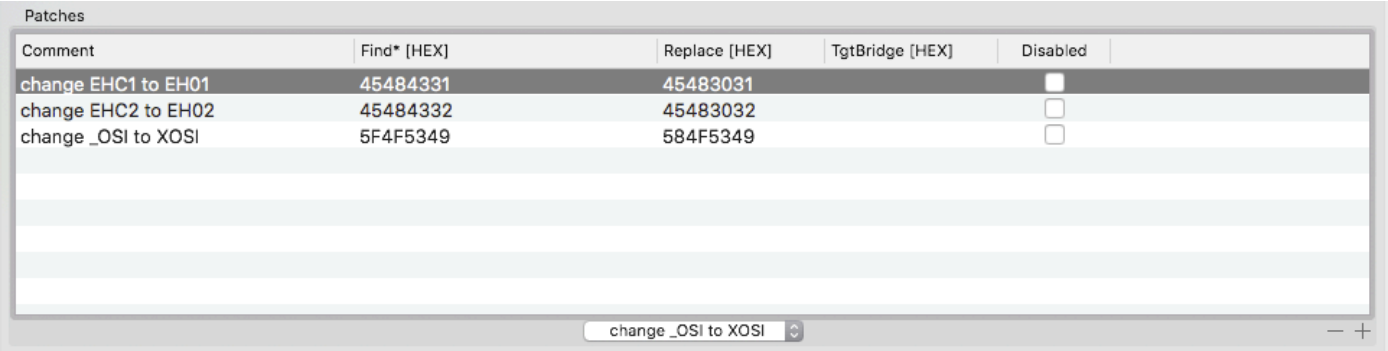
Clover Configurator Settings Explained

> Excerpt from russian Clover Manual for revision 5129 translated by 5T33Z0 using deepL, yandex and google translate.

I. ACPI Section

DSDT

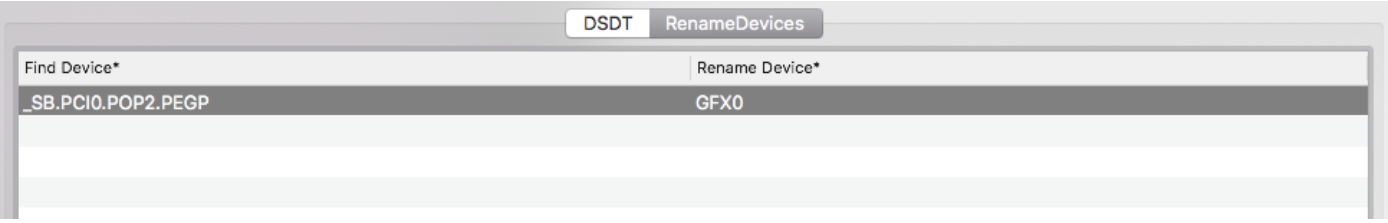
Patches



In this section you can add rules (binary renames) to replace text inside your system's `DSDT` dynamically as binary code represented in hex format. In other words, you replace text, digits and symbols with other text either to avoid conflicts with macOS or to make certain devices work within macOS by renaming them to something it knows.

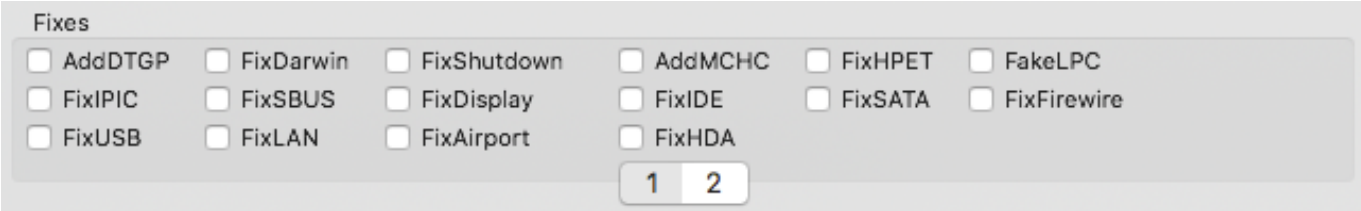
If you look at the first binary rename example, it says "change EHC1 to EH01" followed by a find value in hex (45484331) and a replace value (45483031) which literally translates to "EHC1" and "EH01" if you decode the hex values back to text with the Hex Converter in the "Tools" section. Which renames to use when depends on your system, used macOS version, etc. and is not part of this overview.

