



Processor

Motorola DSP56300 range.

Background

The algorithm implemented is the ITU-T G.722 recommendation, variable rate audio coder. The encoder compresses linear-PCM (Pulse Code Modulated), wideband audio input data, at a sample rate of 16kHz, to 64 000 bps and decoding one of three bit rates: 48 000, 56 000, or 64 000 bps. G.722 is a mandatory coding scheme for wideband audio under the ITU specification H.320 for videoconferencing applications. The G.722 specification uses a sub-band ADPCM (adaptive differential pulse code modulation) algorithm.

Features and Performance

- A possible 6 channels of G.722 on 100MHz device
- Less than 900 words of program memory required
- Less than 1200 words of data memory required for 6 channels of G.722
- Passes all ITU-T test vectors.

G.722	Program Memory		X Data Memory		Y Data Memory		Processing Load (MHz)
	Code (words)	Tables (words)	Variables (words)	Tables (words)	Variables (words)	Tables (words)	
Encoder	447	266+55*	76	55	n*76	0	n* 8.68
Decoder	364	169+24*	77	24	n*77	0	n* 7.9
Encoder + Decoder	811	435+79*	153	79	n*153	0	n*16.58

Table 1 : DSP Requirements for G.722

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.

Technical Notes

In G.722 the input samples are split in the frequency domain into a low and a high band covering 0-4kHz and 4-8kHz using quadrature mirror filters (QMF). The samples for each band are then fed into independent ADPCM encoders. Despite only using 2 bits for the high band, the improvement to the speech quality over G.711 and other narrow-band speech coders is very significant.

Like G.711, G.722 is also often used at rates less than 64 000 bps, namely 56 000 and 48 000 bps with a slight reduction in speech quality. This allows an 8 000 bps or 16 000 bps auxiliary data channel. However unlike G.711 it is necessary to inform the decoder of the received bit rate, as it uses different quantisation tables at the different rates, this selection is performed by the decoder initialisation function.

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

Code 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.726, G.728, G.729, G.729A, G.729B, G.729AB and other communication algorithms.

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