

SOC MPEG Codec Modules

Datasheet (Module Selection Guide)

System-On-Chip (SOC) Technologies
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1. Product Overview

The SOC MPEG Codec Modules are small all-in-one hardware boards that connect to a user PCB through a standard DDR3 connector for video/audio compression, decompression, and transcoding functions. The codec modules are based on one of the hardware platforms, the MCM-1000S (Spartan-6 LX150 FPGA), MCM-1000A (Artix-7 A200T FPGA), MCM-1000K (Kintex-7 K325T FPGA), and MCM-1000Z (Zynq-7045 FPGA), as showing in Fig. 1 through Fig. 4 respectively.



Fig. 1 The SOC MCM-1000S Modules



Fig. 2 The SOC MCM-1000A Modules



Fig. 3 The SOC MCM-1000K Modules



Fig. 4 The SOC MCM-1000Z Modules

By configuring the FPGAs on the MCM-1000X (S/A/K/Z) modules, using the SOC video/audio encoder, decoder, or transcoder IP cores, a series of codec module products are offered, which include:

1. H.265 video/audio encoders
2. H.264 video/audio encoders;
3. H.264 video/audio decoders;
4. MPEG-2 video/audio encoders;

5. MPEG-2 video/audio decoders;
6. H.264-to-H.265 transcoders;
7. MPEG2-to-H.264 video/audio transcoders;
8. H.264-to-MPEG2 video/audio transcoders;
9. Multiple-channel encoder and/or encoders/decoders;
10. Multiple-standard encoder and/or encoders/decoders.

(Note: H.265 video/audio decoder modules will be available in the near future).

In each of the above categories, a series of standard modules are offered for different applications, from lower-end to high-end. Specifications for standard module, such as resolution and frame rate, are provided in the following section.

Technical details for the encoders, decoders, and transcoders are provided in the Datasheets of the IP cores that are used to configure the modules:

- [Datasheet – H.265 Encoder IP Cores](#)
- [Datasheet – H.264 Encoder IP Cores](#)
- [Datasheet – H.264 Decoder IP Cores](#)
- [Datasheet – MPEG-2 Encoder IP Cores](#)
- [Datasheet – MPEG-2 Decoder IP Cores](#)
- [Datasheet – H.265-to-H.264 Transcoder IP Cores](#)
- [Datasheet – MPEG-2-to-H.264 Transcoder IP Cores](#)
- [Datasheet – H.264-to-MPEG-2 Transcoder IP Cores](#)

User interface for the modules are provided by the API interface manual:

- [API Manual - H265 Decoder Modules](#)
- [API Manual - H264 Encoder Modules](#)
- [API Manual - H264 Decoder Modules](#)
- [API Manual – MPEG-2 Encoder Modules](#)
- [API Manual – MPEG-2 Decoder Modules](#)

Information for integrating the modules on to user PCBs are provided in the Integration Sheets:

- [Pin Assignment Sheet - Decoder Modules](#)
- [Pin Assignment Sheet - Encoder Modules](#)
- [Pin Assignment Sheet – Transcoder Modules](#)

SOC also provides PCB design references through its licensing programs. Contact SOC sales for details: sales@soctechnologies.com

2. Factory Standard Codec Modules

2.1 H.265 Encoder Modules

The H.265 encoder modules are based on either the MCM-1000K or MCM-1000Z hardware. The SOC H.265 encoder IP cores of different configurations are used to configure the FPGAs on the hardware modules to produce the codec modules.

Table-1 lists the product codes of the factory standard H.265 video encoder (video only) modules, along with the specifications for each module. Table-2 lists the video/audio encoder modules. The hardware platform, MCM-1000K or MCM-1000Z, is used for the H.265 video encoder. Customers can order the H.265 encoder modules using the product code, according to the specifications required by the application.

Table-1: H.265 Video Encoder Modules:

Product #	Specifications						
	Standard	Profile	Resolution	Chroma	Precision	Frame Rate	Audio
EC-V-H265-8b-30-1080-M	H.265	Main 4:2:2 12	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 30fps	no
EC-V-H265-10b-30-1080-M	H.265	Main 4:2:2 12	up to 1080i/p	4:2:0/4:2:2	up to 10 bits	up to 30fps	no
EC-V-H265-10b-30-1080-M	H.265	Main 4:2:2 12	up to 1080i/p	4:2:0/4:2:2	up to 12 bits	up to 30fps	no
EC-V-H265-8b-60-1080-M	H.265	Main 4:2:2 12	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 60fps	no
EC-V-H265-10b-60-1080-M	H.265	Main 4:2:2 12	up to 1080i/p	4:2:0/4:2:2	up to 10 bits	up to 60fps	no
EC-V-H265-10b-60-1080-M	H.265	Main 4:2:2 12	up to 1080i/p	4:2:0/4:2:2	up to 12 bits	up to 60fps	no
EC-V-H265-8b-30-4k-M	H.265	Main 4:2:2 12	4k/UHD	4:2:0/4:2:2	8 bits	up to 30fps	no
EC-V-H265-10b-30-4k-M	H.265	Main 4:2:2 12	4k/UHD	4:2:0/4:2:2	up to 10 bits	up to 30fps	no
EC-V-H265-10b-30-4k-M	H.265	Main 4:2:2 12	4k/UHD	4:2:0/4:2:2	up to 12 bits	up to 30fps	no
EC-V-H265-8b-60-4k-M	H.265	Main 4:2:2 12	4k/UHD	4:2:0/4:2:2	8 bits	up to 60fps	no
EC-V-H265-10b-60-4k-M	H.265	Main 4:2:2 12	4k/UHD	4:2:0/4:2:2	up to 10 bits	up to 60fps	no
EC-V-H265-10b-60-4k-M	H.265	Main 4:2:2 12	4k/UHD	4:2:0/4:2:2	up to 12bits	up to 60fps	no