RenameDevices



Unlike the previous method of ACPI binary renames, this method serves as a more specfic and refind method for renaming devices which is less brute force. Whereas binary renames replace *every* occurance of a specified value throughout the *whole* DSDT which can be problematic, in the `RenameDevices` section, the algorithm will only search and replace names of devices for the specified path/region. To use this section properly you need to dump the unmodified DSDT and research it with maciASL.

Fixes [1]



AddDTGP

In addition to the `DeviceProperties`, there is also a Device Specific Method (`_DSM`) specified in the `DSDT` called `DTGP` to inject custom parameters into some devices.

`_DSM` ia a well-known method, which is included in macOS since version 10.5. It contains an array with a device description and a call to the universal DTGP method, which is the same for all devices.

Without the DTGP method, modified `DSDTs` would not work well. This fix simply adds this method so that it can then be applied to other fixes. It does not work on its own alone.

FixIPIC

Removes the interrupt from the IPIC device. This fix affects the operation of the Power key (a pop-up window with the options Reset, Sleep, Shutdown).

FixUSB

Attempts to solve numerous USB problems. For XHCI controller, when using native or patched IOUSBFamily, such DSDT patch is irreplaceable.

The Apple driver specifically uses ACPI, and the DSDT script must be correct. The prescription in DSDT does not conflict with thongs.

FixDarwin

Mimics Windows XP under Darwin OS. Many sleep and brightness problems stem from misidentification of the system.

FixSBUS

Adds SMBus Controller to the device tree, thereby removing the warning about its absence from the system log. And also creates the correct bus power management routung. Also affects sleep.

FixLAN

Injection of the "built-in" property for the network card is necessary for correct operation. Also a card model is injected - for cosmetics.

FixShutdown

A condition is added to the `_PTS` method: if argument = 5 (shutdown), then no other action is required. Strange, why? Nevertheless, there is repeated confirmation of the effectiveness of this patch for ASUS boards, maybe for others, too. Some `DSDT` already have such a check, in which case such a fix should be disabled. If `SuspendOverride` = `true` is set in the config, then this fix will be extended by arguments 3 and 4. That is, going to sleep (Suspend). On the other hand, if `HaltEnabler` = `true`, then this patch is probably no longer needed.

FixDisplay

Produces a number of video card patches. Injects properties, and the devices themselves, if they are not present. Injects FakeID if ordered. Adds custom properties. The same fix adds an HDAU device for audio output via HDMI. If the FakeID parameter is specified, then it will be injected through the _DSM method. Patches for all video cards, only for non-Intel. For built-in intel another bit is used.

FixAirport

Similar to LAN, the device itself is created, if not already registered in `DSDT`. For some well-known models, the `DeviceID` is replaced with a supported one. And the Airport turns on without other patches.

AddMCHC

Such a device of class `0x060000` is, as a rule, absent in the DSDT, but for some chipsets this device is serviceable, and therefore it must be prescribed in order to properly wire the power management of the PCI bus. The question of the need for a patch is solved experimentally. Another experience, this device was needed on a mother with a Z77 chipset, otherwise the kernel panic at the initial stage of launch. Conversely, on the G41M (ICH7) chipset, this fix causes panic. Unfortunately, there is no general rule in sight.

FixIDE

In the 10.6.1 system, there was a panic for the AppleIntelPIIXATA cache. Two options for solving the problem - using the corrected kext, or fix the device in the DSDT. And for more modern systems? Let it be, if there is such a controller.

FixHDA

Correction of the description of the sound card in the DSDT so that the native AppleHDA driver works. Renaming AZAL -> HDEF is performed, layout-id and PinConfiguration are injected.

FixHPET

As already mentioned, this is the main fix needed. Thus, the minimum required DSDT patch mask looks like `0x0010`

FixSATA

Fixes some problems with SATA, and removes the yellowness of disk icons in the system by mimicry under ICH6. Actually a controversial method, however, without this fix, my DVDs will not play, and for a DVD the drive should not be removable. Those. just replacing the icon is not an option!

There is an alternative, solved by adding a fix with the AppleAHCIport.kext kext. See the chapter on patching kexts.

