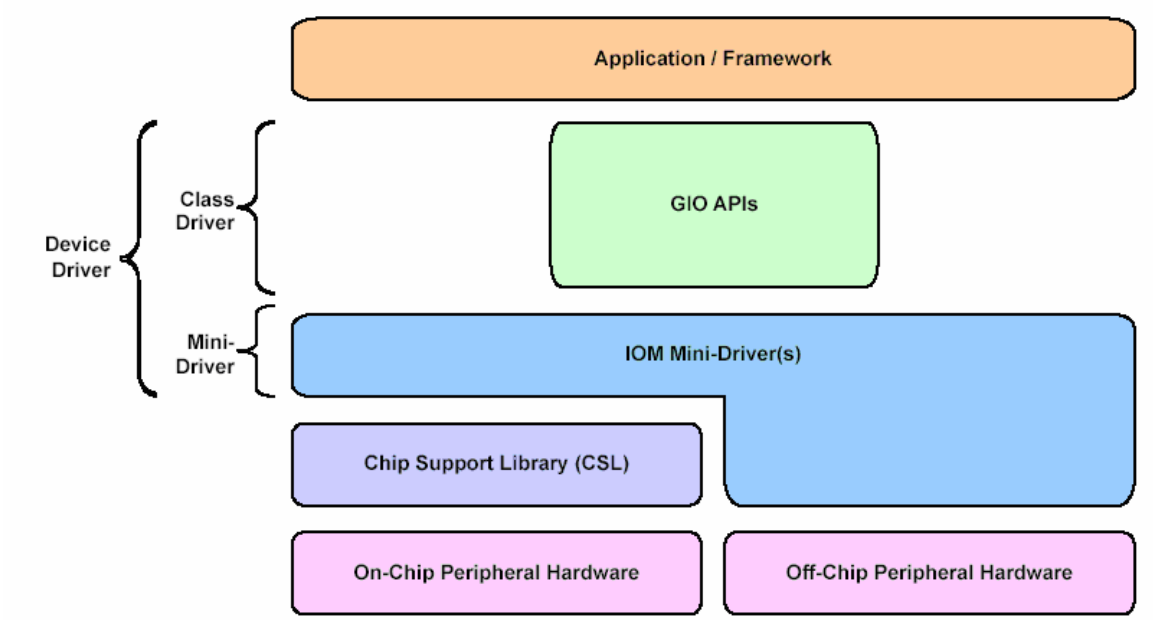
- **Middle layer of the driver conforms to IO Mini driver model defined by the DSP/BIOS DDK (Device Driver Development Kit) Framework.**
- **Supports EDMA and interrupt modes of operation (Interrupt mode not tested)**
- **Supports receive and transmit in I2S mode and transmit in DIT mode**




**Description**

- Details of tools used and versions are available in release notes

PRODUCT PREVIEW

**Capabilities**

The following table gives a quick overview of the supported API provided by the GIO layer to interact with the driver

| GIO API called by application | mini-driver API called | Description |
|---|---|---|
| GIO_create (name, Int mode, Int *status, Ptr chanParams, GIO_Attrs *attrs); | static Int mcasp_mdCreateChan (Ptr *chanp, Ptr devp, String name, Int mode, Ptr chanParams, IOM_TiomCallback cbFxn, Ptr cbArg); | This assigns one of the device channels to be used for the operation (rcv/xmt). It hooks up the necessary ISRs and configures the associated eDMA channel. |
| GIO_Delete (GIO_Handle gioChan); | static Int mcasp_mdDeleteChan(Ptr chanp); | Frees up resources held by channel. |
| GIO_submit (gioChan, IOM_READ, bufp, psize, appCallback); | static Int mcasp_mdSubmitChan(Ptr chanp, IOM_Packet *packet); | Submits a read packet to configure the McASP receive section with. |
| GIO_submit (gioChan, IOM_WRITE, bufp, psize, appCallback); | static Int mcasp_mdSubmitChan(Ptr chanp, IOM_Packet *packet); | Submits a write packet to configure the McASP transmit section with. |
| GIO_Flush(gioChan); | static Int mcasp_mdControlChan(Ptr chanp, Uint16 cmd, Ptr args); | Drains all existing packets for this channel. This call also prevents stalls submission of packets to the channel |
| GIO_Abort(gioChan); | static Int mcasp_mdControlChan(Ptr chanp, Uint16 cmd, Ptr args); | This call aborts all packets submitted to the channel and places the corresponding state machine in reset. |
| GIO_Control(gioChan, cmd, args); | static Int mcasp_mdControlChan(Ptr chanp, Uint16 cmd, Ptr args); | This submits other control commands to the mini-driver. |

