

Mountain Lion HDMI Audio - AMI

<http://www.tonymacx86.com/mod-house/70762-mountain-lion-hdmi-audio-ami-dsdt.html#post438967>

Mountain Lion HDMI Audio - AMI DSDT

Verify first line of an Award dsdt is similar to:

DefinitionBlock (".dsdt.aml", "DSDT", 2, "ALASKA", "A M I", 0x00000014)

Introducing a new simple and easy HDMI Audio dsdt editing tool for OS X HDMI audio. Based on the DSDT Editor built by MaLdOn, pushing the Apply button automatically adds the HDMI audio dsdt edits to your dsdt. This version edits AMI dsdts, both BIOS and EFI.

Benefits

1. Automated HDMI audio dsdt editing
2. Installs HD3000 or HD4000 integrated graphics HDMI audio dsdt edits
3. Installs AMD/Nvidia discrete graphics card HDMI audio dsdt edits
4. No copy, no paste, no finding the right place to paste

Before You Start:

1. OS X does not provide HDMI audio controls (No volume, no mute, no balance, etc.)
2. The connected HDMI device (TV, receiver, etc.) provides any and all audio controls

Requirements

1. Intel
 - 1a. Ivy Bridge motherboard (7 Series)
 - 1b. Sandy Bridge motherboard (6 series)
 - 1c. Core i/Nehalem motherboard (5 Series)
2. OS X
 - 2a. Mountain Lion - 10.8 and newer
 - 2b. Lion - 10.7 and newer
3. dsdt - no compile errors and no exceptions
 - 3a. tonymacx86 - DSDT Database (all non-Gigabyte dsdts)
 - 3b. olarila.com • DSDT patches by motherboard
 - 3c. Note: olarila.com/Motherboard Patches/Gigabyte 6 Series should not be applied to AMI dsdt.
4. Realtek supported audio codecs (8xy): 885, 887, 888, 889, 892, 898
5. AppleHDA.kext, either
 - 5a. Native ML AppleHDA (no onboard audio)
 - 5b. Edited ML_AppleHDA_v2.3.0 or newer (885, 887, 888, 889, 892, 898)
 - 5c. Edited Lion_AppleHDA_V2.2.0 only (885, 887, 888, 889, 892, 898)
6. OS X recognized and enabled graphics with HDMI codec
7. Chimera - 1.11 or newer

Special HDMI Audio Considerations

1. AMD/Nvidia/Intel
 - 1a. HDMI audio works with or without onboard audio working
2. AMD
 - 2a. AMD and Nvidia dsdt edits are the same
 - 2b. HDMI Device_ID and/or Framebuffer edits may be required.
 - 2c. DVI ports do not support HDMI audio
 - 2d. Surround sound (Encoded Digital Audio) does not work with GE=No
3. Nvidia
 - 3a. AMD and Nvidia dsdt edits are the same
 - 3b. All Nvidia HDMI device-ids native to ML AppleHDA
 - 3c. HDMI audio available on all ports (DVI2HDMI adapter)
4. Intel
 - 4a. dsdt edits are different for HD3000 and HD4000
 - 4b. Framebuffer edits may be required for 1 or 2 HDMI outputs
4. 2x HDMI audio available by deleting one audio output device (Line Out or Optical)

Approach

1. The files in the hdmi_audio_dsdt_editing_kit folder represent the HDMI audio dsdt edit source code.
2. Changes in the HDMI audio dsdt edits are made with a text editor to the appropriate file in the hdmi_audio_dsdt_editing_kit and installed with DSDT Editor.
3. The hdmi_audio_dsdt_editing_kit folder is preserved for BIOS updates and new installations.
4. Ensure the native extracted/downloaded dsdt is saved in a folder called native dsdt
5. Do not patch a dsdt more than once. If you do, the dsdt will not compile; start over with a new copy of the native dsdt.

Tools

1. DSDT Editor - Registration required, [olarila.com • View topic - DSDT editor and patcher](#)
2. IORegistryExplorer see [\[Guide\] How to Make a Copy of IOReg](#)
3. Applications/Utilities/Console
4. Applications/TextEdit
5. Carbon Copy Cloner or SuperDuper

Mountain Lion Audio ID (10.8 AppleHDA.kext_v2.3.0 or newer)

1. AMD/Nvidia HDMI audio
 - 1a. Audio ID: 1 for 5/6 port on board audio
 1. Audio ID: 2 for 3 port on board audio
2. HD3000/HD4000 HDMI audio
 - 2a. Audio ID: 3 for 3/5/6 port onboard audio

Mountain Lion Audio ID (10.7.4 AppleHDA.kext_v2.2.0 only available at MultiBeast 4.6.1)

1. See Note 1 below

Lion Audio ID (10.7.4 AppleHDA.kext_v2.2.0 only, available at MultiBeast 4.6.1)

1. See Note 1 below

Attachments

1. ML_HDMI Audio Edits - AMI dsdts
 - 1a. HD4000_AMI_EFI_hdmi_audio_dsdt_editing_kit
 - 1b. HD3000_AMI_EFI_hdmi_audio_dsdt_editing_kit
 - 1c. HD3000_AMI_BIOS_hdmi_audio_dsdt_editing_kit
 - 1d. 5-Series_AMI_BIOS_hdmi_audio_dsdt_editing_kit
2. Special Configuration
 - 2a. HD4000 graphics on 6 Series
 - 2b. HD3000 graphics on 7 Series

