Ultimate-Preamplifer

by

Analog-Precision

http://www.analog-precision.com/

HOW TO IMPLEMENT A STEREO 5-WAY CROSSOVER ON THE ULTIMATE PREAMPLIFIER

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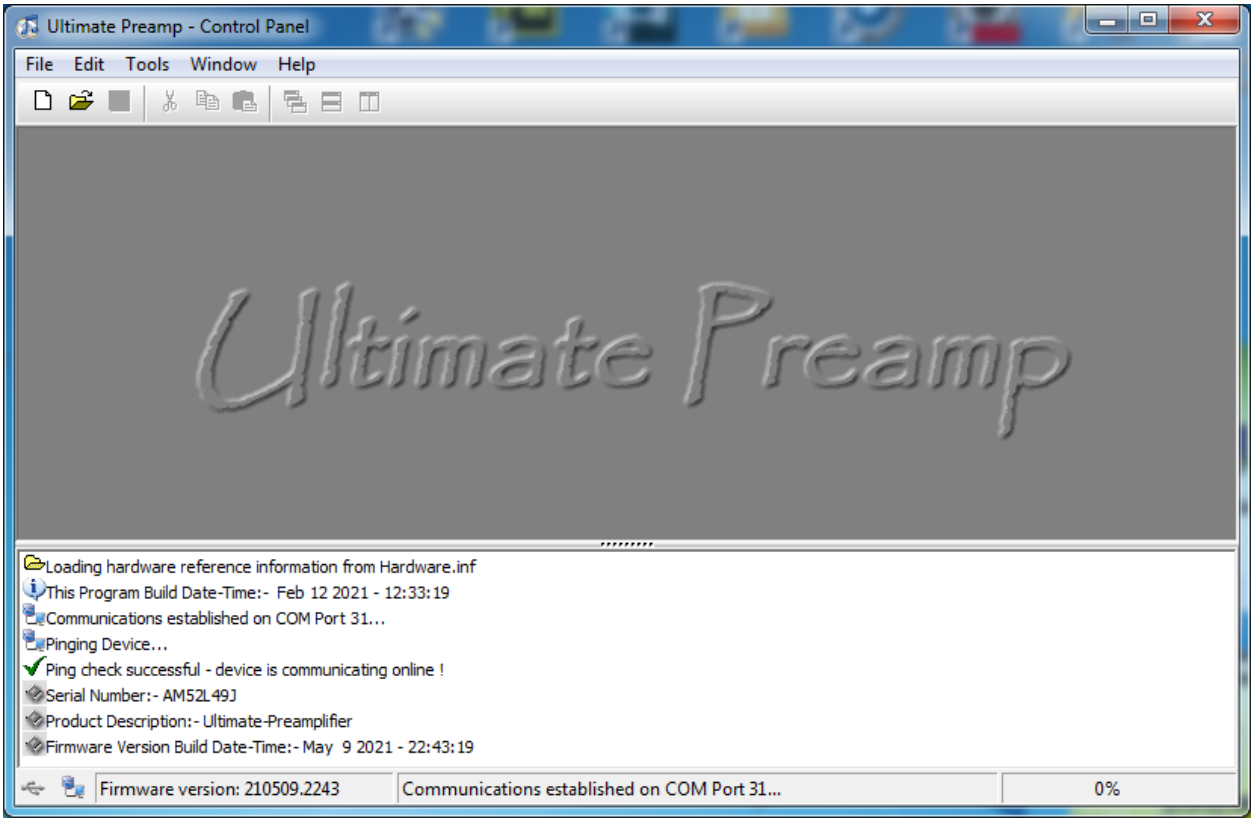
INTRODUCTION

Using one external stereo DAC with an S/PDIF Coaxial or Toslink Optical input you can easily add an additional two channels or stereo pair to the existing 8-channel line-up for a total of 10 channels of DSP processing capability thus increasing the Preamp from a 4-way stereo crossover to a 5-way stereo crossover. Not only that the output level of the external DAC can be made to track the Master Volume control level on the preamp as though the external DAC was an integral part of the preamplifier. You can also drive the external DAC with a different sampling rate to the on-board DSP giving maximum flexibility to interface to any external DAC even it is not capable of the 192kHz native sampling rate of the DSP in the Preamplifier. Typically, this setup would be used to drive an additional set of stereo subwoofers which would be used to augment an existing 4-way stereo active speaker system. This saves on having to buy an additional preamp to get an extra two channels !!

