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™ 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™ 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, and a full-speed USB host controller for firmware upgrade or music playback from thumb drives or iPod.

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<th>FEATURE</th>
<th>BENEFIT</th>
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<td>Highest integration of all audio functions in BD home theater and TV soundbar</td>
<td>Lowest system BOM cost</td>
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</table>
| Patented Hyperstream™ PWM/DAC  
- Output in PWM/DAC/I2S modes  
- Hardware Parametric Equalizer  
- Hardware AGL | Eliminate external DSP  
- Drive analog or digital amplifier and wireless subwoofer transmitter  
- Realistic audio from tiny speaker/enclosure  
- Support amplifier anti-clipping |
| Comprehensive Audio Processing  
- Decode MP3/DD/DTS, etc.  
- Sound effects  
- Enhanced Audio Coprocessor w/ 128kB SRAM | Eliminate external DSP  
- Playback all legacy audio formats  
- Virtual Surround Speaker, AV sync etc.  
- More memory for custom algorithms and ease of programming |
| Versatile Audio Input  
- 3-input enhanced ADC (50kΩ impedance)  
- 4-input SPDIF/ARC receiver  
- 8-ch I2S input | Eliminate external SPDIF receiver & ADC  
- CD quality analog audio input  
- Connect to optical/coax/HDMI SPDIF or Audio Return Channel  
- Take HDMI PCM formats |
| System  
- Remote and GPIO handler  
- I2C master  
- FS USB Host |  
- System control and status  
- Control/monitor external IC components  
- Firmware upgrade, playback from iPoD or thumbdrives |
| Highest integration of all audio functions in BD home theater and TV soundbar | Lowest system BOM cost |
FUNCTIONAL DESCRIPTION

Ensemble II+

- 32-bit RISC
- 64-bit Media Processor
- 2ch Audio ADC
- 50k R
- Mic ADC
- 2011
- 7.1ch Differential PWM/DAC
- Audio Coprocessor Module
  - 128kB RAM
  - Custom Algorithms
  - Enhanced PEQ
  - Speaker Filter
  - Enhanced DRC
- Firmware Upgrade
- GPIO / I2C / IR
- CVBS (for debugging or sound tuning)
- Power Stage
- SDRAM
- Flash
- HDMI 1.4/3D Repeater
- TV in
- Line in
- Aux in
- MIC In
- SPDIF
- HDMI SPDIF
- HDMI I2S
- ARC
- Audio Coprocessor
- Remote
- MCU
- SPI
- PWM/DAC
- SDRAM
- Flash
- BD Decoder
- HDMI Out
- Ethernet
- Analog Video
- HS USB 2.0 Host
- Servo/AFE
- USB Host
- Line In
- MIC In
- MIC ADC
- SPDIF
- SPDIF In
- HDMI 1.4 ARC
- HDMI Rx
- HDMI Tx
- HDMI In
- HDMI Out
- RJ45
- Analog Video

APPLICATION DIAGRAM

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