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16Mb SGRAM based SODIMM
(backward compatibility with 8Mb SGRAM based SODIMM)

Abstract

A 16Mb SGRAM based 144pin SODIMM can keep the backward compatibility with 8Mb based. To do that, we need to change current 144pin SODIMM JEDEC specification by changing pin names. This application note explains how 16Mb SGRAM based SODIMM keeps the backward compatibility with 8Mb SGRAM based 144pin SODIMM.

Pin Assignment of 100pin QFP and 144pin SODIMM

Both 8Mb and 16Mb SGRAM use 100pin QFP package, but address names of pin 29, 30 and 51 are different. However, the physical placements of Bank Select Address and Auto Precharge pin are same. For the detailed pin name information, refer to the table 1.

< table 1. Pin assignment of 100pin QFP and 144pin SODIMM >

Pin # on SoDIMM	JEDEC	8M based	16M based	Pin # on QFP
78	RSVD	RSVD	RSVD	
79	A11	RSVD	RSVD	
80	A10	RSVD	A8	30
81	A9	A9 (BA)	A10 (BA)	29
82	A8	A8 /AP	A9 /AP	51
83	A7	A7	A7	50
Remarks		IntelSODIMM compatible	Samsung Proposal	

Application Review (Graphic board design keeping compatibility)

A graphic subsystem may solder SGRAMs on a board or use SODIMM for graphic memory. Sometimes, they may solder SGRAMs on a board and extend the graphic memory size using SODIMM. That means there is a possibility of any kind of mixture with 8Mb and 16Mb SGRAM on a system and nobody knows which combination end user uses.

Bring up an issue

On 100pin QFP, AP and BA pins are connected to pin 51 and 29 respectively regardless of different address name on 8Mb and 16Mb SGRAM component. JEDEC SODIMM standard defines just address names of each pin. 8Mb based SODIMM is using the same address name as JEDEC standard. If we want to keep the compatibility on module with JEDEC definition, component address names of 16Mb SGRAM have to be changed. Otherwise, in the same manner, module address names have to be changed. Both are just name issues, not physical issues.

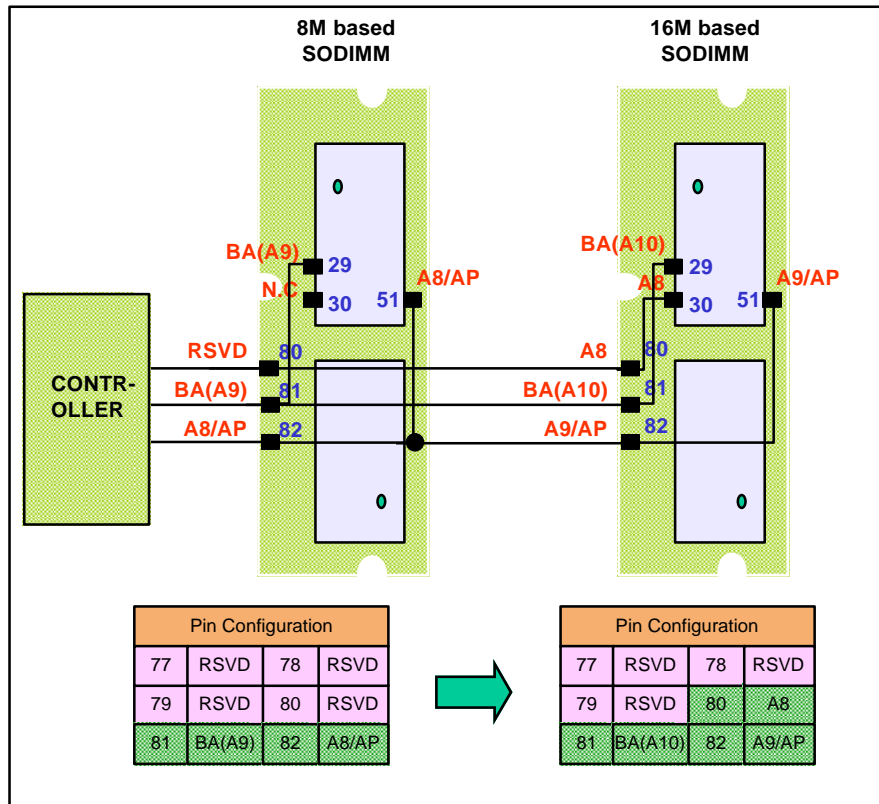
Board design to use both, 8Mb and 16Mb SGRAM.

If we assume one board which has 100pin QFP foot print for 8Mb SGRAM, one pin, regardless of the name at controller, is connected to pin 51 of 8Mb SGRAM. The name of pin 51 is A8/AP on 8Mb SGRAM. If he replace 8Mb to 16Mb, the same pin at controller is connected to A9/AP of 16Mb SGRAM. There is no other way to use both, 8Mb and 16Mb SGRAM on a board. That means there is no way to support both 8Mb and 16Mb SGRAM without pin name change.

16Mb based Module Proposal to keep the backward compatibility with 8Mb SGRAM based SODIMM.

If we change the names of pin 80,81 and 82 on 16Mb SGRAM based SODIMM as table 1, we can use 8Mb and 16Mb SGRAM on a board with a very basic assumption that graphic controller can deal with the different address names. Actually, controller must understand the different address mapping of 8Mb and 16Mb SGRAM to support both density. Therefore, Samsung proposes 16Mb SGRAM based SODIMM pin names as table 1.* Note 1
For more detailed information, refer to Figure 1.

< Figure 1. Signal connection diagram >



* Note 1: To avoid the confusion caused by the different pin names on 144pin SODIMM, Samsung is going to propose a new pin naming of 144pin SODIMM in JEDEC. For example, define pin 81 as BA0.