



**Microsemi**

## **Timberwolf™ Software Development Kit ZLS38100 Revision P3.0.0**

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*This document describes new features, fixed errata and operational notes for the ZLS38100 Timberwolf Software Development Kit (SDK) P3.0.0 release.*

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### **1.0 REVISION SUMMARY**

These are the release and errata notes for the Production release P3.0.0 of the ZLS38100 Timberwolf SDK. Proven on both Linux based platforms and non-OS platforms. The SDK includes direct support for Linux based platforms such as the Raspberry PI and the Ambarella SxL platforms.

### **2.0 CONTENTS**

Included within the P3.0.0 package:

1. Documentation - New SDK Porting/User Guide, SDK Reference Guide
2. Voice Processing SDK source code:
  - a) HBI kernel driver - Host BUS Interface slave Linux kernel device driver for Host controllers that want to communicate with the Timberwolf devices over either SPI or I2C. Ability to load a desired firmware and configuration record into the device at boot time
  - b) System Service Layer - To prevent multiple threads or processes from accessing a Timberwolf device simultaneously.
  - c) HBI user-space wrapper - User-Space wrapper of the main kernel driver functions exposed to the user.
  - d) Microsemi ALSA audio codec with optional ALSA mixer and sample ALSA machine drivers for audio samples exchange between the Host Controller and the Timberwolf devices over I2S or PCM.
  - e) Sample User-Space Host Applications - To quickly demo the features of the Timberwolf devices
3. Utility Tools - To convert the Timberwolf firmware image file and the configuration record file into either a binary (\*.bin) format that can be loaded into the device at runtime or into c-code (\*.h) format that can be compiled with the SDK.

### **3.0 NEW FEATURES ADDED (SINCE P3.0.0)**

- Unified Hal driver that can be compiled for either SPI or I2C.
- Simplified SSL driver.
- Added the ability to boot load a firmware and related configuration into each of the ZL380xx devices supported by the platform at boot time.
- New detailed Porting/User and Reference Guide Documents.
- Distinct /dev device entry is now created for each of the ZL380xx device on Linux/Android

platforms.

- The host bus number and ZL380xx device address (Chip Select) must now be defined within the HAL for each of the supported ZL380xx devices included in the design.
- An ALSA codec Mixer driver is added as a compile option.
- HBI\_init() and HBI\_term() function calls are not longer required by the user application.
- For Linux/Android /procfs init\_device, open\_device, term\_device and close\_device calls are no longer required. If the procfs feature is enabled, distinct procfs devices are automatically created and initialized at hbi driver loading for each of the ZL380xx devices supported by the platform.
- Save a ZL380xx configuration record only to an existing firmware on flash is now supported.
- Added example SDK “Hello World” application to verify the porting of the SDK and the platform.

## 4.0

### BUG FIXES

- The SDK now truly supports multiple ZL380xx devices up to the capability of the Host.
- Fixed an issue in the demo application that demonstrates the loading of firmware and configuration images into the device. The issue relates to the loading of configuration image included within version 2.x.x ZLS380xx firmware package. It was observed that configuration records included within 2.x or later firmware package were not loaded properly by the application.
- Fixed an issue with the HBI\_read() function where read request above 64 bytes reported corrupted data for the bytes above 64.

## 5.0

### COMPILE INSTRUCTIONS

- The Source code for the Timberwolf SDK is partitioned into 6 main directories. The code within the /platform directory is platform dependent therefore is the only code that is specific to the particular platform SDK. The HBI driver, ALSA driver and System Service Layer codes reside within this directory. If any aspect of the SDK needs to be modified as a result of a change in the particular platform Controller SDK, then this code is the only code that must be changed. The code in the other directories are Timberwolf device specific and the user of the SDK must not modify this code.
- The root folder of the SDK includes a Makefile and accompanying Makefile.globals and configuration files. The user must at least configure the following variables within the Makefile.globals accordingly prior to compiling the SDK.
  - VPROC\_MAX\_NUM\_DEVS *specify the number of Timberwolf devices that needs to be supported by the driver*
  - HBI\_MAX\_INST\_PER\_DEV *For multi-threaded application that wants to have access to the same device driver from different thread*
  - TOOLSPATH *The path to the tool chain needed to compile the SDK*
  - KSRC *The path to the Linux kernel for which to compile the SDK*
  - CROSS\_COMPILE *The cross-compiler needed to compile the SDK*
  - ARCH *The host platform architecture (arm? arm64?....)*
- The SDK can be compiled to include either the SPI or the I2C driver not both. Therefore, to compile the SDK for the desired HBI option use either one of the following commands:
  - For SPI: `make hbilnx HBI=SPI` or simply `make hbilnx`
  - For I2C: `make hbilnx HBI=I2C`

## **6.0 SUPPORTED DEVICES AND FIRMWARE**

The Driver supports the following combination of devices and firmware:

- OPN ZL3804x (x:0, 2) with firmware ZLS380x version P1.0 or later
- OPN ZL3805x (x:0, 1, 2) with firmware ZLS3805x version P1.0 or later
- OPN ZL3806x (x:0, 2, 3, 7) with firmware ZLS3806x version P1.0 or later
- OPN ZL38080 with firmware ZLS38080 version P1.1.0 or later
- OPN ZL38090 with firmware ZLS38090 version E1.0.1 or later

## **7.0 ERRATA**

None known at the time of release.

## **8.0 OPERATIONAL NOTES**

The current release of the SDK was tested on various platforms such as the Raspberry Pi (rev 1-3) Raspian images (Stretch and Jessie) with Linux kernels 3.18 to 4.9.70. The Ambarella S2L platform with kernel 3.10.50.



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**Microsemi**

**Microsemi Corporate Headquarters**  
One Enterprise, Aliso Viejo CA 92656 USA  
Within the USA: +1 (949) 380-6100  
Sales: +1 (949) 380-6136  
Fax: +1 (949) 215-4996

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