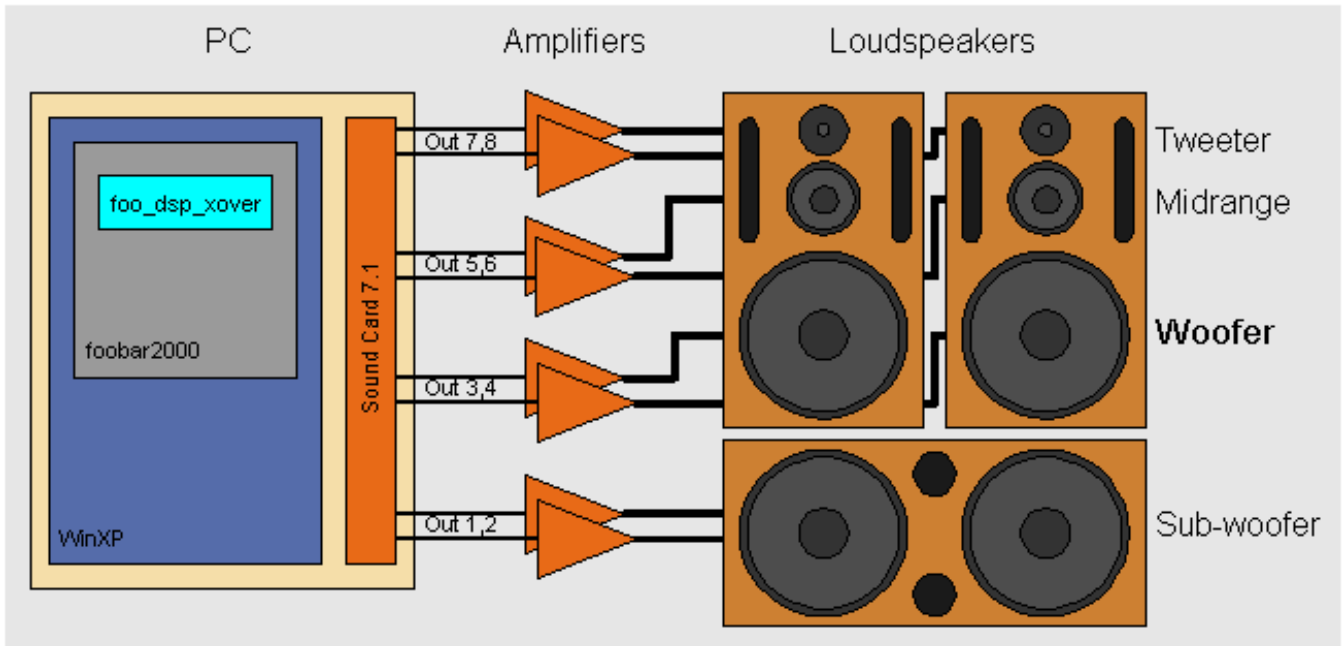# foo_dsp_xover

Purpose

foo_dsp_xover is a software digital crossover implementation that I have been working on for a while in my spare time as a hobby. It is a foobar2000 audio player plugin that implements this digital crossover to achieve active multi-amplification.

