(Archived) Linux machine Configuration (Laptop 2008-2012)

This guide has been archived (lack of quality hardware). No additional work will be done.

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INTRODUCTION
Hardware Requirements

Processor

Release Year (Non-Negotiable)

- Recommended: 2011-2012
  - Minimum: 2008

Technical Requirements (Non-Negotiable)

- *64-Bit*
- *Acceptable:* Dual Core
- *Recommended:* Quad Core

Processor (Negotiable)

- *Intel*
  - Value: (Sandy Bridge) Core i5
  - Low cost: (Sandy Bridge) Core i3
- *AMD*
  - Value
    - (APU) Comal Fusion (Socket FS1r2/FP2)
    - (Non APU) Turion II Dunabe (Socket S1G4)
  - Low Cost
    - (APU) Sabine (Socket FS1)
    - (Non APU) Athlon II Dunabe (Socket S1G4)

Memory (Non-negotiable)

DDR3 is easier to find then DDR2.

- Minimum: 4GB
- Recommended: 8-16GB

SSD/HDD (Negotiable)

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- ***SSD***
    - Minimum: 256GB
    - Recommend: 512GB
- ***HDD***
    - Minimum: 500GB
    - Recommend: 1TB

Miscellaneous

Non-Free firmware requirements (Integrated)

- ***Intel***
    - Intel HD Graphics: N/A
    - Intel GMA: ***Required for PowerVR chipsets (GMA 500/600/3600/3650)***
- ***AMD***
    - AMD Radeon G Series: ***Non-Free firmware required.***
    - AMD Radeon HD: ***Non-Free firmware required.***

Non-Free firmware requirements (Dedicated)

- ***AMD and nVidia require Non-Free firmware. Open source firmware may degrade performance or cause problems.***

Laptop battery recalibration (Optional)

[Refer to this guide](#) if your laptop includes an older battery. This is optional but highly recommended.

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TOOLS:

- USB Flash Drive (1)

16GB or larger
Boot media (Recommended)

- DVD (1)

Boot media (Backup)

PARTS:

- 2.5" SATA Hard Drive (1)

Required if the factory drive was removed.

- 8GB PC3L-1600 (2x4GB) (1)

DDR3L (1.5V compatible)
Used in modern laptops.

- 16GB PC3L-1600 (2x8GB) (1)

DDR3L (1.5V compatible)
Used in modern laptops.

- 8GB PC2-6400 SODIMM (1)

DDR2 800MHz (Legacy laptops)
Used in pre-2010 laptops.

- 16GB PC2-6400 SODIMM (1)

DDR2 800MHz (Legacy laptops)
Used in pre-2010 laptops.

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Step 1 — System selection/Future delete (No carry)

- *Model:*
- *Processor: Intel Core i5 2nd/3rd gen XXXXM/QM*
  - *Graphics: Intel HD Graphics 3000/4000*
- *RAM: 8/16/32GB (DDR3/L)*
- *Storage: (SSD/HDD)*
- *Networking*
  - *Ethernet:*
  - *WiFi:*

Step 2 — Install Media/DVD dropped/Future delete

- ⚑ *USB installation is typically recommended. [Refer to this guide](#) for bootable USB drive creation instructions.*
  - *USB:* This is recommended for most users. Modern systems boot from USB reliably.
  - *DVD:* Only consider this if your system cannot boot from USB reliably.

