



**SIGNALS+SOFTWARE**

**Data Sheet**

## ITU G.722 Speech Coder



### Processor

Motorola StarCore™ MSC8101 DSP.

### Background

**SIGNALS+SOFTWARE** are developing a complete suite of communication software for the Motorola MSC8100 family of DSPs. The initial development platform, the MSC8101, utilizes the StarCore™ 140 four ALU (Algorithmic Logic Unit) DSP core. This device also has 512kb memory and a Communications Processor Module (CPM) making it a versatile device for communication applications.

The algorithm implemented is the ITU-T recommendation G.722 variable rate audio coder. The encoder compresses linear wideband audio input data, at a sample rate of 16kHz, to data rates of 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

- G.722 solution undergoing further optimisation. Please see Table 2 for predicted figures.

G.722	Program Memory (Kbytes)	Tables (Kbytes)	Stack (Kbytes)	Data Memory (Kbytes)	Processing Load (MHz)
Encoder	2.11	0.31	0.49	n * 0.14	n * 4.98
Decoder	1.64	0.38	0.49	n * 0.14	n * 4.77
Encoder + Decoder	3.06	0.50	0.49	n * 0.29	n * 9.75

**Table 1 : Current DSP Requirements for G.722**

G.722	Program Memory (Kbytes)	Tables (Kbytes)	Stack (Kbytes)	Data Memory (Kbytes)	Processing Load (MHz)
Encoder + Decoder	6.0	1.0	0.3	n * 0.3	n * 4.5

**Table 2 : Predicted DSP Requirements for G.722**

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

### 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. 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 is it necessary to inform the decoder of the received bit rate, as it uses different quantisation tables for the different rates

### 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. The audio functions are either callable as C functions or as assembly functions.

### Availability

Code is available now, for a one-off payment and/or royalties depending on the commercial application.

Also available for StarCore™ are a full range of vocoders including G.711, G.723.1, G.726, 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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