



UEFI, HP, and Me: A Bootloader Love-Hate Story

How one stubborn laptop taught me more about firmware psychology
than I ever wanted to know

Demystifying Bootloaders

Term	Meaning	Reality
BIOS	<i>Basic Input/Output System</i> : A ghost of the original IBM PC/XT	Bodges layered upon bodes; boots your hot new PC as if it was fresh out of 1983
UEFI	<i>Unified Extensible Firmware Interface</i> : The modern replacement	A fresh take; smarter, flexible, but still occasionally cursed
CSM	<i>Compatibility Support Module</i> : A component of UEFI that allows legacy booting (a.k.a BIOS mode)	Usually throws away UEFI’s ability to recognize a GPT disk set up for legacy booting, falling back to BIOS heuristics for determining bootability
MBR	<i>Master Boot Record</i> : A 512-byte relic that supports, without hacks, a maximum of 4 partitions	Designed when a “large drive” was 10MB; yet somehow still alive
GPT	<i>GUID Partition Table</i> : Modern, robust, and sanity-preserving	The only sane partitioning scheme for 2025; theoretically supports BIOS booting

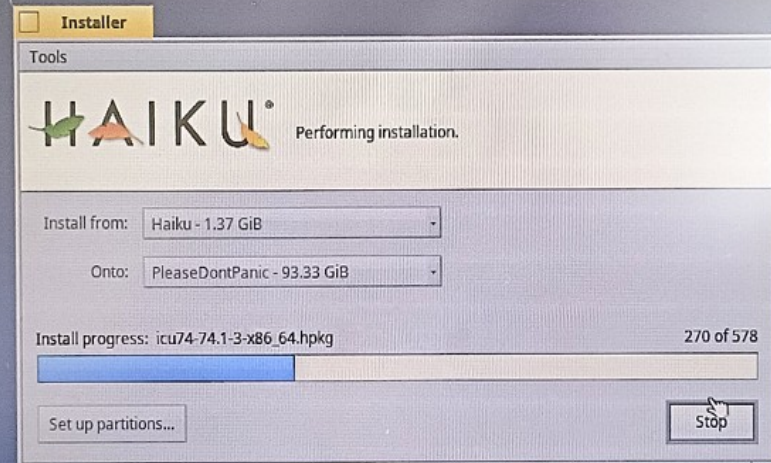
Meet the Stubborn Hardware

- HP Elitebook 8560p (circa 2011)
- Early Insyde-based EFI firmware
- EFI support primarily intended for internal consumption (e.g. diagnostics and updates)
- Dual-drive setup: Crucial MX200 mSATA SSD (Expansion bay) + original WD Black HDD, both 500 GB
- Mission: A modern, reliable boot into any OS



The Catalyst

- GPT disks booted in legacy mode
- Fragile BIOSBOOT shim prone to breakage
- GRUB forgot how to boot Haiku (after convincing it to reinstall)
- How hard can it possibly be to boot UEFI?



“Sure, I can help you with that! Absolutely!”

Holding Shift usually shows the GRUB menu, except when it doesn't; I should probably just reconfigure GRUB to show the menu unconditionally; or (better) find a way to convince Hewlett Packard's half-baked UEFI implementation to boot all the OSes I want.

That'd be a lot better than relying on fragile legacy booting from a GPT-formatted disk.

I did have rEFInd installed on there. The complication seems to be that HP doesn't properly support EFI variables; which was leading to the installers of `_some_` OSes to fail when trying to install the bootloader; even though the installation process was largely successful.

Exactly — the root of your trouble here isn't really GRUB at all, it's the awkward handshake between HP's quirky UEFI and your multi-boot GPT setup.

Right now you're stacking two layers of fragility:

- **Legacy BIOS boot from GPT** (which is already a “this works until it doesn't” situation),
- GRUB's “only show menu when it feels like it” default.

A more stable setup would be:

1. Switch to proper UEFI boot for all OSes

- Even if HP's UEFI is flaky, you can usually tame it with a combination of:
 - Setting `BootOrder` with `efibootmgr` (Linux) so Fedora, Haiku, etc., are all first-class citizens.
 - Ensuring each OS has its `.efi` loader in `\EFI\<OS>\` plus a copy in `\EFI\Boot\bootx64.efi` as a fallback ↓

2. Install GRUB in EFI mode (not legacy)

Ah — yep, that's the classic HP “UEFI but only in the most begrudging sense” problem.

On a lot of EliteBooks from that era, the firmware will:

- Pretend to support EFI variables, but lose them after a reboot or firmware update.
- Ignore `efibootmgr` changes unless they target the fallback path (`\EFI\Boot\bootx64.efi`).
- Sometimes hardcode its boot to **only** load `bootx64.efi` from the EFI System Partition (ESP) — no matter what `BootOrder` says.

That explains why rEFInd worked for you — it doesn't *need* EFI variable support if you just plant it in the fallback location.

A trick that usually works on stubborn HPs is:

1. Put your preferred boot manager (rEFInd or GRUB EFI) as the fallback loader

- Copy it to:

```
bash
/EFI/Boot/bootx64.efi
```

Copy code

- This is the “if all else fails” file the firmware *will* run.

