Reference Manual* from NXP.

Note that input functions that are available on multiple pins will require control of an input multiplexer. This is controlled via register `IOMUXC_xxx_SELECT_INPUT` where `xxx` is the name of the input function. Again, for more information about the register settings, see the *i.MX RT1064 Processor Reference Manual* from NXP.

4.1.1 Alternative I/O Function List

There is an accompanying Excel document that lists all alternative functions for each available I/O pin. The reset state is shown as well as the uCOM function allocation. The reset state is typically GPIO, ALT5 function.

4.2 I/O Pin Control

Each pin also has an additional control register for configuring input hysteresis, pull up/down resistors, push-pull/open-drain driving, drive strength and more. Also in this case, configuration is normally done via the SDK BSP but it is possible to directly access the control registers, which are called `IOMUXC_SW_PAD_CTL_PAD_xxx` where `xxx` is the name of the i.MX RT1064 pin. For more information about the register settings, see the *i.MX RT1064 Processor Reference Manual* from NXP.

As a general recommendation, select slow slew rate and lowest drive strength (that still result in acceptable signal edges for the system) in order to reduce problems with EMC.

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5 Memory Areas

This chapter presents the different memories that are available.

5.1 FlexRAM - Internal 512 + 512 = 1024 KByte SRAM

The first 512 KByte internal SRAM of the i.MX RT1064 is controlled by the FlexRAM block. It is highly configurable and flexible. The 512 KByte array is divided into sixteen 32 KByte blocks. Each of these blocks can be configures as one of three functions:

- OCRAM (On-Chip RAM memory)
- DTCM (Data Tightly-Coupled Memory)
- ITCM (Instruction Tightly-Coupled Memory)

Configuration is controlled either by an otp fuse value, which is the default, or by software via register IOMUXC_GPR_GPR16 and IOMUXC_GPR_GPR17. The FlexRAM banks can be configured at runtime.

The default value, no otp fuses set, is the following memory allocation: 256 KByte to OCRAM, 128 KByte each to DTCM and ITCM.

The memory address region for RAM blocks configured as OCRAM is: 0x2020 0000

The memory address region for RAM blocks configured as DTCM is: 0x2000 0000

The memory address region for RAM blocks configured as ITCM is: 0x0000 0000

There is an application note: *Using the i.MX RT FlexRAM* (AN12077) that describes the FlexRAM block in more detail. This is recommended reading.

The second 512 KByte of internal SRAM is available as OCRAM.

5.2 On-chip 4 MByte FLASH

The on-chip QSPI flash has memory address region: 0x7000 0000 - 0x703F FFFF (4 MByte)

5.3 Optional on-board QSPI FLASH

The optional on-board (or on carrier board) QSPI flash can connect to the FLEXSPI pins and starts at memory address region: 0x6000 0000.

5.4 External 32 MByte SDRAM

The external SDRAM has memory region: 0x8000 0000 - 0x81FF FFFF (32 MByte)

5.5 E2PROM with MAC Address

There is an 128 Byte E2PROM with MAC address (EUI-48) connected to I2C channel#1. The 8-bit I2C address is 0xA6/0xA7 (read/write), which equals to a 7-bit I2C address of 0x53.

The memory is 24AA025E48T from Microchip.

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6 Murata Wi-Fi/BT Module Mounting Option

There is a mounting option for the *iMX RT1064 uCOM* board where a high-performance, power-efficient Wi-Fi/BT module from Murata is mounted. The picture below illustrates one module mounted on the board. The primary option is the 1XK module, which is a Wi-Fi 4 solution based on NXP IW416 chipset. Other Wi-Fi/BT modules can also be mounted. Contact Embedded Artists for a discussion. The u.fl. antenna connector is located in the lower right corner.

