AMD HDMI Audio

Intel chipsets, 5 Series and Newer
1. AMI UEFI, 2. AMI BIOS or 3. Award BIOS

v3: 9/10/2015 - Initial Release

OS X HDMI audio for AMD graphics cards with dsdt edits or HDMI audio ssdts. With appropriate HDMI audio exist (dsdt or ssdt), OS X natively supports AMD HDMI audio with a few graphics cards (ex., Sapphire Vapor-X HD5870, Sapphire Vapor-X HD6870). Most AMD graphics cards require identifying a working framebuffer and editing the framebuffer to get all connectors working and enable HDMI audio. Note, a solution that works on a specific graphics will likely not work with the same graphics card from a different manufacturer (different VBIOS).

Before Starting
1. OS X does not provide HDMI audio controls
   a. No volume, no mute, no balance, etc.
2. The connected HDMI device provides audio control
   a. TV, receiver, etc.
3. Audio enabler kext disables HDMI audio
   a. Remove System/Library/Extension (S/L/E)
      i. S/L/E/HDAEnabler1.kext (if present)
      ii. S/L/E/HDAEnabler2.kext (if present)
4. Make a bootable backup of your system (CarbonCopyCloner/

SuperDuper)

Step 1: AMD HDMI Audio kext edits
1. Default framebuffer, no edits
2. Framebuffer injection, edits likely required, see below

Step 2: OS X/AMD HDMI Audio
1. Verify motherboard OS X HDMI Audio installed (choose 1 method)
   a. **dsdt edits**: [Guide]-OSX-hdmi_audio-hdef_audio-dsdt_v3.pdf.zip
      i. Prerequisite, HDxxxx-AMD-Nvidia dsdt edits present
         - Confirm with Debug info at end of dsdt
      ii. MaciASL/Source/+/
         - https://raw.github.com/toleda/audio_hdmi_amd-nvidia/master
      iii. MaciASL/Patches (subject to change)
         - AMD-fb_default-PEG0
         - AMD-fb_injection-PEG0 (patch/edit required)
         - AMD-fb_default-PEGP
         - AMD-fb_injection-PEGP (patch/edit required)
      iv. MaciASL/Patches/AMD-fb_injection- (patch edits/ required info)
         - device_id
         - model
         - framebuffer
         - number of connectors
         - Screenshot
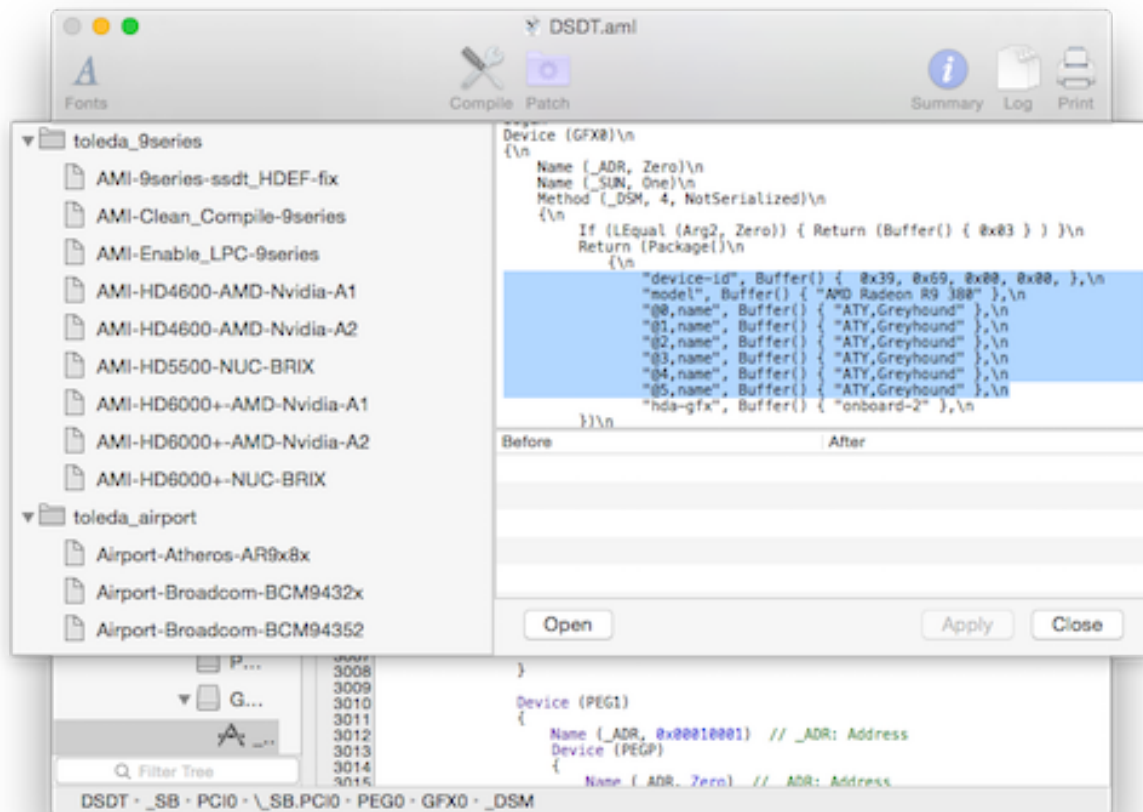
     v.   MaciASL (see a. dsdt edits, above)
- Apply
- Close
- Compile
- Save As/DSDT.aml/Format: ACPI Machine language Binary
- Install

