

## Part 2: HDMI Audio DSDT Edits

If you are uncomfortable editing your DSDT then you will not have HDMI Audio on your Snow Leopard system. Simply put, there is no other way. While editing the DSDT is not hard, it must be exactly correct. The DSDT used in this guide is from a Gigabyte motherboard. Other manufacturers' DSDTs may not look exactly like examples below. If you have serious doubts, seek assistance.

What you will need:

DSDTSE v1.4.3 - <http://www.osx86.es/?p=610>

IORegistryExplorer - available as an Optional Install/Xcode on the Retail Mac OS X Install Disc.

dsdt-hdmi\_audio-v2.dsl -



Now, is a good time back up your system. Preferably, you have a bootable backup. Time Machine is not a good choice for the primary backup.

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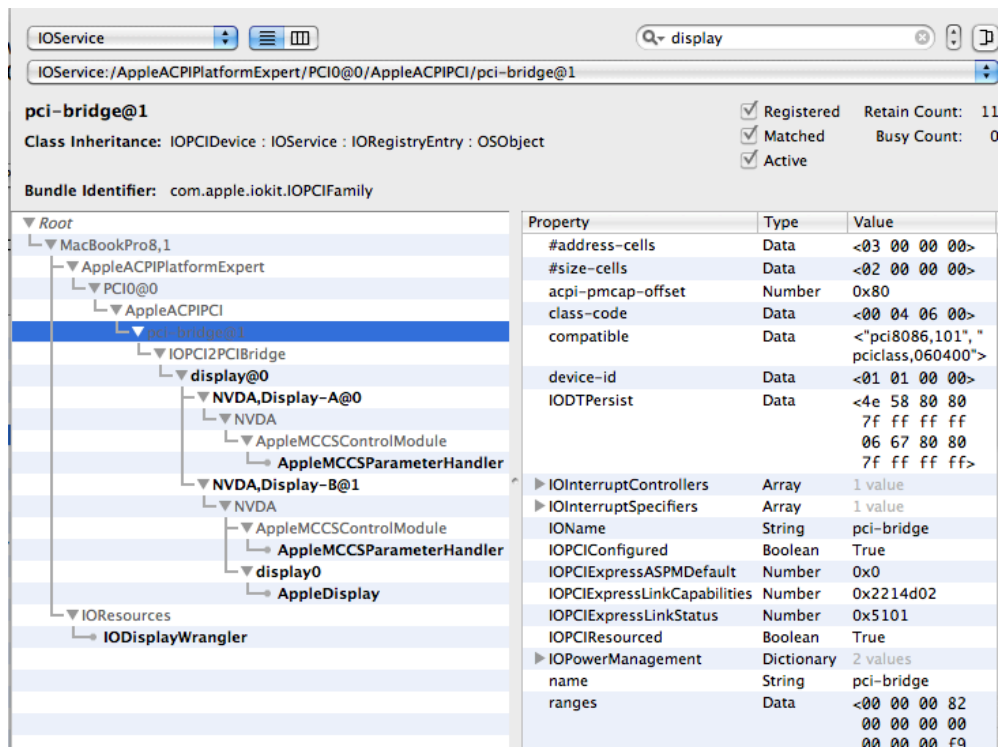
IORegistry Explorer is a developer tool that reports the state and status of Mac OS X.

1. Graphics card display (PCIe) address

The graphics card address defines the path between the processor and the graphics card

There are several techniques to obtain the display address including IOReg, bdmessg, gfxutil, lspci, etc. IOReg is described below.

- a. Run IOReg, verify "IOService" is displayed in the upper left corner of the IOReg window
- b. Enter "display" in the search window
- c. Look for PCIO@0
- d. Example: PCIO > AppleACPIPCI > pci-bridge@d, where "d" is the display address (d is usually 1 or 3, sometimes 2, never 0)
- e. The display address is d, actually, 0x000d0000. Note the display address for use later.  
Graphic card references could be P0P1@1, P0P3@3, ....

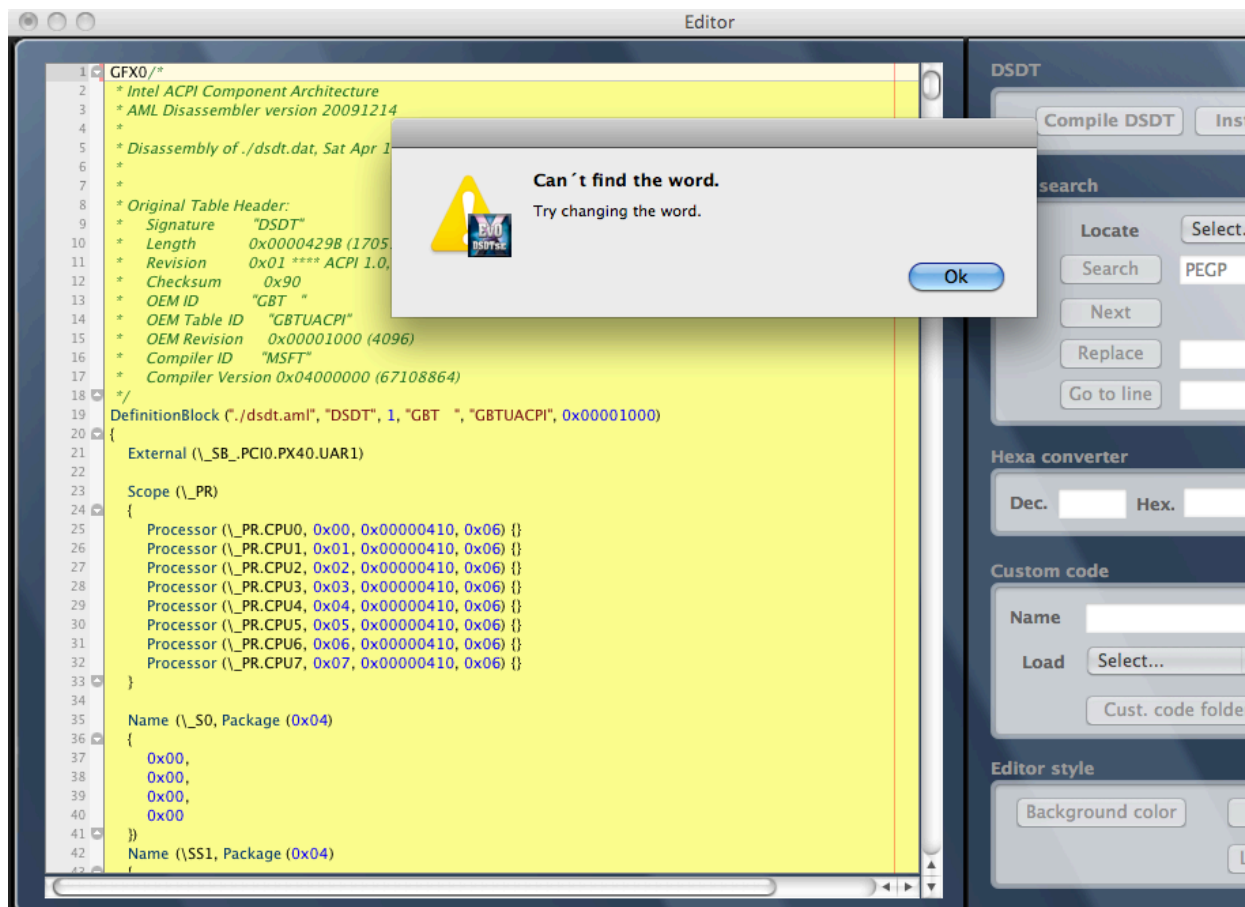


## 2. Open DSDT

Open Finder on the drive the system boots from and select the Extra folder. Make a back up of your dsdt.aml file. If you don't have an Extra folder, your system is not ready for HDMI audio.

