



What applications can be done  
by using VS1003?

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# Alternatives

## Audio decoder (slave)

### Basic functionality

- MP3/WMA/SP-midi/WAV
- Voice recording from microphone
- Streaming support for internet radio
- Bass and treble functions

### Plugins

- DTMF generator
- WMA Rewind
- Spectrum analyzer
- Pitch / tempo shifter
- 8 kHz phone application
- Echo cancellation

## Standalone (Master)

### Basic Functionality

- Plays MPW/WMA/Sp-midi/WAV files from SD card
- 3 buttons, one LED, no display
- Customization by using EEPROM for boot
- Software power on/off
- Optional high speed USB support with bridge chip

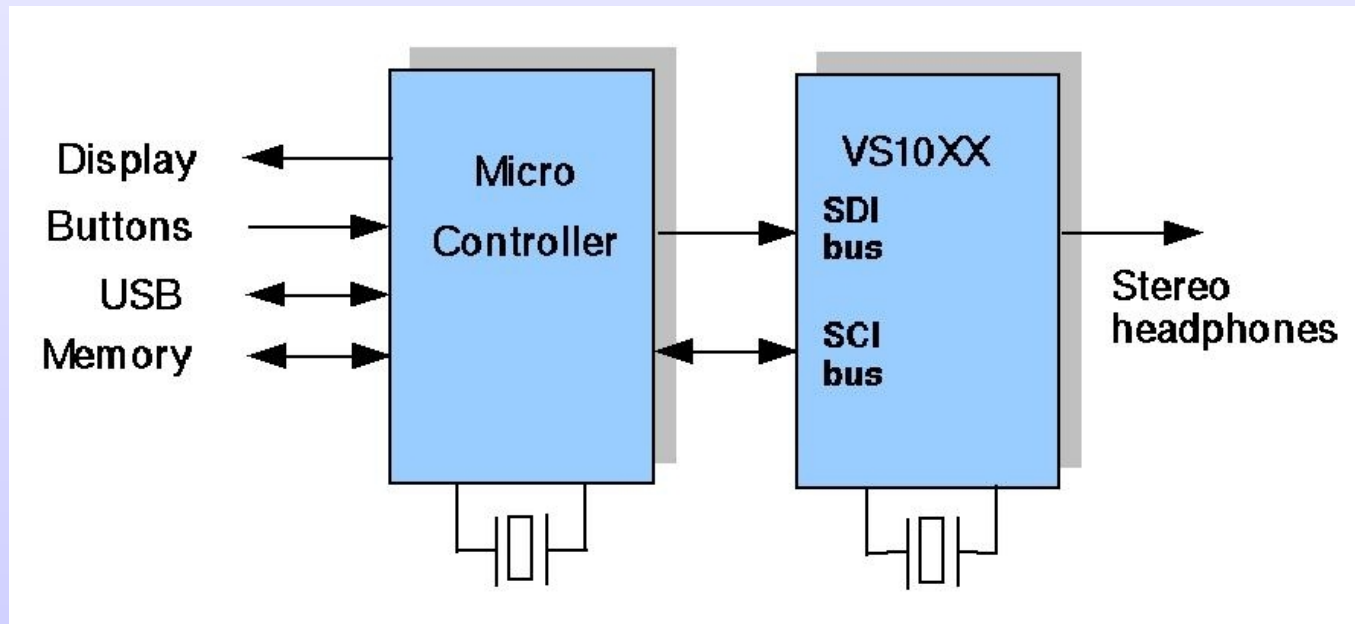
### Plugins/modifications

- 16/32-button interface
- Store file index before power off
- Real-time midi
- Infinite looping
- play/pause from IO level
- Record WAV from microphone

# VS1003 as Slave Processor

## Basic Functionality

- Audio decoding (MP3/WMA/SP-midi/WAV)
- Voice recording from microphone (WAV)
- Streaming support for internet radio (sample rate can be adapted on the fly)
- Bass and treble functions