b. **ssdt/hdmi**: [Guide]-OSX-hdmi_audio-hdef_audio-ssdt_v3.pdf.zip
     i.   Determine display device name (subject to change)
- NPE3
- P0P1
- P0P2
- PEG0
     ii.   AMD-default-display device name
- ssdt_hdmi-amd
- Install (Instructions included with Download)
- Jump to 3. Restart

iii. AMD-fb_injection-display device name (MaciASL)
- ssdt_hdmi-amd/fb_injection
- Download
- MaciASL/Open
- AMD-fb_injection- (ssdt edits/required info, as above)
- Screenshot
-
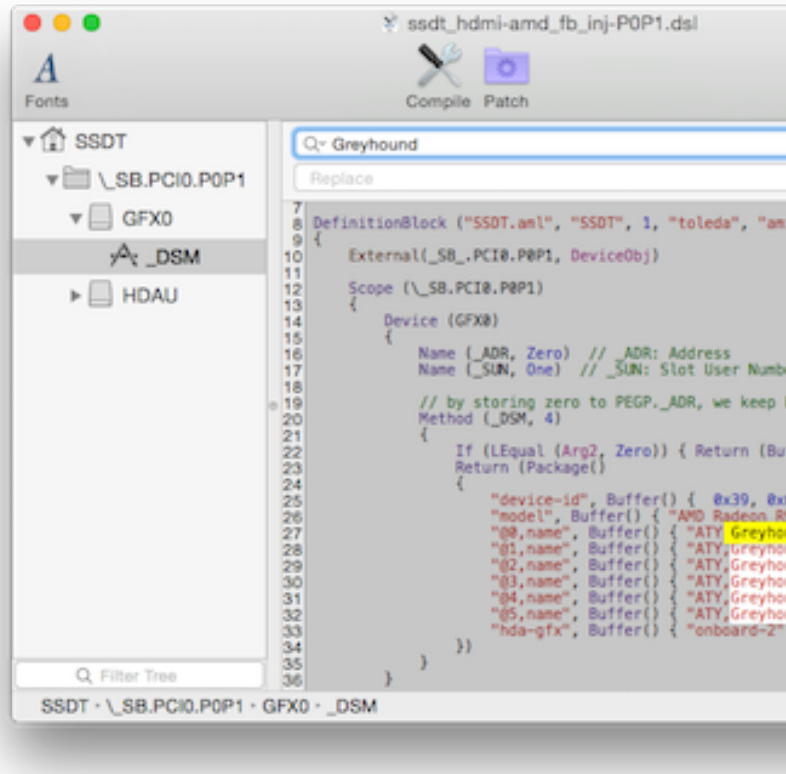
- MaciASL/Compile
- MaciASL/Save As/SSDT-2.aml/Format: ACPI Machine language Binary
