VLSI Solution Oy
Internet Radio Presentation
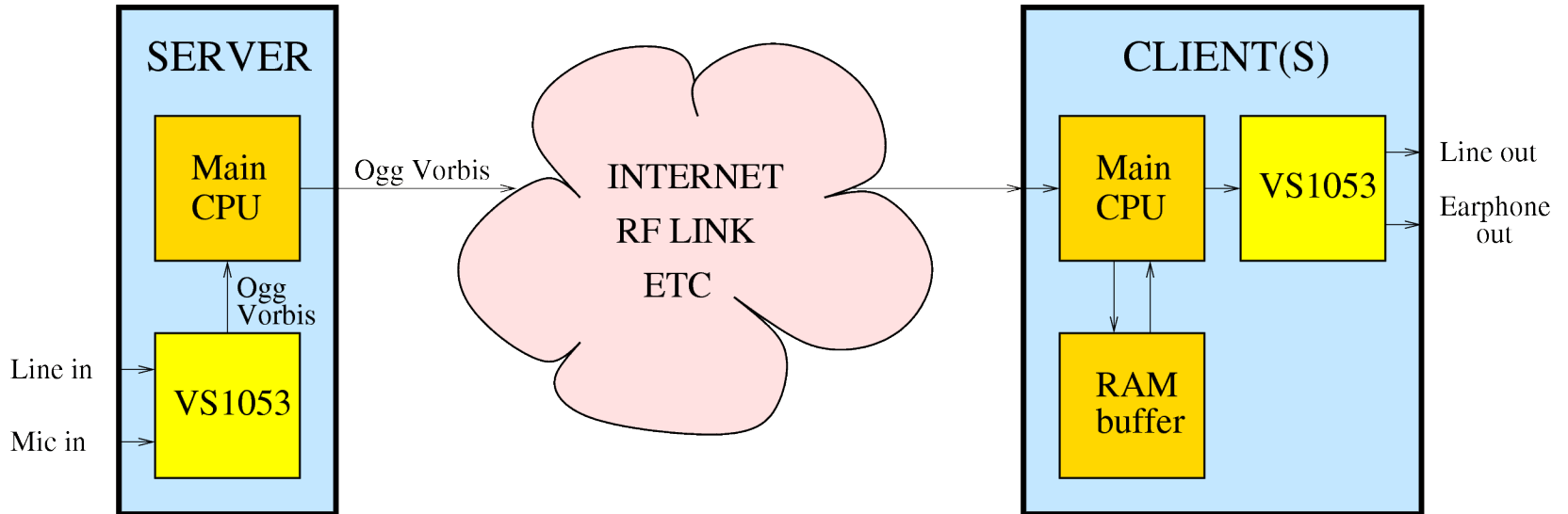
August 2008

Streaming – File based server / client(s)

SERVER

Main
CPU

File
storage

MP3,
HE–AAC,
Ogg Vorbis,
WMA, etc

INTERNET

RF LINK

ETC

CLIENT(S)

Main
CPU

VS1011
or
VS1053

Line out

Earphone
out

RAM
buffer
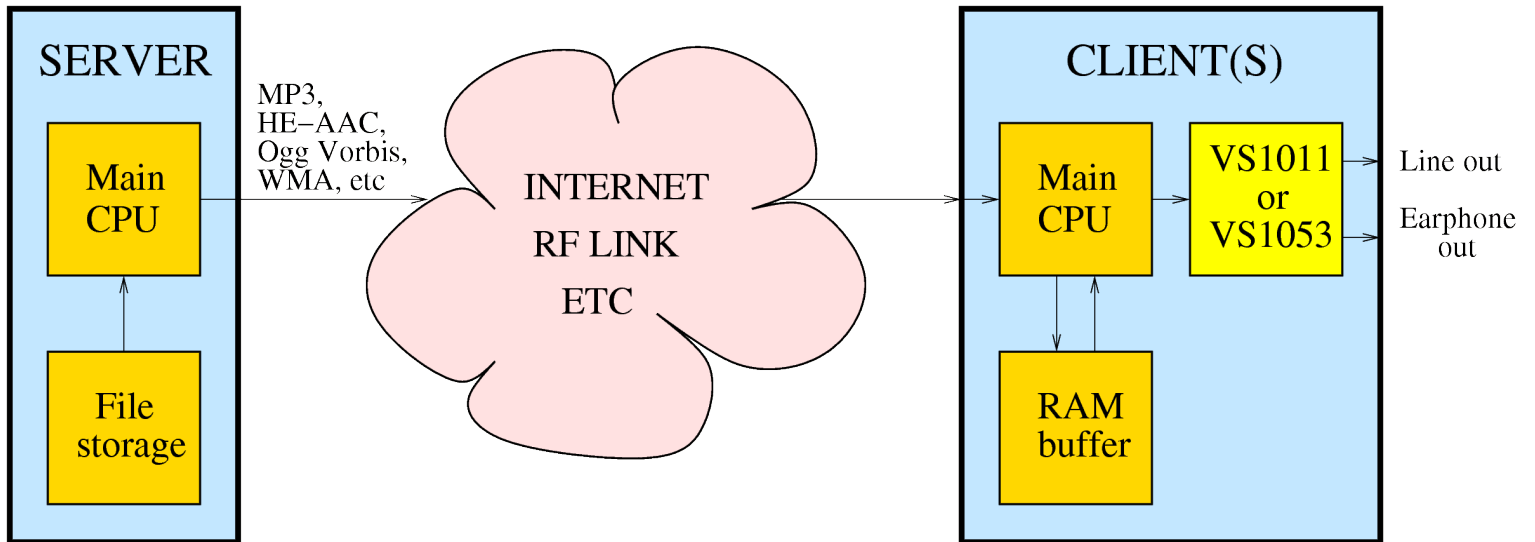
Streaming – Real-time server / client(s)