Note: H.265 encoder modules with be available in the near future.

Table-2: H.265 Video&Audio Encoder Modules:

Product #	Specifications						
	Standard	Profile	Resolution	Chroma	Precision	Frame Rate	Audio
EC-VA-H265-8b-30-1080-M	H.265	Main 4:2:2 12	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 30fps	AAC or MPEG2 Layer-2
EC-VA-H265-10b-30-1080-M	H.265	Main 4:2:2 12	up to 1080i/p	4:2:0/4:2:2	up to 10 bits	up to 30fps	AAC or MPEG2 Layer-2
EC-VA-H265-12b-30-1080-M	H.265	Main 4:2:2 12	up to 1080i/p	4:2:0/4:2:2	up to 12 bits	up to 30fps	AAC or MPEG2 Layer-2
EC-VA-H265-8b-60-1080-M	H.265	Main 4:2:2 12	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 60fps	AAC or MPEG2 Layer-2
EC-VA-H265-10b-60-1080-M	H.265	Main 4:2:2 12	up to 1080i/p	4:2:0/4:2:2	up to 10 bits	up to 60fps	AAC or MPEG2 Layer-2
EC-VA-H265-12b-60-1080-M	H.265	Main 4:2:2 12	up to 1080i/p	4:2:0/4:2:2	up to 12 bits	up to 60fps	AAC or MPEG2 Layer-2
EC-VA-H265-8b-30-4k-M	H.265	Main 4:2:2 12	4k/UHD	4:2:0/4:2:2	8 bits	up to 30fps	AAC or MPEG2 Layer-2
EC-VA-H265-10b-30-4k-M	H.265	Main 4:2:2 12	4k/UHD	4:2:0/4:2:2	up to 10 bits	up to 30fps	AAC or MPEG2 Layer-2
EC-VA-H265-12b-30-4k-M	H.265	Main 4:2:2 12	4k/UHD	4:2:0/4:2:2	up to 12 bits	up to 30fps	AAC or MPEG2 Layer-2
EC-VA-H265-8b-60-4k-M	H.265	Main 4:2:2 12	4k/UHD	4:2:0/4:2:2	8 bits	up to 60fps	AAC or MPEG2 Layer-2
EC-VA-H265-10b-60-4k-M	H.265	Main 4:2:2 12	4k/UHD	4:2:0/4:2:2	up to 10 bits	up to 60fps	AAC or MPEG2 Layer-2
EC-VA-H265-12b-60-4k-M	H.265	Main 4:2:2 12	4k/UHD	4:2:0/4:2:2	up to 12bits	up to 60fps	AAC or MPEG2 Layer-2

2.2 H.264 Encoder Modules

The H.264 encoder modules are based on either the MCM-1000S or MCM-1000A hardware. The SOC H.264 encoder IP cores are used to configure the FPGAs on the hardware modules to produce the codec modules.

Table-3 lists the product code of the factory standard video encoder modules (video only), along with the specifications for each module. Table-4 lists the video/audio encoder modules (both video and audio). The hardware platform, MCM-1000S, or MCM-1000A, or MCM-1000Z, used for each module is also provided in the table. Customers can order the encoder modules using the product code, according to the specifications required by the application.

Table-3: H.264 Video Encoder Modules:

Product #	Specifications							Hardware
	Standard	Profile	Resolution	Chroma	Precision	Frame Rate	Audio	
EC-V-H264-8b-30-720-M	H.264	up to High	up to 720i/p	4:2:0/4:2:2	8 bits	up to 30fps	no	MCM-1000S
EC-V-H264-8b-60-720-M	H.264	up to High	up to 720i/p	4:2:0/4:2:2	8 bits	up to 60fps	no	MCM-1000S
EC-V-H264-8b-30-1080-M	H.264	up to High	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 30fps	no	MCM-1000S
EC-V-H264-10b-30-1080-M	H.264	up to High	up to 1080i/p	4:2:0/4:2:2	up to 10 bits	up to 30fps	no	MCM-1000S
EC-V-H264-8b-60-1080-M	H.264	up to High	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 60fps	no	MCM-1000A
EC-V-H264-10b-60-1080-M	H.264	up to High	up to 1080i/p	4:2:0/4:2:2	up to 10 bits	up to 60fps	no	MCM-1000A
EC-V-H264-8b-30-4k-M	H.264	High	4kx2k	4:2:0/4:2:2	up to 8 bits	up to 30fps	no	MCM-1000A
EC-V-H264-10b-30-4k-M	H.264	High	4kx2k	4:2:0/4:2:2	up to 10 bits	up to 30fps	no	MCM-1000A