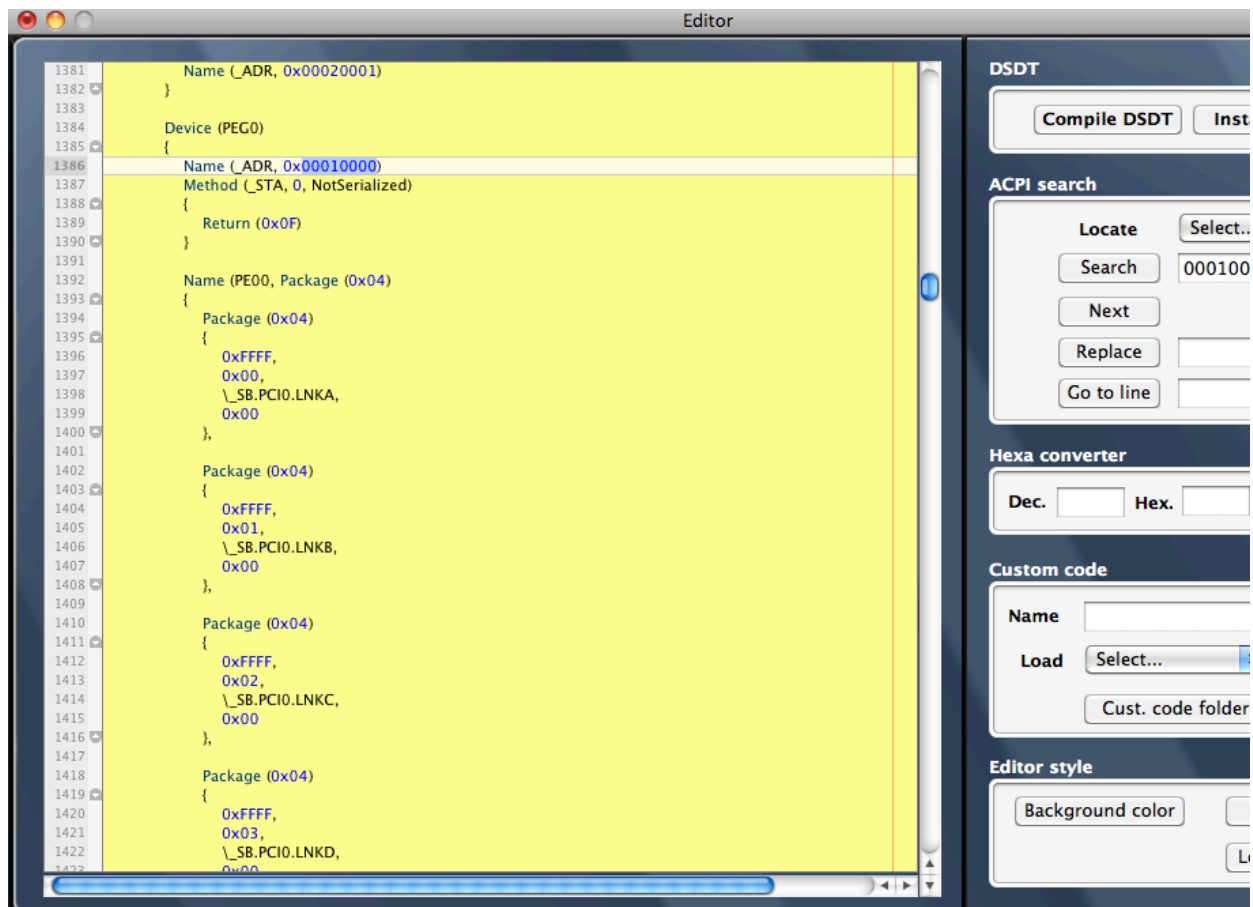
This step verifies the DSDT can be edited for HDMI audio and identifies known problems before investing time making edits and ensures the dsdt compiles before any changes are made.

a. Search PEGP, "Can't find the word." is good news. Click OK and continue. If the editor finds "Device (PEGP)", your dsdt may already be edited for HDMI Audio. Proceed to Step 5. Verify DSDT.

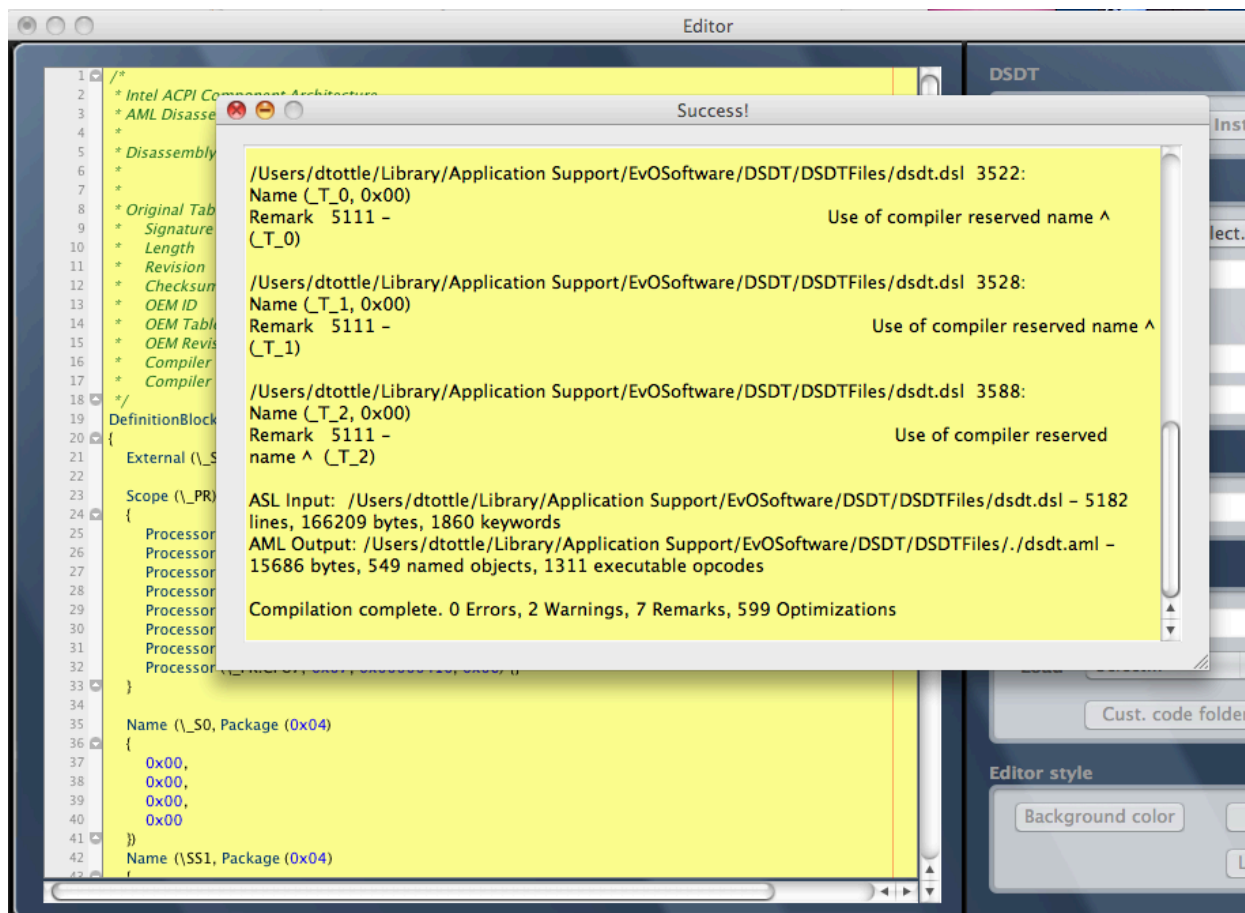


- b. Search "GFX0". If no, proceed. If no for PEGP and yes for GFX0, seek assistance.
- c. Enter the display address from Step 1, "0x00010000" or "0x00030000" in the search box and search. Select Next, If search finds another device with the same address, your mother board may not support HDMI audio. Select Next and look for another device. Repeat until you are back at the first entry.

**SPECIAL NOTE:** If you see "Device (PEG0)" as below (likely in the Gigabyte Sandy Bridge DSDT), skip to Step 4; Edit DSDT