SERVER

Main CPU

Ogg Vorbis

INTERNET

RF LINK

ETC

CLIENT(S)

Main CPU

VS1053

Line out

Earphone out

Ogg Vorbis

Line in

Mic in

VS1053

RAM buffer

The New Technology Creator

VLSI
Solution y

Technical Challenges

CHALLENGE	SOLUTION
speed of streaming medium	use of high quality codecs such as **HE-AAC** and **Ogg Vorbis**
variable latency of streaming medium	client buffer memory
sample rate skew	decoder **adjusts the sample rate** to match with the server
bit errors of streaming media	**robust** audio decoder
low power consumption	dedicated low-power hardware (not PC!)

Our offering for Streaming

VS1011
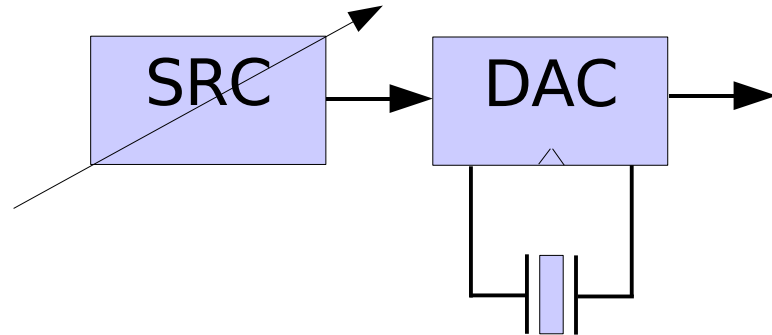- Mp3 decoder
- 5 KiB customization IRAM

VS1053
- Multi-format decoder
- ADC + Ogg Vorbis encoder
- 16 KiB customization IRAM
- EarSpeaker technology

Streaming Highlights – Sample rate conversion
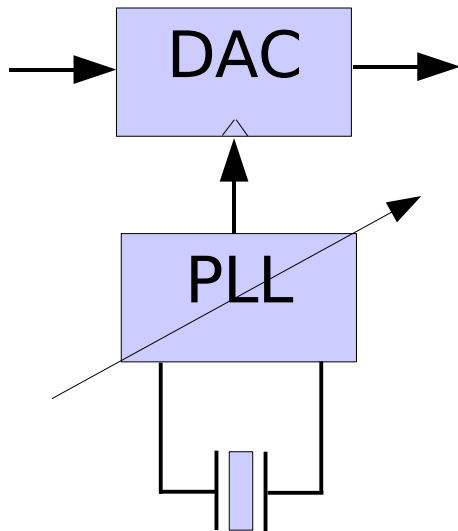
Conventional way to tune sample rate => audible jitter from PLL

VS10XX uses finely adjustable Sample Rate Converter (SRC) and constant sample rate DAC => crystal clear sound

Streaming Highlights – EarSpeaker Technology

DSP simulates Room and Head Transfer Functions to move headphone sound outside the listener's head=>

- Natural 3-dimensional sound
- Realistic stereo image
- No listening fatigue
- VS1053

- Input from microphone or line-in (stereo)

- Line input typ. SNR > 90 dB and THD < 0.005%

- Supports 11 quality settings:
  - Voice: mono 15kbit/s @ 8kHz
  - Wide band voice: mono 28kbit/s @ 16kHz
  - HiFi voice: mono 87kbit/s @ 44.1kHz
  - Music: stereo 135kbit/s @ 44.1 kHz

- VS1053

Streaming Highlights - Summary

- Easy to use
  - Designed as slave processor
  - Flexible external clock range
  - SPI interface for communication

- High performance analog hardware
  - Integrated DAC, ADC*), Headphone driver

- Special Technology
  - EarSpeaker*)

- Customization
  - Plugins, applications, KITs and Boards
  - Free technical support

*) VS1053 only

Features of VS1053

- Decodes HE-AAC+, Ogg Vorbis, LC-AAC, WMA, MP3, WAV, GM1

- Encodes Ogg Vorbis, WAV

- EarSpeaker

- Stereo line in SNR >90dB

- DAC dynamic range >100dB

- Low power consumption

- 7x7 mm LQFP48 package

Additional information

- **support@vlsi.fi**