



Product Selection Guide
Q1 2013

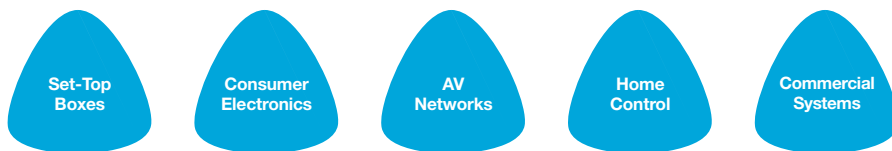


Sigma Designs is a leading provider of system-on-chip (SoC) solutions used to deliver entertainment and control throughout the home:

- Media processing
- Smart TV
- Video encoding
- Home AV networking
- Video processing
- Home control

Sigma Designs' products are sold worldwide through a direct sales force and distributors. Sigma's Common Stock, publicly traded since 1986, is listed on the NASDAQ National Market under the symbol SIGM. Headquartered in Milpitas, California, the company also has sales offices in China, Denmark, Hong Kong, Israel, Japan, Singapore, and Taiwan.

Powering the new digital home



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Sigma Designs' Secure Media Processors™ offer a complete, high-performance SoC solution for a wide variety of consumer products. Featuring high-quality audio/video decoding, powerful audio/video processing, and commonly-used peripheral interfaces, our SoCs and software enable rapid product development and lower manufacturing cost. In addition, our Secure Media Processor™ architecture offers advanced content protection, supporting a wide variety of Digital Rights Management (DRM) and Conditional Access (CA) solutions.

Video Decoding	Audio Decoding	DRM/CA	Peripheral I/O
<ul style="list-style-type: none"> • MPEG-4.10 (H.264) • MPEG-4.2 • MPEG-2 • MPEG-1 • VC-1 • WMV9 • AVS (China) • DV, AVCHD • RMVB v9, v10 	<ul style="list-style-type: none"> • Dolby <ul style="list-style-type: none"> - Dolby Digital - Dolby Digital Plus - Dolby TrueHD • MPEG, MPEG 2.5 • WMA, WMA Pro • WMA Lossless • AAC, HE-AAC • DRA (China) • FLAC • Ogg Vorbis • PCM, LPCM, DVD LPCM, BD LPCM, WFA LPCM • G.711 a-law and u-law • G.722, ADPCM DVI/MS/QT • G.729, G.729A • GSM AMR • Skype SILK 	<ul style="list-style-type: none"> • PlayReady • HDCP, DTCP • Conax • Irdeto • Nagravision • NDS • Rovi • SecureMedia • Verimatrix • Viaccess • Widevine 	<ul style="list-style-type: none"> • PCI • Peripheral bus • Ethernet • USB • SD Card • Smartcard • IDE/SATA • SPI • Transport stream • IR • I²C • I²S, SPDIF • HDMI with CEC, deep color, xvYCC

Video Processing	Audio Processing
<ul style="list-style-type: none"> • Motion and edge adaptive deinterlacing • Adaptive 2D/3D noise, mosquito noise, and block artifact reduction • Adaptive detail and contrast enhancement • Brightness, contrast, saturation, hue, colorimetry correction, color temperature, and gamma controls 	<ul style="list-style-type: none"> • Dolby ProLogic IIx • SRS TruSurround XT • SRS TruVolume • SRS WOW HD • Upsampling, downsampling • Bass redirection management • 8-channel mixing • Dual mode processing • Channel re-mapping • 2-channel downmixing • Watermark detection • Dolby Digital encoding • G.722 ADPCM encoding

Operating Systems

- Linux
- Android™
- WinCE



Innovation

- First multi-codec HD video decoder
- First Secure Media Processor™
- First multi-CPU architecture
- First high bandwidth internal bus design

Leadership

- First SoC for Microsoft® Mediaroom™
- First SoC for Blu-ray players
- First SoC for media players

Technical Excellence

- IPTV, ATSC, DVB, ARIB, DMB, Blu-ray, AVCHD, HDV, DVD
- Advanced audio and video processing
- APIs for feature rich, scalable applications

Experience

- IPTV solutions since 2000
- Pioneer in advanced DVD
- Video processing and decoding since 1993
- 30+ years technology leader

	SMP8910
DMIPS	3008*
L2 Cache	512 KB
Video Input Port with VBI Capture	30-bit BT.601/656
Ethernet	(2) 10/100/1000
SATA II (3.0 Gbps, eSATA compatible)	2
USB 2.0 Embedded Host	2
SDIO	•
Transport Stream Inputs	6 SSI
Transport Stream Outputs	2 SSI
Peripheral Bus, DVB-CI, CI+ Support	•
DRAM Support	64-bit 1 GB (DDR2-800)
NAND Flash Support	SLC/MLC/eMMC
NOR Flash Support	SPI
Audio Inputs	7.1 I ² S + SPDIF
Audio Outputs	7.1 I ² S + SPDIF
Non-Rovi ACP Version	SMP8911

* Host CPU + IPU (2400 + 608). Host CPU is dual core, each core with 2 thread processors and FPU.



Target Markets

- Premium media players
- Premium IPTV and hybrid set-top boxes

Supported Technologies

- Multiple task-specific processors lowers power and enables best middleware and application performance
- Three audio DSPs support wide variety of audio codecs
- Security CPU supports wide variety of conditional access (CA) and digital rights management (DRM) solutions, including Nagravision NOCS v1.1

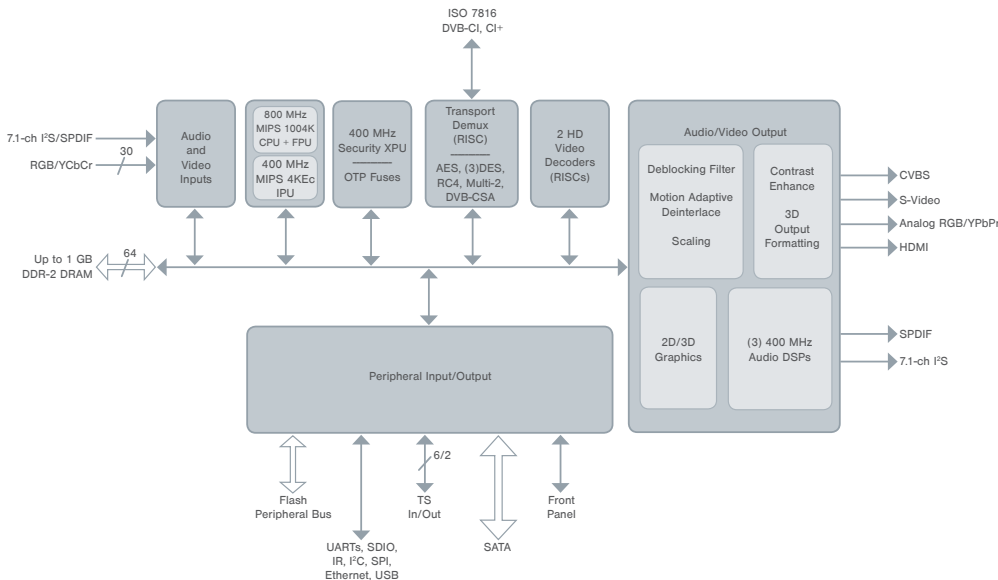
Video Decoding

- MPEG-4.10 (H.264) BP@L3, MP@L4.2, HP@L4.2, MVC HP@L4.2
- SMPTE 421M (VC-1) MP@HL, AP@L3
- WMV9 MP@HL
- MPEG-2 MP@HL
- MPEG-4.2 ASP@L5 (up to HD, 1-point GMC)
- AVS Jizhun profile@L2.0, 4.0, 6.0*
- RMVB v9, v10
- 3D video support
 - Generic side-by-side and top-bottom
 - RealD, SENSIO® Hi-Fi 3D, TDVision

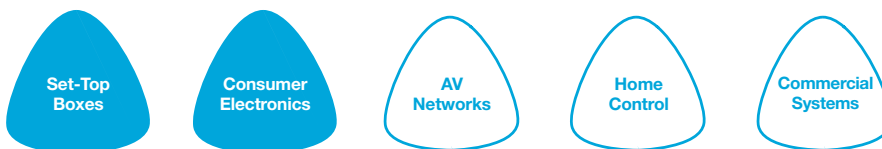
* 20 Mbps for L4.0; 40 Mbps for L6.0

Advanced Video Processing

- 3D graphics accelerator with Open GL ES 1.1/2.0 support
- VXP® motion adaptive deinterlacing and adaptive contrast enhancement
- Integrated HDMI with CEC, 12-bit deep color, xvYCC



Powering the new digital home



	SMP8680	SMP8682
DMIPS	1818*	1818*
System/DSP Clock Rates	800/400 MHz	800/400 MHz
2D/3D Graphics	2D	2D
Ethernet	(3) 10/100/1000	(3) 10/100/1000
HDMI Input	•	•
SATA II (3.0 Gbps)	1	1
USB 2.0	2 OTG	2 OTG
SDIO	2	2
Peripheral Bus, DVB-CI Support	•	•
HomePNA® (external AFE)	•	•
DRAM Support	16-bit 512 MB (DDR3-1600)	16-bit 512 MB (DDR3-1600)
NAND Flash Support	SLC/MLC	SLC/MLC
NOR Flash Support	SPI	SPI
Video DACs	4	4
Audio Outputs	2.0 I ² S + SPDIF	2.0 I ² S + SPDIF
Non-Rovi ACP Version	SMP8681	SMP8683

* Host CPU + IPU (1208 + 610)



Target Markets

- IPTV and hybrid set-top boxes
- Thin clients

Supported Technologies

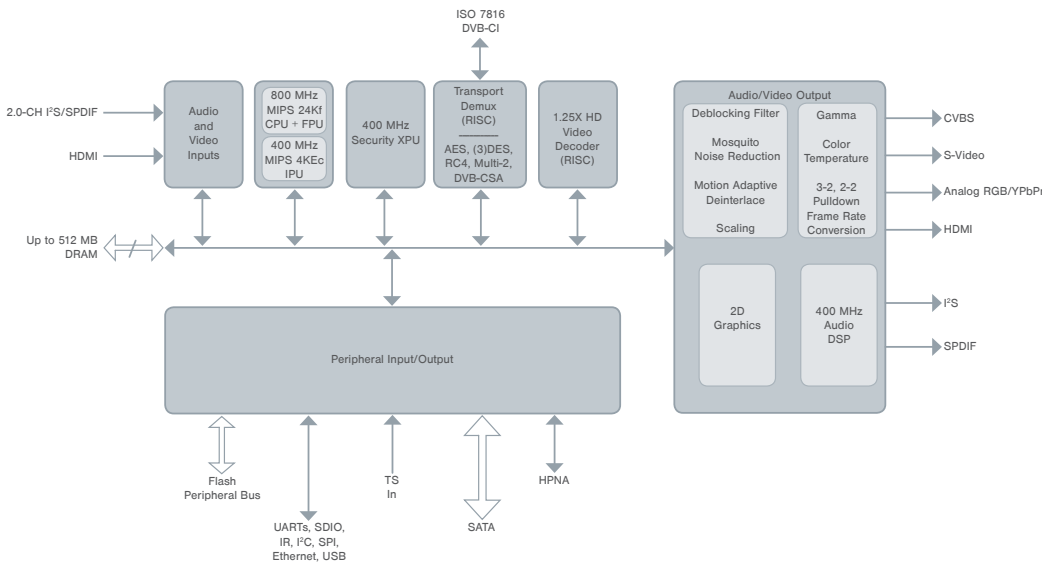
- Multiple task-specific processors lowers power and enables best middleware and application performance
- Audio DSP supports wide variety of audio codecs
- Security CPU supports wide variety of conditional access (CA) and digital rights management (DRM) solutions

Video Decoding

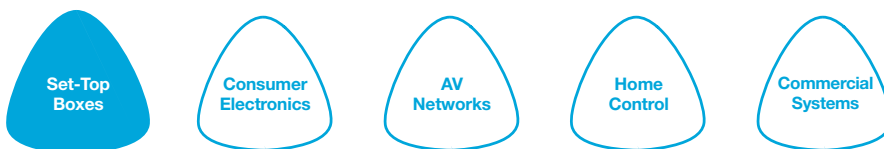
- MPEG-4.10 (H.264) BP@L3, MP@L4.0, HP@L4.0
 - SMPTE 421M (VC-1) MP@HL, AP@L3
 - WMV9 MP@HL
 - MPEG-2 MP@HL
 - MPEG-4.2 ASP@L5 (up to HD, 1-point GMC)
 - AVS Jizhun profile@L2.0, 4.0, 6.0*
 - RMVB v9, v10
 - 3D video support
 - Generic side-by-side and top-bottom output
 - RealD (side-by-side output)
- * 20 Mbps for L4.0; 40 Mbps for L6.0

Advanced Video Processing

- 12-bit xvYCC processing
- Integrated HDMI output with CEC, 12-bit deep color, xvYCC
- Integrated HDMI input with 8-bit color, xvYCC (SMP8680)