And, accordingly, this bit can be omitted! One of the few bits I recommend not to use.
FixFirewire bit (11):

Adds the "fwhub" property to the Firewire controller, if present. If not, then nothing will happen. You can bet if you don't know if you need to or not.

FakeLPC

Replaces the DeviceID of the LPC controller so that the AppleLPC kext clings to it.

Needed for those cases when the chipset is not provided for OSX (for example ICH9). However, the native list of Intel and NForce chipsets is so long that the need for such a patch is very rare. It is checked in the system whether the AppleLPC kernel has been loaded, if not, the patch is needed.

Though, this is also not a fact. It happens that the cache itself is unloaded from memory as unnecessary, although the chipset is supported.

FixFirwire

Note: Missing Decription in Manual!

Fixes [2]

FixDarwin7

Same as `FixDarwi`, only for the Windows 7 system. Old DSDTs may not have a check for such a system. You have options.

FixADP1

Corrects the `ADP1` device (power supply), which is necessary for laptops to sleep correctly - plugged in or unplugged.

FixRegions

This is a very special patch. While other patches in this section are designed to fix `BIOS.aml` in order to create a good custom DSDT from scratch, this fix is designed for tuning an existing custom `DSDT.aml`.

The DSDT has regions that have their own addresses, such as:
`OperationRegion` (GNVS, SystemMemory, 0xDE6A5E18, 0x01CD). The problem is that this region address is created *dynamically* by the BIOS and it can be different from boot to boot. This was first noticed when changing the total amount of memory, then when changing BIOS settings, and on my computer it even depends on the pre-boot history, such as the amount of occupied NVRAM. Clearly, in the custom `DSDT.aml` this number is fixed, and therefore may not be true. The simplest observation is the lack of sleep. After fixing a region, sleep appears, but only until the next offset. This fix fixes all regions in the custom DSDT to values in the BIOS DSDT, and thus the mask

```
<key>Fixes</key>
<dict>
  <key>FixRegions</key>
  <true/>
</dict>
```

is sufficient if you have a well-made custom DSDT with all your needed fixes. There is another patch, but it is not for DSDT specifically, but for all ACPI tables in general, so adding it in the ACPI Sectiuon is inappropriate.

FixRTC and Rtc8Allowed

Removes interrupt from device `_RTC`. It is necessary, and it is very strange that someone would not enable this patch. If there is no interrupt in the original, then this patch won't cause any harm. However, the question arose about the need to edit the length of the region. To avoid clearing `CMOS`, you need to set the length to `2`, but at the same time a phrase like `"…only single bank…"` appears in the Kernel Log.

I do not know what is wrong with this message, but it can be excluded if the length is set to 8 bytes by using the Fix `Rtc8Allowed`:

```
<key>ACPI</key>
<dict>
  <key>DSDT</key>
  <dict>
    <key>Rtc8Allowed</key>
    <false />
</dict>
```

- `true` - the length of the region will remain 8 bytes, if there was one,
- `false` - will be corrected by 2 bytes, which more reliably prevents the CMOS from being reset.

As researched by vit9696 the region length should still be 8, because you need it to save the hibernation key. So the fix itself is useful. Sinc on desktops, hibernation is not needed, you may think about resetting the CMOS.

DeleteUnused

Removes unused floppy, CRT and DVI devicese - an absolute prerequisite for running IntelX3100 on Dell laptops. Otherwise black screen, tested by hundreds of users.

FixMutex

This patch finds all Mutex objects and replaces `SyncLevel` with `0`. We use this patch because macOS does not support proper Mutex debugging and will break on any inquiry with Mutex that has a nonzero SyncLevel. Nonzero SyncLevel Mutex objects are one of the common causes of ACPI battery method failure. Added by Rehabman in revisions r4265 to r4346.

For example, in Lenovo u430 mutexes are declared like this:

`Mutex (MSMI, 0x07)`

To make it compatible with macOS you need to change it to:

`Mutex (MSMI, 0)`

This is a very controversial patch. Use it only if you are fully aware of what you are doing.

FixTMR

Removes the interrupt from the _TMR timer in the same way. It is deprecated and not used by Mac.

AddPNLF

Inserts a PNLF (Backlight) device, which is necessary to properly control the screen brightness, and, oddly enough, helps to solve the problem with sleep, including for the desktop.

