# MARK MDX 0408 FIR Filtres Creation DSP 24 Bit Digital Audio Processor User Manual



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Contents



## 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.

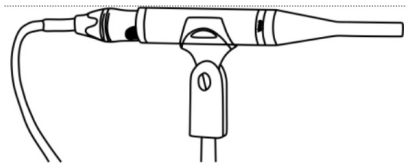
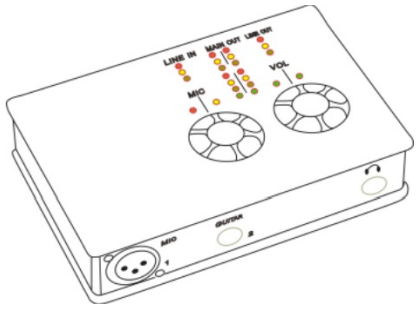
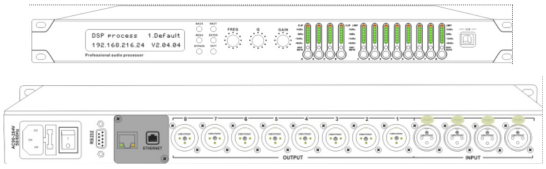
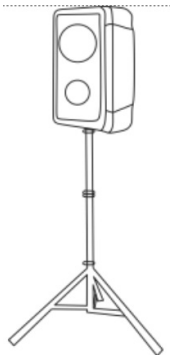

**Some calculation:**
Frequency resolution = Sampling/Taps
Available min. frequency ≈ Frequency resolution*3
Means when use adjust audio signal with 48kHz, 1024 taps, FIR filters will take effect in frequency above 141Hz of audio signal. The taps value more high, the FIR filter curve more steep.

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

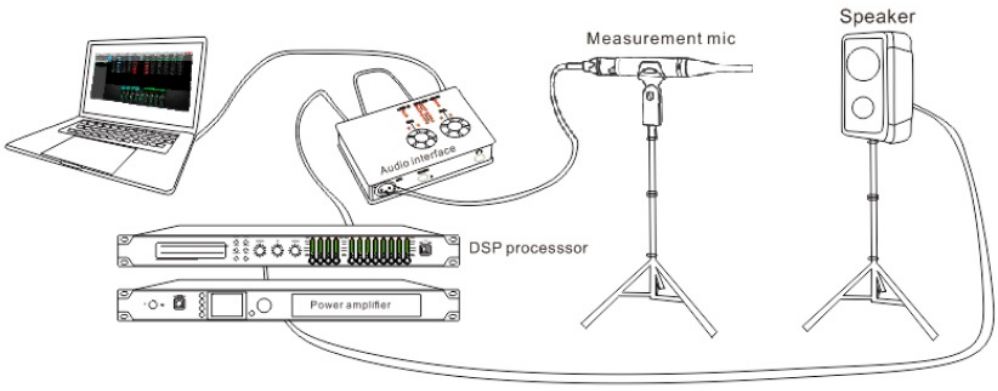
| Taps Sampling | 48kHz | 96kHz |
|---|---|---|
| 256 | 2.67ms, LF 563Hz | 1.33ms, LF 1125Hz |
| 512 | 5.33ms, LF 279Hz | 2.67ms, LF 558Hz |
| 768 | 7.99ms, LF 188Hz | 4.00ms, LF 375Hz |
| 1024 | 10.67ms, LF 141Hz | 5.33ms, LF 281Hz |
| 2048 | 21.33ms, LF 70Hz | 10.67ms, LF 141Hz |