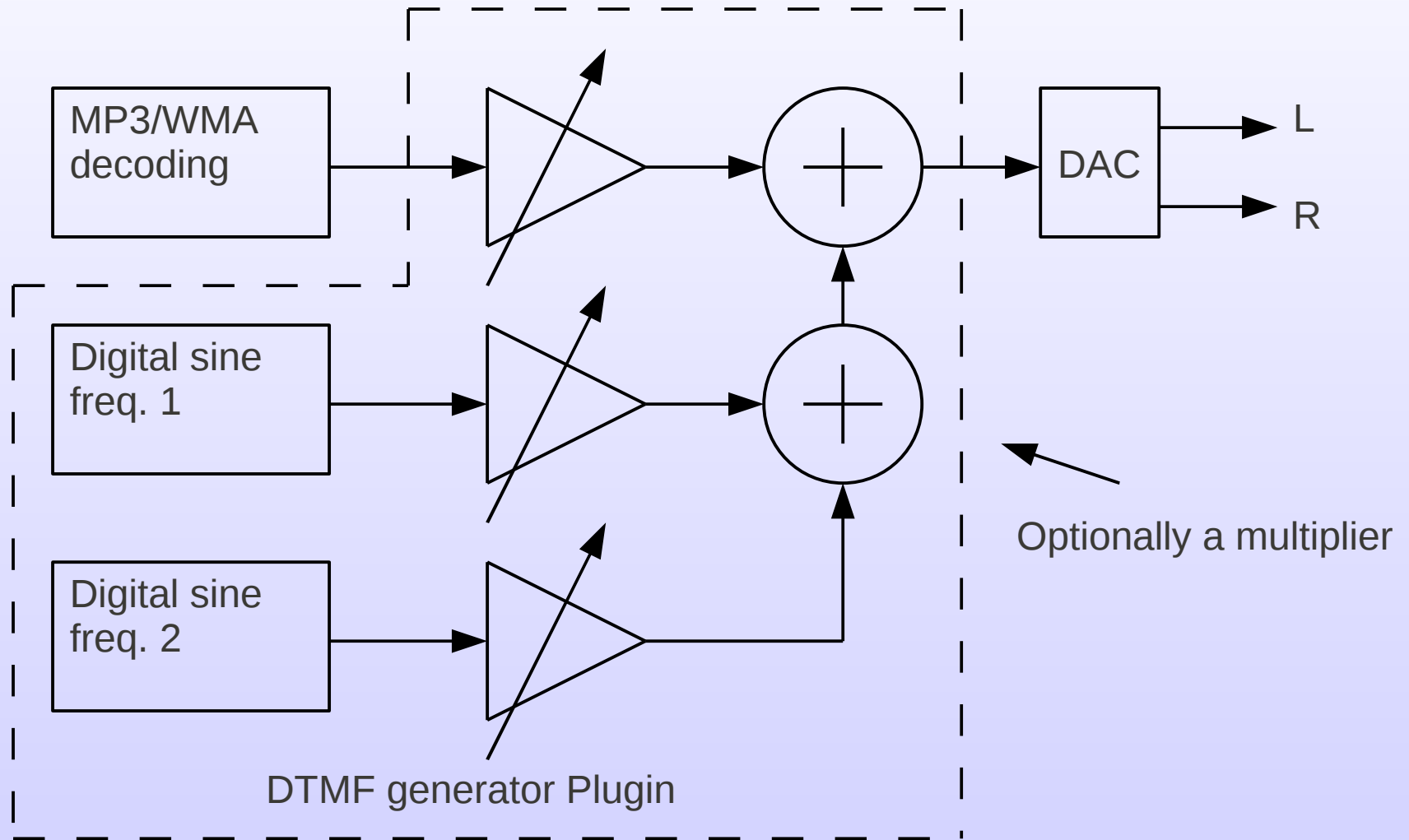


# VS1003 as Slave Processor

## **Added** functionality with software plugins

- DTMF generator
- WMA Rewind
- Spectrum analyzer
- Pitch / tempo shifter (for karaoke)
- 8 kHz phone application