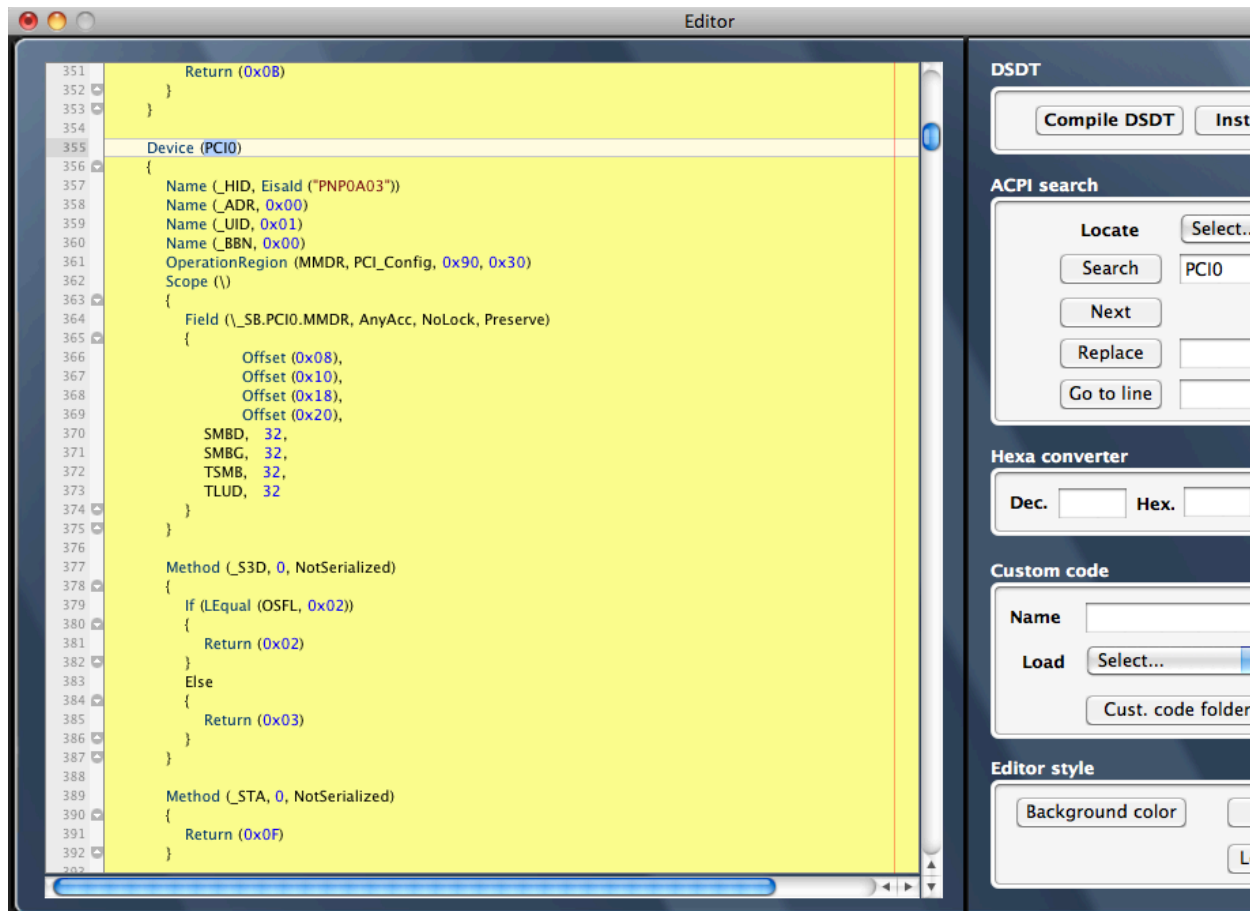
d. Select Compile. If successful, continue (warnings and remarks, OK). If errors, seek assistance.



### 3. Preview DSDT

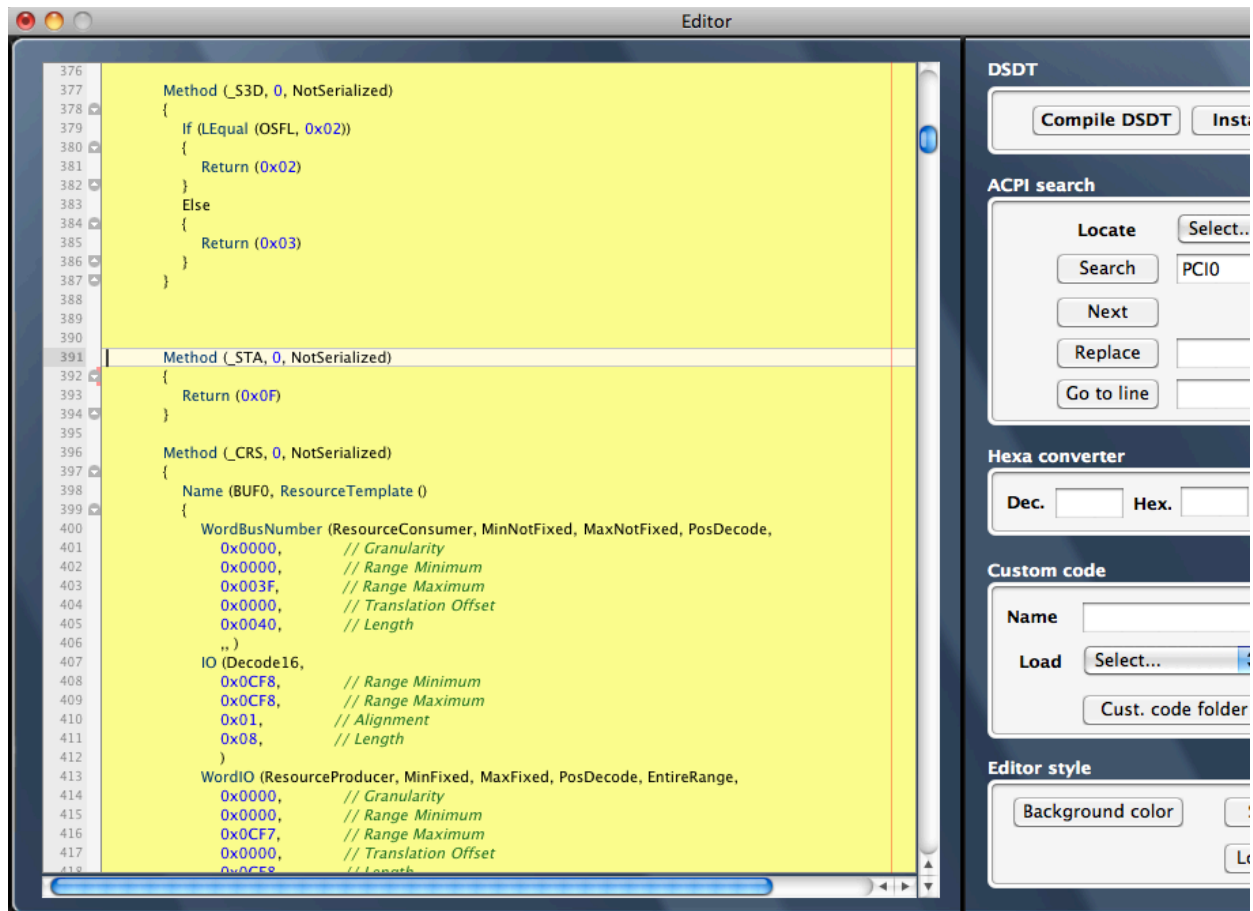
This step identifies the exact place to put the HDMI audio edits in your DSDT.

- Enter "PCI0" in the Search box and Search (0 is zero, not O). Hit Next until you see "Device (PCI0)". If "Device (PCI0)" is not found, seek assistance as your mother board may not support HDMI audio.

