



Crescendo III+ SoundBar SoC

Product Brief

The **Crescendo III+ SoundBar** is a 4th-generation SoC that integrates all soundbar audio functions and SDRAM in a 128-pin Low Profile Quad Flat Pack (LQFP) package.

For best sound, the **Crescendo III+** SoC is built on the ESS SABRE DAC technology normally found only in high-end audiophile and professional audio equipments to deliver spectacular music with an unsurpassed sound stage, utilizing the ESS patented HyperStream™ modulator capable of 100% modulation and unconditional stability to drive analog or digital amplifiers. For digital amplifiers, feedback is provided to drastically reduce distortion and non-linearities encountered by open-loop systems.

For lowest system BOM, the **Crescendo III+** SoC embeds a 2MB SDRAM and adopts a unified memory architecture for lowest memory cost. It integrates a 32-bit RISC and a 64-bit media processor for audio decoding, post-processing, lip-synchronization and sound effects such as virtual surround and bass enhancement, a hardware parametric equalizer (PEQ) for speaker equalization, an automatic gain limiter (AGL) for anti-clipping control, a user-programmable 32-bit Audio Coprocessor for custom sound algorithms, a 5.1-channel patented HyperStream™ Class D or D/A converter with 3-channel feedback for driving digital or analog power stages, a 2-input HyperStream™ stereo ADC for connection to line input sources, a 6-input SPDIF/ARC receiver for connection to coaxial, optical, HDMI and ARC input sources, a 4-channel system ADC for analog status measurement, a 2-ch PWM controller for analog voltage control, a 3-channel key ADC for multi-key support, and dual full-speed USB host/device controllers for firmware upgrade or music playback from thumb drives or iPod.