Mountain Lion HDMI Audio dsdt Edits - Two Steps

1. Preparation
2. dsdt edits

Mountain Lion HDMI Audio dsdt Edits - Preparation

1. Make a copy of IOReg
2. Backup dsdt.aml
3. Key Information

Key Information

1. Determine graphics device names and address
 - 1a. IOReg/Search display
 - 1a. Example: Discrete Graphics - PEG0@1
 - 1a. Example: Integrated Graphics - GFX0@2 (N/A - 5 series)

IOService: /AppleACPIPlatformExpert/PCI0@0/AppleACPIPCI/G...r@0/AppleMCCSControlModule/AppleMCCSParameterHandler

AppleMCCSParameterHandler

Class Inheritance: AppleMCCSParameterHandler : IODisplayParameterHandler : IOService : IORegistryEntry : OSObject

Bundle Identifier: com.apple.driver.AppleMCCSControl

Registered Retain Count: 4
Matched Busy Count: 0
Active

Property	Type	Value
CFBundleIdentifier	String	com.apple.driver.AppleMCCSControl
IOClass	String	AppleMCCSParameterHandler
IOKitDebug	Number	0x0
IOMatchCategory	String	IODisplayParameter
IOProbeScore	Number	0x0
IOProviderClass	String	AppleMCCSControlFamily
IOResourceMatch	String	IOKit

Root

- Macmini5,1
 - AppleACPIPlatformExpert
 - PCI0@0
 - AppleACPIPCI
 - GFX0@2
 - AppleIntelFramebuffer@0
 - AppleMCCSControlModule
 - AppleMCCSParameterHandler
 - AppleIntelFramebuffer@1
 - AppleMCCSControlModule
 - AppleMCCSParameterHandler
 - AppleIntelFramebuffer@2
 - AppleMCCSControlModule
 - AppleMCCSParameterHandler
 - display0
 - AppleDisplay
 - PEG0@1
 - IOPCI2PCIBridge
 - PEGP@0
 - ATY,Duckweed@0
 - ATIFramebufferNI
 - AppleMCCSControlModule
 - AppleMCCSParameterHandler
 - ATY,Duckweed@1
 - ATIFramebufferNI
 - AppleMCCSControlModule
 - AppleMCCSParameterHandler
 - ATY,Duckweed@2
 - ATIFramebufferNI
 - AppleMCCSControlModule
 - AppleMCCSParameterHandler
 - ATY,Duckweed@3
 - ATIFramebufferNI
 - AppleMCCSControlModule
 - AppleMCCSParameterHandler
 - IOResources
 - IODisplayWrangler

2. Determine discrete graphics device names and address

2a. IOREg/Search PEG0

2a. Example: PEG0@1

IOService: /AppleACPIPlatformExpert/PCI0@0/AppleACPIPCI/PEG0@1

PEG0@1

Class Inheritance: IOPCIDevice : IOService : IORegistryEntry : OSObject

Bundle Identifier: com.apple.iokit.IOPCIFamily

Registered Retain Count: 12
Matched Busy Count: 0
Active

| Property | Type | Value |
|----------------|--------|--|
| #address-cells | Data | <03 00 00 00> |
| #size-cells | Data | <02 00 00 00> |
| acpi-device | String | IOACPIPlatformDevice is not serializable |

pci8086,1e3a@16

- AppleIntelMEIDriver
- PEG0@1
 - IOPCI2PCIBridge
 - PEGP@0
 - AppleMCCSControlModule