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Step 3 — Disable Secure Boot (AMI Aptio)/Future delete
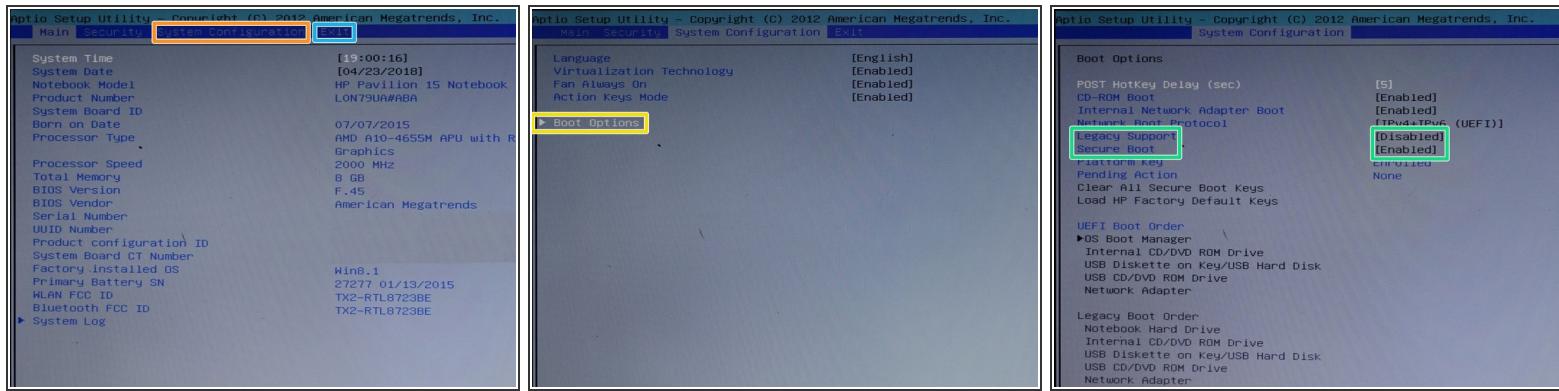
(i) *Multiple attempts may be required.*

⚠ *These steps were developed on an HP Pavilion 15-p263nr. Most systems are similar.*

- Press *Esc/F12* to access the *BIOS* or *F10/F11* for the *One-time boot menu.*
  - Press the right arrow on your keyboard. Find *System Configuration*.
  - In *System Configuration*, select *Boot Options*. Make the following changes:
    - *Disable Secure Boot*. Press *Enter* and select *Disabled*. *If needed, disable Legacy Boot.*
- Save the change and reboot your system.

Step 4 — Distributions/16.04LTS depreciated/Future delete

⚠️ *If you encrypt your system, backup your decryption key and password.*

- *buntu* covers Ubuntu and other flavors. Each release is similar, but system requirements vary. *Support period: 3-5 years (LTS)/6 months (Rolling release).*

- *Linux Mint* is Ubuntu derived. Referral links are used for revenue. *Support period: 4 years.*
  - *LMDE* is Debian derived. *It is not PPA compatible and receives fewer releases.*

- *Debian* is an intermediate distro, often used as a base distro. *Support period: 5 years.*

⚠️ *Ubuntu 16.04 LTS* has privacy issues (Amazon integration). 18.04 LTS fixes this. *EOL: 4/2021*

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Step 5 — Memory (RAM)/Future delete

⚠️ *The RAM in your system determines how it performs. 8GB or more is recommended.*

- *DDR3L* operates at 1.3V, if supported. *DDR3L is backwards compatible with 1.5V.*

- *DDR3* was supported in 2008 (Intel GL/GS) and 2010 (AMD Nile).

- *DDR2* was supported in 2005 (Intel 915GMS) and 2006 (AMD Kite). *Availability may be limited.*

Step 6 — Solid State Drive/128GB depreciated/Future delete

⚠️ *A UEFI BIOS is required to fully address >2TB SSDs.*

⚠️ *If found, make sure any known firmware bugs are fixed. Make sure TRIM is enabled.*

- *128GB SSDs* are only practical as OS drives due to the capacity.

- *256GB SSDs* may work as a primary drive, but are typically OS drives.

- *512GB SSDs* are somewhat affordable. These are good as primary drives.

- *>512GB SSDs* are expensive. If possible, wait for a price reduction.

Step 7 — Hard drive (New WIP)/Future delete

⚠️ *A UEFI BIOS is required to fully address >2TB hard drives.*

📌 *If known, record the Brand, Model and DOM of the original drive.*

- *Budget:* Recommended: **WD Blue 1TB**. *WD Blue drives do not last as long.*

- *7mm:* Recommended: **WD Black 500GB**.

- *9.5mm:* Recommended: **WD Black 1TB**.

Step 8 — Hard Drive (Used)/Future delete

⚠️ *A UEFI BIOS is required to fully address >2TB hard drives.*

⚠️ *Used drives should be tested before use. DO NOT reuse heavily used drives.*

- *250-320GB hard drives* are typically heavily used.

- *500GB-1TB hard drives* <5 years old are generally serviceable. Drives >5 year old are likely to fail.

