



## ITU G.711 Speech Coder

### SIGNALS+SOFTWARE



#### Processor

Texas Instruments TMS320C5000 DSP range.

#### Background

The algorithm implemented is the ITU-T recommendation G.711 audio coder. The encoder compresses linear narrowband audio input data, at a sample rate of 8kHz, to a data rate of 64 000 bps, using non-linear quantisation. G.711 is a simple algorithm, using two selectable logarithmic coding laws, A-law (European standard) and  $\mu$ -law (US standard).

G.711 is the mandatory minimum standard for all ISDN terminal equipment.

#### Features and Performance

- TI eXpressDSP™ Compliant software available
- A possible 144 channels of G.711 on a 100MHz device
- Less than 0.5Kbytes of program memory required

G.711	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	0.74	0.03	$n * 0.01$	0.02	0.03	0	10	$n * 0.24$
Decoder	0.68	0.03	$n * 0.01$	0.02	0.03	0	10	$n * 0.15$
Encoder + Decoder	1.42	0.06	$n * 0.02$	0.04	0.03	0	10	$n * 0.39$

**Table 1 : DSP Requirements for G.711**

**Note:** The specified program memory sizes include both A-law and  $\mu$ -law.  
Processing loads quote worst-case scenarios with n representing the number of channels.  
Program memory table values are initialisation values. Kbytes equals 1024 bytes.

#### Technical Notes

The figures given above are based on a per-sample implementation of G.711. Significantly lower processing loads are possible with block-based processing.

The above figures use an algebraic implementation of G.711. If requested a table-lookup implementation of G.711 is available. This allows lower processing loads but adds to the overall code size.

G.711 is 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.

#### Interface Details

The eXpressDSP™ G.711 software uses the IG711 interface specified by Texas Instruments in the eXpressDSP™ developers' kit.

The software is also available in a non-eXpressDSP version. The DSP requirements for this version are similar to those given in Table 1.

### 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.723.1, G.728, G.729, G.729A, G.729B/G.729AB, and for other communication algorithms. G.711 is 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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