# DTMF plugin

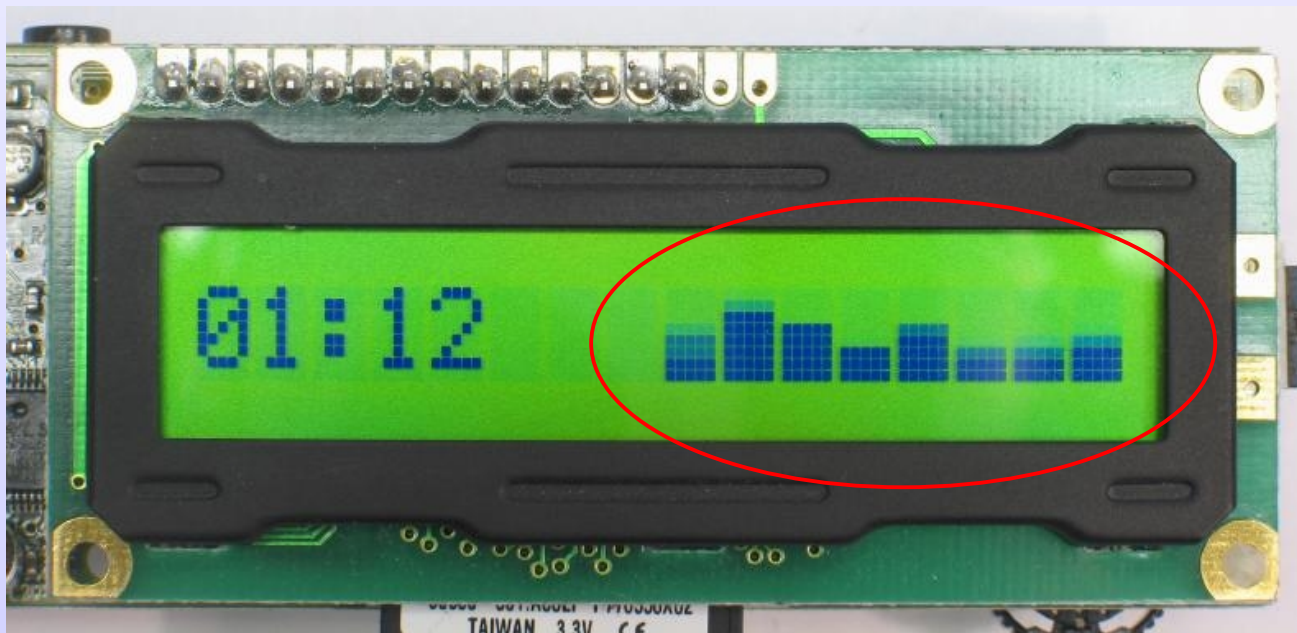


# WMA Rewind plugin

- implements a resynchronization code that tries to find the ASF packet boundaries of WMA automatically
- implements broadcast support (ignores file size) for web radio applications

# Spectrum Analyzer plugin

- Filters upto 23 frequency bands for a graphical spectrum display
- The number of bands and the center frequencies are configurable
- The analyzer works for all audio file types and streams



# Pitch / Tempo shifter plugin

## Background

- changing just the sample rate would change both pitch AND tempo

## The plugin

- change the pitch of a song without changing the tempo (pitch shifter), or
- change the tempo without changing the pitch