Table-4: H.264 Video&Audio Encoder Modules:

Product #	Specifications							Hardware
	Standard	Profile	Resolution	Chroma	Precision	Frame Rate	Audio	
EC-VA-H264-8b-30-720-M	H.264	up to High	up to 720i/p	4:2:0/4:2:2	8 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000S
EC-VA-H264-8b-60-720-M	H.264	up to High	up to 720i/p	4:2:0/4:2:2	8 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000S
EC-VA-H264-8b-30-1080-M	H.264	up to High	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000S
EC-VA-H264-10b-30-1080-M	H.264	up to High	up to 1080i/p	4:2:0/4:2:2	up to 10bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000S
EC-VA-H264-8b-60-1080-M	H.264	up to High	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000A
EC-VA-H264-10b-60-1080-M	H.264	up to High	up to 1080i/p	4:2:0/4:2:2	up to 10 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000A
EC-VA-H264-8b-30-4k-M	H.264	High	4kx2k	4:2:0/4:2:2	8 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000A
EC-VA-H264-10b-30-4k-M	H.264	High	4kx2k	4:2:0/4:2:2	10 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000A
EC-VA-H264-8b-60-4k-M	H.264	High	4kx2k	4:2:0/4:2:2	8 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000Z
EC-VA-H264-10b-60-4k-M	H.264	High	4kx2k	4:2:0/4:2:2	10 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000Z

2.3 H.264 Decoder Modules

Hardware platform MCM-1000S based on Xilinx Spartan-6 LX150 FPGA has sufficient logic resources and computing speed for all of the H.264 HD decoders (except 4k resolution). Table-5 lists the factory standard H.264 video decoder modules (video only), along with the product code and specifications. Table-6 lists the factory standard H.264 video and audio decoder modules, product code, specifications.

Table-5: H.264 Video Decoder Modules:

Product #	Specifications							Hardware
	Standard	Profile	Resolution	Chroma	Precision	Frame Rate	Audio	
DC-V-H264-8b-30-720-M	H.264	up to High	up to 720i/p	4:2:0/4:2:2	8 bits	up to 30fps	no	MCM-1000
DC-V-H264-8b-60-720-M	H.264	up to High	up to 720i/p	4:2:0/4:2:2	8 bits	up to 60fps	no	MCM-1000
DC-V-H264-8b-30-1080-M	H.264	up to High	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 30fps	no	MCM-1000
DC-V-H264-10b-30-1080-M	H.264	up to High	up to 1080i/p	4:2:0/4:2:2	up to 10 bits	up to 30fps	no	MCM-1000
DC-V-H264-8b-60-1080-M	H.264	up to High	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 60fps	no	MCM-1000
DC-V-H264-10b-60-1080-M	H.264	up to High	up to 1080i/p	4:2:0/4:2:2	up to 10 bits	up to 60fps	no	MCM-1000
DC-V-H264-8b-30-4k-M	H.264	High	4kx2k	4:2:0/4:2:2	8 bits	up to 30fps	no	MCM-1000A
DC-V-H264-10b-30-4k-M	H.264	High	4kx2k	4:2:0/4:2:2	10 bits	up to 30fps	no	MCM-1000A
DC-V-H264-8b-60-4k-M	H.264	High	4kx2k	4:2:0/4:2:2	8 bits	up to 60fps	no	MCM-1000K
DC-V-H264-10b-60-4k-M	H.264	High	4kx2k	4:2:0/4:2:2	10 bits	up to 60fps	no	MCM-1000K

Table-6: H.264 Video&Audio Decoder Modules:

Product #	Specifications							Hardware
	Standard	Profile	Resolution	Chroma	Precision	Frame Rate	Audio	
DC-VA-H264-8b-30-720-M	H.264	up to High	up to 720i/p	4:2:0/4:2:2	8 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000
DC-VA-H264-8b-60-720-M	H.264	up to High	up to 720i/p	4:2:0/4:2:2	8 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000
DC-VA-H264-8b-30-1080-M	H.264	up to High	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000
DC-VA-H264-10b-30-1080-M	H.264	up to High	up to 1080i/p	4:2:0/4:2:2	up to 10 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000
DC-VA-H264-8b-60-1080-M	H.264	up to High	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000
DC-VA-H264-10b-60-1080-M	H.264	up to High	up to 1080i/p	4:2:0/4:2:2	up to 10 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000
DC-VA-H264-8b-30-4k-M	H.264	High	4kx2k	4:2:0/4:2:2	8 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000A
DC-VA-H264-10b-30-4k-M	H.264	High	4kx2k	4:2:0/4:2:2	10 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000A
DC-VA-H264-8b-60-4k-M	H.264	High	4kx2k	4:2:0/4:2:2	8 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000K
DC-VA-H264-10b-60-4k-M	H.264	High	4kx2k	4:2:0/4:2:2	10 bits	up to 60fps	AAC/MPEG2 L-2 L	MCM-1000K