**Applications**

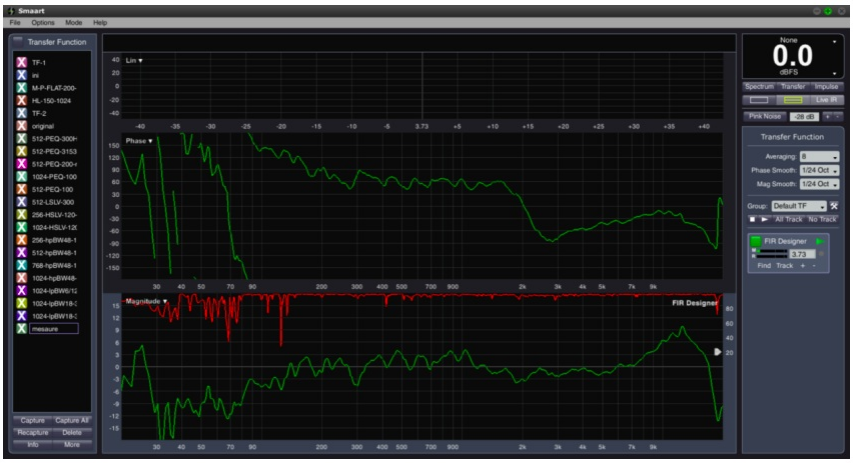
- Linear of the phase curve of the speaker;
- Match the phase and magnitude of different speaker models within the same product line, as well as different speaker models in the installation project to make it easier to debug speaker groups and arrays;
- Dealing with linear array systems (for audience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

| | | |
|---|---|---|
| Measurement Microphone | ×1 |  |
| Audio Interface | ×1 |  |
| Windows PC (installed software including Smarts, re Phase or FIR Designer, Mconsole) | ×1 |  |
| FIR audio processor or DSP network power amplifier | ×1 |  |
| Speaker | ×1 |  |

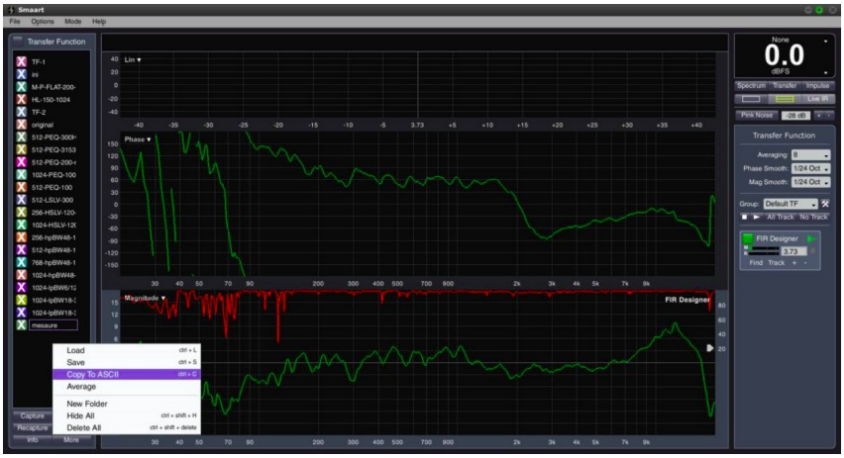
**Connection schematic diagram:**




Using third party software to set FIR magnitude and phase
**Step 1:** measure phase curve of speaker in Smaart V7