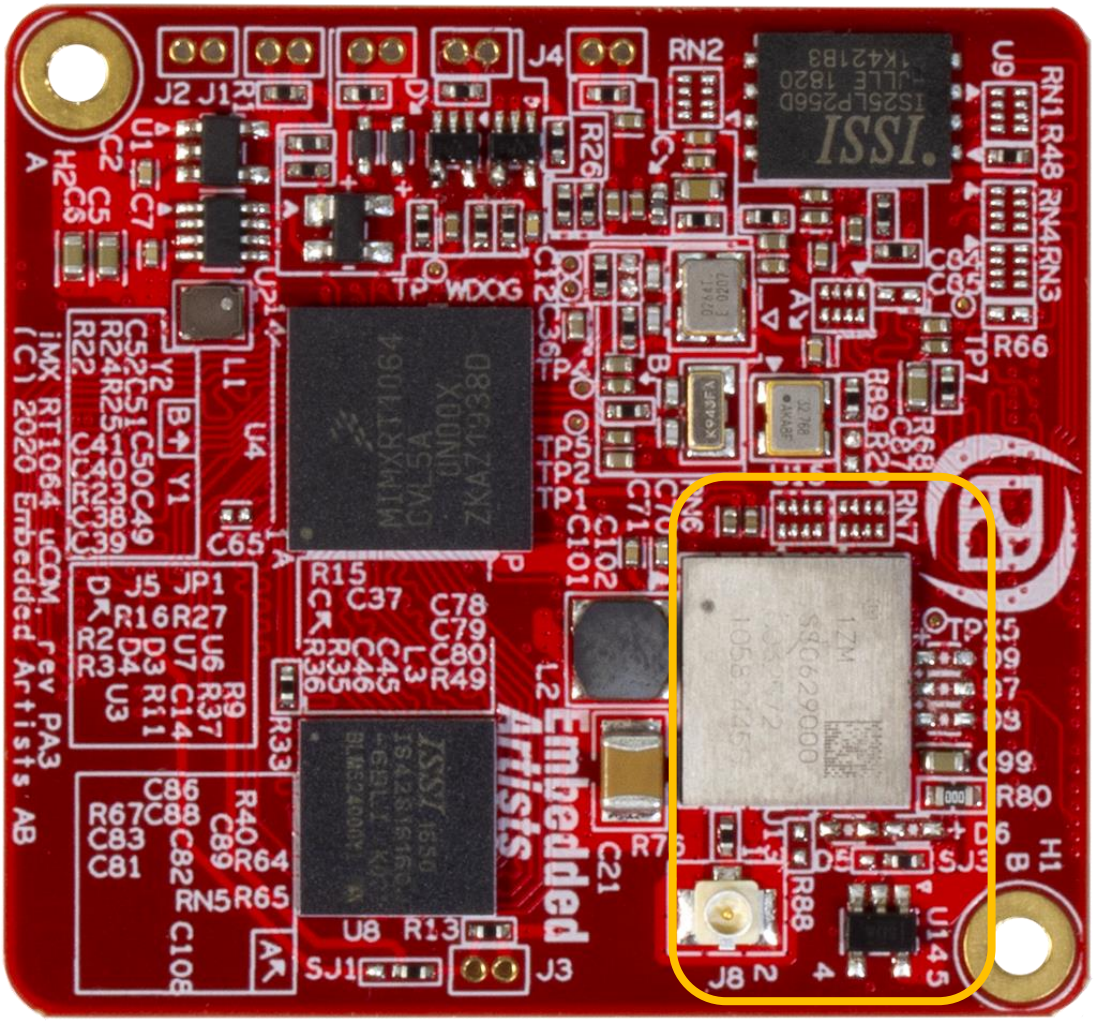

Figure 3 – Wi-Fi/BT Module Mounted on iMX RT1064 uCOM Board

Note that with this mounting option, several signals on connector JB are no longer available.

The Wi-Fi/BT module is powered by default from an external 3.3V supply, VDD_RF. There is a mounting option that allows for the Wi-Fi/BT module to be powered from the internal 3.3V supply but special care must be taken for this option due to startup current spikes from Wi-Fi/BT chipsets. Contact Embedded Artists for further information.

Note that the version with on-board Wi-Fi/BT module is not a stocked mounting option. A minimum order quantity (MOQ) will apply. Contact Embedded Artists for further information.

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7 Powering and Integration

The i.MX RT1064 uCOM board has several internal voltage regulators. The main 3.3V supply is also available for the carrier board design, reducing integration cost. Designs with moderate power consumption may not need any external 3.3V power supply at all on the carrier board. Everything can be handled by the on-board generated voltage supply.

7.1 Available Power Supply Rails

The table below presents the available power rail that can be used on the carrier board that the *iMX RT1064 uCOM Board* is integrated on.

Power Rail Output	Description	Voltage Range	Max Current
NVCC_3V3 on JA pins 20/22/24/26/28/30	3.3V for external use on carrier board.	3.3V	400mA

Note that each pin on the Hirose DF40C expansion connectors can carry 300mA maximum. Connect to all pins on the expansion connectors that carry a specific power rail. High current power rails have more than one pin.

Note that external load variations can affect the internal voltage regulators operation and potentially disturb the i.MX RT1064 MCU operation. Make sure that the carrier board electronics does not have abrupt consumption variations and does not generate noise on the power rails. Also **calculate the heat dissipation** of the voltage converters in case the carrier board has high current consumption.

The 5 to 3.3V voltage regulator is a buck dc/dc voltage regulator with about 85% efficiency.