2.4 MPEG-2 Encoder Modules

Table-7 lists the standard MPEG-2 video encoder modules. Table-8 lists the MPEG-2 video/audio encoder modules. The 8 bit precision and 60 frames/second modules are offered as extensions of MPEG-2 standard.

Table-7: MPEG-2 Video Encoder Module

Product #	Specifications							Hardware
	Standard	Profile	Resolution	Chroma	Precision	Frame Rate	Audio	
EC-V-MPEG2-8b-30-720-M	MPEG-2	up to High	up to 720i/p	4:2:0/4:2:2	8 bits	up to 30fps	no	MCM-1000
EC-V-MPEG2-8b-60-720-M	MPEG-2	up to High	up to 720i/p	4:2:0/4:2:2	8 bits	up to 60fps	no	MCM-1000
EC-V-MPEG2-8b-30-1080-M	MPEG-2	up to High	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 30fps	no	MCM-1000
EC-V-MPEG2-8b-60-1080-M	MPEG-2	up to High	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 60fps	no	MCM-1000A

Table-8: MPEG-2 Video&Audio Encoder Modules:

Product #	Specifications							Hardware
	Standard	Profile	Resolution	Chroma	Precision	Frame Rate	Audio	
EC-VA-MPEG2-8b-30-720-M	MPEG-2	up to High	up to 720i/p	4:2:0/4:2:2	8 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000
EC-VA-MPEG2-8b-60-720-M	MPEG-2	up to High	up to 720i/p	4:2:0/4:2:2	8 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000
EC-VA-MPEG2-8b-30-1080-M	MPEG-2	up to High	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000
EC-VA-MPEG2-8b-60-1080-M	MPEG-2	up to High	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000A

2.5 MPEG-2 Decoder Modules

Table-9 lists the standard MPEG-2 video decoder modules. Table-10 lists the MPEG-2 video/audio decoder modules. The 10 bit precision and 60 frames/second modules are offered as extensions of MPEG-2 standard.

Table-9: MPEG-2 Video Decoder Modules:

Product #	Specifications							Hardware
	Standard	Profile	Resolution	Chroma	Precision	Frame Rate	Audio	
DC-V-MPEG2-8b-30-720-M	MPEG-2	up to High	up to 720i/p	4:2:0/4:2:2	8 bits	up to 30fps	no	MCM-1000
DC-V-MPEG2-8b-60-720-M	MPEG-2	up to High	up to 720i/p	4:2:0/4:2:2	8 bits	up to 60fps	no	MCM-1000
DC-V-MPEG2-8b-30-1080-M	MPEG-2	up to High	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 30fps	no	MCM-1000
DC-V-MPEG2-10b-30-1080-M	MPEG-2	up to High	up to 1080i/p	4:2:0/4:2:2	up to 10 bits	up to 30fps	no	MCM-1000
DC-V-MPEG2-8b-60-1080-M	MPEG-2	up to High	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 60fps	no	MCM-1000
DC-V-MPEG2-10b-60-1080-M	MPEG-2	up to High	up to 1080i/p	4:2:0/4:2:2	up to 10 bits	up to 60fps	no	MCM-1000

Table-10: MPEG-2 Video&Audio Decoder Modules:

Product #	Specifications							Hardware
	Standard	Profile	Resolution	Chroma	Precision	Frame Rate	Audio	
DC-VA-MPEG2-8b-30-720-M	MPEG-2	up to High	up to 720i/p	4:2:0/4:2:2	8 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000
DC-VA-MPEG2-8b-60-720-M	MPEG-2	up to High	up to 720i/p	4:2:0/4:2:2	8 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000
DC-VA-MPEG2-8b-30-1080-M	MPEG-2	up to High	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000
DC-VA-MPEG2-10b-30-1080-M	MPEG-2	up to High	up to 1080i/p	4:2:0/4:2:2	8&10 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000
DC-VA-MPEG2-8b-60-1080-M	MPEG-2	up to High	up to 1080i/p	4:2:0/4:2:2	8 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000
DC-VA-MPEG2-10b-60-1080-M	MPEG-2	up to High	up to 1080i/p	4:2:0/4:2:2	8&10 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000

2.6 H.264-to-H.265 Transcoder Modules

Table-11 lists the standard H.264-to-H.265 video transcoder modules. Table-12 lists the H.264-to-H.265 video/audio transcoder modules.