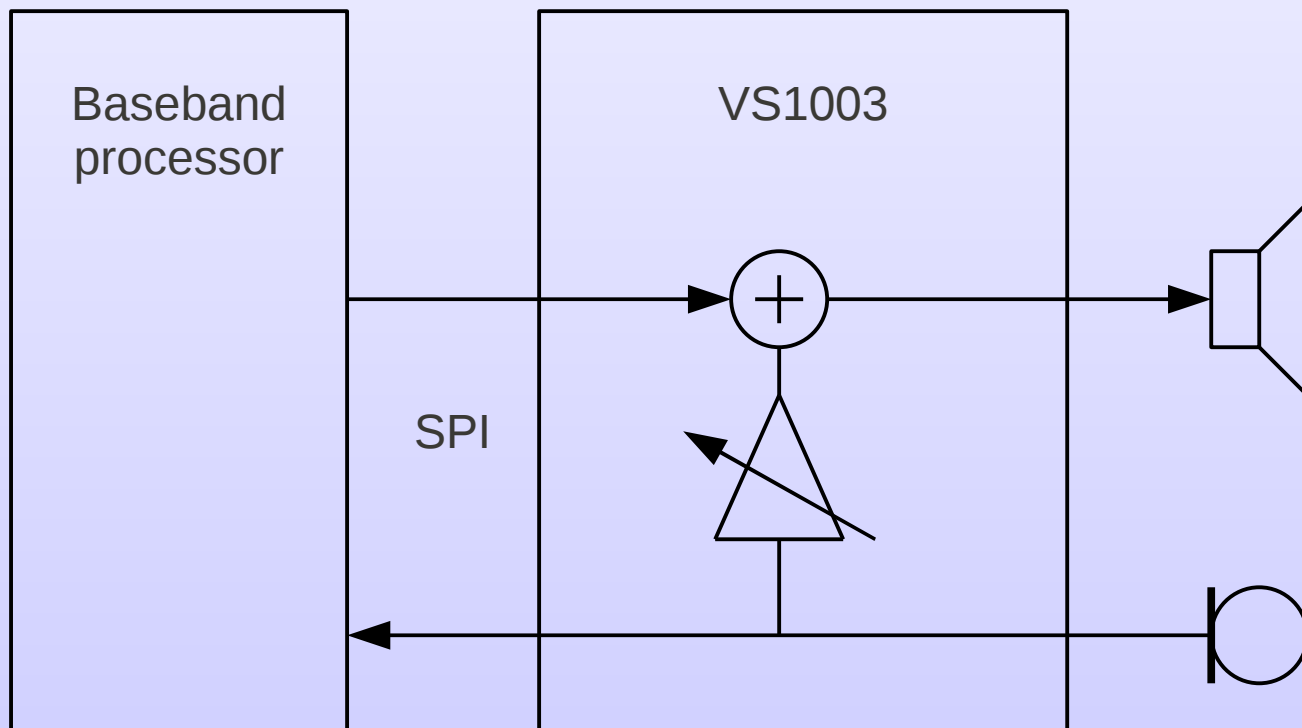
## Applications

- Karaoke
- Play an important message slower of voice recorder



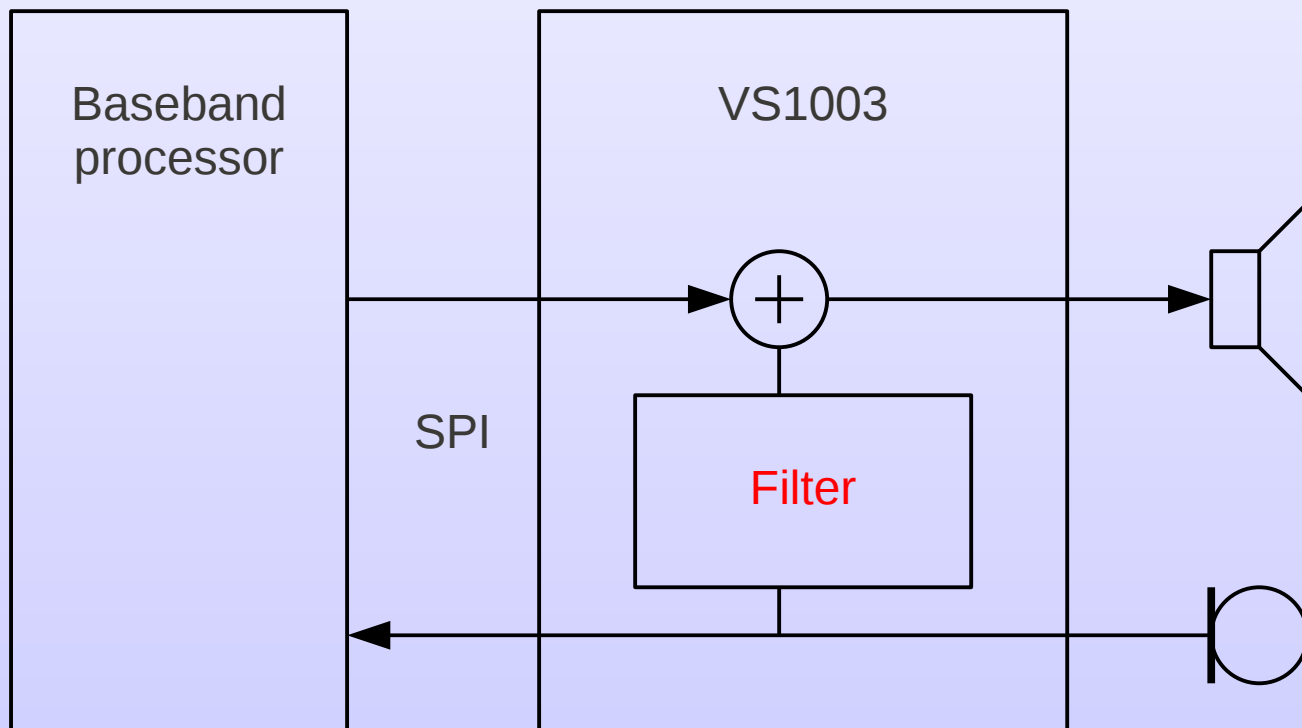
# 8 kHz phone application

- Device is MP3/WMA/SP-midi/WAV decoder  