This software needs to run on a WinXP PC equipped with a multi-channel sound card (e.g. 5.1 or 7.1 surround sound card) feeding the various voices of a multi-amplifier and loudspeaker active configuration set-up.
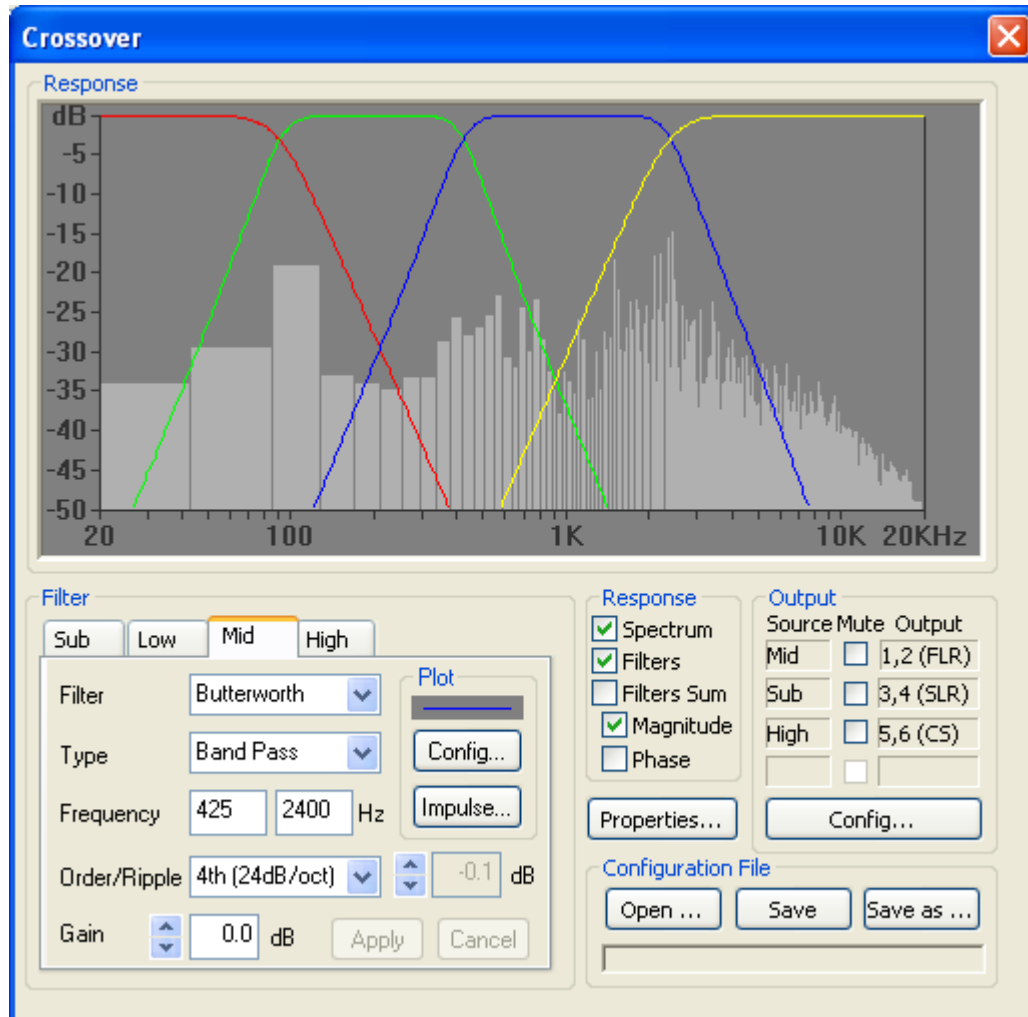

Example of an active crossover setup

I initially developed this software for both DIY speaker development and music listening. Active amplification has always been my favourite mode for listening to music.

Specifications

- Stereo
- 4 voices or less
- Filters algorithm: Butterworth, Bessel, Chebyshev
- Filter type: Low Pass, High Pass, Band Pass, Band Stop
- Filter Order: 1 to 8
- Filter frequencies: 1-22050 Hz
- Graphical display of:
    - Filter response
    - Playing music spectrum
- Multi sampling frequency support.
- Gain control per voices
- Output dialogue allowing each voice configuration:
    - Routing
    - Delay in: seconds, milliseconds, meters, millimetres, inches, 1/100 inches
    - Summing: stereo, mono, sum to left, sum to right
    - Phase: normal, reverse
    - Solo a voice

- Mute control per voice
- Validation data entry error reporting dialogue for:
  - Filter
  - Delay
- Automatic recall from previews session of all parameters
- Configuration data model validation and automatic reset warning dialogue, to avoid misuse of obsolete data.

