

## General Description

The AS3510 combines high flexibility and outstanding performance for analog audio front-end solutions.

This codec-chip contains a high performance 18 bit digital to analog converter. The dynamic range exceeds 95dB for best audio quality, for multi media applications (audio playback) within battery or line operated equipment.

An additional audio power amplifier can directly drive external headphones or small 4Ω speakers with a power of up to half a watt. The power-up is click- and pop-less due to a smooth start-up circuitry. The overall distortion level is always below 0.02%.

The microphone input amplifier contains an automatic gain control (AGC) with a dynamic range of 40dB to generate an amplified and compressed signal for the ADC, which provides 14 Bit resolution at 8kHz sampling-rate.

Furthermore all necessary power management is included such as bandgap reference and four voltage regulators. The two 2.9V regulators are used internally (analog and digital supply), but can also be used for external purposes as well. The third output is designed to supply the peripheral cells and an external digital core, and is programmable from 1.5V to 2.5V in 5 steps (default is 2.5V). They are all powered through a DCDC-Converter, which can work down to a voltage of 1V. So the whole chip can work from a single battery cell.

The fourth regulator is only used for generating the supply voltage for the analog USB 1.1 interface circuit. It is supplied via the USB connector. The performance of the regulators is excellent (noise, line- and load-regulation) and allows the direct supply of sensitive analog circuits.

Because of the internal supply and signal filtering only few small external capacitors are required for de-coupling and stabilising and lead to very low output noise.

The current consumption is very low and makes the chip ideally for battery powered devices.

## Key Features

### On chip DCDC Converter

- 1.0 to 5.5V input voltage range

### 4 On-chip high performance voltage regulators

- Digital Supply, 2.9V
- Analog Supply, 2.9V
- Core Supply, 1.5 to 2.5V
- USB Transceiver Supply, 3.2V

### 18 Bit stereo DAC

- Dynamic range >95 dB
- THD < -85dB
- De-emphasis for 32 kHz, 44.1 kHz and 48 kHz

### Stereo power audio amplifier

- Max. 2x 0.5W @ 4Ω
- Analog volume control -39dB to +3dB, 3dB steps including mute)
- Click- and pop-less startup and power down
- Auxiliary inputs for additional audio sources

### Microphone input

- 14 Bit  $\Sigma\Delta$ -ADC , 8kHz sampling rate
- Automatic gain control (AGC)
- Low power consumption
- Wide battery supply range 1.0V – 5.5V
- Standard I2S interface
- Audio sampling rates: 8, 11.025, 12, 16, 22.05, 24, 32, 44.1, and 48 kHz
- I2C control interface
- USB 1.1 front-end
- 49 Pin BGA Package

## Applications

- Audio frontend for cellular phones
- Stand alone MP3 player
- CD and DVD player
- PDAs

# Block Diagram

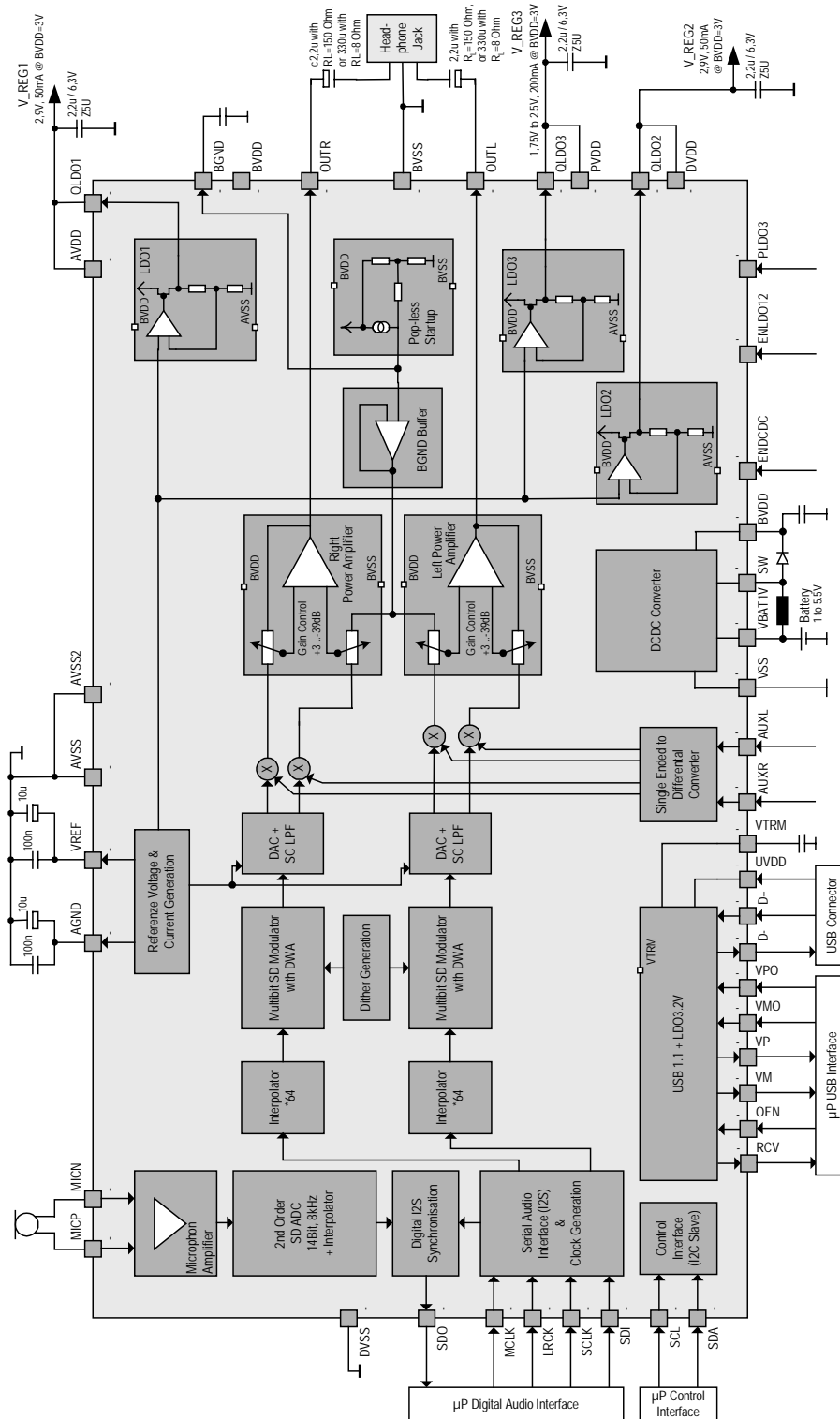


Figure 1 Block Diagram of AS3510