

**Refresh Cycle change from 4K/64ms in C-die
to 2K/32ms in 16M SDRAM D-die**

Refresh cycle time change from 4K/64ms to 2K/32ms

This note has been prepared in an attempt to inform you that the refresh cycle time of 16M SDRAM has been changed from 4K/64ms in C-die to 2K/32ms in D-die and accordingly the part number has been changed. The 8th location in the part number represents refresh characteristics in our current SDRAM part number establishment rule, therefore it has been changed from "0" in C-die which represents 4K/64ms to "1" in D-die which represents 2K/32ms. (Refer to the Table -1)

<Table -1>

Device	C-die	D-die
1Mx16 SDRAM	KM416S1020C	KM416S1120D
2Mx8 SDRAM	KM48S2020C	KM48S2120D
4Mx4 SDRAM	KM44S4020C	KM44S4120D

What is the difference between 2K/32ms and 4K/64ms in the aspect of system

If you use distributed refresh method, this refresh cycle change will not cause any problem because the duty cycle of both 4K/64ms and 2K/32ms is identical to 15.6us and as a result, auto refresh can be performed once in every 15.6us in both cases.

Otherwise, if you use burst refresh method, this change may cause a problem somewhat depends on the system. For the 4K/64ms in C-die, the auto refresh can be performed once with a burst of 4096 in every 64ms. In case of 2K/32ms in D-die, it can be performed twice with a burst of 2048 in every 64ms. Except this, there is no other difference.