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|--------|------------------------------------|-------------------|--------|------|----------|------|------|------------|------|---------------|------------|------|---|-----------|------|---------------|-------------|------|----|--------------------------|-------|---------|-------------------------|-------|---------|--------|--------|------------|-----------------|---------|------|-------------------------|--------|-----|------------------------------|--------|-----------|------------------------|--------|--------|----------------|---------|------|---------------------|------------|----------|------|--------|------------|----------|--------|------------|--------|------|--|-----|------|---|-------------|------|---------------|--------------|------|---------------|---------------------|------|---------------|-----------|------|---------------|
| <div><div><div><div><div><div>AMD0000Controller</div><div>▼ AMDBartsGraphicsAccelerator</div><div><div>→ AMDAccel2DContext</div><div>→ AMDAccel2DContext</div><div>→ AMDAccel2DContext</div><div>→ AMDAccel2DContext</div><div>→ AMDAccelDevice</div><div>→ AMDAccelDevice</div><div>→ AMDAccelSharedUserClient</div><div>→ AMDR8xxGLContext</div></div></div><div><div>→ AMDSupport</div><div>▼ ATY,Duckweed@0</div><div><div>▼ ATIFramebufferNI</div><div><div>▼ AGPM</div><div><div>↳ gpu-control</div></div><div>→ AMDNDRVService</div><div>▼ AppleMCCSControlModule</div><div><div>↳ AppleMCCSParameterH...</div></div><div>→ AppleUpstreamUserClient...</div><div>→ IOFramebufferI2CInterface</div><div>→ IOFramebufferUserClient</div></div></div><div>▼ ATY,Duckweed@1</div><div><div>▼ ATIFramebufferNI</div><div><div>→ AMDNDRVService</div><div>▼ AppleMCCSControlModule</div><div><div>↳ AppleMCCSParameterH...</div></div><div>→ AppleUpstreamUserClient...</div><div>→ IOFramebufferI2CInterface</div><div>→ IOFramebufferUserClient</div></div></div><div>▼ ATY,Duckweed@2</div><div><div>▼ ATIFramebufferNI</div><div><div>→ AMDNDRVService</div><div>▼ AppleMCCSControlModule</div><div><div>↳ AppleMCCSParameterH...</div></div><div>→ AppleUpstreamUserClient...</div><div>→ IOFramebufferI2CInterface</div><div>→ IOFramebufferUserClient</div></div></div><div>▼ ATY,Duckweed@3</div><div><div>▼ ATIFramebufferNI</div><div><div>→ AMDNDRVService</div><div>▼ AppleMCCSControlModule</div><div><div>↳ AppleMCCSParameterH...</div></div><div>→ AppleUpstreamUserClient...</div><div>→ IOFramebufferI2CInterface</div><div>→ IOFramebufferUserClient</div></div></div><div>→ PEGP@0,1</div></div></div><div>▼ RP01@1C</div><div><div>↳ IOPCI2PCIBridge</div></div><div>▼ RP07@1C,6</div><div><div>↳ IOPCI2PCIBridge</div><div><div>↳ PXSX@0</div></div></div><div>▼ RP08@1C,7</div><div><div>↳ IOPCI2PCIBridge</div><div><div>↳ PXSX@0</div></div></div><div>▼ SAT0@1F,2</div></div></div></div> | <table><tr><td>acpi-path</td><td>String</td><td>IOACPIPlane:/_SB/PCI0@0/PEG0@10000</td></tr><tr><td>acpi-pmcap-offset</td><td>Number</td><td>0x80</td></tr><tr><td>built-in</td><td>Data</td><td><00></td></tr><tr><td>class-code</td><td>Data</td><td><00 04 06 00></td></tr><tr><td>compatible</td><td>Data</td><td><"pcif,0", "pci8086,151", "pci8086,0400"></td></tr><tr><td>device-id</td><td>Data</td><td><51 01 00 00></td></tr><tr><td>IODTPersist</td><td>Data</td><td><></td></tr><tr><td>▶ IOInterruptControllers</td><td>Array</td><td>1 value</td></tr><tr><td>▶ IOInterruptSpecifiers</td><td>Array</td><td>1 value</td></tr><tr><td>IOName</td><td>String</td><td>pci-bridge</td></tr><tr><td>IOPCIConfigured</td><td>Boolean</td><td>True</td></tr><tr><td>IOPCIExpressASPMDefault</td><td>Number</td><td>0x0</td></tr><tr><td>IOPCIExpressLinkCapabilities</td><td>Number</td><td>0x261ad03</td></tr><tr><td>IOPCIExpressLinkStatus</td><td>Number</td><td>0x5101</td></tr><tr><td>IOPCIResourced</td><td>Boolean</td><td>True</td></tr><tr><td>▶ IOPowerManagement</td><td>Dictionary</td><td>3 values</td></tr><tr><td>name</td><td>String</td><td>pci-bridge</td></tr><tr><td>pcidebug</td><td>String</td><td>0:1:0(1:1)</td></tr><tr><td>ranges</td><td>Data</td><td><00 00 00 82
00 00 00 00
00 00 e0 f7
00 00 00 82
00 00 00 00
00 00 e0 f7
00 00 00 00
00 00 10 00
00 00 00 c2
0f 00 00 00
00 00 00 10
00 00 00 c2
0f 00 00 00
00 00 00 10
00 00 00 00
00 00 00 10
00 00 00 81
00 00 00 00
00 e0 00 00
00 00 00 81
00 00 00 00
00 e0 00 00
00 00 00 00
00 10 00 00></td></tr><tr><td>reg</td><td>Data</td><td><00 08 00 00
00 00 00 00
00 00 00 00
00 00 00 00
00 00 00 00></td></tr><tr><td>revision-id</td><td>Data</td><td><09 00 00 00></td></tr><tr><td>subsystem-id</td><td>Data</td><td><00 00 00 00></td></tr><tr><td>subsystem-vendor-id</td><td>Data</td><td><0f 00 00 00></td></tr><tr><td>vendor-id</td><td>Data</td><td><86 80 00 00></td></tr></table> | acpi-path | String | IOACPIPlane:/_SB/PCI0@0/PEG0@10000 | acpi-pmcap-offset | Number | 0x80 | built-in | Data | <00> | class-code | Data | <00 04 06 00> | compatible | Data | <"pcif,0", "pci8086,151", "pci8086,0400"> | device-id | Data | <51 01 00 00> | IODTPersist | Data | <> | ▶ IOInterruptControllers | Array | 1 value | ▶ IOInterruptSpecifiers | Array | 1 value | IOName | String | pci-bridge | IOPCIConfigured | Boolean | True | IOPCIExpressASPMDefault | Number | 0x0 | IOPCIExpressLinkCapabilities | Number | 0x261ad03 | IOPCIExpressLinkStatus | Number | 0x5101 | IOPCIResourced | Boolean | True | ▶ IOPowerManagement | Dictionary | 3 values | name | String | pci-bridge | pcidebug | String | 0:1:0(1:1) | ranges | Data | <00 00 00 82
00 00 00 00
00 00 e0 f7
00 00 00 82
00 00 00 00
00 00 e0 f7
00 00 00 00
00 00 10 00
00 00 00 c2
0f 00 00 00
00 00 00 10
00 00 00 c2
0f 00 00 00
00 00 00 10
00 00 00 00
00 00 00 10
00 00 00 81
00 00 00 00
00 e0 00 00
00 00 00 81
00 00 00 00
00 e0 00 00
00 00 00 00
00 10 00 00> | reg | Data | <00 08 00 00
00 00 00 00
00 00 00 00
00 00 00 00
00 00 00 00> | revision-id | Data | <09 00 00 00> | subsystem-id | Data | <00 00 00 00> | subsystem-vendor-id | Data | <0f 00 00 00> | vendor-id | Data | <86 80 00 00> |
| acpi-path | String | IOACPIPlane:/_SB/PCI0@0/PEG0@10000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| acpi-pmcap-offset | Number | 0x80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| built-in | Data | <00> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| class-code | Data | <00 04 06 00> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| compatible | Data | <"pcif,0", "pci8086,151", "pci8086,0400"> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| device-id | Data | <51 01 00 00> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IODTPersist | Data | <> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ▶ IOInterruptControllers | Array | 1 value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ▶ IOInterruptSpecifiers | Array | 1 value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IOName | String | pci-bridge | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IOPCIConfigured | Boolean | True | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IOPCIExpressASPMDefault | Number | 0x0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IOPCIExpressLinkCapabilities | Number | 0x261ad03 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IOPCIExpressLinkStatus | Number | 0x5101 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IOPCIResourced | Boolean | True | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ▶ IOPowerManagement | Dictionary | 3 values | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| name | String | pci-bridge | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| pcidebug | String | 0:1:0(1:1) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ranges | Data | <00 00 00 82
00 00 00 00
00 00 e0 f7
00 00 00 82
00 00 00 00
00 00 e0 f7
00 00 00 00
00 00 10 00
00 00 00 c2
0f 00 00 00
00 00 00 10
00 00 00 c2
0f 00 00 00
00 00 00 10
00 00 00 00
00 00 00 10
00 00 00 81
00 00 00 00
00 e0 00 00
00 00 00 81
00 00 00 00
00 e0 00 00
00 00 00 00
00 10 00 00> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| reg | Data | <00 08 00 00
00 00 00 00
00 00 00 00
00 00 00 00
00 00 00 00> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| revision-id | Data | <09 00 00 00> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| subsystem-id | Data | <00 00 00 00> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| subsystem-vendor-id | Data | <0f 00 00 00> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| vendor-id | Data | <86 80 00 00> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

