ARC® Video Subsystem MPEG 2/4 Decoder v1.2

MPEG-2 MP@ML, MPEG-4 SP, MPEG-4 ASP, H.263 and MJPEG Decoder

Release Notes

5827-013

ARC® Video Subsystem MPEG 2/4 Decoder v1.2 Release Notes

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Chapter 1 — Introduction

This release contains the ARC® Video Subsystem MPEG 2/4 Decoder for the ARC 700 processor with the ARC Media Extensions.

The ARC Video Subsystem MPEG 2/4 Decoder is based on the FFMPEG solution and supports the following decoders:

- MPEG 2 Decoder, MPEG-2 Main Profile and Main Level (MPEG 2 MP@ML).
- MPEG 4 SP Decoder, MPEG-4 Simple Profile (MPEG-4 SP).
- MPEG 4 ASP Decoder, MPEG-4 Advanced Simple Profile (MPEG-4 ASP).
- H.263 Decoder, annexes I, J, and T.
- MJPEG Decoder.

FFMPEG is distributed under the GNU Lesser General Public License (LGPL), a copy of which is available at http://www.gnu.org/copyleft/lesser.html.

Supported IP Libraries, Tools and OS Platforms

The ARC Video Subsystem MPEG 2/4 Decoder implementation supports the following IP Libraries, tools and host operating systems:-

Company	Product	Version
ARC	ARChitect 2	2.9.51 or later
ARC	ARC 700 IP Library	4.4 for MX [1]
ARC	ARC 700 IP Library	4.6 or later for MXP [2]
ARC	ARC Media Extensions IP Library (MX)	1.1 or later
ARC	ARC Media Extensions Processor IP Library (MXP)	1.1 or later
MetaWare	High C/C++ Toolset	7.4.3 Patch 2 or later
Microsoft	Windows XP	2002 Service pack 2
Red Hat	Linux	RHEL 3.0

Notes

1 ARC 700 IP Library version 4.4 is compatible with MX only

2 ARC 700 IP Library version 4.6 or later is compatible with MXP

Supported ARC Video Subsystems

The ARC Video Subsystem MPEG 2/4 Decoder supports the following ARC Video Subsystems:

Product	IP Library Version
AV 417V	MXP 1.1 or MXP 1.2
AV 407V	MXP 1.2
AV 406V	MXP 1.2
AV 404V	MXP 1.2
AV 402V	MXP 1.2
AV 401V	MXP 1.3
AV 401	MX 1.1

Features

The following codecs are supported:

- MPEG-2 Main Profile and Main Level Decoder, ISO/IEC 13813-4 Compliant
- MPEG-4 Simple Profile Decoder, ISO/IEC 14496-4 Compliant
- MPEG-4 Advanced Simple Profile Decoder, ISO/IEC 14496-4 Compliant
- H.263 Annex J, I, T, ITU-T Compliant
- MJPEG Decoder

Release Details

The following table contains the release details for the ARC Video Subsystem MPEG 2/4 Decoder implementation on the ARC 700 processor.

Software	MPEG-2/4 Decoder
Processor	ARC 700
Version No	1.2
Release Date	31/Mar/2008

Installation Structure

The ARC Video Subsystem MPEG 2/4 Decoder library is supplied as a single ARChitect IP Library file using the file extension `.iplib`.

Building with ARChitect creates the full build structure of the ARC Video Subsystem MPEG 2/4 Decoder.

Documentation

The *ARC Video Subsystem MPEG 2/4 Decoder Bookshelf* is the starting point for all the documentation, and provides links to the following:

- *ARC Video Subsystem MPEG 2/4 Decoder Release Notes*: Containing a summary of the release, and changes since the last release.
- *ARC Video Subsystem MPEG 2/4 Decoder Getting Started*: Containing a summary on using the product.
- *ARC Video Sub-System Codecs Application Programming Interface Reference*: Describing the C Application Program Interface (API) and resource requirements and the basic integration and usage of the codec library.

To view the on-line documentation, select **Help > Contents** from the ARChitect menu.

Chapter 2 — Build Structure

Extracting the provided codec ZIP file creates a full build structure. The contents of the extracted system are described in the following sections:

Build Specification

The ARC Video Subsystem MPEG 2/4 Decoder module has the following build specifications:

- Makefile for building codec and example wrapper using the MetaWare C/C++ compiler toolchain
- You can execute the built codec using the MetaWare debugger instruction set simulator or on an ARCangel 4 FPGA platform using an ARC 700 FPGA image.
- The codec requires the ARC 700 Media Extensions with or without optional Huffman acceleration, and is built in release mode (no debug information is contained in the object files).