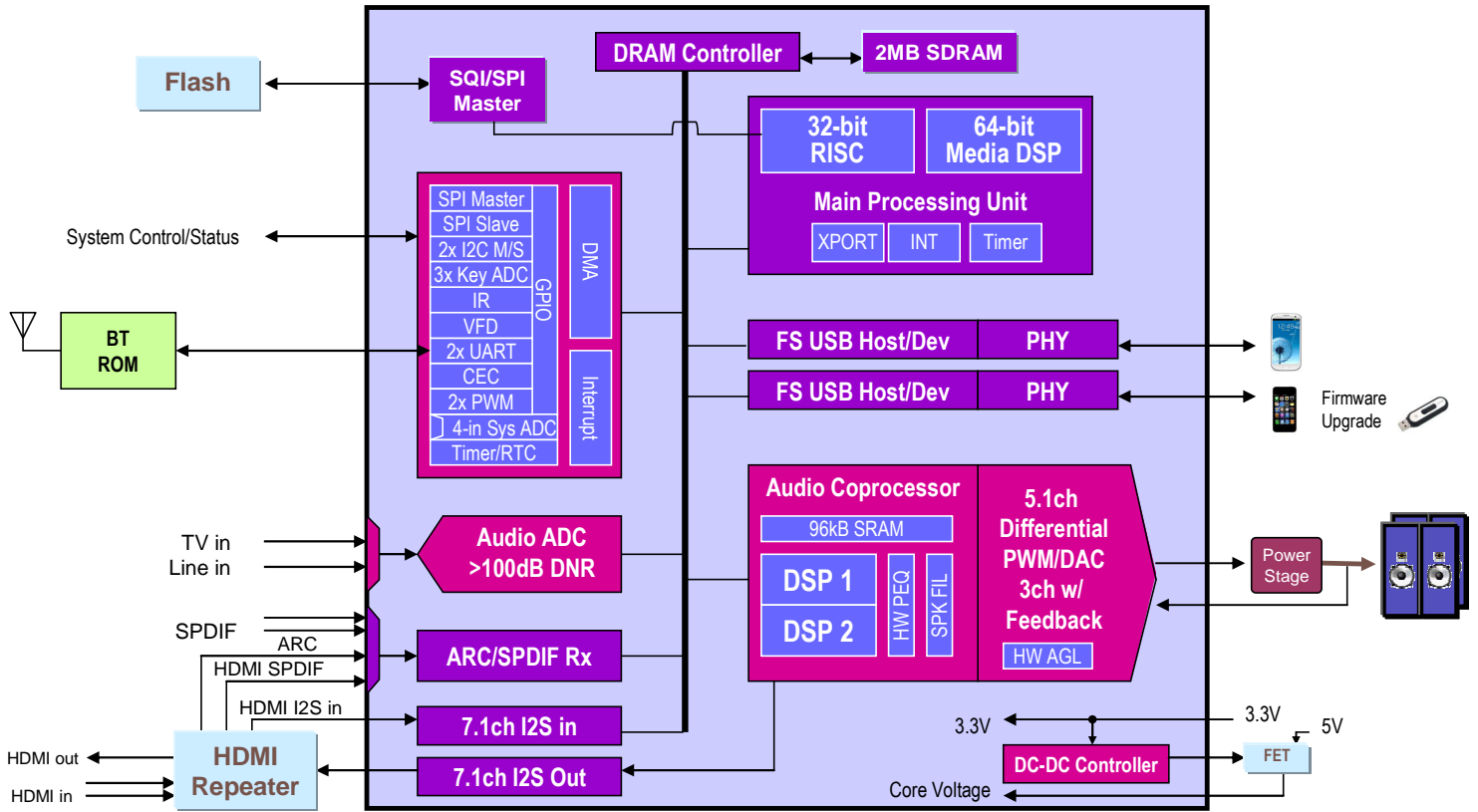
FEATURE	BENEFIT
<ul style="list-style-type: none"> Embedded 2MB DRAM SQI/SPI Master 128-QFP (14x14 mm2) 	<ul style="list-style-type: none"> Eliminates external SDRAM Supports 4-bit serial flash for faster execution Small PCB footprint
Enhanced System Controller <ul style="list-style-type: none"> 4-input System Monitor ADC 2x PWM controller SPI M/S, 2x I2C M/S, 2x UART, GPIO IR, 3x Key ADC, VFD CEC 	Eliminate external MCU <ul style="list-style-type: none"> System event monitoring Analog voltage generation System control & status monitoring User interface, multiple keys/pin HDMI CEC control
Patented Hyperstream™ PWM/DAC <ul style="list-style-type: none"> Output in PWM/DAC/I2S modes 5.1ch Differential PWM/DAC, 3ch with feedback Hardware Parametric Equalizer & AGL 	Eliminate external DSP <ul style="list-style-type: none"> Drive analog or digital amplifier and wireless subwoofer transmitter Drastically reduce digital Class D power stage distortion Realistic audio from tiny speakers; support amplifier anti-clipping
Comprehensive Sound Bar Processing <ul style="list-style-type: none"> Decode MP3/DD/DTS, etc. Sound effects Audio Coprocessor w/ 96kB SRAM 	Eliminate external DSP <ul style="list-style-type: none"> Playback all legacy audio formats Virtual Surround Speaker, AV sync etc. Supports custom algorithms
Versatile Audio Input <ul style="list-style-type: none"> 2-input enhanced ADC (50kΩ impedance) 6-input SPDIF/ARC receiver 8-ch I2S input 	Eliminate external SPDIF receiver & ADC <ul style="list-style-type: none"> CD quality analog audio input Connect to optical/coax/HDMI SPDIF or Audio Return Channel Take HDMI high resolution audio in compressed or PCM formats
System <ul style="list-style-type: none"> Dual FS USB Host/Device Core voltage DC-DC controller 	<ul style="list-style-type: none"> Connects to Apple & Android docks w/o external MUX Eliminates external DC-DC regulator, lower BOM & power consumption



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FUNCTIONAL BLOCK DIAGRAM

Crescendo 3+ SoC



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