- *>1TB hard drives* <5 years old are generally serviceable. Drives >5 year old are likely to fail.

Step 9 — Optical drive/Future delete

📌 If you do not use your optical drive, a Hard Drive -> Optical Drive Caddy can be installed. *Measure your optical drive with a digital caliper to determine if it is 9.5 or 12.7mm.*

- *DVD Recorder* drives are the most common. DVD±R drives read both formats.

- *Blu-Ray* drives are primarily user installed.

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Step 10 — Processor (Intel)/Future delete
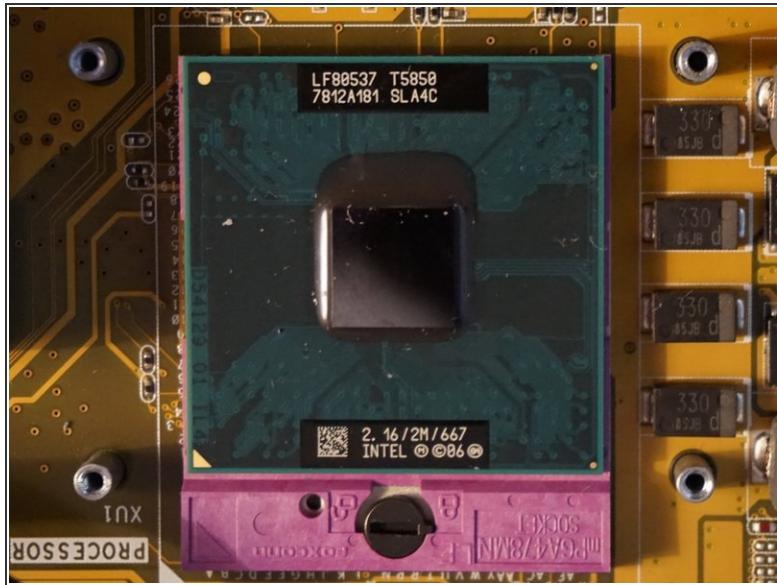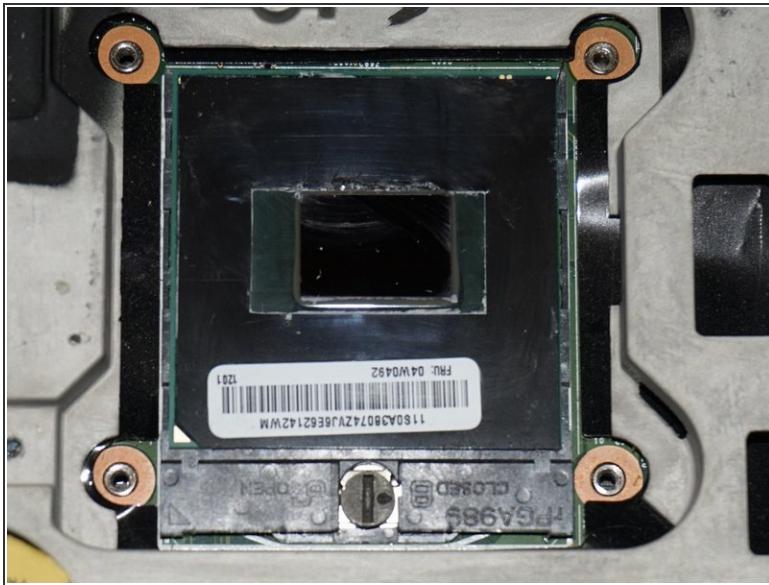
ⓘ *Low end processors have been omitted.*

- *Core i Series 3rd gen (Ivy Bridge)* systems are becoming common. However, they tend to be more expensive.

- *Core i Series 2nd gen (Sandy Bridge)* systems are common and affordable.

- *Pentium (Sandy/Ivy Bridge)* systems are low end, but better than Celeron systems. *These are difficult to recommend.*

- While *Core i Series 1st gen (Arrandale)* systems are usable, the onboard graphics are subpar. Consider a Pentium laptop.

