



Crescendo III SoundBar SoC

Product Brief

The **Crescendo III SoundBar** is a 3rd-generation SoC that integrates all soundbar audio and microcontroller (MCU) functions in a 176-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.

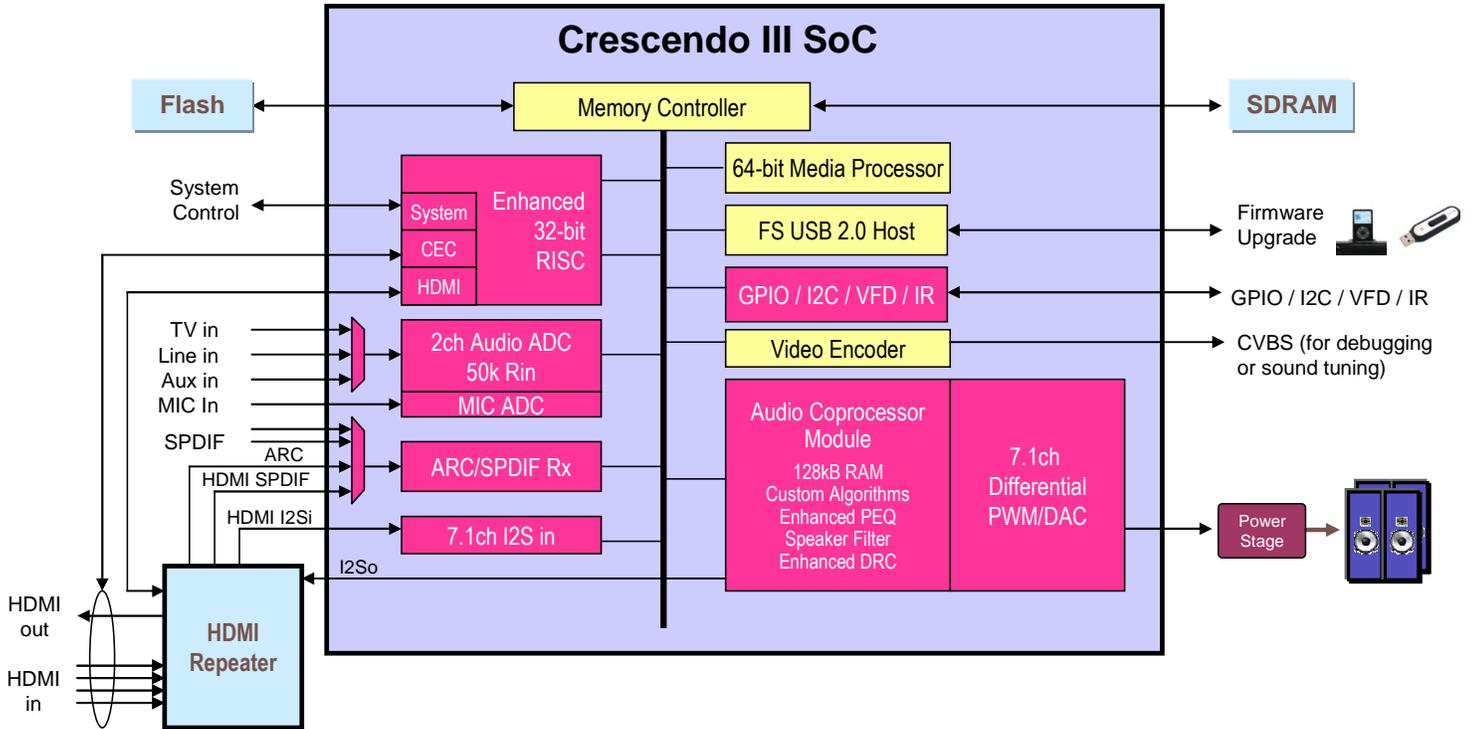
For lowest system BOM, the **Crescendo III** SoC adopts a unified memory architecture is adopted for lowest memory cost. It integrates a 32-bit RISC to eliminate multiple microcontrollers needed for system, CEC and HDMI repeater control. Additionally, it includes a 64-bit media processor for audio decoding, 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 7.1-channel patented HyperStream™ Class D or D/A converter for driving digital or analog power stages, a 3-input HyperStream™ stereo ADC for connection to line input sources, a stereo MIC ADC for microphone input, a 4-input SPDIF/ARC receiver for connection to coaxial, optical, HDMI and ARC input sources, an 8-channel I2S input for connection to HDMI repeater, a flexible remote, VFD and GPIO module for connection to remote control, VFD, buttons and LEDs, and a full-speed USB host controller for firmware upgrade or music playback from thumb drives or iPod.

FEATURE	BENEFIT
Highest integration of all audio and system controller functions in TV soundbar	Lowest system BOM cost
Enhanced 32-bit RISC controller with remote and GPIO handler, VFD controller, I2C master and UART	Eliminate multiple MCUs for system, CEC and HDMI control/monitoring <ul style="list-style-type: none"> • Main MCU for IR, VFD, Keys and system control • CEC MCU for HDMI CEC processing • HDMI MCU/daughter card for HDMI repeater control
Patented Hyperstream™ PWM/DAC <ul style="list-style-type: none"> • Output in PWM/DAC/I2S modes • 7.1ch Differential PWM/DAC • Hardware Parametric Equalizer • Hardware AGL 	Eliminate external DSP <ul style="list-style-type: none"> • Drive analog or digital amplifier and wireless subwoofer transmitter • Realistic audio from tiny speaker/enclosure • Support amplifier anti-clipping
Comprehensive Sound Bar Processing <ul style="list-style-type: none"> • Decode MP3/DD/DTS, etc. • Sound effects • Enhanced Audio Coprocessor w/ 128kB SRAM 	Eliminate external DSP <ul style="list-style-type: none"> • Playback all legacy audio formats • Virtual Surround Speaker, AV sync etc. • More memory for custom algorithms and ease of programming
Versatile Audio Input <ul style="list-style-type: none"> • 3-input enhanced ADC (50kΩ impedance) • MIC ADC • 4-input SPDIF/ARC receiver • 8-ch I2S input 	Eliminate external SPDIF receiver & ADC <ul style="list-style-type: none"> • CD quality analog audio input • Microphone input for Karaoke applications • Connect to optical/coax/HDMI SPDIF or Audio Return Channel • Take HDMI audio in PCM format
System <ul style="list-style-type: none"> • FS USB Host 	<ul style="list-style-type: none"> • Firmware upgrade, playback from iPod or thumbdrives



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FUNCTIONAL BLOCK DIAGRAM



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