The Observation

- Scary warning when enabling UEFI
- Installing OS in UEFI mostly works, but can fail when setting bootvars
- HP ignores bootvars that are set
- CSM cannot be disabled
- “Boot From EFI File” is the only reliable way to EFI boot external media

```
Make sure Secure Boot is disabled before proceeding.  
root@silverfish:~# grub2-install --target=x86_64-efi --efi-directory=/boot/efi --bootloader-id=grub2  
Installing for x86_64-efi platform.  
Could not prepare Boot variable: No space left on device  
grub2-install: error: efibootmgr failed to register the boot entry: Input/output error.  
root@silverfish:~#
```

UEFI Boot Mode

Warning

The “UEFI Boot” option on this system is provided for development purposes only and is currently NOT fully supported or warranted by HP.

Warning

The “UEFI Boot” option on this system is provided for development purposes only and is currently NOT fully supported or warranted by HP. Preboot Authentication and Drive Lock are currently NOT supported under the UEFI Boot mode. HP strongly recommends disabling Preboot Authentication and Drive Lock before enabling UEFI Boot on this system.

Accept

Cancel

Please Select

Notebook Upgrade Bay (UEFI)

Notebook Ethernet (UEFI)

OS Boot Manager

Boot From EFI File

Notebook Hard Drive

Notebook Upgrade Bay

USB Hard Drive 1 - TDKMedia Platinum 3.0

The Plan

- Boot Fedora in EFI mode using SystemRescueCD
- Install rEFInd and an EFI bootloader
- `\_(ツ)_/`
- Profit

```

:: Triggering udevents...
:: running hook [memdisk]
:: running hook [findroot]
Searching for block devices ...
=====
NAME                SIZE FS/TYPE LABEL
-----
/dev/sda             465.8G
/dev/sda1             1M
/dev/sda2             1G ext4
/dev/sda3            195.3G btrfs  fedora_silverfish00
/dev/sda4             93.3G befs   PleaseDontPanic
/dev/sda5              5G vfat   HP_TOOLS
/dev/sdb             465.8G
/dev/sdb1            100M vfat
/dev/sdb2             16M
/dev/sdb3            465.1G ntfs
/dev/sdb4             530M ntfs
/dev/sdc              29.4G
/dev/sdc1            29.4G vfat   UENTOV
/dev/sdc2             32M vfat   UTOYEFI
=====
Checking for /sbin/init on device /dev/sda ...
Checking for /sbin/init on device /dev/sda1 ...
Checking for /sbin/init on device /dev/sda2 ...
Checking for /sbin/init on device /dev/sda3 ...
Checking for /sbin/init on device /dev/sda4 ...
[ 19.495001] befs: (sda4): ag_shift disagrees with blocks_per_ag.
[ 19.497647] befs: (sda4): <--- befs_find_key sbin not found
[ 19.497707] befs: (sda4): <--- befs_btree_find Key sbin not found
Checking for /sbin/init on device /dev/sda5 ...
Checking for /sbin/init on device /dev/sdb ...
[ 19.743482] EXT4-fs (sdb): UFS: Can't find ext4 filesystem
[ 19.743707] EXT4-fs (sdb): UFS: Can't find ext4 filesystem
[ 19.743882] EXT4-fs (sdb): UFS: Can't find ext4 filesystem
[ 19.744042] befs: (sdb): invalid magic header
[ 19.744218] FAT-fs (sdb): bogus number of reserved sectors
Checking for /sbin/init on device /dev/sdb1 ...
Checking for /sbin/init on device /dev/sdb2 ...
[ 19.762664] EXT4-fs (sdb2): UFS: Can't find ext4 filesystem
[ 19.762839] EXT4-fs (sdb2): UFS: Can't find ext4 filesystem
[ 19.762994] EXT4-fs (sdb2): UFS: Can't find ext4 filesystem
[ 19.763149] befs: (sdb2): invalid magic header
[ 19.763298] FAT-fs (sdb2): bogus number of reserved sectors
Checking for /sbin/init on device /dev/sdb3 ...
Checking for /sbin/init on device /dev/sdb4 ...
Checking for /sbin/init on device /dev/sdc ...
[ 19.871131] EXT4-fs (sdc): UFS: Can't find ext4 filesystem
[ 19.872442] EXT4-fs (sdc): UFS: Can't find ext4 filesystem
[ 19.873571] EXT4-fs (sdc): UFS: Can't find ext4 filesystem
[ 19.874731] befs: (sdc): invalid magic header
[ 19.875925] FAT-fs (sdc): bogus number of reserved sectors
Checking for /sbin/init on device /dev/sdc1 ...
Checking for /sbin/init on device /dev/sdc2 ...
ERROR: Failed to find /sbin/init on any block device, cannot continue
sh: can't access tty; job control turned off
[rootfs ~]# _

```

The Reality

- After much ado, Wayland boots
- But no mouse, no WiFi
- Switch to VT, realise half of PCI devices missing, fall back to wired Ethernet
- Download & install GRUB EFI and rEFInd



```
root@silverfish:~# grub2-install --target=x86_64-efi --efi-directory=/boot/efi --bootloader-id=Fedora
Installing for x86_64-efi platform.
grub2-install: error: This utility should not be used for EFI platforms because it does not support UEFI Secure Boot. If y
Make sure Secure Boot is disabled before proceeding.
root@silverfish:~# grub2-install --target=x86_64-efi --efi-directory=/boot/efi --bootloader-id=Fedora --force
Installing for x86_64-efi platform.
Could not prepare Boot variable: No space left on device
grub2-install: error: efibootmgr failed to register the boot entry: Input/output error.
root@silverfish:~#
```