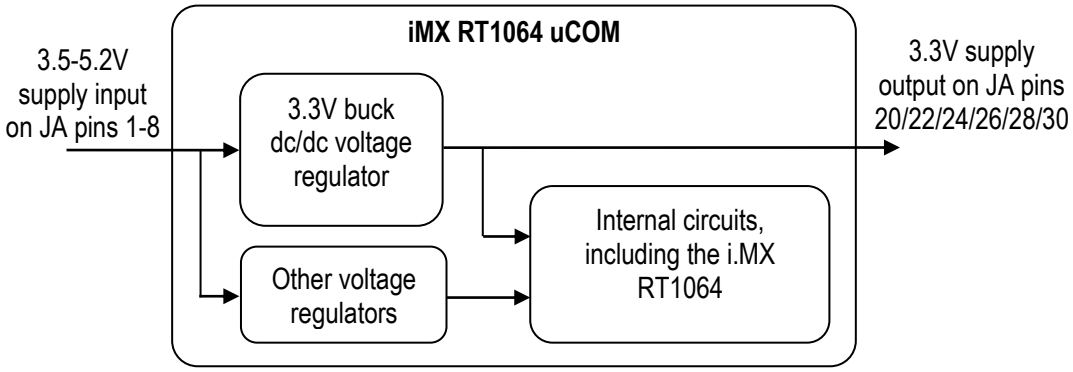

Figure 4 – iMX RT1064 uCOM Board Powering Architecture

7.2 Integration

This integration is very simple. An external 3.5-5.2V supply is basically all that is needed. The internal RTC can optionally be powered from a separate RTC supply input.

- Supply the 3.5-5.2V input voltage to **VSYS_4V2** (connect to all eight pins on connector JA)
- Optionally supply a 3.5-5.2V input voltage to **VBAT_RTC_IN** to power the real-time clock (RTC) and keep it running. If no supply is connected to VBAT_RTC_IN, the RTC is powered from VSYS_4V2 supply input if this is valid.
- Leave signals BAT_TEMP, BAT_CURRP and BAT_CURRN unconnected.
- Leave supply inputs PSU_5V on JA pin 54/56/58/60 and VBUS_USB on JA pin 62/64/66/68 unconnected.

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8 Technical Specification

8.1 Absolute Maximum Ratings

All voltages are with respect to ground, unless otherwise noted. Stress above these limits may cause malfunction or permanent damage to the board.

Symbol	Description	Min	Max	Unit
VSYS_5V	Main input supply voltage	-0.3	5.5	V
VDD_RTC	RTC supply voltage	-0.3	3.7	V
VIO	Vin/Vout (I/O VDD + 0.3): 3.3V IO	0	3.6	V
	Vin/Vout (I/O VDD + 0.3): 1.8V IO	0	1.98	V
USB_xx_VBUS	USB VBUS signals	-0.3	5.25	V
USB_xx_DP/DN	USB data signal pairs	-0.3	3.63	V

8.2 Recommended Operating Conditions

All voltages are with respect to ground, unless otherwise noted.

Symbol	Description	Min	Typical	Max	Unit
VSYS_5V[1]	Main input supply voltage Ripple with frequency content < 10 MHz Ripple with frequency content ≥ 10 MHz	4.2		5.0 50 10	V mV mV
VDD_RTC[1]	RTC supply voltage **Note:** This voltage must remain valid at all times for correct operation of the board (including, but not limited to the RTC).	3.0		3.5	V
USB_xx_VBUS	USB VBUS signals		5	5.25	V

[1] Either VSYS_5V or VDD_RTC must be present (and within valid range) for correct operation of the board (including, but not limited, the ONOFF functionality and the RTC).

8.3 Power Ramp-Up Time Requirements

Input supply voltages (VSYS_5V and VDD_RTC) shall have smooth and continuous ramp from 10% to 90% of final set-point. Input supply voltages shall reach recommended operating range in 1-20 ms.

8.4 Electrical Characteristics

For DC electrical characteristics of specific pins, see NXP's *i.MX RT1064 Crossover Processor Datasheet*. The internal VDD operating point for GPIOs is 3.3V for all signals.

8.4.1 Reset Input

The reset input is triggered by pulling the reset input low (0.2 V max). The internal power on sequence will start immediately on the negative edge of the reset input.

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8.5 Power Consumption

There are several factors that determine power consumption of the *iMX RT1064 uCOM Board*, like input voltage, operating temperature, SDRAM/QSPI/Ethernet activity, operating frequencies for the different cores, body biasing and the software executed.

The values presented are typical values and should be regarded as an estimate. Always measure current consumption in the real system to get a more accurate estimate.

