



HiMPP Startup Sound

## User Guide

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## **HiSilicon Technologies Co., Ltd.**

Address: Huawei Industrial Base  
Bantian, Longgang  
Shenzhen 518129  
People's Republic of China

Website: <http://www.hisilicon.com>

Email: [support@hisilicon.com](mailto:support@hisilicon.com)



# About This Document

## Purpose

This document provides the basic functions and boot command lines relevant to the startup sound. You can configure these functions based on actual applications.



### NOTE

Unless otherwise specified, the contents of this document apply to the Hi3516A and the Hi3516D.

## Related Versions

The following table lists the product versions related to this document.

Product Name	Version
Hi3516A	V100
Hi3516D	V100
Hi3519	V100


## Intended Audience

This document is intended for:





- Technical support engineers
- Software development engineers

## Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 <b>DANGER</b>	Alerts you to a high risk hazard that could, if not avoided, result in serious injury or death.



Symbol	Description
 <b>WARNING</b>	Alerts you to a medium or low risk hazard that could, if not avoided, result in moderate or minor injury.
 <b>CAUTION</b>	Alerts you to a potentially hazardous situation that could, if not avoided, result in equipment damage, data loss, performance deterioration, or unanticipated results.
 <b>TIP</b>	Provides a tip that may help you solve a problem or save time.
 <b>NOTE</b>	Provides additional information to emphasize or supplement important points in the main text.

## Change History

Changes between document issues are cumulative. Therefore, the latest document issue contains all changes made in previous issues.

### Issue 01 (2016-02-20)

This issue is the first official release.



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# 1 HiMPP Startup Sound User Guide

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## 1.1 New Functions

The U-boot code has the following new functions:

- Enables and disables the audio output (AO) device in the boot environment.
- Covers all the typical AO interfaces and timings.

## 1.2 Boot Command Lines

- **startao**: Starts the AO device.  
Parameters: data address, data size, and volume  
`hisilicon # help startao`  
`startao - startao - open interface of ao device.`  
`- startao [addr size volume]`  
  
- **<addr>**: address of the memory where the audio data is stored  
Note: You are advised not to store the audio data in the operating system (OS) memory and media memory zone (MMZ) memory, or you can select an MMZ address segment that is not used during startup based on the actual application scenario.  
  
- **<size>**: size of the audio data  
- **<volume>**: output volume
- **stopao**: Stops the AO device.  
Parameter: none  
`hisilicon # help stopao`  
`stopao - stopao - close interface of ao device.`

## 1.3 Boot Functions

The following functions are provided for encoding under the boot:

- **startao**



```
int start_ao(unsigned int u32Addr, unsigned int u32Size  
AUDIO_SAMPLE_RATE_E enSample, unsigned int u32Vol)
```

- stopao  

```
int stop_ao()
```

## 1.4 New Code or Modified Code

Only the basic functions relevant to the startup sound are provided. You can configure these functions based on actual applications (the following takes the Hi3516A as an example).

```
├── common  
│   ├── cmd_ao.c  
│   └── Makefile  
├── include  
│   ├── configs  
│   │   └── hi3516a.h  
│   └── hi3516a_ao.h  
├── Makefile  
└── product  
    └── hiaudio  
        ├── acodec  
        │   └── v500  
        │       ├── acodec.c  
        │       ├── acodec_def.h  
        │       ├── acodec.h  
        │       └── Makefile  
        └── ao  
            └── hi3516a  
                ├── aiao_ext.h  
                ├── aiao_hal.c  
                ├── aiao_hal.h  
                ├── aiao_reg.h  
                ├── ao.c  
                ├── hi_board.h  
                ├── hi_type.h  
                └── Makefile
```

## 1.5 Examples of Command Lines

The examples of command lines are as follows:



- Start and configure the AO device:  
`startao 0x82000000 0xb0000 0`
- Stop the AO device:  
`stopao`

## 1.6 Precautions

- Currently the startup sound function supports only the mono-channel 16-bit 8 kHz raw audio data with the frame length of 320.
- You are advised to burn the audio data to the DDR address space in the later part of the MMZ or any other memory excluding the OS memory.
- The volume range is 0 dB to 6 dB. If the volume is set to a value greater than 6 dB, the actual volume is 6 dB; if the volume is set to a value less than 0 dB, the actual volume is 0 dB.
- The data address and data length transferred by the startao function must be 32-byte aligned.