DDR3 to DDR4

DDR4 – Advantages of Migrating from DDR3

DDR4 is the next evolution in DRAM, bringing even higher performance and more robust control features while improving energy economy for enterprise, micro-server, tablet, and ultrathin client applications. The following table compares some of the key feature differences between DDR3 and DDR4.

Feature/Option	**DDR3**	**DDR4**	**DDR4 Advantage**
Voltage (core and I/O)	1.5V	1.2V	Reduces memory power demand
VREF inputs	2 – DQs and CMD/ADDR	1 – CMD/ADDR	VREFDQ now internal
Low voltage standard	Yes (DDR3L at 1.35V)	No	Memory power reductions
Data rate (Mb/s)	800, 1066, 1333, 1600, 1866, 2133	1600, 1866, 2133, 2400, 2666, 3200	Migration to higher-speed I/O
Densities	512Mb–8Gb	2Gb–16Gb	Better enablement for large-capacity memory subsystems
Internal banks	8	16	More banks
Bank groups (BG)	0	4	Faster burst accesses
tCK – DLL enabled	300 MHz to 800 MHz	667 MHz to 1.6 GHz	Higher data rates
t CK – DLL disabled	10 MHz to 125 MHz (optional)	Undefined to 125 MHz	DLL-off now fully supported
Read latency	AL + CL	AL + CL	Expanded values
Write latency	AL + CWL	AL + CWL	Expanded values
DQ driver (ALT)	40Ω	48Ω	Optimized for PtP (point-to-point) applications
DQ bus	SSTL15	POD12	Mitigate I/O noise and power
RTT values (in Ω)	120, 60, 40, 30, 20	240, 120, 80, 60, 48, 40, 34	Support higher data rates
RTT not allowed	READ bursts	Disables during READ bursts	Ease-of-use
ODT modes	Nominal, dynamic	Nominal, dynamic, park	Additional control mode; supports OTF value change
ODT control	ODT signaling required	ODT signaling not required	Ease of ODT control, allows non-ODT routing on PtP applications
Multipurpose register (MPR)	Four registers – 1 defined, 3 RFU	Four registers – 3 defined, 1 RFU	Provides additional specialty readout