

## Mobile

### Mobile Streaming & Playback on ARM Devices

As mobile entertainment continues to grow and consumers demand faster, better experiences, content producers need to ensure optimal audio-visual performance across multiple platforms and devices.



MainConcept<sup>®</sup> Mobile SDK Packages provide components for real-time decoding on Android and iOS ARMv7 and ARMv8 devices in various profiles, at levels supported by the HEVC/H.265 and AVC/H.264 standards. The SDKs also include a set of powerful network components for network streaming, including Apple HLS, DASH-264 and DASH-265 playback. The components allow decoding HEVC/H.265 as well as H.264/AVC and AAC both in MP4, MPEG-2 TS file format or as Elementary Stream on mobile devices.

H.265 mobile decoding supports HEVC Main (4:2:0 8-bit) as well as Main 10 (4:2:0 10-bit) Profiles, and enables HM 14.0-compliant, real-time elementary stream playback up to 1080p at 30 frames per second. The MainConcept HEVC Decoder offers Wavefront Parallel Processing (WPP), Tiles, Slices and I- P- and B-frames support, including the ability to process streams with deblocking and Sample Adaptive Offset (SAO) enabled. HEVC's flexible coding units supported up to 64 x 64, replace fixed-size AVC/H.264 macroblocks, sub-partitioning the picture into rectangular regions.

MainConcept Mobile SDKs also offer an AVC/H.264 Decoder for ARM providing real-time playback for Android and iOS in various profiles, at levels defined by the standard. The components allow AVC/H.264 and AAC (i.e. AAC LC, HE AAC v1 and HE AAC v2) real-time decoding on mobile devices up to 1080p. Together with the MPEG-2 Demuxer, you the Mobile SDK is now able to play back Apple HLS compliant streams on both iOS and Android.

### MAINCONCEPT MOBILE SDK BENEFITS:

- Leverage the same API as all other MainConcept codecs.
- Gain a flexible SDK solution for decoding HEVC/H.265 in most mobile environments.
- Speed time to market with highly specialized integration support.
- Enjoy feature-rich, format-compliant open standard codec technology

Mobile SDK Packages work on every ARM CPU with ARMv7 (32-bit) and ARMv8 (64-bit) instruction sets, such as NVIDIA Tegra 3, Apple A5/A6X and various ARM Cortex and Snapdragon CPU's that can be found in the Apple iPad 3 (and higher), Asus Nexus 7, Sony XPERIA Tablet S, etc. The HEVC as well as the AVC Decoder for ARM come with an automatic NEON detection to make use of this extension when available for increased performance.

The package for ARM comes with a set of updated network components, in order to receive streams over the network. It allows users to receive and playback Apple HLS, DASH-264 and DASH-265 content which is not necessarily supported natively by the device (e.g. MPEG-DASH on iOS). In addition, the package contains a complete DLNA Stack Module, including a DLNA Media Server, DLNA Control Point as well as a DLNA Media Renderer.

## FEATURES

### HEVC/H.265 ARM DECODER:

**Profiles:**

HEVC Main / Main 10 Profiles, 4:2:0 8-bit / 10-bit 1080p (HM 14.x compliant)

**Optimizations:**

Multi-core & multi-threading support

**Acceleration:**

NEON, Advanced SIMD, MPE

**Memory Usage:**

Cache usage, memcpy and memset optimizations

**In-Loop Filters:**

Deblocking filter & Sample Adaptive Offset (SAO)

**Coding Unit Support:**

8 x 8 up to 64 x 64

**Compression:**

Support for I-, P-, B-Frames

**Parallel Decoding:**

Wavefront Parallel Processing (WPP)

**Transform Unit Support:**

4 x 4 up to 32 x 32

**Chroma Offset:**

Feature in deblocking filter allowing adjustment of the Quantization Parameters (QP) in the Chroma component.

**Parallel Processing:**

Switchable Wavefront Parallel Processing (WPP)

**Tiles / Slices:**

Tiles and Slices for improved parallel processing of large-resolution images

**Scaling List:**

Support for HEVC/H.265 streams that use Scaling Matrices / Lists

**Error Resilience:**

Improved decoder robustness

**Entropy Coding:**

CABAC optimizations

**NEON Filter Optimizations:**

Optimizing special functions, such as deblocking filter, Intra DC-only filter, Intra neighbor filter

**Motion Prediction:**

Inter Luma & Inter Chroma as well as Intra Prediction optimizations; Constrained Intra Prediction, Different Merge Levels

**CPU Instruction Set:**

ARMv7 (32-bit) & ARMv8 (64-bit)

**Supported Operating Systems:**

Android and iOS

### AVC/H.264 DECODER:

**Profiles:**

Baseline, Main and High Profile (4:2:0 8-bit)

**Level:**

Up to 3.2

**Compression:**

Support for I-, P-, B-slices

**Max Resolution:**

Up to 1080p

**In-Loop Filter:**

Deblocking filter

**Quality Control:**

Weighted prediction

**Frame Structure:**

Progressive, interlaced

**Entropy Coding:**

CABAC, CAVLC

**Interpolation:**

Full-, half-, and quarter-pixel

**Miscellaneous:**

Low delay flag, Field pictures, Fields reordering, Chroma upsampling

**Color Spaces:**

Native FOURCC YV12 (other color spaces supported via built-in Universal Color Converter module)

**Processor Architectures:**

Optimized for NEON instructions.

**CPU Instruction Set:**

ARMv7 (32-bit) and ARMv8 (64-bit) platforms

**Supported Operating System:**

Apple iOS (ver. 5 and higher) and Android (ver. 4.0 and higher)

## STREAM TYPES & FORMATS

**Elementary Stream:**

Generic AVC/H.264 and HEVC/H.265 Elementary Streams

**Transport Stream:**

Apple HLS; Generic AVC/H.264 and HEVC/H.265 MPEG TS Streams

**MP4:**

DASH-264, DASH-265; Generic AVC/H.264 and HEVC/H.265 MP4 Streams

**3GP:**

Generic AVC/H.264 3GP Streams compliant with older mobile devices such as cell phones and tablets

## MAINCONCEPT MOBILE SDK PACKAGES

**MOBILE SDK AVC/H.264**

Complete set of AVC/H.264 mobile network and decoding components, incl. support for receiving and playing back Apple HLS and DASH-264.

**MOBILE SDK HEVC/H.265**

Complete set of HEVC/H.265 mobile network and decoding components, incl. support for receiving and playing back DASH-265.

## COMPONENTS

### MOBILE SDK AVC/H.264

AVC/H.264 Video Decoder  
DLNA Stack (incl. DLNA Media Server, Control Point, Media Renderer)  
Network Source  
SDP Parser  
Net Tools  
AAC Decoder  
MP4 Demuxer  
MPEG-2 Demuxer  
Color Converter (not optimized)

### MOBILE SDK HEVC/H.265

HEVC/H.265 Video Decoder  
DLNA Stack (incl. DLNA Media Server, Control Point, Media Renderer)  
Network Source  
SDP Parser  
Net Tools  
AAC Decoder  
MP4 Demuxer  
MPEG-2 Demuxer  
Color Converter (not optimized)

## TECH SPECS

- **ARMv7** and **ARMv8** devices running **Android ver. 4 and higher**
- **ARMv7** and **ARMv8** devices running **Apple iOS ver. 5 and higher**

**MORE INFORMATION:**  
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