



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

SIGNALS+SOFTWARE



Processor

Motorola DSP56300 range.

Background

The algorithms implemented are the ITU-T G.729 Annex A and G.729 Annex A + Annex B recommendations, 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 includes G.729A with the additional option of Annex B. Annex B implements silence compression techniques to reduce the transmitted bit rate during the silent intervals of speech and conforms to Recommendation V.70 silence compression. Systems allowing discontinuous transmission (DTX) are based on Voice Activity Detection (VAD) algorithms and Comfort Noise Generator (CNG) algorithms that allows the insertion of Silence Insertion Descriptor (SID) frames during the silence intervals. This also provides the additional advantage of using lower processing loads and DSP bandwidth resource during silence frames.

Features and Performance

- Approximately 7 channels of G.729A on 100MHz device
- Approximately 7 channels of G.729A+B on 100MHz device
- Less than 15 Kwords of program memory required for either G.729A or G.729A+B
- Less than 14 Kwords of data memory required for 7 channels of G.729A
- Less than 14 Kwords of data memory required for 7 channels of G.729A+B
- Passes all ITU-T test vectors

G.729A	Program Memory		X Data Memory		Y Data Memory		Processing Load (MHz)
	Code (Kwords)	Tables (Kwords)	Variables (Kwords)	Tables (Kwords)	Variables (Kwords)	Tables (Kwords)	
Encoder	5.9	2.9	1.3+n*0.2	1.5	1.0+n*0.4	1.3	n*10.6
Decoder	2.3	2.1	0.9+n*0.04	1.3	0.2+n*0.4	0.8	n*2.0
Encoder + Decoder	7.5	2.9	1.3+n*0.2	1.5	1.0+n*0.7	1.4	n*12.6

Table 1 : DSP Requirements for G.729A

G.729A+B	Program Memory		X Data Memory		Y Data Memory		Processing Load (MHz)
	Code (Kwords)	Tables (Kwords)	Variables (Kwords)	Tables (Kwords)	Variables (Kwords)	Tables (Kwords)	
Encoder	8.9	3.2	1.4+n*0.3	1.5	1.1+n*0.5	1.7	n*10.8
Decoder	3.4	2.3	0.9+n*0.04	1.3	0.2+n*0.4	1.0	n*2.3
Encoder + Decoder	11.0	3.2	1.4+n*0.3	1.5	1.1+n*0.8	1.7	n*13.1

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

Note: Processing loads quote worst-case scenarios with n representing the number of channels. Program memory table values are initialisation values. 1 word equals 24 bits. Kwords equals 1024 words.

Technical Notes

The ITU-T G.729 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 will be achieved by use of a Post Filter.

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.

Availability

Fully optimised code for G.729A and G.729A+B is available now for a one-off payment and/or royalties depending on the commercial application.

Also available for DSP56300 are a full range of vocoders including G.711, G.722, G.726, G.728, G.729, G.729+B and other communication algorithms.

SIGNALS+SOFTWARE

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