- Screenshot
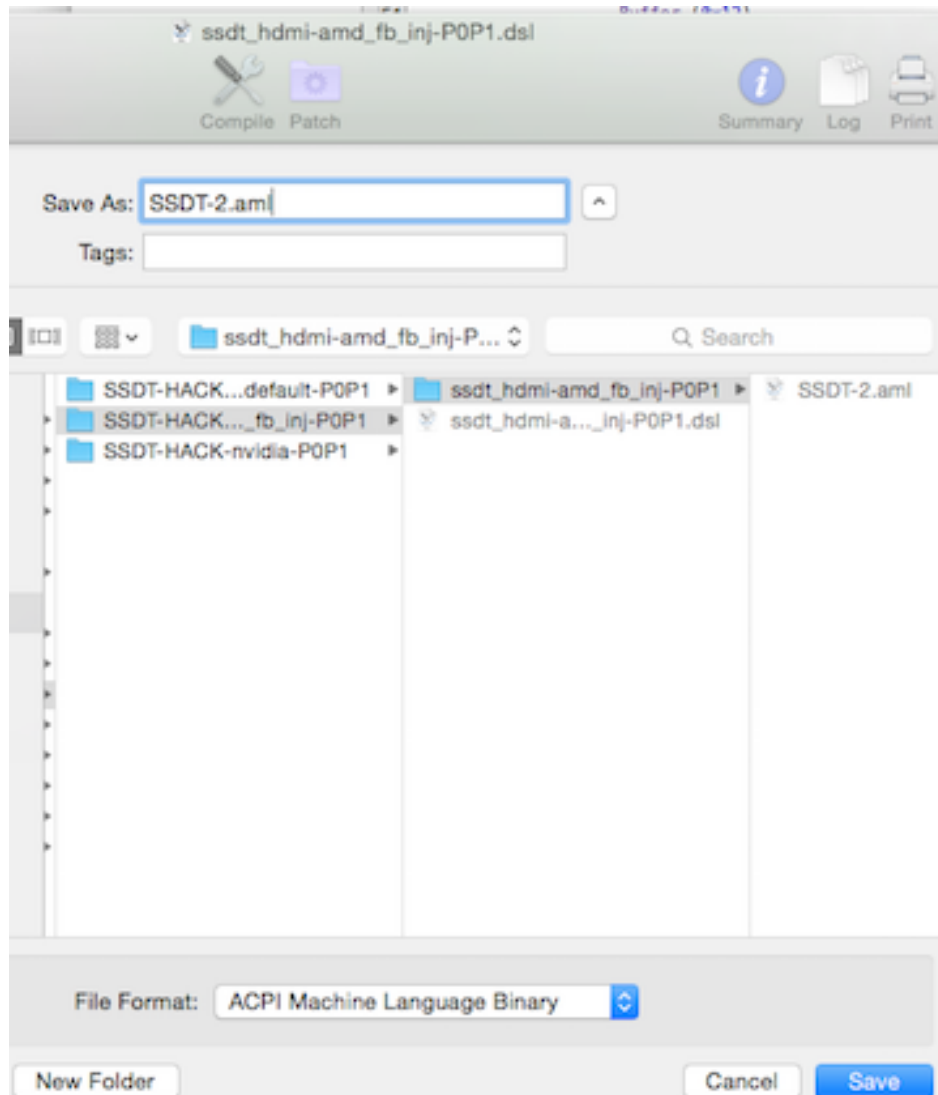
-
- Install (Instructions included with Download)
2. Framebuffer injection, Clover/kext edits
   a. Framebuffer injection
      i. Working framebuffer (video)
         - Radeon Compatibility Guide - ATI/AMD Graphics Cards
         - ATI/AMD 5xxx & 6xxx Graphics Cards Framebuffer Personalities
      ii. edit dsdt/ssdt
   b. Framebuffer edits (HDMI audio)
      i. Working connectors (edit connector for VBIOS sense_id)
         - Editing custom personalities for ATI Radeon HD[45]xxx - ATi - InsanelyMac Forum)