- *Core 2 Duo* systems are still usable for basic tasks. *It is typically cheaper to replace the entire system if it has a major failure.*

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## Step 11 — Processor (AMD)/Future delete
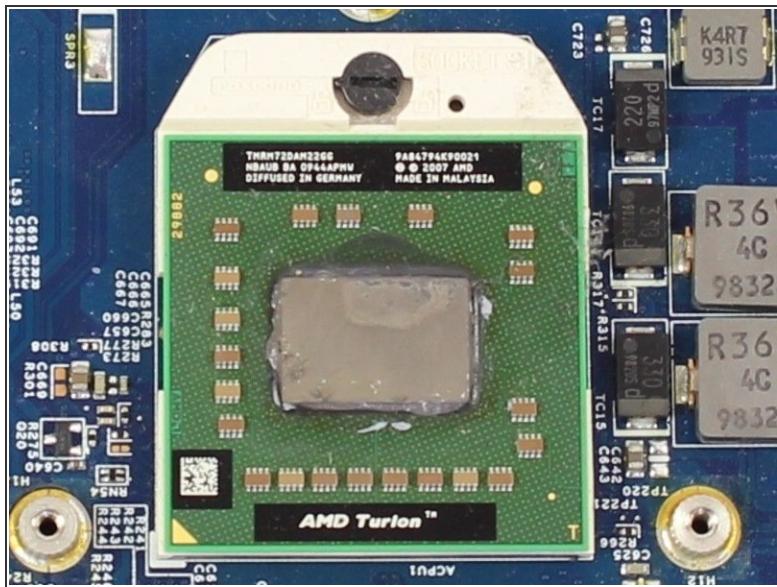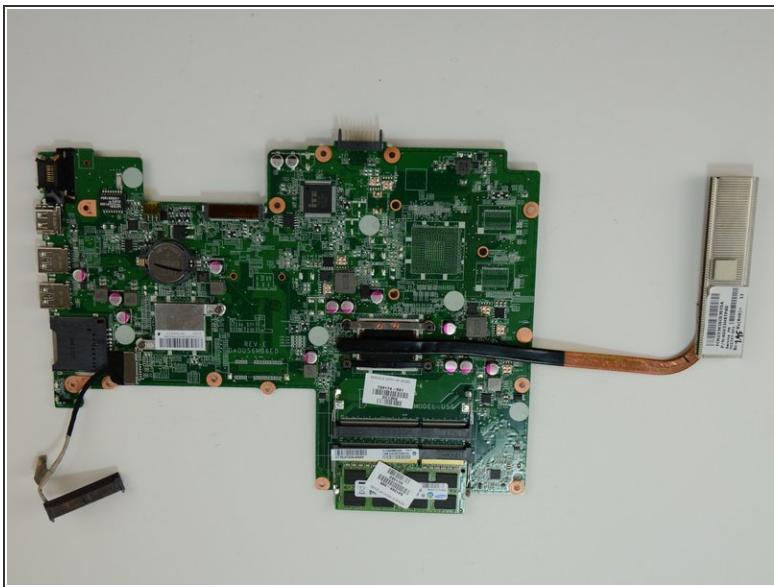
- The ***Comal (Fusion) (2012)*** platform was designed for mainstream laptops. All processors are dual or quad core. ***This platform uses Radeon 7XXXG graphics.***

- The ***Sabine (Fusion) (2011)*** platform was designed for mainstream laptops. Try to avoid E2/A4 laptops. ***This platform uses Radeon 6XXXG graphics.***

- The ***Brazos (2011)*** platform was designed for netbooks. All processors are dual core except the C30/E-240. ***This platform uses Radeon HD 6000 graphics.***

- The ***Danube (2010)*** platform was designed for mainstream notebooks. All processors are dual or quad core except the V Series. ***This platform uses Radeon HD 4200 graphics.***

- The ***Nile (2010)*** platform is designed for Ultrathin laptops. All processors are dual core except the Athlon II K125/K145/V105. ***This platform uses Radeon HD 4200 graphics.***

⚠️ ***These platforms only support DDR2.***

- The ***Tigris (2009)*** platform was designed for mainstream laptops. All processors are dual core except the Sempron M100/120/140. ***This platform uses Radeon HD 4200 graphics.***

- The ***Congo (2009)*** platform was designed for Ultraportable laptops. There are no single core processors. ***This platform uses Radeon HD 3200 graphics.***

