

## 1 Release Description

The features described in the release notes are NXP extended media formats and codecs based on Android™ native media framework.

Only codecs that have no license restriction are included in the standard release package.

Codecs that have license restriction are provided in separate packages. For more details, see Section 6 [License-Restricted Codecs](#).

## 2 Supported Hardware SoCs/Boards

- i.MX 8M Mini
- i.MX 8M Nano
- i.MX 8M Plus
- i.MX 8M Quad
- i.MX 8QuadMax (Silicon Revision B0)
- i.MX 8QuadXPlus (Silicon Revision B0)

## 3 What's New

- Supported Android Codec2 implementation in media framework, phased out OpenMAXIL.
- Enhanced stability and robustness.

## 4 Enhanced Features

### 4.1 Local playback

This section describes the local playback information.

#### 4.1.1 Enhanced and extended formats and codecs

The following table provides the information about the enhanced codecs.

Table 1. Enhanced codecs

File extension	Demuxers	Video decoders	Audio decoders
.mp3	-	-	MP3
.aac/.adts	-	-	AAC LC/PLUS
.wav	-	-	LPCM

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Table 1. Enhanced codecs (continued)

File extension	Demuxers	Video decoders	Audio decoders
.flac	-	-	FLAC
.amr/.awb	-	-	AMR-NB/AMR-WB
.mp4 .mov	MP4	MPEG4 SP/ASP except GMC H.264 BP/MP/HP MPEG2 H.263 MJPEG HEVC	AAC LC/PLUS MP3 Vorbis PCM
.m4a	MP4	-	AAC LC/PLUS
.3gp	MP4	MPEG4 SP/ASP except GMC H.264 BP/MP/HP H.263 HEVC	AAC LC/PLUS AMR-NB AMR-WB
.avi	AVI	MPEG4 SP/ASP except GMC Xvid H.264 BP/MP/HP H.263 MJPEG HEVC	AAC LC/PLUS MP3 LPCM
.wma	ASF	-	WMA STD, PRO, Lossless
.wmv/.asf	ASF	VC-1 SP/MP/AP HEVC	WMA STD, PRO, Lossless
.mkv/mka	MKV	H.264 BP/MP/HP MPEG4 SP/ASP except GMC Xvid VC-1 SP/MP/AP HEVC VP8 VP9 MPEG2 H.263	AAC MP3 WMA STD, PRO, Lossless Vorbis Opus PCM
.flv	FLV	Sorenson H.263	MP3

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Table 1. Enhanced codecs (continued)

File extension	Demuxers	Video decoders	Audio decoders
		H.264 BP/MP/HP	AAC
.mpg	MPEG2/PS	MPEG2 BP/MP	MP3
.vob	MPEG2/TS	MPEG2 BP/MP	AAC
.ts		H.264 BP/MP/HP	LPCM
.m2ts		HEVC	
.webm	MKV	VP8	MP3
		VP9	AAC LC/PLUS
.rmvb	RM	RV 8/9/10	RA
.rm	RM	RV 8/9/10	AAC
.ra	RM	-	RA

**NOTE**

- For detailed video and audio codec capability, see Section 5 "[Codec Specification](#)".
- AACPlus, ASF, WMV, WMA, and RMVB are restricted codec packages and are not generally available. Install them from the Restricted Codec Package.
- MJPEG subtypes and MJPEG\_2000 and MJPEG\_B are not supported.
- MJPEG only supports YUV420 and YUV422 (horizontal) color formats.
- To enable tile format, use this command on board console:

```
setprop media.hantro_vpu.enable-tile 1
```

## 4.2 Streaming playback

The following table provides the information about streaming playback.

Table 2. Feature matrix for streaming playback

Protocol	File format
HTTP	.mp4/.3gp/.mov .flv/ .f4v .avi .wmv/.asf .mpg/.vob/.ts .mp3 .aac .wma .mkv

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Table 2. Feature matrix for streaming playback (continued)

Protocol	File format
RTP	.ts
UDP	.ts

To set up RTP/UDP streaming, perform the following operations:

- Install vlc 1.1.5 on Windows® OS or Ubuntu.
- For UDP streaming server: run VLC with the command:

```
vlc -vvv stream_file_name --sout udp://224.0.1.1:1234
```

- For the RTP streaming server:
  1. Start vlc with the GUI, and select **Media > Streaming**.
  2. Press **Add** to load the stream file, press **Stream**, and click **Next**.
  3. Select **RTP/Mpeg Transport Stream** from the drop-down list, and click **Add**.
  4. Enter the IP address 224.0.1.1 and base port number 5004, and deselect **Activate Transcoding**.
  5. Press **Stream** at the bottom. The server is started.
- For the UDP streaming client, run the Gallery on the Android platform with the command:

```
am start -n com.android.gallery3d/com.android.gallery3d.app.MovieActivity -d udp://224.0.1.1:1234
```

- For the RTP streaming client, run Gallery on the Android platform with the command:

```
am start -n com.android.gallery3d/com.android.gallery3d.app.MovieActivity -d rtp://224.0.1.1:5004
```

- For the uni-cast, use the client IP address instead of 224.0.1.1 when starting the server, and use the server IP address instead of 224.0.1.1 when starting the client.