Bootloader Hide-and-Seek

- Dude, where's my bootloader?
- Dude, *there's* your bootloader
- How did it get there, Dude?
- Dude, we were so messed up last boot

```
[root@sysrescue ~]# rm -rf /mnt/sdb1/EFI/{Boot,Fedora}
[root@sysrescue ~]# mv /mnt/sda2/efi/EFI /mnt/sdb1/
mv: inter-device move failed: '/mnt/sda2/efi/EFI' to '/mnt/sdb1/EFI':
[root@sysrescue ~]# mv /mnt/sda2/efi/EFI/* /mnt/sdb1/EFI/
[root@sysrescue ~]# ls /mnt/sda2/efi /mnt/sdb1/EFI
/mnt/sda2/efi:
EFI mach_kernel System

/mnt/sdb1/EFI:
BOOT fedora Microsoft refind tools
```

```
/dev/sdb1 on /boot/efi type vfat (rw,relatime)
/dev/sda2 on /boot type ext4 (rw,relatime)
root@silverfish:~# umount /dev/sda1
umount: /dev/sda1: not mounted.
root@silverfish:~# umount /dev/sdb1
umount: /boot/efi: not mounted.
root@silverfish:~#
```

```
/mnt/sdb1/EFI:
Boot Fedora Microsoft
```

```
[root@sysrescue ~]# ls /mnt/sda2/efi/
EFI/ mach_kernel System/
[root@sysrescue ~]# ls /mnt/sda2/efi/EFI
BOOT fedora refind tools
[root@sysrescue ~]# _
```

Firmware Forensics

```
rEFInd - Booting OS                                GRUB version 2.12

Minimal BASH-like line editing is supported. For the first word, TAB lists possible command completions. Any
TAB lists possible device or file completions. To enable less(1)-like paging, "set pager=1".
Using load options ""

grub> _
```

- EFI Bootvars are either ignored or broken
- Install rEFInd to fallback path (<ssd>/EFI/BOOT/BOOTX64.EFI)
- Set bootorder "Expansion Bay (UEFI)" then "OS Boot Manager"
- HP tries to boot rEFInd, fails, reboots into Windows on the *same ESP*
- Manually booting rEFInd works

```
Checking for /sbin/init on device /dev/sdb1 ...
Checking for /sbin/init on device /dev/sdb2 ...
[ 19.532579] EXT4-fs (sdb2): VFS: Can't find ext4 filesystem
[ 19.532833] EXT4-fs (sdb2): VFS: Can't find ext4 filesystem
[ 19.532990] EXT4-fs (sdb2): VFS: Can't find ext4 filesystem
[ 19.533151] btrfs (sdb2): invalid magic header
[ 19.533301] FAT-fs (sdb2): bogus number of reserved sectors
Checking for /sbin/init on device /dev/sdb3 ...
Checking for /sbin/init on device /dev/sdb4 ...
Checking for /sbin/init on device /dev/sdc ...
[ 19.635176] EXT4-fs (sdc): VFS: Can't find ext4 filesystem
[ 19.635779] EXT4-fs (sdc): VFS: Can't find ext4 filesystem
[ 19.636333] EXT4-fs (sdc): VFS: Can't find ext4 filesystem
[ 19.636987] btrfs (sdc): invalid magic header
[ 19.637550] FAT-fs (sdc): bogus number of reserved sectors
Checking for /sbin/init on device /dev/sdc1 ...
Checking for /sbin/init on device /dev/sdc2 ...
ERROR: Failed to find /sbin/init on any block device, cannot continue
sh: can't access tty: job control turned off
[rootfs ~]# mount -o subvol=root /dev/sda3 /new_root
[rootfs ~]# exec switch-root /new_root /sbin/init
sh: exec: line 2: switch-root: not found
[ 97.098208] Kernel panic - not syncing: Attempted to kill init! exitco
[ 97.099339] CPU: 1 UID: 0 PID: 1 Comm: sh Not tainted 6.12.30-1-lts #1
[ 97.100499] Hardware name: Hewlett-Packard HP EliteBook 8560p/1618, BL
[ 97.101663] Call Trace:
[ 97.102829] <TASK>
[ 97.104012] dump_stack_lvl+0x5d/0x80
[ 97.105189] panic+0x118/0x2db
[ 97.106359] do_exit.cold+0x15/0x58
[ 97.107527] do_group_exit+0x2d/0xc0
[ 97.108685] __x64_sys_exit_group+0x18/0x20
[ 97.109842] x64_sys_call+0x14b4/0x14c0
[ 97.111009] do_syscall_64+0x7b/0x190
[ 97.112175] ? syscall_exit_to_user_mode+0x37/0x1c0
[ 97.113358] ? do_syscall_64+0x87/0x190
[ 97.114539] ? syscall_exit_to_user_mode+0x37/0x1c0
[ 97.115736] ? do_syscall_64+0x87/0x190
[ 97.116903] ? __x64_sys_rt_sigaction+0x11b/0x140
[ 97.118169] ? syscall_exit_to_user_mode+0x37/0x1c0
[ 97.119349] ? do_syscall_64+0x87/0x190
[ 97.120513] ? irqentry_exit_to_user_mode+0x2c/0x1b0
[ 97.121699] entry_SYSCALL_64_after_hwframe+0x76/0x7e
[ 97.122901] RIP: 0033:0x7584adc80f68
[ 97.124110] Code: ff 64 89 02 eb c4 67 e8 d6 1d 04 00 66 0f 1f 44 00 00
if 84 00 00 00
[ 97.127060] RSP: 002b:00007ffc3a0e9cf8 EFLAGS: 00000202 ORIG_RAX: 00000
[ 97.128635] RAX: ffffffff80000000 RDX: 0000000000000000 RCX: 00007584ad
[ 97.130220] RBX: 0000000000000000 RSI: ffffffff80000000 RDI: 000000000
[ 97.131807] RBP: 0000000000000003 R08: 00007ffc3a0e93dc R09: 00007ffc3a
[ 97.133415] R10: 0000000000000000 R11: 0000000000000202 R12: 000000000
[ 97.135026] R13: 0000000000000002 R14: 00007584ad4fd000 R15: 000000e3da
[ 97.136665] </TASK>
[ 97.138374] Kernel Offset: 0x9e00000 from 0xffffffffb1000000 (relocatio
[ 97.138945] ---[ end Kernel panic - not syncing: Attempted to kill init
-
```

