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# BeClear Library

BeClear SmartTV & SmartHome for xCORE-200

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## Features

- Mono AEC, Beamforming, Noise suppression
- Runs at 16kHz

## Resource Usage

TBD

## Components

TBD

## Software version and dependencies

This document pertains to version 1.1.2 of this library. It is known to work on version 14.3.2 of the xTIMEcomposer tools suite, it may work on other versions.

This library depends on the following other libraries:

- lib\_device\_control (>=3.2.0)

## Related application notes

None

## APPENDIX A - Known Issues

- GAMMA\_NN\_SR BeClear parameter always reports a value of 2 - only affects SmartHome (#17795)
- Occasionally AGCMAIN is reported an unexpected, small variation due to fixed point conversion errors e.g. 1.00139 instead of 1.0 (#17794)

## APPENDIX B - BeClear library change log

### B.1 1.1.2

- CHANGE: Remove stray calls to printf
- CHANGE: Set all return error codes of the tuning scripts as positive integers
- CHANGE: Add handling of out of range values in aec\_filter\_test.py
- CHANGE: Remove reference to “smart”
- CHANGE: Remove signal handling in host app
- CHANGE: Convert error codes in host app to positive integers
- RESOLVED: Fix AEC filter plotting for linear devices (#17893)
- RESOLVED: Update shutdown() calls in host app
- RESOLVED: Fix some issues on AEC filter and NL model scripts for Windows and later versions of Matplotlib (>=2.1.0)

### B.2 1.1.1

- CHANGE: Separated tuning related commands from BeClear parameters in host app
- CHANGE: Updates to tuning helper scripts and documentation
- RESOLVED: Fixed payload size of control transfers in host app
- RESOLVED: Typo in parameter naming GAMMAS\_NS to GAMMA\_NS
- RESOLVED: Typo in parameter naming LATTE to LATTEN
- RESOLVED: Various minor build warnings in host application

### B.3 1.1.0

- ADDED: Ability to set non-linear model including helper scripts
- ADDED: XBECLEAR\_SYS\_DELAY define
- CHANGE: Simplified example host application - removed “interactive mode”
- RESOLVED: Various minor issues in host application
- RESOLVED: SmartHome now uses XBECLEAR\_MIC\_GEO

### B.4 1.0.2

- CHANGE: Update license text
- RESOLVED: Removed shift up from I2C device address in example host application for Raspberry Pi
- RESOLVED: Issue with “script” mode in xscope host app
- RESOLVED: Incorrect range for various params in host application
- RESOLVED: Some parameter default values updated

### B.5 1.0.1

- RESOLVED: Some parameters for SmartHome incorrectly defined

### B.6 1.0.0

- CHANGE: The default value for GAMMA\_NN\_SR in SmartTv is aligned with SmartHome.
- ADDED: SmartHome: API extended with parameters for Speech Recognition stationary noise suppression: STATNOISEONOFF, GAMMA\_NS\_SR, and GAMMA\_NN\_SR
- ADDED: Direction-Of-Arrival, see API function AMBIPHONE\_GetFSBDelay(). The function returns the beam direction in a pfloat with range [-1.0 : 1.0] w.r.t. the first 2 microphones (Tv) or two selected

microphones (Home). The definition of the beam direction is equal to the definition of the beam angle in SmartTV.

- ADDED: XBECLEAR\_MIC\_GEO for SmartHome (only required for DOA and used in the calculation of GetFSBDelay())

## **B.7 0.2.5**

- ADDED: XBECLEAR\_MIC\_GEO (SmartTv only)

## **B.8 0.2.4**

- CHANGE: Rebrand to VocalFusion (host control app naming)

## **B.9 0.2.3**

- RESOLVED: Added missing descriptions.h file to release

## **B.10 0.2.2**

- CHANGE: Move parameter descriptions to separate file. Extend host application memory allocation to handle longer descriptions.

## **B.11 0.2.1**

- CHANGE: Host control application commands now match parameter naming

## **B.12 0.2.0**

- CHANGE: Added script mode to control command line utility

## **B.13 0.1.3**

- CHANGE: Expanded beclear\_conf\_defaults to cover larger subset of settings
- CHANGE: Added missing explicit type casts to remove build warnings
- ADDED: Added channel in/out for testing BeClear and golden reference generation tests

## **B.14 0.1.2**

- RESOLVED: Makefile in host dir renamed makefile.OSX as per docs

## **B.15 0.1.1**

- RESOLVED: Host dir now included in the release

## **B.16 0.1.0**

- CHANGE: Split of init and process modes

## **B.17 0.0.5**

- RESOLVED: Memory bug in the APES object initialization is fixed
- RESOLVED: Redundant control parameters are removed
- CHANGE: Memory and cycle optimizations.

- CHANGE: For alignment with SmartTv is the SmartHome HPF filter set to 70Hz (previous releases 180Hz)
- CHANGE Includes minor software reconstructions to align SmartTv with SmartHome

### **B.18 0.0.4**

- ADDED: Initial support for control via SPI
- ADDED: SPI build of RPi control application
- RESOLVED: Issues with RPi control application makefile
- RESOLVED: Unused parameters aecpathchange and xin\_level are removed from the parameter structure (SmartTv only)
- CHANGE: Library interface (i.e. the required header files) simplified
- CHANGE: Control applications for SmartTv and SmartHome unified
- CHANGE: The audio I/O buffers (i.e. mics, far, qcom, qsr) are now allocated outside of the library
- CHANGE: To align SmartTV with the SmartHome, the BeClear\_SRTVBF\_GetVoiceActivity function is replaced by a new voiceactivity parameter
- CHANGE: Location of WriteOutput() as recommend by author
- CHANGE: Removed CVS file handling from example control application
- CHANGE: sr\_gamma\_vad modified based on SENSORY\_KEYWORD

### **B.19 0.0.3**

- ADDED: BeClear\_SRTVBF\_GetVoiceActivity()
- ADDED: Build support for control app for Raspberry Pi
- RESOLVED: Path change detector now functional

### **B.20 0.0.2**

- RESOLVED: Run-time memory corruption

### **B.21 0.0.1**

- Initial development
- Changes to dependencies:
  - lib\_device\_control: Added dependency 2.0.0
  - lib\_logging: Added dependency 2.0.1
  - lib\_xassert: Added dependency 2.0.1