



Technical Documentation

AEC 2.X - OVERVIEW

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History

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Notes

- (1) Creation.
- (2) Approval.
- (3) Update.

Glossary

AEC	Acoustic Echo Cancellor
ES	Echo Suppressor
VAD	Voice Activity Detector

References

- [1] [L1D_AS191-1 – AEC 2.x – API Definition](#)
- [2] [L1D_AS260 – ES 1.x – Overview](#)
- [3] [L1D_AS261-1 – ES 1.x API – Definition](#)

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1 Introduction

This document provides an overview of the Acoustic Echo Canceller (AEC) module. This document applies to AEC 2.0 and next releases, AEC 2.x [1].

2 AEC Overview

The primary goal of the AEC is to remove the echo stemming from the loudspeaker reverberation to the microphone. Generally, an Echo Suppressor (ES) is implemented beside the AEC to help to remove the residual echo in the uplink [2], [3].

The AEC 2.x is based on Affine Projection (AP) algorithm ensuring fast convergence with low computational complexity. Also, the AEC 2.x embeds a divergence control algorithm using a dual structure of slow and fast adaptive filters under stepsize control (Figure 2.1).

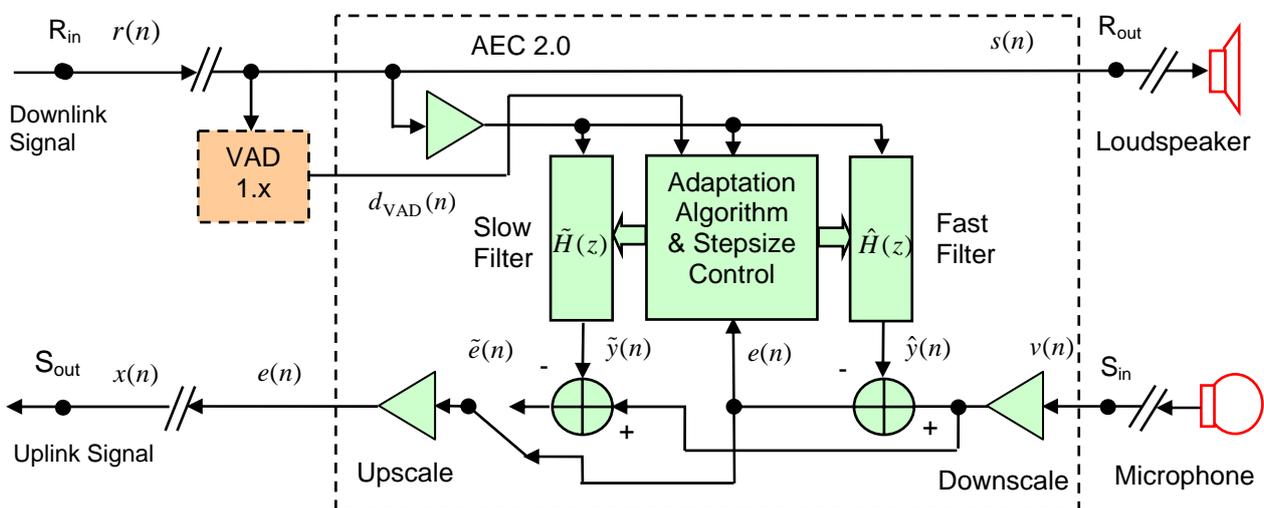


Figure 2.1 The AEC 2.x + VAD 1.x – Block Diagram

The AEC 2.x adaptation is directed by an external Voice Activity Detector (VAD 1.x) implemented in the downlink. The residual echo in the uplink is removed thanks to the Echo Suppressor (ES 1.x).

3 AEC Use Cases

The AEC with divergence control is especially suitable during double-talk situations when the far-end and the near end speakers are talking during the same time. This situation commonly leads to AEC divergence and audible echo in the uplink while the near speech frames are distorted.

The AEC 2.x is able to deal with double-talk situation thanks to the dual filter structure. When a double-talk situation occurs, the echo cancellation is done using the slow adaptive filter. This reduces significantly the AEC divergence and so improves the duplex capabilities especially in handset mode.

4 AEC Features

The AEC 2.x features are summarized below (Table 4.1).

Features	Values	Comments
Sampling frequency	8000 Hz	
IO Digital amplitude	16-bits [-32768; 32767]	
IO Frame duration	20 ms	160 samples
Processing sub-frame duration	20 ms	160 samples
Processing delay	none	

Table 4.1 The AEC 2.x – Features

5 Conclusion

To prevent AEC divergence in double-talk situation, a divergence control algorithm is necessary in addition to the adaptation algorithm. The AEC 2.x implements a robust and efficient solution of divergence control algorithm especially suitable in double-talk situations for comfortable communication in duplex mode.