Table-11: H.264-to-H.265 Video Transcoder Modules:

Product #	Specifications							Hardware
	Standard	Profile	Resolution	Chroma	Precision	Fame Rate	Audio	
TC-V-H.264-to-H.265-8b-30-720-M	H.265	Main 4:2:2	up to 720i/p	up to 4:2:2	8 bits	up to 30fps	no	MCM-1000Z
TC-V-H.264-to-H.265-10b-30-720-M	H.265	Main 4:2:2	up to 720i/p	up to 4:2:2	10 bits	up to 30fps	no	MCM-1000Z
TC-V- H.264-to-H.265-8b-60-720-M	H.265	Main 4:2:2	up to 720i/p	up to 4:2:2	8 bits	up to 60fps	no	MCM-1000Z
TC-V- H.264-to-H.265-10b-60-720-M	H.265	Main 4:2:2	up to 720i/p	up to 4:2:2	10 bits	up to 60fps	no	MCM-1000Z
TC-V- H.264-to-H.265-8b-30-1080-M	H.265	Main 4:2:2	up to 1080i/p	up to 4:2:2	8 bits	up to 30fps	no	MCM-1000Z
TC-V- H.264-to-H.265-10b-30-1080-M	H.265	Main 4:2:2	up to 1080i/p	up to 4:2:2	10 bits	up to 30fps	no	MCM-1000Z
TC-V- H.264-to-H.265-8b-60-1080-M	H.265	Main 4:2:2	up to 1080i/p	up to 4:2:2	8 bits	up to 60fps	no	MCM-1000Z
TC-V- H.264-to-H.265-10b-60-1080-M	H.265	Main 4:2:2	up to 1080i/p	up to 4:2:2	10 bits	up to 60fps	no	MCM-1000Z

Table-12: H.264-to-H.265 Video & Audio Transcoder Modules:

Product #	Specifications							Hardware
	Standard	Profile	Resolution	Chroma	Precision	Fame Rate	Audio	
TC-V-H.264-to-H.265-8b-30-720-M	H.265	Main 4:2:2	up to 720i/p	up to 4:2:2	8 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000Z
TC-V-H.264-to-H.265-10b-30-720-M	H.265	Main 4:2:2	up to 720i/p	up to 4:2:2	10 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000Z
TC-V- H.264-to-H.265-8b-60-720-M	H.265	Main 4:2:2	up to 720i/p	up to 4:2:2	8 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000Z
TC-V- H.264-to-H.265-10b-60-720-M	H.265	Main 4:2:2	up to 720i/p	up to 4:2:2	10 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000Z
TC-V- H.264-to-H.265-8b-30-1080-M	H.265	Main 4:2:2	up to 1080i/p	up to 4:2:2	8 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000Z
TC-V- H.264-to-H.265-10b-30-1080-M	H.265	Main 4:2:2	up to 1080i/p	up to 4:2:2	10 bits	up to 30fps	AAC/MPEG2 L-2	MCM-1000Z
TC-V- H.264-to-H.265-8b-60-1080-M	H.265	Main 4:2:2	up to 1080i/p	up to 4:2:2	8 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000Z
TC-V- H.264-to-H.265-10b-60-1080-M	H.265	Main 4:2:2	up to 1080i/p	up to 4:2:2	10 bits	up to 60fps	AAC/MPEG2 L-2	MCM-1000Z

2.7 H.264-to-MPEG2 Transcoder Modules

Table-13 lists the standard H.264-to-MPEG2 video transcoder modules. Table-14 lists the H.264-to-MPEG2 video/audio transcoder modules. The 60frames/second modules are offered as extensions of MPEG-2 standard.

Table-13: H.264-to-MPEG2 Video Transcoder Modules:

Product #	Specifications							Hardware
	Standard	Profile	Resolution	Chroma	Precision	Fame Rate	Audio	
TC-V-H.264-to-MPEG2-8b-30-720-M	MPEG2	High	up to 720i/p	up to 4:2:2	8 bits	up to 30fps	no	MCM-1000A
TC-V- H.264-to-MPEG2-8b-60-720-M	MPEG2	High	up to 720i/p	up to 4:2:2	8 bits	up to 60fps	no	MCM-1000A
TC-V- H.264-to-MPEG2-8b-30-1080-M	MPEG2	High	up to 1080i/p	up to 4:2:2	8 bits	up to 30fps	no	MCM-1000A
TC-V- H.264-to-MPEG2-8b-60-1080-M	MPEG2	High	up to 1080i/p	up to 4:2:2	8 bits	up to 60fps	no	MCM-1000A

Table-14: H.264-to-MPEG2 Video&Audio Transcoder Modules:

Product #	Specifications							Hardware
	Standard	Profile	Resolution	Chroma	Precision	Fame Rate	Audio	
TC-VA- H.264-to -MPEG2-8b-30-720-M	MPEG2	High	up to 720i/p	up to 4:2:2	8 bits	up to 30fps	AAC/MPEG2-L2	MCM-1000A
TC-VA- H.264-to -MPEG2-8b-60-720-M	MPEG2	High	up to 720i/p	up to 4:2:2	8 bits	up to 60fps	AAC/MPEG2-L2	MCM-1000A
TC-VA- H.264-to -MPEG2-8b-30-1080-M	MPEG2	High	up to 1080i/p	up to 4:2:2	8 bits	up to 30fps	AAC/MPEG2-L2	MCM-1000A
TC-VA- H.264-to -MPEG2-8b-60-1080-M	MPEG2	High	up to 1080i/p	up to 4:2:2	8 bits	up to 60fps	AAC/MPEG2-L2	MCM-1000A

2.8 MPEG2-to-H.264 Transcoder Modules

Table-15 lists the standard MPEG2-to-H.264 video transcoder modules, and Table-16 lists the MPEG2-to-H.264 video/audio transcoder modules. The 60frames/second modules are offered as extensions of MPEG-2 standard.

Table-15: MPEG2-to-H.264 Video Transcoder Modules:

Product #	Specifications							Hardware
	Standard	Profile	Resolution	Chroma	Precision	Fame Rate	Audio	
TC-V-MPEG2-to-H.264-8b-30-720-M	MPEG2	High	up to 720i/p	up to 4:2:2	8 bits	up to 30fps	no	MCM-1000
TC-V-MPEG2-to-H.264-8b-60-720-M	MPEG2	High	up to 720i/p	up to 4:2:2	8 bits	up to 60fps	no	MCM-1000
TC-V-MPEG2-to-H.264-8b-30-1080-M	MPEG2	High	up to 1080i/p	up to 4:2:2	8 bits	up to 30fps	no	MCM-1000
TC-V-MPEG2-to-H.264-8b-60-1080-M	MPEG2	High	up to 1080i/p	up to 4:2:2	8 bits	up to 60fps	no	MCM-1000

Table-16: MPEG2-to-H.264 Video&Audio Transcoder Modules:

Product #	Specifications							Hardware
	Standard	Profile	Resolution	Chroma	Precision	Fame Rate	Audio	
TC-VA-MPEG2-to-H.264-8b-30-720-M	MPEG2	High	up to 720i/p	up to 4:2:2	8 bits	up to 30fps	MPEG2-L2/AAC	MCM-1000
TC-VA-MPEG2-to-H.264-8b-60-720-M	MPEG2	High	up to 720i/p	up to 4:2:2	8 bits	up to 60fps	MPEG2-L2/AAC	MCM-1000
TC-VA-MPEG2-to-H.264-8b-30-1080-M	MPEG2	High	up to 1080i/p	up to 4:2:2	8 bits	up to 30fps	MPEG2-L2/AAC	MCM-1000
TC-VA-MPEG2-to-H.264-8b-60-1080-M	MPEG2	High	up to 1080i/p	up to 4:2:2	8 bits	up to 60fps	MPEG2-L2/AAC	MCM-1000

3. Non-Standard Codec Modules

The previous section provides the information on SOC's factory standard MPEG codec modules. Customers can order modules based on customer specific requirements (non-standard modules). There is a Minimum Order Quantity (MOQ) required for customized configurations. Contact SOC sales sale@soctechologies.com for information.

4. Connecting the Codec Modules to a User PCB

The MCM-1000X (S/A/K/Z) modules have identical edge pins that are compatible to standard DDR3 connector pin layout. The following off-the-shelf DDR3 connectors can be used to connect the SOC codec modules onto a user PCB:

1. AS0A621-U2SN-7F
2. AS0A621-H2S6-7H
3. MM80-204B1-1
4. MM80-204B1-1E
5. DDR III connectors compatible with the above.

Fig. 5 shows a photo of a standard 204 pin DDR3 PCB connector. Refer to the datasheet of the connector used for the physical dimension and PCB design requirements.



Fig. 5 A photo of the standard 204 pin DDR3 connector

5. Pin Assignments and Electrical Properties

Pin Assignment for encoder modules, decoder modules, and transcoder modules are different. But, the pin assignment for all of the encoder modules is the same, which is true for the decoder modules and transcoder modules. Details on the pin Assignment can be found in the Pin Assignment sheets.

- [Pin Assignment Sheet - Decoder Modules](#)
- [Pin Assignment Sheet - Encoder Modules](#)
- [Pin Assignment Sheet – Transcoder Modules](#)

6. Evaluation Kits

SOC offers two evaluation kits for evaluating the codec modules (or IP cores). The evaluation kits can also be used as product development platforms.

The evaluation kits are:

1. FMC-MCM-1000, Fig. 6 and 7;
2. VTR-2000, Fig. 8 and 9.

Refer to the User Guides of FMC-MCM-1000 and VTR-1000 for details.

- User Guide – FMC-MCM-1000
- User Guide - VTR-1000

For evaluation uses, SOC pre-loads the firmware/software and I/O drivers of the FMC-MCM-1000 and VTR-2000, which makes the kits “plug-and-play”. Evaluation Instruction Manual is included in the delivery package.

