HD5x0 HDMI Audio
Skylake/100 Series/Socket 1151: Desktop/Laptop/NUC/BRIX

v1.1: 4/22/2016 - HD530 Update
v1: 4/10/2016 - Initial release

OS X HDMI audio for HD5x0 systems with either: 1. Clover enabled HDMI audio or 2. HDMI audio ssdt (any bootloader). Laptops, use NUC-BRIX Clover/ssdts.

Requirements
1. OS X 10.11.4 and newer
2. AMI UEFI/Skylake/100 Series/Socket 1151 Intel motherboard
3. HD5x0 graphics, recognized and enabled
4. 100 Series Desktop/Laptop/NUC/BRIX configurations supported
5. 100 Series motherboard audio codecs
   a. Supported: ALC283, ALC887, ALC892 and ALC1150
   b. Unsupported audio codec/HDMI audio only
6. Audio ID: 3 only
   a. 3 - HD5x0/HD4000/HD300 HDMI audio
      - 3, 5, 6 port motherboard audio (-A3)
      - Orange port removed (no 5.1 analog)
      - Supports 1x HDMI or DP device

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
3. Make a bootable backup of your system (CarbonCopyCloner/ SuperDuper)

Tools
1. IORegistryExplorer_v2.1.zip (View Raw)
2. DPCIManager
3. MaciASL
4. Xcode on the Mac App Store

OS X/HD5x0 HDMI Graphics and Audio
1. HD5500 (no native HDMI audio support, framebuffer edits required)
    a. HDMI display (SKL framebuffer 0x00001219 or 0x0002619)
        i. AppleIntelFramebuffer@0, Port 0x5/DP
        ii. AppleIntelFramebuffer@1, Port 0x6/DP
        iii. AppleIntelFramebuffer@2, Port 0x7/DP (0x00002619 N/A)
    b. DP audio supported
    c. DVI audio supported
    d. Three displays supported, one with HDMI audio
        i. DP
        ii. DVI (w/DVI2HDMI adapter)
        iii. HDMI
2. Supported Configurations (OS X HDMI Audio)
    a. HD5x0 only
    b. Nvidia only
    c. AMD only
    d. HD5x0 and Nvidia
    e. HD5x0 and AMD