**AND**
- 8 kHz audio codec (low latency, sidetone, MIC level information)



# Echo cancellation application

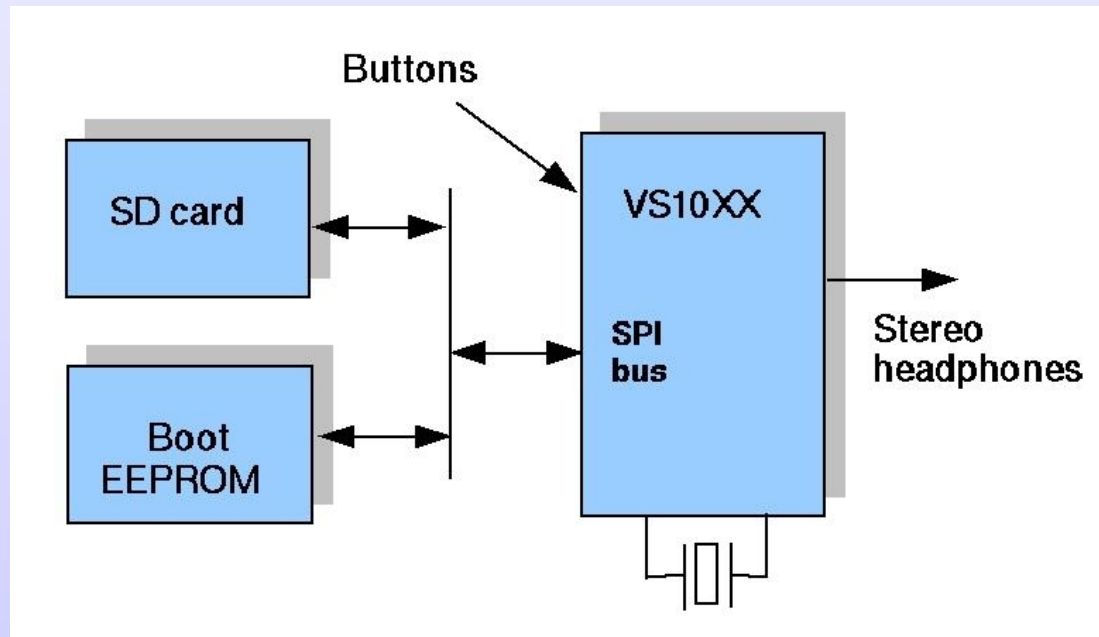
- Device is 8 kHz audio codec (low latency, sidetone, MIC level information)  
**AND**
- 1000-tap adaptive filter for echo cancellation