### 4.3 Audio pass through streaming

Audio pass through supports audio AC-3 and DD-plus. To enable audio pass through, run the following command to set the property:

```
setprop persist.audio.pass.through 2000
```

## 5 Codec Specification

Video decoder for i.MX with VPU hardware

Table 3. Video decoder for i.MX with VPU hardware

	Format	Platform	Profile	Min. Resolution	Max. Resolution	Frame Rate	Bit Rate	Comment
Video Decoder	HEVC	i.MX 8M Quad	main/main 10	144 x 144	4096 x 2160	60 fps	160 Mbps	-

*Table continues on the next page...*

Table 3. Video decoder for i.MX with VPU hardware (continued)

	Format	Platform	Profile	Min. Resolution	Max. Resolution	Frame Rate	Bit Rate	Comment
		i.MX 8M Plus i.MX 8M Mini	main/main 10	144 x 144	1920 x 1080	60 fps	100 Mbps	-
		i.MX 8QuadXPlu s	main	144 x 144	4096 x 2160	30 fps	100 Mbps	-
		i.MX 8QuadMax	main	144 x 144	4096 x 2160	60 fps	100 Mbps	-
	H.264	i.MX 8M Quad	HP/MP/BP	96 x 48	4096 x 2160	30 fps	60 Mbps	-
		i.MX 8M Plus i.MX 8M Mini	HP/MP/BP	48 x 48	1920 x 1080	60 fps	60 Mbps	-
		i.MX 8QuadXPlu s	HP/MP/BP	64 x 64	4096 x 2160	30 fps	50 Mbps	-
		i.MX 8QuadMax	HP/MP/BP	64 x 64	4096 x 2160	30 fps	50 Mbps	-
		i.MX6	HP/MP/BP	64 x 64	1920 x 1080	60 fps	50 Mbps	-
	VP9	i.MX 8M Quad	profile 0, 2	96 x 72	4096 x 2160	60 fps	100 Mbps	-
		i.MX 8M Plus i.MX 8M Mini	profile 0, 2	72 x 72	1920 x 1080	60 fps	100 Mbps	-
	VP8	i.MX 8M Quad	-	48 x 48	-	-	-	-
		i.MX 8M Plus i.MX 8M Mini	-	48 x 48	1920 x 1080	60 fps	60 Mbps	-
		i.MX 8QuadXPlu s	-	64 x 64	1920 x 1080	60 fps	60 Mbps	-

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Table 3. Video decoder for i.MX with VPU hardware (continued)

	Format	Platform	Profile	Min. Resolution	Max. Resolution	Frame Rate	Bit Rate	Comment
		i.MX 8QuadMax	-	64 x 64	1920 x 1080	60 fps	60 Mbps	-
		i.MX6Q	-	64 x 64	1920 x 1080	30 fps	20 Mbps	-
		i.MX6DualLite	-	64 x 64	1280 x 720	30 fps	20 Mbps	-
	MPEG4/XVID	i.MX 8M Quad	SP/ASP	48 x 48	1920 x 1080	60 fps	-	-
		i.MX 8QuadXPluses	SP/ASP	64 x 64	1920 x 1080	60 fps	-	-
		i.MX 8QuadMax	SP/ASP	64 x 64	1920 x 1080	60 fps	-	-
		i.MX6	SP/ASP	64 x 64	1920 x 1080	30 fps	40 Mbps	-
	MPEG2	i.MX 8M Quad	MP	48 x 48	1920 x 1080	60 fps	-	-
		i.MX 8QuadXPluses	MP	64 x 64	1920 x 1080	60 fps	-	-
		i.MX 8QuadMax	MP	64 x 64	1920 x 1080	60 fps	-	-
		i.MX6	MP	64 x 64	1920 x 1080	30 fps	50 Mbps	-
	H.263	i.MX 8M Quad	P0/P3	48 x 48	1920 x 1080	60 fps	-	-
		i.MX 8QuadXPluses	P0/P3	64 x 64	1920 x 1080	60 fps	-	-
		i.MX 8QuadMax	P0/P3	64 x 64	1920 x 1080	60 fps	-	-
		i.MX6	P0/P3	64 x 64	1920 x 1080	30 fps	20 Mbps	-
	WMV9/VC1	i.MX 8M Quad	AP/MP/SP	48 x 48	1920 x 1080	60 fps	-	-
		i.MX 8QuadXPluses	AP/MP/SP	64 x 64	1920 x 1080	60 fps	-	-