HP_TOOLS Experiment (Pt. 1)

- Try to repurpose “HP_TOOLS” at end of HDD as ESP
 - Install rEFInd to “/EFI/BOOT/BOOTX64.EFI”
 - Firmware ignores it (not in bootorder selection) and continues booting Windows
- Use partitioner to “bless” HP_TOOLS as a real ESP
 - Firmware still stubbornly refuses to acknowledge it
- Shrink from 5GB to 500MB?
 - No change in behaviour
- Rename from “HP_TOOLS” to “ESP_HPTOOLS”?
 - Completely indifferent

```

uefi      - C12A7328-F81F-11D2-BA4B-00A0C93EC93B
raid      - A19D880F-05FC-4D3B-A006-743F0F84911E
lvm       - E6D6D379-F507-44C2-A23C-238F2A3DF028
xbootldr  - BC13C2FF-59E6-4262-A352-B275FD6F7172
Partition type or alias (type L to list all): 1

Changed type of partition 'Microsoft basic data' to 'EFI System'.

Command (m for help): p
Disk /dev/sda: 465.76 GiB, 500107862016 bytes, 976773168 sectors
Disk model: WDC WD5000BPKT-6
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes
Disklabel type: gpt
Disk identifier: EDA7AF03-146C-4152-9364-178258A72AE7

Device      Start      End      Sectors  Size Type
/dev/sda1    2048      4095      2048      1M BIOS boot
/dev/sda2    4096    2101247    2097152      1G Linux extended boot
/dev/sda3   2101248  411701247  409600000  195.3G Linux filesystem
/dev/sda4  411701248 412725247   1024000      500M EFI System

Command (m for help): i 4
Partition number (1-4, default 4): 4

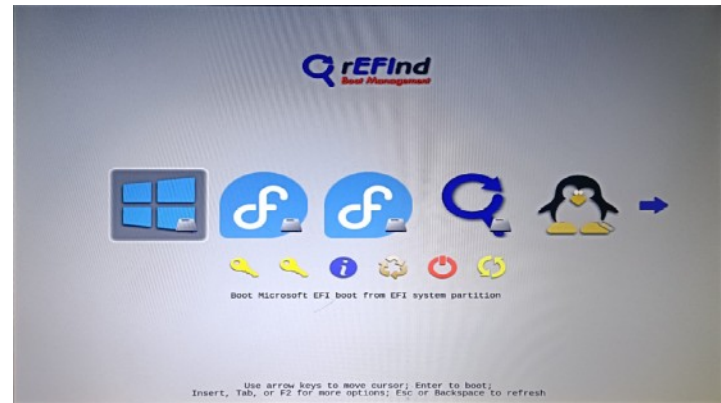
Device: /dev/sda4
Start: 411701248
End: 412725247
Sectors: 1024000
Size: 500M
Type: EFI System
Type-UUID: C12A7328-F81F-11D2-BA4B-00A0C93EC93B
UUID: 5E92EEF9-B5DE-4923-992C-830E61FAA71D
Name: EFI System Partition

Command (m for help): w
The partition table has been altered.
Syncing disks.