ii. Chameleon/Chimera: install S/L/E
　　　　　- 　edited AMD....Controller.kext
　　　iii. Clover: edit config.plist/KernelAndKextPatches
　　　　　- 　KextsToPatch/AMD....Controller binary
　　c. Rebuild kernel cache
3. Restart

Step 3: Verify AMD HDMI Audio (Ex., HDMI/DP/AirPlay Audio enabled)
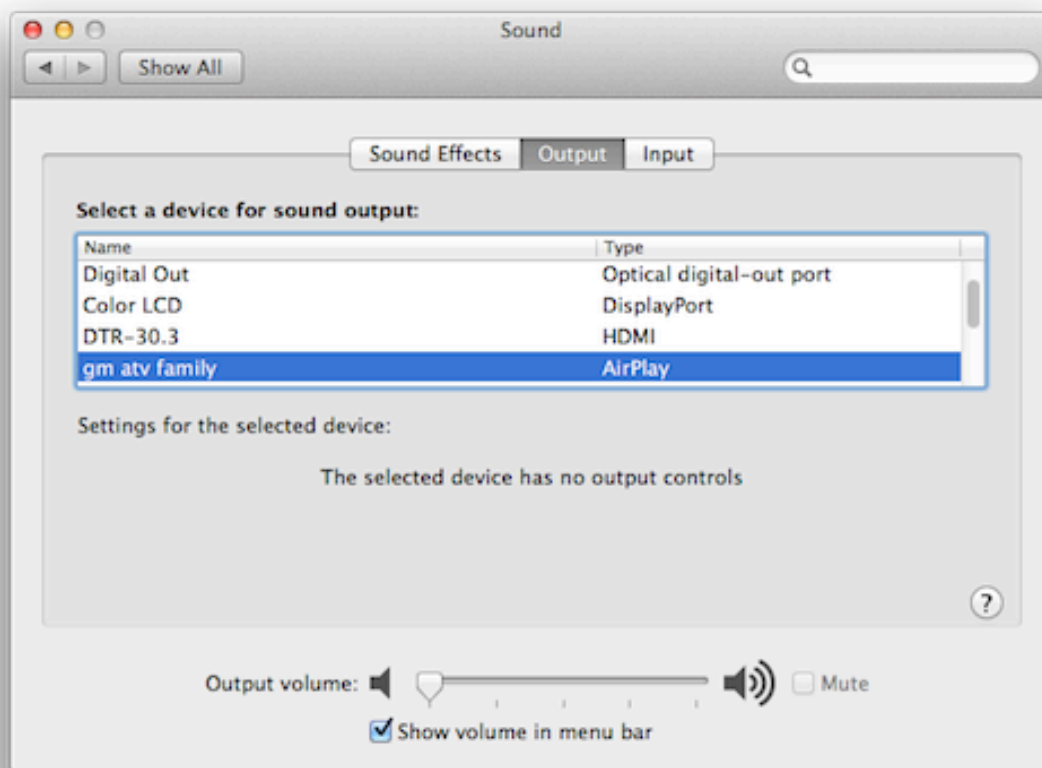
Requirements
1. OS X 10.6.5 and newer with either
　　a. patched AppleHDA.kext
　　b. native AppleHDA.kext
2. Intel chipsets: 5 Series and newer, all flavors
　　a) AMI EUFI
　　b) AMI BIOS
　　c) Award BIOS