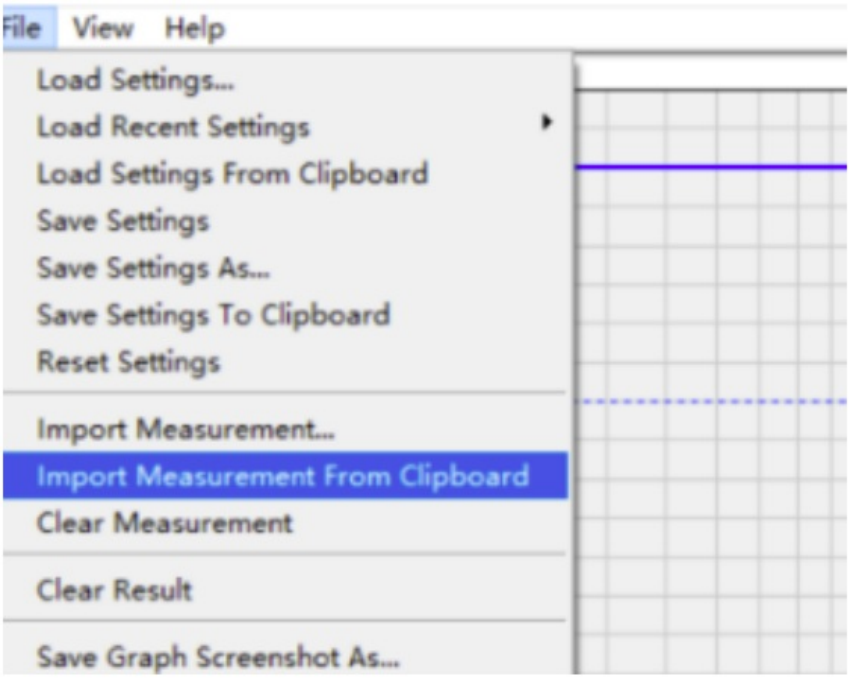


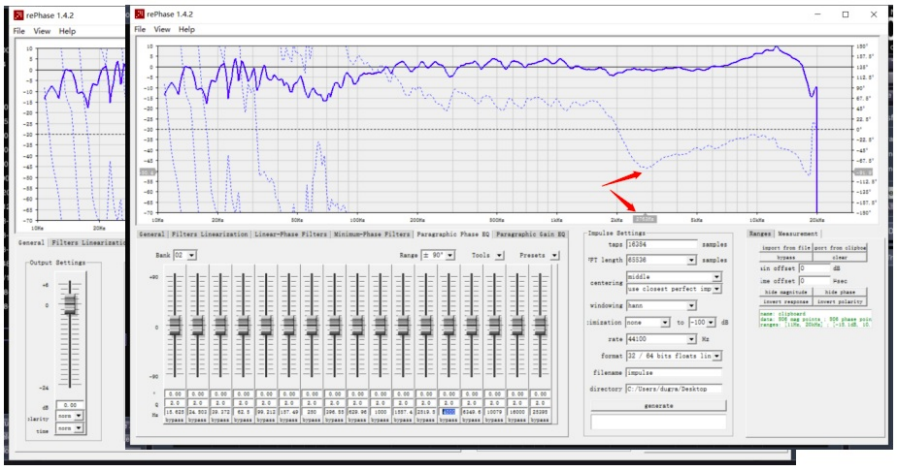
**Step 2:** copy curve to ASCII in Smaart V7



