

Application Note

tRAS Lock-out & Concurrent Auto-Precharge

2002. 11. 19

Memory division

Add flag for Concurrent Auto Precharge to DDR SPD

Subject :

tRAS Lock-out(Fast Auto Precharge) & Concurrent Auto Precharge

Background :

Both Concurrent Auto precharge and tRAS lock-out are supported by all of the SAMSUNG' s DDR SDRAM devices.

But, Current DDR SPD specifications do not permit support of tRAS lock-out & concurrrent auto-precharge. This feature, however, is beneficial to many markets including the server market.

Presented at the January 2001 JEDEC meeting, then approved to ballot, this recommends adding a bit to the DDR SPD to indicate support of this function. So, SAMSUNG will apply this description to DDR SPD to new device.

What are the tRAS lock-out(Fast A/P) & Concurrent A/P

- tRAS lock-out

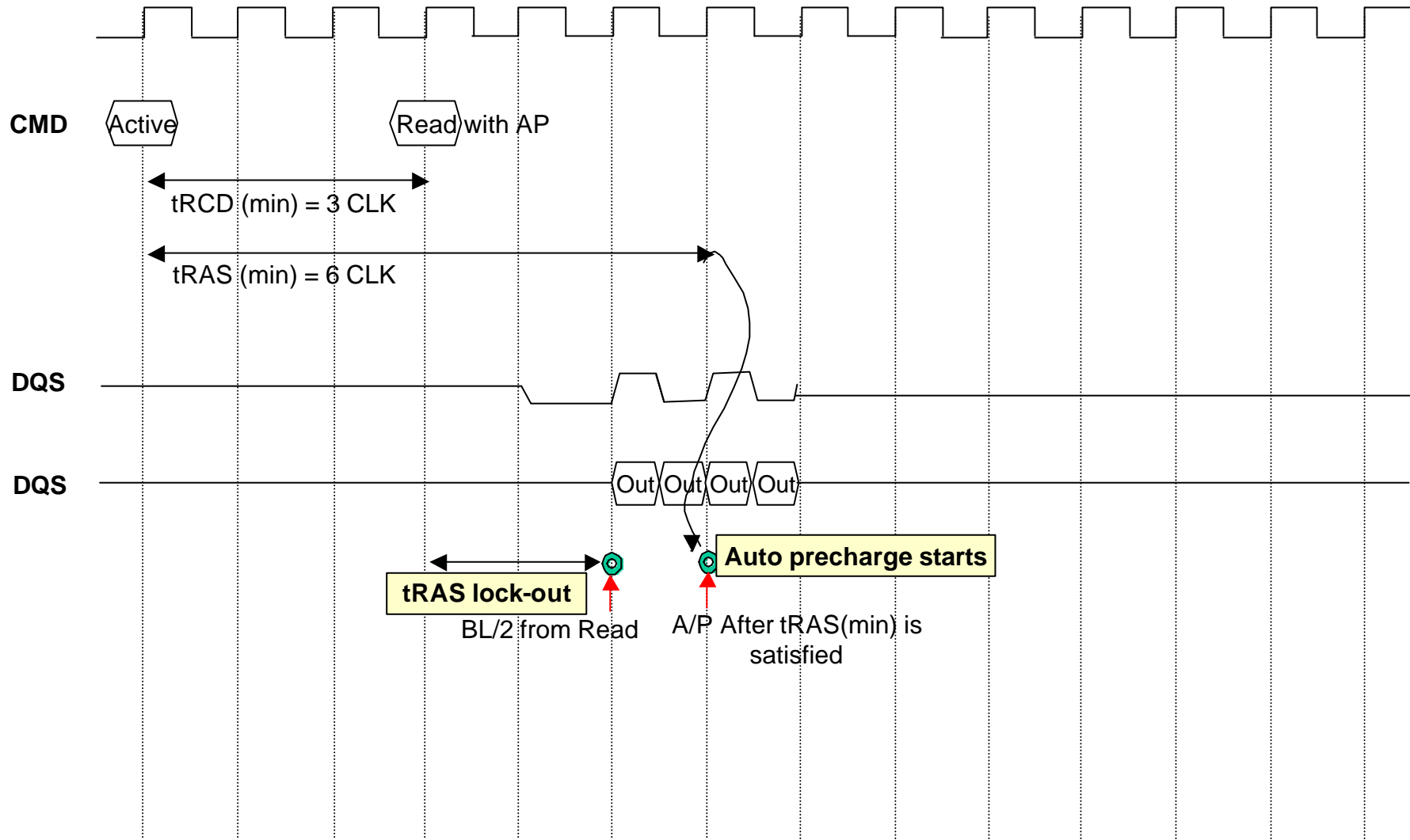
: If a read with auto-precharge command is initiated, the DDR SDRAM automatically enters the precharge operation BL/2 clock later from a read with auto-precharge command when tRAS(min) is satisfied. If not, the start point of precharge operation will be delayed until tRAS(min) is satisfied.

