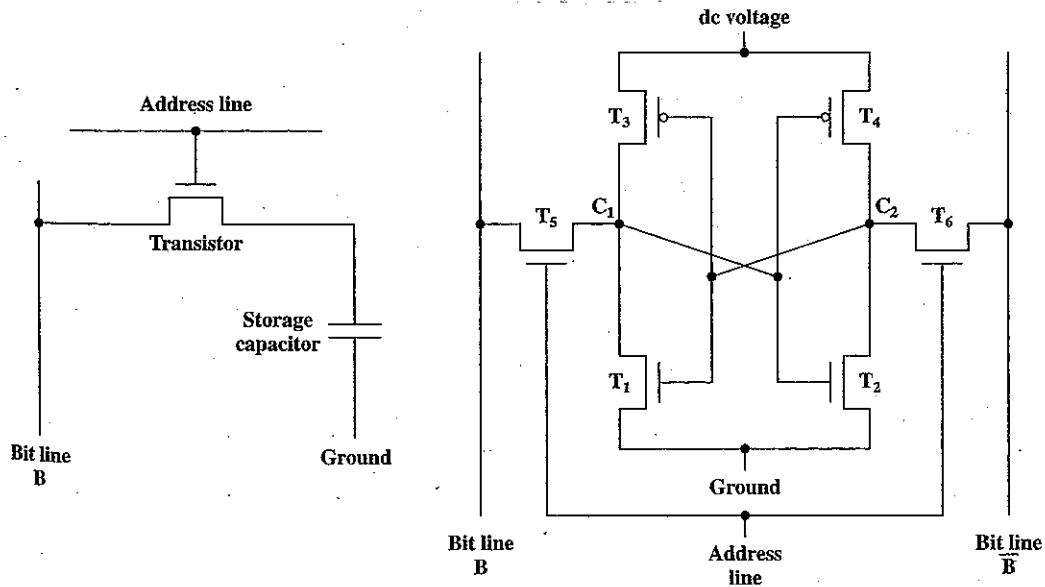


5. Internal Memory

Table 5.1 Semiconductor Memory Types

Memory Type	Category	Erasure	Write Mechanism	Volatility
Random-access memory (RAM)	Read-write memory	Electrically, byte-level	Electrically	Volatile
Read-only memory (ROM)	Read-only memory	Not possible	Masks	Nonvolatile
Programmable ROM (PROM)			Electrically	
Erasable PROM (EPROM)	Read-mostly memory	UV light, chip-level	Electrically	
Electrically Erasable PROM (EEPROM)		Electrically, byte-level		
Flash memory		Electrically, block-level		



