MPEG-4 HD, 3D-MVC 40 nm DVR STB IC

EMMA3SE and EMMA3SE/P

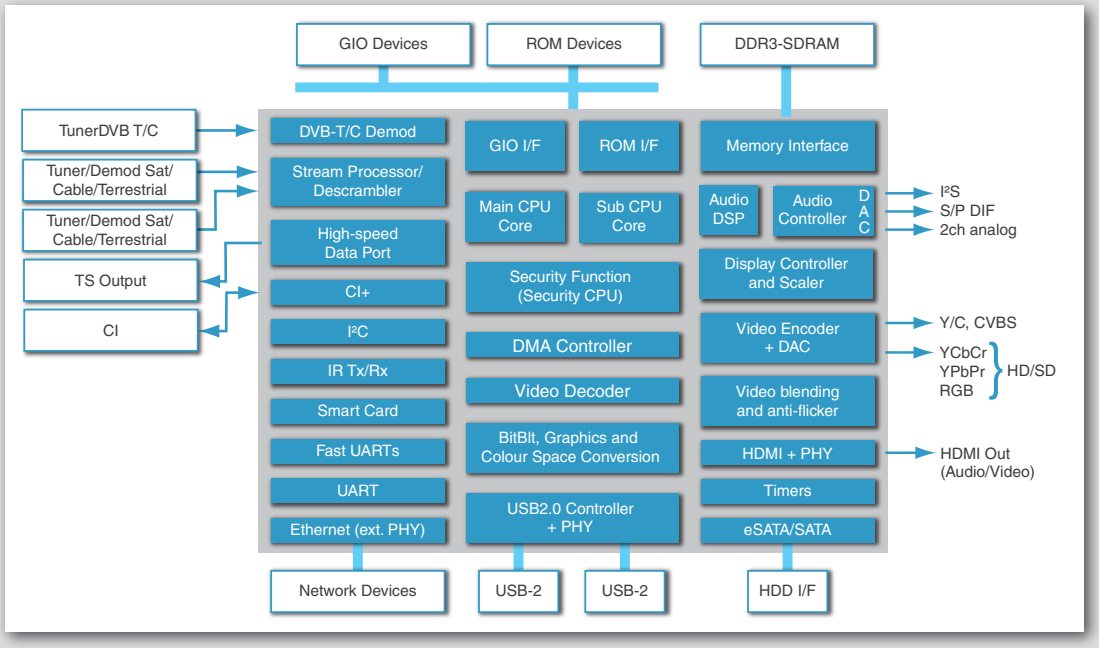
EMMA3SE/(P) is a flexible MPEG-4 HD DVR set-top box device enabling cost effective solutions for wide range of broadcast, IP and broadcast/IP hybrid markets ranging from low cost single tuner broadcast STB to three tuner DVR with Ethernet interface for broadband and Home Networking. EMMA3SE/P version of the device includes advanced security compliant with all major pay TV conditional access companies.

The EMMA3SE/(P) (μPD6142xF1) is a third generation MPEG-4 HD decoder based on Renesas established 40 nm technology to achieve high integration, low cost and ultra low power consumption requiring no heat sinks even in demanding thermal environments. This device enables a single common platform design to achieve SD to HD, non-DVR to DVR and from broadcast only to network connected STB thereby saving on multi platform developments.

The front-end has integrated DVB -T1 or C1 channel decoder (external tuner) and two external tuner/demod interfaces suitable for 2nd generation satellite, cable and terrestrial markets. The video decoder is able to provide dual HD (PiP) or 3D MVC or 1080p decoding accompanied by a high performance 2D BitBLT based graphics engine. To experience HD for SD content, the SD decoding can be up-scaled to 720P or 1080i. HD and SD video can be output simultaneously via HDMI and analogue ports. A flexible DSP based audio decoder supports all major audio codecs required by broadcasters and operators including dual audio decoding needed for audio description, transcoding and down decoding from high end audio to those standards commonly available in lower end TV sets or AV amplifier products.

EMMA3SE/(P) has dual MIPS32™ 4KEC™ CPU architecture delivering combined performance of 1224 DMIPS operating under either RTOS-RTOS or a Linux-RTOS operating systems. In each case, the RTOS sub-CPU handles all speed critical real-time tasks e.g. audio and video while the main CPU handles application software. Cost sensitive projects that only require SD decoding, can use EMMA3SL2/L(P) which has the same architecture and package pin-out as EMMA3SE/(P) providing a common HW/SW development platform.