FIRMWARE COMPATIBILITY

Note the following procedures requires firmware revision 210509-2243 or later (9th May 2021). Please update your Preamp to this version before trying to attempt the following procedures. The easiest way to inspect your firmware revision is to restart the preamp and look at the firmware revision at the bottom part of the splash screen on the LCD display in the Preamp. Alternatively run the UPCP program and observe the information display at the bottom of the screen.

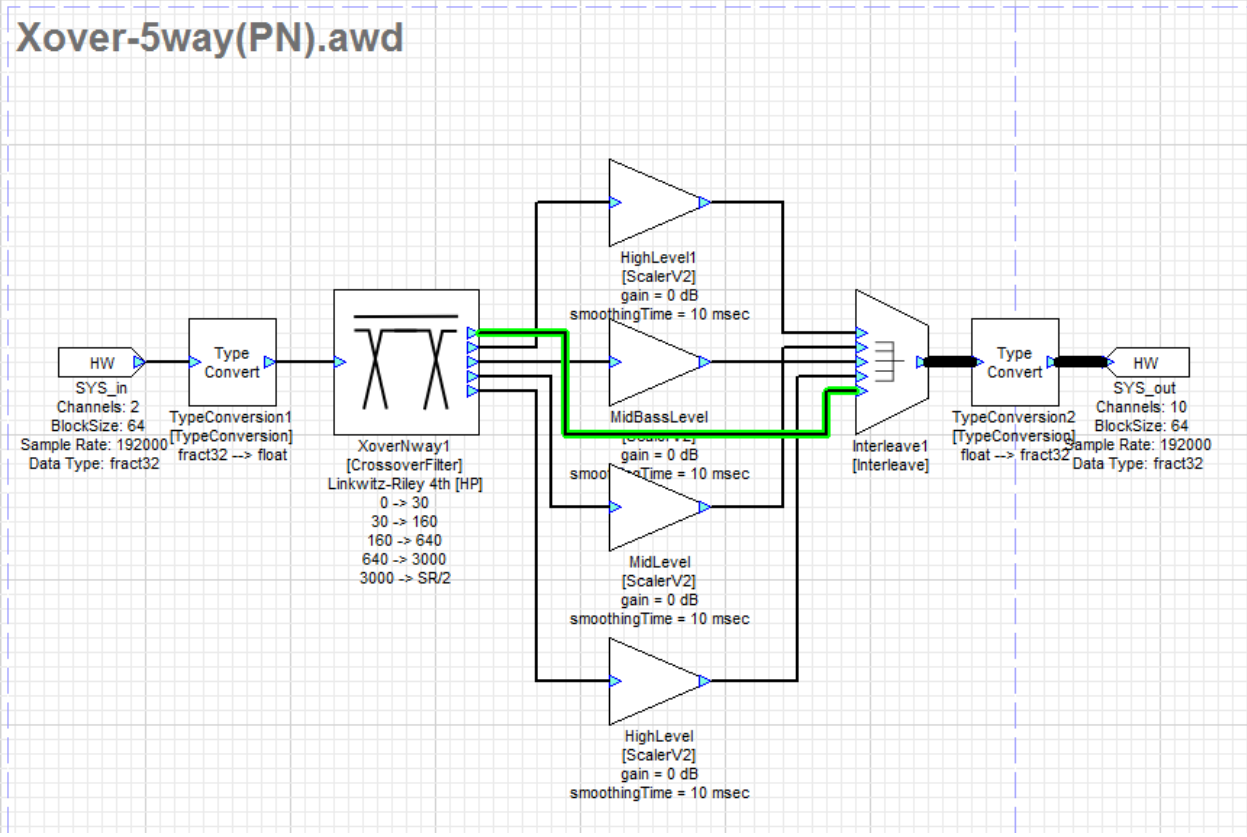


For more information on how to upgrade the firmware on the Ultimate-Preamp please refer to the following guide.

https://analog-precision.com/Downloads/Docs/How_to_upload_firmware_to_the_Ultimate_Preamplifier.pdf

A 5-WAY CROSSOVER EXAMPLE USING AUDIOWEAVER

This setup would typically be used with an existing stereo 4-way speaker system along with an additional two subwoofers to form a stereo 5-way system. In this section we describe a simple Audioweaver setup that implements a 5-way crossover using the dedicated Audioweaver crossover block to do this.