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Step 12 — Graphics (Integrated)/Future delete
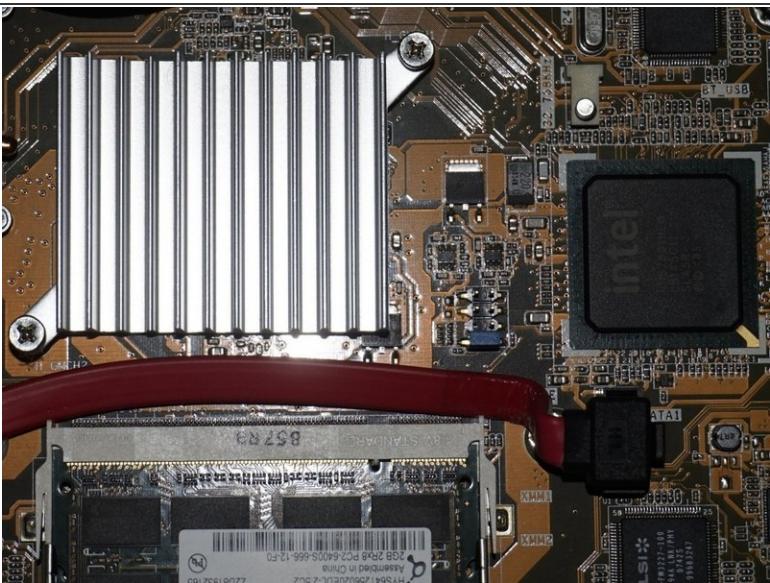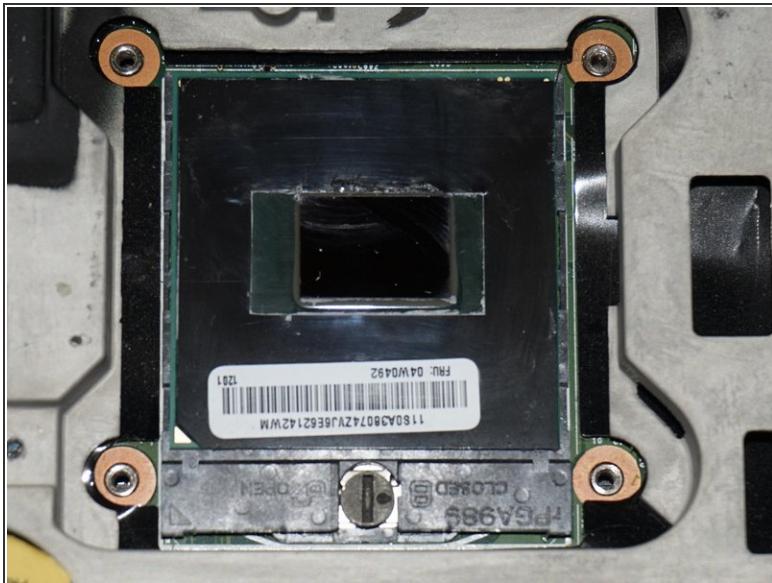
⚠️ ***Chipsets on this list are integrated into the CPU.***

- ***Intel HD Graphics (2010-present)*** are integrated into the processor. While HD Graphics 2000/2500/3000/4000 performance is acceptable, 1st generation is subpar.

- ***AMD Radeon G Series graphics (2011-present)*** are integrated into A Series APUs. Since the GPU is integrated into the processor, performance is CPU dependent.

⚠️ ***Chipsets on this list are integrated into the motherboard. There will be a performance gap.***

- ***AMD Radeon HD graphics (Integrated)*** perform better today, but require Non-Free firmware.

- ***Intel GMA graphics*** have strong compatibility. ***Caution: Some older chipsets are unusable. PowerVR chipsets (500/600/3600/3650) require Non-Free firmware.***

