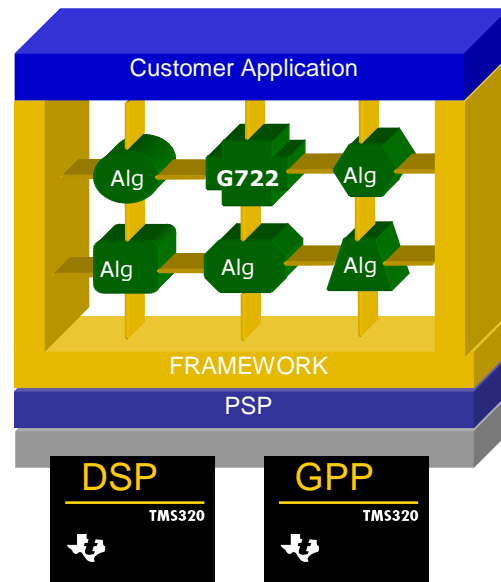




- This is an implementation of ITU G.722 recommendations on TI C64X+ processor
- Mixed C and C64X+ assembly code implementation
- eXpressDSP™ compliant
- Bit-exact with all ITU G722 test sequences
- Validated on TMS320C6455 DSK with Code Composer Studio 4.2 and Code Generation Tools version 7.2.0A10197
- Supports both ELF and COFF formats



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

- Encoder Compresses linear PCM input signals (15 bits) sampled at 16 kHz sampling rate into a 64Kbps SB-ADPCM bit-stream
- Decoder expands 48/56/64Kbps bitstream into PCM samples of 15 bits each at 16KHz
- 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
- Implementation Compatible with TI XDAIS rules
- Fully interruptible Code
- Support ITU G.722 Appendix IV Packet Loss Concealment (PLC)
- Relocatable tables
- This release supports Big Endian and Little Endian Mode of operation
- Efficient Scratch memory management with reduced stack requirements
- The implementation support run time data buffers relocation & table relocation
- The implementation supports both ELF and COFF formats
- Fully validated on TMS320C6455 DSK, using CCS version 4.2 with the code generation tools version 7.2.0A10197



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Summary of performance

Table 1. Configuration Table

CONFIGURATION	ID
Encoder ,Big Endian	G722_001
Decoder during bad frame , Big Endian	G722_002
Decoder during good frame ,Big Endian	G722_003
Full Duplex during good frame ,Big Endian	G722_004
Encoder ,Little Endian	G722_005
Decoder during bad frame , Little Endian	G722_006
Decoder during good frame , Little Endian	G722_007
Full Duplex during good frame , Little Endian	G722_008

Table 2. Cycles Information – TMS320C6455 DSK (COFF Library)

CONFIGURATION ID	PERFORMANCE STATISTICS (IN MEGACYCLES/SEC) ¹	
	AVERAGE	PEAK
G722_001	1.48	1.65
G722_002	1.30	1.62
G722_003	1.25	1.27
G722_004	2.73	2.92
G722_005	1.42	1.61
G722_006	1.31	1.64
G722_007	1.25	1.27
G722_008	2.67	2.88

¹ Measured with frame size= 160 samples (10ms)

Measured with 32K L1P configured as cache, 32K L1D configured as cache , with all program and data in L2 Memory configured as SRAM. Both L1P and L1D are invalidated before each encoder and decoder execution

Table 3. Cycles Information – TMS320C6455 DSK (ELF Library)

CONFIGURATION ID	PERFORMANCE STATISTICS (IN MEGACYCLES/SEC) ¹	
	AVERAGE	PEAK



G722_001	1.47	1.66
G722_002	1.30	1.62
G722_003	1.25	1.27
G722_004	2.72	2.93
G722_005	1.43	1.62
G722_006	1.30	1.64
G722_007	1.24	1.27
G722_008	2.67	2.19

¹ Measured with frame size= 160 samples (10ms)

Measured with 32K L1P configured as cache, 32K L1D configured as cache , with all program and data in L2 Memory configured as SRAM. Both L1P and L1D are invalidated before each encoder and decoder execution

Table 4. Memory Statistics - Generated with Code Generation Tools Version 7.2.0A10197 (COFF Library)

CONFIGURATION	MEMORY STATISTICS ²				
	PROGRAM MEMORY	DATA MEMORY			TOTAL
		INTERNAL	EXTERNAL	STACK	
G722_001	4.69	2.05	0	0.14	6.88
G722_002/ G722_003	21.81	4.43	0	0.27	26.51
G722_004	26.5	4.60	0	0.41	31.51
G722_005	4.69	2.05	0	0.14	6.88
G722_006/ G722_007	22.68	4.43	0	0.27	27.38
G722_008	27.37	4.60	0	0.41	32.38

² All memory requirements are expressed in kilobytes (1 kilobyte = 1024 8-bit bytes).

Table 5. Memory Statistics - Generated with Code Generation Tools Version 7.2.0A10197 (ELF Library)

CONFIGURATION	MEMORY STATISTICS ²				
	PROGRAM MEMORY	DATA MEMORY			TOTAL
		INTERNAL	EXTERNAL	STACK	
G722_001	4.69	2.05	0	0.14	6.88
G722_002/ G722_003	21.81	4.43	0	0.27	26.51
G722_004	26.5	4.60	0	0.41	31.51
G722_005	4.69	2.05	0	0.14	6.88
G722_006/ G722_007	22.6	4.43	0	0.27	27.3



G722_008	27.29	4.60	0	0.41	32.3
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² All memory requirements are expressed in kilobytes (1 kilobyte = 1024 8-bit bytes).

Table 6. Internal Data Memory Split-up

CONFIGURATION	DATA MEMORY – INTERNAL ²		
	SHARED		INSTANCE ³
	CONSTANTS	SCRATCH	
G722_001	1.44	0.44	0.17
G722_002/ G722_003	1.44	1.14	1.85
G722_004	1.44	1.14	2.02
G722_005	1.44	0.44	0.17
G722_006/ G722_007	1.44	1.14	1.85
G722_008	1.44	1.14	2.02

³ All memory requirements are expressed in kilobytes (1 kilobyte = 1024 8-bit bytes)

⁴ 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 Recommendation G.722

glossary

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

ITU	International Telecommunication Union
ITU-T	Telecommunication Standardization Sector of ITU



REVISION HISTORY

Scope: Applicable updates to the G722 on C6455 have been incorporated.

DATE	VERSION	ADDITIONS/CHANGES/DELETIONS
08 FEB 2005	1.0	Initial Version
07 MAR 2005	1.1	Updated after re-release
10 NOV 2006	1.00	Adding xDM APIs.
MAR 2009	1.11.00	Big endian support
JUNE 2009	1.12.00	ITU-T Appendix IV (plc) support
January 2012	2.00.00	Added ELF support

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