3. Determine integrated graphics device names and address (N/A - 5 series)

3a. IOReg/Search GFX0, Select GFX0, Cancel Search (X), Scroll up

3a. Example: GFX0@2

IOService
Search

IOService:/AppleACPIPlatformExpert/PCI0@0/AppleACPIPCI/GFX0@2

GFX0@2

Class Inheritance: IOPCIDevice : IOService : IORegistryEntry : OSObject

Bundle Identifier: com.apple.iokit.IOPCIFamily

- ▼ **GFX0@2**
 - ▼ AppleIntelCapriController
 - AppleMEClientController
 - ▼ AppleIntelFramebuffer@0
 - AGPM
 - gpu-control
 - IOHWControl
 - AppleMCCSControlModule
 - AppleMCCSParameterHandler
 - AppleUpstreamUserClientDriver
 - IOFramebufferI2CInterface
 - IOFramebufferUserClient
 - ▼ AppleIntelFramebuffer@1
 - ▼ AppleMCCSControlModule
 - AppleMCCSParameterHandler
 - AppleUpstreamUserClientDriver
 - IOFramebufferI2CInterface
 - IOFramebufferUserClient
 - ▼ AppleIntelFramebuffer@2
 - ▼ AppleMCCSControlModule
 - AppleMCCSParameterHandler
 - AppleUpstreamUserClientDriver
 - display0
 - AppleDisplay
 - IOFramebufferI2CInterface
 - IOFramebufferSharedUserClient
 - IOFramebufferUserClient
 - ▼ Gen7Accelerator
 - Gen72DContext
 - Gen72DContext
 - Gen72DContext
 - Gen7Device
 - Gen7GLContext
 - Gen7Surface
 - Gen7Surface
 - Gen7Surface
 - Gen7Surface
 - ▼ GLAN@19
 - ▼ AppleIntelE1000e
 - en0
 - IONetworkStack
 - IONetworkStackUserClient
 - ▼ HDEF@1B
 - ▼ AppleHDAController@1B
 - IOHDACodecDevice@1B,0
 - IOHDACodecDriver
 - IOHDACodecFunction@1B,0,1
 - AppleHDACodecGeneric
 - AppleHDADriver
 - IOHDACodecDevice@1B,3
 - IOHDACodecDriver
 - IOHDACodecFunction@1B,3,1
 - ▼ LPCB@1F
 - AppleLPC
 - pci8086,150@0
 - ▼ pci8086,1e3a@16
 - AppleIntelMEIDriver
 - ▼ PEG0@1
 - ▼ IOPCI2PCIBridge
 - PEG0@0