Build Directory Structure

The directory structure for the build related files and the associated documents are as follows.

Table 1 Directory Structure

Directory	Files	Description
`MPEGDecoderLib`	`*.h`, `*.c`	API Wrapper source files
`MPEGDecoderLib\libarcavcodec`	`*.h`, `*.c`	MPEG-2/4 codec source files
`MPEGDecoderApp`	`*.h`, `*.c`	Example application source files
`MPEGDecoderLib\deps`, `MPEGDecoderApp\deps`	`*.dep`	C/C++ dependency files
`MPEGDecoderLib\obj`, `MPEGDecoderApp\obj`	`*.o`	Compiled and assembled relocatable object files
`MPEGDecoderLib`, `MPEGDecoderLib\libarcavcodec`	`*.a`	Library/archive files

Build File Descriptions

The following sections detail the specific files contained in the installation structure:

Build Files

The root directory contains the following files used for building the projects for the ARC Video Subsystem MPEG 2/4 Decoder using the project space provided.

- `Makefile` – generic makefile to build the codec and wrapper application
- `mpeg.cmd` – linker command file to control linkage of the example application

Source Files

The source directories contain the following files, which are the source for making the projects.

- `MPEGDecoderLib\libarcavcodec` – contains all MPEG decoding files, with ARC specific files in the `arc` sub-directory (C source and header files)
- `MPEGDecoderLib` – contains API wrapper code (`arc_mpeg.c`) to provide the documented ARC Video Codec API
- `MPEGDecoderApp` – contains an example application file (`main.c`).

Header Files

The `MPEGDecoderLib` directory contains the following files, which are the headers required for using the API in other projects.

- `arc_codecs.h` – header file required by any code that wishes to use the ARC MPEG Video Codec library
- `stdint.h` – local implementation of C99 types

Linker Command File

The root directory contains the file `mpeg.cmd`, which is the linker command file for memory placements.

Chapter 3 — Release Change Information

The major changes from previous releases of the ARC Video Subsystem MPEG 2/4 Decoder module are described here.

The following release change information is available:

Release v1.2

This release covers the following changes:

- Maintenance updates to the MPEG-2/4 decoder
- Introduction of H.263 annexes I, J, and T

Maintenance updates to the MPEG-2/4 decoder

There were some maintenance updates to the MPEG-2 and MPEG-4 decoder functions. Please refer to the support site https://support.ARC.com for further details.

Introduction of H.263 annexes I, J, and T

The FFMPEG code has been adapted to include support for annex I (advanced intra prediction), T (modified quantization mode) and J (deblocking filter mode).

H.263 material that is encoded using the annex J coding tool requires that the ARC Video Subsystem is operated at a frequency of at least 150 MHz to achieve CIF 30 frames-per-second decoding rate.

Release v1.1

The key updates from the Early Adopters Program (EOP) release are listed here.

The key features of this release are:

- Improved Decoder Performance
- MPEG 2 and MPEG-4 SP ISO Compliant
- MPEG-4 ASP ISO Compliant Option
- MJPEG Decoder

Improved Decoder Performance

This release contains improved decoder performance over any previous Early Access Program (EOP) releases.

MPEG 2 and MPEG-4 SP ISO Compliant

The FFMPEG code has been adapted by ARC to be compliant to ISO/IEC standard. See Known Issues for any caveats.

MPEG-4 ASP ISO Compliant Option

An ISO compliant GMC option is provided for the MPEG-4 ASP Decoder. The ISO GMC option ensures that the MPEG-4 ASP decoder is complaint to the ISO/IEC standard. With this option GMC macroblock handling is supported using the processor core and not the SIMD Extensions unit, therefore decoder performance is impacted when dealing with S picture or S macroblock types.

The Non ISO compliant GMC option treats any S-type macroblock as a P-type macroblock by using the average motion vector, calculated as per section 7.8.7.3 in the ISO specification. This option allows the decoder to run at a greater speed compared to the ISO compliant GMC option.

MJPEG Decoder

The ARC Video Subsystem MPEG 2/4 Decoder also supports MJPEG data stream decode.

Release v1.0

This is the first Early Adopters Program (EOP) release from ARC International.

Chapter 4 — Known Issues

An up to date list of product issues is located on the customer support site, https://support.arc.com/.

Known Limitations

Limitations known at the time of release are listed here.

MPEG-2 Decoder Fails Some ISO Tests

The MPEG-2 decoder does not handle *d-type* picture types, and therefore does not pass `tcela-18-d-pict`.

The current supplied wrapper (not the codec) does not handle appending of different stream resolution types as tested by `ME12.stream17` and `ME12.stream17_long`.