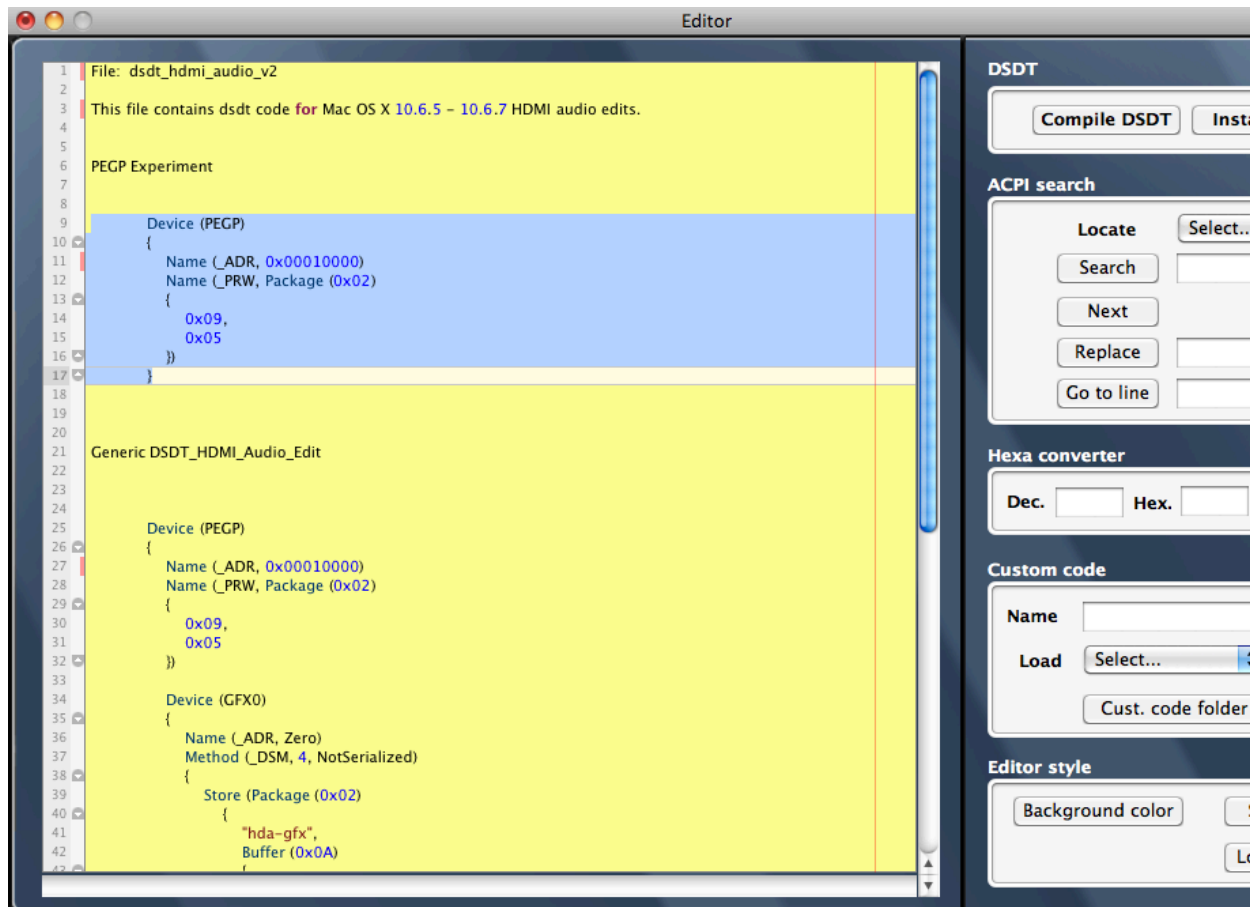


- b. Look down through the code and find "Method (\_STA, 0, NotSerialized)" (line 389 in the DSDT above).
- c. Put the cursor at the beginning of the line above and hit return twice. This creates some space to add the edit code.

SPECIAL NOTE: If you have experience editing your DSDT, jump to Step 4 Edit DSDT

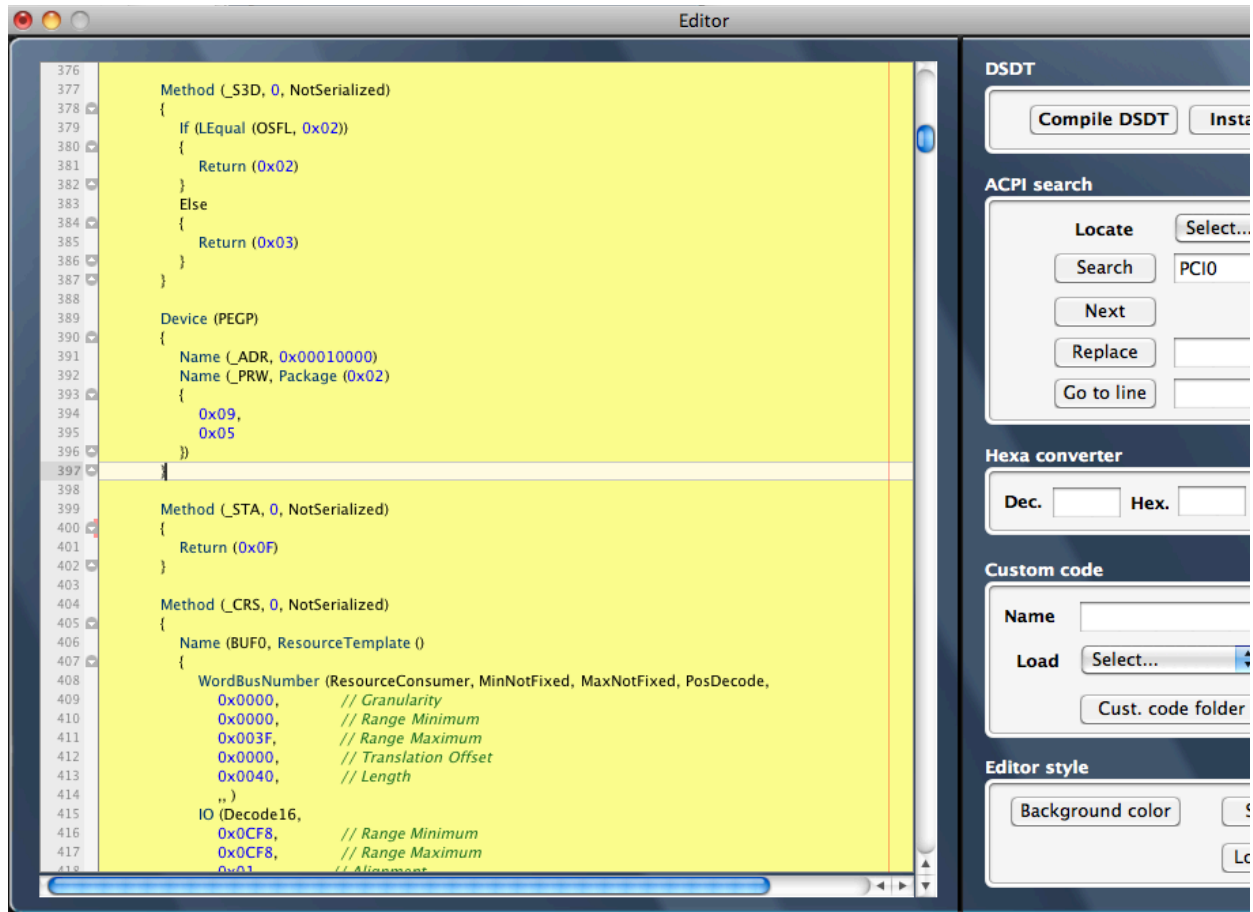


d. Double click on dsdt-hdmi\_audio-v2.dsl and another editor window will open in DSDTSE. Go to this DSDTSE edit window and copy the nine lines of code under the comment "Generic DSDT\_HDMI\_Audio\_Edit"

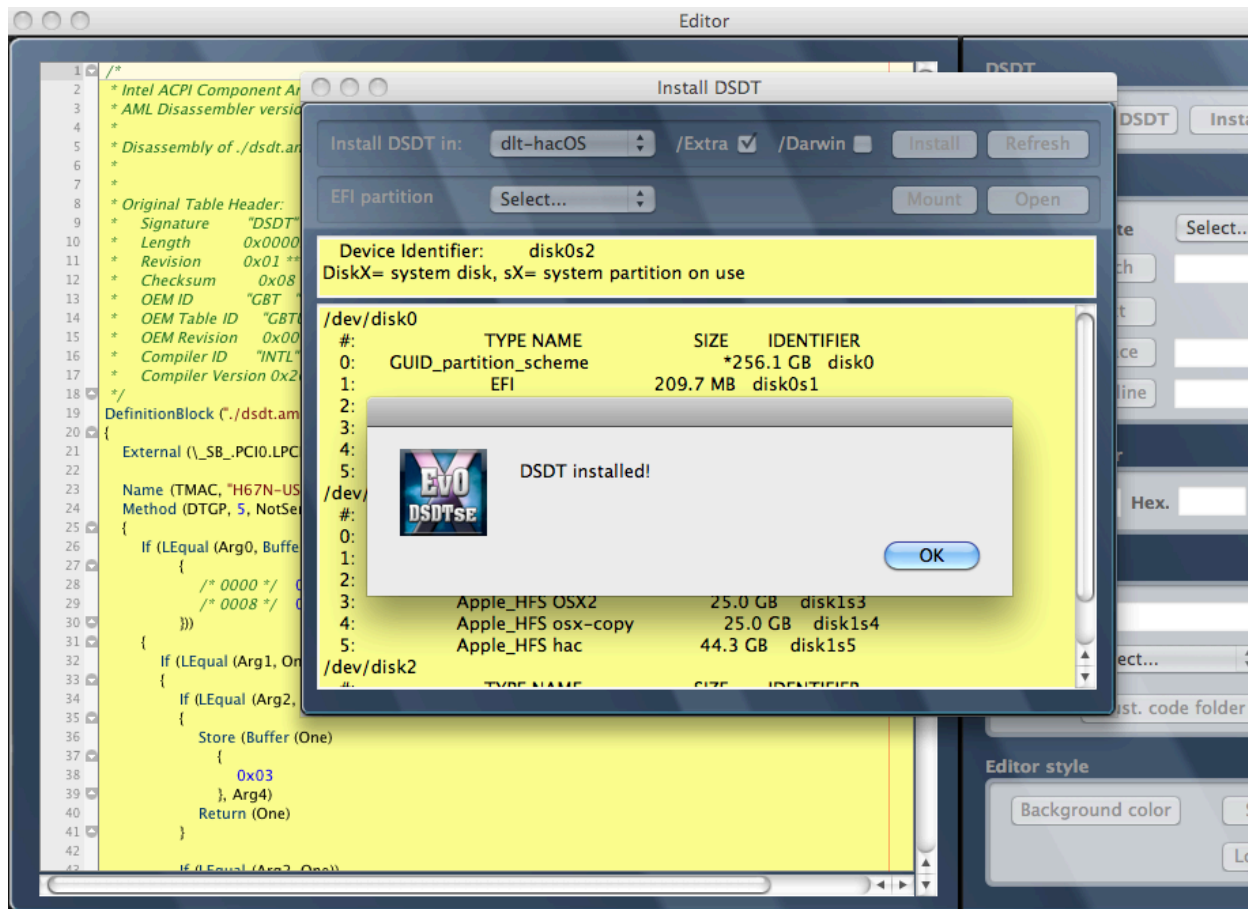


- e. Paste the code into the space made in your DSDT.
- f. Make sure the code looks similar to the dsdt below.