3. OS X HDMI audio support with
   a. AMD HD 5xxx, HD 6xxx, HD 7xxx, R7/R9 2xx, R7/R9 3xx
4. Configurations supported
   a. All desktop
   b. Some Laptop
5. Motherboard audio codecs
   a. Supported: ALC885, ALC887, ALC888, ALC892, ALC898 and ALC1150
   b. Unsupported audio codec/HDMI audio only
6. Audio ID, select one
   a. 1 - 3, 5, 6 port motherboard audio (-A1)
   b. 2 - 3 (5.1) port motherboard audio (-A2)
   c. 3 - 3, 5, 6 port motherboard audio (-A3)
      i. with HD3000/HD4000 HDMI audio only
   d. 1 - Native AppleHDA.kext (w/unsupported audio codec)

OS X/AMD HDMI Audio
1. AMD HD5xxx/HD6xxx/HD7xxx/R7/R9 (framebuffer injection/ editing may be required)
   a. Framebuffers, see [ATI/AMD 5xxx & 6xxx Graphics Cards Framebuffer Personalities,](#)
   b. Framebuffer edits,
      i. [Lion HDMI Audio - Part 3a: Kext Edits - AMD](#)
      ii. [Editing custom personalities for ATI Radeon HD[45]xxx - ATi - InsanelyMac Forum)](#)
   c. DP audio supported
   d. DVI audio not supported
2. Supported Configurations (OS X HDMI Audio)
   a. AMD only
   b. Intel IGFX and AMD
3. Case Studies
   a. [Case_Studies]_AMD-HD7xxx_HDMI_Audio_v2.pdf.zip
   b. [Case_Studies]_AMD-HD5xxx-HD6xxx_HDMI_Audio_v2.pdf.

dsdt/ssdt edits
```
      Device (PEGP)  // Rename
      {
        Name (_ADR, 0x00010000)
1.      Device (GFX0)
        {
          Name (_ADR, Zero)
```

```
            Name (_SUN, One)
            Method (_DSM, 4, NotSerialized)
            {
               If (LEqual (Arg2, Zero))
               {
                  Return (Buffer (One)
                  {
                      0x03
                  })
               }

               Return (Package (0x02)
               {
                  "hda-gfx",
                  Buffer (0x0A)
                  {
                      "onboard-2"
                  }
               })
            }
        }

2.      Device (HDAU)
        {
            Name (_ADR, One)
            Method (_DSM, 4, NotSerialized)
            {
               If (LEqual (Arg2, Zero))
               {
                  Return (Buffer (One)
                  {
                      0x03
                  })
               }

               Return (Package (0x04)
               {
                  "layout-id",
                  Buffer (0x04)
                  {
                      0x01, 0x00, 0x00, 0x00
```

```
                },

                "hda-gfx",
                Buffer (0x0A)
                {
                    "onboard-2"
                }
            })
        }
      }
    }
  }


3. Framebuffer Injection (Sapphire HD 7750 Low Profile)
   Device (GFX0)
   {
       Name (_ADR, Zero)
       Name (_SUN, One)
       Method (_DSM, 4, NotSerialized)
       {
           If (LEqual (Arg2, Zero))
           {
               Return (Buffer (One)
               {
                   0x03
               })
           }

           Return (Package (0x10)
           {
               "AAPL,slot-name",
               Buffer (0x07)
               {
                   "Slot-1"
               },

               "device-id",
               Buffer (0x04)
               {
                   0x3F, 0x68, 0x00, 0x00
```

```
        },

        "@0,name",
        Buffer (0x0E)
        {
            "ATY,Dashimaki"
        },

        "@1,name",
        Buffer (0x0E)
        {
            "ATY,Dashimaki"
        },

        "@2,name",
        Buffer (0x0E)
        {
            "ATY,Dashimaki"
        },

        "@3,name",
        Buffer (0x0E)
        {
            "ATY,Dashimaki"
        },

        "model",
        Buffer (0x13)
        {
            "AMD Radeon HD 7750"
        },

        "hda-gfx",
        Buffer (0x0A)
        {
            "onboard-2"
        }
    })
    }
}
```

