

(19)  
(12)

(KR)  
(B1)

(51) 。 Int. Cl. <sup>6</sup>  
G06F 13/38

(45)  
(11)  
(24)

2002 03 22  
10 - 0329893  
2002 03 12

(21) 10 - 1999 - 0021979  
(22) 1999 06 14

(65)  
(43)

2000 - 0011296  
2000 02 25

(30) 09/121,933 1998 07 24 (US)

(73)

10504

(72)

05403	33
05446	9
05452	20
05452	29

(74)

:

(54)

2 I/O (DRAM) , DRAM , ( , 500 MHz) 8:1 16:1  
( , 64 ) . , DRAM  
DRAM 가 가 .

2

1 (DRAM) ,

2 1

3 2 (SDRAM) ,

4

50 : 51 :

52 : 56 :

58 :

68 : /

/ (dynamic random access memory : DRAM)  
/ DRAM .

가 , DRAM  
DRAM ,

가 가 . ,  
.

5 (nanosecond : ns) 200 MHz .  
DRAM 60 ns .

가 .

/ .

(extended data out : EDO) (sy

nchronous DRAM : SDRAM)가 , SDRAM EDO RAM 가

가 I/O DRAM

Hz ( ) DRAM I/O (clocked) 가 500 M

, 8:1

4 Mb 1 16 Mb(64 x 256 X 1024) I/O DRAM . 6

(page) (20, 22, 24, 26) (10, 12, 14, 16)

( , 2 Kb) (20, 22, 24, 26) 64 x 256

4) 64 (30) (34) 64 (30) 8:1 (3 (MUX)

(36) (36) I/O (38) DQ0 - DQ8 . 64

(30) 8 8 (burst) 가 , I/O (38)

1:8 (DEMUX)(40)가 (42) (row) (44)

(32) 64 (30) , 1 (pipelining)

I/O (38) DQ0 - DQ8 (42) (46) (47)

가 , 64 8 8

가 (column) /

8 1 (46) (47)

. RXCLK TXCLK (handshaking)

가 .

가 DRAM

가 .

DRAM / I/O DRAM

DRAM / I/O

DRAM DRAM 2

( , 500 MHz) 8:1 I/O ( , 64

) . , DRAM

DRAM

가

가

2  
64

, 56

8  
8

56  
DRAM

64

가

59), (51) (56) (58) (50) DRAM(60) (63) PCI(peripheral component interconnection bus)( (50) DRAM(60) (52) (62) (52) 430, 440 450 (application specific DRAM(68) SDRA M(66) , ASIC(70) (63) (62) DRAM(68) DRAM(68) , DRAM

3

08/861,101

ASIC (70)

64 Mb RAM (66)

4 16 Mb SDRAM(111<sub>1</sub> - 111<sub>4</sub>)

RAM (66) 4 16 Mb SDRAM(111<sub>1</sub> - 111<sub>4</sub>) (bank) 4 SDRAM

4 SDRAM(111<sub>1</sub> - 111<sub>4</sub>) 0

(119)

(118)

4 x 16 (112<sub>1</sub> -

가 (loading)

2

(112<sub>1</sub> - 112<sub>4</sub>)

64

(113)

(114)

64

(113)

8

가

(112<sub>1</sub> - 112<sub>4</sub>)

64

8

(113)

(114)

(112<sub>1</sub> - 112<sub>4</sub>)

SDRAM(111<sub>1</sub> - 111<sub>4</sub>)

FIFO(first in first out)

32

(116)

(118)

(119)

(119)

(Jedec ) SDRAM(111<sub>1</sub> - 111<sub>4</sub>)

, , (117) 32 (116)  
 (115) 64 (113)  
 (119) . 32 (116) (118)  
 , SDRAM .  
 (119) (112<sub>1</sub> - 112<sub>4</sub>), (114), (115, 117), S  
 DRAM(111<sub>1</sub> - 111<sub>4</sub>) (119) (115) I/O (6  
 2 63) 64 (113) .  
 . 32 (117) (CS) 32 (116)  
 (116) , (118, 119) SDRAM(111<sub>1</sub> - 111<sub>4</sub>)  
 32 ( SDRAM(111<sub>1</sub> - 111<sub>4</sub>) 8 ) . 32  
 / (116) 16 16 .  
 , .

- 1)
- 2)
- 3) (precharge)
- 4)
- 5)
- 6)
- 7)
- 8) /
- 9) /
- 10) / /
- 11) / /
- 12)
- 13)
- 14)
- 15)
- 16)

64 , SDRAM (66) 8:1 (63) 가  
 (62) (63) , 500 MHz 4 SD  
 RAM(111<sub>1-4</sub>) , SDRAM(111<sub>1-4</sub>) 4x16 (112<sub>1-</sub>  
 4) , 64 (113) , (113) (11  
 4 - 115) (63) I/O (119)  
 (118) SDRAM ,  
 , I/O (62) (124) (126)  
 64 (113) (119) 4 x 16 SDRAM, 111<sub>1</sub>  
 I/O (62) , 64 I/O (124, 126)  
 , 4 , 3 SDRAM ASIC 64  
 (62) DRAM (68)  
 , ASIC 가 . 4  
 (111<sub>1</sub>' - 111<sub>4</sub>') 16 16 (2 ) , 16  
 256  
 14 4 가  
 robe) 64 x 16 4 CAS(Column Address St  
 , 64 I/O  
 SIC SDRAM SDRAM A  
 SDRAM  
 / / I/O DRAM  
 / / I/O DRA  
 M

(57)

1.

