



# Ensemble II+ SoC

## Product Brief

The **Ensemble II+** SoC is a 3rd-generation SoC that integrates all BD home theater audio and TV soundbar processing functions in a 128-pin Low Profile Quad Flat Pack (LQFP) package.

For best sound, the **Ensemble II+** 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<sup>®</sup> modulator capable of 100% modulation and unconditional stability to drive analog or digital amplifiers.

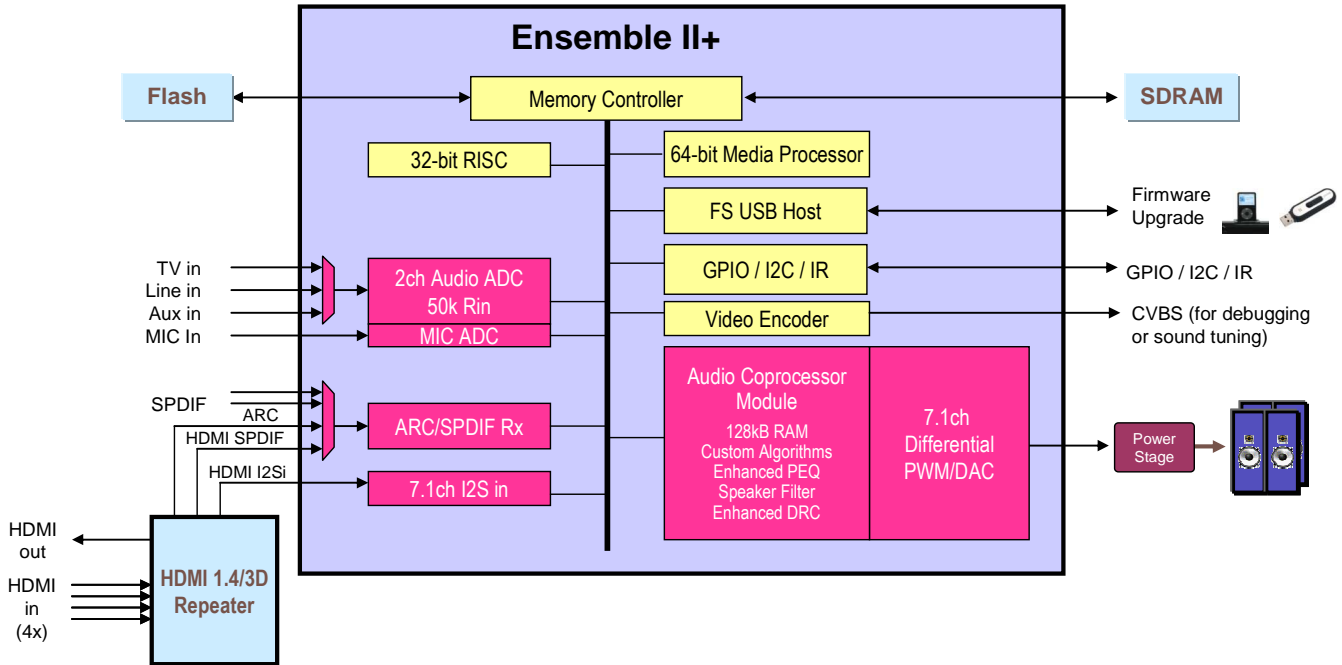
For lowest system BOM, the **Ensemble II+** SoC adopts a unified memory architecture for lowest memory cost. It integrates a 32-bit RISC and a 64-bit media processor for audio decoding, post-processing, lip-synchronization and sound effects such as virtual surround and bass enhancement, a hardware parametric 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 7.1-channel patented HyperStream<sup>™</sup> Class D or D/A converter for driving digital or analog power stages, a 3-input HyperStream<sup>™</sup> 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, 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 functions in BD home theater and TV soundbar	Lowest system BOM cost
Patented Hyperstream <sup>™</sup> PWM/DAC <ul style="list-style-type: none"> <li>• Output in PWM/DAC/I2S modes</li> <li>• Hardware Parametric Equalizer</li> <li>• Hardware AGL</li> </ul>	Eliminate external DSP <ul style="list-style-type: none"> <li>• Drive analog or digital amplifier and wireless subwoofer transmitter</li> <li>• Realistic audio from tiny speaker/enclosure</li> <li>• Support amplifier anti-clipping</li> </ul>