PNLF_UID

There are several sample brightness curves/graphs in the system and they have different UIDs. If some realtor used that curve, that doesn't mean that you will have the same brightness with the same processor. It depends on the panel – not the processor.

Generally speaking, It would be better to build a `PNLF` calibration system, but that's aerobatics. For now, all we're suggesting is to experiment with different values, and see if it gets better. Added in revision r5103.

AddIMEI

Required patch for Sandy Bridge CPUs and above, which adds the `IMEI` device to the device tree, if it does not exist already.

FixIntelGfx

Patch for Intel integrated graphics is separated from the rest of the graphics cards, that is, you can put the injection for Intel and not put for Nvidia.

FixS3D

Likewise, this patch solves the problem with sleep.

FixWAK

Adds Return to the `_WAK` method. It has to be, but for some reason often the DSDT does not contain it. Apparently the authors adhered to some other standards. In any case, this fix is completely safe.

FixACST

Some DSDTs can have a device, method or variable named `ACST`, but this name is also used by macOS 10.8+ to control C-States!

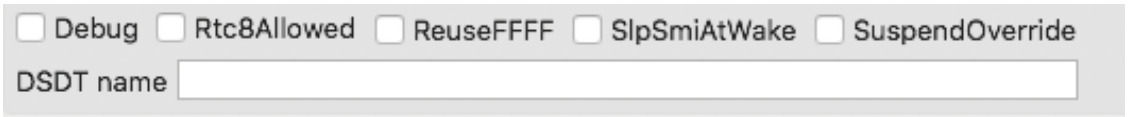
As a result, a completely implicit conflict with very unclear behavior can occur. This fix renames all occurrences of `ACST` to `OCST` which is safe. But check your DSDT first: search for `ACST` and check if it refers to Device `AC` and Method `_PSR` (_PSR: PowerSource) in some kind of way.

AddHDMI

Adds an `HDAU` device to `DSDT` that matches the HDMI output on an ATI or Nvidia video card. It is clear that since the card was bought separately from the motherboard, there is simply no such device in the native DSDT. In addition, the `hda-gfx = onboard-1` or `onboard-2` property is injected into the device as appropriate:

- `1` if UseIntelHDMI = false
- `2` if there is an Intel port that occupied port 1.

Next Sub-Section:



Debug

Enabables Debug Log which will be stored in `EFI/CLOVER/misc/debug.log`. Enabling this feature slows down boot dramatically but helps resolving issues.

RTC8Allowed

see "Fixes [2]" Section, "FixRTC".

ReuseFFFF

In some cases, the attempt to patch the GPU is hindered by the presence of:

```
Device (PEGP) type of device
  {
  Name (_ADR, 0xFFFFFF)
  Name (_SUN, One)
  }
```

You can change its address to `0`, but that doesn't always work.

NOTE: This fix is deprecated an has been removed from Clover since r5116!

SlpSmiAtWake

Adds `SLP_SMI_EN=0` at every wake. This may help to solve sleep and shutdown issues on UEFI boot.

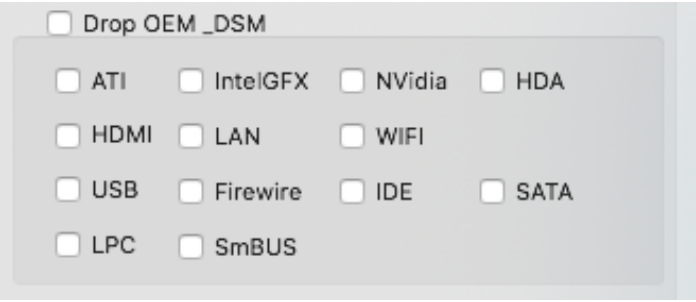
NOTE: This fix is deprecated an has been removed from Clover r5134!

SuspendOverride

The shutdown patch only works on power state `5` (shutdown). However, we may want to extend this patch to states `3` and `4` by enabling `SuspendOverride`.

This helps when going to sleep during a UEFI boot. Symptoms: the screen will turn off but the lights and fans would continue running.
Advanced Hackers can use a binary rename to fix it (not covered here).