For product development purposes, the IP cores (“netlist” format) and the I/O driver executable/source codes are available for licensing. This allows the user to integrate the IP cores and I/O codes into the product designs.

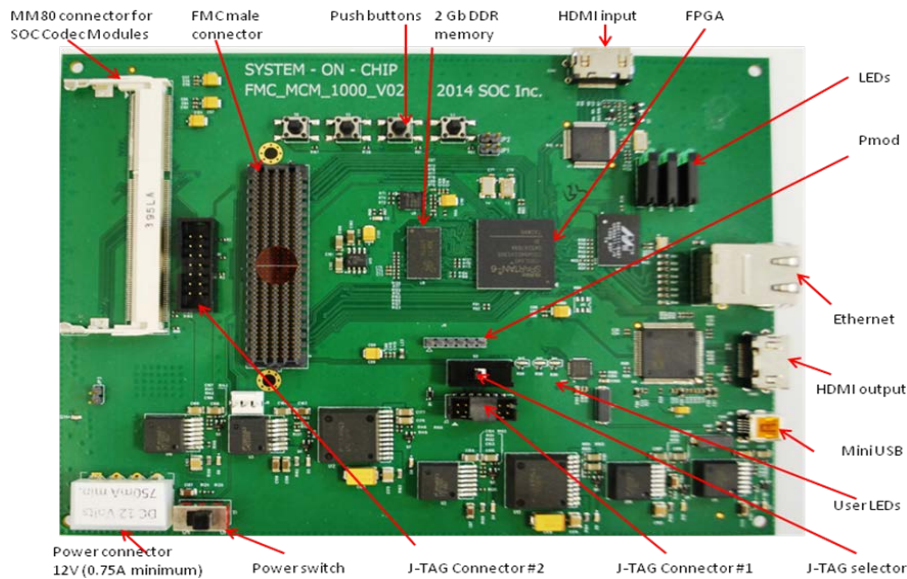


Fig. 6 FMC-MCM-1000 evaluation board (Top view)



Fig. 7 FMC-MCM-1000 evaluation board (bottom view)

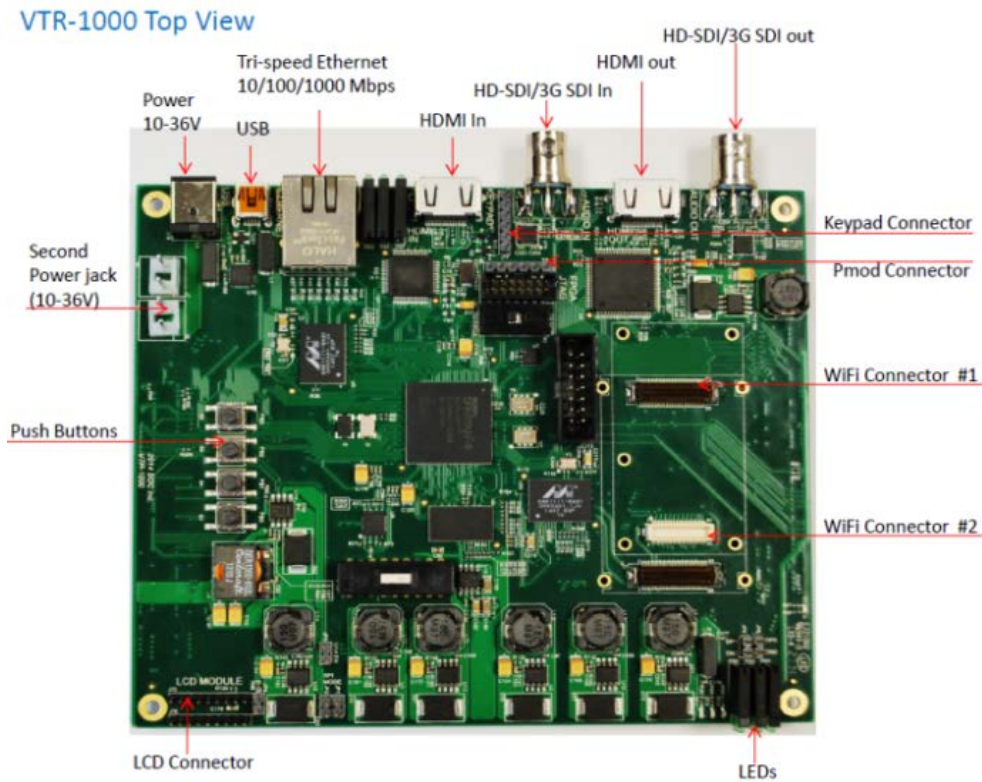


Fig. 8 VTR-1000 evaluation board (Top view)