- h. Compile. If there is an error, see if you can solve it. If not, quit DSDSE (don't save) and start again from the beginning.
- i. With a successful compile, select "Install DSDT", select your boot volume, check Extra, and select Install. If the message "A previous dsdt.aml file...", select OK. Enter password.



- j. With a successful install, reboot.
- k. Run IOREg, enter "PEGP" in the search window.
- l. You will see "PEGP@1" or "PEGP@3", depending on display address. If the edit was successful, please proceed. Otherwise, seek assistance.

IOService: /AppleACPIPlatformExpert/PCI0@0/AppleACPIPCI/PEGP@1

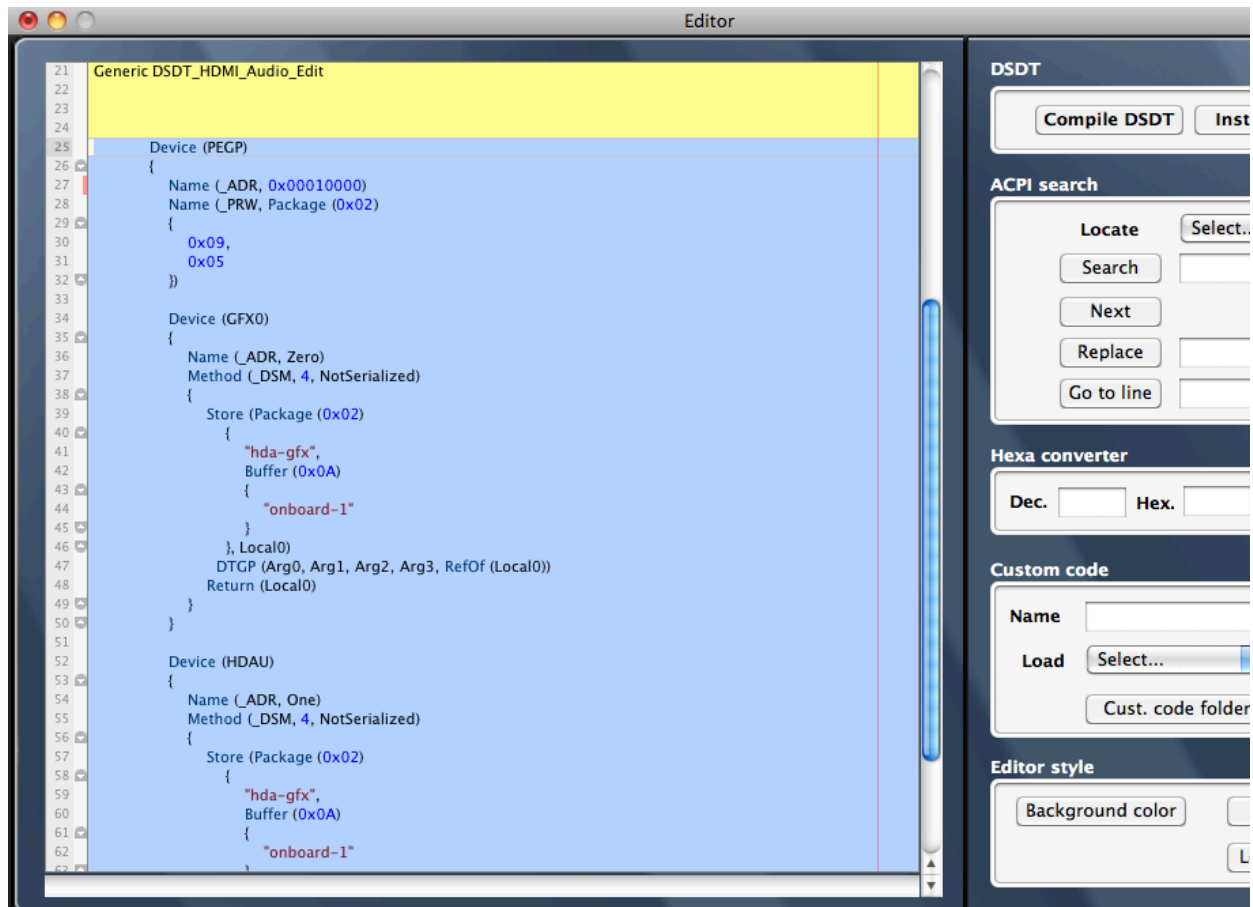
**PEGP@1** ☒ Registered Retain Count: 13  
 Class Inheritance: IOPCIDevice : IOService : IORegistryEntry : OSObject ☒ Matched Busy Count: 0  
☒ Active  
 Bundle Identifier: com.apple.iokit.IOPCIFamily

Property	Type	Value
#address-cells	Data	<03 00 00 00>
#size-cells	Data	<02 00 00 00>
acpi-device	String	IOACPIPlatformDevice is not serializable
acpi-path	String	IOACPIPlane:/_SB/PCI0@0/PEGP@10000
acpi-pmcap-offset	Number	0x80
built-in	Data	<00>
class-code	Data	<00 04 06 00>
compatible	Data	<"pcif,0", "pci8086,101", "pciclass,060400">
device-id	Data	<01 01 00 00>
IODTPersist	Data	<c2 54 80 80 7f ff ff ff ea 66 80 80 7f ff ff ff>
IOInterruptControllers	Array	1 value
IOInterruptSpecifiers	Array	1 value
IOName	String	pci-bridge
IOPCIConfigured	Boolean	True
IOPCIExpressASPMDefault	Number	0x0

#### 4. Edit DSDT

In this step, the HDMI edits are made to the DSDT. Care must be taken to ensure all edits are accurate and complete. Though unlikely, a mistake may make your system unbootable or significantly compromise performance.