Tools
1. IORegistryExplorer (select one)
    1. IORegistryExplorer_v2.1.zip (View Raw)
    2. IOJones Download
2. DPCIManager

Troubleshooting
1. Verify HDMI device connected
    a. System Information/Graphics/Display/HDMI device/ Television/Yes
2. Run IOReg/IOJones/Verify Devices HDEF and GFX0 (native/PEGP)
    a. Ex. IOReg/Search: HDEF
    b. Select HDEF
    c. Cancel Search (x)
    d. Scroll up to view HDEF device and properties
3. IOReg/IOJones/Verify HDEF@1B
    a. If Credits, delete S/L/E/HDAEnabler1.kext or HDAEnabler2.kext
    b. Verify layout-id is 1, 2 or 3 (i.e., <01 00 00 00>)
    c.

```
IOService              ⇕  ☰ ▥              Q▾ Search              ⋮ ⬚

IOService:/AppleACPIPlatformExpert/PCI0@0/AppleACPIPCI/HDEF@1B        ⋮

HDEF@1B

Class        IOPCIDevice : IOService : IORegistryEntry : OSObject    ☑ Registered    Retain Count:  10
                                                                     ☑ Matched       Busy Count:    0
Bundle       com.apple.iokit.IOPCIFamily                             ☑ Active
```

Property	Type	Value
Credits	**String**	2008 (c) Kabyl/ Taruga
subsystem-vendor-id	Data	<58 14 00 00>
IOPCIMSIMode	Boolean	True
▶ IOInterruptControllers	Array	2 values
name	Data	<"pci8086,1e20">
vendor-id	Data	<86 80 00 00>
IOPCIResourced	Boolean	True
acpi-pmcap-offset	Number	0x50
IOPCIExpressASPMDefault	Number	0x0
device-id	Data	<20 1e 00 00>
compatible	Data	<"pci1458,a002", "pci8086,1e20", "pciclass,040300", "HDEF">
layout-id	Data	<02 00 00 00>
IOPCIExpressLinkCapabilities	Number	0x0
acpi-path	String	IOACPIPlane:/_SB/ PCI0@0/ HDEF@1b0000
subsystem-id	Data	<02 a0 00 00>
revision-id	Data	<04 00 00 00>
IOPCIExpressLinkStatus	Number	0x0

Tree:
```
└─▼ HDEF@1B
   └─▼ AppleHDAController@1B
      └─▼ IOHDACodecDevice@1B,2
         └─▼ IOHDACodecDriver
            └─▼ IOHDACodecFunction@1B,2,1
               └─▼ AppleHDACodecGeneric
                  └─▼ AppleHDADriver
                     ├─▼ AppleHDAEngineInput@...
                     │  └→ AppleHDAStream
                     ├─→ IOAudioEngineUserCl...
                     ├─→ IOAudioEngineUserCl...
                     ├─→ IOAudioEngineUserCl...
                     ├─→ IOAudioEngineUserCl...
                     ├─→ IOAudioEngineUserCl...
                     ├─▼ IOAudioLevelControl
                     │  └→ IOAudioControlUs...
                     ├─▼ IOAudioLevelControl
                     │  └→ IOAudioControlUs...
                     ├─▼ IOAudioSelectorControl
                     │  └→ IOAudioControlUs...
                     └─▼ IOAudioToggleControl
                        ├─→ IOAudioControlUs...
                        ├─→ IOAudioControlUs...
                        └─→ IOAudioControlUs...
```

4. IOReg/IOJones/Verify PEGP@1/GFX0@0 (or native PEG0@1/ PEGP@0)
   a. Verify hda-gfx = <"onboard-2">
   b. If injection missing, see dsdt/ssdt HDMI audio edits
   c.

