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Data Sheet

ITU G.726 Speech Coder

Digital DNA from Motorola

Processor

Motorola DSP56300 range.

Background

The algorithm implemented is the ITU-T G.726 recommendation, variable rate audio coder. The encoder compresses narrowband audio data in A-law or μ-law linear-PCM (Pulse Code Modulated) format, at a sample rate of 8kHz, to 16 000, 24 000, 32 000 and 40 000 bps. G.726 supersedes G.721 and G.723, as the G.726 specification at 32 000 and 40 000 bps is identical to G.721 (32 000 bps only) and G.723 (32 000 and 40 000 bps).

G.726 is used in speech compression for speech storage, digital circuit multiplication and telephony multiplexing applications where the delay must be kept low to avoid side tone echo problems.

Features and Performance

- Approximately 8 channels of G.726 on 100MHz device
- Less than 800 words of program memory required
- Less than 2200 words of data memory required for 8 channels of G.726
- Passes all ITU-T test vectors

G.726	Program Memory		X Data Memory		Y Data Memory		Processing Load (MHz)
	Code (words)	Tables (words)	Variables (words)	Tables (words)	Variables (words)	Tables (words)	
Encoder	600	206	n*73	0	0	206	n*5.7
Decoder	694	206	n*73	0	0	206	n*6.5
Encoder + Decoder	765	206	n*146	0	0	206	n* 12.2

Table 1 : DSP Requirements for G.726

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

The G.726 specification uses an Adaptive Differential Pulse Code Modulation (ADPCM) algorithm. An important feature is that the coding/decoding delay is essentially zero, as the algorithm processes one sample at a time. The performance at the various bit rates for a single encode/decode is judged to be as follows:

40 000 bps Identical to 64 000 bps PCM (G.711) for audio - passes 9 600 bps modem signals
32 000 bps Identical to 64 000 bps PCM for audio
24 000 bps Some degradation from 64 000 bps PCM for audio
16 000 bps Considerable degradation from 64 000 bps PCM for audio but still intelligible

The main application of 32 000 channels is for overload channels carrying voice in Digital Circuit Multiplication Equipment (DCME). The 40 000 bps channel is to carry data modem signals in DCME, especially for modems operating at greater than 4 800 bps. G.726 is now also widely used for Voice over DSL applications.

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

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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