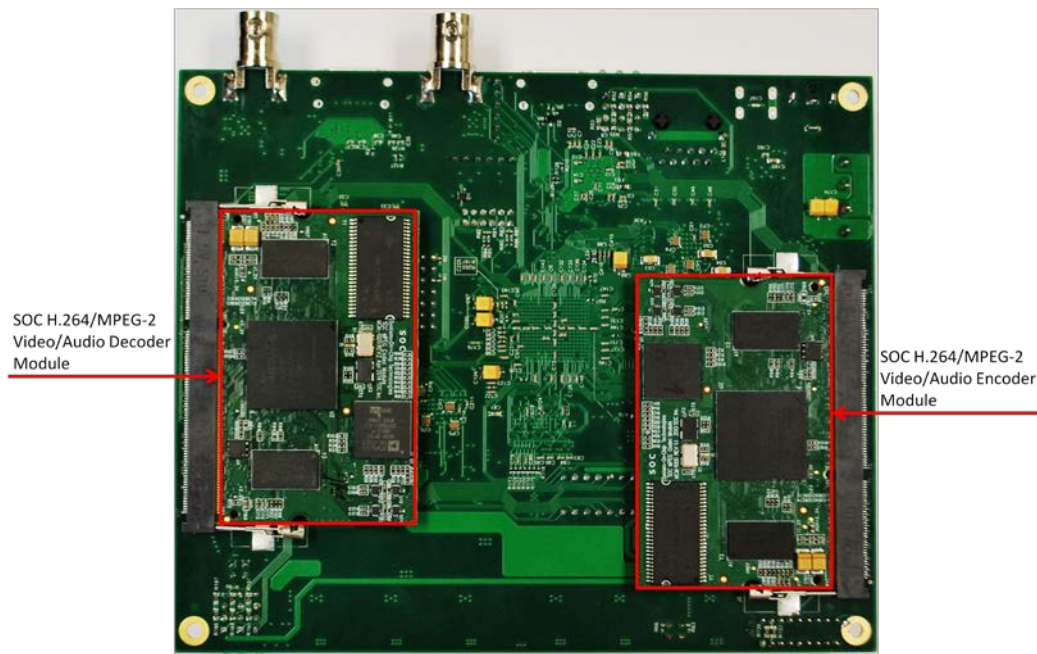


Fig. 9 VTR-1000 evaluation board (Bottom view)

7. Ordering Information

Fig. 10 shows the product code naming convention for the SOC MPEG codec modules and IP cores. Users can order the standard configurations listed in Tables 1-16 in Section 2. Non-standard codec modules can be ordered following the same naming format (minimum order quantity is required for non-standard modules).

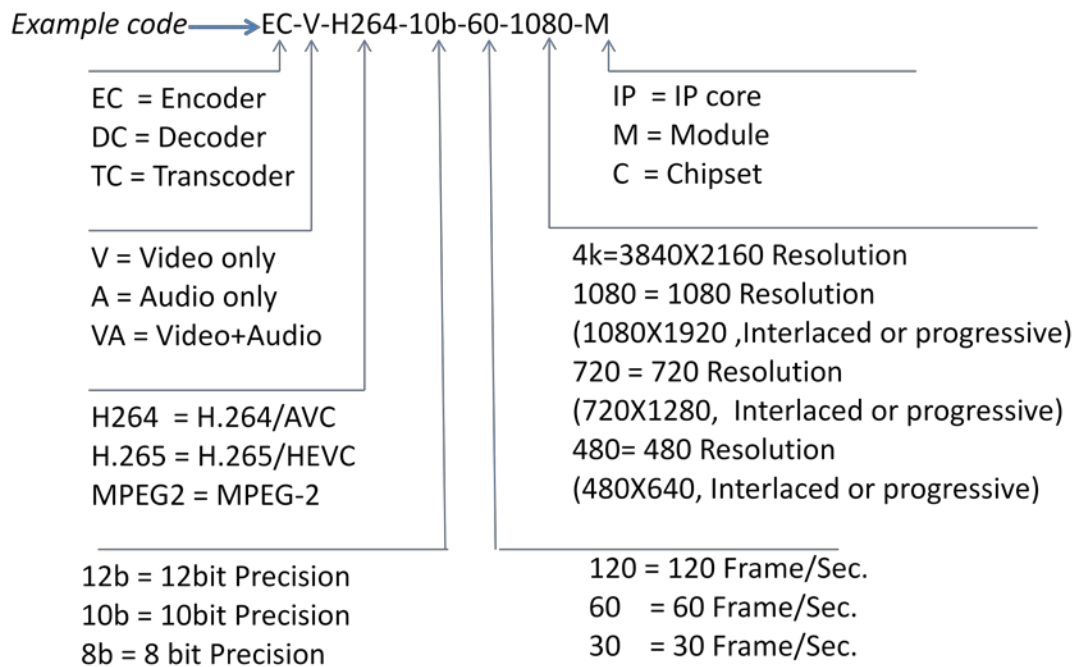


Fig. 10 SOC MPEG codec (IP cores, modules, and Chipset) product code naming convention

8. Contact Information

Please Contact SOC head office or distributor for product details or to place an order.

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