Next Sub-Section: Drop OEM_DSM



Drop OEM_DSM

Some OEM DSDTs already contain the method `_DSM` for some devices. But it folowes another structure and logic then we need for macOS. Since we can't modify this method nor create our own with the same name, we need to drop these OEM _DSM, so `DropOEM_DSM` was created to be able to do so.

The default value is false if using a custom `DSDT` and true if using `BIOS.aml`.

Alternatively if you only need to drop the `_DSM` for certain devices, you can select any of these individually.

NOTE: This feature seems to be no longer supported by Clover. Enabling this feature in r5134 results in a Config Error:

> Warning: Unknown key '/ACPI/DSDT/DropOEM_DSM:10'. Skipped.

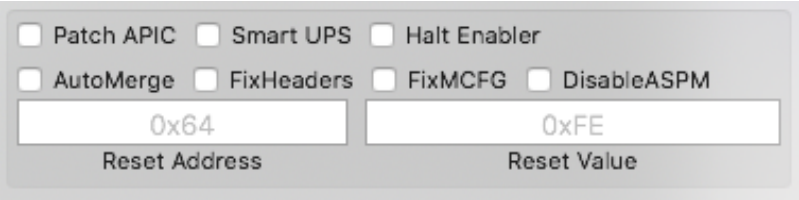
The "Drop OEM_DSM" Section has been dropped from the latest version of Clover Configurator (5.18.0.0).

FixHeaders

It will check the headers of not only DSDT, but all ACPI tables in general, solving the problem of Chinese characters in the names of tables that macOS does not tolerate, immediately panicking.

Whether you have a problem with tables or not, it's safe to enable this fix. The fix is recommended to all users, even if you are not going to fix your DSDT. Old setting inside DSDT fixes remains for backward compatibility but I recommend to exclude it from those section.

Next Sub-Section:



Patch APIC

Some computers can only be booted with `cpus=1` or with a special patched kernel (Lapic NMI patch). A simple analysis showed that their MADT table is wrong, that is, there are no NMI partitions in it. `Patch APIC` is used to correct such tables on the fly. For a healthy computer, nothing bad will happen.

AutoMerge

Combines/merges any `DSDT` and `SSDT` changes from `EFI/CLOVER/ACPI/patched` with existing ACPI files.

If set to `true`, it changes the way files in in `ACPI/patched` are handled: Instead of adding such files at the end of the XSDT (for example, treating them as an additional table/SSDT), if the signture, index and OemTableId match an existing OEM table, it will replace that table.

With this function, as with `DSDT`, you can fix individual SSDTs (or other tables) simply by putting the corrected file into ACPI/patched. No need to fumble with `DropOem` or `DropTables`. And the original order is preserved. The mapping for SSDT is based on naming, where the naming convention used by the F4 extractor in the loader menu is used to identify the SSDT position in XSDT.

For example, if your `ACPI/origin` had SSDT-6-SaSsdt.aml and you wanted to fix it, you could just fix the file as needed and put it in ACPI/patched. Same if you put it in `ACPI/patched` as `SSDT-6.aml`. Since some OEM ACPI sets do not use unique text in the OEM table-id field, Clover uses both the OEM table-id and the number that is part of the file name to locate the original in XDST. If you stick to the names provided in ACPI/origin, you should be fine. Added by Rehabman in revisions 4265 to 4346.

Smart UPS

This parameter is intended to prescribe a power profile=3 in the `FADT` table. The logic is as follows:

`PM=1` - Desktop , mains power

`PM=2` - Notebook, mains or battery power

`PM=3` - Server, powered by SmartUPS, which macOS also supports

Clover will choose between 1 and 2 based on an analysis of the mobility bit, but there is also a Mobile parameter in the SMBIOS section. You can say, for example, that we have a MacMini and that it is mobile. A value of 3 will be substituted if smartUPS=Yes.

Halt Enabler

This Patch is for fixing the shutdown/sleep problem during UEFI boot. The fix is only injected once, before calling `boot.efi`, so 100% efficiency is not guaranteed. Nevertheless it is quite safe, at least on Intel chipsets.

FixMCFG

If enabled, the table is not discarded, but corrected. The author of the patch is again vit9696. However, the method of discarding this table is still in stock.

