

# MDX 0408

## **FIR Filtres Creation User Manual**

User Manual – Version 1.0



FIR filter and applications

When user uses PEQ to adjust audio signal and set a linear magnitude, he can find the phase of signal changed, due to IIR filter. However, DSP products provide user a useful tool FIR filter to adjust audio signal with a linear phase.



Some calculation:

Frequency resolution = Sampling/Taps

Available min. frequency ≈ Frequency resolution\*3

Means when use adjust audio signal with 48kHz, 1024 taps, FIR filters will take effect in frequency above 141Hz of audio signal. The taps value more high, the FIR filter curve more steep.

FIR filter processing audio signal will produce a certain delay: Delay = (1/Sampling Hz)\*Taps/2

#### \*Outputs 7 and 8 do not support 512 taps

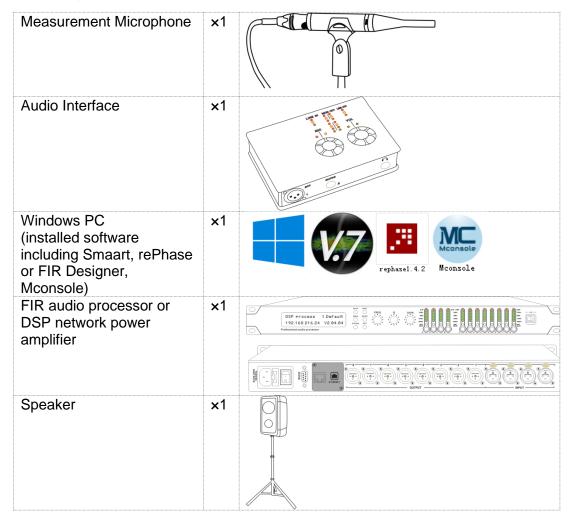
Taps		48kHz	96kHz
	Sampling		
256		2.67ms, LF 563Hz	1.33ms, LF 1125Hz
512		5.33ms, LF 279Hz	2.67ms, LF 558Hz
768		7.99ms, LF 188Hz	4.00ms, LF 375Hz
1024		10.67ms, LF 141Hz	5.33ms, LF 281Hz
2048		21.33ms, LF 70Hz	10.67ms, LF 141Hz

#### Applications:

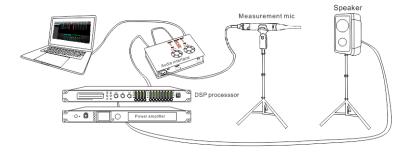
- Linear of the phase curve of the speaker;
- Match the phase and magnitude of different speaker models within the same product line, as well as different speaker models in the installation project to make it easier to debug speaker groups and arrays;
- Dealing with linear array systems (for audience area coverage optimization);
- Frequency division optimization to improve the consistency of frequency response of multi-division speakers over their coverage Angle range.



Devices required:



Connection schematic diagram:



Using third party software to set FIR magnitude and phase

Step 1: measure phase curve of speaker in Smaart V7



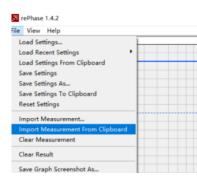


### Step 2: copy curve to ASCII in Smaart V7

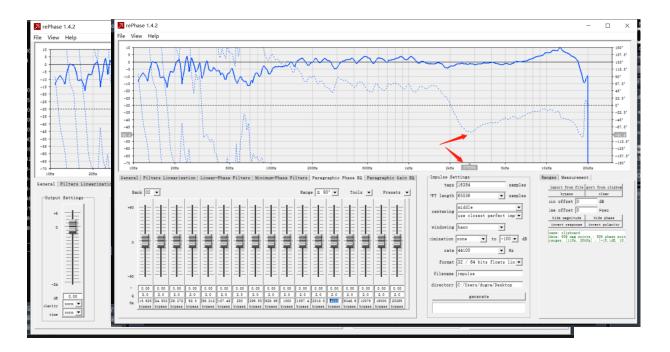


Step 3: copy curve to software rePhase

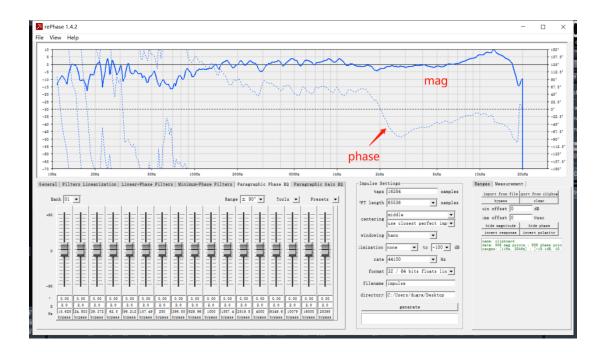
"Import Measurement From Clipboard"