Powering the new digital home



	SMP8670	SMP8672	SMP8674
DMIPS	1592*	2210**	1592*
Host CPU	24Kf	74Kf	24Kf
L2 Cache		256 KB	
System/DSP Clock Rates	700/350 MHz	800/400 MHz	700/350 MHz
3D Graphics		SGX520	
H.264 HP Support	L4.1	L4.2	L4.2
H.264 MVC Support		•	
Audio DSPs	1	2	2
Nagravision CA Support		•	•
Ethernet	(2) 10/100/1000	(2) 10/100/1000	(1) 10/100
USB 2.0	2 OTG	2 OTG	2 OTG
SDIO	2	2	1
Transport Stream Inputs	2 SSI	1 SPI, 2 SSI	1 SPI, 2 SSI
Transport Stream Outputs		1 SSI	
DRAM Support	32-bit 512 MB (DDR2-700)	16-bit 1 GB (DDR3-1600)	16-bit 512 MB (DDR3-1400)
NAND Flash Support	SLC/MLC	SLC/MLC/eMMC	SLC/MLC/eMMC
NOR Flash Support	SPI	SPI	SPI
Digital RGB/YCbCr Video Outputs		•	
Peripheral Bus	•	•	
Non-Rovi ACP Version	SMP8671	SMP8673	SMP8675

* Host CPU + IPU (1057 + 535) ** Host CPU + IPU (1600 + 610)



Target Markets

- IPTV and hybrid set-top boxes
- Thin clients
- Media players
- Wireless display receivers

Supported Technologies

- Multiple task-specific processors lowers power and enables best middleware and application performance
- Audio DSP supports wide variety of audio codecs
- Security CPU supports wide variety of conditional access (CA) and digital rights management (DRM) solutions, including Nagravision NOCS v1.2

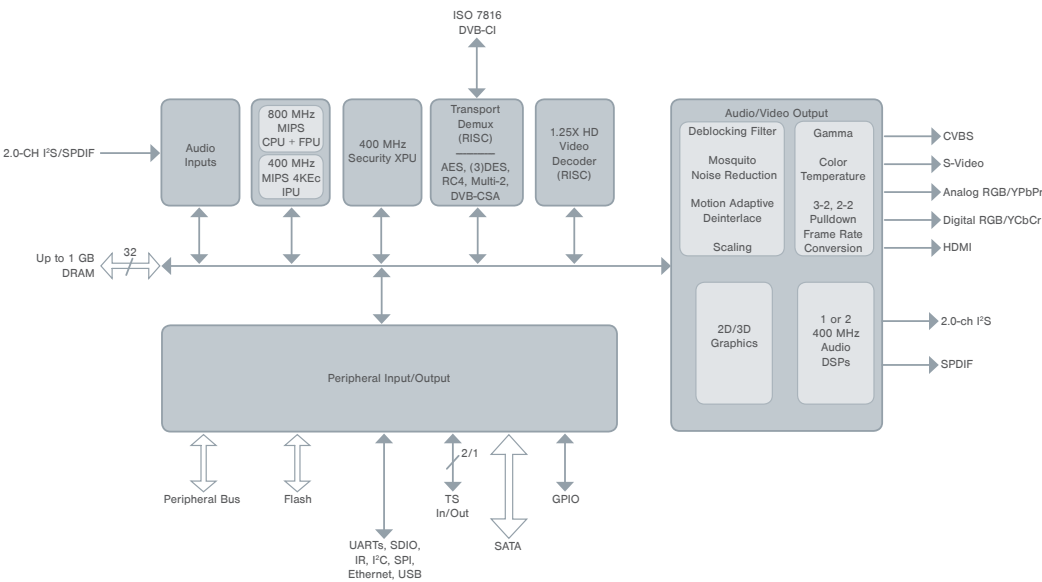
Video Decoding

- MPEG-4.10 (H.264) BP@L3, MP@L4.0, HP@L4.2, MVC HP@L4.2
- SMPTE 421M (VC-1) MP@HL, AP@L3
- WMV9 MP@HL
- MPEG-2 MP@HL
- MPEG-4.2 ASP@L5 (up to HD, 1-point GMC)
- AVS Jizhun profile@L2.0, 4.0*, 6.0*
- RMVB v9, v10
- 3D video support
 - Generic side-by-side and top-bottom output
 - RealID (side-by-side output)

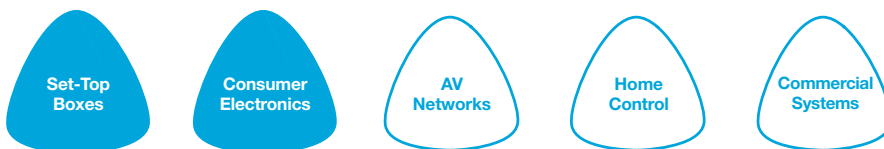
* 20 Mbps for L4.0; 40 Mbps for L6.0

Advanced Video Processing

- 3D graphics accelerator with OpenGL ES 1.1/2.0 support
- Deblocking and deringing filters
- 12-bit xvYCC processing
- Integrated HDMI with CEC, 12-bit deep color, and xvYCC



Powering the new digital home



	SMP8652	SMP8654	SMP8656
DMIPS	1230*	1230*	1230*
System/DSP Clock Rates	500/333 MHz	500/333 MHz	500/333 MHz
Nagravision CA Support			•
3D Graphics			SGX531
Ethernet	(2) 10/100	(2) 10/100	(2) 10/100/1000
HDMI		•	•
SATA II (1.5 Gbps)	1	2	2
USB 2.0	1 OTG	2 Host	2 Host
SDIO	2		
Peripheral Bus, DVB-CI Support		•	
DRAM Support	32-bit 512 MB (DDR2-667)	64-bit 1 GB (DDR2-667)	64-bit 1 GB (DDR2-667)
NAND Flash Support	SLC	SLC	SLC/MLC
NOR Flash Support	16-bit 256 MB SPI		SPI
Digital YCbCr Video Inputs	•	•	•
Digital RGB/YCbCr Video Outputs	•		
Video DACs	4	6	6
Audio Outputs	5.1 I ² S + SPDIF	5.1 I ² S + SPDIF	5.1 I ² S + SPDIF
PCI		•	•
Non-Rovi ACP Version	SMP8653	SMP8655	SMP8657

* Host CPU + IPU (720 + 510)



Target Markets

- IPTV and hybrid set-top boxes
- Thin clients
- Media players
- Wireless display receivers

Supported Technologies

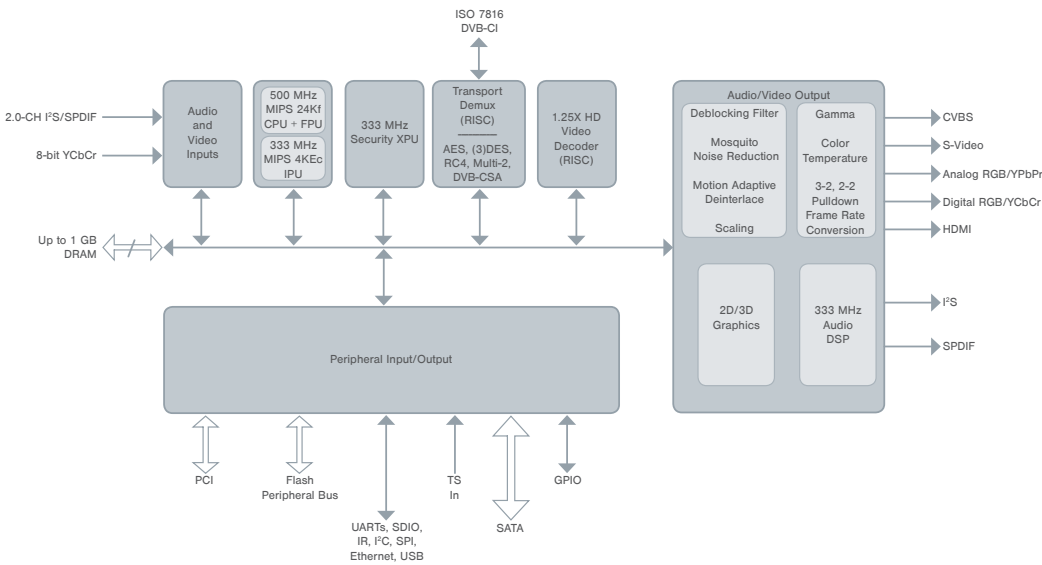
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Video Decoding

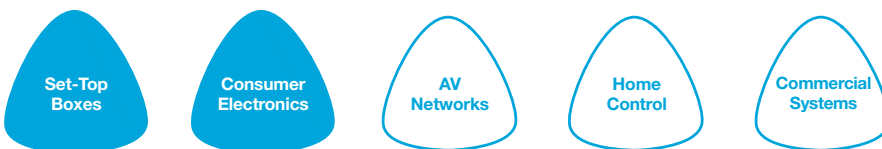
- MPEG-4.10 (H.264) BP@L3, MP@L4.0, HP@L4.0
- SMPTE 421M (VC-1) MP@HL, AP@L3
- WMV9 MP@HL
- MPEG-2 MP@HL
- MPEG-4.2 ASP@L5 (up to HD, 1-point GMC)
- AVS Jizhun profile@L2.0, 4.0, 6.0
- RMVB v9, v10
- 3D video support
 - Generic side-by-side and top-bottom output
 - RealD (side-by-side output)

Advanced Video Processing

- 2D/3D graphics accelerator with Open GL ES 1.1/2.0 support
- Motion adaptive deinterlacing
- Deblocking and deringing filters
- 12-bit xvYCC processing
- Integrated HDMI with CEC, 12-bit deep color, xvYCC



Powering the new digital home



	SMP8642	SMP8644	SMP8646
DMIPS	1840*	1840*	2208**
L2 Cache			256 KB
System/DSP Clock Rates	667/333 MHz	667/333 MHz	800/400 MHz
Video Input Port with VBI Capture		8-bit BT.601/656	
Ethernet	(2) 10/100	(2) 10/100	(2) 10/100/1000
SATA II (1.5 Gbps, eSATA compatible)	2	2	2
USB 2.0 Embedded Host	2	2	2
Transport Stream Inputs		1 SPI, 3 SSI	1 SPI, 3 SSI
Transport Stream Outputs		1 SPI, 2 SSI	
Peripheral Bus, DVB-CI Support		•	
DRAM Support	64-bit 1 GB (DDR2-667)	64-bit 1 GB (DDR2-667)	64-bit 1 GB (DDR2-800)
NAND Flash Support	SLC	SLC	SLC/MLC
NOR Flash Support		16-bit 8 KB	SPI
Digital RGB/YCbCr Video Outputs		•	
Audio Inputs	2.0 I ² S or SPDIF	(2) 2.0 I ² S or SPDIF	2.0 I ² S or SPDIF
Audio Outputs	9.1 I ² S + SPDIF	(2) 9.1 I ² S + SPDIF	9.1 I ² S + SPDIF
Non-Rovi ACP Version	SMP8643	SMP8645	SMP8647

* Host CPU + IPU (1330 + 510) ** Host CPU + IPU (1600 + 608)



Target Markets

- Premium media players
- Premium IPTV and hybrid set-top boxes

Supported Technologies

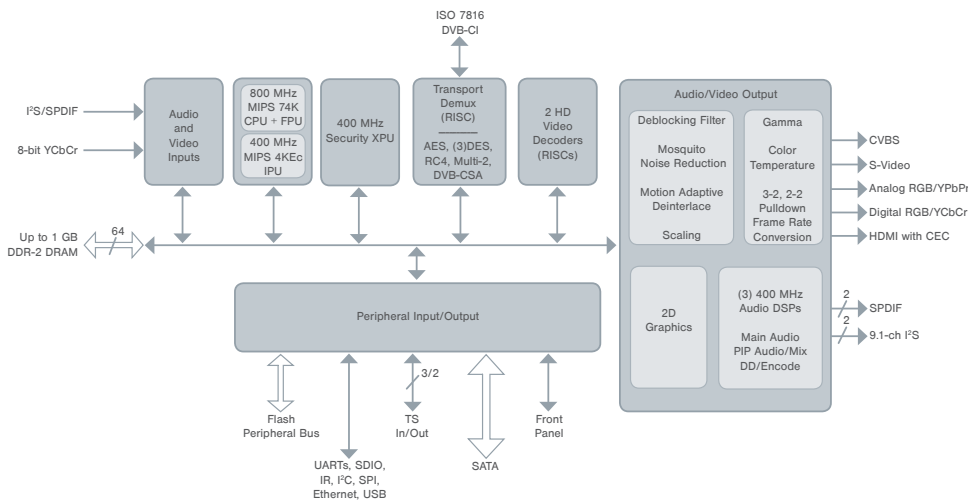
- Multiple task-specific processors lowers power and enables best middleware and application performance
- Three audio DSPs support wide variety of audio codecs
- Security CPU supports wide variety of conditional access (CA) and digital rights management (DRM) solutions

Video Decoding

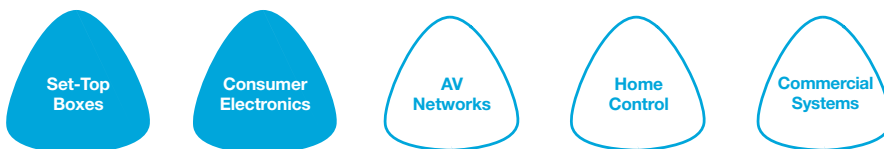
- MPEG-4.10 (H.264) BP@L3, MP@L4.0*, HP@L4.0*
- SMPTE 421M (VC-1) MP@HL, AP@L3
- WMV9 MP@HL
- MPEG-2 MP@HL
- MPEG-4.2 ASP@L5 (up to HD, 1-point GMC)
- AVS Jizhun profile@L2.0, 4.0, 6.0
- RMVB v9, v10
- 3D video support
 - Generic side-by-side and top-bottom output
 - RealID (side-by-side output)