(a) Dynamic RAM (DRAM) cell

(b) Static RAM (SRAM) cell

Figure 5.2 Typical Memory Cell Structures

Memory Organization

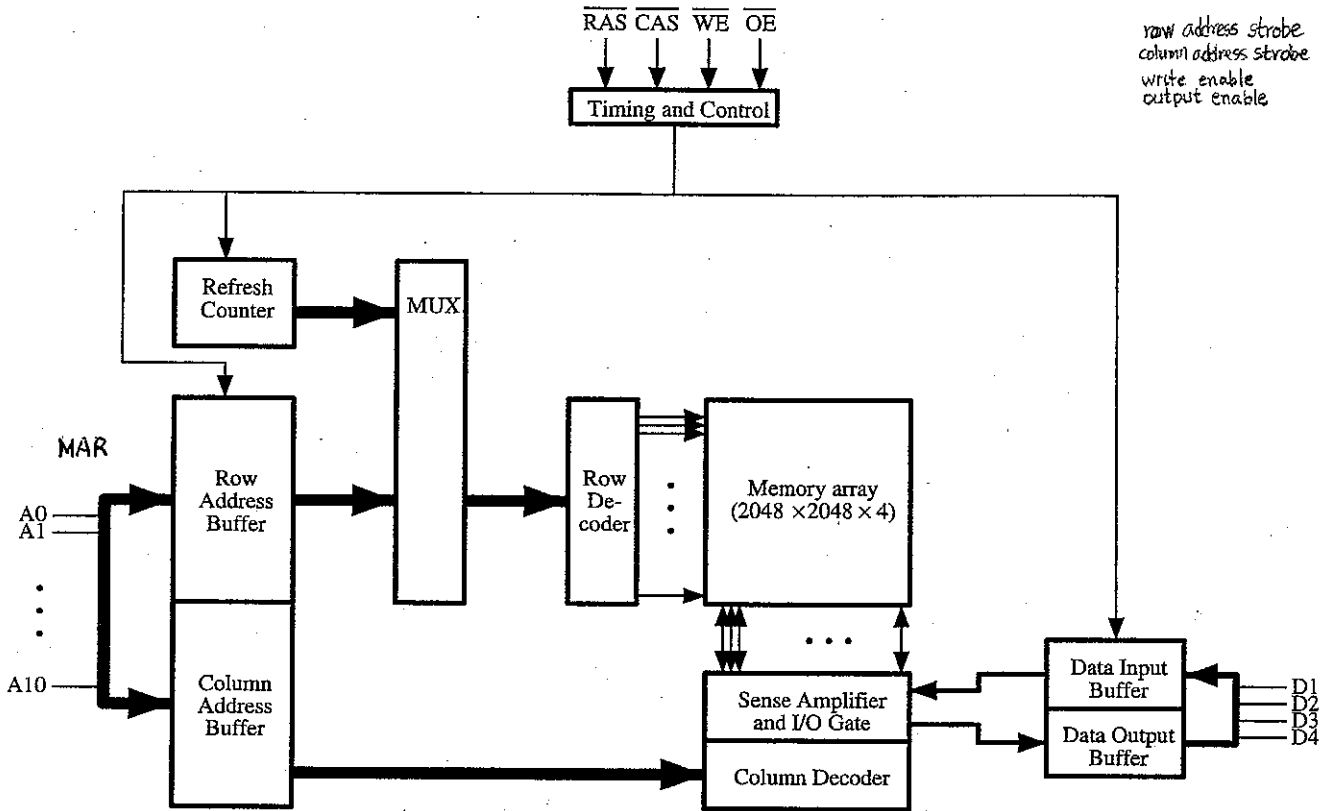
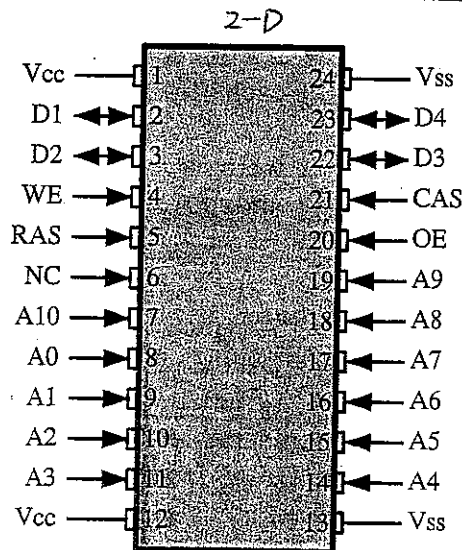


Figure 5.3 Typical 16-Megabit DRAM (4M x 4).
2-D

Memory Package Pins and Signals.

