# WMA Version9 Decoder (v1.13) on C64x+

## FEATURES

- **eXpressDSP Digital Media (XDM) interface compliant**
- **Validated on DRA446 EVM**
- **All versions, namely V2, V7, V8, V9, V9 beta odd, and V9 NC supported**
- **Class 4 implementation of WMA decoder supported**
- **Low, medium, and high bit-rates supported**
- **Variable Bit Rate (VBR) mode supported**
- **Maximum of two channels supported**
- **Raw Compressed Audio (RCA) streams supported**
- **Outputs 16-bit PCM samples**
- **8 - 48 kHz output sampling rates and 5 - 384**

- **kbps input bit- rates supported**
- **Microsoft Acceptance Test criteria compliant**
- **Digital Rights Management (DRM) not supported**

## DESCRIPTION

WMA Version9 Decoder is WMA standard decoder that decodes Windows Media Audio files in the Advanced Systems Format (ASF). It is validated on DRA446 EVM with Code Composer Studio version 3.2.40.12 and Code Generation Tools version 6.0.8.

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## Performance Summary

This section describes the performance of the WMA Version9 Decoder on C64x+ (on DRA446).

### Table 1. Configuration Table

| CONFIGURATION | ID |
|---|---|
| RCA support library | WMA_DEC_001 |

### Table 2. Cycles Information - Profiled on DRA446 EVM with Code Generation Tools Version 6.0.8

| CONFIGURATION ID | PERFORMANCE STATISTICS (MEGA CYCLES PER SECOND)[1] | | |
|---|---|---|---|
| | TEST DESCRIPTION | AVERAGE | PEAK |
| WMA_DEC_001 | test1_WMA_v8_20kbps_22kHz_2.wma | 14.66 | 39.23 |
| | test1_WMA_v8_32kbps_44kHz_2.wma | 14.75 | 25.81 |
| | test2_WMA_v9_1pCBR_320kbps_48kHz_2.wma | 15.67 | 36.11 |
| | test2_WMA_v9_2pVBR-Bitrate_192kbps_48kHz_2_NC.wma | 13.88 | 30.14 |
| | test2_WMA_v9_2pVBR-Peak128kbps_Avg64kbps_48kHz_2_NC.wma | 11.15 | 25.20 |
| | test2_WMA_v9_1pCBR_128kbps_44kHz_2_NC.WMA | 12.10 | 29.46 |

(1) Measured with program memory, stack, and I/O buffers in external memory and with cache configuration: 64K-bytes L2, 32K-bytes L1P, and 16K-bytes L1D cache with cache thrashing.

### Table 3. Memory Statistics - Generated with Code Generation Tools Version 6.0.8

| CONFIGURATION ID | MEMORY STATISTICS[1] | | | | TOTAL |
|---|---|---|---|---|---|
| | PROGRAM MEMORY | DATA MEMORY | | | |
| | | INTERNAL[2] | EXTERNAL | STACK | |
| WMA_DEC_001 | 113 | Not used | 122.34 | 6 | 241.34 |

(1) All memory requirements are expressed in kilobytes (1K-byte = 1024 bytes).
(2) Internal memory is not used.

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

| CONFIGURATION ID | DATA MEMORY - INTERNAL[1] | | |
|---|---|---|---|
| | SHARED | | INSTANCE |
| | CONSTANTS | SCRATCH | |
| WMA_DEC_001 | Not used | Not used | Not used |

(1) All memory requirements are expressed in kilobytes.

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

| CONFIGURATION ID | DATA MEMORY - EXTERNAL [1] | | |
|---|---|---|---|
| | SHARED | | INSTANCE |
| | CONSTANTS | SCRATCH | |
| WMA_DEC_001 | 59.28 | 16 | 47.06 |

(1) All memory requirements are expressed in kilobytes.

### Table 6. Co Processor(s) Memory Statistics

| CONFIGURATION ID | SEQ DATA MEMORY | SEQ PROG MEMORY | IMX WORKING MEM | IMX IMG BUF | IMX CMD MEM |
|---|---|---|---|---|---|
| WMA_DEC_001 | 0 | 0 | 0 | 0 | 0 |

Product Folder Link(s):

**Note**: The decoder does not use co-processors and hence all the values are zero.

**PRODUCT PREVIEW**

## Notes

- I/O buffers:
  - Input buffer size = 25K-bytes
  - Output buffer size = 16K-bytes
- 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

- Implementation Acceptance test specification, Version 9.00, Revision G. Date: May 19, 2003, Microsoft Corporation.
- An Overview of Windows Media Audio Decoding, WMA Version 7.0, Microsoft Corporation.
- TMS320 DSP Algorithm Standard API Reference (literature number SPRUF02A)

## 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 |
|---------|-------------|
| ASF | Advanced Systems Format |
| EVM | Evaluation Module |
| RCA | Raw Compressed Audio |
| VBR | Variable Bit Rate |
| WMA | Windows Media Audio |
| XDM | eXpressDSP Digital Media |

**PRODUCT PREVIEW**

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