Step 13 — Graphics (Dedicated)/Future delete
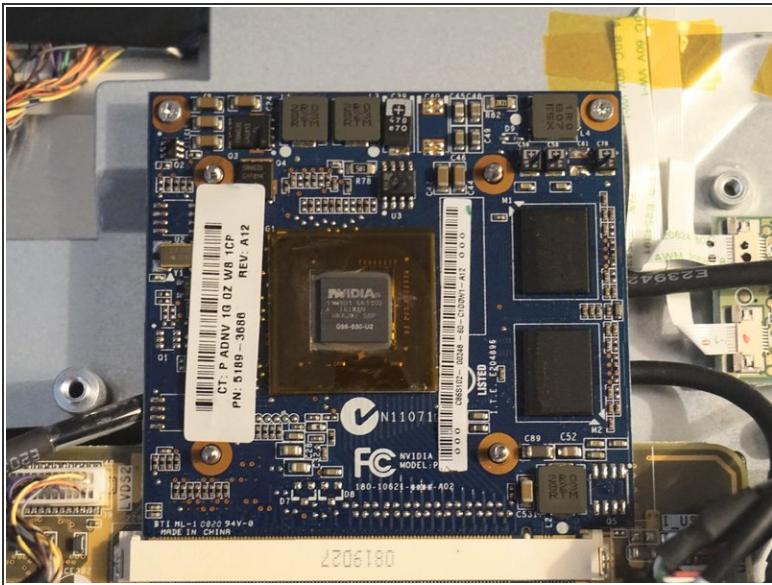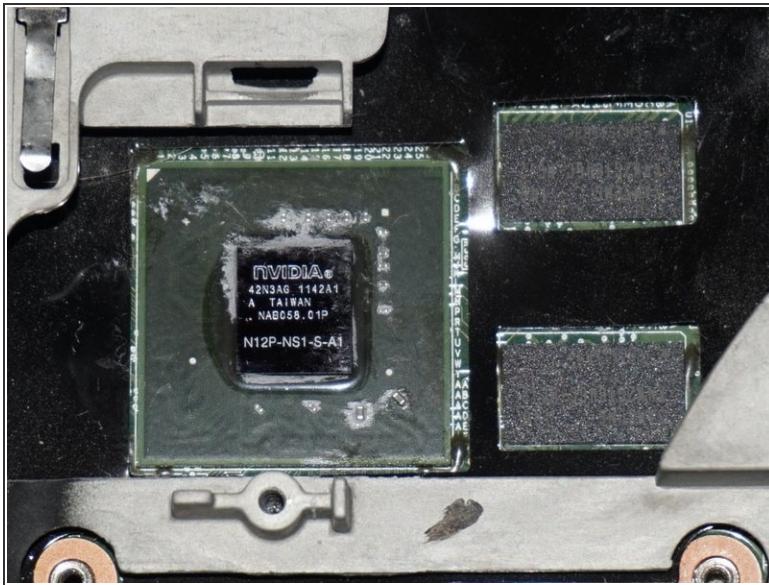
⚠️ *Dual GPU laptops may not work correctly. Check if this can be disabled.*

⚠️ *AMD and nVidia require Non-Free firmware. Some images do not include it (Ex: Debian Official).*

- *AMD*
  - *AMD Radeon* GPUs are marketed towards consumers. *While Linux support is better, some features are not supported.*
  - *AMD FirePro* GPUs are made for ISV certified workstations. These cards provide full Linux support.
- *nVidia*
  - *nVidia GeForce* GPUs are known for subpar Linux compatibility. *nVidia focuses on proprietary API support (DirectX, PhysX, GameWorks). This may impact performance.*
  - *nVidia Quadro* GPUs are made for ISV certified workstations. These cards provide full Linux support.

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Step 14 — Wireless (Compatibility)/Future delete

⚠️ ***Wireless cards without 802.11n or dual band support should be replaced. Some laptops require a [half to full height bracket](#).***

- ***Intel wireless cards** work well in Linux. **Some distros do not include the firmware required (Non-Free) on official images.***

- ***QCA/Atheros wireless cards** work well in Linux and are usually easily configured. **ath10k cards require Non-Free firmware.***

- ***Azurewave wireless card** compatibility is chipset based. **ath10k cards are the most compatible.***

- ***Realtek wireless cards** work best in *buntu and Linux Mint. Compatibility varies in other distros. **Some distros do not include the firmware required (Non-Free) on official images.***

Step 15 — Wireless (No Whitelist)/Future delete

- *Dell* laptops are not whitelisted. *Factory Intel laptops provide the best out of the box support.*

- *Alienware (Dell)* laptops are not whitelisted. *Some Killer Wireless cards have problems in Linux.*

- *Acer* laptops are not whitelisted.

- *Asus* Asus laptops are not whitelisted.