- Concurrent Auto Precharge

: If read command entered during the auto-precharge operation, Then, auto-precharge is canceled and execute reading. Precharge operation is delayed after that.

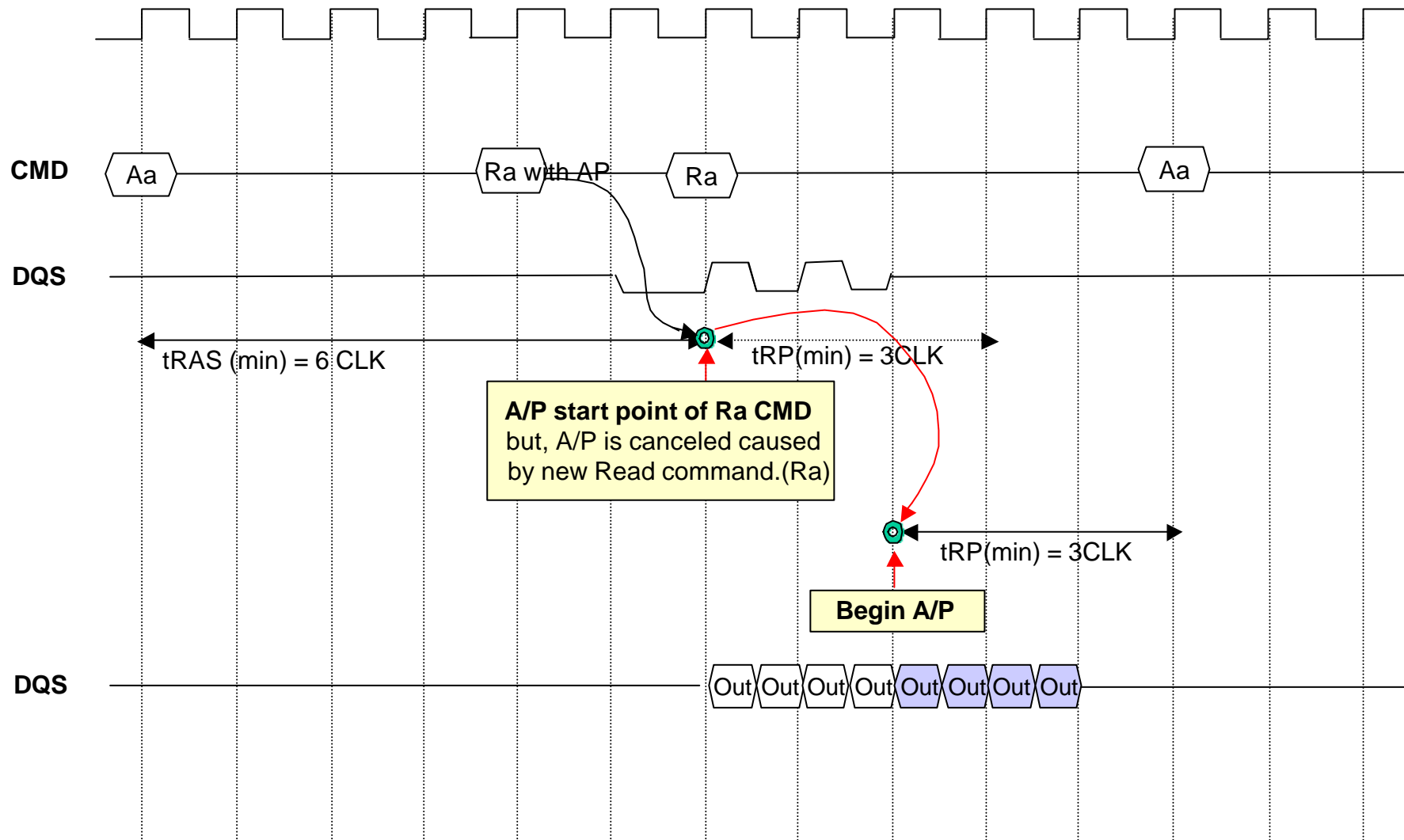
Timing for tRAS Lock-out

@ DDR266, CL=2



Timing for Concurrent Auto Precharge

@ DDR266, CL=2



DDR SPD 22Byte Change

22byte : DDR SDRAM Device Attributes - General

Old JEDEC (Aug.,1999)

Bit 7	Bit6	Bit5 ~ Bit0
TBD	TBD	...
0	0	0 or 1



00h

New JEDEC (Jan.,2001)

Bit 7	Bit6	Bit5 ~ Bit0
Supports Fast AP: 0 = tRAP is tRAS 1 = tRAP is tRCD	Concurrent Auto Precharge: 0 = Not supported 1 = Supported	has no difference
1	1	0 or 1



C0h

- All of the Samsung's DDR SDRAM devices can support tRAS lock-out & Concurrent Auto Precharge.