



## TECHNICAL WHITE PAPER

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# THUNDERBOLT NATIVE + LOW POWER MODE ON HP ELITEBOOK G5 NOTEBOOKS AND HP ZBOOK G5 WORKSTATIONS

## 1 OVERVIEW

HP is adding Thunderbolt **Native + Low Power** mode option on HP EliteBook 830/836/840/846/850/1050 G5 and HP ZBook 14u/15u/15/17/Studio/Studio x360 G5. This document will provide an overview of the feature and benefits from having it enabled. It will also cover the requirements to enable Native + Low Power mode and its known limitations.



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# 2 BENEFITS OF THUNDERBOLT NATIVE + LOW POWER

The Thunderbolt “Native + Low Power mode” option provides benefits of Run Time D3 (RTD3). Below is the list of benefits from having Thunderbolt RTD3 with Native PCI Express Mode.

## 2.1 ENHANCED USER EXPERIENCE

- Faster enumeration and de-enumeration of Thunderbolt devices
- A more robust solution which improves hot plug and surprise removal for Thunderbolt devices

## 2.2 BETTER OS AND THUNDERBOLT CONTROLLER INTEGRATION

- With Native + Low Power Mode, the Thunderbolt controller is always available to the Operating System (OS), but in a lower power state
- Without Native + Low Power Mode, to save power the Thunderbolt controller is surprise removed from the PCIe bus when no devices are connected. When a device is plugged into the Thunderbolt port, the OS must re-enumerate the Thunderbolt controller first, before any additional devices are enumerated

## 2.3 IMPROVED BATTERY LIFE

- RTD3 extends battery life of the system. When RTD3 capable devices are connected but idle (during S0) the controller will allow the entire Thunderbolt hierarchy to go into low power state (D3) while the system is being actively used. Thus, lowering the Thunderbolt controller power consumption tremendously when devices are idle

# 3 MINIMUM REQUIREMENTS TO SUPPORT NATIVE + LOW POWER MODE

In order to properly support the Native + Low Power mode, it is recommended that you use the latest HP BIOS version, Intel Thunderbolt 3 Secure Connect Software, and Intel Thunderbolt 3 Firmware. Enabling Native + Low Power Mode without the latest HP BIOS, Intel Thunderbolt 3 Secure Connect Software, and Intel Thunderbolt 3 Firmware could result in an unsupported state. Refer to table 1 below for the minimum requirements.

**Table 1:** Minimum requirements to support Native + Low Power mode

	HP BIOS version (softpaq #)	Intel Thunderbolt 3 Secure Connect Software version (Softpaq #)	Intel Thunderbolt 3 Firmware (softpaq #)	Operating System
HP EliteBook 830 G5 Notebook PC	HP BIOS version 01.04.00 (SP91951)	17.4.77.400 Rev.A (SP92028)	35.0.1.x.1 Rev.A (SP92475)	Windows 10 RS3 build 16299.637
HP EliteBook 836 G5 Notebook PC				
HP EliteBook 840 G5 Notebook PC	HP BIOS version 01.04.00 (SP91951)	17.4.77.400 Rev.A (SP92028)	35.0.1.x.1 Rev.A (sp91910)	
HP EliteBook 840 G5 Healthcare Edition Notebook PC				
HP EliteBook 846 G5 Notebook PC				
HP EliteBook 846 G5 Healthcare Edition Notebook PC				
HP EliteBook 850 G5 Notebook PC				
HP ZBook 14u G5 Mobile Workstation				
HP ZBook 15u G5 Mobile Workstation				



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	HP BIOS version (softpaq #)	Intel Thunderbolt 3 Secure Connect Software version (Softpaq #)	Intel Thunderbolt 3 Firmware (softpaq #)	Operating System
HP EliteBook 1050 G5 Notebook PC	01.06.03 (SP95189)	17.4.77.400 Rev.A (SP92028)	35.0.1.x.1(SP94763)	Windows 10 RS3 build 16299.637
HP ZBook 15 G5 Mobile Workstation	01.06.03 (SP95187)	17.4.77.400 Rev.A (SP92028)	35.0.1.x.1(SP94762)	
HP ZBook 17 G5 Mobile Workstation	01.06.03 (SP95187)	17.4.77.400 Rev.A (SP92028)	35.0.1.x.1(SP94761)	
HP ZBook Studio x360 G5 Mobile Workstation	01.06.03 (SP951898)	17.4.77.400 Rev.A (SP92028)	35.0.1.x.1(SP94763)	
HP ZBook Studio G5 Mobile Workstation				

## 4 HOW TO ENABLE NATIVE + LOW POWER MODE?

To enable Native + Low Power Mode on HP EliteBook 830/836/840/846/850/1050 G5 and HP ZBook 14u/15u/15/17/Studio/Studio x360 G5, please follow the steps below:

1. Make sure the Notebook or Workstation has the minimum requirements (refer to table 1).
2. Go to **BIOS (F10)** menu.
3. In the F10 menu, navigate to **Advance**.
4. Click on **Port Options**.
5. Set the Thunderbolt PCIe Hot Plug option to “**Native + Low Power mode**”.

## 5 KNOWN LIMITATIONS

When docked to HP Elite Dock with Thunderbolt 3 or HP ZBook Dock with Thunderbolt 3, there is a limitation with the LAN on the dock that causes the MAC Address Pass Through feature to fail WOL (Wake On LAN) from standby, hibernation and shutdown state. User would need to change the Thunderbolt PCIe Hot Plug option in the F10 BIOS to “Legacy” mode to get the full MAC Address Pass Through feature fully function with WOL from all sleep states.

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