Subject: 4 Pi Crossover
Posted by truenorth on Fri, 05 Feb 2021 14:37:02 GMT
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Hello Wayne,

Greetings. I've been enjoying my 4 Pi for over a decade until couple weeks ago while listening (at normal sound level) I noticed I was getting ear fatigue after 10 minutes from one ear. After switching left <> right speakers, my ear fatigue followed the speaker swap. So now I am focusing my troubleshooting on a speaker, most likely the speaker crossover.

While going through my saved crossover schematics (2Pi and 4Pi), for some reason, I can only find the original 4Pi schematic and not the updated version. Can you please send me the latest 4 Pi crossover schematic? Also, any suggestion as to which component could be the culprit?

My 4 Pi is made up of 2225H, DE250, and H290C. I also have 15 ohm across DE250 (added later for H290C).

Thanks in advance,
Norb

Subject: Re: 4 Pi Crossover
Posted by Wayne Parham on Fri, 05 Feb 2021 14:55:26 GMT
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I'll send plans via email.

I would suggest swapping the midwoofer, then the tweeter compression driver and then the crossover board. Make sure you are focused on the right thing.

If it turns out it's the crossover, I'd replace the resistors first, followed by the capacitors. I can't imagine the coils going bad but if all else fails, I guess you could try swapping them too. But I'm sure you will have found your culprit long before you get to that point.

Subject: Re: 4 Pi Crossover
Posted by truenorth on Fri, 05 Feb 2021 15:34:10 GMT
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Thanks for the tip Wayne.

You got me thinking, before pulling the midwoofers out (not fun), I am now thinking I can use a dBMeter phone App and some kind of tone generator to see if I can isolate the issue.

Subject: Re: 4 Pi Crossover
Posted by truenorth on Wed, 10 Feb 2021 05:03:44 GMT
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I like to report my Issue is now solved! Thanks for the schematic Wayne.

Root cause: Human error :(
My culprit tweeter wiring got reversed. Story below....

Here is how I found the issue:
1] I started by running an online tone generator application from an android device connected to my amp via the headphone jack. On the receiving end, I ran audio/spectrum analyzer on my iphone. Ran frequency sweep and measured frequency response on each driver at a time. Although it is crude, it showed both speakers were putting out between 38Hz to 18KHz (roughly) and no distorted waveform. Which meant the speakers were doing what it is supposed to.

2] At this point, I was still getting mild ear fatigue, next, I decided to switch each driver from one side to the other. Since my 4 Pi has the tweeter in a separate box seating on top of midwoofer box I proceeded to switch the tweeters first. At this point I noticed the wiring for the tweeters weren't the same. After double checking with crossover diagram I noticed the polarity on the suspect tweeter to be reversed. Further memory recall, pointed to about a month ago I was messing with the wiring but didn't get to listen to the 4 Pi right away until sometime afterwards which lead me to a wild chase.

I am happy to report my 4 Pi is back....

Subject: Re: 4 Pi Crossover
Posted by Wayne Parham on Wed, 10 Feb 2021 14:47:00 GMT
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Nice work tracking that down!

Thanks for reporting back. It will be useful for others facing your same circumstance.

Subject: Re: 4 Pi Crossover
Posted by docjrev on Mon, 15 Feb 2021 02:37:59 GMT
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Hello,
Same thing happened to me. Had my Pi4s for 10 plus years. I recently replaced my horn with the

new Wayne horn (H90C and add the 16 ohm resistor) and forgot that in the B&C DE250 driver "red" binding post is the "-". I was listening and seemed that the sound and stage were out of focus. I knew something was wrong.

I use an "AudioTool" program from StudioSix called speaker polarity detector to detect polarity while playing a "speaker pop wav file". This tool sends pop-like sound to your speakers and using an iPhone, you can post the iPhone mic to each driver and it will tell you the driver's polarity.

Corrected, everything sounded very, very good. The improvement from the old to the newer horn is outstanding! Hard to explain but my speakers sounded like a much better pair. Thanks Wayne.

Subject: Re: 4 Pi Crossover
Posted by rvsixer on Mon, 15 Feb 2021 12:29:03 GMT
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docjrev wrote on Sun, 14 February 2021 18:37I use an "AudioTool" program from StudioSix called speaker polarity detector to detect polarity while playing a "speaker pop wav file".
Great tip on this speaker polarity tester. After googling a bit, I found in addition to the tool being bundled within AudioTools, it is also available standalone for a bit of cost savings:
https://apps.apple.com/us/app/speaker-polarity/id293263027

Subject: Re: 4 Pi Crossover
Posted by truenorth on Mon, 15 Feb 2021 21:49:28 GMT
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Nice!!!

I wish I had this tool/utility when I was troubleshooting my issues... I think this is a must have tool when building speakers.

I just downloaded the pop wav file and ran it from my laptop connected to the amp and also downloaded the app for iphone and it all checked out :)

The Pop wav file can be found here:
https://studiosixdigital.com/audiotools-modules-2/speaker-test-modules/speaker_pop/

iphone speaker test apps:
- search for "speaker polarity" in the app store and you should come across several app options. I used app called "Audio Control"

Thanks for sharing.