# VS1003 as Standalone

## Basic Functionality

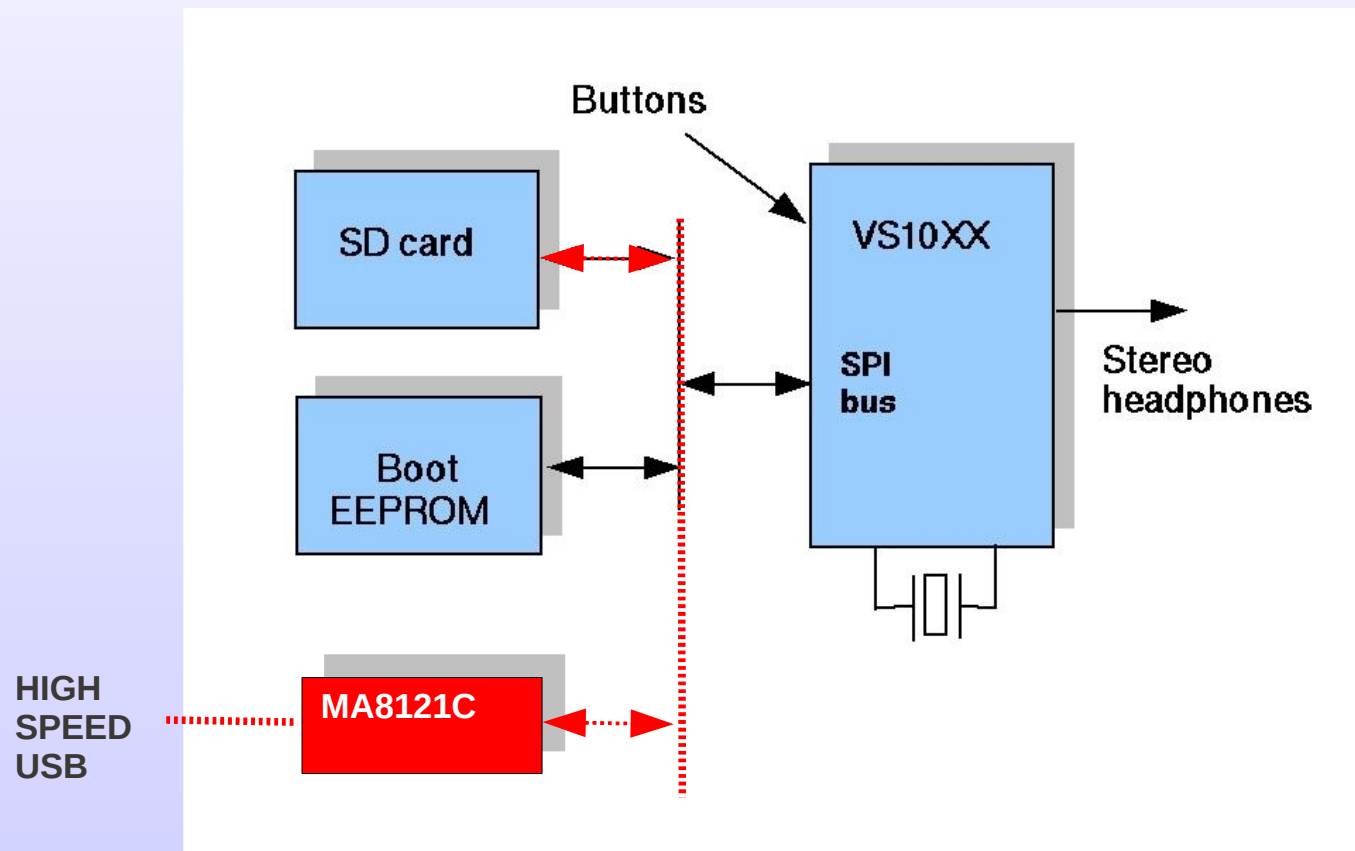
- Plays MPW/WMA/Sp-midi/WAV files from card (FAT)
- 3 buttons, one LED, no display
- Customization by using EEPROM for boot
- MMC, SD, SDHC cards supported