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Table 3. Video decoder for i.MX with VPU hardware (continued)

	Format	Platform	Profile	Min. Resolution	Max. Resolution	Frame Rate	Bit Rate	Comment
		i.MX 8QuadMax	AP/MP/SP	64 x 64	1920 x 1080	60 fps	-	-
		i.MX6	AP/MP/SP	64 x 64	1920 x 1080	30 fps	45 Mbps	-
	MJPEG	i.MX 8M Quad	-	48 x 48	1920 x 1080	60 fps	180 Mpixl	-
		i.MX 8QuadXPlu s	-	64 x 64	1920 x 1080	60 fps	-	-
		i.MX 8QuadMax	-	64 x 64	1920 x 1080	60 fps	-	-
		i.MX6	-	64 x 64	1920 x 1080	30 fps	120 Mpixl	-
	RV	i.MX 8M Quad	8/9/10	48 x 48	1920 x 1080	60 fps	-	-
		i.MX 8QuadXPlu s	8/9/10	64 x 64	1920 x 1080	60 fps	-	-
		i.MX 8QuadMax	8/9/10	64 x 64	1920 x 1080	60 fps	-	-
		i.MX6	8/9/10	64 x 64	1920 x 1080	30 fps	40 Mbps	-
	Sorenson Spark	i.MX 8QuadMax	-	64 x 64	1920 x 1080	60 fps	-	-
		i.MX 8QuadXPlu s	-	64 x 64	1920 x 1080	60 fps	-	-

**NOTE**

Please find supported formats based on each platform.

## Video decoder for i.MX without VPU hardware

Table 4. Video decoder for i.MX without VPU hardware

	Format	Platform	Profile	Min. resolution	Max. resolution	Frame rate	Bit rate	Comment
Software Video Decoder	-	i.MX all	-	-	According to system performance	According to system performance	According to system performance	Supported With Android Native Decoder

## Video encoder for i.MX with VPU hardware

Table 5. Video encoder for i.MX with VPU hardware

	Format	Platform	Profile	Min. Resolution	Max. Resolution	Frame Rate	Bit Rate	Comment
Video Encoder	H.265	i.MX 8M Plus	main/main 10	64 x 64	1920 x 1080	60 fps	-	-
	H.264	i.MX 8M Mini	HP/MP/BP	132 x 96	1920 x 1080	60 fps	40 Mbps	-
		i.MX 8M Plus						
		i.MX 8QuadXPlu s	HP/MP/BP	64 x 64	1920 x 1080	30 fps	-	-
		i.MX 8QuadMax	HP/MP/BP	64 x 64	1920 x 1080	30 fps	-	-
		i.MX 6	BP	64 x 64	1920 x 1080	30 fps	20 Mbps	-
	VP8	i.MX 8M Mini	-	132 x 96	1920 x 1080	30 fps	60 Mbps	-
	MPEG4	i.MX 6	SP	64 x 64	1280 x 720	30 fps	12 Mbps	-
	H.263	i.MX 6	P3	64 x 64	1280 x 720	30 fps	8 Mbps	-

## Audio decoder

Table 6. Audio decoder

	Platform	Feature/ Profile	Feature/ Profile	Channel	Sample rate (kHz)	Bit rate (kbps)	Comment
DSP Audio Decoder	i.MX 8M Plus  i.MX QuadXPlus  i.MX 8QuadMax	MP3	MPEG-1 (Layer-1/ Layer-2/ Layer-3)	stereo/mono	<= 48	32-448	-
			MPEG-2 (Layer-1/ Layer-2/ Layer-3)		<= 24	8-256	-
			MPEG-2.5 (Layer-3)		<= 12	8-160	-
	i.MX 8M Plus  i.MX QuadXPlus  i.MX 8QuadMax	AACLC	MPEG-2 AACLC	stereo/mono	8-96	-	Bit rate depends on both the sample rate and the number of channels
			MPEG-4 AACLC				

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Table 6. Audio decoder (continued)