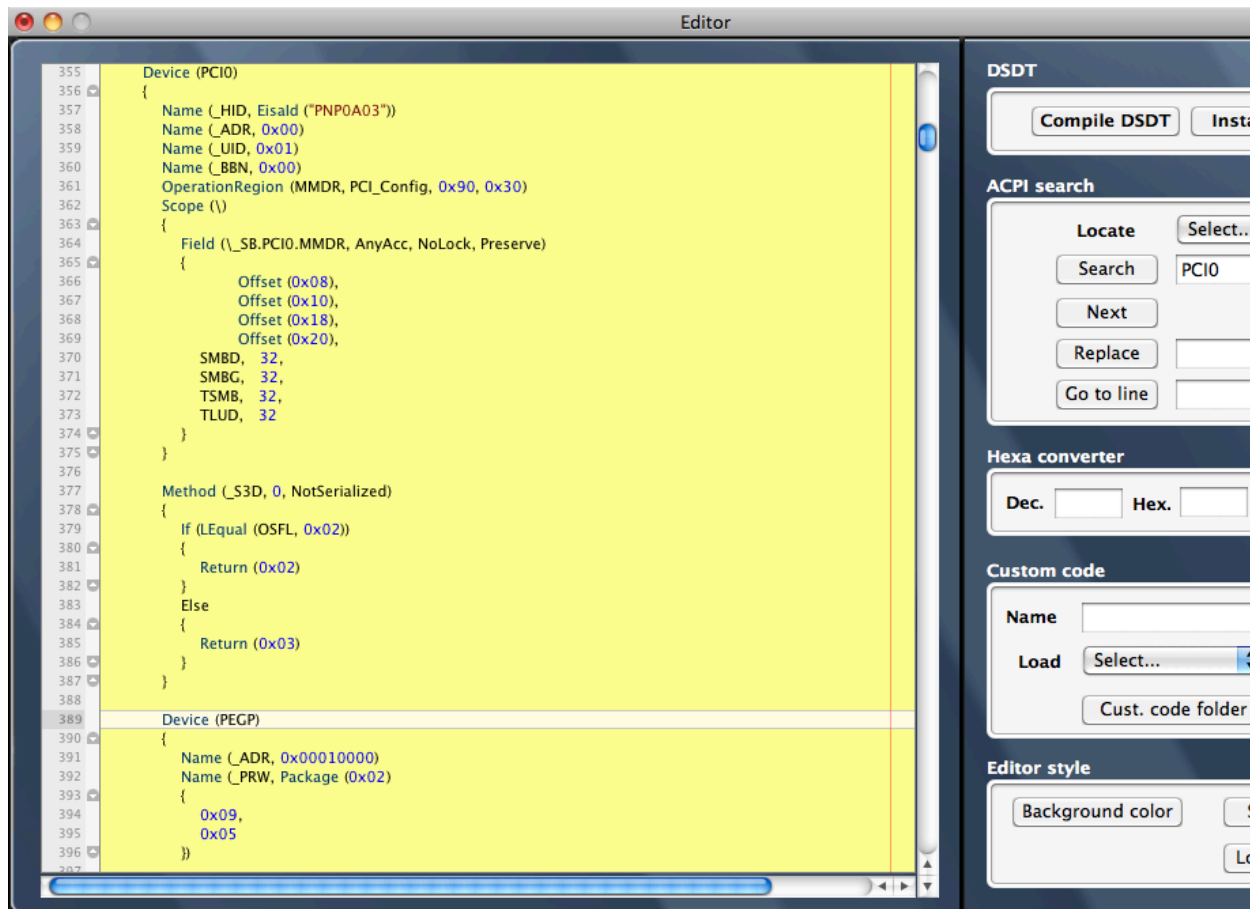
- Go to the other DSDTSE edit window and copy the 44 lines of code under the comment "Generic DSDT\_HDMI\_Audio\_Edit"

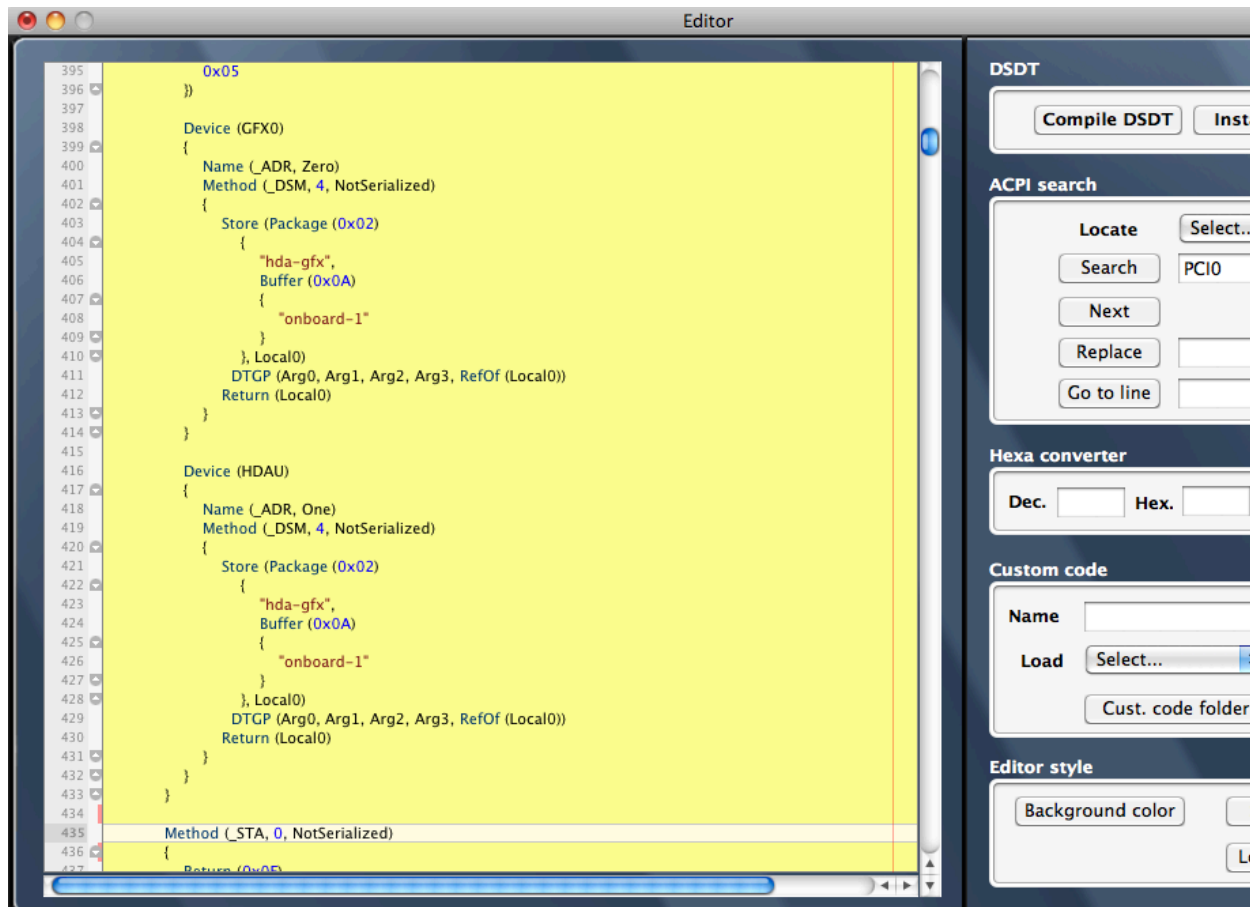


If you ran the experiment successfully, jump to step d.

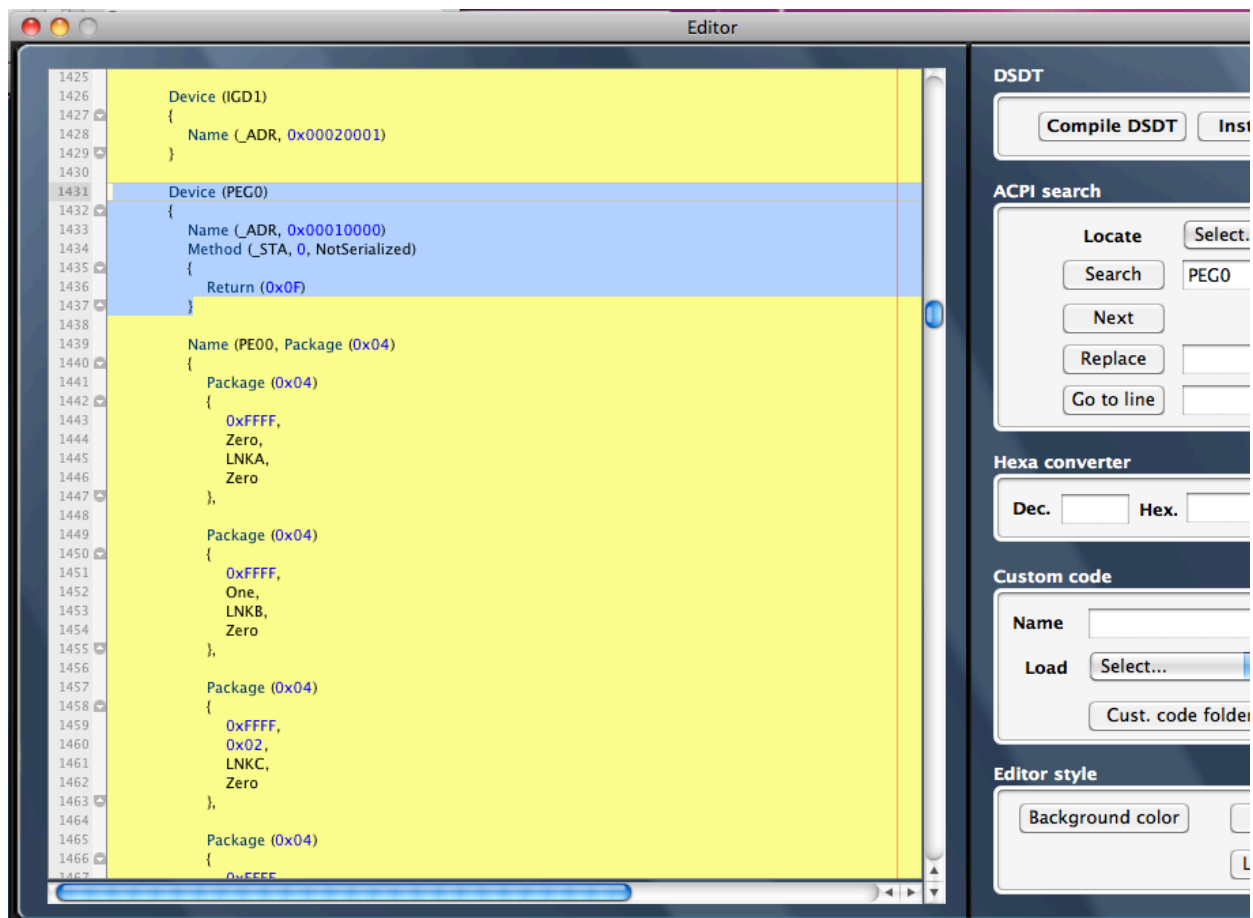
If you starting here, images for the next three steps are above and not repeated.