Block Diagram



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Key Features

- CPU:
  - » Main & Sub MIPS32™ 4KEC™: Total 1224 MIPS
- Security CPU (EMMA3SE/P) compliant with all major CA vendors
- Memory:
  - » 512 MB, 16-bit DDR3 at 1333 MHz
  - » NOR Flash: 64 MB; NAND Flash 32 GB, 8/16 bit
- Stream processor:
  - » 2 x serial input or 1 x parallel
  - » 1 x DVB-T1 or C1 integrated demod with ext. tuner (Optional)
  - » 108 PID filters (3 for PCR), 96 section filters
  - » DVB descrambler: AES, DES/3DES and CSA3
  - » DVB-CI+ & DVB-CI: Serial or parallel DVB demodulators
- Video decoder:
  - » MPEG-4 AVC HP@L4.2, MP@L3.2, ASP@L5
  - » H.264 / MPEG-4 MVC (3D), VC1 AP@L3, AP@L2
  - » MPEG-2 MP@HL, JPEG decode w/o Progressive JPEG
  - » DivX HD 1080P Profile, Sorenson Video, VP6, WMV9 AP@L3
  - » AVS Jizhun profile@L4.0, 4.2, 6.0 and 6.2 (support 4:2:0)
- Audio processor:
  - » MPEG-1 L1/2, MP3, MPEG-4 AAC, MPEG-4 HE-AAC
  - » MS10, Dolby Digital (DD), Dolby Digital Plus (DD+)
  - » WMA, DRA, DTS
  - » Transcode: DTS to DDCO or DD+ to DD
  - » Down mixing: DD+ & DD to 2 chl. PCM
  - » Audio description, DD pass through to SPDIF
- Audio Outputs:
  - » 2ch Audio DAC
  - » I2S, SPDIF, HDMI
- Display:
  - » Main O/P: 8-bit alpha blending: 1 x V, 2 x OSD, 1 x Still, 1 x BG
    - Resolution: 1080i to 480i, 1080p to 480p
  - » Sub O/P: 1 x V, 1 x BG
    - Resolution: 576i/480i
  - » OSD 1,2 plane: 1920 x 1080 x 2/4/8 bpp CLUT, 32 bpp True colour
    - Anti flicker filter
  - » Capture engine
  - » IP Conversion - Motion Adaptive
  - » Up-scale from SD 720P or 1080i
  - » 3DNR, MNR, BNR. PQC function (Sharpness, LTI/CTI)
- Graphics Engine
  - » 2D BitBLT
  - » Powerful 2-D / 1-D block moves
  - » Colour space conversion, colour expansion
- Video Encoder:
  - » 6-DACs - Current driven: SD and HD
  - » NTSC/PAL/SECAM
  - » Macrovision 7.1.L1 and AGC1.2, DCS for SD and HD
  - » HDMI with deep colour, x.v.colour, 3D Pass Through, Integrated HDCP key 1.4
- Networking and Storage:
  - » Ethernet 10/100 Ethernet MAC
  - » USB2.0 High Speed Host Controller x 2ch
  - » eSATA or SATA x 1ch
- Peripherals:
  - » 2 x FUART, 2 x I²C, 2 x Smart Card,
  - » 1x IR Rx and PCMCIA
  - » Integrated VCXO
  - » GIO Bus

Ordering Information

Applications	Part Number	Description
Standard digital AV applications	µPD61425F1-1yz-GNL-A	Standard part with HDMI & SATA
	µPD6142xF1-1yz-GNL-A	Standard part with more options (request data)
Secure pay TV applications	µPD61420F1-xyz-GNL-A	Standard part with HDMI, HDCP, demod & SATA
	µPD6142xF1-xyz-GNL-A	Standard part with more options (request data)

Document Reference	Devices	Document Type
R19DS0018EG0100	µPD6142xF1	Data Sheet
R19UH0051EG0107	µPD6142xF1	User's Manual
R19PF0036ED0000	µPD6142xF1	EMMA3SE/P Reference Design

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