MPAMCFG_MBW_MAX, MPAM Memory Bandwidth Maximum Partition Configuration Register

The MPAMCFG_MBW_MAX characteristics are:

Purpose

MPAMCFG_MBW_MAX is a 32-bit read/write register that controls the maximum fraction of memory bandwidth that the PARTID selected by MPAMCFG_PART_SEL is permitted to use.

MPAMCFG_MBW_MAX_s controls maximum bandwidth for the Secure PARTID selected by the Secure instance of MPAMCFG_PART_SEL. MPAMCFG_MBW_MAX_ns controls the maximum bandwidth for the Non-secure PARTID selected by the Non-secure instance of MPAMCFG_PART_SEL. MPAMCFG_MBW_MAX_rt controls the maximum bandwidth for the Root PARTID selected by the Root instance of MPAMCFG_PART_SEL. MPAMCFG_MBW_MAX_rl controls the maximum bandwidth for the Realm PARTID selected by the Realm instance of MPAMCFG_PART_SEL.

A PARTID that has used more than MAX is given no access to additional bandwidth if HARDLIM == 1 or is given additional bandwidth only if there are no requests from PARTIDs that have not exceeded their MAX if HARDLIM == 0.

If MPAMF_IDR.HAS_RIS is 1, the control settings accessed are those of the resource instance currently selected by MPAMCFG_PART_SEL.RIS and the PARTID selected by MPAMCFG_PART_SEL.PARTID_SEL.

Configuration

This register is present only when FEAT_MPAM is implemented, MPAMF_IDR.HAS_MBW_PART == 1 and MPAMF_MBW_IDR.HAS_MAX == 1. Otherwise, direct accesses to MPAMCFG_MBW_MAX are res0.

The power and reset domain of each MSC component is specific to that component.

Attributes

MPAMCFG_MBW_MAX is a 32-bit register.

Field descriptions

31	30 29 28 27 26 25 24 23 22 21 20 19 18 17 16	15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
HARDLIM	RES0	MAX

HARDLIM, bit [31]

Hard bandwidth limiting.

HARDLIM	Meaning
0b0	When MAX bandwidth is exceeded, the partition contends with a low preference for downstream bandwidth beyond MAX.
0b1	When MAX bandwidth is exceeded, the partition does not use any more bandwidth until the memory bandwidth measurement for the partition falls below MAX.

Bits [30:16]

Reserved, res0.

MAX, bits [15:0]

Memory maximum bandwidth allocated to the partition selected by MPAMCFG_PART_SEL. MAX is in fixed-point fraction format. The fraction represents the portion of the total memory bandwidth capacity through the controlled component that the PARTID is permitted to allocate.

The implemented width of the fixed-point fraction is given in MPAMF_MBW_IDR.BWA_WD. Unimplemented bits are RAZ/WI. The implemented bits of the MAX field are always to the left of the field. For example, if BWA_WD = 3, the implemented bits are MPAMCFG_MBW_MAX[15:13] and MPAMCFG_MBW_MAX[12:0] are unimplemented.

The fixed-point fraction MAX is less than 1. The implied binary point is between bits 15 and 16. This representation has as the largest fraction of the bandwidth that can be represented in an implementation with w implemented bits is 1.0 minus one half to the power w.

Accessing MPAMCFG_MBW_MAX

This register is within the MPAM feature page memory frames.

In a system that supports Secure, Non-secure, Root, and Realm memory maps, there must be MPAM feature pages in all four address maps:

- MPAMCFG_MBW_MAX_s must only be accessible from the Secure MPAM feature page.
- MPAMCFG_MBW_MAX_ns must only be accessible from the Non-secure MPAM feature page.
- MPAMCFG_MBW_MAX_rt must only be accessible from the Root MPAM feature page.
- MPAMCFG_MBW_MAX_rl must only be accessible from the Realm MPAM feature page.

MPAMCFG_MBW_MAX_s, MPAMCFG_MBW_MAX_ns, MPAMCFG_MBW_MAX_rt, and MPAMCFG_MBW_MAX_rl must be separate registers:

- The Secure instance (MPAMCFG_MBW_MAX_s) accesses the memory maximum bandwidth partitioning used for Secure PARTIDs.
- The Non-secure instance (MPAMCFG_MBW_MAX_ns) accesses the memory maximum bandwidth partitioning used for Non-secure PARTIDs.
- The Root instance (MPAMCFG_MBW_MAX_rt) accesses the memory maximum bandwidth partitioning used for Root PARTIDs.
- The Realm instance (MPAMCFG_MBW_MAX_rl) accesses the memory maximum bandwidth partitioning used for Realm PARTIDs.

When RIS is implemented, loads and stores to MPAMCFG_MBW_MAX access the memory maximum bandwidth partitioning configuration settings for the bandwidth resource instance selected by MPAMCFG_PART_SEL.RIS and the PARTID selected by MPAMCFG_PART_SEL.PARTID_SEL.

When RIS is not implemented, loads and stores to MPAMCFG_MBW_MAX access the memory maximum bandwidth partitioning configuration settings for the PARTID selected by MPAMCFG_PART_SEL.PARTID_SEL.

When PARTID narrowing is implemented, loads and stores to MPAMCFG_MBW_MAX access the memory maximum bandwidth partitioning configuration settings for the internal PARTID selected by MPAMCFG_PART_SEL.PARTID_SEL, and MPAMCFG_PART_SEL.INTERNAL must be 1.

When PARTID narrowing is not implemented, loads and stores to MPAMCFG_MBW_MAX access the memory maximum bandwidth partitioning configuration settings for the request PARTID selected by MPAMCFG_PART_SEL.PARTID_SEL, and MPAMCFG_PART_SEL.INTERNAL must be 0.

MPAMCFG_MBW_MAX can be accessed through the memory-mapped interfaces:

Component	Frame	Offset	Instance
MPAM	MPAMF_BASE_s	0x0208	MPAMCFG_MBW_MAX_s

Accesses on this interface are **RW**.

Component	Frame	Offset	Instance
MPAM	MPAMF_BASE_ns	0x0208	MPAMCFG_MBW_MAX_ns

Accesses on this interface are **RW**.

Component	Frame	Offset	Instance
MPAM	MPAMF_BASE_rt	0x0208	MPAMCFG_MBW_MAX_rt

When FEAT_RME is implemented, accesses on this interface are **RW**.

Component	Frame	Offset	Instance
MPAM	MPAMF_BASE_rl	0x0208	MPAMCFG_MBW_MAX_rl

When FEAT_RME is implemented, accesses on this interface are **RW**.

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