



VAD and CNG

SIGNALS+SOFTWARE



Processor

Texas Instruments TMS320C6000 DSP range.

Background

The implemented algorithms are stand-alone Voice Activity Detection (VAD) and Comfort Noise Generation (CNG). These modules are based on the Full Rate-GSM speech processor standard, which uses silence compression techniques to reduce the transmitted bit rate during the silent intervals of speech. Discontinuous transmission (DTX) systems are based on VAD and CNG algorithms, which insert Silence Insertion Descriptor (SID) frames during the silence intervals. The VAD module makes speech/silence decisions and analyses silence to produce SID frames. During silence, SID's are periodically sent to the CNG module, which generates comfort noise. This also provides the additional advantage of using lower processing loads and DSP bandwidth resource during silence frames.

Features and Performance

- TI eXpressDSP™ Compliant software available

VAD	Program Memory		Data Memory			Interrupt Latency (Cycles)	Typical call Period (ms)	Processing Load (MHz)
	Code (Kbytes)	Tables (Kbytes)	Static Memory		Stack Memory (Kbytes)			
			Heap (Kbytes)	Tables (Kbytes)				
VAD	19.41	0.05	n * 1.05	0.35	1.98	12280	20	n * 1.40

Table 1 : DSP Requirements for Stand-Alone VAD

CNG	Program Memory		Data Memory			Interrupt Latency (Cycles)	Typical call Period (ms)	Processing Load (MHz)
	Code (Kbytes)	Tables (Kbytes)	Static Memory		Stack Memory (Kbytes)			
			Heap (Kbytes)	Tables (Kbytes)				
CNG	9.85	0.05	n * 0.79	0.26	0.65	7980	20	n * 0.50

Table 2 : DSP Requirements for Stand-Alone CNG

Note: Processing loads quote worst-case scenarios with n representing the number of channels

Technical Notes

The software is written using only fixed-point instructions and is compatible with both the TMS320C6000 fixed-point family and the TMS320C6700 floating-point family. It is supplied in both big-endian and little-endian formats.

Interface Details

The eXpressDSP™ software uses an interface defined by SIGNALS+SOFTWARE that is similar to the other vocoder interfaces specified by Texas Instruments in the eXpressDSP™ developer's kit.

The software is also available in a non-eXpressDSP version with a basic multi-channel interface. The DSP requirements for this version are similar to those given in Table 1.

Availability

The code is available now, for a one-off payment and/or royalties depending on the commercial application.

Software for the TMS320C6000 is available for a range of vocoders including G.711, G.722, G.723.1, G.726, G.728, G.729, G.729A, G.729B, G.729AB, FR-GSM, AMR-GSM, EFR-GSM, IS-641-A and other communication algorithms. VAD and CNG are also available for the TMS320C5000.

SIGNALS+SOFTWARE

SIGNALS+SOFTWARE was founded in 1992 as a developer of high quality Digital Signal Processing application software for the communications industry. Supplying to a whole range of customers, including large blue chip corporations, **SIGNALS+SOFTWARE** has quickly established itself as the world leader in DSP software design and production.

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