(dynamic random access memory : DRAM)

DRAM 1 ,

DRAM , 1 2 ,

1 2 , 1 2 ,

1 DRAM 가 ,

1 2 DRAM , DRAM 2 가

2.

1 ,

1 8 , 2 64 .

3.

1 ,

1 2

4.

(DRAM)

,

가 ,

(high - bandwidth) / ,

(lower - bandwidth) / ,

/ , 가

, DRAM / 가 가

5.

4 , / 1 ,  
 / 2 , 1  
 2 , 1

6.

5 ,  
 1 8 , 2 64

7.

5 ,  
 1 2

8.

7 ,  
 1 2 가

9.

가  
 ,  
 가 ,  
 2 , 가  
 , 가 가 1 가  
 , 가 2  
 가 , 가 2



10.

9

가

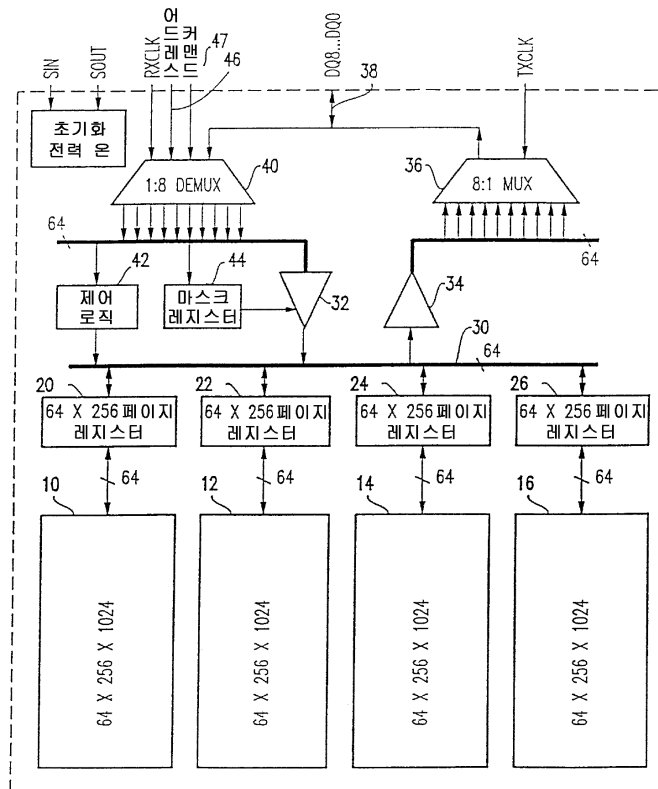
11.