| Property | Type | Value |
|---------------------------|------------|--|
| AAPL,gray-page | Data | <01 00 00 00> |
| AAPL,gray-value | Data | <c3 8c 64 00> |
| AAPL,ig-platform-id | Data | <0a 00 66 01> |
| AAPL,iokit-ndrv | Data | <20 bd db 80 7f ff ff ff> |
| acpi-device | String | IOACPIPlatformDevice is not serializable |
| acpi-path | String | IOACPIPlane:/_SB/PCI0@0/GFX0@20000 |
| assigned-addresses | Data | <10 10 00 82 00 00 00 00 00 00 80 f7 00 00 00 00 00 00 40 00 18 10 00 c2 0f 00 00 00 00 00 00 20 00 00 00 00 00 00 10 20 10 00 81 00 00 00 00 00 f0 00 00 00 00 00 00 40 00 00 00> |
| attached-gpu-control-path | String | IOService:/AppleACPIPlatformExpert/PCI0@0/AppleACPIPCI/GFX0@2/AppleIntelFramebuffer@0/AGPM |
| built-in | Data | <00> |
| class-code | Data | <00 00 03 00> |
| compatible | Data | <"pci1043,84ca", "pci8086,166", "pci-class,030000"> |
| device-id | Data | <66 01 00 00> |
| hda-gfx | Data | <"onboard-1"> |
| IODeviceMemory | Array | 3 values |
| IOHibernateState | Data | <00 00 00 00> |
| IOInterruptControllers | Array | 2 values |
| IOInterruptSpecifiers | Array | 2 values |
| IOName | String | display |
| IOPCIMSIMode | Boolean | True |
| IOPCIResourced | Boolean | True |
| IOPowerManagement | Dictionary | 3 values |
| model | Data | <"Intel HD Graphics 4000"> |
| name | String | display |
| pcidebug | String | 0:2:0 |
| reg | Data | <00 10 00 00 00 00 00 00 00 00 00 00 00 00 00 00 10 10 00 02 00 00 00 00 00 00 00 00 00 00 00 00 00> |

4. Verify MEIDriver (6 and 7 Series only)
- 4a. IOReg/Search MEI, Select MEI Cancel Search (X), Scroll up
- 4b. Example: MEI device_id 3a1e

The screenshot shows the IORegistry Explorer window with the search bar set to "IOService". The selected device is "pci8086,1e3a@16". The left pane shows a tree view of the device's hierarchy, including "AppleIntelMEIDriver", "PEG0@1", "IOPCI2PCIBridge", "PEGP@0", "AMD6000Controller", "AMDBarbGraphicsAccelerator", "AMDAccel2DContext", "AMDAccelDevice", "AMDAccelSharedUserClient", "AMDR8xxGLContext", "AMDSupport", "ATY,Duckweed@0", "ATIFramebufferNI", "AGPM", "gpu-control", "AMDNDRVService", "AppleMCCSControlModule", "AppleMCCSParameter...", "AppleUpstreamUserClient...", "IOFramebufferI2CInterface", "IOFramebufferUserClient", "ATY,Duckweed@1", "ATIFramebufferNI", "AMDNDRVService", "AppleMCCSControlModule", "AppleMCCSParameter...", "AppleUpstreamUserClient...", "IOFramebufferI2CInterface", "IOFramebufferUserClient", "ATY,Duckweed@2", and "ATIFramebufferNI".

The right pane shows the properties of the selected device:

| Property | Type | Value |
|------------------------|------------|--|
| acpi-pmcap-offset | Number | 0x50 |
| assigned-addresses | Data | <10 b0 00 82 00 00 00 00 00 b0 f3 f7 00 00 00 00 10 00 00 00> |
| class-code | Data | <00 80 07 00> |
| compatible | Data | <"pci1043,84ca", "pci8086,1e3a", "pciclass,078000"> |
| device-id | Data | <3a 1e 00 00> |
| IODeviceMemory | Array | 1 value |
| IOInterruptControllers | Array | 2 values |
| IOInterruptSpecifiers | Array | 2 values |
| IOName | String | pci8086,1e3a |
| IOPCIMSI Mode | Boolean | True |
| IOPCIResourced | Boolean | True |
| IOPowerManagement | Dictionary | 3 values |
| name | String | pci8086,1e3a |
| pcidebug | String | 0:22:0 |
| reg | Data | <00 b0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 10 b0 00 02 00 00 00 00 00 00 00 00 00 00 00 10 00 00 00> |
| revision-id | Data | <04 00 00 00> |
| subsystem-id | Data | <ca 84 00 00> |
| subsystem-vendor-id | Data | <43 10 00 00> |
| vendor-id | Data | <86 80 00 00> |

5. Verify HDEF
- 5a. IOReg/Search HDEF, Select HDEF, Cancel Search (X), Scroll up
- 5b. Example: HDEF/layout-id 0x00 0x00 0x00 0x00 (not valid)

The screenshot shows the IORegistry Explorer window with the search bar set to "IOService". The selected device is "HDEF@1B". The left pane shows a tree view of the device's hierarchy, including "GLAN@19", "AppleIntelE1000e", and "en0".