Advanced Video Processing

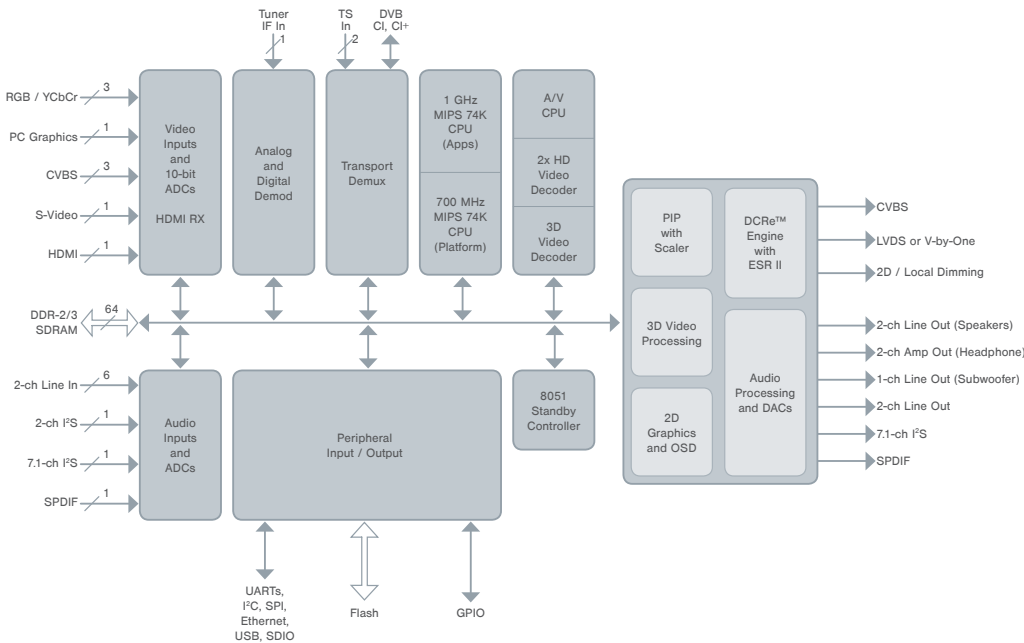
- Motion adaptive deinterlacing
- Deblocking and deringing filters
- Simultaneous HD, CIT-HD, and SD outputs
- Individual brightness, contrast, saturation, hue, and colorimetry correction controls for each video source and output port
- 12-bit xvYCC processing
- Integrated HDMI with CEC, 12-bit deep color, xvYCC



Powering the new digital home



	FNB1xx	FNP1xx	FNB2xx	FNP2xx
Max Output Frequency	120Hz	120Hz	240Hz	240Hz
Max Output Resolution	1920x1080 (16:9)	2560x1080 (21:9)	1920x1080 (16:9)	2560x1080 (21:9)
Panel Interface	LVDS	LVDS	V-by-One	V-by-One
Memory Interface	48-bit	48-bit	64-bit	64-bit
Dual HD Decode		•		•
AV Encode		Optional		Optional
SteadyView		•		•
2D Dimming		•		6 SSI
2D to 3D Conversion	Basic	Advanced	Basic	Advanced
3D Graphics		•		•



Target Markets

- 200/240Hz Smart TV

Supported Technologies

- Multiple MIPS 74Kf cores
- 48-/64-bit DDR3-1600 memory interface
- H.264 and MPEG-2 encoder (720p30)
- Integrated 8051 standby controller
- 2D and 3D graphics accelerators
- 3DTV support
- DVB-CI/CI+ v1.2 support
- Smartcard interface for ARIB
- Secure boot and key storage

Broadcast

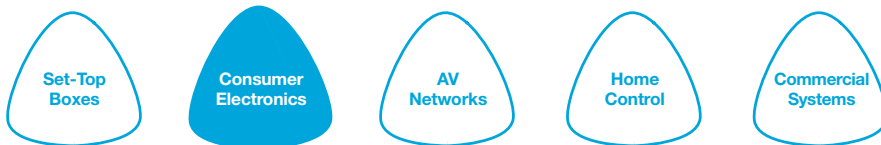
- DVB-T, DVB-C, ISDB-T, ATSC, and ClearQAM demodulators
 - ETSI EN 300 744
 - Nordig Unified 2.0
 - ITU-J.83 Annex A/C compliant
 - ATSC A/53, A/74 compliant
- Analog demodulators
 - BTSC, EIAJ, MA2, D/K1 A2, D/K2 A2, D/K3 A2, B/G A2, D/K NICAM, B/G NICAM, I NICAM, L NICAM, FM Radio
- PAL, SECAM, and NTSC

Video Decoding

- Dual HD decode to support simultaneous decode from broadcast and broadband
- MPEG-4.10 (H.264) BP@L3, MP@L4.1, HP@L4.1, MVC HP@L4.1
- MPEG-2 MP@HL
- AVS Jizhun profile (1080p30)
- RMVB v8, v9, v10 (1080p30)
- VP6, VP8 (1080p30)
- DivX 3.11 (1080p30)

Video Processing

- 240Hz MEMC and full frame rate conversion
- 2D local dimming (edge and direct lit), 512 segments
- 3DTV formatter with MEMC support and content adaptive 2D to 3D conversion
- 21:9 240Hz display support



DVB Solutions	tbd	tbd	tbd
ATSC Solutions	tbd	tbd	tbd
Max Output Frequency	60Hz	60Hz	60Hz
Max Output Resolution	1920x1080 (16:9)	1920x1080 (16:9)	1920x1080 (16:9)
Panel Interface	LVDS	LVDS	LVDS
Memory Interface	32-bit	32-bit	32-bit
3D Graphics	•		
3D Formatter	•	•	•
Internet Support	•	•	
PCB Layers	2 or 4	2 or 4	2 or 4



Target Markets

- 50/60Hz Smart TV

Supported Technologies

- 16-/32-bit DDR3-1600 memory interface
- Integrated 8051 standby controller
- 2D and 3D graphics accelerators
- 3DTV support
- DVB-CI/CI+ v1.2 support
- Smartcard interface for ARIB
- Secure boot and key storage

Broadcast

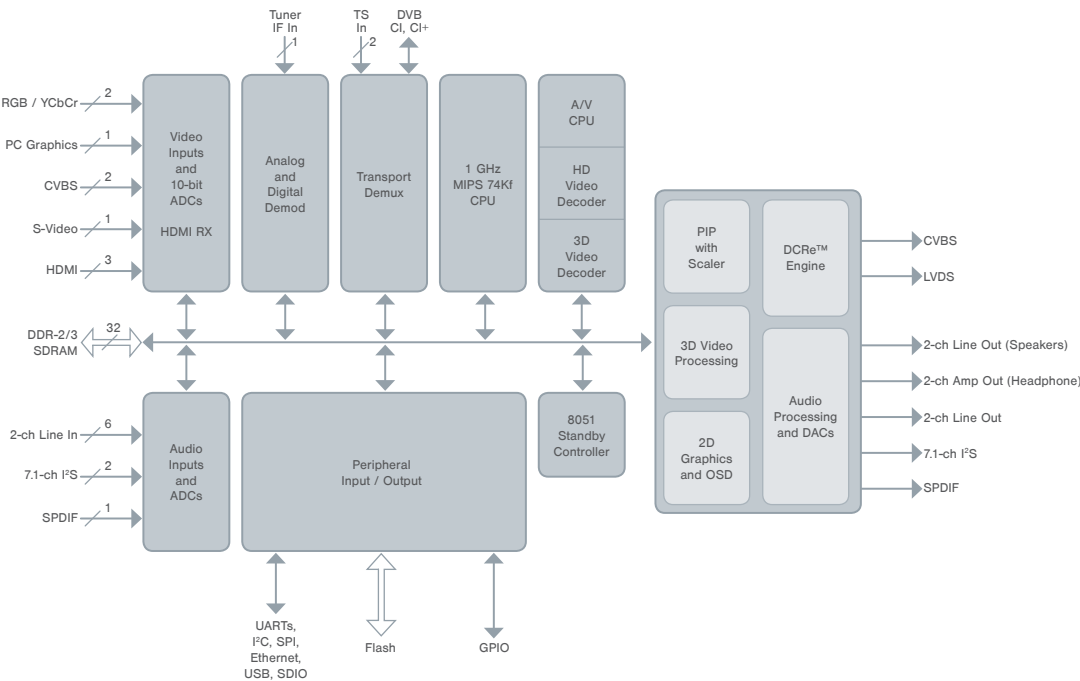
- DVB-T, DVB-C, ATSC, and ClearQAM demodulators
 - ETSI EN 300 744
 - Nordig Unified 2.0
 - ITU-J.83 Annex A/B/C compliant
 - ATSC A/53, A/74 compliant
- Analog demodulators
 - BTSC, EIAJ, MA2, D/K1 A2, D/K2 A2, D/K3 A2, B/G A2, D/K NICAM, B/G NICAM, I NICAM, L NICAM, FM Radio
- PAL, SECAM, and NTSC

Video Decoding

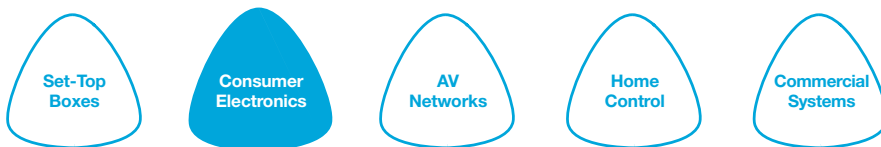
- MPEG-4.10 (H.264) BP@L3, MP@L4.1, HP@L4.1
- MPEG-2 MP@HL
- AVS Jizhun profile (1080p30)
- RMVB v8, v9, v10 (1080p30)
- DivX 3.11 (1080p30)

Video Processing

- Cross-color and cross-luma post processing filters
- Motion adaptive de-interlacing and noise reduction
- Local contrast enhancement
- Enhanced super resolution
- MPEG artifact reduction
- Universal color processor
- 3DTV formatter with content adaptive 2D to 3D conversion
- Support for 3DTV polarized (pattern retarder) panels
- Pivot function



Powering the new digital home



	BXL68-BxB12H	BXL68-BxB12T	BXL18-BxB12H
Max Output Frequency	60Hz	60Hz	60Hz
Max Output Resolution	1920x1080 (16:9)	1920x1080 (16:9)	1920x1080 (16:9)
Panel Interface	LVDS	LVDS	LVDS
Memory Interface	32-bit	32-bit	16-bit
Boot Flash	SPI	NAND	SPI
Secure Boot		•	
PCB Layers	2/4	2/4	2/4



Target Markets

- 50/60Hz Smart TV

Supported Technologies

- 16-/32-bit DDR3-1333 memory interface
- Integrated 8051 standby controller
- 2D graphics accelerator
- 3DTV support
- DVB-CI/CI+ v1.2 support
- Smartcard interface for ARIB
- Secure boot and key storage

System BOM Reduction

- 2-layer PCB support
- Single DDR3 option for non-connected HDTVs
- Passive component reduction

Broadcast

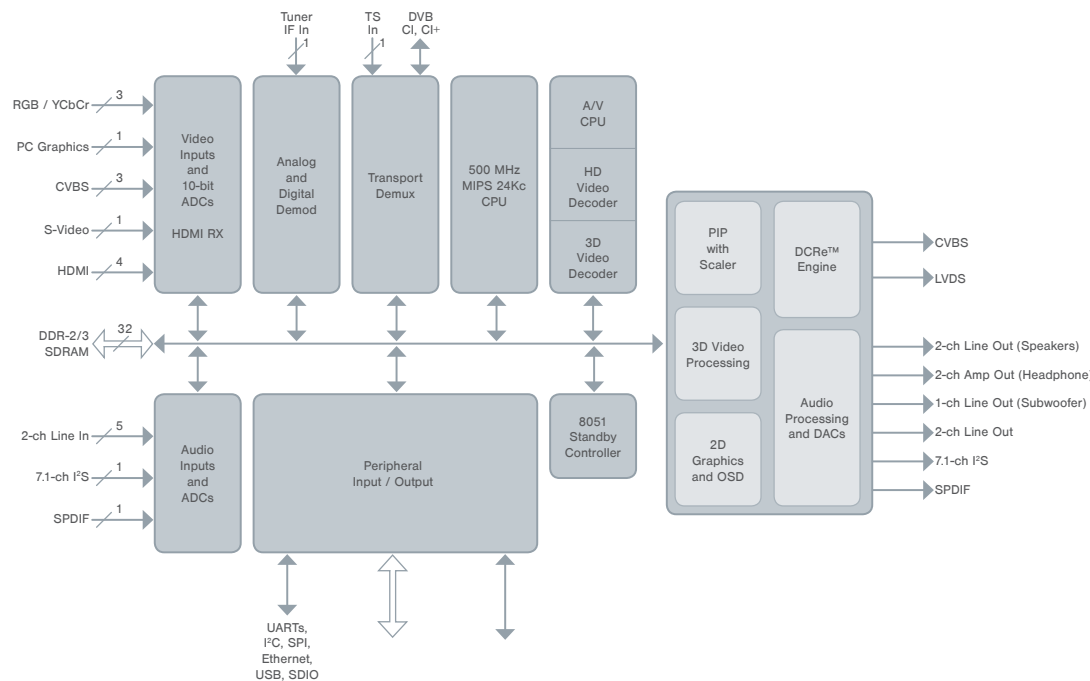
- DVB-T, DVB-C, ATSC, and ClearQAM demodulators
 - ETSI EN 300 744
 - Nordig Unified 2.0
 - ITU-J.83 Annex A/B/C compliant
 - ATSC A/53, A/74 compliant
- Analog demodulators
 - BTSC, EIAJ, MA2, D/K1 A2, D/K2 A2, D/K3 A2, B/G A2, D/K NICAM, B/G NICAM, I NICAM, L NICAM, FM Radio
- PAL, SECAM, and NTSC