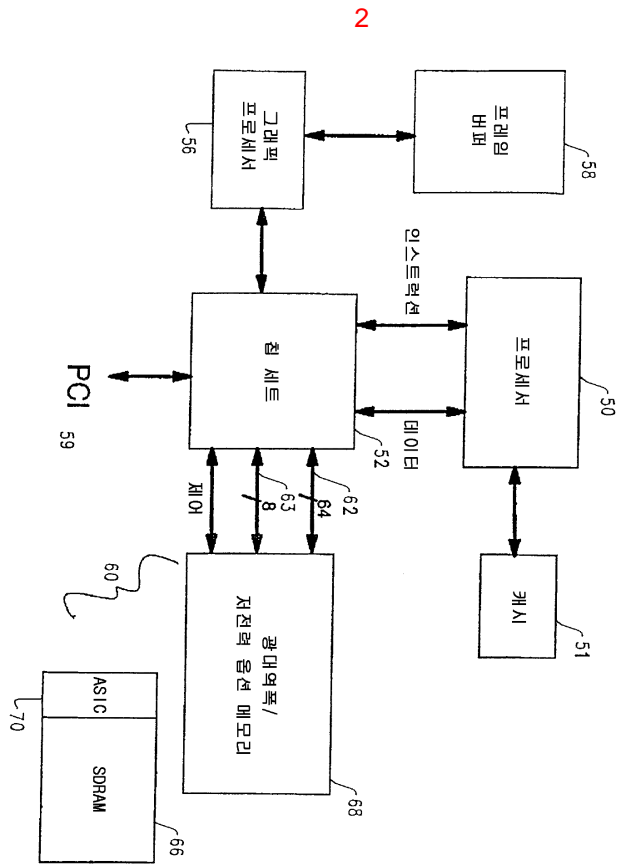
9

가

1

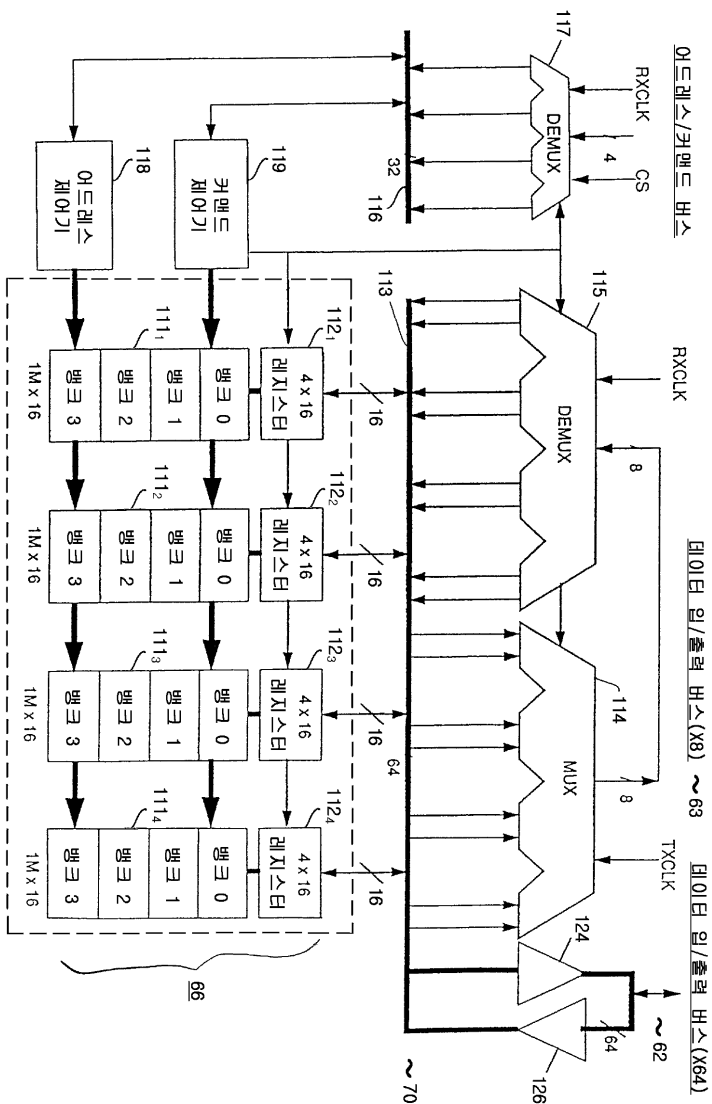
(선행기술)



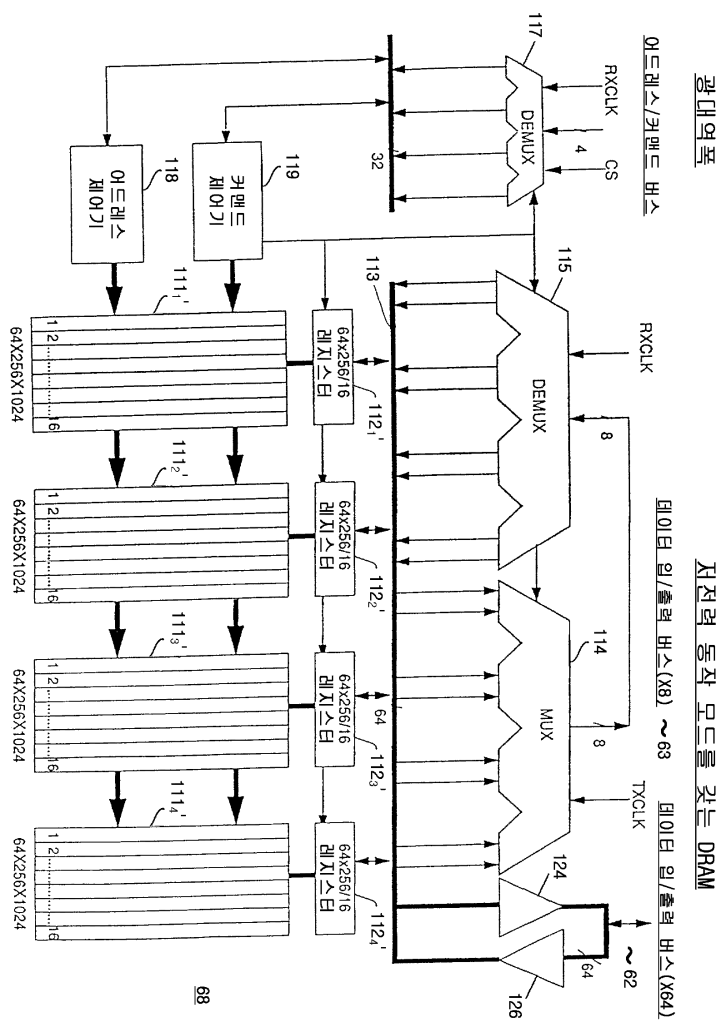


광대역폭

저전력 동작 모드를 갖는 DRAM



3



68