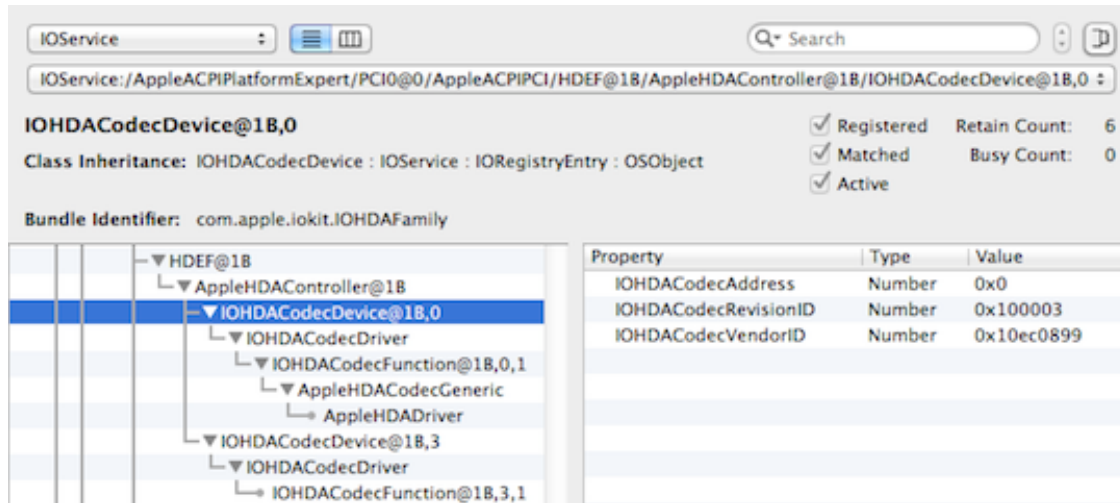
The right pane shows the properties of the selected device:

| Property | Type | Value |
|-------------|--------|-----------------------------|
| acpi-device | String | IOACPIPlatformDevice is not |

| | |
|--|--|
| <ul style="list-style-type: none"> IONetworkStack <ul style="list-style-type: none"> IONetworkStackUserClient | |
| <ul style="list-style-type: none"> <ul style="list-style-type: none"> HDEF@18 <ul style="list-style-type: none"> AppleHDAController@18 <ul style="list-style-type: none"> IOHDACodecDevice@18,0 <ul style="list-style-type: none"> IOHDACodecDriver <ul style="list-style-type: none"> IOHDACodecFunction@18,0,1 <ul style="list-style-type: none"> AppleHDACodecGeneric <ul style="list-style-type: none"> AppleHDAADriver IOHDACodecDevice@18,3 <ul style="list-style-type: none"> IOHDACodecDriver <ul style="list-style-type: none"> IOHDACodecFunction@18,3,1 LPC@1F <ul style="list-style-type: none"> AppleLPC pci8086,150@0 pci8086,1e3a@16 <ul style="list-style-type: none"> AppleIntelMEIDriver PEG0@1 <ul style="list-style-type: none"> IOPCI2PCIBridge <ul style="list-style-type: none"> PEGP@0 <ul style="list-style-type: none"> AMD6000Controller AMDGraphicsAccelerator <ul style="list-style-type: none"> AMDAccel2DContext AMDAccel2DContext AMDAccel2DContext AMDAccel2DContext AMDAccelDevice AMDAccelDevice AMDAccelSharedUserClient AMDR8xxGLContext AMDSupport ATI,Duckweed@0 <ul style="list-style-type: none"> ATIFramebufferNI <ul style="list-style-type: none"> AGPM <ul style="list-style-type: none"> gpu-control AMDNDRVService AppleMCCSControlModule <ul style="list-style-type: none"> AppleMCCSParameterH... AppleUpstreamUserClient... IOFramebufferI2CInterface IOFramebufferUserClient ATI,Duckweed@1 <ul style="list-style-type: none"> ATIFramebufferNI <ul style="list-style-type: none"> AMDNDRVService AppleMCCSControlModule <ul style="list-style-type: none"> AppleMCCSParameterH... AppleUpstreamUserClient... IOFramebufferI2CInterface IOFramebufferUserClient ATI,Duckweed@2 <ul style="list-style-type: none"> ATIFramebufferNI <ul style="list-style-type: none"> AMDNDRVService AppleMCCSControlModule <ul style="list-style-type: none"> AppleMCCSParameterH... AppleUpstreamUserClient... IOFramebufferI2CInterface IOFramebufferUserClient | |

| | | |
|------------------------------|------------|--|
| acpi-path | String | serializable
IOACPIPlane:/_SB/
PCI0@0/
HDEF@1b0000 |
| acpi-pmcap-offset | Number | 0x50 |
| assigned-addresses | Data | <10 d8 00 82
00 00 00 00
00 00 f3 f7
00 00 00 00
00 40 00 00> |
| built-in | Data | <00> |
| class-code | Data | <00 03 04 00> |
| compatible | Data | <"pci1043,851f", "
pci8086,1e20", "pc
iclass,040300"> |
| device-id | Data | <20 1e 00 00> |
| IODeviceMemory | Array | 1 value |
| IOInterruptControllers | Array | 2 values |
| IOInterruptSpecifiers | Array | 2 values |
| IOName | String | pci8086,1e20 |
| IOPCIExpressASPMDefault | Number | 0x0 |
| IOPCIExpressLinkCapabilities | Number | 0x0 |
| IOPCIExpressLinkStatus | Number | 0x0 |
| IOPCIMSI Mode | Boolean | True |
| IOPCIResourced | Boolean | True |
| IOPowerManagement | Dictionary | 3 values |
| layout-id | Data | <00 00 00 00> |
| name | String | pci8086,1e20 |
| pcidebug | String | 0:27:0 |
| reg | Data | <00 d8 00 00
00 00 00 00
00 00 00 00
00 00 00 00
00 00 00 00
10 d8 00 02
00 00 00 00
00 00 00 00
00 00 00 00
00 40 00 00> |
| revision-id | Data | <04 00 00 00> |
| subsystem-id | Data | <1f 85 00 00> |
| subsystem-vendor-id | Data | <43 10 00 00> |
| vendor-id | Data | <86 80 00 00> |