- *MSI* laptops are not whitelisted. *Some Killer Wireless cards have problems in Linux.*

- *Samsung* laptops are not whitelisted. *Most laptops ship with Intel or Broadcom wireless.*

- *Private label* laptops are manufactured by ODM's (Ex: Clevo/Sager) for companies like System76. These are typically not whitelisted.

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Step 16 — Wireless (Whitelist)/Future delete

⚠️ *These laptops will not boot with an unauthorized card installed.*

- *Lenovo* laptops from 2005-2015 are whitelisted. POST will halt with an 1802 error.

- *HP Business* laptops from 2004-2012 are whitelisted. *2013+ laptops are unaffected.*

- *HP Consumer* laptops have been whitelisted since 2007.

- *Some LG* laptops have a whitelist. *Research the laptop you are considering if this matters.*

Step 17 — (DEPRECIATED) Northbridge
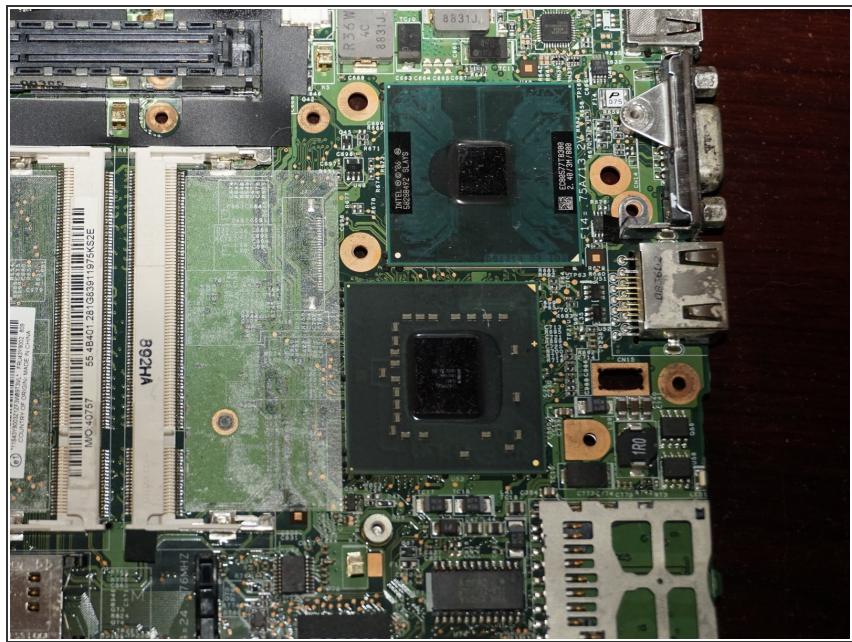
⚠️ *Modern Intel/AMD processors integrate the northbridge into the processor.*

📌 This list is generalized and some chipsets are not listed. *If possible, try and use a 1st party chipset.*

- **Intel** Outside of a few obscure chipsets, most Intel chipsets work without any issues.

- **AMD** chipsets are primarily found on OEM systems and high end boards. Most motherboards use a VIA chipset.

- **VIA** chipsets are known for excellent Linux compatibility. This is primarily because VIA provides firmware for Linux. *Distros like Debian typically require manual firmware installation.*

- **nVidia nForce** nVidia left the chipset market in 2010, but these systems are still out there. *These chipsets require Non-Free firmware.*

