Digital Network Echo Cancellers

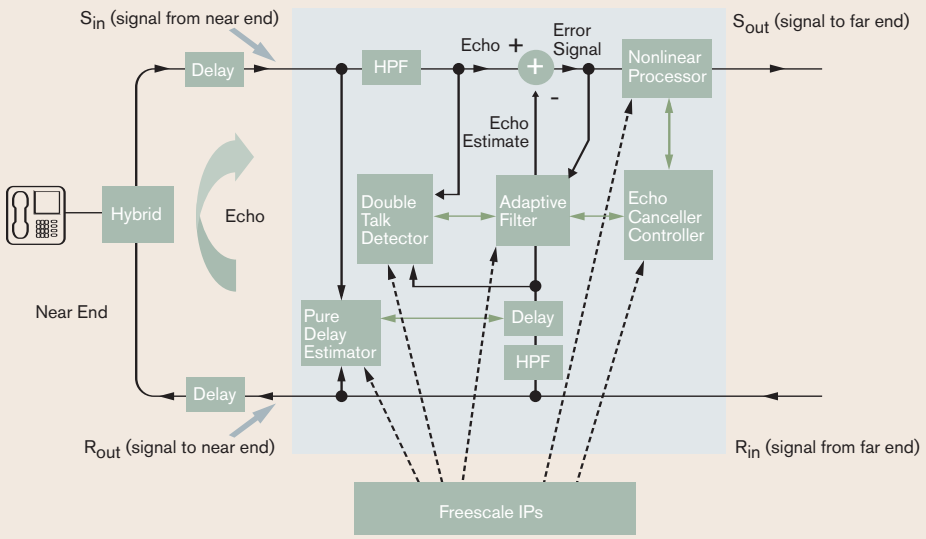
Processor

StarCore™ Family of Digital Signal Processors from Freescale

Introduction

Freescale echo cancellation solutions include a set of network echo cancellers for various market requirements and applications. Equipped with Freescale technologies, the solutions offer carrier-class echo cancellation service for packet telephony networks. The echo cancellers are designed to cover up to 128 ms echo path delay with one 24 ms moving window. This 24 ms window is sufficient to handle the multi-reflective echo paths in G.168 (2002) and others that are expected to be encountered in the network. The echo path delay of the echo canceller is runtime configurable, from 8 ms up to 128 ms, so users may choose a proper configuration to meet the need of echo path configurations (or spans) and the resource budget in per channel data memory and processing load million cycles per second (MCPS).

FREESCALE ECHO CANCELLER BLOCK DIAGRAM



Features

Freescale Semiconductor's* echo cancellation solutions are robust, field-proven implementations with more than 15 years global deployment into Tier 1 carrier-class telecommunications infrastructure products. The echo cancellers are based on normalized LMS adaptive algorithms and have the following major features:

> Rapid initial convergence rate (echo cancelled within 50 ms)

> Far-reaching and stable infinite convergence depth

> Intelligent near-end talk signal detection mechanism

> Adaptive nonlinear processor with optional comfort noise matching

> Innovative mechanism for near-end background noise handling

> Effective background processing for divergence prevention

> Runtime configurable echo-span coverage from 8 ms up to 128 ms

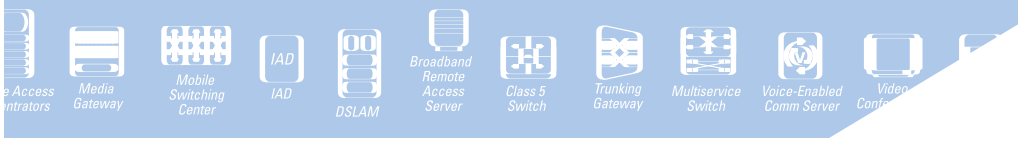
> Fast mid-call convergence (i.e., re-convergence upon hybrid change in the middle of a call)

> Four configurable comfort noise matching levels

> Smart handling of signaling tones

The echo cancellers are ITU-T G.168 (2000/2002) compliant, and systematically evaluated with Freescale voice quality evaluation techniques and by independent expert groups.

*The Semiconductor Products Sector of Motorola, Inc. became Freescale Semiconductor, Inc. in 2004.