6. Determine motherboard audio codec device_id (Select 2nd line after HDEF)
- 6a. IOREG/AppleHDAController/OHDACodecDevice/IOHDACodecVendorId
- 6a. Example: IOREG/10ec0899



Evaluate HDMI Audio dsdt edit file < IOReg Key Information

1. 7 Series/EFI

| 7 Series EFI | After HDMI Audio Edits | HDMI Audio Edit file | IOReg |
|---------------------|------------------------|------------------------|---------------------|
| layout-id | 0x01, 0x00, 0x00, 0x00 | 0x01, 0x00, 0x00, 0x00 | 0x__ 0x__ 0x__ 0x__ |
| discrete graphics | PEGP@1 | PEGO@1 | @ |
| integrated graphics | IGPU@2 | GFX0@2 | @ |

2. 6 Series/EFI

| 7 Series EFI | After HDMI Audio Edits | HDMI Audio Edit file | IOReg |
|---------------------|------------------------|------------------------|---------------------|
| layout-id | 0x01, 0x00, 0x00, 0x00 | 0x01, 0x00, 0x00, 0x00 | 0x__ 0x__ 0x__ 0x__ |
| discrete graphics | PEGP@1 | PEGO@1 | @ |
| integrated graphics | IGPU@2 | GFX0@2 | @ |

3. 6 Series/BIOS

| 6 Series BIOS | After HDMI Audio Edits | HDMI Audio Edit file | IOReg |
|---------------------|------------------------|------------------------|---------------------|
| layout-id | 0x01, 0x00, 0x00, 0x00 | 0x01, 0x00, 0x00, 0x00 | 0x__ 0x__ 0x__ 0x__ |
| discrete graphics | PEGP@1 | P0P1@1 | @ |
| integrated graphics | IGPU@2 | GFX0@2 | @ |

4. 5 Series/BIOS

| 5 Series BIOS | After HDMI Audio Edits | HDMI Audio Edit file | IOReg |
|-------------------|------------------------|------------------------|---------------------|
| layout-id | 0x01, 0x00, 0x00, 0x00 | 0x01, 0x00, 0x00, 0x00 | 0x__ 0x__ 0x__ 0x__ |
| discrete graphics | PEGP@1 | P0P1@1 | @ |

Edit Desktop/....._hdmi_audio_dsdt_editing_kit/hdmi_audio_ami....txt - TextEdit

1. TextEdit/Edit layout-id/01 to 02 or 03

1a. Audio ID: 1, layout-id 0x01, 0x00, 0x00, 0x00 /* 5/6 port on board and/or AMD/Nvidia HDMI audio

1b. Audio ID: 2, layout-id 0x02, 0x00, 0x00, 0x00 /* 3 port on board and/or AMD/Nvidia HDMI audio

1c. Audio ID: 3, layout-id 0x03, 0x00, 0x00, 0x00 /* onboard and HD3000/HD4000 HDMI audio only

2. TextEdit/Edit (_ADR, 0x00010000) to 0x00020000 or 0x00030000 - if necessary

3. TextEdit/discrete graphics/Find PEG0/Replace (table above)- if necessary

4. TextEdit/integrated graphics/Find GFX0/Replace (table above) - if necessary

5. Verify edits

6. Save

Apply Edits - DSDT Editor

1. DSDT Editor/Open dsdt.aml
 2. DSDT Editor/Patch/Open Desktop/./....._hdmi_audio_dsdt_editing_kit/hdmi_audio_ami....txt
 3. DSDT Editor/Patch/Apply
 4. DSDT Editor/iASL/Compile
- If necessary, Special Configuration/HD4000 graphics on 6 Series or HD3000 graphics on 7 Series
5. DSDT Editor/Patch/Open HD4000 graphics on 6 Series or HD3000 graphics on 7 Series
 - 5a. DSDT Editor/Patch/Apply
 - 5b. DSDT Editor/iASL/Compile

Verify Edits - DSDT Editor

1. DSDT Editor/Find HDEF (1x), represented as Device (HDEF)
2. DSDT Editor/Find PEGP (1x), represented as Device (PEGP)
3. DSDT Editor/Find GFX0 (1x), represented as Device (GFX0)
4. DSDT Editor/Find HDAU (1x), represented as Device (HDAU)
5. DSDT Editor/Find IGPU (1x), Next, until represented as Device (IGPU) - N/A 5 Series dsdt

Save dsdt - DSDT Editor

1. DSDT Editor/iASL/Save .aml As... Desktop/....._hdmi_audio_dsdt_editing_kit/dsdt. aml (add extension)

Install dsdt.aml - DSDT Editor

1. DSDT Editor/iASL/Save .aml As...Extra/dsdt.aml (add extension) Note: may not work.
2. Copy (Drag/Hold Option key) Desktop/....._hdmi_audio_dsdt_editing_kit/dsdt. aml to Extra