Comprehensive Audio Processing <ul style="list-style-type: none"> <li>• Decode MP3/DD/DTS, etc.</li> <li>• Sound effects</li> <li>• Enhanced Audio Coprocessor w/ 128kB SRAM</li> </ul>	Eliminate external DSP <ul style="list-style-type: none"> <li>• Playback all legacy audio formats</li> <li>• Virtual Surround Speaker, AV sync etc.</li> <li>• More memory for custom algorithms and ease of programming</li> </ul>
Versatile Audio Input <ul style="list-style-type: none"> <li>• 3-input enhanced ADC (50kΩ impedance)</li> <li>• 4-input SPDIF/ARC receiver</li> <li>• 8-ch I2S input</li> </ul>	Eliminate external SPDIF receiver & ADC <ul style="list-style-type: none"> <li>• CD quality analog audio input</li> <li>• Connect to optical/coax/HDMI SPDIF or Audio Return Channel</li> <li>• Take HDMI PCM formats</li> </ul>
System <ul style="list-style-type: none"> <li>• Remote and GPIO handler</li> <li>• I2C master</li> <li>• FS USB Host</li> </ul>	<ul style="list-style-type: none"> <li>• System control and status</li> <li>• Control/monitor external IC components</li> <li>• Firmware upgrade, playback from iPod or thumbdrives</li> </ul>
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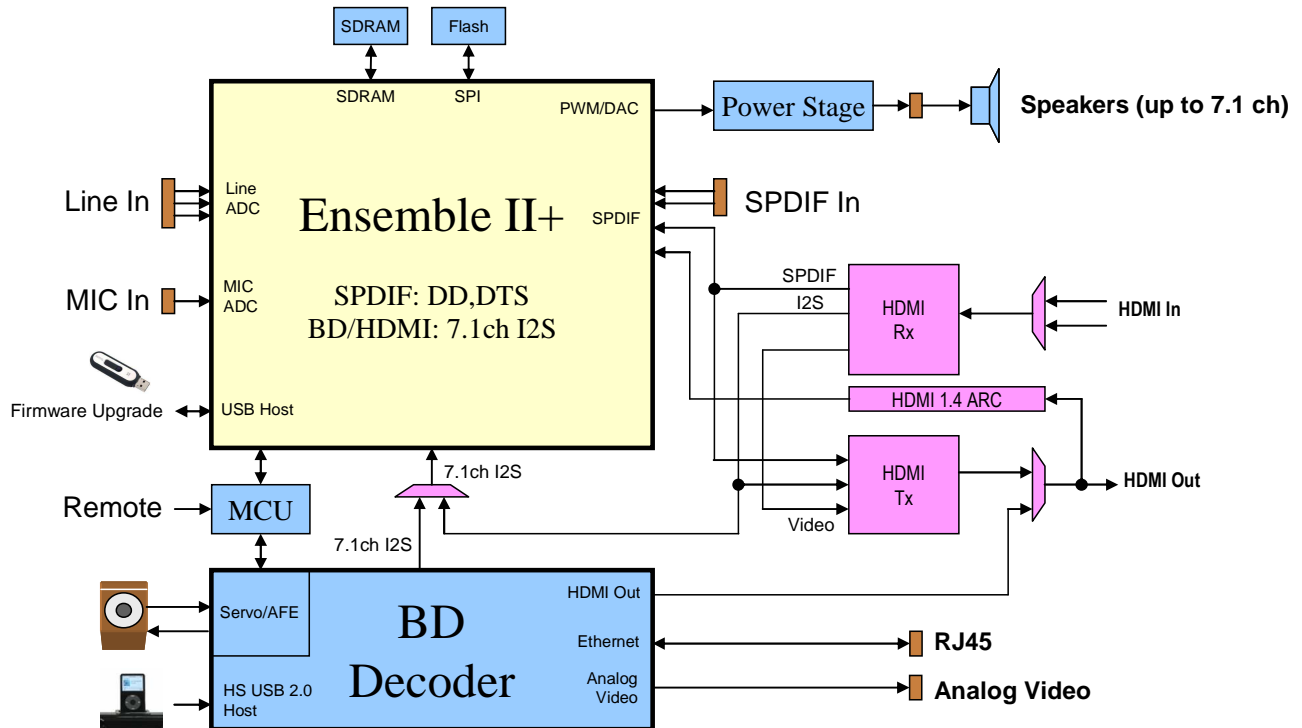


# Ensemble II+ SoC Datasheet

## FUNCTIONAL DESCRIPTION



## APPLICATION DIAGRAM



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