Symbol	Description (VIN = 5V, Toperating = 25°C)	Typical	Max Observed	Unit
I_{VSYS_5V}MAX	Maximum CPU load, 528 MHz ARM Cortex-M7 frequency, without Ethernet	TBD	TBD	mA
I_{VSYS_5V}_SDRAM	Additional current for SDRAM	TBD	TBD	mA
I_{VSYS_5V}_ETH	Additional current for Ethernet Phy	TBD	TBD	mA
I_{VSYS_5V}_SYSIDLE	System idle state	TBD	TBD	mA
I_{VSYS_5V}_LPIDLE	Low power idle state	TBD	TBD	mA
I_{VSYS_5V}_SUSPEND	Suspend state	TBD	TBD	uA
I_{VBAT_RTC}_RTC	Current consumption to keep internal RTC running	TBD	TBD	uA

8.6 Mechanical Dimensions

The table below presents the mechanical dimensions of the module.

Dimension	Value (±0.1 mm)	Unit
Module width	42	mm
Module height	45	mm
Module top side height	2.0	mm
Module bottom side height	1.4	mm
PCB thickness	1.4	mm
Mounting hole diameter	2.3	mm
Module weight	2 ±0.5 gram	gram

The picture below show the mechanical details of the *iMX RT1064 uCOM Board*. The outer measurement is 42 x 45 mm. Note that the picture is seen from the bottom side.

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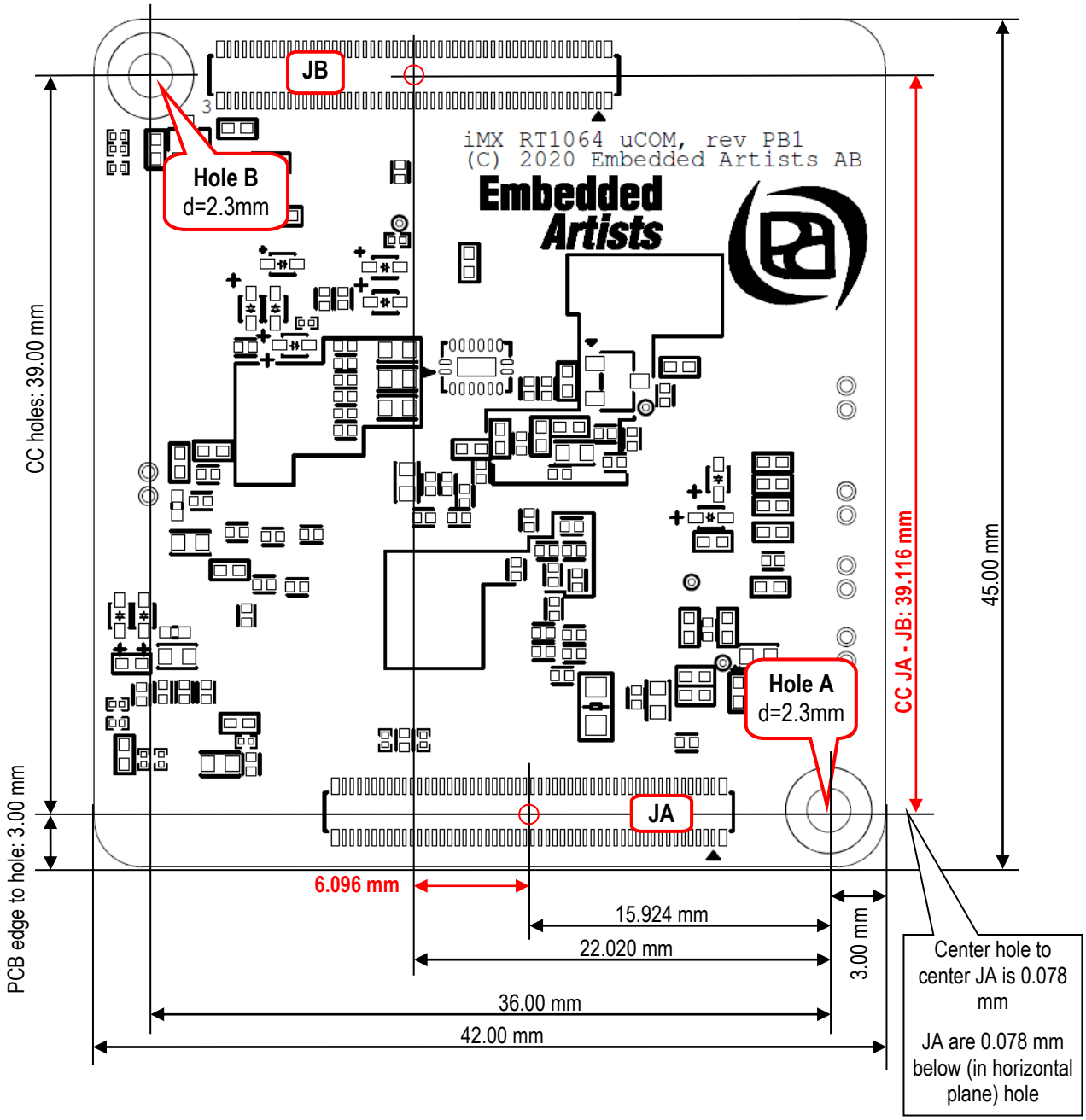

Figure 5 – iMX RT1064 uCOM Board Mechanical Outline, View from Bottom Side

Note that placement of the connectors on the carrier board is very important. They must be parallel and have a placement tolerance of +-0.1mm (non-accumulative). Make sure the relative measures between the connectors (marked with red in the picture above) are correct.