- Enter "PCI0" in the search box and search (0 is zero, not O). If "PCI0" is not found, your mother board may not support HDMI audio.
- If you found Device PEG0, P0P1, P0P2 or P0P3, skip to Step i. Otherwise, look down through the code and find "Method (\_STA, 0, NotSerialized)"
- Put the cursor at the beginning of the line above and hit return twice. This creates some space to add the edit code.
- Paste the code into the line above the "Method (\_STA, 0, NotSerialized)" line.
- Make sure it looks like the example below.

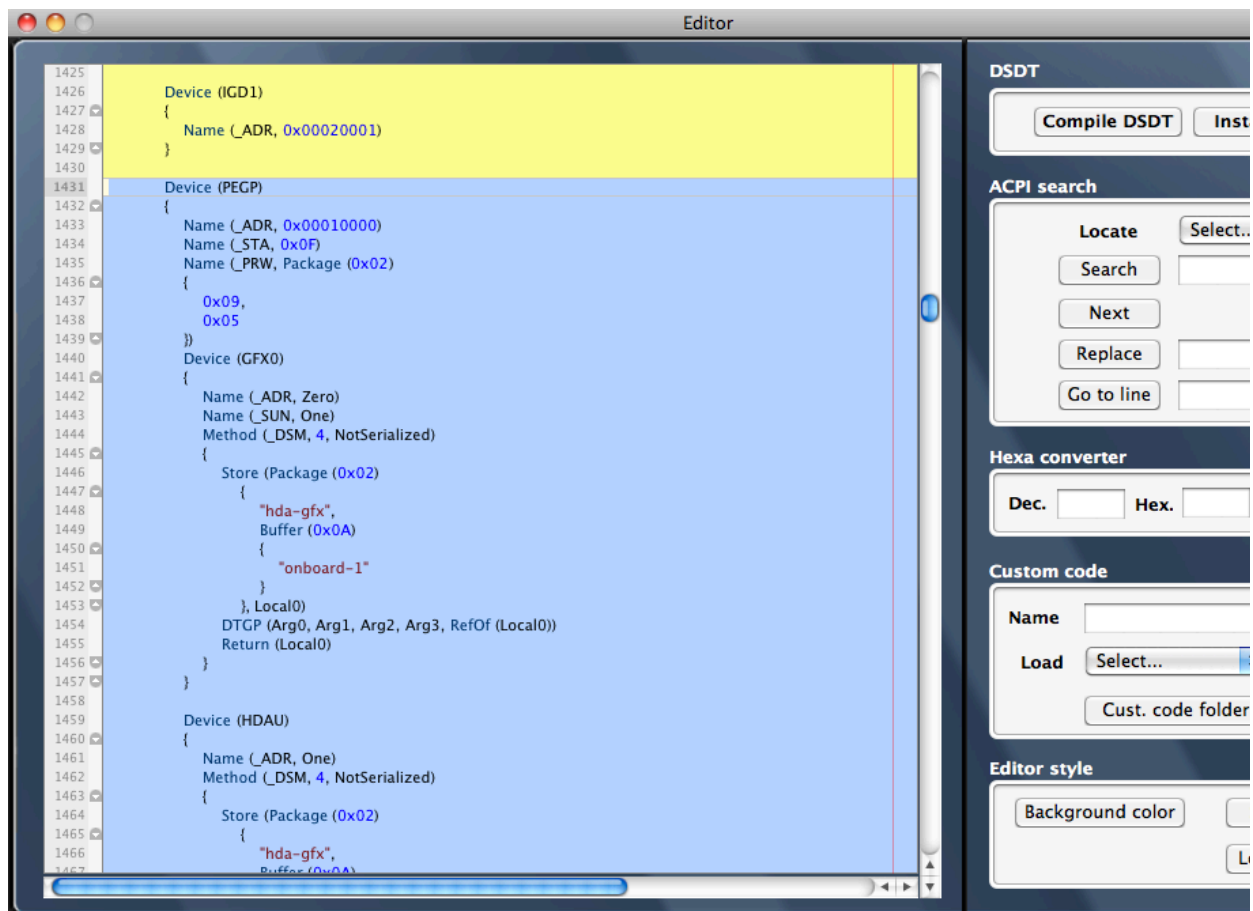




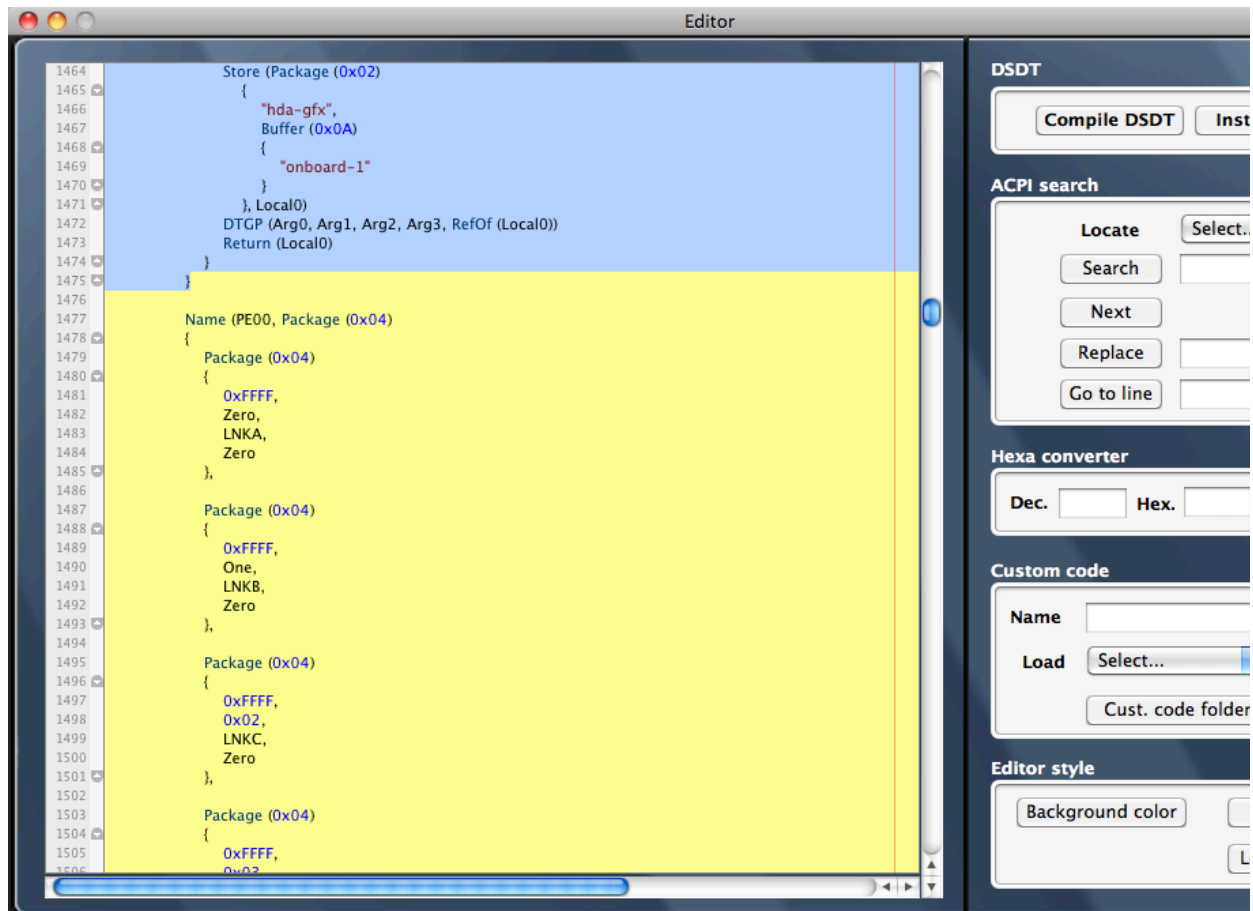
- g. If you have pasted the HDMI Audio code into your DSDT, skip to Step h. Compile.
- h. If you found Device PEG0, P0P1, P0P2 or P0P3, paste the code on top of DEVICE (PEG0, P0P1, etc.) as shown below.