Mountain Lion HDMI Audio - Kext Edits

1. No kext edits required (AppleHDA.kext, AppleIntelFramebufferCapri.kext, AppleIntelSNBGraphicsFB.kext)
2. Exception; some unsupported AMD graphics may required framebuffer edits, see Lion HDMI Audio - Part 3a: Kext Edits - AMD (Mountain Lion procedure same as Lion)

Lion HDMI Audio - Kext Edits

1. Lion HDMI Audio - Part 3a: Kext Edits - AMD
2. Lion HDMI Audio - Part 3b: Kext Edits - Nvidia
3. Lion HDMI Audio - Part 3c: Kext Edits - Intel HD3000 Revised

Verify S/L/E and org.chameleon.Boot.plist

1. Delete any and all audio enablers (HDAEnabler8??), helpers (ALC8??), etc.; AppleHDA.kext only.
2. Delete any and all graphics enablers and property injectors. DSDT injection only.

Restart

Verify HDMI Audio

1. System Preferences/Sound/Outputs



Troubleshooting

1. Verify HDMI device connected
 - 1a. System Information/Graphics/Display/HDMI device name/Television/Yes
2. Verify Extra/dsdt.aml is
 - 2a. a .aml file
 - 2b. edited

3. Run IOREg
- 3a. Verify Devices (see **Verify Edits - DSDT Editor** above)
4. Problem Reporting
- 4a. Motherboard/processor/OS and version/graphics
- 4b. Procedure/Guide Used
- 4c. dsdt
- 4d. copy of IOREg

Notes

1. For Lion AppleHDA.kext (10.7.4, v2.2.0) Audio IDs see Optimized Realtek Lion 10.7.4 AppleHDA

dsdt Edits

1. HDEF

Device (HDEF)

```
{
    Name (_ADR, 0x001B0000)
....
....
    Method (_DSM, 4, NotSerialized)
    {
        Store (Package (0x06)
            {
                "hda-gfx",
                Buffer (0x0A)
                {
                    "onboard-2"
                },

                "layout-id",
                Buffer (0x04)
                {
                    0x01, 0x00, 0x00, 0x00
                },

                "PinConfigurations",
                Buffer (Zero) {}
            }, Local0)
        DTGP (Arg0, Arg1, Arg2, Arg3, RefOf (Local0))
        Return (Local0)
    }
}
```

2a. IGPU - HD4000 (renamed from GFX0)

Device (IGPU)

```
{
    Name (_ADR, 0x00020000)
....
....
    Method (_DSM, 4, NotSerialized)
    {
        Store (Package (0x06)
            {
                "device-id",
                Buffer (0x04)
                {
                    0x66, 0x01, 0x00, 0x00
                },
            },
```

```

        "AAPL,ig-platform-id",
        Buffer (0x04)
        {
            0x0A, 0x00, 0x66, 0x01
        },

        "hda-gfx",
        Buffer (0x0A)
        {
            "onboard-2"
        }
    }, Local0)
    DTGP (Arg0, Arg1, Arg2, Arg3, RefOf (Local0))
    Return (Local0)
}
}

```

2a. IGPU - HD3000 (renamed from GFX0) - N/A 5 Series dsdt

```

Device (IGPU)
Name (_ADR, 0x00020000)
Method (_DSM, 4, NotSerialized)
{
    Store (Package (0x06)
        {
            "device-id",
            Buffer (0x04)
            {
                0x26, 0x01, 0x00, 0x00
            },

            "AAPL,snb-platform-id",
            Buffer (0x04)
            {
                0x10, 0x00, 0x03, 0x00
            },

            "hda-gfx",
            Buffer (0x0A)
            {
                "onboard-2"
            }
        }, Local0)
    DTGP (Arg0, Arg1, Arg2, Arg3, RefOf (Local0))
    Return (Local0)
}

```

3. PEGP renamed from PEG0, P0P1, etc.

```

Device (PEGP)
{
    Name (_ADR, 0x00010000) /* Verify display address in IOReg
.
.
    }
.
.
}

```

4. GFX0

```
Device (GFX0)
{
    Name (_ADR, Zero)
    Name (_SUN, One)
    Method (_DSM, 4, NotSerialized)
    {
        Store (Package (0x06)
        {
            "@0,connector-type",
            Buffer (0x04)
            {
                0x00, 0x08, 0x00, 0x00
            },

            "@1,connector-type",
            Buffer (0x04)
            {
                0x00, 0x08, 0x00, 0x00
            },

            "hda-gfx",
            Buffer (0x0A)
            {
                "onboard-2"
            }
        }, Local0)
        DTGP (Arg0, Arg1, Arg2, Arg3, RefOf (Local0))
        Return (Local0)
    }
}
```

5. HDAU

```
Device (HDAU)
{
    Name (_ADR, One)
    Method (_DSM, 4, NotSerialized)
    {
        Store (Package (0x02)
        {
            "hda-gfx",
            Buffer (0x0A)
            {
                "onboard-2"
            }
        }, Local0)
        DTGP (Arg0, Arg1, Arg2, Arg3, RefOf (Local0))
        Return (Local0)
    }
}
```

Credits:

VCH888; [ALC889A, Gigabyte \(Intel\): now having a working front mic - insanely-mac Forum - Page 38](#)

MaLdOn/oldnapalm/cassio: [olarila.com • View topic - DSDT editor and patcher](#)

proteinshake: [HD4000 full acceleration for 10.8 / 10.7.5 - InsanelyMac Forum](#)