Note that the mounting hole location shall be measured relative to the three connectors, not relative to the pcb edge.

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Since the stacking height is only 1.5mm in normal case, make sure no components other than the three connectors are within the dotted red line. When using 3mm stacking height it is possible to have low-profile components under the *iMX RT1064 uCOM Board*. The picture below illustrates the principal dimensions.

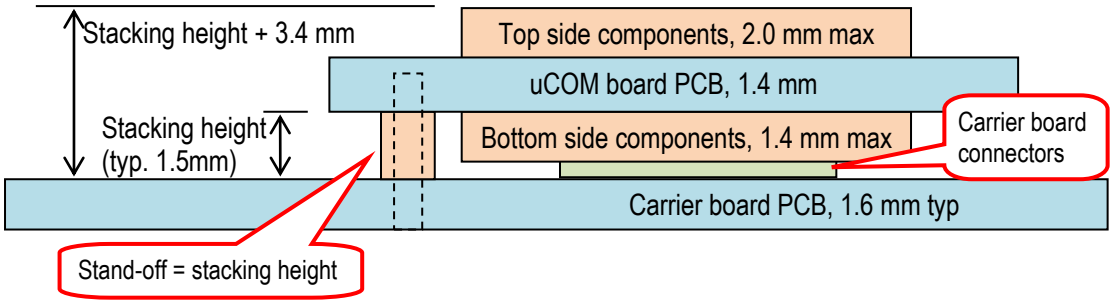

Figure 6 – uCOM Board Mounting on Carrier Board, Stacking Height

8.6.1 DF40C Socket

The headers mounted on the *iMX RT1064 uCOM Board* are DF40C-100DP-0.4V(51) (for JA / JB).

The receptacles that are needed on the carrier board are, depending on stacking height:

Connector	1.5 mm stacking height (standard)	3.0 mm stacking height
100-pos (JA / JB)	DF40C-100DS-0.4V(51) HRS number: 684-4033-4 51	DF40HC(3.0)-100DS-0.4V(51) HRS number: 684-4151-0 51

8.6.2 Module Assembly Hardware

The *iMX RT1064 uCOM Board* has two 2.3 mm mounting holes for securing a good mechanical mounting. Use M2 screws and associated standoffs that have the same height as the stacking height (1.5mm or 3 mm, depending on carrier board connectors).

When mounting the *iMX RT1064 uCOM* board, match hole A on the carrier board with hole A on the uCOM board before the final mounting.

A suitable threaded insert is 9774015243R from Würth Elektronik. This component is used on the *uCOM Carrier Board*.

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8.7 Environmental Specification

8.7.1 Operating Temperature

Ambient temperature (T_A)

Parameter		Min	Max	Unit
Operating temperature range:	commercial temperature range industrial temperature range	0 -40	70[1] 85[1]	°C °C
Storage temperature range		-40	85	°C
Junction temperature i.MX RT1064 MCU, operating:	comm. temp. range ind. temp. range.	0 -40	95 105	°C °C

[1] Depends on cooling/heat management solution.

8.7.2 Thermal Parameters

The i.MX RT1064 MCU thermal parameters are listed in the table below.

Parameter	Typical	Unit
Thermal Resistance, Junction to ambient ($R_{\theta JA}$), natural convection	39.5	°C/W
Thermal Resistance, Junction to package top (Ψ_{JT})	2.65	°C/W

8.7.3 Relative Humidity (RH)

Parameter	Min	Max	Unit
Operating: 0°C ≤ T_A ≤ 70°C, non-condensing (comm. temp. range) Operating: -40°C ≤ T_A ≤ 85°C, non-condensing (ind. temp. range)	10	90	%
Non-operating/Storage: -40°C ≤ T_A ≤ 85°C, non-condensing	5	90	%

8.7.4 Thermal Design Considerations

Heat dissipation from the i.MX RT1064 MCU depending on many operating conditions, like operating frequency, operating voltage, activity type, activity cycle duration and duty cycle. Dissipated heat can be up to 2.5 Watt but is typically much lower. Note that an active Wi-Fi module or Ethernet-Phy can have considerable heat dissipation. This must be taken into account also.

If external cooling is needed, or not, depends on dissipated heat and ambient temperature range. In most cases it is possible to operate the *iMX RT1064 uCOM Board* without external cooling, at least with ambient temperature up to +50° Celsius. Above this, care must be taken not to exceed max junction temperature of the i.MX RT1064 MCU.