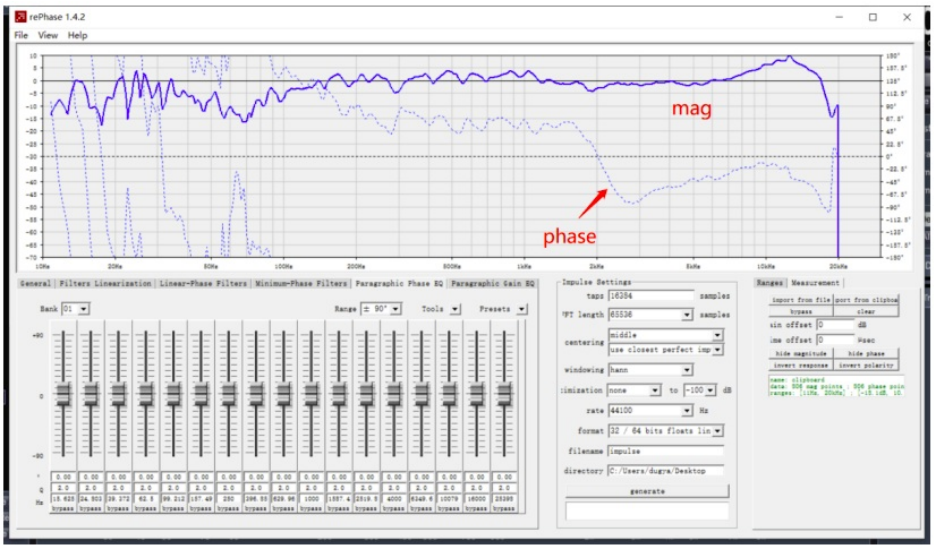

**Step 3:** copy curve to software rePhase

**“Import Measurement From Clipboard”**

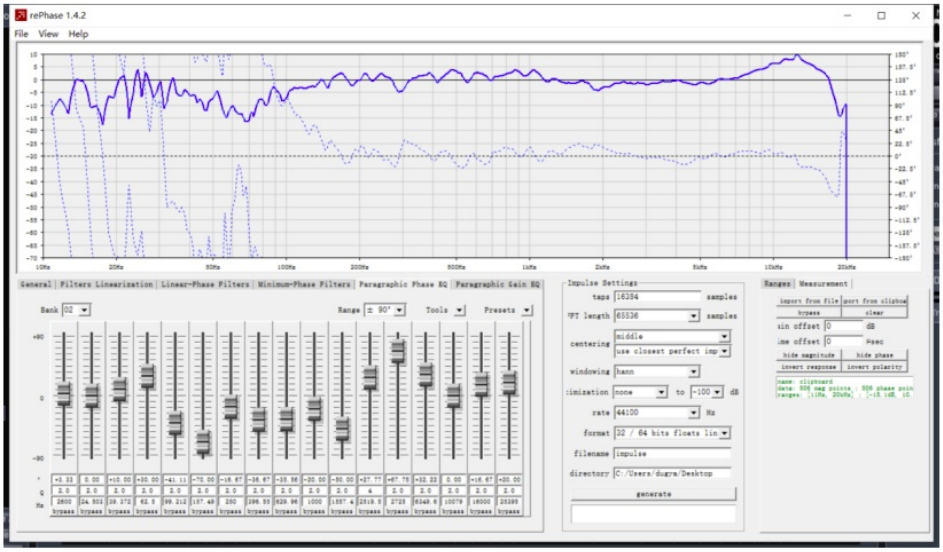




**Step 4:** adjust phase EQ or any other parameter in software, to match a linear phase for speaker



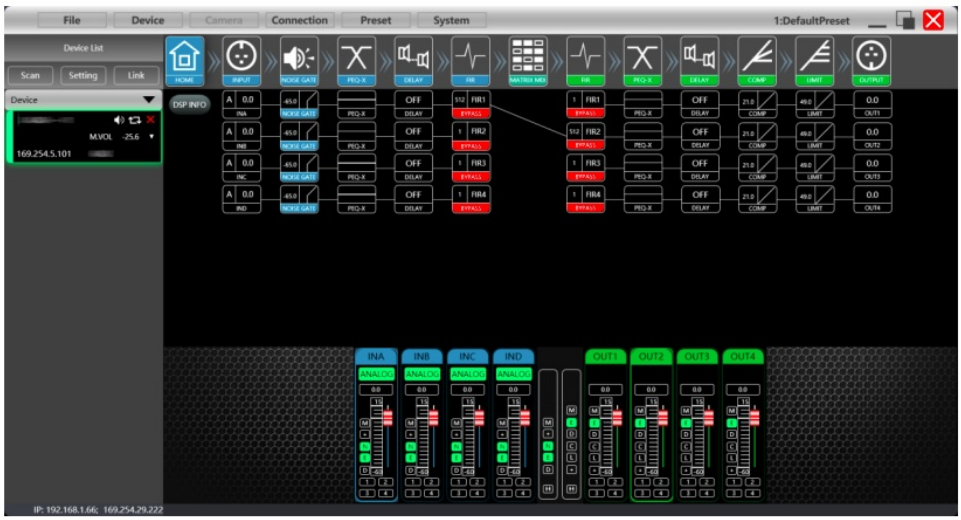

**Step 5**: export .txt file after setting



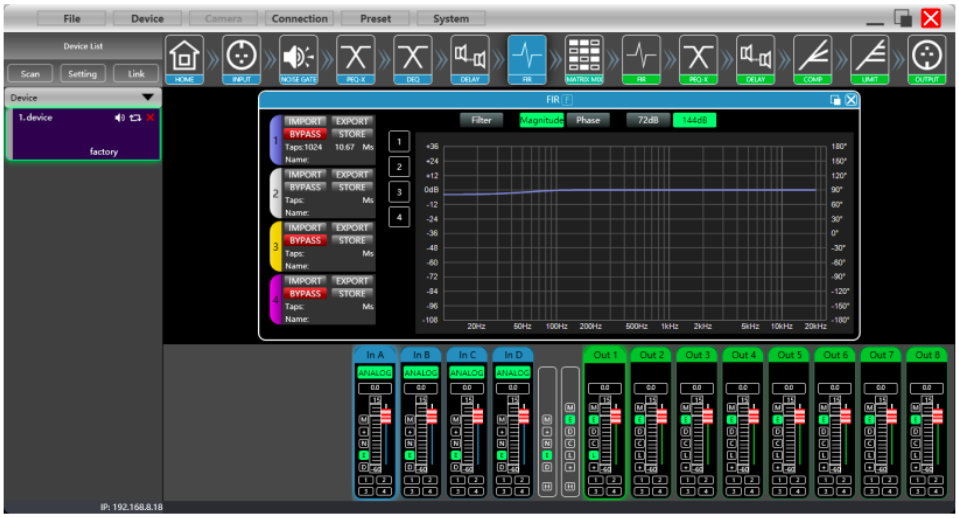
**Marks:**

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.

