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NEW METHOD FOR NOTEBOOK POWER SAVING BY RJ45 CABLE DETECTION

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New method for Notebook power saving by RJ45 cable detection

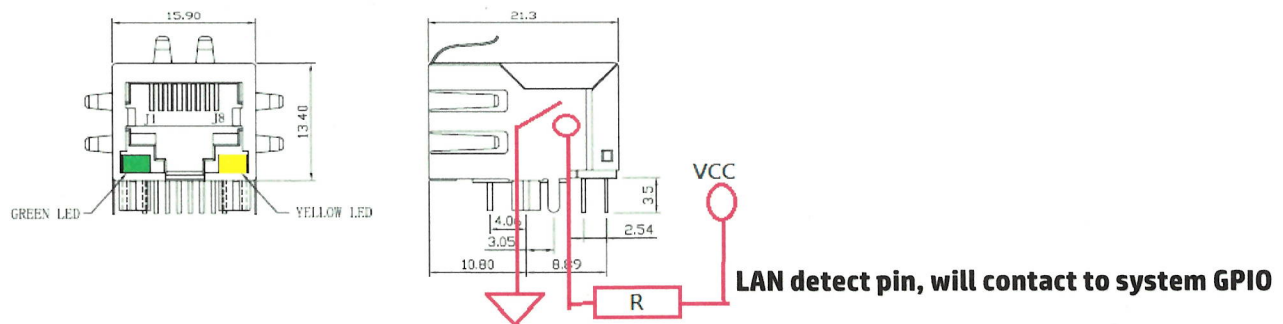
Conventional approach:

In current design, the LAN chip still need to keep the power on even the RJ45 cable not plug-in. Although the LAN chip able to enter the D3 low power mode to save the system power but still with power consumption loading. This invention is to add the detect function at LAN connector to turn on or turn off the LAN chip power.

New approach:

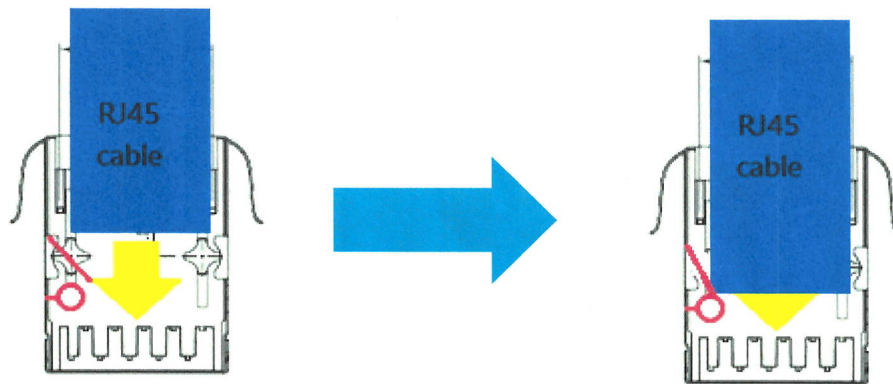
Fully turn off LAN chip power by adding the RJ45 cable detect function into LAN connector, the detect function constituted by two spring inside the LAN connector. (please refer below picture)

- When the RJ45 cable plug-in the LAN connector, these two springs will contact together then cause the detect pin change the state from high to low. (please refer below picture)
- The detect pin will connect to system GPIO pin and system BIOS will base on GPIO state to know if RJ45 cable be plugged in or not to decide the LAN chip power and LAN chip PCIe port turn on or off.



- Notebook system BIOS and image must include the LAN chip resource allocate and driver installation.
- Once complete the action to allocate the LAN chip resource allocate and driver installation, system will turn off LAN power and related PCIe port. (GPIO = high)

- When RJ45 cable be plugged into LAN connector, the detect pin will change the state due to RJ45 cable will push these two springs are connection. (GPIO = low, BIOS to turn on the LAN power and related PCIe port)
- When RJ45 cable be plugged out from LAN connector, the detect pin will change the state due to two springs are disconnect. (GPIO = high, BIOS to turn off the LAN power and related PCIe port)



Before RJ45 cable plug in the connector, the A and B are disconnect (LAN detect pin state is high, LAN power and related PCIe port off)

After RJ45 cable plug in the connector, the A and B are connect (LAN detect pin state is low, LAN power and related PCIe port on)

The benefit for this new method,

- No need to change the RJ45 cable design.
- New connector will not impact the LAN function or performance.
- LAN chip power and related PCIe port able to fully turn off to save the system power.

Disclosed by Chiu, Dennis / Huang, Iris / Lin, Serine and Lin, Alex, HP Inc.