Verify operating conditions in the final product. Self-heating in an application can sometimes be significant (depending on ventilation and cooling). Always measure the operating temperature on the i.MX RT1064 MCU under worst case situation (lowest temperature, no execution activity versus highest temperature, maximum execution). Verify that the case temperature is within allowed limits.

The i.MX RT1064 MCU has an integrated temperature sensor for monitoring the junction (i.e., die) temperature.

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8.7.5 Humidity Design Considerations

Also make sure the relative humidity (RH) limits are met. The non-condensing requirement is important to meet. This can be a problem if temperature in the system is varying rapidly.

8.8 Product Compliance

Visit Embedded Artists' website at http://www.embeddedartists.com/product_compliance for up to date information about product compliances such as CE, RoHS2/3, Conflict Minerals, REACH, etc.

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9 Functional Verification and RMA

There is a number of functional tests that can be performed on the *iMX RT1064 uCOM Board* to verify correct operation on the different interfaces. Note that such tests should be performed on the carrier board that is supplied with the *iMX RT1064 uCOM Developer's Kit* and with and with the latest version of an unmodified copy of the patched SDK that Embedded Artists provide.

The tests can also be done to troubleshoot a board that does not seem to operate properly. It is strongly advised to read through the list of tests and actions that can be done before contacting Embedded Artists. The different tests can help determine if there is a problem with the board, or not. For return policy, please read Embedded Artists' General Terms and Conditions document (http://www.embeddedartists.com/sites/default/files/docs/General_Terms_and_Conditions.pdf).

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10 Things to Note

This chapter presents a number of issues and considerations that users must note.

10.1 Shared Pins and Multiplexing

The i.MX RT1064 Crossover microcontroller has multiple on-chip interfaces that are multiplexed on the external pins. It is not possible to use all interfaces simultaneously and some interface usage is prohibited by the *iMX RT1064 uCOM* on-board design. Check if the needed interfaces are available to allocation before starting a design. These is a separate Excel sheet for this, showing all the pin multiplexing options available for each signal on the DF40C expansion connectors.

10.2 Program Content when uCOM Boards are Delivered

The *iMX RT1064 uCOM* board is delivered with a pre-programmed application that is just a forever loop of NOP operations. No pin initialization is done so the application mimics what happens if the program flash would be empty or if USB Boot loader/ISP mode is enabled.

Note that in general **it is a bad idea to assume a *iMX RT1064 uCOM* board is always empty when you first mount in on a carrier board**. The board can have been accidentally programmed with another application during the program development work.

It is strongly recommended to implement a procedure to always make sure a known application is programmed a *iMX RT1064 uCOM* board when mounted on a carrier board. Before powering a board that has just been mounted on a carrier board, place the processor in USB Boot loader/ISP mode (by pulling pin ISP_Enable low). Design the carrier board so that a processor in USB Boot loader mode/ISP will not be damaged or do anything harmful to the carrier board. Program the correct application directly after powering the carrier board (with the new *iMX RT1064 uCOM* board).

Note that when the *iMX RT1064 uCOM* board is sold as part of a *iMX RT1064 Developer's Kit*, a demo application is programmed to the board. This is one of the reasons to never assume an *iMX RT1064 uCOM* board does not have an application programmed.

10.3 OTP Fuse Programming and Boot Control

The i.MX RT1064 MCU has on-chip OTP fuses that can be programmed, see NXP documents *IMXRT1064RM, i.MX RT1064 Processor Reference Manual* for details. Once programmed, there is no possibility to reprogram them.

***iMX RT1064 uCOM Boards* are delivered with BT_FUSE_SEL = 1**. No other OTP fuse has been programmed. It is completely up to the COM board user to decide if OTP fuses shall be programmed, and in that case, which ones.

Just programming BT_FUSE_SEL = 1 will set the boot device to the on-chip QSPI flash. It is possible to specify another boot mode by programming the BOOT_CFG fuses.

Note that Embedded Artists does not replace iMX RT1064 uCOM Boards because of wrong OTP programming. It's the user's responsibility to be absolutely certain before OTP programming and not to program the fuses by accident.

Note that signal BOOT_CTRL can be either high or low. It does not matter. The result is the same since BT_FUSE_SEL = 1. The board will boot according to OTP fuses. The default (when no specific fuses, except BT_FUSE_SEL, are programmed) is from external QSPI flash. Other boot sources are possible by programming OTP fuses. See NXP document *IMXRT1064RM, i.MX RT1064 Processor Reference Manual* for details.

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10.4 Note uCOM Orientation when Mounting

It is possible to mount the uCOM board with incorrect orientation. Doing that will damage the uCOM board beyond repair and can also damage the carrier board. Make sure (production) mounting instructions are particular about the orientation and how to identify the correct orientation of the uCOM. It is recommended to add notes in the silk screen on the carrier board to make operators aware of the issue. The picture below illustrates the silk screen text found on the *uCOM Carrier Board*.

