

## G.711 Encoder/Decoder (v1.12.00) on C64x+

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### FEATURES

- Compliant with the eXpressDSP™ Digital Media (XDM1.0 ISPHDEC1 and XDM1.0 ISPHENC1) interface
  - A-law and U-law compression (encoding) and decompression (decoding) supported
  - Operates on sets of 8 samples
  - Little endian mode of operation supported
  - Validated on DM644x EVM with Code Composer Studio version 3.3.38.2 and code generation tools version 6.0.15
- This codec can be used on any of TI's C64x+ based platforms such as DM644x, DM648, DM643x, DM646x, OMAP35xx and their derivatives.

### DESCRIPTION

G.711 is one of the earliest speech coders that convert 16-bit linear PCM samples to 8-bit compressed A-law or U-law samples to give a 64Kbps data rate in the encoder. Decoder expands 64Kbps bit-stream into linear PCM samples of 16-bits each at 8 KHz.



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## Performance Summary

This section describes the performance of G711 Encoder/Decoder on DM644x EVM.

**Table 1. Configuration Table**

CONFIGURATION	ID
Encoder – 10ms	G711_001
Decoder – 10ms	G711_002
Full Duplex – 10ms	G711_003

**Table 2. Cycles Information – Profiled on DM644x EVM with Code Generation Tools Version 6.0.15**

CONFIGURATION ID	PERFORMANCE STATISTICS (MEGA CYCLES PER SECOND) <sup>(1)(2)(3)</sup>	
	AVERAGE <sup>(4)</sup>	PEAK <sup>(4)</sup>
G711_001	0.22	0.22
G711_002	0.22	0.22
G711_003	0.44	0.44

(1) Measured with frame size= 80 samples (10ms).

(2) Measured with 32K L1P configured as cache, 16K L1D configured as cache and 64KB L2 configuration configured as cache.

(3) All program and data is placed in External Memory. L1P, L1D and L2 are invalidated before each encoder and decoder execution.

(4) Average and peak MCPS measurements can vary by +/-5%.

**Note:** Cycle numbers vary across C64x+ platforms depending on the size of cache at L1P, L1D, L2, DDR2 clock and DSP clock.

**Table 3. Memory Statistics - Generated with Code Generation Tools Version 6.0.15**

CONFIGURATION ID	MEMORY STATISTICS <sup>(1)</sup>				
	PROGRAM MEMORY	DATA MEMORY			TOTAL
		INTERNAL	EXTERNAL	STACK	
G711_001	1.16	0	0.008	0.02	1.188
G711_001	0.86	0	0.508	0.02	1.388
G711_003	2.02	0	0.516	0.02	2.556

(1) All memory requirements are expressed in kilobytes (1 kilobyte = 1024 bytes).

**Table 4. Internal Data Memory Split-Up**

CONFIGURATION ID	DATA MEMORY - INTERNAL <sup>(1)</sup>			INSTANCE <sup>(2)</sup>
	SHARED			
	CONSTANTS	SCRATCH		
G711_001	Not used	Not used	Not used	
G711_002	Not used	Not used	Not used	
G711_003	Not used	Not used	Not used	

(1) All memory requirements are expressed in kilobytes (1 kilobyte = 1024 bytes).

(2) Does not include I/O buffers.

**Table 5. External Data Memory Split-Up**

CONFIGURATION ID	DATA MEMORY - EXTERNAL <sup>(1)</sup>			INSTANCE <sup>(2)</sup>
	SHARED			
	CONSTANTS	SCRATCH		
G711_001	0	0	0.008	
G711_002	0.5	0	0.008	
G711_003	0.5	0	0.016	

(1) All memory requirements are expressed in kilobytes (1 kilobyte = 1024 bytes).

(2) Does not include I/O buffers.

## Notes

- Total data memory for N Non-Pre-Emptive Instances = Constants + Runtime Tables + Scratch + N\*(Instance + I/O buffers + Stack)
- Total data memory for N Pre-Emptive Instances = Constants + Runtime Tables + N\*(Instance + I/O buffers + Stack + Scratch)

## References

- ITU-T Recommendation G.711:Pulse code modulation (PCM) of voice frequencies
- *G.711 Encoder/Decoder on C64x+ User's Guide* (literature number: SPRUEC9B)

## Glossary

Term	Description
Constants	Elements that go into .const memory section
Scratch	Memory space that can be reused across different instances of the algorithm
Shared	Sum of constants and scratch
Instance	Persistent-memory that contains persistent information - allocated for each instance of the algorithm

## Acronyms

Acronym	Description
EVM	Evaluation Module
ITU	International Telecommunication Union
ITU-T	Telecommunication Standardization Sector of ITU
PCM	Pulse Code Modulation
XDM	eXpressDSP Digital Media

## Revision History

This data sheet revision history highlights the changes made to the SPRS341A codec specific data sheet to make it SPRS341B.

**Table 6. Revision History of G711 Encoder/Decoder on C64x+**

SECTION	ADDITIONS/MODIFICATIONS/DELETIONS
Global	<ul style="list-style-type: none"> <li>• Modified code generation tools version to 6.0.15</li> </ul>
<a href="#">Section 1</a>	Features: <ul style="list-style-type: none"> <li>• Updated supported platforms</li> </ul>
<a href="#">Table 2</a>	Cycles Information: <ul style="list-style-type: none"> <li>• Updated Average value for Configuration ID G711_002</li> <li>• Added table footnote 'Average and peak MCPS measurements can vary by +/-5%'.</li> </ul>

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