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## Step 18 — (DEPRECIATED) nVidia Optimus (Dell)
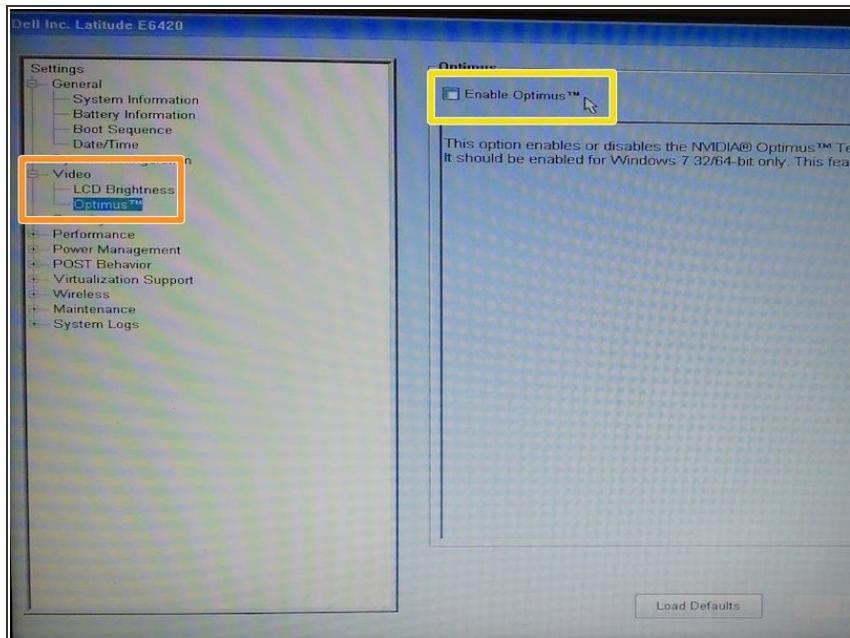
ⓘ **Image source: [Dell Community](#)**

⚠ This step only applies to Latitude, Vostro and Precision systems. *Some laptops require a BIOS update to enable this option.*

⚠ *Installation media without bundled Non-Free firmware REQUIRES manual configuration. Disable Optimus to avoid this.*

- Press **F2** or **F12 (One-time boot menu)** to access the BIOS.

- Open the *Video* submenu and find **Optimus**. Make the following changes:

  - Unckeck **Enable Optimus**.

- Save the change and exit the BIOS. The system will default to the nVidia GPU in this mode.

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Step 19 — (DEPRECIATED) nVidia Optimus (Lenovo)
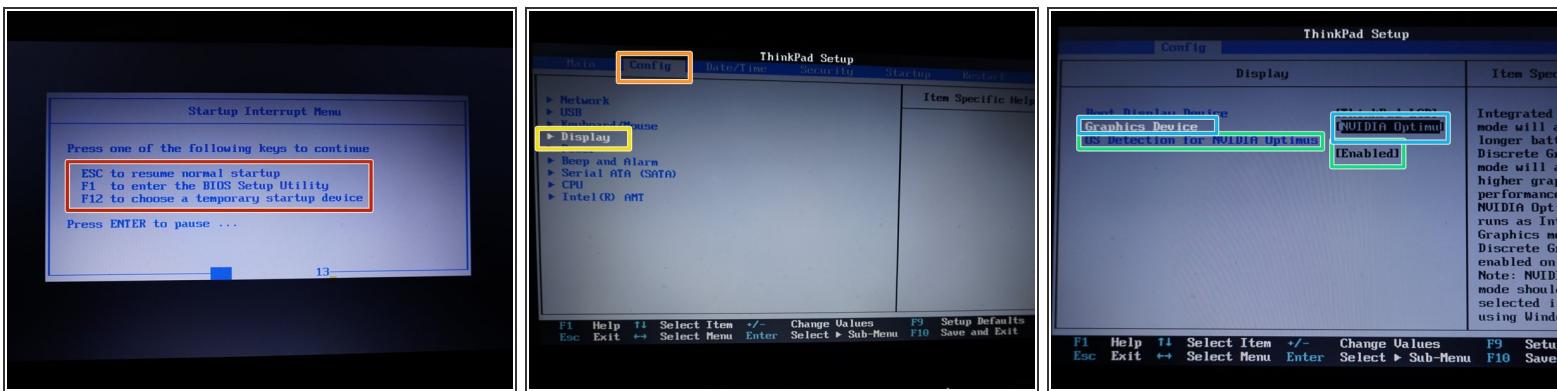
⚠ *This step only applies to Optimus enabled ThinkPads.*

⚠ *Installation media without bundled Non-Free firmware REQUIRES manual configuration. Disable Optimus to avoid this.*

- Load the BIOS. Press **F1 (BIOS)**, **F12 (Boot menu)** or the **ThinkVantage button (Startup Interrupt).**

- Find the **Config** tab in the BIOS.

- Find the *Display* submenu. Press **Enter** and make the following changes:
  - Disable *OS Detection for NVIDIA Optimus.* To do this, press **Enter** and select **Disabled**.

- Select a GPU to use once Optimus is disabled. Once done, choose **Exist Saving Changes**. The system will restart.