Always match the "A" and "B" marking on the uCOM with the "A" and "B" on the *Carrier Board*.

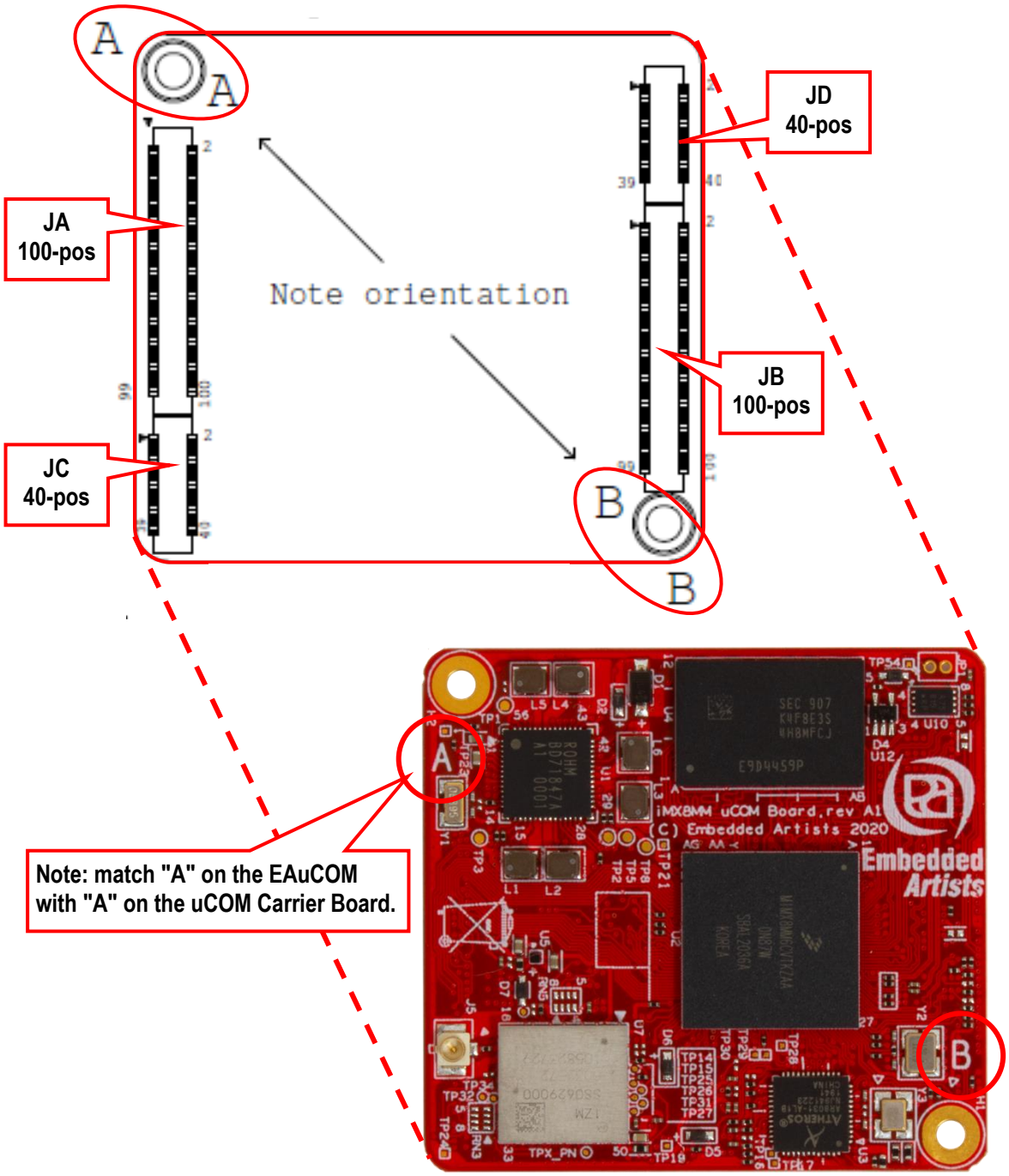

Figure 7 – Orientation of uCOM Board when Mounting on Carrier Board

Note that the picture above is generic and does not explicitly illustrates the iMX RT1064 uCOM board.

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10.5 Handle the uCOM Board with Great Care

Handle the *iMX RT1064 uCOM board* with great mechanical care. **Only remove/unmount it from the *uCOM Carrier board* if absolutely needed.** Only use small movements and small force. Do not insert a screwdriver between the uCOM board and uCOM Carrier board and bend without having first watched the Youtube video we have published about this topic: https://www.youtube.com/watch?v=-a1UGi_rrLM, title "How to mount and unmount a uCOM board".

