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SMART RECOVERY MECHANISM FOR THUNDERBOLT HOT PLUG MODE SWITCH

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Smart Recovery Mechanism for Thunderbolt Hot Plug Mode Switch

Abstract: A smart recovery mechanism improves the stability of Thunderbolt hot plug mode switching and ensures that the BIOS, the firmware/driver, and the OS are properly synchronized.

This disclosure relates to the field of computer interfacing.

A technique is disclosed that provides a smart recovery mechanism to correctly sync up the hot plug mode status between the Basic Input/Output System (BIOS), the Thunderbolt firmware/driver, and the OS. The BIOS may be implemented using Unified Extensible Firmware Interface (UEFI).

Current computers which support Thunderbolt PCIE hot plug mode switching provide an option in the BIOS setup menu for mode switching (Legacy and Native mode). The BIOS will execute a switch mode command to change the mode in Thunderbolt firmware according to this option. After restarting the system, the BIOS will then enable/disable PCIE native hot plug and PME control in OS. Then the BIOS, the Thunderbolt firmware/driver, and the OS would be in the same working mode.

However, the mode switch operation may fail for various reasons, such as for example a timing issue. If the mode switch fails, then the BIOS, the OS, and the Thunderbolt firmware/driver will not be in the same hot plug mode, and numerous unexpected problems will occur. For example, if the Thunderbolt firmware/driver is in Legacy mode, and BIOS/OS is in Native mode, then Thunderbolt devices may not be recognized when they are plugged into the interface.

According to the present disclosure, and as understood with reference to the Figure, various operations are performed in the Setup Menu, during Pre-Boot, and Post-Boot in the OS. At 10, the user changes the Thunderbolt hot plug mode option in the BIOS setup menu. At 20, the BIOS executes the switch mode function and stores the result in a BIOS variable. At 30, the system is restarted. At 40, the BIOS uses the stored variable and the current switch mode to determine whether the mode switch operation passed or failed. If the operation passed, then at 50 the OS is run with the new mode. If the operation failed, then at 60 the BIOS executes the switch mode function. At 70, it is determined whether the second mode switch operation passed or failed. If the operation passed, then at 50 the OS is run with the new mode. If the operation failed, then at 80 the BIOS executes a command to get the current Thunderbolt mode from firmware, and syncs up the mode status with the BIOS and OS. At 90, the OS is run with the old mode. At 100, the user will see in the setup menu that the mode has been rolled back to old mode setting.

The disclosed technique advantageously provides a smart error recovery process for Thunderbolt hot plug mode switching. It gives one more chance to switch modes in the event that the mode switch failure is due to a Thunderbolt firmware timing issue. If the mode switch is ultimately not successful, it avoids many unexpected Thunderbolt problems in the OS if the mode switch mode fails, by syncing up the hot plug mode between the BIOS, the Thunderbolt firmware/driver, and the OS. If the mode switch fails, the user can check the result by accessing the setup menu option. If user sees that the option is not changed to what they intended, then it means that the mode switch failed

and the user can try to get help to correct the problem. As a result, higher stability on Thunderbolt products is provided.

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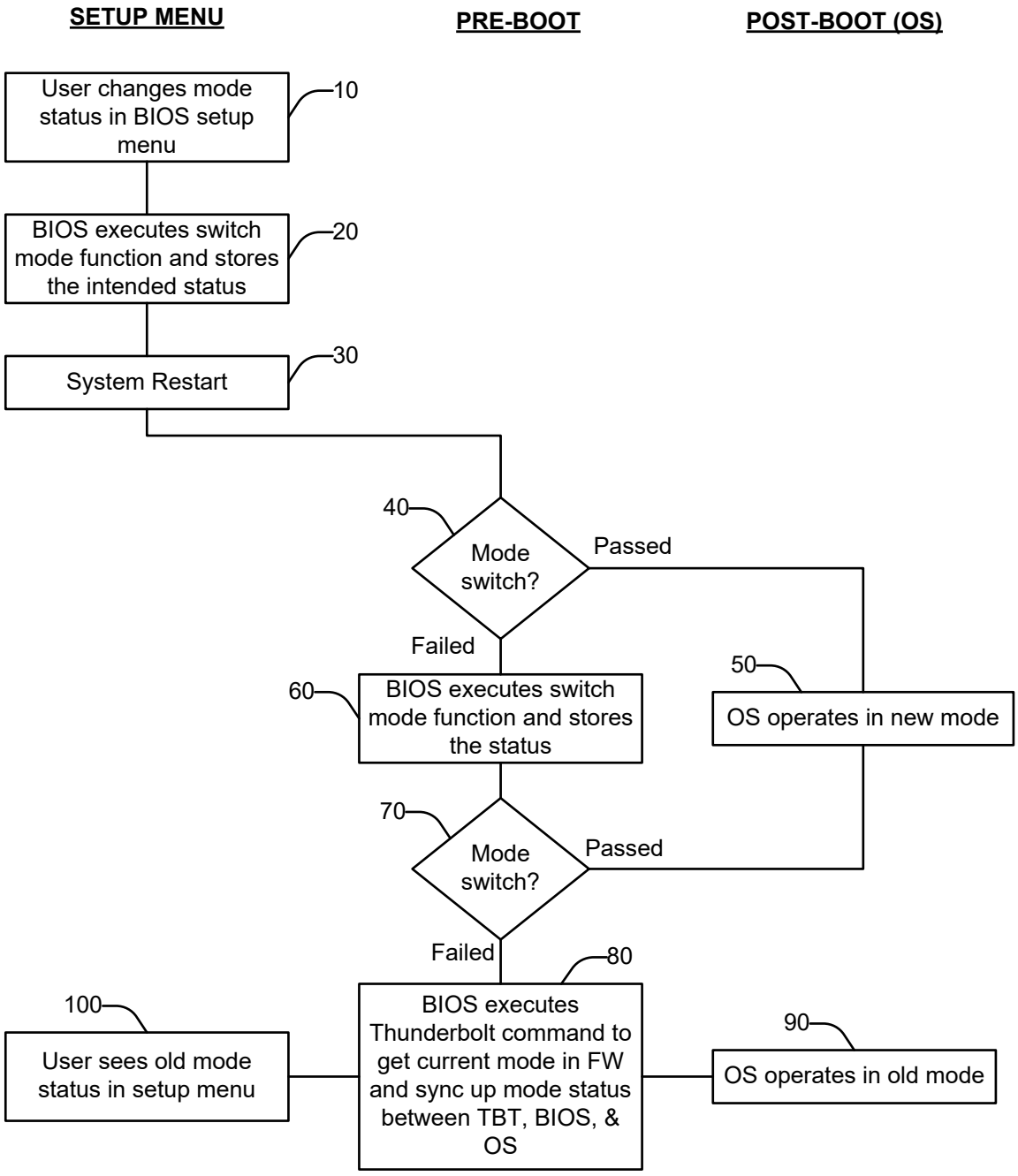
SETUP MENU
PRE-BOOT
POST-BOOT (OS)
User changes mode status in BIOS setup menu
10
BIOS executes switch mode function and stores the intended status
20
System Restart
30
40
Mode switch?
Passed
Failed
50
OS operates in new mode
60
BIOS executes switch mode function and stores the status
70
Mode switch?
Passed
Failed
80
100
User sees old mode status in setup menu
BIOS executes Thunderbolt command to get current mode in FW and sync up mode status between TBT, BIOS, & OS
90
OS operates in old mode