Video Decoding

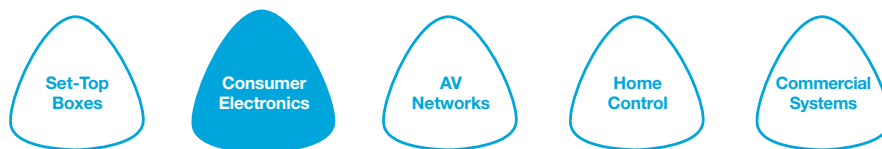
- MPEG-4.10 (H.264) BP@L3, MP@L4.1, HP@L4.1
- MPEG-2 MP@HL
- AVS Jizhun profile (1080p30)
- RMVB v8, v9, v10 (1080p30)
- DivX 3.11 (1080p30)

Video Processing

- Improved picture quality for 42" and larger HDTVs
- Local contrast enhancement
- Support for 3DTV line based striped polarizer panels or remap to 60Hz frame sequential format



Powering the new digital home



	DVB Solutions ATSC Solutions	TSXL68-A11-H TAXL68-A11-H	TSXL68-A11-S TAXL68-A11-S	TSXL68-A11-T TAXL68-A11-T	TSXL68-A22-H TAXL68-A22-H	TSXL28-A10-H TAXL28-A10-H
Max Output Frequency		60Hz	60Hz	60Hz	60Hz	60Hz
Max Output Resolution		1920x1080 (16:9)	1920x1080 (16:9)	1920x1080 (16:9)	1920x1080 (16:9)	1920x1080 (16:9)
Panel Interface		LVDS	LVDS	LVDS	LVDS	LVDS
Memory Interface		32-bit	32-bit	32-bit	32-bit	16-bit
Boot Flash		SPI	SPI	NAND	NAND	SPI
Secure Boot			•	•		
PCB Layers		4	4	4	4	2



Target Markets

- 50/60Hz Smart TV

Supported Technologies

- 16-/32-bit DDR3-1333 memory interface
- Integrated 8051 standby controller
- 2D graphics accelerator
- 3DTV support
- DVB-CI/CI+ v1.2 support
- Smartcard interface for ARIB
- Secure boot and key storage

Broadcast

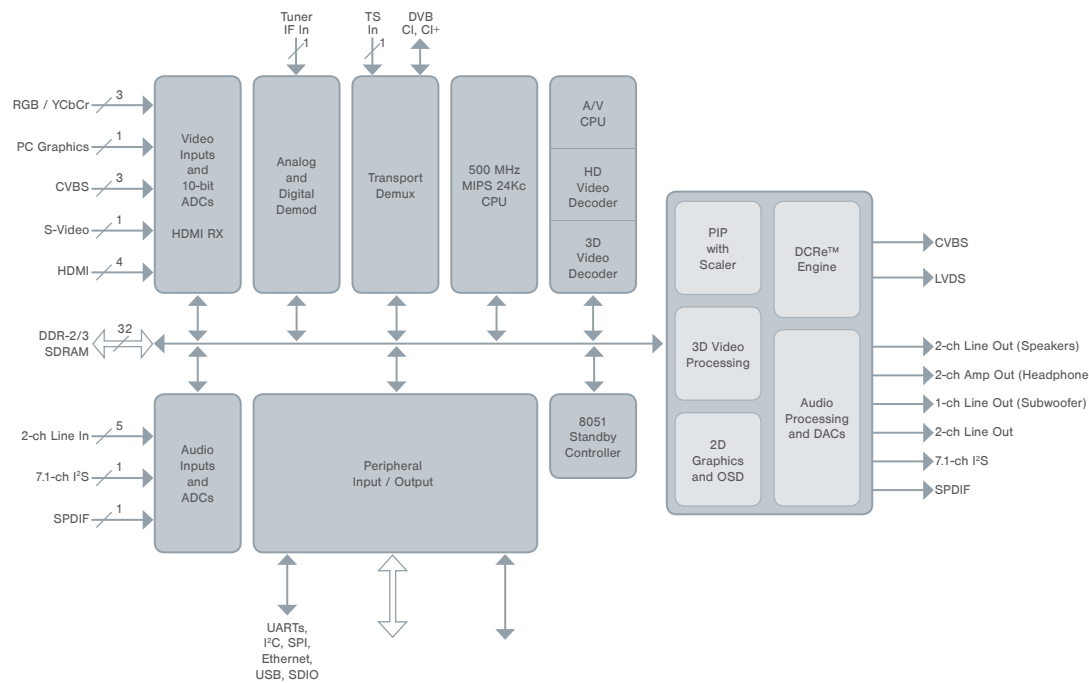
- DVB-T, DVB-C, ATSC, and ClearQAM demodulators
 - ETSI EN 300 744
 - Nordig Unified 2.0
 - ITU-J.83 Annex A/B/C compliant
 - ATSC A/53, A/74 compliant
- Analog demodulators
 - BTSC, EIAJ, MA2, D/K1 A2, D/K2 A2, D/K3 A2, B/G A2, D/K NICAM, B/G NICAM, I NICAM, L NICAM, FM Radio
- PAL, SECAM, and NTSC

Video Decoding

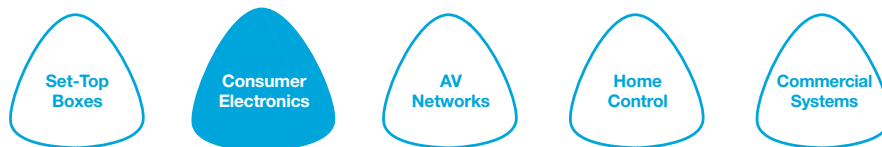
- MPEG-4.10 (H.264) BP@L3, MP@L4.1, HP@L4.1
- MPEG-2 MP@HL
- AVS Jizhun profile (1080p30)
- RMVB v8, v9, v10 (1080p30)
- DivX 3.11 (1080p30)

Video Processing

- Cross-color and cross-luma post processing filters
- Motion adaptive de-interlacing and noise reduction
- Local contrast enhancement
- Enhanced super resolution
- MPEG artifact reduction
- Universal color processor
- Support for 3DTV line based striped polarizer panels or remap to 60Hz frame sequential format to be received by a 3D capable frame rate converter SoC (e.g. FRC-V)



Powering the new digital home



PL330

H.264 HD Encoder



General

- 1.2V, 1.8V, and 3.3V power supplies
- 380mW power in full operation
- 278-pin, 11mm x 11mm VFBGA package

System Interfaces

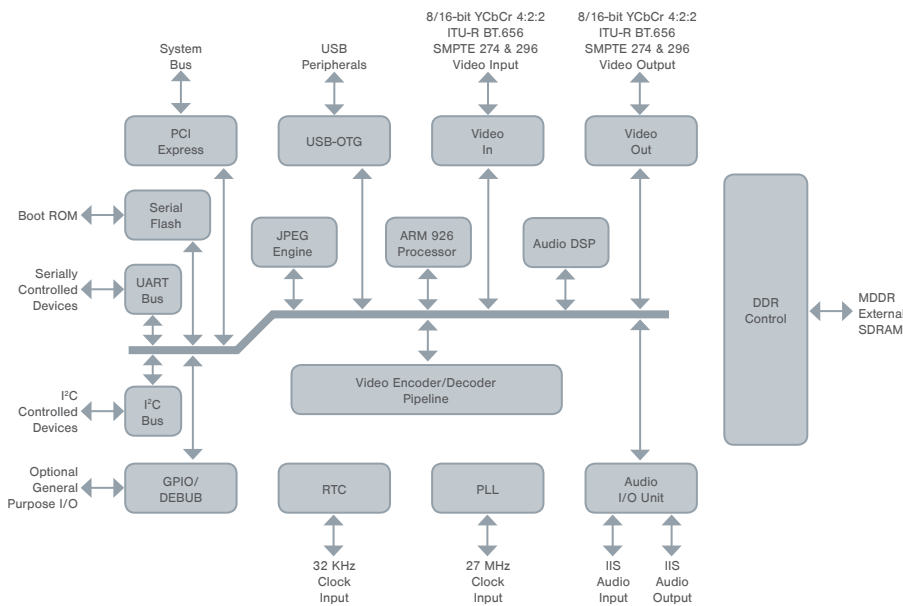
- Single 27 MHz input as master clock
- PCI Express Gen 1
- USB 2.0 Device
- GPIO, UART, and I²C compatible buses
- MDDR memory interface
- SPI serial flash interface for boot ROM
- SDIO

Video Interfaces

- Video input and output interfaces
- SMPTE 274/296, BT.656 interfaces
- 8-/16-bit YCbCr 4:2:2 interface with embed/external sync
- Interfaces to popular CMOS sensors
- Progressive scan and interlaced video
- Multi-tap down-scaler for arbitrary sizes
- Optimized single-pass encoder using motion analysis and advanced scalable algorithms

Audio Section

- Supports AAC-LC, MPEG Audio, MP3, PCM, G.711, G.729
- Supports 16-bit I²S, left-/right-justified
- I²S master and slave modes for audio inputs/outputs



Target Markets

- Video conferencing
- PVR
- Video phone
- IT & surveillance video capture
- Home surveillance
- Remote medicare / learning
- Wireless video transmission

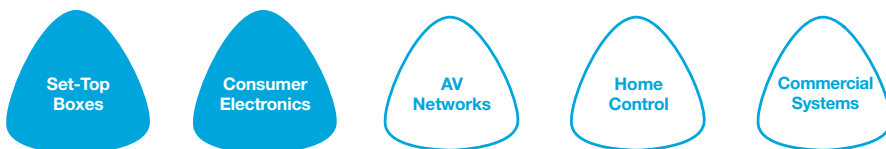
Video Encoding Features

- Real-time full-HD H.264 (AVC) video encode
- Wide resolution ranges from 1920x1080 to QQVGA
- Baseline, Main, and High profile up to Level 4.1
- CAVLC and CABAC entropy coding
- Single-pass VBR/CBR encode up to 20 Mbps
- Dynamic change on bitrate, frame rate, and GOP structure
- Key frame insertion on-the-fly
- Quarter-pixel accuracy
- Multiple H.264 streams encoding (2 channels 720p30 or 4 channels of VGAp30)
- H.264 and MJPEG simultaneously
- Baseline JPEG encode/decode up to 2M pixel @ 30 fps

System Processor

- 266 MHz ARM9 processor
- ARC DSP for audio functions

Powering the new digital home



VXP® video processing brings video quality to a new level by offering a complete package of the world's highest quality video processing algorithms for deinterlacing, scaling, and image enhancement.

HDTVs vary in their ability to cleanly display standard-definition content, such as DVDs and most television shows. This is due to the different video processing solutions used to upscale the content to fill the screen. With viewing of online low-resolution content becoming popular, the capabilities of these alternative video processing solutions are stretched even further. VXP® video processing can bring a high-definition experience to standard-definition content and make viewing of on-line content more enjoyable.

High-definition content can also be improved with high quality video processing. Just because a source is in high-definition doesn't mean that it will offer the best possible picture. Although the content may be high-definition, it may still contain artifacts and reduced picture quality that can distract the viewer. VXP® video processing ensures a consistent, more enjoyable viewing experience.