10.6 On-board I2C Connected Device

There is one I2C-E2PROM component connected to the I2C-A channel, 24AA025E48T-I/OT from Microchip. It is a 1 Kbit I2C-E2PROM with EUI-48 number for unique Ethernet-MAC address. 128 Bytes are available for user data. The other half of the memory is fixed (and contains the EUI-48 number).

The 7-bit I2C-address is 0x53 and the 8-bit I2C-address is 0xA6/0xA7. Note that the maximum clock frequency on I2C-A is 400kHz.

10.7 ESD Precaution when handling the uCOM Board

Please note that the *iMX RT1064 uCOM Board* come without any case/box and all components are exposed for finger touches – and therefore extra attention must be paid to ESD (electrostatic discharge) precaution, for example use of static-free workstation and grounding strap. Only qualified personnel shall handle the product.

Make it a habit always to first touch the mounting hole (which is grounded) for a few seconds with both hands before touching any other parts of the boards. That way, you will have the same potential as the board and therefore minimize the risk for ESD.

In general touch as little as possible on the boards in order to minimize the risk of ESD damage. The only reasons to touch the board are when mounting/unmounting it on a carrier board.

Note that Embedded Artists does not replace boards that have been damaged by ESD.

10.8 EMC / ESD

The *iMX RT1064 uCOM Board* has been developed according to the requirements of electromagnetic compatibility (EMC). Nevertheless depending on the target system, additional anti-interference measurement may still be necessary to adherence to the limits for the overall system.

The *iMX RT1064 uCOM Board* must be mounted on carrier board (typically an application specific board) and therefore EMC and ESD tests only makes sense on the complete solution.

No specific ESD protection has been implemented on the *iMX RT1064 uCOM Board*. ESD protection on board level is the same as what is specified in the i.MX RT1064 MCU datasheet. **It is strongly advised to implement protection against electrostatic discharges (ESD) on the carrier board** on all signals to and from the system. Such protection shall be arranged directly at the inputs/outputs of the system.

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10.9 Integration - Contact Embedded Artists

It is strongly recommended to contact Embedded Artists at an early stage in your project. A wide range of support during evaluation and the design-in phase are offered, including but not limited to:

- *iMX RT1064 uCOM Developer's Kit* to simplify evaluation
- Custom Carrier board design, including 'ready-to-go' standard carrier boards
- Display solutions
- Mechanical solutions
- Schematic review of customer carrier board designs
- Driver and application development

The *iMX RT1064 uCOM Board* targets a wide range of applications, such as:

- HMI/GUI solutions
- Connected vending machines
- Point-of-Sale (POS) applications
- Access control panels
- Audio
- IP phones
- Smart appliances
- Home energy management systems
- Industrial automation
- HVAC Building and Control Systems
- Smart Grid and Smart Metering
- Smart Toll Systems
- Data acquisition
- Communication gateway solutions
- Connected real-time systems
- ...and much more

For more harsh use and environments, and where fail-safe operation, redundancy or other strict reliability or safety requirements exists, always contact Embedded Artists for a discussion about suitability.

There are application areas that the *iMX RT1064 uCOM Board* is not designed for (and such usage is strictly prohibited), for example:

- Military equipment
- Aerospace equipment
- Control equipment for nuclear power industry
- Medical equipment related to life support, etc.
- Gasoline stations and oil refineries

If not before, **it is essential to contact Embedded Artists before production begins**. In order to ensure a reliable supply for you, as a customer, we need to know your production volume estimates and forecasts. Embedded Artists can typically provide smaller volumes of the *iMX RT1064 uCOM Board* directly from stock (for evaluation and prototyping), but **larger volumes need to be planned**.

The more information you can share with Embedded Artists about your plans, estimates and forecasts the higher the likelihood is that we can provide a reliable supply to you of the *iMX RT1064 uCOM Board*.

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11 Custom Design

This document specifies the standard *iMX RT1064 uCOM Board* design. Embedded Artists offers many custom design services. Contact Embedded Artists for a discussion about different options.

Examples of custom design services are:

- Mounting a Wi-Fi/BT module. More than one option exists.
- Different memory sizes on SDRAM and external QSPI Flash.
- Different I/O voltage levels on all or parts of the pins.
- Different mounting options, for example remove Ethernet-Phy to get 24-bit parallel RGB display interface.
- Different pinning on DF40C connectors.
- Different board form factor and different expansion connectors (different board standard).
- Different input supply voltage range.
- Single Board Computer solutions, where the core design of the *iMX RT1064 uCOM Board* is integrated together with selected interfaces.
- Changed internal pinning to make certain pins available.

Embedded Artists also offers a range of services to shorten development time and risk, such as:

- Standard Carrier boards ready for integration
- Custom Carrier board design
- Display solutions
- Mechanical solutions

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