Note that the crossover block and interleave have 5 stereo pairs or 10 channels. We assign the lowest frequency band from the crossover block (top connection) to the additional stereo pair on the interleave (bottom connection) because this is the connection that represents channels 9/10 which are routed to the S/PDIF output.

Now run the script on the Preamp or compile and load the compiled script to the Preamplifier. For more information on how to run Audioweaver scripts or upload Audioweaver binaries to the Ultimate-Preamplifier please refer to the following document:-

https://analog-precision.com/Downloads/Docs/Uploading_Audioweaver_Design_to_the_Ultimate_Preamp.pdf

SETTING UP THE PREAMPLIFIER WITH AN EXTERNAL DAC

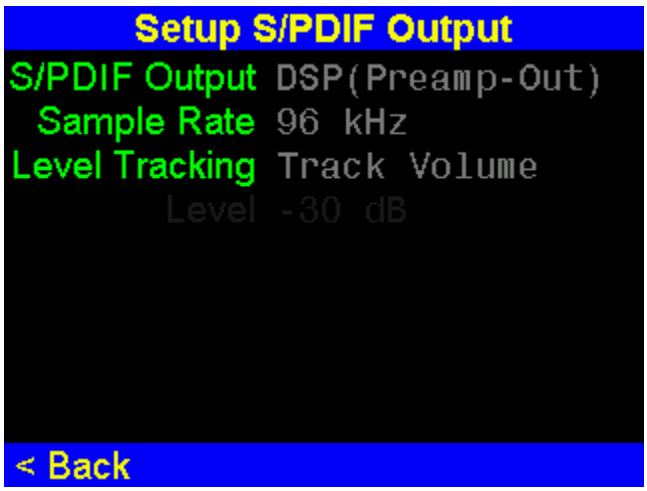
First connect an external DAC to the Coax S/PDIF or optical Toslink outputs from the back of the Preamp.

Note that the optical Toslink output on the Ultimate-Preamplifier is only capable of a maximum of 96kHz whereas the S/PDIF Coax output is capable of a maximum 192kHz. You also need to know what your DAC is capable of handling as most optical inputs usually cannot handle anything above 96kHz.

In this example we used an EE-MU0404 from Creative Labs as an external DAC to handle the low frequency subwoofer channels from the preamp. We used a 75 ohm(RG-59) BNC to RCA coax cable and connected the output of the Preamp to the DAC as follows.

Now we need to tell the Preamplifier that we want to use the additional two channels which can be done from the front panel menu.

ie [Main Menu] -> [Setup] -> [Setup Audio] -> [Setup S/PDIF Out]

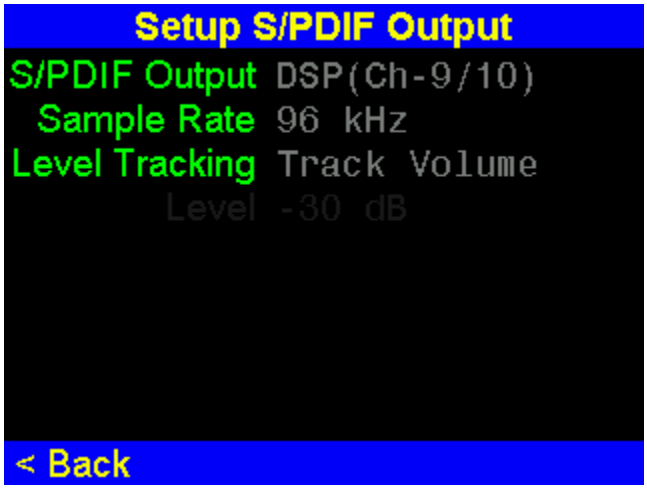


Set the S/PDIF Output from OFF to DSP. When the Preamp is set to 2-Ch Preamp mode the S/PDIF output on the back of the Preamp will represent the two-channel preamp output that is normally fed straight to channels 1-2 of the DAC in 2-Channel stereo Preamp mode. When you upload an Audioweaver design to the Preamp and force it into the Multi-Channel Preamplifier mode this will change from “Preamp-Out” to “Ch-9/10” indicating the additional two channels used in the 5-way crossover design.

