

# Ittiam Dolby Digital (AC3) Decoder

## Dolby Digital Decoder

Dolby Digital™ AC-3 is a perceptual audio coding standard, used by several consumer applications, like digital terrestrial television broadcasting, several cable and satellite television standards, worldwide DVD audio. Its underlying perceptual coding engine provides high quality multi-channel audio at low bit-rates, a flexible format, integrated support for important consumer features, and moderate implementation complexity. It also supports a number of system features that improve the overall listening experience, such as volume normalization and dynamics processing.

Note on Licensing: Ittiam’s AC-3 Decoder implementation on ARM9E is provided subject to the terms and conditions of the Dolby Laboratories Licensing Corporation and requires certification of the end product.

## Features

- 5.1 Channel decoding
- Sampling Rates 32, 44.1 and 48 kHz
- Bitrates : 32 – 640 kbps
- Channel Coupling
- Re-matrixing
- Dialog normalization
- Dynamic Range Compression
- Downmixing
- Error detection (CRC checking)
- Supports Annex C of ATSC-A52 (Karaoke Capable)
- Supports Annex D of ATSC-A52 (Extended bit-stream)

- Supports a simple C callable with flexible memory allocation scheme
- Multi-channel, Reentrant software

## Decoder Validation

The AC3 Decoder is validated for the conformance against the specification.

## Resource requirements on ARM9E Processor

Function	MCPS	Pgm	Tables	Static	Scratch
	Peak	ROM (kb)		RAM (kb)	
<b>AC3 Decoder</b>	56.6	42	5.5	8	9

### Note

The Data Memory mentioned in the above Table does not include Input/ Output buffers.

MCPS measurement is with 0 wait-state memory access.

## Details of ARM9E Resources required

### CPU Loading

CPU Description	Simulator		Hardware	
	Ave MCPS	Peak MCPS	Ave MCPS	Peak MCPS
384 Kbps 48 kHz 5.1 channels	32.9	56.6	78	103

### Memory Usage

Program	Program	Tables	Static	Stack	Scratch	Input	Output
AC3 Dec	42	5.5	8	1	9	3.75	3

#### Note:

- Memory numbers are in KB (Kilobytes)
- I/O Buffer size for single input/output buffers
- Performance numbers on Simulator generated with ARM ADS Tools version 1.2 *with 0-wait state memory access and without Cache*
- Hardware performance generated on a ARM9E processor with 16Kb of I Cache and 8 Kb of D Cache
- Hardware performance generated under Linux 2.6 , using the ARM-GCC 3.4.3 Compiler
- MCPS numbers on the hardware will vary with the I-Cache and D-Cache size and with the memory configuration/place
- The peak MCPS given above for difmus4.ac3 which is a 384 kbps 48 kHz 5.1 channel stream.
- The output buffer requirement is assuming block output is enabled with 16 bits sample size. The output buffer requirements are 16 bit frame output 18 kB, 24 bit block output 4.75 kB and 24 bit frame output is 27 kB.

#### Notice

Ittiam Systems reserves the right to make changes to its products or discontinue any of its products or offerings without notice. Ittiam warrants the performance of its products to the specifications applicable at the time of sale in accordance with Ittiam's standard warranty.



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