



# NETBRICKS

## AUDIO-BRICKS

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### INTRODUCTION

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*AUDIO-BRICKS* is a family of software components implementing the algorithms necessary for processing audio signals. This software is written in portable "C" language and implemented for fixed point, 32/16 bit CPU (RICS, CICS, PC, MAC, DSP, Micro-controllers, ...). Optimized code can also be provided for some popular CPUs.

*AUDIO-BRICKS* products are designed to be used on General Switched Telephone Network (GSTN) through ISDN or PSTN interfaces.

*AUDIO-BRICKS* products are :

- ❑ **DTMF generation and detection** (*DMTF*) : fully compliant with ITU-T Q.23 and Q.24
- ❑ **TONE generation and detection** (*Tone*) : fully compliant with ITU-T V.25 (ANS, CNG, CT) plus user-defined tones
- ❑ **Line Echo Canceller** (*LEC*) : fully compliant with the ITU-T G.168-2000 recommendation

*AUDIO-BRICKS* is targeting single client side as well as pool for large channel bank Server.

*AUDIO-BRICKS* could be used in conjunction with Netbricks SoftModem-Bricks and PSTN signaling driver.

*AUDIO-BRICKS* is addressed to the OEM and technology transfer markets.

*AUDIO-BRICKS* is priced on a one-time source code license fee for a Hardware technology and a Licensee's premises, with royalty buy-out on a per channel basis.

**LEC - G.168-2000 LINE ECHO CANCELLER**

- Written in portable C code, some functions are coded in assembly to optimise the performances. **LEC** can be easily ported to any platform
- **LEC** callable functions are run to completion oriented (pseudo reentrant) and fully independent of the software architecture. Each function uses a per channel context for running simultaneous multiple channels.
- The API allows static memory allocation or dynamic memory allocation scheme if the user provides malloc/free equivalent functions
- **LEC** cancels echo tail length ranging from 8 ms to 64 ms
- **LEC** includes a tone disabler (2100 Hz with phase reversal ) and a comfort noise generator
- Sample Interface: linear PCM, A-law or  $\mu$ -law samples at a 8 kHz sampling frequency
- Block based processing of the samples. The user chooses the size of the block

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**MEMORY AND CPU REQUIREMENTS**

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**LEC**

Peaks CPU usage is shown above

PLATFORM	8ms echo path	16ms echo path	32 ms echo path
ARM7 TDMI	18 MHz	31 MHz	44 MHz
Texas DSP TMS320C5410	10 MHz	12MHz	16 MHz
Pentium MMX	7 MHz	10 MHz	13 MHz