# VS1003 as Standalone

## Optional High Speed USB support

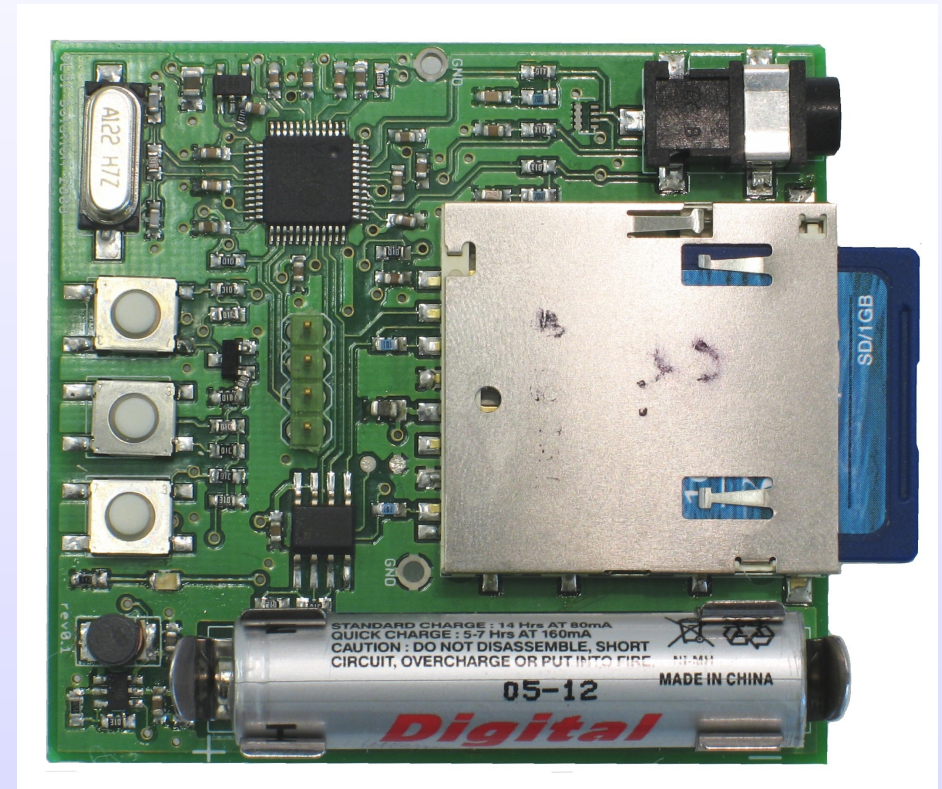
- Low cost usb bridge disconnects VS1003 from the SPI bus when SD card is made visible as Removable Mass Storage to PC via High Speed USB



# VS1003 as Standalone

## **Modified** functionality

- 16/32-button interface
- Store file index before power off
- Real-time midi
- Infinite looping
- play/pause from IO level
- Record WAV from microphone
- Software power on/off
- **Low cost & high sound quality**



# 16/32 button interface application

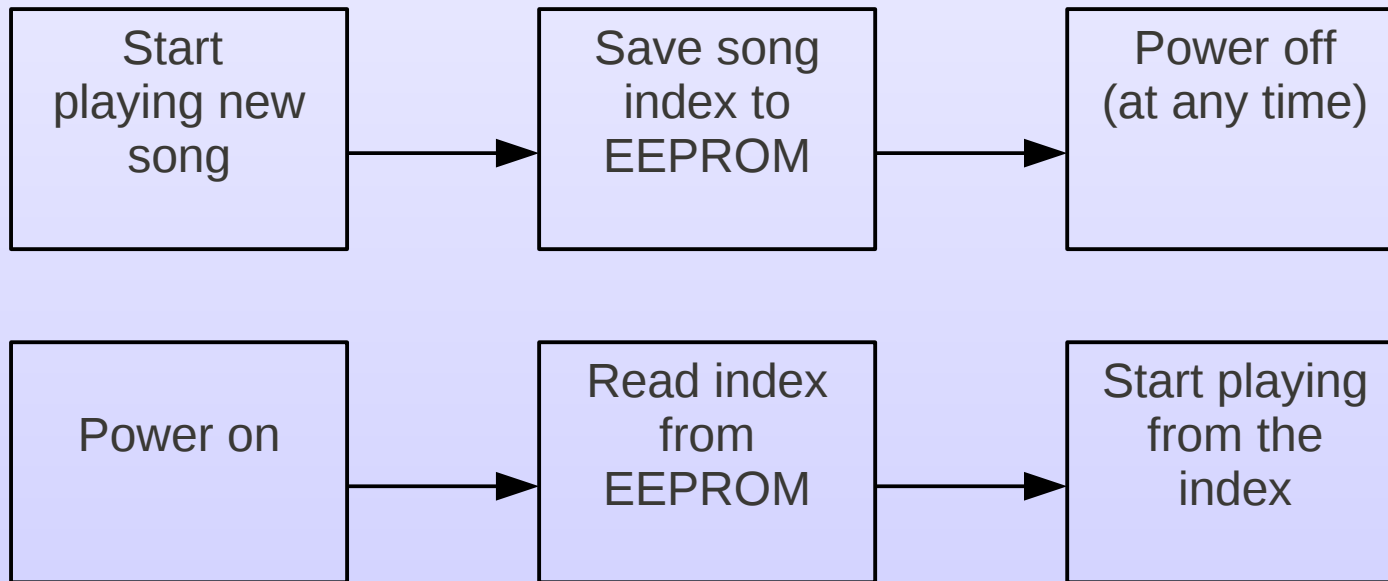
- Device is standalone player but has 16/32 button interface
- Uses line-in input to measure voltage of resistor string supplied by reference voltage of VS1003

