

1 简介

i.MX RT1024 处理器包含 4 MB 的片上闪存和 256 KB 的片上 RAM。与 i.MX RT1020 不同，i.MX RT1024 嵌入了一个 4 MB QSPI 闪存，可帮助客户节省空间并简化电路设计。

本文档旨在从系统角度介绍如何从 i.MX RT1020 迁移到 i.MX RT1024。

2 功能比较

i.MX RT1024 在芯片中结合了 i.MXRT1020 和一个 4 MB QSPI 闪存。表 1 列举了 RT1020 和 RT1024 的功能比较。在迁移时请注意以下事项：

- i.MX RT1024 芯片无法直接替换 i.MXRT1020 芯片。
- i.MX RT1024 只能从内部 QSPI 闪存启动，而 i.MXRT1020 可以从外部闪存启动。

表 1. RT1020 vs RT1024

	RT1020	RT1024
Package	144LQFP	144LQFP
Frequency	500 MHz, consumer grade 396 MHz, Industrial grade	500 MHz, consumer grade 396 MHz, Industrial grade
RAM	256 KB	256 KB
Flash	NA	4 MB
CAN	2	2
Ethernet	1	1
1588 EVENT	4	2
eMMC4.5/SD3.0	2	2
USB OTG	1	1
SAI	3	3
SPDIF	1	1
Timer	2	2
PWM	2	2
KPP	8 × 8	5 × 5
UART	8	8
I ² C	4	4

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表 1. RT1020 vs RT1024 (continued)

	RT1020	RT1024
SPI	4	4
ADC	2	2
ACMP	4	4
GPIO	96	90

3 Boot option 变化

i.MX RT1020 和 i.MX RT1024 具有不同的 XIP 启动选项，这意味着它们通过不同的 FlexSPI 引脚组进行启动。i.MX RT1020 可以为 FlexSPI 使用三个启动选项，而 i.MXRT1024 仅可以使用一个选项。

请参见下表了解启动选项的差异。表 2 和 表 3 描述了 i.MXRT1020 和 i.MXRT1024 的 XIP 启动相关的引脚。

表 2 和 表 3 describe the XIP boot pins for i.MXRT1020 and i.MXRT1024.

表 2. i.MXRT1020 XIP boot options

Peripheral	Port (IO function)	PAD	Description
FlexSPI	FLEXSPI_B_DATA3	GPIO_SD_B1_00	Boot option to connect the external XIP flash, such as, QSPI flash, Octal flash and Hyper flash, and so on.
	FLEXSPI_B_DATA2	GPIO_SD_B1_03	
	FLEXSPI_B_DATA1	GPIO_SD_B1_04	
	FLEXSPI_B_DATA0	GPIO_SD_B1_02	
	FLEXSPI_B_SCLK	GPIO_SD_B1_01	
	FLEXSPI_B_DQS	GPIO_SD_B0_05	
	FLEXSPI_B_SS0_B	GPIO_SD_B0_04	
	FLEXSPI_B_SS1_B	GPIO_SD_B0_01	
	FLEXSPI_A_DQS	GPIO_SD_B1_05	
	FLEXSPI_A_SS0_B	GPIO_SD_B1_11	
	FLEXSPI_A_SS1_B	GPIO_SD_B0_00	
	FLEXSPI_A_SCLK	GPIO_SD_B1_07	
	FLEXSPI_A_DATA0	GPIO_SD_B1_08	
	FLEXSPI_A_DATA1	GPIO_SD_B1_10	
	FLEXSPI_A_DATA2	GPIO_SD_B1_09	
	FLEXSPI_A_DATA3	GPIO_SD_B1_06	

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表 2. i.MXRT1020 XIP boot options (continued)

Peripheral	Port (IO function)	PAD	Description
FlexSPI 2 nd option	FLEXSPI_A_DATA3	GPIO_AD_B1_00	The other boot option, just available to connect QSPI flash.
	FLEXSPI_A_DATA2	GPIO_AD_B1_03	
	FLEXSPI_A_DATA1	GPIO_AD_B1_04	
	FLEXSPI_A_DATA0	GPIO_AD_B1_02	
	FLEXSPI_A_SCLK	GPIO_AD_B1_01	
	FLEXSPI_A_SS0_B	GPIO_AD_B1_05	

表 3. i.MXRT1024 XIP boot option

Peripheral	Port (IO function)	PAD	Description
FlexSPI	FLEXSPI_A_DATA3	GPIO_AD_B1_00	Connected to the embedded QSPI flash for booting.
	FLEXSPI_A_DATA2	GPIO_AD_B1_03	
	FLEXSPI_A_DATA1	GPIO_AD_B1_04	
	FLEXSPI_A_DATA0	GPIO_AD_B1_02	
	FLEXSPI_A_SCLK	GPIO_AD_B1_01	
	FLEXSPI_A_SS0_B	GPIO_AD_B1_05	
	FLEXSPI_A_DQS	GPIO_SD_B1_05	