16-Mbit DRAM



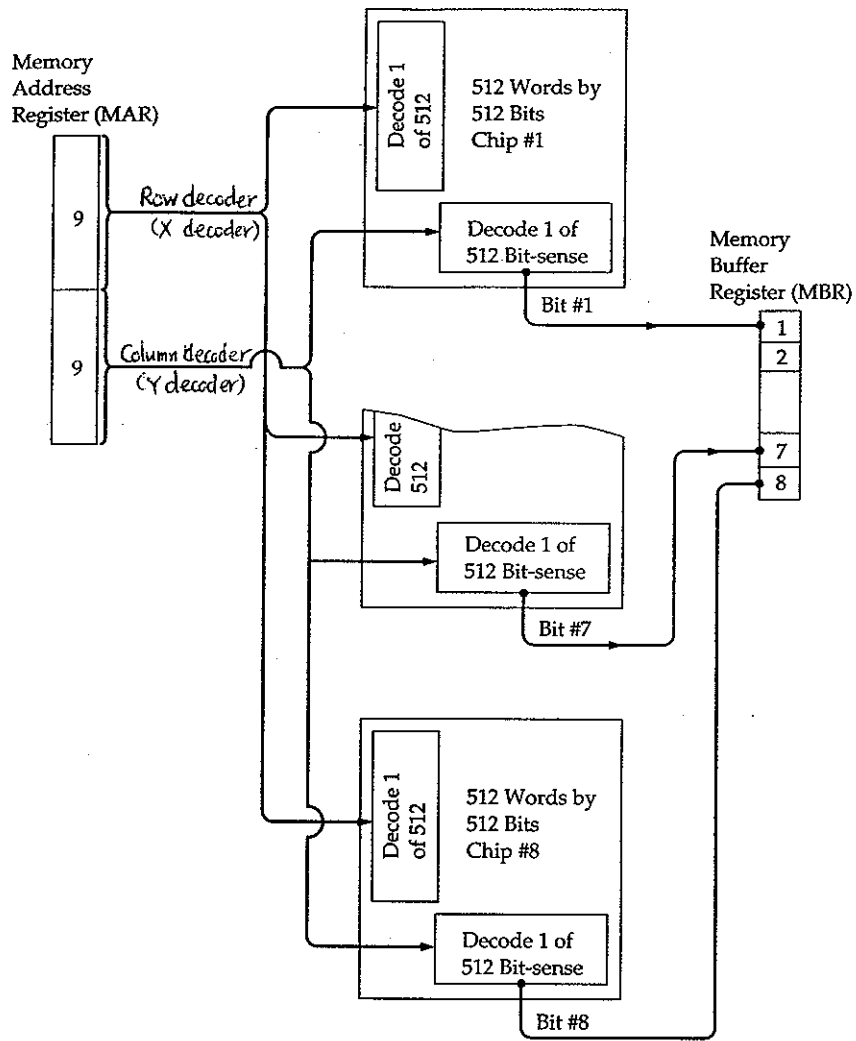


FIGURE 5.5. 256K-byte memory organization

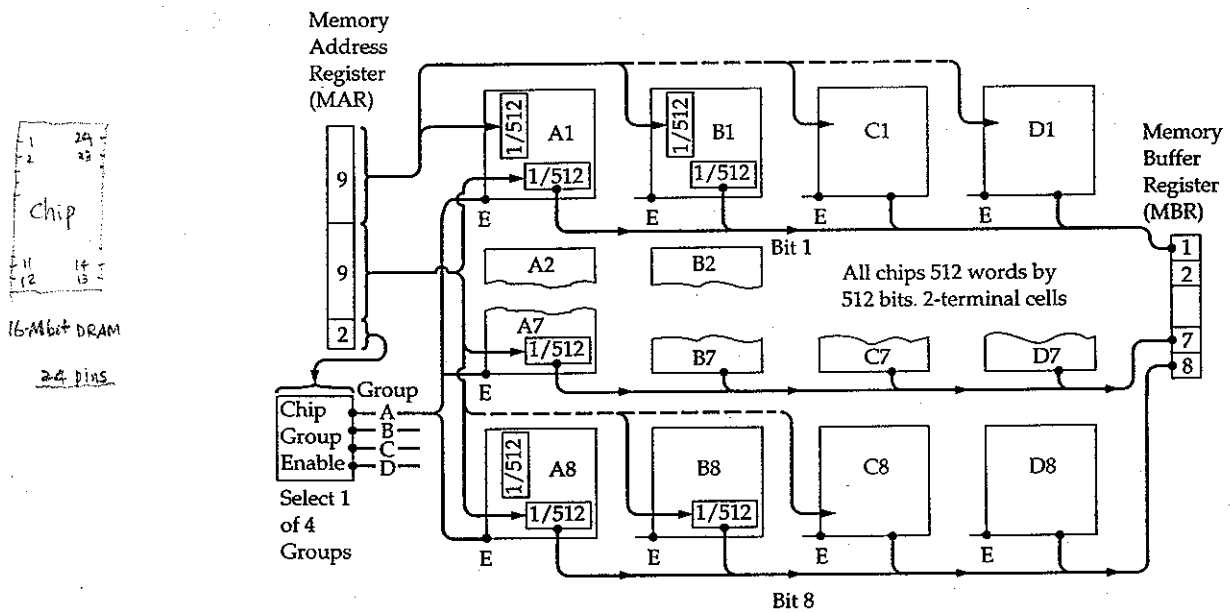


FIGURE 5.6. 1M-byte memory organization

Error-Correcting detecting/correcting

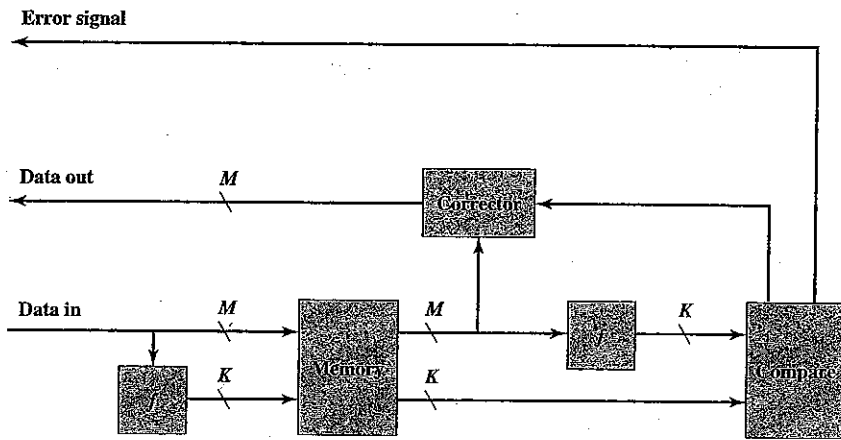