```

HP_TOOLS Experiment (Pt. 2)

- **Rename “HP_TOOLS” to “ESP_HPTOOLS”**
 - Breaks connection to HP diagnostics
 - Still refuses to enumerate HDD as an EFI boot candidate
- **Copy ESP contents from SSD into “ESP_HPTOOLS”, pull SSD**
 - Firmware *still* refuses to acknowledge it as boot option
 - No problem finding Windows Boot Manager, though
- **Rename “ESP_HPTOOLS” back to “HP_TOOLS”**
 - Same result, but tools work
- **Remove Windows Boot Manager from “HP_TOOLS”, masquerade rEFInd as bootmgfw.efi**
 - *Finally*, rEFInd boots by default
- **Chaos theory: Reinstall SSD to expansion bay, with authentic ESP and Windows bootloader**



Current Situation

- **“HP_TOOLS” resides as first partition of first disk, as an ordinary “msftdata” partition**
 - Contains rEFInd at “/EFI/Microsoft/Boot/bootmgfw.efi”
 - Contains HP Tools at “/Hewlett-Packard”
- **“EFI_SYS” is next partition, tagged as real ESP**
 - Contains all OS bootloaders, including Windows
- **Firmware doesn’t care about special flags or partition names; just boots the first “bootmgfw.efi” from the first FAT32 partition it sees**