	Platform	Feature/ Profile	Feature/ Profile	Channel	Sample rate (kHz)	Bit rate (kbps)	Comment
	i.MX 8M Plus i.MX QuadXPlus i.MX 8QuadMax	HE-AAC	HE-AAC V1 HE-AAC V2	stereo/mono	8-96	-	
	i.MX 8M Plus i.MX QuadXPlus i.MX 8QuadMax	WMA STD	L1 @ QL1	stereo/mono	44.1	64-161	-
			L2 @ QL1		<= 48	<= 161	-
			L3 @ QL1		<= 48	<= 385	-
	i.MX 8M Plus i.MX QuadXPlus i.MX 8QuadMax	WMA Pro	M0a @ QL2	stereo/mono	<= 48	48-192	-
			M0b @ QL2	stereo/mono	<= 48	<= 192	-
			M1 @ QL2	<= 5.1	<= 48	<= 384	-
			M2 @ QL2	<= 5.1	<= 96	<= 768	-
			M3 @ QL2	<= 7.1	<= 96	<= 1500	-
	i.MX 8M Plus i.MX QuadXPlus i.MX 8QuadMax	WMA Lossless	N1	stereo/mono	<= 48	<= 3000	-
			N2	<= 5.1	<= 96	<= 3000	-
			N3	<= 7.1	<= 96	<= 3000	-
Software Audio Decoder	i.MX All	MP3	MPEG-1 (Layer-1/ Layer-2/ Layer-3)  MPEG-2 (Layer-1/ Layer-2/ Layer-3)  MPEG-2.5 (Layer-3)	stereo/mono	8-448	8-448	-
		AACLC	MPEG-2 AACLC  MPEG-4 AACLC	<= 5.1	8-96	8-368	-
		HE-AAC	HE-AAC V1 HE-AAC V2	stereo/mono	8-96	Mono: 8-384  stereo: 16-768	-

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Table 6. Audio decoder (continued)

	Platform	Feature/ Profile	Feature/ Profile	Channel	Sample rate (kHz)	Bit rate (kbps)	Comment
		WMA STD	L1 @ QL1	stereo/mono	44.1	64-161	-
			L2 @ QL1		<= 48	<= 161	-
			L3 @ QL1		<= 48	<= 385	-
		WMA Pro	M0a @ QL2	stereo/mono	<= 48	48-192	-
			M0b @ QL2	stereo/mono	<= 48	<= 192	-
			M1 @ QL2	<= 5.1	<= 48	<= 384	-
			M2 @ QL2	<= 5.1	<= 96	<= 768	-
			WMA Pro	<= 7.1	<= 96	<= 1500	-
		WMA Lossless	N1	stereo/mono	<= 48	<= 3000	-
			N2	<=5.1	<= 96	<= 3000	-
			N3	<=7.1	<= 96	<= 3000	-
		RA	cook	stereo/mono	8, 11.025, 22.05, 44.1	-	-

**Audio encoder**

Use Android OS default audio encoders.

## 6 License-Restricted Codecs

For information about receiving the restricted codec packages, contact an NXP representative.

### 6.1 Package list

The following features are supplementary to standard codec release packages.

Table 7. License limited codecs

Package name	Feature
fsl_aacp_dec.tar.gz	Audio Codec: AACPlus
fsl_ms_codec.tar.gz	<ul style="list-style-type: none"> <li>Demuxer: ASF</li> <li>Video Decoder: WMV</li> <li>Audio Codec: WMA</li> </ul>
fsl_real_dec.tar.gz	<ul style="list-style-type: none"> <li>Demuxer: RM</li> <li>Audio Decoder: RA</li> </ul>
imx_dsp.tar.gz	Audio hardware codec: Hi-Fi firmware
imx_dsp_codec.tar.gz	Audio hardware codec: MP3, BSAC
imx_dsp_aacp_dec.tar.gz	Audio hardware codec: AACLC, AACPlus

## 6.2 How to install the license limited codecs

See the readme file for each package.

## 7 Limitations of This Release

- The minimum resolution is 64\*64
- Complex Profile of WMV9 is not supported
- Multimedia files that do not have index table may not be searchable
- Corrupted multimedia files may not be searchable and may have an incorrect duration

## 8 Known Issues

None.

## 9 Revision History

Table 8. Revision history

Revision number	Date	Substantive changes
P9.0.0_1.0.0-beta	11/2018	Initial release
P9.0.0_1.0.0-ga	01/2019	i.MX 8M, i.MX 8QuadMax, i.MX 8QuadXPlus GA release.
P9.0.0_2.0.0-ga	04/2019	i.MX 8M, i.MX 8QuadMax, i.MX 8QuadXPlus GA release.
P9.0.0_2.0.0-ga	08/2019	Updated the location of the SCFW porting kit.
android-10.0.0_1.0.0	02/2020	i.MX 8M Mini, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8QuadXPlus GA release.
android-10.0.0_1.0.0	03/2020	Deleted the Android 10 image.
android-10.0.0_2.1.0	04/2020	i.MX 8M Plus Alpha and i.MX 8QuadXPlus Beta release.
android-10.0.0_2.0.0	05/2020	i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Quad, i.MX 8QuadMax, and i.MX 8QuadXPlus GA release.
android-10.0.0_2.3.0	07/2020	i.MX 8M Plus EVK Beta1 release, and all the other i.MX 8 GA release.

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