AN14570

使用 **RT1040-EVK** 为 **RT104x** 进行设计

Rev. 1.0 — **2025**年**2**月**12**日 应用笔记

文档信息

信息	内容
关键词	AN14570_ZH, RT1041, RT1042, RT1042, RT1046
摘要	本应用说明便于用户方便选择和开发 RT1040 系列。

1 介绍

i.MX RT1040 跨界 MCU 基于 Arm Cortex-M7内核，具有实时性能和高集成功能，适用于工业和物联网应用。

i.MX RT1040 CM7 运行频率高达 600 MHz，内置 512 KB 片上 RAM，可配置为 TCM 或通用存储器使用。该系列提供各种存储器接口和丰富的连接接口，包括 UART、SPI、I²C、USB 和 CAN。i.MX RT1040 采用 169 BGA 紧凑型封装提供更高的灵活性，温度范围扩展至125°C。

目前，RT1040 系列有四个部件编号：RT1041、RT1042、RT1043 和 RT1046。这些部件之间存在一些细微差别，因此编写了本应用说明以方便选择和开发。

2 芯片概述及设计要点

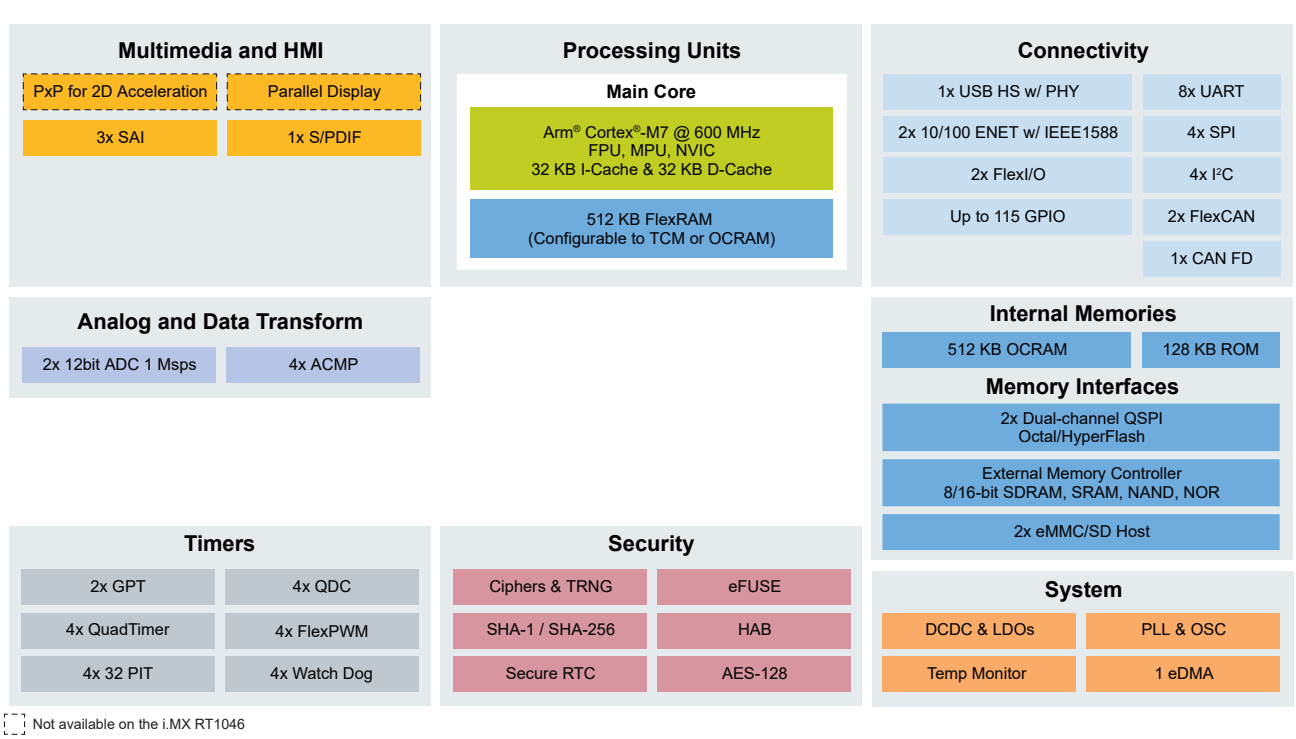

图 1. RT1040 框图

性能方面，消费级芯片可以运行 600 MHz，工业级芯片可以达到 528 MHz。并且全部支持最高 512 KB TCM，为性能要求高的应用保证固定低延迟的内存访问。因此 CPU 性能表现一致，不同型号之间主要差异体现在外设数量、SRAM 存储空间大小、封装类型等方面。

表 1 简要介绍了不同型号之间的差异。

表 1. RT1040 设备之间的差异

	RT1041	RT1042	RT1043	RT1046
ADC	12 ch	12 ch	12 ch	15 ch
FlexRAM	512 KB	512 KB	512 KB	512 KB
OCRAM	0	0	512 KB	512 KB
ENET	x1	x1	x1	x2

表 1. RT1040 设备之间的差异...续上页

	RT1041	RT1042	RT1043	RT1046
LPSPI	x3	x3	x3	x4
LCD/PXP	N	Y	Y	N
Tj (Commercial)	0 to +95	0 to +95	0 to +95	0 to +95
Tj (Industrial)	-40 to +125	-40 to +125	-40 to +125	-40 to +125
Package	9 × 9 mm, 0.65 mm, BGA169	9 × 9 mm, 0.65 mm, BGA169	9 × 9 mm, 0.65 mm, BGA169	7 × 7 mm, 0.5 mm, BGA169
	11 × 11 mm, 0.8 mm, BGA169	11 × 11 mm, 0.8 mm, BGA169		
注：RT1041/RT1042 9 × 9 和 11 × 11 mm 的 ballmap 分布是不同的。				

根据 表 1 和客户的常见问题，以下是一些设计要点：

- RT1041/RT1042 9 × 9 和 11 × 11 mm 的 ball map 不同。
- RT1040 系列中 7 × 7、9 × 9 和 11 × 11 mm 的 ball map 不同。
- RT1043 = RT1042 + 512 KB OCRAM，但 RT1043 只有 9 × 9 mm 封装。
- 相同封装的 RT1041、RT1042、RT1043 引脚兼容。

3 开发设计参考资料

3.1 硬件

RT1041, RT1042 和 RT1043 可以参考以下设计文件：RT1040_EVK_Design_Files。

注：RT1040_EVK 设计基于 11 × 11 mm、0.8 mm 和 BGA169 封装的芯片。对于 9 × 9 mm、0.65 mm 间距的 RT1041/RT1042/RT1043 设备，ball map 与 RT1040_EVK 上的 ball map 不同，客户应参考 RT1040 数据表中的符号封装信息。

RT1046 可以参考以下设计文件：RT1046_EVK_Design_Files。

3.2 软件

对于 RT1041 和 RT1042，用户可以直接使用 RT1040 SDK 进行开发。.

RT1043 内部有比 RT1042 更大的 SRAM 空间（ 512 KB FlexRAM + 512 KB OCRAM）。基于这一点，用户可以使用 RT1040 的 SDK 并将 linker 文件替换为 RT1060 的 linker 文件即可。或者用户可以直接使用 RT1060 SDK。

对于 RT1046，建议使用 RT1060 SDK。

4 修订记录

表 2 汇总了自初始版以来对本文档所做的更改。

表 2. 修订记录

文档号	日期	说明
AN14570_ZH v.1.0	2025 年 2 月 12 日	初次发布

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