HD5x0 HDMI Audio Installation

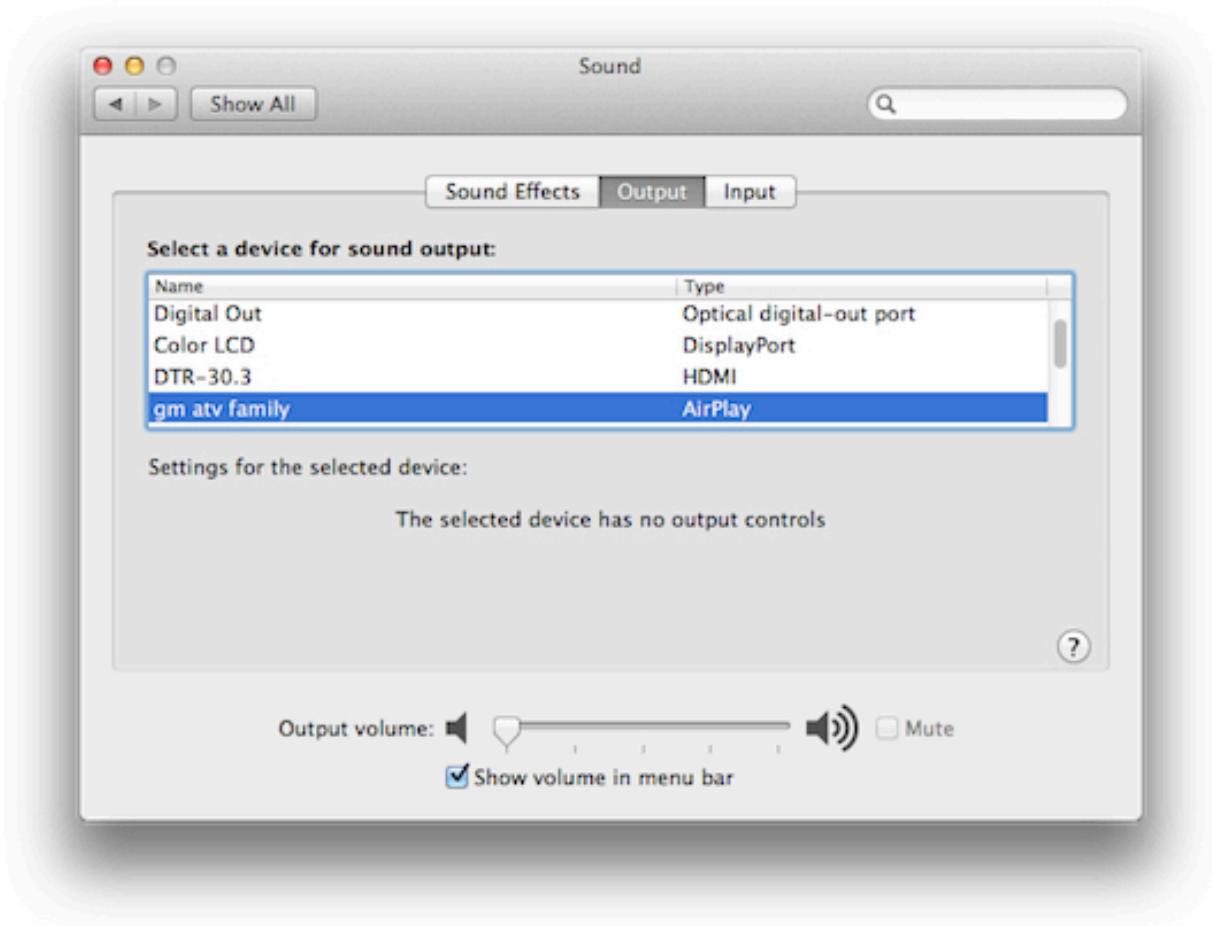**Step 1: HD5x0 HDMI Audio kext edits** (see Step 2/Clover)
1. AppleIntelSKLGraphicsFramebuffer.kext (select one)
   a. HD530 Only (copy and paste to config.plist)
      i. config-hdmi_hd5x0-110.plist (config.plist/ KernelAndKextPatches/KextsToPatch)
         - 10.11.4+-SKL-1912000-4_displays

Step 2: OS X HDMI Audio Guides- select Clover or ssdt
1. Clover:
   a. config-hdmi_hd5x0-110.plist
      i. Use Xcode, plist editor, etc.
      ii. Copy and paste each patch
   b. All Skylake: config.plist/
      i. ACPI/DSDT/Patches
         - 10.8+-Rename-GFX02IGPU
         - 10.11+-Rename-HDAS2HDEF
         - 10.11+-Rename-HECI2IMEI
      ii. Device/Arbitrary/
         - 10.8+-Intel-IGPU-HDMI-HDA
   c. HD530/Desktop: config.plist
      i. Device/Arbitrary/
         - 10.11.4+-Intel-HDA-Desktop
      ii. Graphics/
         - ig-platform-id/19120000 (remove " # HD530")
      iii. KernelAndKextPatches/KextsToPatch
         - 10.11.4+-SKL-1912000-4_displays
         - If no motherboard DP connector, add one HDMI port patch
            - 10.11.4-SKL-1912000-Port_0x5-DP2HDM
            - 10.11.4-SKL-1912000-Port_0x6-DP2HDM
            - 10.11.4-SKL-1912000-Port_0x7-DP2HDM
   d. HD540/NUC: config.plist
      i. Device/Arbitrary/
         - 10.11.4+-Intel-HDA-NUC
      ii. Graphics/
         - ig-platform-id/19260000 (remove " # HD540")