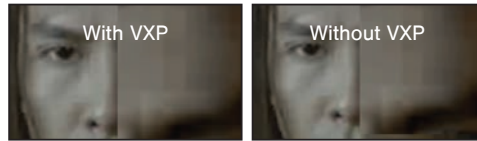
3D Noise Reduction

3D and 2D noise reduction which adaptively applies both temporal and spatial noise reduction, producing the clearest picture while maintaining fine image details



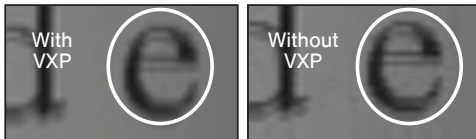
Block Artifact Reduction

Block artifact reduction identifies block artifacts introduced by source compression, adaptively smoothing the block boundaries



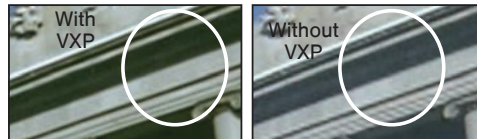
Mosquito Noise Reduction

Mosquito noise reduction recognizes object edges and removes mosquito noise to produce crisp, clear images



Motion and Edge Adaptive Deinterlacing

Motion and edge adaptive deinterlacing which includes directional interpolation to eliminate jaggy artifacts



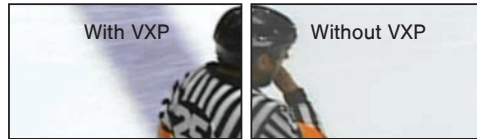
Detail Enhancement

Detail enhancement seeks out underlying image detail bringing unprecedented texture, sharpness and clarity to images



Adaptive Contrast Enhancement

Adaptive contrast enhancement analyzes the brightness level of each frame, producing stunning images with optimal contrast



Film Cadence Detection

Robust film cadence detection for interlaced and progressive sources providing fast 3:2/2:2 lock time, bad edit recovery, and support for extended film cadences



Features

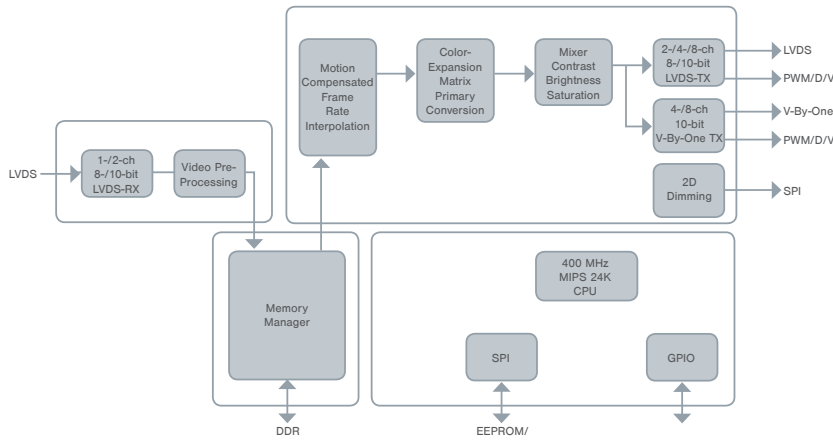
- Mosquito noise reduction recognizes object edges and removes mosquito noise to produce crisp, clear images
- Block artifact reduction identifies block artifacts introduced by source compression, adaptively smoothing the block boundaries
- 3D and 2D noise reduction which adaptively applies both temporal and spatial noise reduction, producing the clearest picture while maintaining fine image details
- Detail enhancement seeks out underlying image detail bringing unprecedented texture, sharpness, and clarity to images
- Motion and edge adaptive deinterlacing which includes directional interpolation to eliminate jaggy artifacts
- 10-/12-bit processing offers superior image precision
- Robust film cadence detection for interlaced and progressive sources providing fast 3:2/2:2 lock time, bad edit recovery, and support for extended film cadences
- Adaptive contrast enhancement analyzes the brightness level of each frame, producing stunning images with optimal contrast

FRC-V

Frame Rate Converter (FRC) for 200/240Hz 3DTV



	TFRCV-	A01	A02	A03	A04	A05	A06	A08	A09
LVDS Output		•			•	•			
V-by-One Output			•	•			•	•	•
2D Dimming			•	•		•			
3D Formatting		•		•		•	•		
2D to 3D Conversion		•	•	•	•	•	•	•	•
Overdrive		•	•	•	•	•	•	•	•



Target Markets

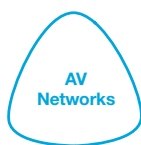
- 200/240Hz 3DTV

Supported Technologies

- Fast and reliable film mode detection
- Spread-spectrum clock system
- LED backlight dimming control
- Split-screen mode for easy retail demo
- 16-/32-bit DDR3-1333 memory interface
- 3DTV support

Video Processing

- Vector-based motion compensated frame rate conversion from 50/60Hz to 100/120/200/240Hz
- 10-bit processing
- Supports xvYCC
- 4:2:2 internal processing and 4:4:4 PC/gaming mode
- Superior “halo” performance (NHF technology)
- Enhanced video quality with backend video processing supports global, segment, or 2D (up to 512 segments) backlight dimming control
- Superior MEMC performance on blended OSD and protection on logo
- Content adaptive 2D to 3D conversion
- 3DTV formatter supports HDMI v1.4a 3DTV formats
- Support for 3D line interleaved and frame-sequential panels

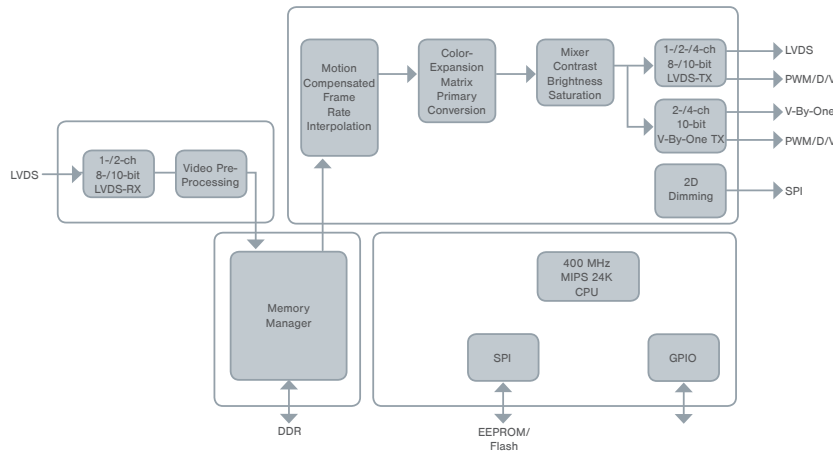


FRC-S+

Frame Rate Converter (FRC) for 100/120Hz 3DTV



	TFRCs+ -	B01	B02	B03	B04	B05	B06	B07	B08
LVDS Output	•				•	•		•	•
V-by-One Output			•	•			•	•	
2D Dimming			•	•		•		•	
3D Formatting	•		•			•			•
2D to 3D Conversion	•	•	•	•	•	•	•	•	•
Overdrive		•	•			•		•	



Target Markets

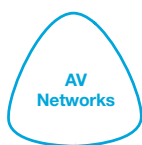
- 100/120Hz 3DTV

Supported Technologies

- Fast and reliable film mode detection
- Spread-spectrum clock system
- LED backlight dimming control
- Split-screen mode for easy retail demo
- 16-/32-bit DDR3-1333 memory interface
- 3DTV support
- Supports 200/240Hz displays using two devices

Video Processing

- Vector-based motion compensated frame rate conversion from 50/60Hz to 100/120Hz
- 10-bit processing
- Supports xvYCC
- 4:2:2 internal processing and 4:4:4 PC/gaming mode
- Superior “halo” performance (NHF technology)
- Enhanced video quality with backend video processing supports global, segment, or 2D (up to 512 segments) backlight dimming control
- Superior MEMC performance on blended OSD and protection on logo
- Content adaptive 2D to 3D conversion
- 3DTV formatter supports HDMI v1.4a 3DTV formats
- Support for 3D line interleaved and frame-sequential panels

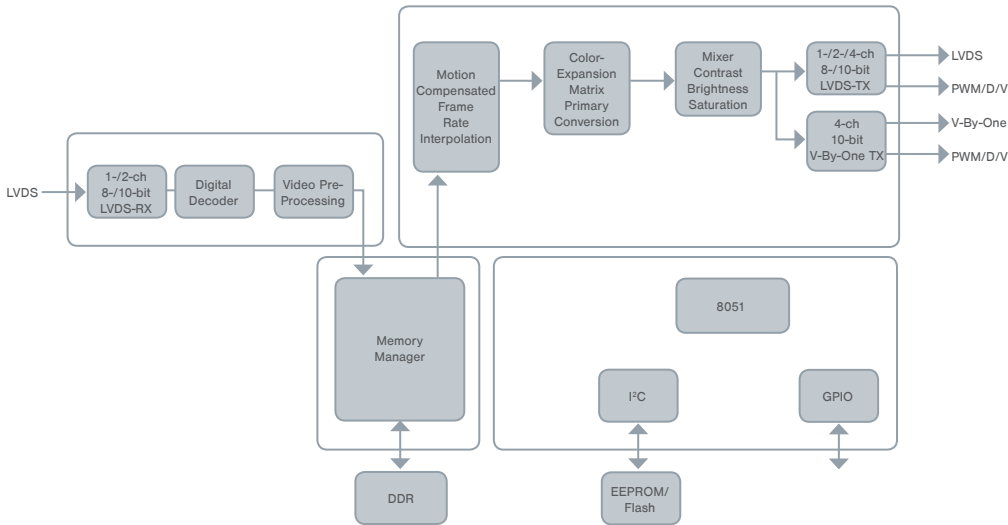


FRC-S

Frame Rate Converter (FRC) for 100/120Hz HDTV



	FRC 9459S	FRC 9559S
1-/2-ch 8-/10-bit LVDS Output	•	•
4-ch 8-/10-bit LVDS Output	•	
4-ch 10-bit V-By-One Output		•



Target Markets

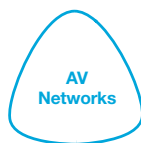
- 100/120Hz HDTV

Supported Technologies

- Fast and reliable film mode detection
- Spread-spectrum clock system
- Split-screen mode for easy retail demo
- 16-/32-bit DDR2-1066 memory interface
- Supports 200/240Hz displays using two devices

Video Processing

- Vector-based motion compensated frame rate conversion from 50/60Hz to 100/120Hz
- 10-bit processing
- Supports xvYCC
- 4:2:2 internal processing and 4:4:4 PC/gaming mode
- Superior "halo" performance
- Superior MEMC performance on blended OSD and protection on logo



GF9452

12-bit Dual Channel, Dual Output VXP® Video Processor



GF9452	
Video Input Formats	8-/10-/12-bit RGB or 4:2:2/4:4:4 YCbCr 16-/20-/24-bit RGB (G, BR) or 4:2:2/4:4:4 YCbCr (Y, CbCr) 24-/30-/36-bit 4:4:4 YCbCr (Y, Cb, Cr) 24-/30-/36-bit RGB
Video Output Formats	8-/10-/12-bit RGB or 4:2:2/4:4:4 YCbCr 16-/20-/24-bit RGB (G, BR) or 4:2:2/4:4:4 YCbCr (Y, CbCr) 24-/30-/36-bit 4:4:4 YCbCr (Y, Cb, Cr) 24-/30-/36-bit RGB
Host Interface	6-bit address, 16-bit data 4-wire serial
DDR-2 DRAM (DDR667) Support	4 x 512Mb (video + OSD)

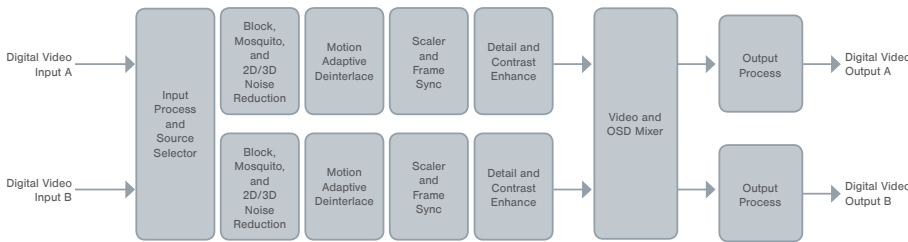


Target Markets

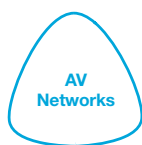
- AV receivers
- Blu-ray players
- Commercial systems

Supported Technologies

- Supports all DTV video and PC graphics formats
- Supports active raster size up to 2048x2048
- High quality motion and speed adaptive deinterlacing
- Multi-tap scaling engine with panoramic scaling and aspect ratio conversion
- Multiple on-screen video display, including picture-in-picture (PIP), picture-on-picture (POP), picture-by-picture (PBP)
- Adaptive 3D noise reduction
- Mosquito noise reduction and block artifact reduction
- Adaptive detail enhancement featuring sharpness and texture enhancement with precise overshoot control
- Adaptive contrast enhancement
- User programmable gamma correction



Powering the new digital home



Features

- Two independent channels of VXP® processing
- Support for 12-bit input and output on both channels
- Flexible output architecture to support single, dual, and twin channel outputs
- Advanced film mode detection and compensation for interlaced and progressive sources, including support for frame-locked 3:3 (72Hz) and 2:2 (48Hz) output cadence generation
- Frame rate conversion with full support for genlock and frame-lock operation

GF9450

10-bit Dual Channel VXP® Video Processor



GF9450	
Video Input Formats	8-/10-bit RGB or 4:2:2/4:4:4 YCbCr 16-/20-bit RGB (G, BR) or 4:2:2/4:4:4 YCbCr (Y, CbCr) 24-/30-bit 4:4:4 YCbCr (Y, Cb, Cr) 24-/30-bit RGB
Video Output Formats	8-/10-bit RGB or 4:2:2/4:4:4 YCbCr 16-/20-bit RGB (G, BR) or 4:2:2/4:4:4 YCbCr (Y, CbCr) 24-/30-bit 4:4:4 YCbCr (Y, Cb, Cr) 24-/30-bit RGB
Host Interface	6-bit address, 16-bit data 4-wire serial
DDR-2 DRAM (DDR667) Support	4 x 512Mb (video + OSD)

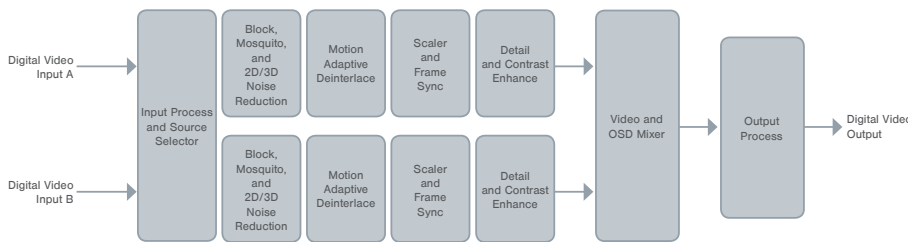


Target Markets

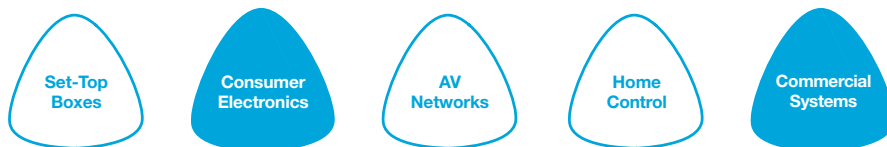
- AV receivers
- Blu-ray players
- Commercial systems

Supported Technologies

- Supports all DTV video and PC graphics formats
- Supports active raster size up to 2048x2048
- High quality motion and speed adaptive deinterlacing
- Multi-tap scaling engine with panoramic scaling and aspect ratio conversion
- Multiple on-screen video display, including picture-in-picture (PIP), picture-on-picture (POP), picture-by-picture (PBP)
- Adaptive 3D noise reduction
- Mosquito noise reduction and block artifact reduction
- Adaptive detail enhancement featuring sharpness and texture enhancement with precise overshoot control
- Adaptive contrast enhancement
- User programmable gamma correction



Powering the new digital home



Features

- Two independent channels of VXP® processing
- Provides two flexible 30-bit digital video input ports
- Flexible single or dual pixel digital video output
- Advanced film mode detection and compensation, including support for frame-locked 3:3 (72Hz) and 2:2 (48Hz) output cadence generation
- Frame rate conversion with full support for genlock and frame-lock operation

G.hn is a set of ITU-T Recommendations defining the next generation home AV network standard used for transferring Internet Protocol (IP) content across existing coax cables, phone wires, and AC power wires in the home. Sigma Designs, one of the leading proponents of G.hn, is considered one of the leaders in G.hn due to our extensive and proven expertise in deploying HomePNA® and HomePlug® AV solutions that use existing coaxial cables, phone lines, and AC powerlines in the home. G.hn is capable of data rates up to 1 Gbps per media (coax, phone, power).