- i. Make sure it looks like the example below.





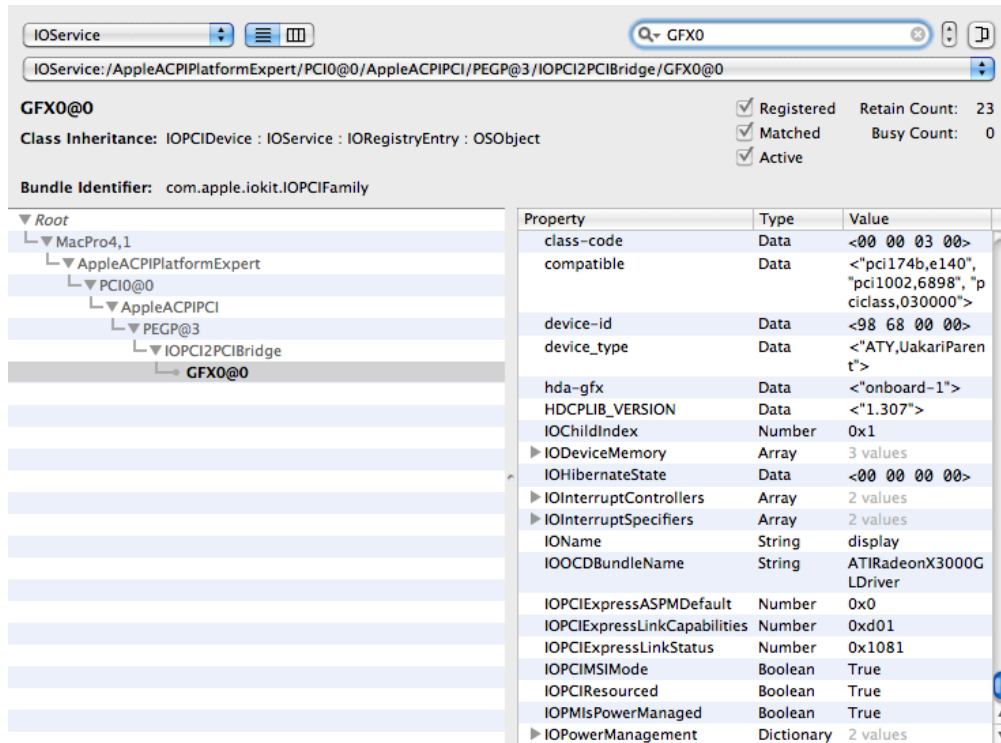


- j. Compile. If there is an error, see if you can solve it. If not, quit DSDSE (don't save) and start again from the beginning.
- k. With a successful compile, select "Install DSDT", select your boot volume, check Extra, and select Install. If the message "A previous dsdt.aml file...", select OK. Enter password.
- l. With a successful install, plug your HDMI device into the graphics card and reboot.

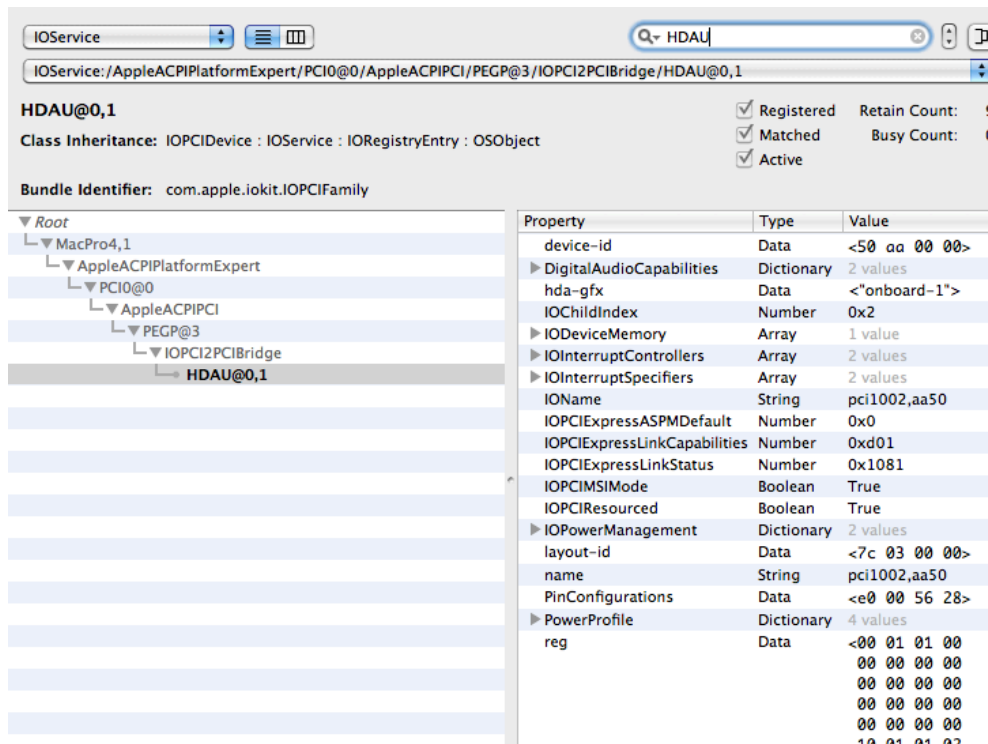
## 5. Verify DSDT

This step verifies the HDMI audio edits are correct.

- a. Run IOReg, Search "GFX0". You should see a chain that includes:  
PCI0 > AppleACPIPCI > PEGP@1 > IOPCI2PCIBridge > GFX0@0. If different, seek assistance.
- b. Verify GFX0, hda-gfx = <"onboard-1">



- c. Run IOREg, Search "HDAU". This chain looks like:  
 PCI0 > AppleACPIPCI > PEGP@1 > IOPCI2PCIBridge > HDAU@0,1. If different, seek assistance.  
 d. Verify HDAU, hda-gfx = <"onboard-1">, please note device-id for later use (i.e., 50 aa, translates to aa50)



Congratulations, it appears you have successfully edited your dsdt for HDMI audio.

## 6. Working HDMI Audio

HDMI audio is available out of the box for the following graphics card with the above DSDT edits.

- Sapphire Vapor X HD 5870 1GB
- Sapphire Vapor X HD 5770 1GB

If one of the graphics cards above is installed, working HDMI Audio (HDAU) looks like this:

The screenshot shows the IOService window with the path `IOService:/AppleACPIPlatformExpert/PCI0@0/AppleACPIPCI/PEGP@3/IOPCI2PCIBridge/HDAU@0,1` selected. The left pane displays a tree view of the device hierarchy, and the right pane shows the properties of the selected device.

**HDAU@0,1**  
Class Inheritance: IOPCIDevice : IOService : IORegistryEntry : OSObject  
Bundle Identifier: com.apple.iokit.IOPCIFamily

Properties:

Property	Type	Value
acpi-device	String	IOACPIPlatformDevice is not serializable
acpi-path	String	IOACPIPlane:/_SB/PCI0@0/PEGP@30000/HDAU@1
assigned-addresses	Data	<10 01 01 82 00 00 00 00 00 c0 dF fb 00 00 00 00>
built-in	Data	<00>
class-code	Data	<00 03 04 00>
compatible	Data	<"pci174b,aa50", "pci1002,aa50", "pci class,040300">
device-id	Data	<50 aa 00 00>
DigitalAudioCapabilities	Dictionary	2 values
hda-gfx	Data	<"onboard-1">
IOChildIndex	Number	0x2
IODeviceMemory	Array	1 value
IOInterruptControllers	Array	2 values
IOInterruptSpecifiers	Array	2 values
IOName	String	pci1002,aa50
IOPCIExpressASPMDefault	Number	0x0
IOPCIExpressLinkCapabilities	Number	0xd01
IOPCIExpressLinkStatus	Number	0x1081
IOPCIMSIMode	Boolean	True
IOPCIResourced	Boolean	True
IOPowerManagement	Dictionary	2 values
layout-id	Data	<7c 03 00 00>
name	String	pci1002,aa50
PinConfigurations	Data	<e0 00 56 28>

IOReg Graphics System - Video and Audio; AMD Radeon on the left and Nvidia GeForce on the right.