2. ssdt: [Guide]-OSX-hdmi_audio-hdef_audio-ssdt_v3.pdf.zip
   a. ssdt_v3: ssdt_hdmi_hd5x0
      i. ssdt_hdmi-hd530
      ii. ssdt_hdmi-hd540
   b. ssdt - ssdt_hdef (onboard audio, if needed)
      i. ssdt_hdef-3-100-hdas
3. dsdt edits: not available
4. Restart with HDMI device connected

Step 3: Verify HDMI Audio (Ex., HDMI/DP/AirPlay audio enabled)

kext edit (ex.,HD530)
1. AppleIntelSKLGraphicsFramebuffer.kext
   a. HD530 Only
      i. Hex Editor
         - binary: AppleIntelSKLGraphicsFramebuffer
         - find: 01030303
         - repl: 01030403
         - cmt: 10.11.4+-SKL-1912000-4_displays
      ii. Hex Editor (ex., connector edit)
         - binary: AppleIntelSKLGraphicsFramebuffer
         - find: 01050900 00040000 87010000
         - repl: 01050900 00080000 87010000
         - cmt: 10.11.4-SKL-1912000-Port_0x5-DP2HDM

ssdt edit (ex.,HD530)
1. Name (GFX0._STA, Zero)

```
Device (IGPU)
{
    Name (_ADR, 0x00020000)
    Method (_INI, 0, NotSerialized)
    {
        Store (Zero, \_SB.PCI0.GFX0._ADR)
    }

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

        Return (Package (0x04)
        {
            "AAPL,ig-platform-id",
            Buffer (0x04)
            {
                0x00, 0x00, 0x12, 0x19
```

```
        },

            "hda-gfx",
            Buffer (0x0A)
            {
                "onboard-1"
            }
        })
    }
}

2.   Name (HECI._STA, Zero)
     Name (HECI._STA, Zero)
     Device (IMEI)
     {
        Name (_ADR, 0x00160000)
        Method (_INI, 0, NotSerialized)
        {
            Store (Zero, \_SB.PCI0.HECI._ADR)
        }

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

            Return (Package (0x02)
            {
                "device-id",
                Buffer (0x04)
                {
                    0x3A, 0xA1, 0x00, 0x00
                }
            })
        }
```

```
        }

3.    Name (HDAS._STA, Zero)
      Device (HDEF)
      {
         Name (_ADR, 0x001F0003)
         Method (_INI, 0, NotSerialized)
         {
            Store (Zero, \_SB.PCI0.HDAS._ADR)
         }

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

            Return (Package (0x06)
            {
               "hda-gfx",
               Buffer (0x0A)
               {
                   "onboard-1"
               },

               "layout-id",
               Unicode ("\x03"),
               "PinConfigurations",
               Buffer (Zero) {}
            })
         }
      }
```

Troubleshooting

1. Verify HDMI device connected
    a. System Information/Graphics/Display/HDMI device/ Television/Yes
2. Run IOReg/IOJones/Verify Devices HDEF, IGPU (native/GFX0) and HDAU
    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 = 3
    c. Verify hda-gfx = <onboard-1>
    d.

4. IOReg/IOJones/Verify IGPU@2 (or GFX0@2)
   a. If no IGPU@2 verify HD5x0 HDMI audio ssdt
   b. Verify hda-gfx = <onboard-1>
   c. If no AppleIntelSKLController, verify HD5x0 HDMI audio ssdt
   d. Verify HD530/AAPL,ig-platform-id=<00 00 12 19> OR
   e. Verify HD540/AAPL,ig-platform-id=<00 00 26 19>

f.

5. Verify AppleIntelFramebuffer@[0, 1 or 2] with display0 attached
   a. HDMI: connector-type=<00 08 00 00>
   b. DVI: connector-type=<00 08 00 00>
   c. DP: connector-type=<00 04 00 00>
 d.

Problem Reporting
1. Problem Reporting/Post to:
2. Problem Reporting/Attached requested files

Credit
RehabMan
bcc9, Post #11 http://www.insanelymac.com/forum/top...ort/?p=1934889