HomePNA® (HPNA) is the marketing name for the ITU-T G.9954 standard, and is a leading standard and technology used for transferring Internet Protocol (IP) content across existing coax cables or phone wires in the home. It is capable of data rates up to 320 Mbps (payload rates up to 200 Mbps).

HomePlug® AV (HPAV) is a leading standard and technology used for transferring Internet Protocol (IP) content across existing AC power wires in the home. HomePlug® AV is capable of data rates up to 200 Mbps (payload rates up to 110 Mbps).



G.hn Features

- PHY rate up to 1 Gbps per medium (coax, phone, power); up to 3 Gbps aggregated over all media
- Every in-home coax, phone, and power outlet can be a home AV network connection
- G.hn MIMO over power line - enables usage of power line as a multiple input multiple output (MIMO) channel, thus extending coverage, improving the network's immunity to noise and delivering higher throughput
- Optimized for IPTV and multicast systems for video and audio traffic
- Plug & Play solution, self-install over all three media
- Supports HomePNA™ 3.1 (ITU-T G.9954 standard)
- Supports simultaneous connection to multiple media for optimal coverage and throughput

HomePNA® Features

- Every in-home coax or phone jack can be a home AV network connection
- Payload rates up to 200 Mbps over coax, 140 Mbps over phone wires
- Used by more than 40 service providers globally
- Four out of the top five North American telcos deploying IPTV have selected HomePNA®

HomePlug® AV Features

- Every in-home AC power outlet can be a home AV network connection
- ClearPath™ technology for improved AC powerline performance
- Payload rates up to 110 Mbps
- 1152 channels enables a highly customizable solution to maximize performance in different environments

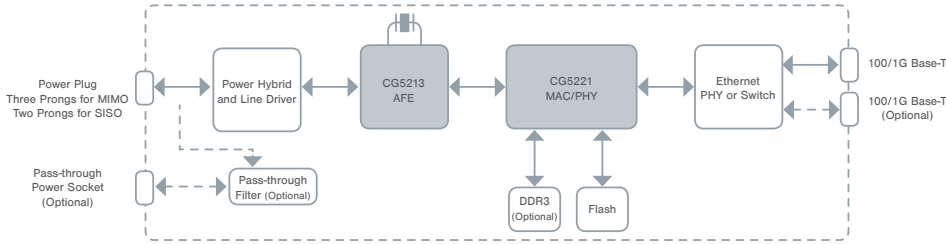
CG5200 Series

G.hn chipsets, self install home entertainment networks over all wires, coax, phonenumber and power line

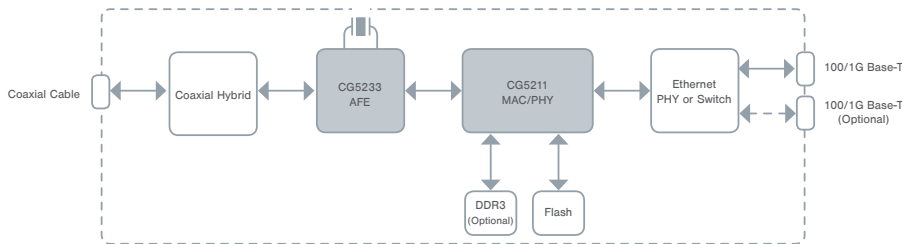


SYSTEM IMPLEMENTATION EXAMPLES:

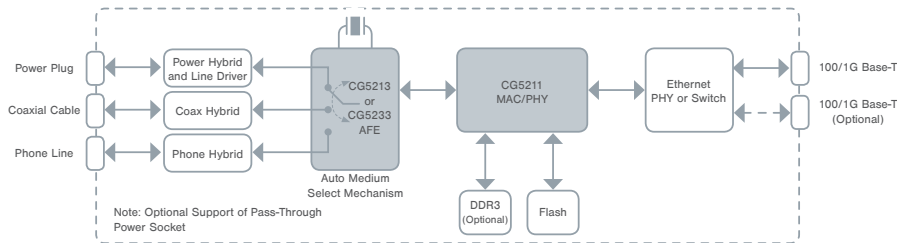
Ethernet Over Power Line Bridge, MIMO and SISO (CG5220 Based)



Ethernet Over Coaxial Cable Bridge (CG5210 Based)



Ethernet to G.hn Bridge with Automatic Medium Selection (CG5210 Based)



Target Markets

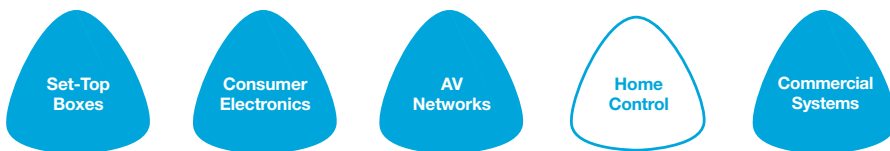
- Connected TVs
- Set-top boxes, thin clients and Consumer electronics products
- Residential gateways (RG)
- Optical network terminals (ONTs)
- Home audio and home theater systems
- Network-attached storage devices (NAS)
- IP cameras
- PCs
- Video game consoles
- VoIP adaptors
- Ethernet to G.hn bridges
- G.hn to Z-Wave® bridges

Benefits

- Self-install even by a novice customer, no need for professional installation
- Compliant with ITU-T G.9954
- Guaranteed reliable whole home coverage even in homes with thick walls and multiple floors. Increased customer satisfaction and reduced maintenance expenditures
- Consistent user experience and improved immunity to interference for reliable HD picture quality
- Simple management, unified set of APIs, management and diagnostic tools for all media
- No need to hold double inventory; the same solution can support all media
- No need to run new wires; G.hn operates over existing power line, coax and phone line.
- Instantly secure the home network without the hassle of SSID and other cumbersome mechanisms
- Enables fast and cost-effective troubleshooting via advanced local/remote diagnostic tools
- Easy to embed. Enables all consumer electronics products in a home to be part of the same mesh network
- Enables a smooth and seamless migration from HomePNA™ technology to G.hn on coax

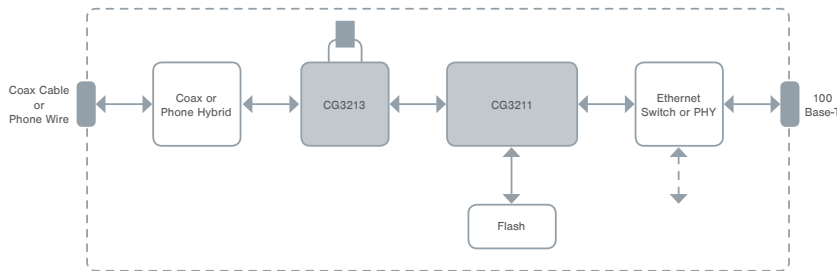
	CG5210	CG5220	CG5230
Digital Chip	CG5211	CG5221	CG5231
Analog Chip	CG5213 or CG5233	CG5213 or CG5233	CG5233
G.hn Modes of Operation	Power Line MIMO and SISO, Coax Cable and Phone Wire	Power Line MIMO and SISO	Power Line SISO
Max Bandwidth	100 MHz	80 MHz	80 MHz
Performance	Ultra	Ultra	Ultra
Coverage	Ultra	Ultra	Very High
Embedded IP Stack, TR69	•	•	•
HomePNA® 3.1 TR69	•	-	-
Auto Medium Selection	•	-	-
Coexistence with HomePlug® AV/P1901	•	•	•
External Memory Support	Optional DDR3	Optional DDR3	Optional DDR3
G.hn to Z-Wave® bridge support	•	•	•
Interfaces	GMII, RGMII, MII, UART, SPI	GMII, RGMII, MII, UART, SPI	GMII, RGMII, MII, UART, SPI
Advanced Power Save	•	•	•

Powering the new digital home



Features

- PHY layer rate up to 320 Mbps
- Payload rates up to 200 Mbps over standard coax cables and up to 140 Mbps over standard phone wires
- Multi-band operation
- Synchronous MAC
- Guaranteed (parameter) and prioritized QoS
- Complies with ITU-T G.9954, HomePNA® v3.1; meets FCC parts 15 and 68
- Master and Endpoint application support
- MII, TurboMII, PHY host interfaces
- Integrated 10/100 Base-T Ethernet MAC
- Coexists with ADSL/ADSL2/ADSL2+, VDSL/VDSL2, ISDN, POTs
- Coexists with terrestrial and satellite TV
- Support for remote and local management and diagnostics
- Field-upgradeable firmware
- Implements complete HomePNA® protocol stack on chip
- Expandable internal packet buffer
- Industrial temperature range
- On-chip filtering reduces hybrid cost
- Low power consumption
- Uses standard Ethernet drivers



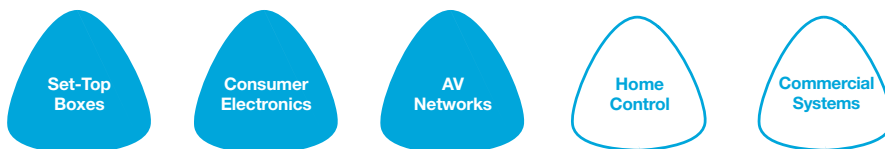
Target Markets

- Home AV networks
- Set-top boxes and CE products
- Residential gateways
- Optical network terminals (ONTs)
- Customer premises equipment (CPE)
- Ethernet to HomePNA® v3.1 bridges

Benefits

- Every in-home coax and phone jack can be a home network connection
- Payload rates up to 200 Mbps over coax, 140 Mbps over phone wires
- Guaranteed parameter-based QoS eliminates data collisions on the network
- Full control over network resource allocation
- Remotely monitor bandwidth and QoS compliance for every data flow
- Remote diagnostic testing for every path in network
- Installation support diagnostics with immediate visual performance indication
- Multi-band operation to enable coexistence with existing services
- Exceeds the HomePNA® 3 specifications for reach over home wiring topologies
- Direct Peer-to-Peer data transfers
- Convergence layer allows bridging (802.11 and Ethernet) with QoS intact
- Adapts to line conditions to compensate for impairments
- Data transfer rate independently maximized between every pair of clients
- Version optimized for MDU and Hospitality applications also available (CG3210M)

Powering the new digital home



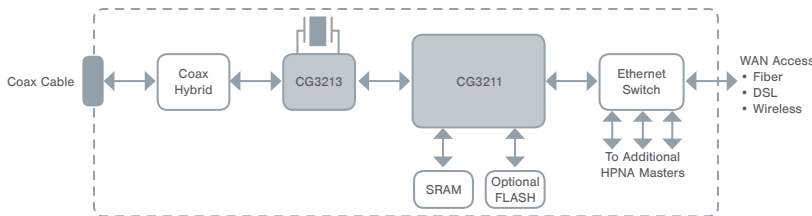
Network Features

- Robust operation above 65 dB (over 1,000 meters) end-to-end attenuation (cable & splitters)
- 190 Mbps effective data rate per band
- Point-to-multipoint topology; up to 62 Endpoints per Master per band
- Advanced TDMA, CSMA/CA MAC protocol
- Low latency and jitter
- Advanced guaranteed and prioritized QoS
- Efficient support of broadcast, multicast, unicast, and VLAN routing schemes
- Supports CBR, VBR, and best effort data streams
- Supports IPv6 protocol
- Field-upgradeable firmware

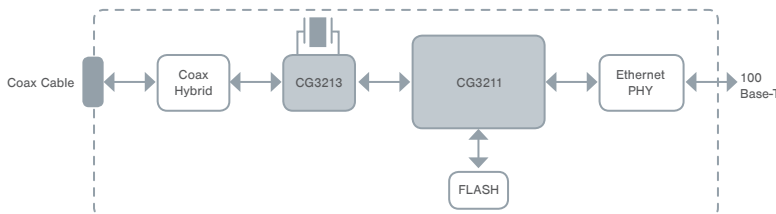
Security Features

- Absolute client to client privacy
- Support AES based encryption
- Advanced device admission & connection control
- Dynamic configuration of clients according to Service Level Agreement (SLA)
- Supports DSLF TR-69
- Local & remote network monitoring and logging tools
- Supports IGMP/MLD snooping and filtering