**Driver Performance Characteristics**

**Release Mode:**

| MCASP DEVICE DRIVER SUB-COMPONENT | PROGRAM MEMORY (IN BYTES) | DATA MEMORY (IN BYTES) | | |
|---|---|---|---|---|
| | | MEMORY TYPE | | TOTAL |
| | | INITIALIZED | UN INITIALIZED | |
| dda | 2284 | 40 | 156 | **2480** |
| ddc | 24212 | 152 | 4232 | **28596** |
| llc | 9500 | 0 | 660 | **9500** |
| **Total** | **35996** | **192** | **4388** | **40576** |

- System Components Total Memory (Code & Data): **40576** Bytes

**Note:** The Driver Performance Characteristics can be included once testing is done on DM648/C6452 SOC.

**Driver Profiling Characteristics**

| SIO | | | | | | |
|---|---|---|---|---|---|---|
| **API Profiled** | **Trial-1** | **Trial-2** | **Trial-3** | **Average (usecs)** | **Maximum (usecs)** | **Minimum (usecs)** |
| SIO_create - Tx | 2301263 | 2301263 | 2301260 | 2301262 | 2301263 | 2301260 |
| SIO_create - Rx | 57 | 56 | 57 | 57 | 57 | 56 |
| SIO_Submit - Write | 1 | 1 | 1 | 1 | 1 | 1 |
| SIO_Submit- Read | 1 | 1 | 1 | 1 | 1 | 1 |
| SIO_Delete - Tx | 20 | 20 | 20 | 20 | 20 | 20 |
| SIO_Delete- Rx | 39 | 39 | 39 | 39 | 39 | 39 |
| Note: | Due to the initialization of codec related steps GIO_create - Tx is taking extremely large time. | | | | | |

| GIO | | | | | | |
|---|---|---|---|---|---|---|
| **API Profiled** | **Trial-1** | **Trial-2** | **Trial-3** | **Average (usecs)** | **Maximum (usecs)** | **Minimum (usecs)** |
| GIO_create - Tx | 2301265 | 2301265 | 2301264 | 2301265 | 2301265 | 2301264 |
| GIO_create - Rx | 55 | 55 | 55 | 55 | 55 | 55 |
| GIO_Submit - Write | 23 | 22 | 22 | 22 | 23 | 22 |
| GIO_Submit- Read | 14 | 13 | 13 | 13 | 14 | 13 |
| GIO_Delete - Tx | 20 | 30 | 29 | 26 | 30 | 20 |
| GIO_Delete- Rx | 38 | 82 | 84 | 68 | 84 | 38 |
| Note: | Due to the initialization of codec related steps GIO_create - Tx is taking extremely large time. | | | | | |

**Driver Performance Characteristics**

AUDIO_WRITE

| Test Setup Information | Sampling Rate in Hz | Word Length in bits | No. of channels/sample | DMA Mode | | |
|---|---|---|---|---|---|---|
| | | | | No. of bytes/Sec | Buffer Size in Bytes | Duration in Sec |
| ARM Frequency = 26 MHZ | 8000 | 32 | 1 | 32931 | 15360 | 50 |
| | 12600 | 32 | 1 | 51916 | 15360 | 50 |
| | 44100 | 32 | 1 | 179896 | 15360 | 50 |
| | 48000 | 32 | 1 | 195788 | 15360 | 50 |
| | 96000 | 32 | 1 | 391230 | 15360 | 50 |

AUDIO_READ

| Test Setup Information | Sampling Rate in Hz | Word Length in bits | No. of channels/sample | DMA Mode | | |
|---|---|---|---|---|---|---|
| | | | | No. of bytes/Sec | Buffer Size in KB | Duration in Sec |
| ARM Frequency = 26 MHZ | 8000 | 32 | 1 | 32931 | 15360 | 50 |
| | 12600 | 32 | 1 | 51609 | 15360 | 50 |
| | 44100 | 32 | 1 | 179180 | 15360 | 50 |
| | 48000 | 32 | 1 | 195779 | 15360 | 50 |
| | 96000 | 32 | 1 | 391249 | 15360 | 50 |



**References**

[1] DSP/BIOS Driver Developer's guide

[2] McASP Programmer's Reference Guide

**Glossary**

| | |
|---|---|
| IOM | TI Terminology, Input/Output Mini Driver. |
| DDC | TI Terminology, Device Driver Core that is OS independent |
| CSL | Chip Support Library |
| GIO | Generic I/O Module |
| McASP | Multi-channel Audio Serial Port |
| I2S | Inter-Integrated Sound protocol |
| DIT | Digital Audio Interface Transmission |
| IOM | Input/Output Module |
| EDMA | Enhanced Direct Memory Access |

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