G722 Codec on (v1.10) C64x+

FEATURES

- **Compliant with the eXpressDSP™ Digital Media (XDM 0.9 ISPHENC/ISPHDEC) interface**
- **Little endian mode of operation supported**
- **Bit Compliant with ITU-T G.722 specifications**
- **Optimized for TI C64x+ DSP**
- **C-callable interface for encoder and decoder**
- **Re-entrant multi channel implementation**
- **Fully interruptible Code**
- **Relocatable tables**
- **Efficient scratch memory management with reduced stack requirements**
- **The implementation support run-time data buffers relocation and table relocation**
- **Validated on DM6446 EVM with Code Composer Studio version 3.3.38.2 and code generation tools version 6.0.7**
- **This codec can be used on other C64x+ platforms like C6455, DM648, DM6437, DM644x, DM6467, OMAP3430, and OMAP3530**

DESCRIPTION

The ITU G.722 converts digitized, linear PCM input signals (15 bits) sampled at 16 KHz sampling rate into a 64Kbps SB-ADPCM bit-stream at the encoder. Decoder expands 48/56/64Kbps bit-stream into PCM samples of 15 bits each at 16Khz.

PRODUCT PREVIEW

Performance Summary

Table 1. Configuration Table

CONFIGURATION	ID
Encoder – 10ms	G722_001
Decoder – 10ms	G722_002
Full Duplex – 10ms	G722_003

Table 2. Cycles Information–Profiled on DM6446 EVM with Code Generation Tools Version 6.0.7

CONFIGURATION ID	PERFORMANCE STATISTICS (MEGA CYCLES PER SECOND)(1)(2)	
	AVERAGE	PEAK
G722_001	1.75	2.22
G722_002	1.61	1.78
G722_003	3.36	4.0

(1) MCPS is measured with L1p=32kB, L1d=16kB, L2=64kB. L1P, L1D, and L2 are invalidated after each encoder and decoder execution. Also, measured with framesize=160samples(10ms).
(2) Optimal function placement order followed as per the user guide section Appendix B.

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 6.0.7

CONFIGURATION ID	MEMORY STATISTICS(1)				TOTAL
	PROGRAM MEMORY	DATA MEMORY			
		INTERNAL	EXTERNAL	STACK	
G722_001	4.7	0	0.86	0.27	5.83
G722_002	4.675	0	0.85	0.3	5.83
G722_003	9.375	0	1.02	0.3	10.695

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

Table 4. Internal Data Memory Split-Up

CONFIGURATION ID	DATA MEMORY - EXTERNAL(1)		
	SHARED		INSTANCE(2)
	CONSTANTS	SCRATCH	
G722_001	Not used	Not used	Not used
G722_002	Not used	Not used	Not used
G722_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 - INTERNAL(1)		
	SHARED		INSTANCE(2)
	CONSTANTS	SCRATCH	
G722_001	0.53	0.16	0.17
G722_002	0.53	0.16	0.16
G722_003	0.53	0.16	0.33

(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.722
- *G.722 Encoder/Decoder on C64x+ User's Guide* (literature number: SPRUFS2)

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

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