**Audio Drivers Upgrade**

# **List Of Audio Drivers on 3.18 vs 4.14**

|  |  |
| --- | --- |
| **3.18 kernel** | **4.14 kernel** |
| MDM9607 machine driver | MDM9607 machine driver |
| WCD9330(Tom Tom) codec driver | WCD9330(Tom Tom) codec driver |
| Front end dai driver | Front end dai driver |
| Routing driver | Routing driver |
| Platform drivers (pcm, compress, voice,) | Platform drivers (pcm, compress, voice,) |
| Dai driver | Dai driver |
| MBHC driver | MBHC driver |
| Q6 Drivers(q6asm,q6adm,q6afe) | Q6 Drivers(q6asm,q6adm,q6afe) |
| APR driver | APR driver |
| Aud Calibration | Aud Calibration |
|  | Audio ION driver |
|  | Pin Control driver |

# **Major Audio Changes from 3.18 to 4.14 Kernel**

* All the Audio drivers were part of kernel.
* Kernel/msm-318/sound/soc/msm/
* All drivers were statically loaded during boot up time.
* All drivers were part of boot.img
* On 4.14 kernel, Audio component model was introduced.
* All audio drivers were moved out of kernel.
* All Drivers will be part of system.img
* Vendor/qcom/open-source/audio-kernel/
* All drivers will be loaded dynamically after boot up.

# **List of Base Drivers Dependency for Audio on 3.18**

## Shared memory Driver (SMD):

## Communication b/w HLOS and DSP.

## ION driver for memory allocations.

* Modem needs to be brought of reset (MDSP based target)
* Secure memory calls (SCM Calls).

# **Changes in Base Drivers for Audio on 4.14**

* SMD driver was deprecated in 4.14 kernel.
* Need to Use Remote Process Message (RPMSG) driver Call’s to invoke SMD driver.
* ION Driver was not supported on 4.14 kernel for AUDIO HEAP ID’s.
* Need to Migrate All audio drivers to use DMA coherent API’s for memory allocations.
* msm\_audio\_ion\_alloc is the call which will serve all the audio drivers memory allocations in dsp/msm\_audio\_ion.c.
* ion\_alloc(bufsz, ION\_HEAP(ION\_AUDIO\_HEAP\_ID), 0); is the call in 3.18 kernel version which is deprecated now.
* dma\_alloc\_coherent(msm\_audio\_ion\_data.cb\_dev, bufsz, paddr, GFP\_KERNEL); Is the call which will be used instead of ION\_ALLOC API in 4.14 kernel version
* Gerrit ID: 2954797
* On 4.14 Audio drivers were not calling any SCM calls. They use Secure buffer driver calls to get Buffer attributes to share b/w HLOS and MDSP.
* Our Major Challenge is not to do any modifications in NHLOS.
* Facing issue during getting proper attributes for Audio Memory Pool.
* Back ported All SCM call changes from 3.18 to 4.14

# **Audio Component Changes for MDM9607**

* audio-drivers.lnx.3.0.c6 is suggested component from Audio tech team.
* We need to check the Code in Q6 drivers to see, is suggested component was compatible with older versions of DSP(Our Current version .
* Initially suggested component was not compatible to AVS-2.8. So We found the limitation and Audio tech team suggested to take above component.
* Issues Identified on Audio Component:
* Audio component was not compatible for MDM targets.
* Ported changes from audio-drivers.lnx.3.0 to support MDM targets(apr\_talrpmsg.c,apr\_v3.c). Gerrit: 2954800.
* Q6 state checks were based on ADSP target in driver probes. So, all driver probes were failing.
* Add Changes to check subsys state instead of q6 state. Gerrit: 2988438.
* VOLTE and CS-VOICE backends were not supported on Latest Audio Components.
* Back port changes from 3.18 kernel to support VOLTE and CS-VOICE support on current component. Gerrit: 3017862
* Our Audio Component has changes which were compatible to AVS-2.9
* During voice call set up few Opcodes which were not supported on AVS-2.8 getting fired and leading to voice call set up failures.
* So need to by pass such functions for MDM9607 target.Gerrit for reference: 3029806

# **Porting Efforts for Audio Drivers on MDM9607**

* Take snapshot of machine and Codec driver.
* Add audio dlkm recipe in poky/meta-qti-bsp/recipes-multimedia
* Define Platform Specific Config to stub features or add features.
* Identify configs which need to be enable for our platform.
* Gerrits: 2911629, 2911630, 2911633
* On Component model all configs will be defined in below path.

vendor/qcom/opensource/audio-kernel/config/ mdm9607autoconf.h

mdm9607auto.conf

* Gerrit for auto conf: 2911632
* All ALSA structures usage will be resolved during compilation based on errors.
* All GPIO’s, Pin control configurations needs to be from DTSI file only.
* Need to use msm-cdc-pinctrl driver to configure those muxes.
* DT Gerrit: 2962503, 2957910

# **Important Links and Commands**

* <http://qwiki.qualcomm.com/mdmaudio/Mdm9x07> ----> Describes all rework dependencies, test procedures.
* <https://review-android.quicinc.com/#/q/topic:MDM_Audio_4.14,n,z> -🡪 Gerrit tracker
* Bitbake -c cleanall audiodlkm ----🡪 to clean the audio dlkm libs.
* Bitbake audiodlkm --------------🡪 rebuild audio drivers
* Rebake machine-image ----------🡪 to include the audio changes as part of system image.
* Fastboot flash boot mdm9607-boot.img
* Fastboot flash system mdm9607-sysfs.ubi