Figure 5.7 Error-Correcting Code Function

Hamming Code

Ex. $M = 4$
even-parity

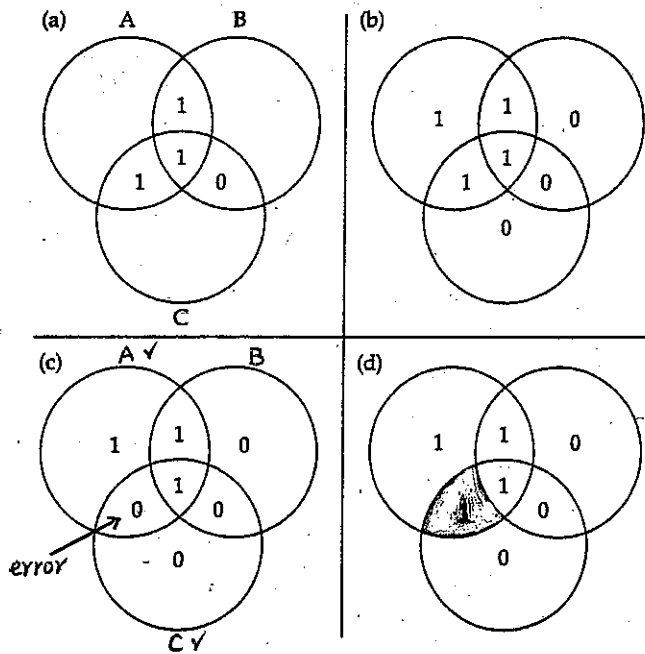


Figure 5.9 Hamming Error-Correcting Code.

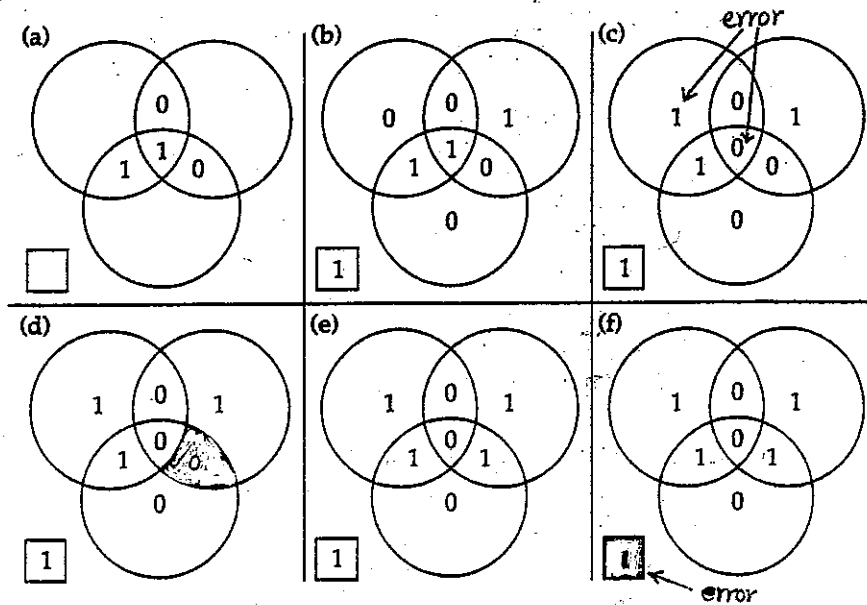


Figure 5.11 Hamming SEC-DED Code.

