



## SIGNALS+SOFTWARE

# VAD and CNG



### Processor

Texas Instruments TMS320C5000 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 is available
- 30 channels of G.728 on 100MHz device
- Less than 9.4 Kbytes program memory required

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)				
6.99	0.03	n * 0.89	0.38	1.96	160	20	n * 2.43	

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)				
3.15	0.03	n * 0.62	0.20	0.88	80	20	n * 0.83	

Table 2 : DSP Requirements for Stand-Alone CNG

**Note:** Processing loads quote worst-case scenarios with n representing the number of channels. Program memory table values are initialisation values. Kbytes equals 1024 bytes.

### Interface Details

For convenience the individual software functions are supplied as a single library module. The library contains all the object code that is required to link in to a user's top-level application code. The functions are either callable as C functions or as assembly functions.

### Availability

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

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

### 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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