WiFi Woes

```

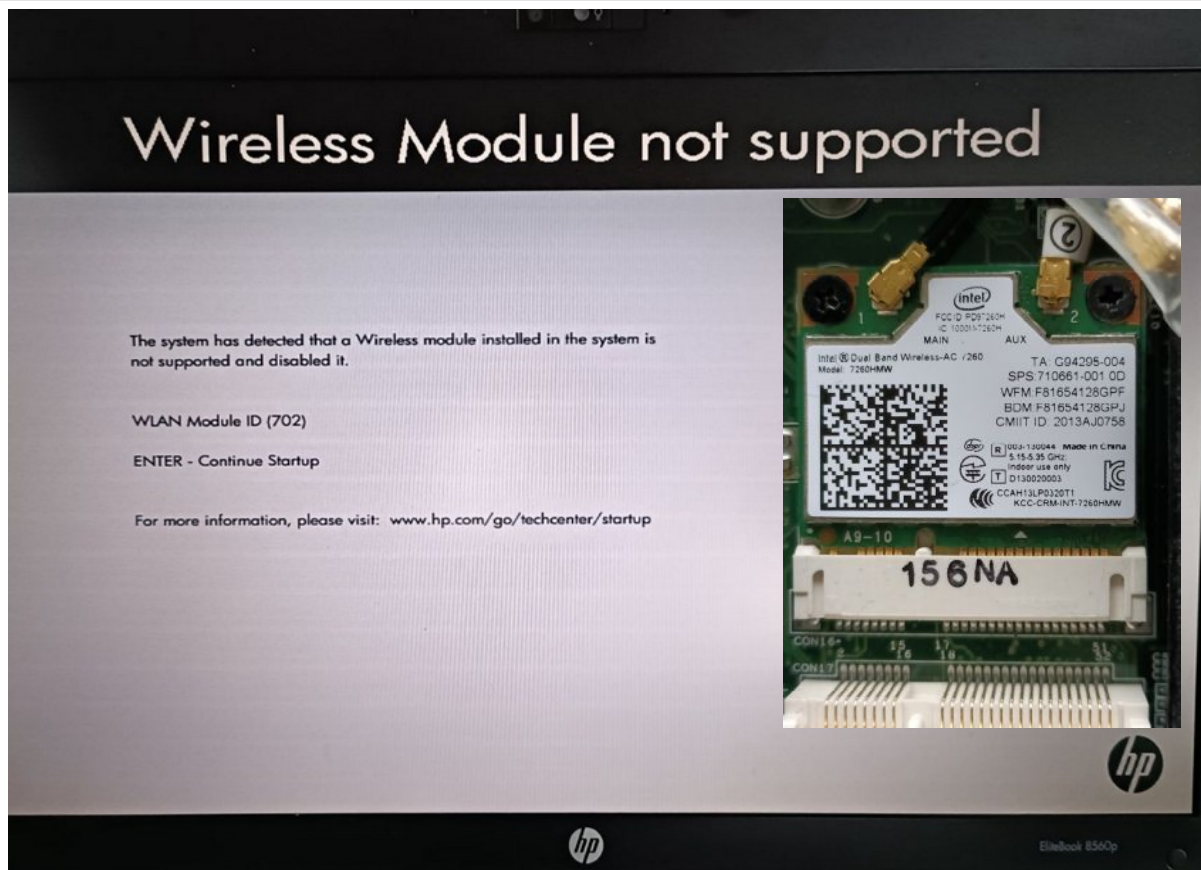
[ 4089.699800] iwlwifi 0000:04:00.0: Microcode SW error detected.  Restarting 0x2000000.
[ 4089.699800] iwlwifi 0000:04:00.0: Loaded firmware version: 19.168.6.1 000002a-0.ucode
[ 4089.699810] iwlwifi 0000:04:00.0: Start IWL Error Log Dump.
[ 4089.699810] iwlwifi 0000:04:00.0: Status: 0x0000044C, count: 6
[ 4089.699811] iwlwifi 0000:04:00.0: Status: 0x0000044C, count: 6
[ 4089.699812] iwlwifi 0000:04:00.0: 0x00001030 | ADVANCED_SYSASSERT
[ 4089.699815] iwlwifi 0000:04:00.0: 0x0000C064 | uPc
[ 4089.699816] iwlwifi 0000:04:00.0: 0x0000C05C | branchlink1
[ 4089.699817] iwlwifi 0000:04:00.0: 0x0000C05C | branchlink2
[ 4089.699818] iwlwifi 0000:04:00.0: 0x0000D6BE | interruptlink1
[ 4089.699819] iwlwifi 0000:04:00.0: 0x00000000 | interruptlink2
[ 4089.699821] iwlwifi 0000:04:00.0: 0x00220091 | data1
[ 4089.699822] iwlwifi 0000:04:00.0: 0x00000000 | data2
[ 4089.699823] iwlwifi 0000:04:00.0: 0x00000800 | line
[ 4089.699824] iwlwifi 0000:04:00.0: 0x6A0C3B1F | beacon time
[ 4089.699825] iwlwifi 0000:04:00.0: 0xE0F694E1 | tsf low
[ 4089.699826] iwlwifi 0000:04:00.0: 0x00000078 | tsf hi
[ 4089.699828] iwlwifi 0000:04:00.0: 0x0000054F | time gp1
[ 4089.699829] iwlwifi 0000:04:00.0: 0x0000C4C1 | time gp2
[ 4089.699830] iwlwifi 0000:04:00.0: 0x00000000 | time gp3
[ 4089.699831] iwlwifi 0000:04:00.0: 0x754312A8 | uCode version
[ 4089.699832] iwlwifi 0000:04:00.0: 0x000000B0 | hw version
[ 4089.699833] iwlwifi 0000:04:00.0: 0x00A48700 | board version
[ 4089.699835] iwlwifi 0000:04:00.0: 0x001A001C | hcmd
[ 4089.699836] iwlwifi 0000:04:00.0: 0xAFAE6308 | isr0
[ 4089.699837] iwlwifi 0000:04:00.0: 0x1141C000 | isr1
[ 4089.699838] iwlwifi 0000:04:00.0: 0x00000F1A | isr2
[ 4089.699839] iwlwifi 0000:04:00.0: 0x0147B8C0 | isr3
[ 4089.699840] iwlwifi 0000:04:00.0: 0x00000000 | isr4
[ 4089.699841] iwlwifi 0000:04:00.0: 0x10010112 | isr_pref
[ 4089.699843] iwlwifi 0000:04:00.0: 0x00023098 | wait_event
[ 4089.699844] iwlwifi 0000:04:00.0: 0x000000C4 | l2p_control
[ 4089.699845] iwlwifi 0000:04:00.0: 0x00000598 | l2p_duration
[ 4089.699846] iwlwifi 0000:04:00.0: 0x00000007 | l2p_mhvalid
[ 4089.699847] iwlwifi 0000:04:00.0: 0x00101042 | l2p_addr_match
[ 4089.699849] iwlwifi 0000:04:00.0: 0x00000015 | lmpm_pmg_sel
[ 4089.699850] iwlwifi 0000:04:00.0: 0x00061222 | timestamp
[ 4089.699851] iwlwifi 0000:04:00.0: 0x00002028 | flow_handler
[ 4089.699934] iwlwifi 0000:04:00.0: Start IWL Event Log Dump: nothing in log
[ 4089.699970] iwlwifi 0000:04:00.0: Device error - SW reset
[ 4089.711660] ieee80211 phy0: Hardware restart was requested
[ 4089.710031] iwlwifi 0000:04:00.0: Radio type=0x1-0x2-0x0
[ 4089.001023] iwlwifi 0000:04:00.0: Radio type=0x1-0x2-0x0
[ 4089.130223] iwlwifi 0000:04:00.0: Microcode SW error detected.  Restarting 0x2000000.
[ 4090.130240] iwlwifi 0000:04:00.0: Loaded firmware version: 19.168.6.1 000002a-0.ucode
[ 4090.130242] iwlwifi 0000:04:00.0: Start IWL Error Log Dump.
[ 4090.130246] iwlwifi 0000:04:00.0: Status: 0x0000044C, count: 6
[ 4090.130248] iwlwifi 0000:04:00.0: 0x00001030 | ADVANCED_SYSASSERT
[ 4090.130249] iwlwifi 0000:04:00.0: 0x0000C064 | uPc
[ 4090.130251] iwlwifi 0000:04:00.0: 0x0000C05C | branchlink1
[ 4090.130252] iwlwifi 0000:04:00.0: 0x0000C05C | branchlink2
[ 4090.130253] iwlwifi 0000:04:00.0: 0x0000D6BE | interruptlink1
[ 4090.130255] iwlwifi 0000:04:00.0: 0x00000000 | interruptlink2
[ 4090.130256] iwlwifi 0000:04:00.0: 0x00220091 | data1
[ 4090.130257] iwlwifi 0000:04:00.0: 0x00000000 | data2
[ 4090.130258] iwlwifi 0000:04:00.0: 0x00000800 | line
[ 4090.130259] iwlwifi 0000:04:00.0: 0x0004179AA | beacon time
[ 4090.130261] iwlwifi 0000:04:00.0: 0xE0FD4656 | tsf low
[ 4090.130262] iwlwifi 0000:04:00.0: 0x00000078 | tsf hi
[ 4090.130263] iwlwifi 0000:04:00.0: 0x000003F3 | time gp1
[ 4090.130264] iwlwifi 0000:04:00.0: 0x0001CE97 | time gp2
[ 4090.130265] iwlwifi 0000:04:00.0: 0x00000000 | time gp3
[ 4090.130266] iwlwifi 0000:04:00.0: 0x754312A8 | uCode version
[ 4090.130267] iwlwifi 0000:04:00.0: 0x000000B0 | hw version
[ 4090.130268] iwlwifi 0000:04:00.0: 0x00A48700 | board version
[ 4090.130269] iwlwifi 0000:04:00.0: 0x0000001C | hcmd
[ 4090.130271] iwlwifi 0000:04:00.0: 0xA786300A | isr0
[ 4090.130272] iwlwifi 0000:04:00.0: 0x01018000 | isr1
[ 4090.130273] iwlwifi 0000:04:00.0: 0x0000061A | isr2
[ 4090.130274] iwlwifi 0000:04:00.0: 0x014760C0 | isr3
[ 4090.130275] iwlwifi 0000:04:00.0: 0x00000000 | isr4
[ 4090.130276] iwlwifi 0000:04:00.0: 0x00010112 | isr_pref
[ 4090.130277] iwlwifi 0000:04:00.0: 0x00023098 | wait_event
[ 4090.130278] iwlwifi 0000:04:00.0: 0x00000428 | l2p_control
[ 4090.130279] iwlwifi 0000:04:00.0: 0x000000C4 | l2p_duration
[ 4090.130280] iwlwifi 0000:04:00.0: 0x000003BF | l2p_mhvalid
[ 4090.130281] iwlwifi 0000:04:00.0: 0x001054F0 | l2p_addr_match
[ 4090.130282] iwlwifi 0000:04:00.0: 0x00000015 | lmpm_pmg_sel
[ 4090.130283] iwlwifi 0000:04:00.0: 0x00061222 | timestamp
[ 4090.130284] iwlwifi 0000:04:00.0: 0x00000384 | flow_handler
[ 4090.130550] iwlwifi 0000:04:00.0: Start IWL Event Log Dump: nothing in log
[ 4090.130587] iwlwifi 0000:04:00.0: Device error - reprobel
[ 4090.135687] iwlwifi 0000:04:00.0: Command REPLY_LEDS_CMD failed: FW Error
[ 4090.135780] iwlwifi 0000:04:00.0: Command REPLY_LEDS_CMD failed: FW Error
[ 4090.153953] wl0: deauthenticating from ee:48:b8:9b:76:29 by local choice (Reason: 3=DEAUTH_L
EAVING)