Back to the story about DropTables

SSDTs are different, and we specify additional Table-IDs, which we will discard, because we are going to generate our own SSDT tables, built according to the rules of Apple, and not Gigabyte, or, God forgive me, ASUS. You can check the table header, or in Clover's boot log. Here, for example, is a table that should not be discarded:

> DefinitionBlock ("SSDT-0. aml", "SSDT", 1, "SataRe", "SataTabl", 0x00001000)

In this case, the saved tables will be subject to the rule for binary DSDT patches, that is, these tables will also be modified, which is logical.
If all SSDT tables for some reason have the same Table-ID, then you can specify the length of the table that you want to drop. The length can be set in hex, as above, or in as a decimal number.

Disable ASPM

This affects the settings of the ACPI system itself, such as the fact that Apple's ASPM management does not work as expected. For example when using a non-native chipset. In which cases it is necessary to enable, and what it affects, I do not remember.

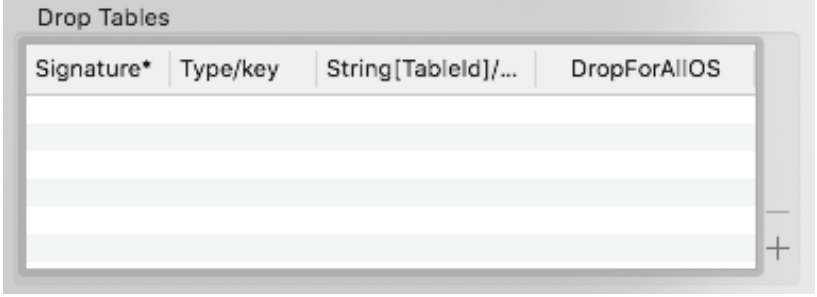
> Annotation from 5T33Z0: I am still quoting the manual here, these are not my words!

Reset Address / Reset Value

These two parameters serve for one very valuable purpose - to fix restart. These values should be in `FADT` table, but for some reason they are not always present, moreover, sometimes the table itself is shorter than necessary, so much shorter that these values are discarded.

The default value is already present in `FACP` but if there's nothing in it, then the pair `0x64/0xFE` is used, which means restart via PS2 Controller. Practice showed that this does not always work for everyone. Another possible value pair is `0x0CF9/0x06`, which means restart via PCI Bus. This pair is also used on native Macs, but does not always work on Hackintoshes. The difference is clear, on hackintoshes there is also a PS2 controller which can interfere with the restart if it is not reset. Another option is `0x92/0x01`, I don't know if that helps anyone.

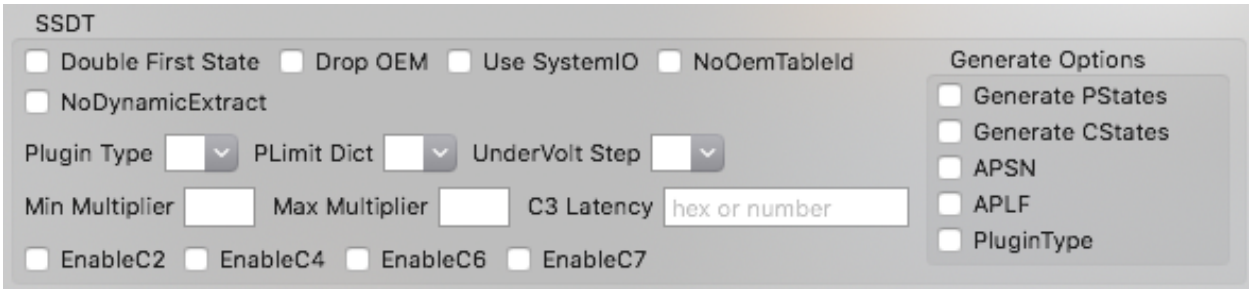
Next Sub-Section: Drop Tables



In this array, you can list tables which should be discarded. These include vatrious table signatures.

`DMAR` is often dropped because macOS does not like `VT-d` technology. Other tables to drop would would be `MATS` (fixes issues with High Sierra) or `MCFG` – because by specifying a MacBookPro or MacMini model, we get severe brakes. A better method has already been invented.

Next Sub-Section: SSDT



Double First State

It has been found that for speedstep to work correctly it is necessary to duplicate the first state of the P-states table. After the introduction of other parameters, the necessity of this fix has become doubtful. This fix is relevant to Intel CPUs of the `Ivy Bridge` family.