Typical MDU Master Device Block Diagram



Typical MDU Endpoint Block Diagram



Target Markets

- DSL gateway equipment
- Optical network terminals (ONTs)
- Ethernet to HomePNA® v3.1 bridges for each unit

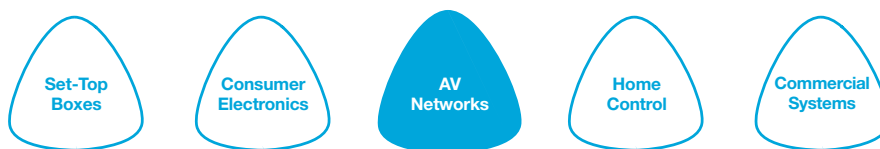
Benefits

- Enables service providers a fast and easy migration to bi-directional, digital broadband services
- Enables the cost-effective provisioning of advanced Triple-Play services such as IPTV, VOD, VoIP, and Broadband Internet Access
- Creates new revenue opportunities for service providers
- Huge cost savings compared to alternative solutions such as DOCSIS, DSL, and Ethernet cabling
- Speedy deployment - no new wires; uses existing coax wires and splitters, in parallel with existing RF video broadcast services
- Enables self-installation of in-home Endpoints by the consumer

Chipset Features

- Same chipset for Master and Endpoint design
- Built-in MII PHY host interfaces
- Built-in 100 Base-T Ethernet MAC
- Internal packet processor and buffer, no need for external processor
- JTAG IEEE 1149.1 test port
- Industrial temperature range

Powering the new digital home

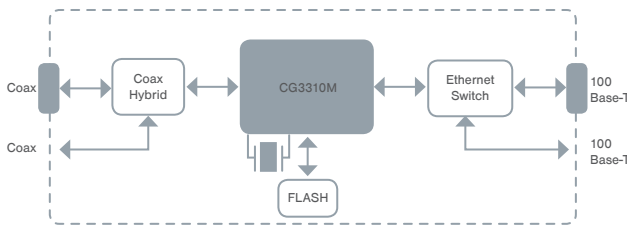


Network Features

- Robust operation above 73 dB (over 1,000 meters) end-to-end attenuation (cable & splitters)
- 160 Mbps effective data rate per band
- Point-to-multipoint topology; up to 126 Endpoints per Master per band
- Advanced TDMA, CSMA/CA MAC protocol
- Low latency and jitter
- Advanced guaranteed and prioritized QoS
- Efficient support of broadcast, multicast, unicast, and VLAN routing schemes
- Supports CBR, VBR, and best effort data streams
- Supports IPv6 protocol
- Field-upgradeable firmware

Security Features

- Absolute client to client privacy
- Support AES based encryption
- Advanced device admission & connection control
- Dynamic configuration of clients according to Service Level Agreement (SLA)
- Supports DSLF TR-69
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Chip Features

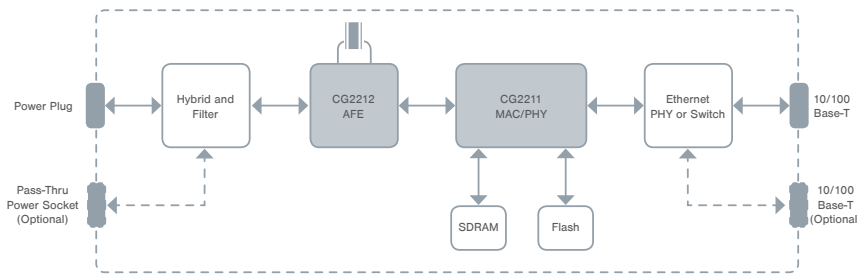
- Based on Fast EoC™ technology
- Single chip for Endpoint design
- Built-in MII PHY host interfaces
- Built-in 100 Base-T Ethernet MAC
- Internal packet processor and buffer, no need for external processor
- JTAG IEEE 1149.1 test port
- Industrial temperature range

Powering the new digital home



Features

- PHY layer rate up to 200 Mbps
- Implements OFDM, channel adaptation, FEC, noise mitigation schemes
- Supports 1024/256/64/16/8-QAM, QPSK, BPSK, ROBO modulation schemes
- Supports IP multicast for audio and video traffic
- IPv4, IPv6 with IGMP v1, v2, v3 snooping support
- 128-bit AES encryption with key management
- Supports pushbutton-based privacy
- Excellent throughput with a variety of packet sizes in a wide range of environments
- Enhanced Quality of Service (QoS) with programmable classification filters and support for priority based and parameter based QoS
- Device Level QoS with advanced hardware mechanism for managing traffic priority
- Environmentally-friendly technology integrates innovative features for reduced energy consumption
- Up to 90% power reduction in power-save mode
- MII MAC and PHY host interfaces
- Signal quality LED indication
- Well-documented Application Programming Interface (API) for easy product adaptation
- Support for customer specific features
- Remote management and diagnostics for faster installation
- Coexistence with neighboring HomePlug® networks



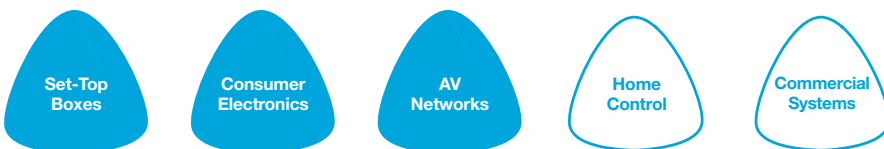
Target Markets

- Home AV networks
- Set-top boxes and CE products
- Residential gateways
- Optical network terminals (ONTs)
- Customer premises equipment (CPE)
- Ethernet to HomePlug® AV v1.1 bridges

Benefits

- Every in-home AC power outlet can be a home network connection
- Quality of Service (QoS) configuration allows data stream prioritization for specific applications
- Device QoS balances resource usage when services contend for the same resources within a device
- Decreased energy costs through reduction of power consumption when system is inactive
- Remote monitoring and management tools reduce maintenance costs
- LED indicators display system status and enable simple installation
- Optimized software API, enabling quick customization and product differentiation
- Secure home communications at the touch of a button
- ClearPath™ technology enables usage of powerline as a multiple input multiple output (MIMO) channel, thus extending coverage, improving the network's immunity to noise and delivering a higher throughput
- Supports TR069
- Supports power-save mode; compliant with EuP 2013

Powering the new digital home



Our Z-Wave® single-chip wireless technology is ideal for easily adding Z-Wave® control and status capabilities to RF remote controls, set-top boxes, CE products, and home automation, home security monitoring, and home energy management products. Z-Wave® has emerged as the industry standard for wireless home control, with more than 160 manufacturers offering more than 700 Z-Wave®-enabled products.

Home Control

Lifestyle & Convenience, Safety & Security, Energy Management



Entertainment Control

RF remote control with metadata for movies, music, personal content



Remote Access

Home control from anywhere in the world via Internet



The wireless mesh network technology automatically routes the RF signal from one Z-Wave® node to the next, around obstacles and radio dead spots, resulting in high reliability and assured whole-home coverage.

The ability to also use the Z-Wave® protocol over IP (Internet Protocol) networks allows Z-wave® enabled products to connect seamlessly using the wireless mesh network, the home network, and the Internet.

For RF remote control applications, Z-Wave® overcomes the line-of-sight limitation of IR, enabling reliable two-way communications and whole-home coverage. Program names, song titles, artist names, channel identification, etc. can now be seen from the remote control.

Z-Wave® allows both manufacturers and consumers the security of knowing that Z-Wave® certified products, regardless of brand, will work together.



Features

- Integration of home, entertainment, security, and energy management control with metadata support
- Seamless interoperability between multiple vendors and applications
- Robust and reliable whole-home coverage through mesh networking
- Z-Wave® protocol over IP (Internet Protocol) networks, such as home network and Internet
- Patented Z-Wave® protocol delivers a complete and highly reliable communication solution, using frame acknowledgement retransmission, collision avoidance, frame checksum check, and sophisticated routing
- Supports unicast, multicast, and broadcast messages
- Low power consumption for multi-year battery life



SD3402	
Frequency	779...956 MHz
Program Memory	64 KB OTP
SRAM	16 KB
NVRAM	64 B
GPIO	23
Keyboard Scan	88 keys
UARTs	1
SPI Ports	1
USB	•
AES Security	•
IR Transmitter	•
Data Rate	100 kbps



Target Markets

- RF/IR remote control
- IPTV and cable set-top boxes that support home security monitoring and home energy management

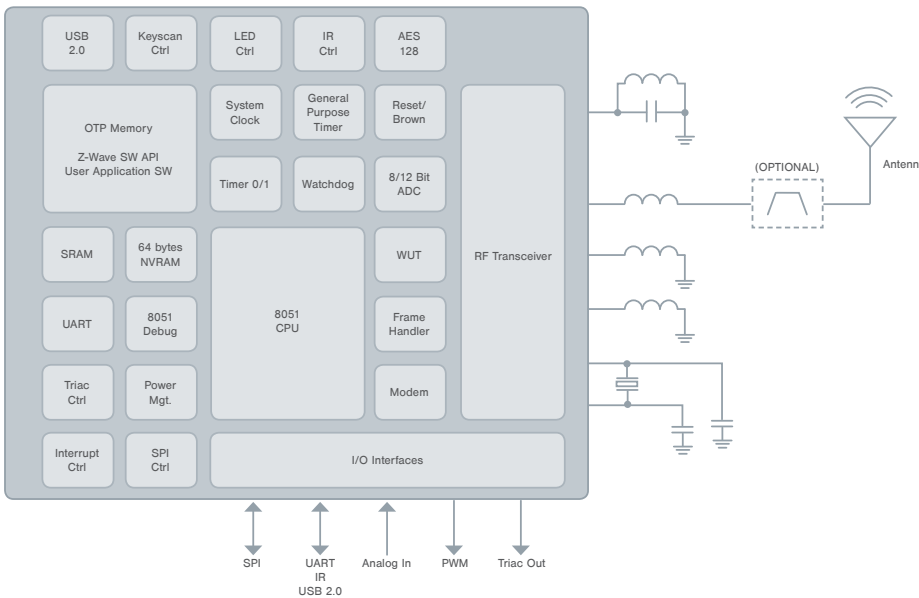
Benefits

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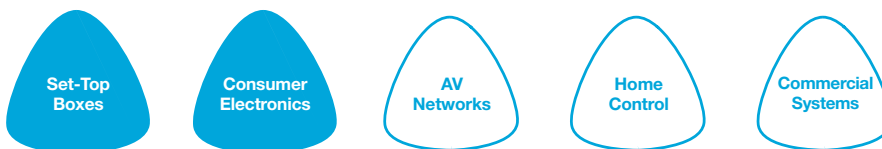
Features

- Integrated CPU and RF transceiver
- IR transmitter
- 64KB OTP, 16KB SRAM, 64B NVRAM
- 1000 DIM step Triac controller
- 4-ch 12-bit rail-to-rail ADC
- Integrated GPIO, SPI, UART, PWM, USB, 88-key matrix scan
- AES 128 security engine
- 4-ch LED controller
- Ultra-low power sleep mode
- 100 kbps data rates, low latency
- Uses frequency bands 779...956 MHz for complete global coverage
- Concurrent multi-channel support reduces external interference
- Superior blocking performance
- Battery monitor and built-in supply regulators
- Power supply: 2.3-3.6V

Z-Wave® CE/STB Controller Selection Guide

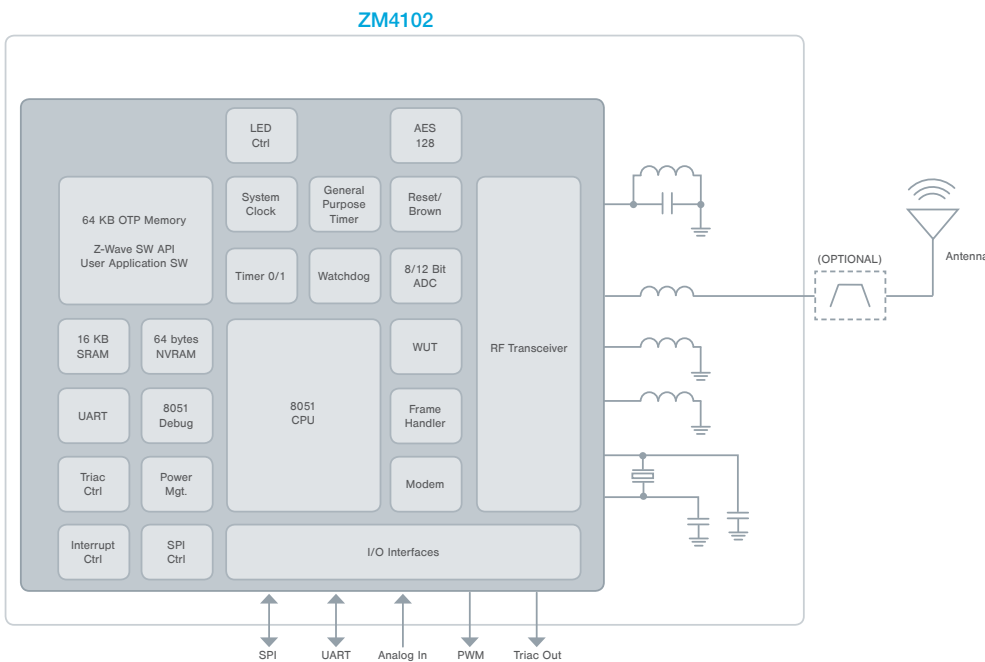


Powering the new digital home



	ZM3102	ZM4101	ZM4102
Frequency	868.40...921.42 MHz	779...956 MHz	779...956 MHz
Program Memory	32 KB flash	64 KB OTP	64 KB OTP
SRAM	2 KB	16 KB	16 KB
NVRAM		64 B	64 B
GPIO	10	32	10
Keyboard Scan		128 keys	
UARTs	1	2	1
SPI Ports	1	2	1
USB		•	
AES Security		•	•
IR Transmitter		•	
IR Learning		•	
Data Rate	40 kbps	100 kbps	100 kbps