[ 4090.154185] iwlwifi 0000:04:00.0: Command REPLY_TXFIFO_FLUSH failed: FW Error
[ 4090.154187] iwlwifi 0000:04:00.0: Command REPLY_TXFIFO_FLUSH failed: FW Error
[ 4090.154188] iwlwifi 0000:04:00.0: Command REPLY_TXF
```

```

[ 4089.698000] iwlwifi 0000:04:00.0: Microcode SW error detected.  Restarting 0x2000000.
[ 4089.698000] iwlwifi 0000:04:00.0: Loaded firmware version: 19.168.6.1 000002a-0.ucode
[ 4089.698010] iwlwifi 0000:04:00.0: Start IWL Error Log Dump.
[ 4089.698020] iwlwifi 0000:04:00.0: Status: 0x0000044C, count: 6
[ 4089.698030] iwlwifi 0000:04:00.0: Status: 0x0000044C, count: 6
[ 4089.698040] iwlwifi 0000:04:00.0: ADVANCED_SYSASSERT
[ 4089.698050] iwlwifi 0000:04:00.0: uPc
[ 4089.698060] iwlwifi 0000:04:00.0: 0x0000C05C branchlink1
[ 4089.698070] iwlwifi 0000:04:00.0: 0x0000C05C branchlink2
[ 4089.698080] iwlwifi 0000:04:00.0: 0x0000D6BE interruptlink1
[ 4089.698090] iwlwifi 0000:04:00.0: 0x00000000 interruptlink2
[ 4089.698100] iwlwifi 0000:04:00.0: 0x00220091 data1
[ 4089.698110] iwlwifi 0000:04:00.0: 0x00000000 data2
[ 4089.698120] iwlwifi 0000:04:00.0: 0x00000800 line
[ 4089.698130] iwlwifi 0000:04:00.0: 0x004179AA beacon time
[ 4089.698140] iwlwifi 0000:04:00.0: 0xE0FD4656 tsf low
[ 4089.698150] iwlwifi 0000:04:00.0: 0xE0F694E1 tsf hi
[ 4089.698160] iwlwifi 0000:04:00.0: 0x00000078 time gp1
[ 4089.698170] iwlwifi 0000:04:00.0: 0x0000054F time gp2
[ 4089.698180] iwlwifi 0000:04:00.0: 0x0000C4C1 time gp3
[ 4089.698190] iwlwifi 0000:04:00.0: 0x00000000 uCode version
[ 4089.698200] iwlwifi 0000:04:00.0: 0x754312A8 hw version
[ 4089.698210] iwlwifi 0000:04:00.0: 0x000000B0 board version
[ 4089.698220] iwlwifi 0000:04:00.0: 0x00488700 hcmd
[ 4089.698230] iwlwifi 0000:04:00.0: 0x01A001C isr0
[ 4089.698240] iwlwifi 0000:04:00.0: 0xAFA63008 isr1
[ 4089.698250] iwlwifi 0000:04:00.0: 0x1141C000 isr2
[ 4089.698260] iwlwifi 0000:04:00.0: 0x00000F1A isr3
[ 4089.698270] iwlwifi 0000:04:00.0: 0x0147B8C0 isr4
[ 4089.698280] iwlwifi 0000:04:00.0: 0x00000000 isr_pref
[ 4089.698290] iwlwifi 0000:04:00.0: 0x10010112 wait_event
[ 4089.698300] iwlwifi 0000:04:00.0: 0x00023098 l2p_control
[ 4089.698310] iwlwifi 0000:04:00.0: 0x000000C4 l2p_duration
[ 4089.698320] iwlwifi 0000:04:00.0: 0x00000598 l2p_mhvalid
[ 4089.698330] iwlwifi 0000:04:00.0: 0x00000007 l2p_addr_match
[ 4089.698340] iwlwifi 0000:04:00.0: 0x00101042 l2p_addr_match
[ 4089.698350] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698360] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698370] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698380] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698390] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698400] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698410] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698420] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698430] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698440] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698450] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698460] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698470] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698480] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698490] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698500] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698510] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698520] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698530] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698540] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698550] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698560] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698570] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698580] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698590] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698600] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698610] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698620] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698630] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698640] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698650] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698660] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698670] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698680] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698690] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698700] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698710] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698720] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698730] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698740] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698750] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698760] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698770] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698780] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698790] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698800] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698810] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698820] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698830] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698840] iwlwifi 0000:04:00.0: 0x00000015 l2p_addr_match
[ 4089.698850] iwlwifi 0000:04
```