IOService ▾	☰ ▥		Q▾ Search	⬍ 🗐

IOService:/AppleACPIPlatformExpert/PCI0@0/AppleACPIPCI/P0P2@1/IOPP/PEGP@0 ⬍

PEGP@0

Class	IOPCIDevice : IOService : IORegistryEntry : OSObject	☑ Registered	Retain Count: 27
		☑ Matched	Busy Count: 0
Bundle	com.apple.iokit.IOPCIFamily	☑ Active	

	Property	Type	Value
↳ IOAudioEngine...			01 00 00 00
↳ IOAudioEngine...			03 00 00 00
↳ IOAudioEngine...			04 00 00 00>
↳ IOAudioEngine...	PP_DALPowerLevel	Number	0x1
▼ IOAudioSelecto...	**hda-gfx**	**Data**	**<"onboard-2">**
↳ IOAudioCon...	pci-bus-number	Number	0x1
↳ IOAudioCon...	ATY,vram_base	Data	<00 00 00 00>
↳ IOAudioCon...	▶ IOInterruptSpecifiers	Array	2 values
↳ IOAudioCon...	CFG_USE_FBC	Boolean	False
↳ IOAudioCon...	PP_DisableSMUUVDHands...	Number	0x0
▼ PEGP@0	revision-id	Data	<00 00 00 00>
↳ AMD7000Controller@6	PP_HighSamplingInterval	Number	0x30d40
↳ AMDSupport	acpi-pmcap-offset	Number	0x50
▼ AMDVerdeGraphicsAccelerator	IOPCIPMCSState	Number	0x0
↳ AMDRadeonX4000_AMDAccel2D...	CFG_FB_LIMIT	Number	0x0
↳ AMDRadeonX4000_AMDAccel2D...	ATIFEDSInfo2	Data	<06 00 00 00
↳ AMDRadeonX4000_AMDAccel2D...			00 00 00 00
↳ AMDRadeonX4000_AMDAccel2D...			00 d7 9c 19
↳ AMDRadeonX4000_AMDAccelDevice			80 ff ff ff>
↳ AMDRadeonX4000_AMDAccelDevice	IOHibernateState	Data	<00 00 00 00>
↳ AMDRadeonX4000_AMDAccelDevice	HDCPLIB_VERSION	Data	<"1.313">
↳ AMDRadeonX4000_AMDAccelDevice	PP_PowerGatingDisable	Number	0x0
↳ AMDRadeonX4000_AMDAccelDevice	IOPMIsPowerManaged	Boolean	True

5. IOReg/IOJones/Verify NVDA, Display-... (find display0 attached)
   a. Verify connector-type=<00 08 00 00>
   b. If wrong connector-type, see dsdt/ssdt HDMI audio edits

c.