NoDynamicExtract

If set to `true`, this flag will disable the extraction of dynamic SSDTs when using `F4` in the bootloader menu. Dynamic SSDTs are rarely needed and usually cause confusion (erroneously putting them in the `ACPI/patched` Folder). Added by Rehabman in revision 4359.

Drop OEM

Since we are going to dynamically load our own SSDT tables, we need to avoid unnecessary overlaps code to avoid conflicts. This option allows you to discard all native tables in favor of new ones.

If you want to avoid patching SSDT tables altogether, there is another option: put the native tables with minor edits in the `EFI/OEM/xxx/ACPI/patched/` Folder, and discard the unpatched tables. However, it is recommended to use the selective Drop method mentioned above.

Use SystemIO

If set to `true`, the SSDT section will be used to select in the generated `_CST` tables between:

```
Register (FFixedHW,
Register (SystemIO,
```

NoOEMTableID

If set to `true`, the OEM table identifier is *NOT* added to the end of file name in ACPI tables dump by pressing `F4` in the Clover Boot Menu. If set to `false`, end spaces are removed from SSDT names when the OEM table ID is added as a suffix. Added by Rehabman in revisions 4265 to 4346.

Sub-Section: Generate Options

In the new Clover, this group of parameters is combined into one section and `PluginType` is now just `true` or `false` because there are no other options. The `APLF` and `APSN` parameters seem to affect speedstep. **Note**: since APSN/APLF are part of Generate → PStates, they act as Generate → PStates = `true`, whereas `PluginType` is independent and works regardless of the choice in Generate → PStates.

NOTE: None of these "Generate" are options needed if you've generated a custom SSDT with ssdtPRGen or SSDTTime!

Generate PStates/Cstates

Here we define that two additional tables will be generated for C-states and for P-states, according to the rules developed by the hack community. For C-states, the table with parameters C2, C4, C6, Latency mentioned in the CPU section. You can also specify parameters in the SSDT section.

Plugin Type

For Haswell and newer CPUs you should set it to `1`, for others to `0`. This key, together with the Generate → `PluginType` key, allows to generate SSDT table containing only `PluginType`, but not P-States, if their generation is disabled. This key is not needed; it was saved for backward compatibility.

PLimit Dict

`PLimitDict` limits the maximum speed of the processor. If set to `0` - the speed is maximal, `1` - one step below maximal. If this key is missing here, the processor will be stuck at the minimum frequency.

UnderVolt Step

Optional parameter to reduce the temperature of the processor by reducing its operating voltage. Possible values are 0 to 9. The higher the value, the lower the voltage, resulting in lower temperatures – until the computer hangs. This is where foolproof protection comes in: Clover won't let you set any value outside the specified range. However, even allowed values can result in unstable operation. The effect of undervolting is really noticeable. However, this parameter is only only applicable to Intel CPUs of the `Penryn` family.

Min Multiplier

Minimum CPU multiplier. It itself reports 16, and prefers to run at 1600, but you should set the stats down to 800 or even 700 in the table for speedstep. Experiment with it. If your system crashes during boot, the Low Frequency is too low!

Max Multiplier

Introduced in conjunction to Min Multiplier, but it seems to be doing nothing and should not be used. However, it somehow affects the number of P-states, so you can experiment with it, but you shouldn't do it without a special need.

C3 Latency

This value appears in real Macs, for iMacs it's about 200, for MacPro it's about 10. In my opinion, iMacs are regulated by P-stats, MacPros are regulated by C-stats. And it also depends on the chipset, whether your chipset will adequately respond to D-state commands from the MacOS. The safest and easiest option is *not to set this parameter*, everything will work fine as it is.

Enable C2, C4, C6 and C7

Specify which C-States you want to enable/generate.

Next Sub-Section:

DisableAML

Note: No info present in the manual. I guess you can add SSDTs from the `ACPI/patched` folder which should be omitted from loading.

Sorted Order

Creates an array to load SSDTs in the `ACPI/patched` folder in the order specified in this list once you add an SSDT to this list. Only SSDTs present in this array will be loaded, namely in the specified order.

In General, a problem with tables is their name. While it is not unusual for OEM Tabkes to use the national alphabet, or just no name, for Apple, it is inacceptable. The name has to be 4 characters of the Roman alphabet. Use "FixHeaders" to fix this issue.