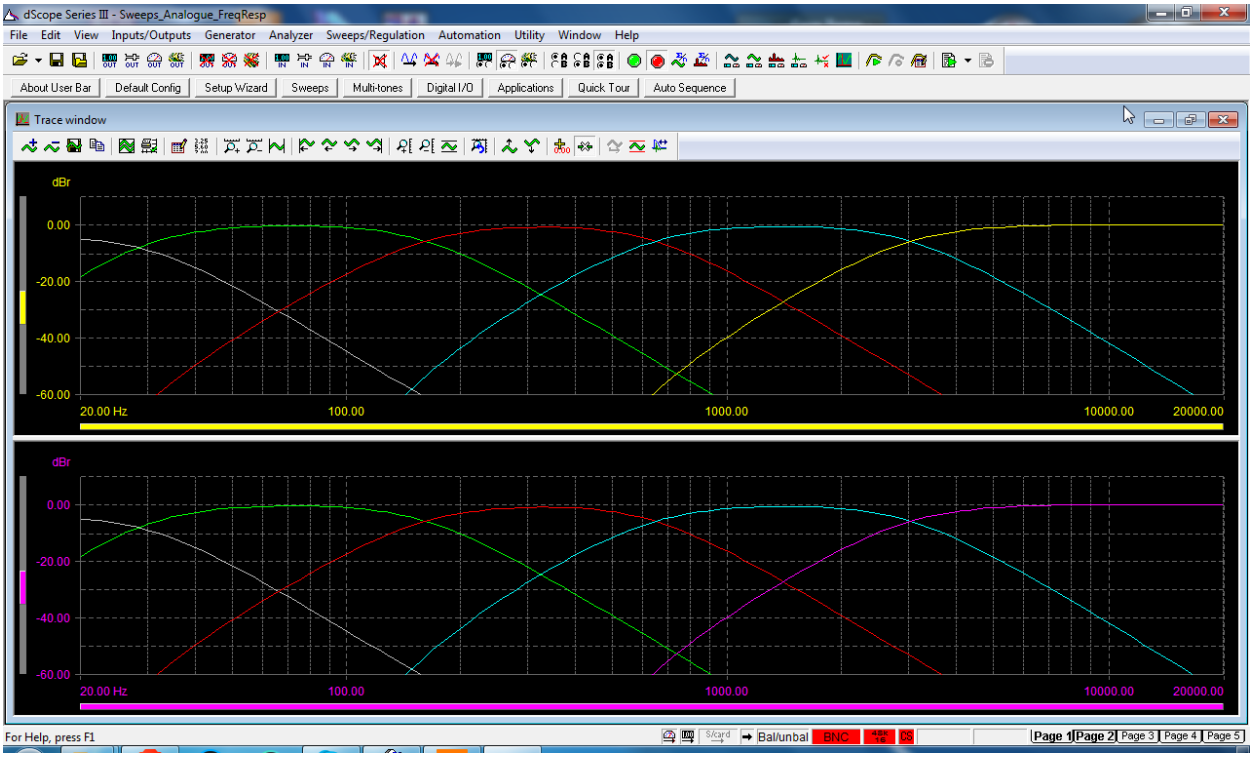
Now we also need to adjust the output sample rate as the internal sampling rate of the DSP is typically set to 192kHz and so if your DAC can’t handle the raw 192kHz you need to down convert it by changing the sample rate to 96kHz or even 48 KHz. In this example we leave it at 96kHz as our DAC can’t handle anything above 96 kHz.

For the “Level Tracking” we want the output level to the external DAC to track the level of the master volume control so make sure this is set to “Track Volume” instead of “Fixed Level”.

Running your Audioweaver script or uploading your Audioweaver binary into the Preamp will change the S/PDIF output source from “Preamp-Out” to “Ch-9/10” as the following LCD screen grab shows.



We ran a frequency sweep test with our analyzer and the results matches what we expect from the crossover design in Audioweaver. Note that the output of the external DAC appears to be 6 dB lower than the preamp analog outputs so you will have to take this into account in the complete system by either adjusting the levels in Audioweaver or adjusting the gain control on the subwoofer.



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