注意

对于 RT1024 XIP 引导选项，这些 PAD 用于内部闪存，用户无法外部使用。

RT1024 只有一个 FlexSPI 端口，用于内部闪存。RT1024 不支持外部 FlexSPI 闪存，请改用内部 SIP 闪存。

4 PINMUX 变化

从 i.MX RT1020 移植到 i.MX RT1024 的过程中，PINMUX 有所变化，如表 4 所示。

表 4. PINMUX changes

Pin name	Pin number	RT1020	RT1024
GPIO_AD_B1_00	87	Available	NA
GPIO_AD_B1_01	88	Available	NA
GPIO_AD_B1_02	89	Available	NA
GPIO_AD_B1_03	90	Available	NA

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表 4. PINMUX changes (continued)

Pin name	Pin number	RT1020	RT1024
GPIO_AD_B1_04	91	Available	NA
GPIO_AD_B1_05	92	Available	NA
NVCC_GPIO4	77	Available	NA
NVCC_GPIO5	104	Available	NA

5 EVK pin 分配变化

i.MX RT1020EVK 和 i.MX RT1024EVK 之间的更改请参考 表 5，其中列出了电源，音频和 FlexSPI 闪存的引脚分配更改。

注意

- 通常情况下 SEMC SDRAM 的最大读写速度是 133 MHz，但是如果将 GPIO_EMC_28 引脚配置为 SAI3_MCLK，则无法同时将其配置为 SEMC_DQS，在这种情况下 SEMC SDRAM 最大读/写速度将限制在 66 MHz。
- 对于 RT1024，即使使用内部 SIP 闪存，仍然需要将 GPIO_SD_B1_05 引脚悬空以实现 133MHz 的最大读写速度。

表 5. i.MXRT1020EVK VS i.MXRT1024EVK

i.MX RT1020EVK		i.MX RT1024EVK	
Module	Pin assignment	Module	Pin assignment
SAI1	GPIO_AD_B1_00(SAI1_MCLK)	SAI3	GPIO_EMC_28(SAI3_MCLK)
	GPIO_AD_B1_01(SAI1_T X_BCLK)		GPIO_SD_B1_06(SAI3_TX_BCLK)
	GPIO_AD_B1_02(SAI1_T X_SYNC)		GPIO_SD_B1_07(SAI3_TX_SYNC)
	GPIO_AD_B1_03(SAI1_TXD)		GPIO_SD_B1_08(SAI3_TXD)
	GPIO_AD_B1_04(AUD_INT)		GPIO_SD_B1_09(AUD_INT)
	GPIO_AD_B1_05(SAI1_RXD)		GPIO_SD_B1_11(SAI3_RXD)
FlexSPI	GPIO_SD_B1_05(FlexSPI_DQS_A)	FlexSPI	GPIO_SD_B1_05(FlexSPI_DQS_A)
	GPIO_SD_B1_06(FlexSPI_D3_A)		SIP Flash
	GPIO_SD_B1_07(FlexSPI_CLK)		
	GPIO_SD_B1_08(FlexSPI_D0_A)		
	GPIO_SD_B1_09(FlexSPI_D2_A)		
	GPIO_SD_B1_10(FlexSPI_D1_A)		
	GPIO_SD_B1_11(FlexSPI_SS0)		

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表 5. i.MXRT1020EVK VS i.MXRT1024EVK (continued)

i.MX RT1020EVK		i.MX RT1024EVK	
Module	Pin assignment	Module	Pin assignment
Power	NVCC_GPIO5	Power	NC
	NVCC_GPIO6		NC

6 软件变化

由于本文档中提到的 RT1020 和 RT1024 之间的硬件资源不同，因此也需要相应地更新软件。

有关细节，请参考用于 RT1024 的 MCUXpresso SDK 发行包 (<https://mcuxpresso.nxp.com>)。

7 其他变化

从 i.MX RT1020 到 i.MX RT1024 还有一些其他变化。

1. ENET 失去了一些 IEEE1588 功能。受影响的信号包括：

- ENET_1588_EVENT2_IN
- ENET_1588_EVENT2_OUT
- ENET_1588_EVENT3_IN
- ENET_1588_EVENT3_OUT

2. GPIO 数量从 96 减少到 90。受影响的信号包括：

- FLEXIO1_FLEXIO10
- FLEXIO1_FLEXIO11
- FLEXIO1_FLEXIO12
- FLEXIO1_FLEXIO13
- FLEXIO1_FLEXIO14
- FLEXIO1_FLEXIO15
- GPIO1_IO16
- GPIO1_IO17
- GPIO1_IO18
- GPIO1_IO19
- GPIO1_IO20
- GPIO1_IO21

3. 8 × 8 键盘减少到 5 × 5 键盘。受影响的信号包括：

- KPP_COL4
- KPP_COL5
- KPP_COL6
- KPP_ROW4
- KPP_ROW5
- KPP_ROW6

4. RT1024 与 RT1020 相比有 8 个 NC 引脚，在硬件设计中应使这些引脚悬空，这 8 个 NC 引脚的标号为 77，87-92，和 104。

8 总结

本文档介绍了如何从 i.MXRT1020 迁移到 i.MXRT1024，这有助于客户将项目平稳地迁移到 i.MXRT1024。

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