Module Handling Guide

SAMSUNG

Module Handling Guide

Overview

- Recently module failure related with Dram or 4 array resistor crack has increased.
  Main root causes are wrong handling method and mechanical damage.
  Current products have more cap. & resistors and the sizes of those passives are reduced and most of them are located around edge area.
  These characteristics require more cautious module handling method.

- This guide book tries to find out tendency and range of module crack pattern based on experiments from several aspects. The main purpose is to reinforce Samsung's process control and help customer effectively control module handling process.

- Test methods are PCB Bow, Twist, Drop Test, UTM(Universal Testing Machine) Test for Dram, Resister & Capacitor. We observed crack phenomena and tendency through the datum and pictures. Tested products are limited to Registered DIMM[Reg.DIMM], Unbuffered DIMM[UDIMM} and BOC PKG based Module, therefore test results might be different when applied to other products.

Module Handling Guide

Memory Module Introduction

	Unbuffered DIMM		Load Reduced DIMM
DDR3		DDR3	
DDR4		DDR4	

	Registered DIMM		SODIMM
DDR3		DDR3	
DDR4		DDR4	

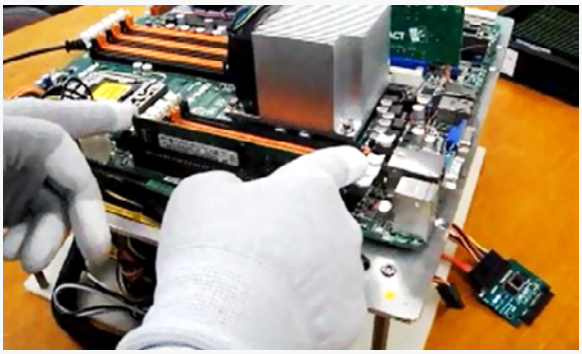
※ Tab stepping is applied to DDR4 DIMM.(except SODIMM)

Module Handling Guide

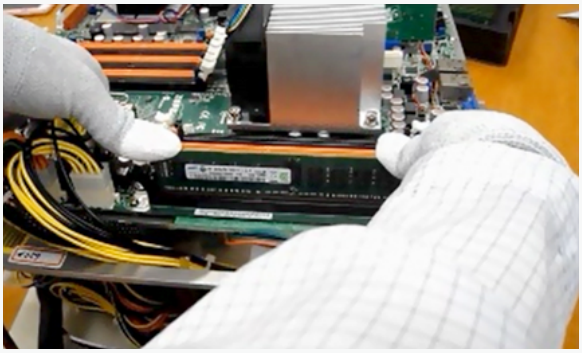
Proper Handling

- Anti-ESD straps should be used.
- The strap should be linked to your body.

- Modules should be picked up from packing trays only one-by-one.



- Place the DIMM gently on the socket with both hands.
- Do not grab packages. Hold only the edge of the PCB with both hands.

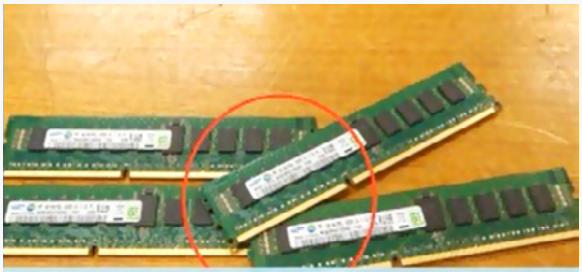


- Press the DIMM in both sides at the same time.
- If the DIMM is inserted in one side at a time, it may cause gold tab and device damage above the tab area from tilting the DIMM.

Module Handling Guide

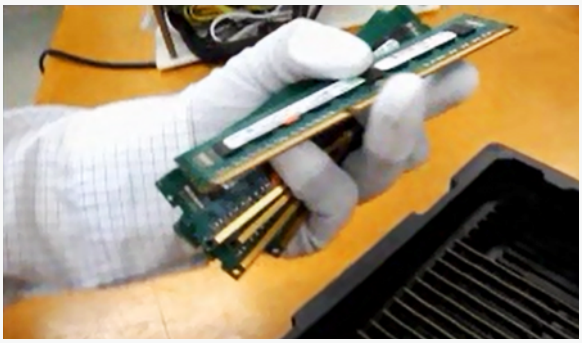
Wrong Handling

- Do not stack two or more modules.



When bumping each other, damage could occur

- Special caution is needed in module handling to prevent external damage on resistors, capacitors, and tabs.



- Do not grab two or more modules at one time.

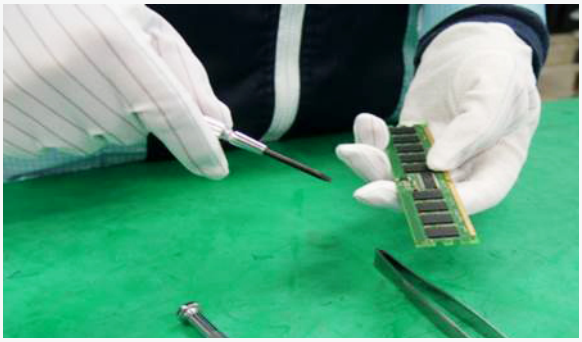
- Do not grab DIMMs without gloves.
  It can cause tab contamination.

Module Handling Guide

Wrong Handling

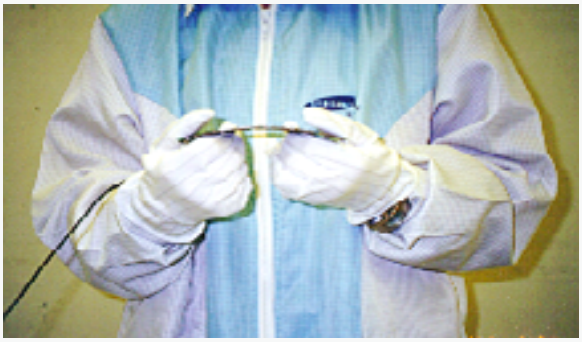
- Do not drop modules on the floor.