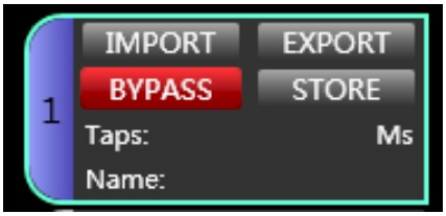
**Step 6**: import FIR .txt file in FIR audio processor or DSP network power amplifier



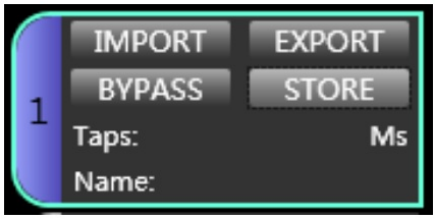

Open Mconsole software, user can choose an input channel or output channel as needed, such as FIR in output channel, it will show a FIR function window.

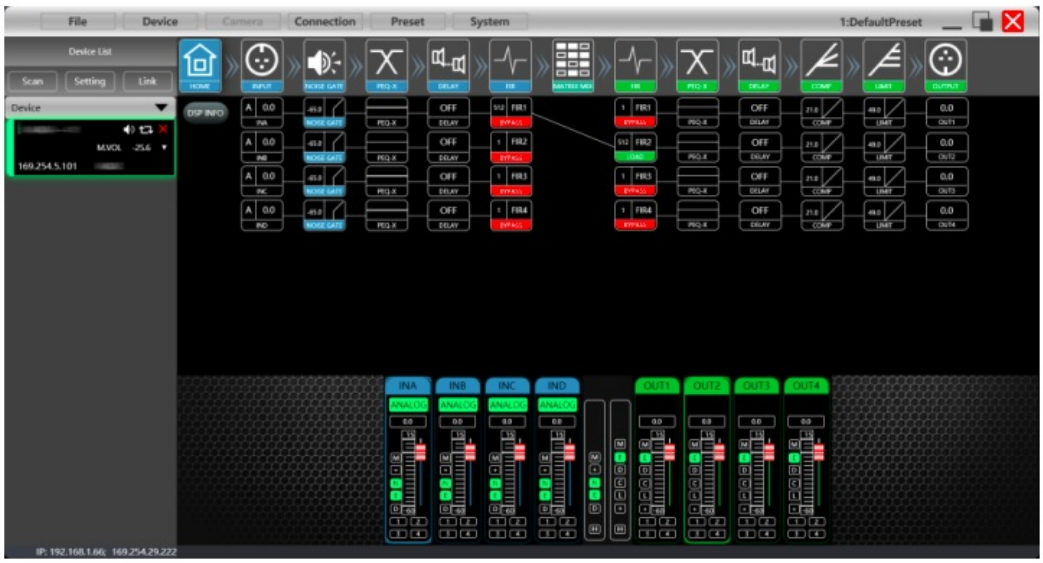



press IMPORT to import txt. file, than press STORE to effect this importing




remember to cancel BYPASS.






**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.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## Documents / Resources

| | |
|---|---|
|  | **MARK MDX 0408 FIR Filtres Creation DSP 24 Bit Digital Audio Processor** [pdf] User Manual<br>MDX 0408, MDX 0408 FIR Filtres Creation DSP 24 Bit Digital Audio Processor, FIR Filtres Creation DSP 24 Bit Digital Audio Processor, Creation DSP 24 Bit Digital Audio Processor, 24 Bit Digital Audio Processor, Digital Audio Processor, Audio Processor, Processor |

## References

- **User Manual**

**Manuals+**, **Privacy Policy**

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