

# RENESAS TECHNICAL UPDATE

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Product Category	MPU/MCU		Document No.	TN-RA*-A0087A/E	Rev.	1.00
Title	Addition of usage for Cache		Information Category	Technical Notification		
Applicable Product	RA6M4 Group, RA6M5 Group, RA6E1 Group, RA6E2 Group, RA6T2 Group, RA6T3 Group, RA4M3 Group, RA4E2 Group, RA4T1 Group	Lot No.	Reference Document	Refer table at the end of this document		
		All				

The description about cache information is added as follows.

14.8.4.3 Cacheability for RA6M4, RA6M5

14.6.4.3 Cacheability for RA6E1, RA4M3

13.6.4.3 Cacheability for RA6T2, RA6E2, RA6T3, RA4E2, RA4T1

When the cache is enabled, the cacheability attribute is determined from the Cortex-M default system address map or by using an Arm MPU exclude 0x2800\_0000 to 0x2FFF\_FFFF area which is always treated as non-cacheable regardless of the default system address map or Arm MPU setting.

When using the default system address map, the cacheable attribution is determined as following:

0x0000\_0000 to 0x27FF\_FFFF : Cacheable  
 0x2800\_0000 to 0x2FFF\_FFFF : Non-cacheable  
 0x3000\_0000 to 0x3FFF\_FFFF : Cacheable  
 0x4000\_0000 to 0x5FFF\_FFFF : Non-cacheable  
 0x6000\_0000 to 0x9FFF\_FFFF : Cacheable  
 0xA000\_0000 to 0xFFFF\_FFFF : Non-cacheable

Note. It is recommended to use below MAIR\_ATTR method for determining QSPI I/O register area if you use QSPI.

When not using the default system address map, MAIR\_ATTR used for each MPU region decides the cacheable attribution as following:

MAIR\_ATTR[7:4] = 0b0000 : Non-cacheable (Device memory)  
 MAIR\_ATTR[7:4] = 0b0100 : Non-cacheable (Normal memory)  
 MAIR\_ATTR[7:4] = 0b1010 : Cacheable  
 Other settings are not supported in the MCU.

Note. In case of accessing following areas, the area must be set to non-cacheable.

Peripheral I/O register area (0x4000\_0000 to 0x5FFF\_FFFF)  
 for RA6M4, RA6M5, RA6E1, RA6E2, RA6T2, RA6T3, RA4M3, RA4E2, RA4T1

QSPI I/O register area (0x6400\_0000 to 0x67FF\_FFFF)  
 for RA6M4, RA6M5, RA4M3, RA6E2

## References

ARM@v8-M Architecture Reference Manual

**Reference Document Table**

Product	Document name
RA6M4 Group	Renesas RA6M4 Group User's Manual: Hardware Rev.1.20
RA6M5 Group	Renesas RA6M5 Group User's Manual: Hardware Rev.1.20
RA6E1 Group	Renesas RA6E1 Group User's Manual: Hardware Rev.1.10
RA6T2 Group	Renesas RA6T2 Group User's Manual: Hardware Rev.1.30
RA4M3 Group	Renesas RA4M3 Group User's Manual: Hardware Rev.1.30
RA6E2 Group	Renesas RA6E2 Group User's Manual: Hardware Rev.1.10
RA6T3 Group	Renesas RA6T3 Group User's Manual: Hardware Rev.1.10
RA4E2 Group	Renesas RA4E2 Group User's Manual: Hardware Rev.1.10
RA4T1 Group	Renesas RA4T1 Group User's Manual: Hardware Rev.1.10