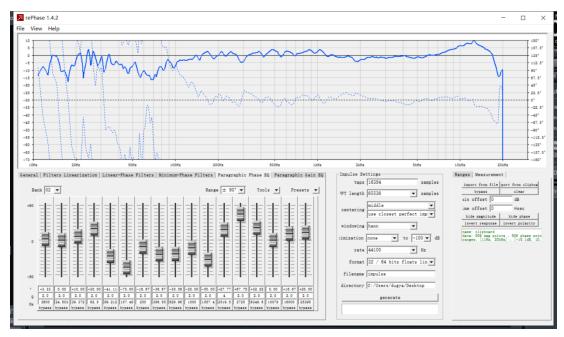


Step 4: adjust phase EQ or any other parameter in software, to match a linear phase for speaker



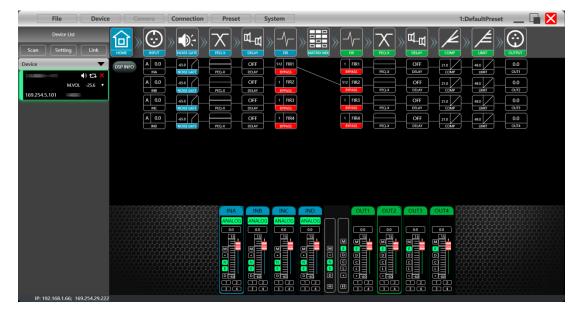


#### Step 5: export .txt file after setting



#### Marks:

- 1. Set taps in 2048/1024/768/512/256, here we set in 512.
- 2. Set rate in 48000Hz.
- 3. User can rename this file and find it easily.
- 4. Set directory for exporting file, such as C:/Users/User/Desktop.
- 5. Click "generate" to export a FIR .txt file.

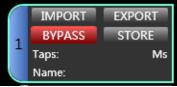


Step 6: import FIR .txt file in FIR audio processor or DSP network power amplifier



Open Mconsole software, user can choose an input channel or output channel as needed, such as FIR in output channel, it will show a FIR function window.

File Devic	e Camera	Connection Preset	eset System	🖬 🔀 🗎
Device List       Scan     Setting     Link				
Device 🔻			FIR F	$\mathbf{X}$
1.device ④ 묘 X		IMPORT     EXPORT       BVPASS     STORE       Taps: 1024     10.67       MPORT     EXPORT       IMPORT     EXPORT       Taps: 0.4     10.67       Taps: 0.4     10.67	1 +36 18   2 +24 15   4 +12 12   -36 -12 00   -48 -12 00   -49 -12 00   -48 -12 00   -49 -12 00   -48 -12 00   -48 -12 00   -48 -12 00   -49 -12 00   -49 -12	در ۲۰ ۲۰ ۲۰
IP: 192.168.8.1				



press **IMPORT** to import txt. file, than press STORE to effect this importing.

	IMPORT	EXPORT
1	BYPASS	STORE
± .	Taps:	Ms
	Name:	

remember to cancel **BYPASS**.

File Device Camera	Connection Preset System	1:DefaultPreset 🔄 🔚 🗙
Device List		
Device DSPINIO () 13 X MVOL -25.5 V	HORE GATE PEQ.X DELAY DYPASS PEQ.X	Off     10     as     00       COLOR     Color     Color     Color       Off     Color     dis     0.0       GBAY     Color     UMIT     0.0       GBAY     Color     UMIT     0.0
169.254.5.101		
NO	Nonciality POX POX POX	
IP: 192.168.1.66; 169.254.29.222		

Step 8: measure the curve of speaker again, use can find it become more linear.





After all setting, please remember to save a preset for your hard working in the speaker.

File Device	Camera Connection	Preset System	1:DefaultPreset 🖬 🔀
		Device Preset	
	SSP INFO     A     0.0     45.0     -       NA     0.0     45.0     -     -       NOSE GATE     NOSE GATE     -     -     -       NOSE GATE     -      -	0   Auto     1   (Default)     2   3     3   4     5   6     6   FIR-Adjust-1124     7   8     9   10     11   12     13   11     14   14	Empty     NO X     DAX     COMP     LMT     Communication       Device Memory     IP3.X     OFF     COMP     IB     0.0       Current     OFF     COMP     IB     0.0     0.0       Boot     OFF     COMP     IB     0.0     0.0       Current     OFF     COMP     IB     0.0     0.0       Current     OFF     COMP     IB     0.0     0.0       Current/Boot     OFF     COMP     IB     0.0     0.0       Save     Recall     ID2.X     OFF     COMP     IB     0.0       Delete     Clear     ID0.0     ID0.0     ID0.0     ID0.0     ID0.0     ID0.0     ID0.0       Import Preset     Imp
	000000000000000000000000000000000000000	15 16 17	Export Preset
19: 192 168 1.66; 169 254,29,222			Eport Package





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