



## ITU G.729A/G.729A+B Speech Coder

### SIGNALS+SOFTWARE



#### Processor

Texas Instruments TMS320C5000 DSP range.

#### Background

The algorithms implemented are the ITU-T recommendations G.729 Annex A and G.729 Annex A + Annex B fixed rate speech coders for internet and multimedia communications. G.729A is a reduced complexity version of G.729 with similar audio performance in most circumstances

G.729A+B comprises of G.729A with the additional option of Annex B. Annex B uses silence compression or discontinuous transmission to reduce the transmitted bit rate during the silent intervals of speech. Voice Activity Detection (VAD) and Comfort Noise Generation (CNG) algorithms are used to enable the transmission of Silence Descriptor (SID) frames during the periods of silence. This provides the additional advantage of using lower processing loads and DSP bandwidth resource during silence intervals.

#### Features and Performance

- TI eXpressDSP™ Compliant software available
- 8 channels of G.729A on 100MHz device
- 7 channels of G.729A+B on 100MHz device
- Passes all ITU-T test vectors

G.729A	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)				
Encoder	11.7	0.03	n * 1.6	5.6	2.4	239	10	n* 10.3
Decoder	4.8	0.03	n * 1.4	5.1	0.8	234	10	n* 2.1
Encoder + Decoder	14.8	0.05	n *3.0	6.0	2.4	239	10	n* 12.3

Table 1 : DSP Requirements for G.729A

G.729A+B	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)				
Encoder	17.9	0.03	n * 1.9	6.2	2.4	239	10	n*10.6
Decoder	7.1	0.03	n * 1.4	5.5	0.8	234	10	n* 2.4
Encoder + Decoder	21.7	0.05	n * 3.3	6.6	2.4	239	10	n* 12.6

Table 2 : DSP Requirements for G.729A+B

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

### Technical Notes

The ITU-T G.729A recommendation compresses narrowband speech and audio signals at a sample rate of 8kHz to 8 000 bps, using a linear predictive analysis-by-synthesis coding, Conjugate-Structure Algebraic-Code-Excited Linear Prediction (CS-ACELP). The coder operates on 10ms frames to extract the parameters of the CELP coding model. The decoder uses two filters. One is based on a 10th order Linear Prediction (LP) filter, the other is based on an adaptive-codebook approach. Additional performance enhancement is achieved by use of a Post Filter.

### Interface Details

The eXpressDSP™ G.729A and G.729A+B software use the IG729 interface specified by Texas Instruments in the eXpressDSP™ developers' kit.

The software is also available in a non-eXpressDSP version with a basic multi-channel interface. The DSP requirements for these versions are similar to those given in Tables 1 and 2.

### Availability

G.729A and G.729A+B are available now, for a one-off payment and/or royalties depending on the commercial application.

Also available for TMS320C5000 are a full range of vocoders including G.711, G.722, G.723.1, G.726, G.728, G.729, G.729+B and other communication algorithms. G.729A and G.729A+B 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.

---

**For further information please contact:**

**SIGNALS+SOFTWARE Ltd.**  
The Heights,  
Lowlands Road,  
Harrow,  
HA1 3AW  
United Kingdom

Tel: +44 (0) 20 8872 9000  
Fax: +44 (0) 20 8872 9001

[www.signalsandsoftware.com](http://www.signalsandsoftware.com)

[sales@signalsandsoftware.com](mailto:sales@signalsandsoftware.com)