HP Firmware – The Gift that Keeps on Giving

- *Of course* HP's 2018 firmware rejects HP's own OEM-approved genuine replacement part, on sale since 2013
- Because, why wouldn't it?
- Why would anybody want a 7260HMW when they can have a Centrino 6205 with broken drivers?



But, Can it Run DOOM?



But, Can it Run DOOM?

- No. Even demons tremor at the horrors of HP's mutilated Insyde BIOS
- HP's priority isn't booting your OS
- Bob wants a Bonus; so bundle in:
 - An offline PIM EFI app (QuickLook)
 - An instant-on OS (QuickWeb, aka SplashTop)
 - An SMM calendar that replaces the Windows boot screen (DayStarter)

```
EFI Shell Version 2.00 [4096.11]
Current running mode 1.1.2
Device mapping table
fs0 :HardDisk - Alias hd29a0a1 blk0
      PciRoot(0x0)/Pci(0x1F,0x2)/??/HD(1,GPT,409C6382-46BA-4CBB-A21F-618E20
fs1 :HardDisk - Alias hd29a0a2 blk1
      PciRoot(0x0)/Pci(0x1F,0x2)/??/HD(2,GPT,3077109D-E727-489C-B1B9-EC97A6
blk0 :HardDisk - Alias hd29a0a1 fs0
      PciRoot(0x0)/Pci(0x1F,0x2)/??/HD(1,GPT,409C6382-46BA-4CBB-A21F-618E20
blk1 :HardDisk - Alias hd29a0a2 fs1
      PciRoot(0x0)/Pci(0x1F,0x2)/??/HD(2,GPT,3077109D-E727-489C-B1B9-EC97A6
blk2 :HardDisk - Alias (null)
      PciRoot(0x0)/Pci(0x1F,0x2)/??/HD(3,GPT,32D2A690-D696-4947-AD55-855060
blk3 :HardDisk - Alias (null)
      PciRoot(0x0)/Pci(0x1F,0x2)/??/HD(1,GPT,2C2DE476-1F50-42B9-8D2E-D9B6AC
blk4 :HardDisk - Alias (null)
      PciRoot(0x0)/Pci(0x1F,0x2)/??/HD(3,GPT,5E8FBFC2-E4CF-40A7-81AE-66F676
blk5 :HardDisk - Alias (null)
      PciRoot(0x0)/Pci(0x1F,0x2)/??/HD(4,GPT,6A426A5A-DB58-4E42-B1FE-FDFC0A
blk6 :BlockDevice - Alias (null)
      PciRoot(0x0)/Pci(0x1F,0x2)/?
blk7 :BlockDevice - Alias (null)
      PciRoot(0x0)/Pci(0x1F,0x2)/?

Press ESC in 1 seconds to skip startup.nsh, any other key to continue.
Shell> blk0:

blk0:\> cd \EFI\tools

blk0:\EFI\tools> doom.efi
./doom1.wad

Arguments: doom.efi.

DOOM Shareware Startup v1.10
U_Init: allocate screens.
M_LoadDefaults: Load system defaults.
Z_Init: Init zone memory allocation daemon.
U_Init: Init WADfiles.
adding ./doom1.wad

=====
Shareware!
=====
M_Init: Init miscellaneous info.
R_Init: Init DOOM refresh daemon -
R_Init_
```

Thank You!

**NO! I
WILL NOT
EFI BOOT
LINUX!**



**AND YOU
CAN'T
MAKE ME!**