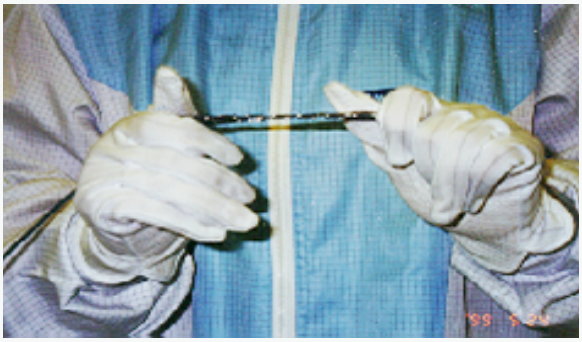
- Handling modules near tools is prohibited because hard metal objects can damage modules.



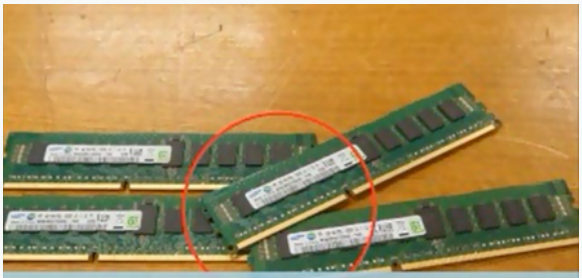
Module Handling Guide

Wrong Handling





- Do not twist or bend the modules.

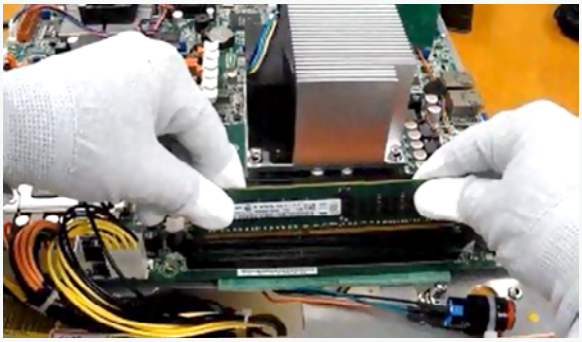


When bumping each other, damage could occur

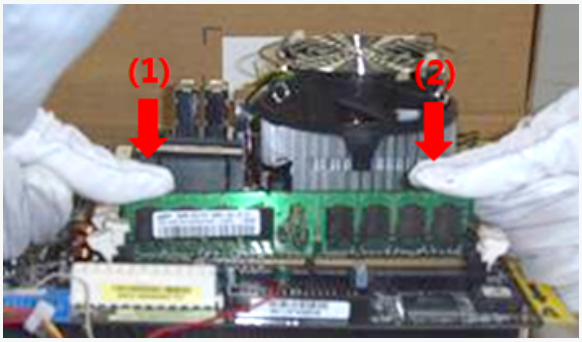
- Do not leave modules out of their tray.
- Do not stack modules in your hand.

Module Handling Guide

Wrong Handling

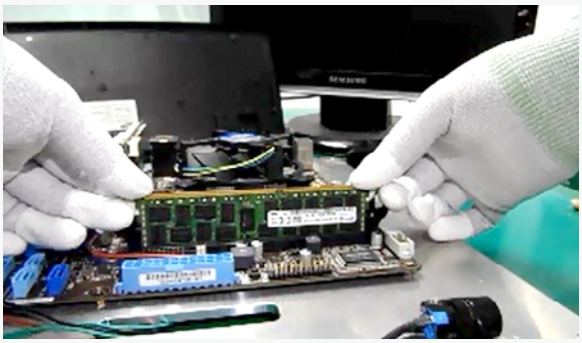


- Do not insert modules by holding packages and passive components. It can cause package EMC cracks and the detachment of passive chips due to higher insertion force.

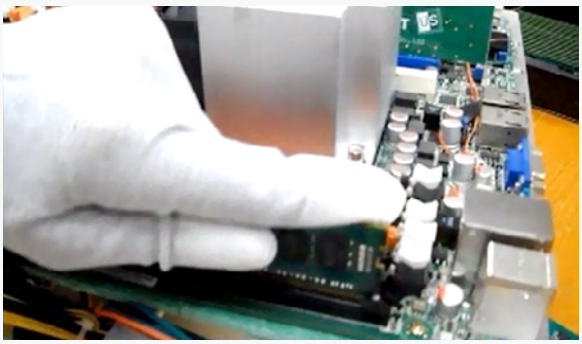


- Insert only one DIMM at a time. Do not insert multiple DIMMs at the same time.

- Do not press each side separately. Tilting can cause device damage above the tab area.



- Do not insert DIMMs upside down. It can cause RTT resistor cracks.



- Do not insert DIMMs using only one hand. It can cause solder joint cracks when the DIMM bends and twists.

Module Handling Guide

Conclusion

- We validated the possibility of cracking tendencies through various tests. Various products, environments, and characteristics of tools can cause errors and affect test results.

  However, the most important conclusion that can be deduced from the tests is that special caution against mechanical damage and handling errors should be taken from the point of unpacking modules to inserting into the sockets on system boards.

  Recent memory module products are structurally weak to external damage due to the increasing numbers of ICs and passive components and the unit's diminishing size.

  It’s difficult to predict and find out clear root causes of failures related with BOC PKG passive components due to many variances and circumstances. However, the above guidelines for memory module handling based on test results should help with crack-related problems and make more effective process control possible.