Screenshots

Main Screen

System Requirements

- PC (even runs on a Celeron 450MHz, 256MB RAM)
- Multichannel sound card, such as a 5.1 or 7.1 surround card
- WinXP PC (SP2 preferably),
- Foobar2000 **version 0.9.x**
- Multi channel amplifier and Speakers

Installation

- If required, download and install foobar2000.
- Then, download the following foo_dsp_xover pluging zip files:
  - Extract from the downloaded zip file **foo_dsp_xover_dll_X_YYY.zip** the file **foo_dsp_xover.dll** and copy it into the directory: **C:\Program Files\foobar2000\components**
  - Only if required (not required with WinXP SP2 for example), extract from the zip file **msvcr71_dll_X_YYY.zip** (zip file only revisionned for SourceForge FRS, it is always the same

content) the file **msvcr71.dll** into the directory **C:\WINDOWS\system32** if not already existing.

Use

- Using **foobar2000->Preferences->Playback->DSP Manager** make sure that the "Crossover" entry is part of the "Active DSPs" list.
- To modify the parameters of the crossover:
  - Highlight: **foobar2000->Preferences->Playback->DSP Manager->Active DSP->Crossover**
  - Select: **foobar2000->Preferences->Playback->DSP Manager->Configure selected**

I advise you to first explore this software with one or a few pair of low cost PC speakers. In fact the re-routing output selectors where meant to facilitate such exploration on a PC only equipped with a single pair of multi-media loudspeaker.

Goals

Where am I going with this software?

In fact, towards a software implementation of a Tact style system, but the poor man version. In fact, foobar2000 has another plugin doing convolution that allows in cascade, upstream of my crossover to implement DRC. And who knows, I could eventually feed the power section of my Panasonic SA-XR45 with the I2S line of my PC sound card, PC that runs the all shebang. Allowing me to get closer to the holly Grail of the Tact full digital audio chain, but for le$$ and also DIY.

I have many other plans in my head and on my hard disk, but I will talk about that later.

Projects

I invite you to send me info on how you use this software: descriptions, picture, diagrams, web link. I will be very happy to discover other people sharing my passion for audio and if you agree I will be sharing these here.

Acknowledgement

A part of this software is inspired by the late Tony Fisher work. This web site is surviving Tony and I have ported some of Tony's corresponding code into this software. Thank you Mr. Fisher.

Links

The development of this foo_dsp_xover project software lives on SOURCEFORGE.NET and it is a plugin develloped for foobar2000

DRC is a very sophisticated piece of work that should give people a strong insight on where I think digital audio restitution is aiming towards. Bravissimo Sinior Sbragion!

Channel Divider is what I would describe as an alternate piece of work to what I am doing. You can find more information about it here it uses a different algorithmic approach, that is worth exploring.

ACXO (Acoustic Correction and Crossover) is fully integrated software (including the media player) for a digital audio processing system running under Windows.

BruteFIR is a specialised processing engine dedicated to the Linux platform that handles high performance FIR filter runtime implementation. One needs to have sets of FIR coefficients calculated off-line by other means to use BruteFIR. This software is developed by Anders Torger and is a very interesting and

sophisticated piece of open source software.

Mr. [Linkwitz](#) is an inspiring engineer; I am please to share the [link to his site](#), because of the indisputable multi-amplification (read: active crossover) approach to the engineering problem of audio restitution he follows, among many other innovative concepts he brings to the audio domain.

About us

My name is [François Bourdon](#), I live in Verchères, Québec, Canada and I have a [personal web site](#) that I should update eventually.

I confess that I have been reluctant for a while to release this software that I felt too immature for public release. But a colleague strongly recommended to me, to let this software live on the public place and in the pure spirit of open source software, to let it grow in the community, benefiting from the community voluntary help in what ever forms that comes. That help could (is): simply using it, talking about it, writing about it, testing it, reporting bugs in it, reporting to me about it's use, suggesting new feature for it, coding it, criticizing it (to me especially), using alternative to it and even competing against it…

That motivating colleague is Fabrice Crestois, Merci! Fabrice.

Warning

- I am not responsible for the consequences of using this software, especially on tweeters. Use at your own risk
- This is a beta version, be indulgent in your expectations of this free and open source software.
- This is an open source project, yet my authorization for use in a commercial project is required.
- Otherwise go ahead and have fun right away!