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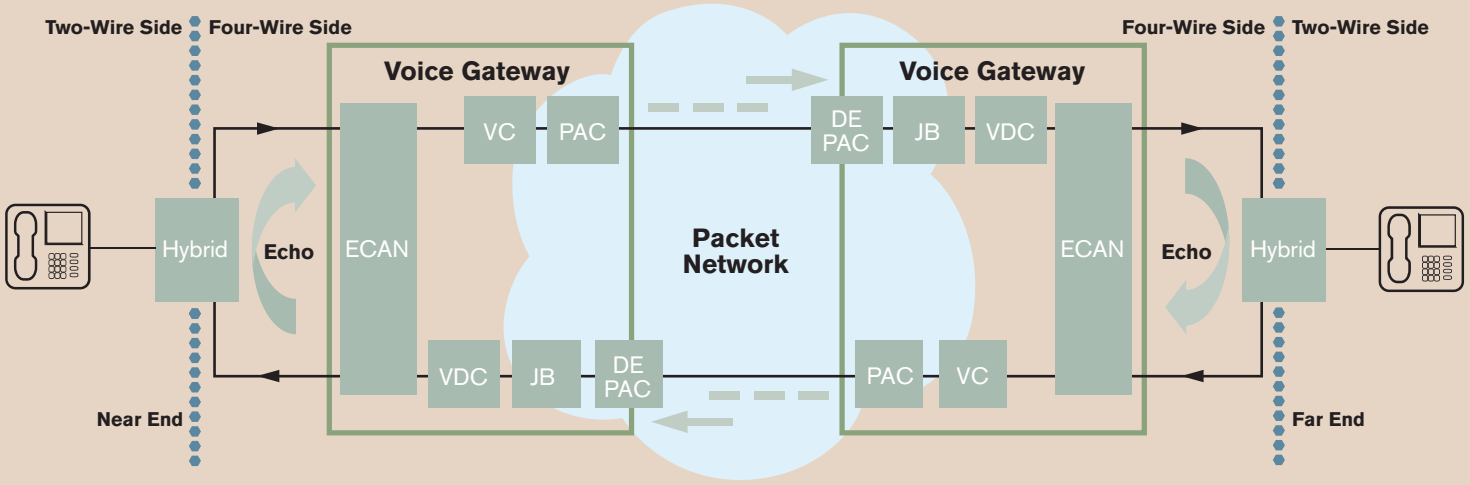
NETWORK ECHO CANCELLERS



VC-voice coder
VDC-voice decoder
PAC-packetizer
DEPAC-depacketizer
JB-jitter buffer

FREESCALE ECHO CANCELLER IS RUNTIME CONFIGURABLE AND THE CONFIGURATION OPTIONS ARE:

Option	Echo Span Coverage	Window Size	Window Type
1	128 ms	24 ms	Moving window
2	64 ms	24 ms	Moving window
3	32 ms	24 ms	Moving window
4	24 ms	24 ms	Fixed window
5	16 ms	16 ms	Fixed window
6	8 ms	8 ms	Fixed window

PERFORMANCE

Echo Span Option	Data Memory (bytes)	Mean Processing Load (MCPS)	Max Processing Load (MCPS per 5 ms frame)
128 ms	4064 N*	2.4 N*	4.0 N*
64 ms	2784 N*	2.4 N*	4.0 N*
32 ms	2144 N*	2.4 N*	4.0 N*
24 ms	1888 N*	2.1 N*	3.7 N*
16 ms	1376 N*	1.8 N*	3.4 N*
8 ms	864 N*	1.5 N*	3.1 N*

*N is the number of channels.

Interfaces

The individual software function is supplied as a single library module, which contains the necessary object code required to link into a user's top-level application code. Essential functions are equipped with C callable interfaces.

Availability

Available today.

Other Documents

The following documents are available upon request. Please contact your sales representative.

- Freescale Echo Cancellation White Paper
- Independent Third-Party Testing Results (under NDA)
- Freescale Echo Canceller Benchmarking Summary (under NDA)
- Freescale Echo Canceller G.168 Test Coverage and Results (under NDA)
- Freescale Echo Canceller Interface Control Document (under NDA)
- Freescale Echo Path Channel Identification White Paper (under NDA)
- Freescale Echo Canceller Evaluation User's Guide (under NDA)

Learn More: For more information about Freescale products, visit **www.freescale.com**.

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