6. IOReg/IOJones/Verify PEGP@1/HDAU@0
   a. Verify hda-gfx = <"onboard-2">
   b. If injection missing, see dsdt/ssdt HDMI audio edits
   c.
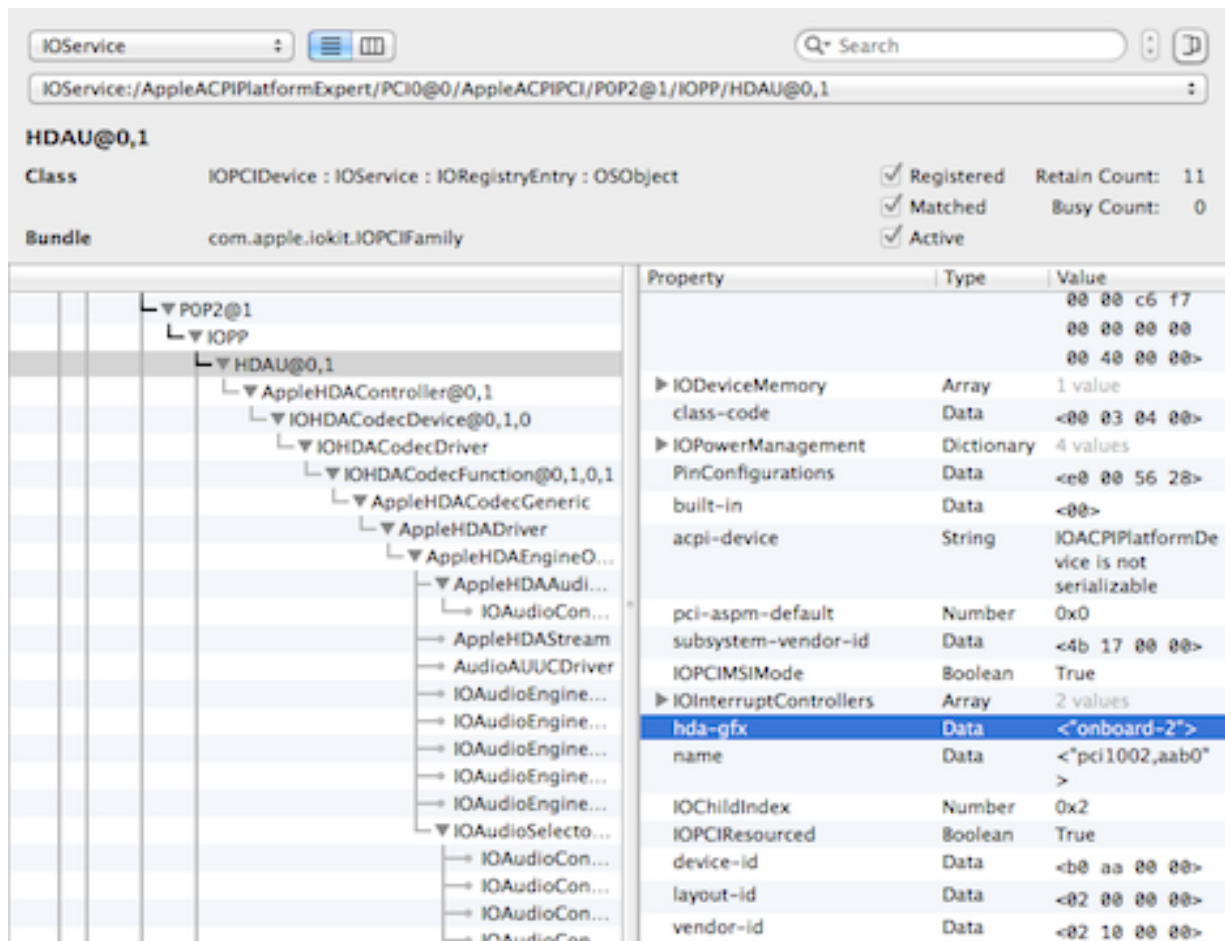
Problem Reporting (include the following information)
1. Description of HDMI audio problem
2. OS X version/motherboard model/BIOS version/processor/ graphics
3. Procedure/Guide Used
4. Copy of IORegistryExplorer/IOJones (either)
   a. IOReg/File/Save a Copy As…, verify file (no ioreg.txt, screenshots)
   b. IOJones/File/Save...
5. Copy Of Console/All Messages (last boot)
   a. Console/File/Save a Copy As...
6. System/Library/Extensions/AppleHDA.kext
7. Chimera/Chameleon
   a. Extra/org.chameleon.Boot.plist
   b. DPCIManager/Misc/Boot Log
   c. Extra/dsdt.aml (if installed)
   d. Extra/ssdt.aml

8. Clover
    a. EFI/CLOVER/config.plist
    b. EFI/CLOVER/misc/debug.log (Set config.plist/Boot/Debug/YES)
        i. or DPCIManager/Misc/Boot Log
    c. EFI/CLOVER/ACPI/Patched/dsdt.aml (if installed)
    d. EFI/CLOVER/ACPI/Patched/ssdt.aml

Credit:
VCH888: ALC889A, Gigabyte (Intel): now having a working front mic - Page 38 - Sound - InsanelyMac Forum