## **Applications**

- Jukebox
- Guide with various language options
- Help panel of industrial machine

# Store file index plugin

- Device is standalone player
- The played file index will be stored to the EEPROM
- Index of last song is always in EEPROM when powered off
- When powered on, playing will continue from the beginning of the song that was interrupted

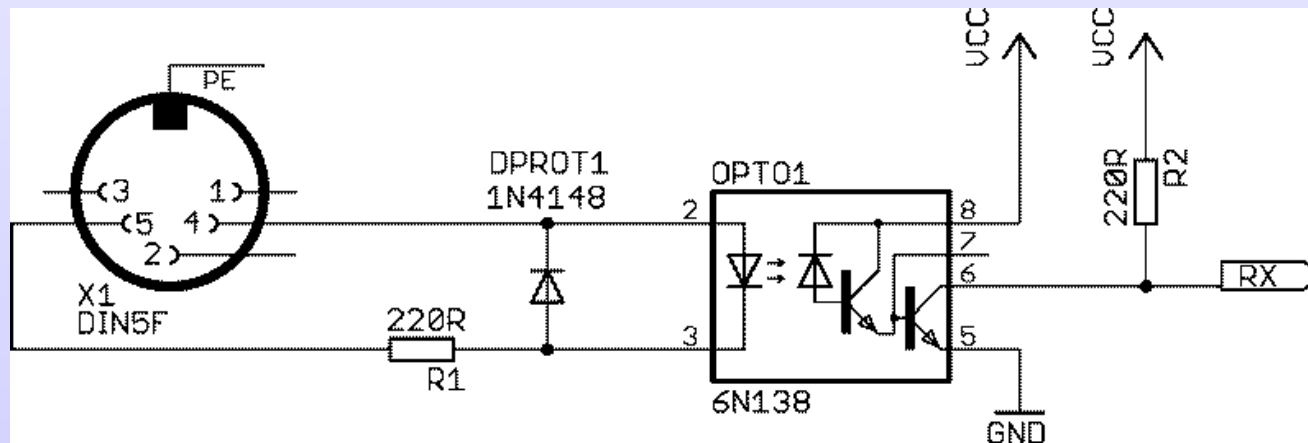


# Midi synthesizer application

- With simple external HW (see below) generic midi output can be connected to MIDI IN of VS1003
- No buttons required

## Applications

- Keyboard accessory
- Portable keyboard
- Toys





# Infinite looping plugin

- Device is standalone player
- Loops all the contents automatically and infinitely
- Automatically starting from power-up

## **Applications**

- Advertisements
- Toys

# Play/pause from IO level plugin

- Device is standalone player
- Starts and stops based on IO level
- No register writings needed

## Applications

- Master does not support SPI

Button	Short Keypress	Long Keypress
SW1	Next song	Volume up
SW2	Pause/Play	Low: pause, High: play
SW3	Previous song	Volume down

# Record WAV from microphone application

- Device is standalone player (slightly stripped)  
**AND Recorder:**
- takes the signal from microphone input,
- encodes it into IMA ADPCM,
- and saves it on top of an existing VSRECORD.WAV

## Applications

- Voice recorder
- Interactive toy

# WMA only application

- Device is WMA/SP-midi/WAV decoder
- **MP3 feature is disabled with the plugin**
- **Unit price is 0.50 USD less**
- Application can be any of the those mentioned before (but without mp3)
- Customer must make **agreement** with VLSI
- Available only to qualified customers
- Customer shall contact Microsoft for the WMA license<sup>1</sup> (current license fee is 0.10 USD per device with 400 kUSD annual maximum) of WMA is used
- No license required for PCM or IMA ADPCM

<sup>1</sup> "Windows Media Components Final Product Agreement"

# Do you have other ideas?

Our support will help you

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