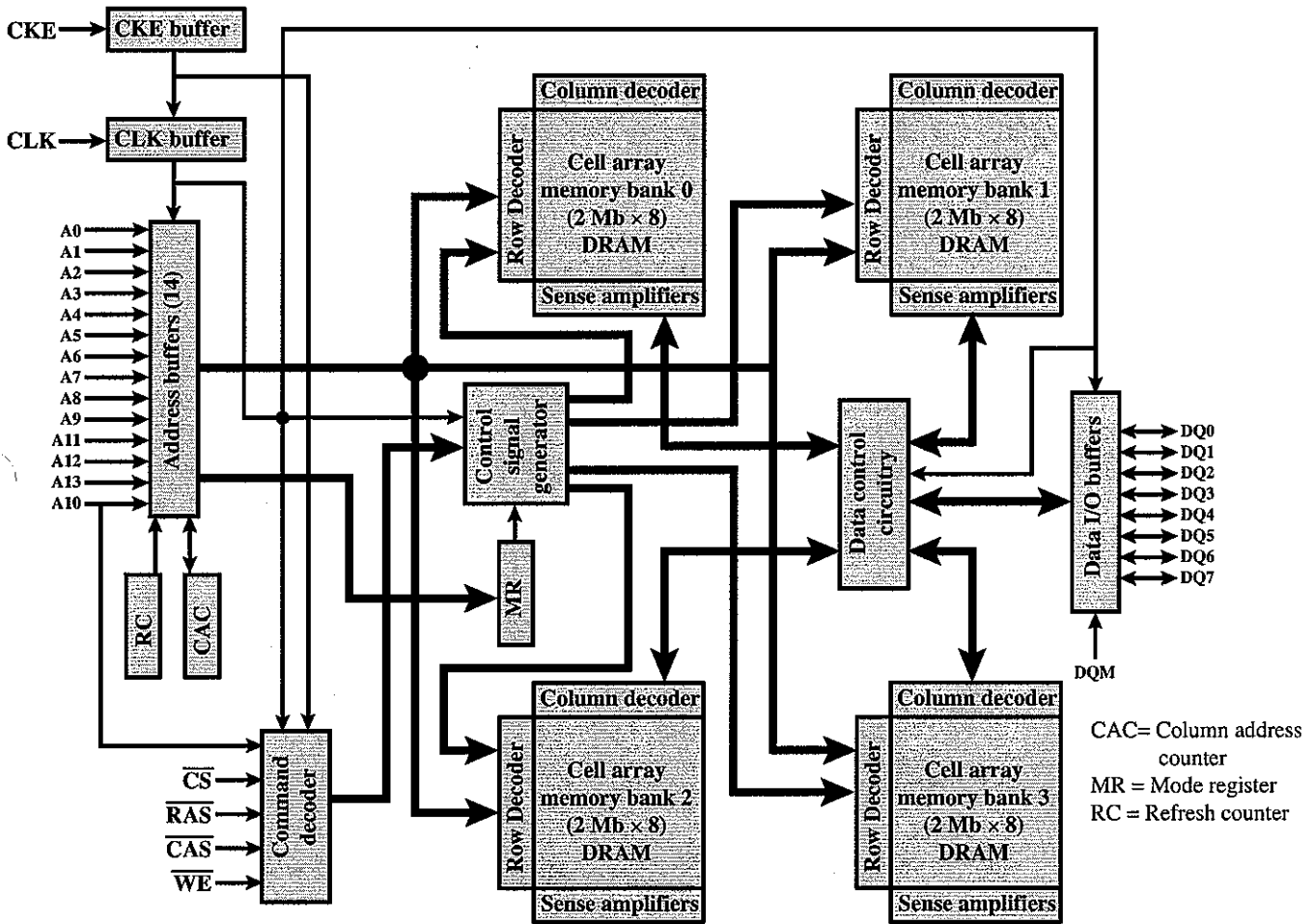


Figure 5.12 Synchronous Dynamic RAM (SDRAM)