Z-Wave® Home Control Module Selection Guide



Target Markets

- Home control
- Home security and monitoring
- Home energy management

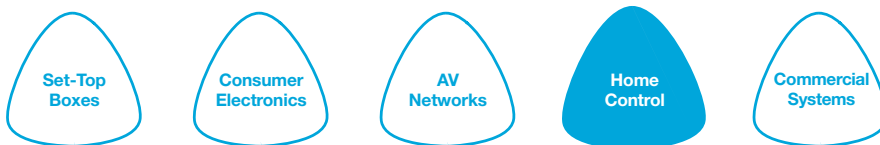
Benefits

- Integration of home, entertainment, security, and energy management control with metadata support
- Seamless interoperability between multiple vendors and applications
- Robust and reliable whole-home coverage through mesh networking
- Z-Wave® protocol over IP (Internet Protocol) networks, such as home network and Internet
- Supports unicast, multicast, and broadcast messages
- Low power consumption for multi-year battery life

Features

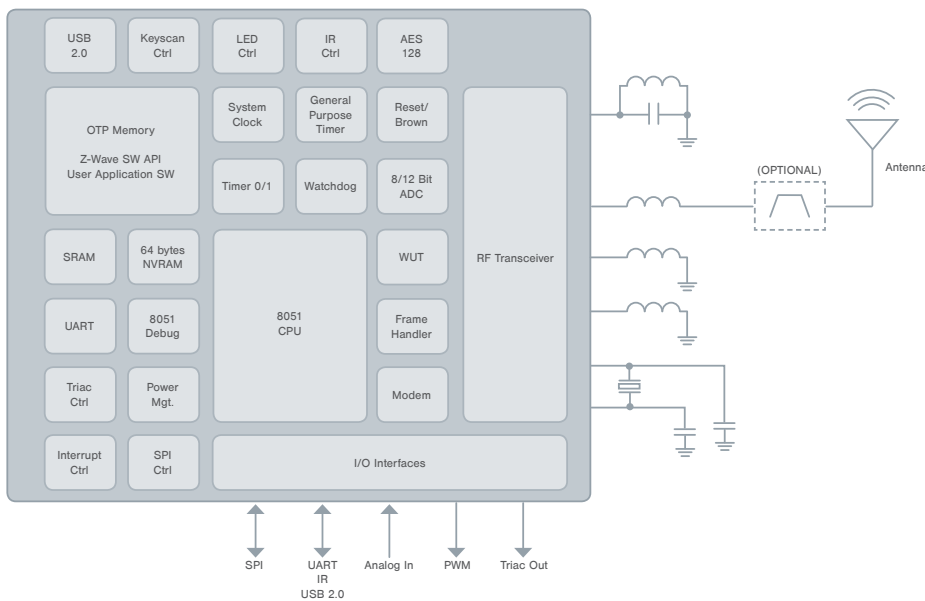
- ZM3102 pin compatible
- Integrated CPU and RF transceiver
- 64KB OTP, 16KB SRAM, 64B NVRAM
- 1000 DIM step Triac controller
- 4-ch 12-bit rail-to-rail ADC
- Integrated GPIO, SPI, UART, PWM
- AES 128 security engine
- Ultra-low power sleep mode
- 100 kbps data rates, low latency
- Uses frequency bands 779...956 MHz for complete global coverage
- Concurrent multi-channel support reduces external interference
- Superior blocking performance
- Battery monitor and built-in supply regulators
- Power supply: 2.3-3.6V
- 12.5x13.6mm module, 18 pins

Powering the new digital home

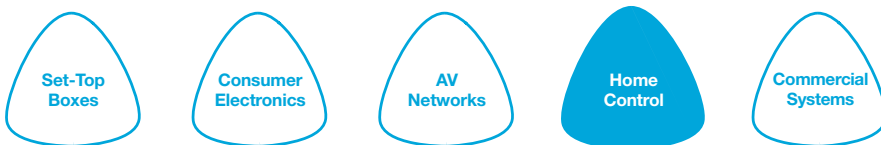


	ZM3102	ZM4101	ZM4102
Frequency	868.40...921.42 MHz	779...956 MHz	779...956 MHz
Program Memory	32 KB flash	64 KB OTP	64 KB OTP
SRAM	2 KB	16 KB	16 KB
NVRAM		64 B	64 B
GPIO	10	32	10
Keyboard Scan		128 keys	
UARTs	1	2	1
SPI Ports	1	2	1
USB		•	
AES Security		•	•
IR Transmitter		•	
IR Learning		•	
Data Rate	40 kbps	100 kbps	100 kbps

Z-Wave® Home Control Module Selection Guide



Powering the new digital home



Target Markets

- Home control
- Home security and monitoring
- Home energy management

Benefits

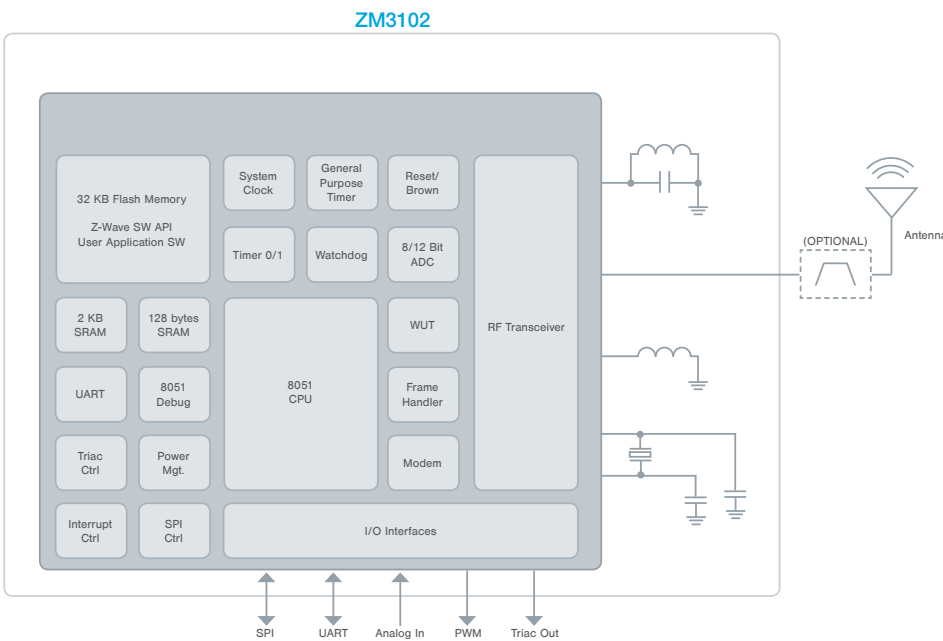
- Integration of home, entertainment, security, and energy management control with metadata support
- Seamless interoperability between multiple vendors and applications
- Robust and reliable whole-home coverage through mesh networking
- Z-Wave® protocol over IP (Internet Protocol) networks, such as home network and Internet
- Supports unicast, multicast, and broadcast messages
- Low power consumption for multi-year battery life

Features

- Integrated CPU and RF transceiver
- IR generation and learning
- 64KB OTP, 16KB SRAM, 64B NVRAM
- 1000 DIM step Triac controller
- 4-ch 12-bit rail-to-rail ADC
- Integrated GPIO, SPI, UART, PWM, USB, 128-key matrix scan
- AES 128 security engine
- 4-ch LED controller
- Ultra-low power sleep mode
- 100 kbps data rates, low latency
- Uses frequency bands 779...956 MHz for complete global coverage
- Concurrent multi-channel support reduces external interference
- Superior blocking performance
- Battery monitor and built-in supply regulators
- Power supply: 2.3-3.6V
- 8x8mm SiP module, QFN56 form factor

	ZM3102	ZM4101	ZM4102
Frequency	868.40...921.42 MHz	779...956 MHz	779...956 MHz
Program Memory	32 KB flash	64 KB OTP	64 KB OTP
SRAM	2 KB	16 KB	16 KB
NVRAM		64 B	64 B
GPIO	10	32	10
Keyboard Scan		128 keys	
UARTs	1	2	1
SPI Ports	1	2	1
USB		•	
AES Security		•	•
IR Transmitter		•	
IR Learning		•	
Data Rate	40 kbps	100 kbps	100 kbps

Z-Wave® Home Control Module Selection Guide



Target Markets

- Home control
- Home security and monitoring
- Home energy management

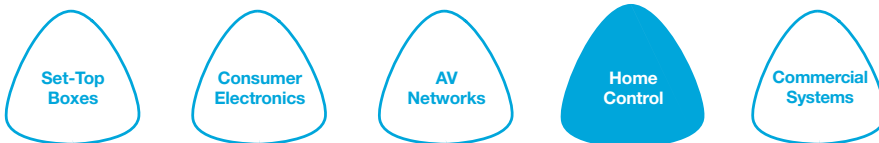
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- Robust and reliable whole-home coverage through mesh networking
- Z-Wave® protocol over IP (Internet Protocol) networks, such as home network and Internet
- Supports unicast, multicast, and broadcast messages
- Low power consumption for multi-year battery life

Features

- Integrated CPU and RF transceiver
- 32KB flash, 2KB SRAM
- Triac controller
- 4-ch 12-bit rail-to-rail ADC
- Integrated GPIO, SPI, UART, PWM
- Ultra-low power sleep mode
- 40 kbps data rates, low latency
- Uses the unlicensed Short-Range Device (SRD) frequency bands
- Battery monitor and built-in supply regulators
- Power supply: 2.1-3.6V
- 12.5x13.6mm module, 18 pins

Powering the new digital home

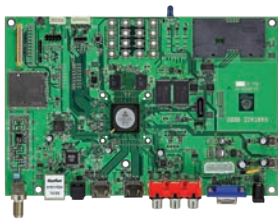


SMP8910 Series Media Processors

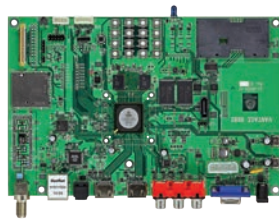


Vantage 8910
SMP8910 Dev. Kit

SMP8680 Series Media Processors

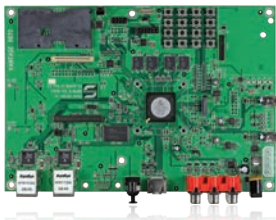


Vantage 8680
SMP8680 Dev. Kit

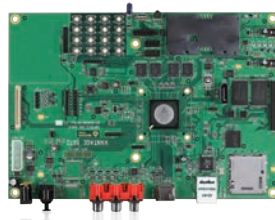


Vantage 8682
SMP8682 Dev. Kit

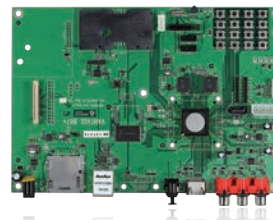
SMP8670 Series Media Processors



Vantage 8670
SMP8670 Dev. Kit



Vantage 8672
SMP8672 Dev. Kit



Vantage 8674
SMP8674 Dev. Kit



Hybrid STB 8674
SMP8674 Hybrid Dev. Kit



EasyTV 8674
SMP8674 Miracast™
Receiver Reference Design

SMP8650 Series Media Processors



Vantage 8656
SMP8656 Dev. Kit



Vantage 8654
SMP8654 Dev. Kit



Vantage 8652
SMP8652 Dev. Kit

SMP8640 Series Media Processors



Vantage 8646
SMP8646 Dev. Kit



Vantage 8644
SMP8644 Dev. Kit

VXP®



RDK9452
GF9452 Reference
Design Kit



RDK9450
GF9450 Reference
Design Kit

HomePNA®



CG3210HLEC
HomePNA® Over Coax



CG3210HLEP
HomePNA® Over Phone



CG3210MLEC
HomePNA® MDU Access



CG3310MLEC
HomePNA® MDU Access

HomePlug® AV



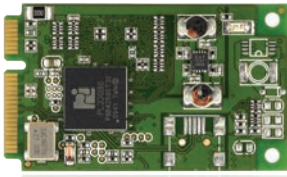
CG2110LEPL
HomePlug® AV

Z-Wave®

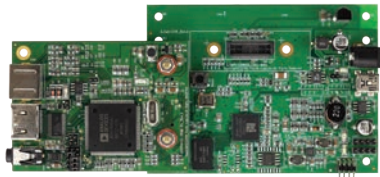


Z-Wave® Home Control
Development Kit

H.264 Encoders



PL330 Mini-PCle Card
Evaluation Kit



PL330 USB Capture Dongle
Evaluation Kit

Software



OTT and HbbTV Software



3D Video



Content Protection



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