iWoofer application manual.

Rev A. (05/22/17)

- *Difference between standard and pro versions.*
- *How to Start. Discovery and connect.*
- *Main menu. Change name of the device.*
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- *Options menu*
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- *Main menu*
    - *Gain, shs, delay, phase.*
    - *Limiter-compressor, dynamic bass.*

Table 1. List of features for each versions.

Feature \ Version	Standard	Pro
XOver control	✓	✓
Gain control	✓	✓
Shs control	✓	✓
Delay control	✓	✓
Phase control	✓	✓
Limiter-Compressor base control	✓	✓
Limiter-Compressor detailed control	✗	✓
Dynamic Bass base control	✓	✓
Dynamic Bass detailed control	✗	✓
Remote hardware control *(hardware vr detailed settings, auto on thresold features)*	✓	✓
Preset manager	✓	✓
Preset import/export features	✓	✓
Room Correction *(group of functions for a minimum phase FIR frequency/impulse response correction)*	✗	✓
Spl meter	✗	✓

The first is that we usually see after tapping to the iWoofer icon is that message: Turn On Bluetooth to allow iWoofer Pro to connect to accessories. It's mean we forgot to turn On the Bluetooth which is necessary for iWoofer connection. If you want to play all functions with no hardware connected, you may tap Ok, and next go to the Demo Mode. Otherwise tap to Settings, and there turn On Bluetooth, next tap to Home button, and to the iWoofer icon again.

In case if within Bluetooth range(10-20m) the app will find any number of subwoofers equipped iWoofer Hardware, all of them appears under "Devices Found:" string with very long names aka UDID number. UDID or MAC address is an unique name and you have no chance to get two iWoofer equipped subs with the same name.
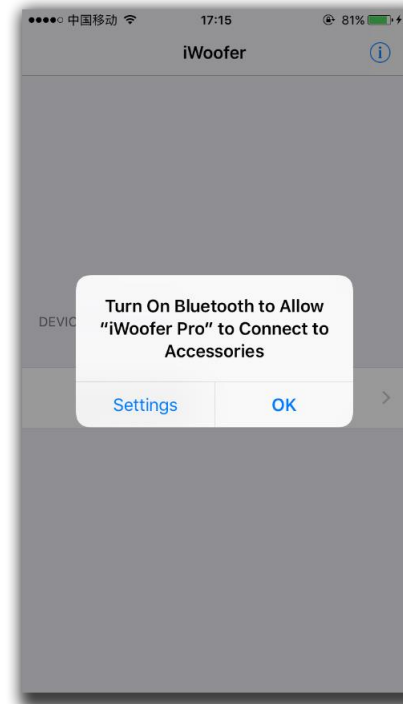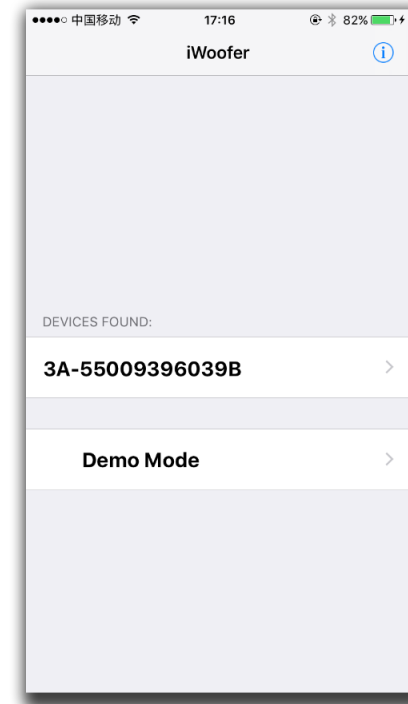

Fig 1. Ble off/on dialog.

Fig 2. Discovery window.

Ok, we have see the UDID and tapping to it we get the main control menu (in case the hardware first time connecting to the iPhone, the app will offer to import preset from hardware. It is a good idea to do that, and just in case save the preset with an authentic name).

The app has renaming function in Options/Name menu, and UDID number could be replaced for any name whatever you like.
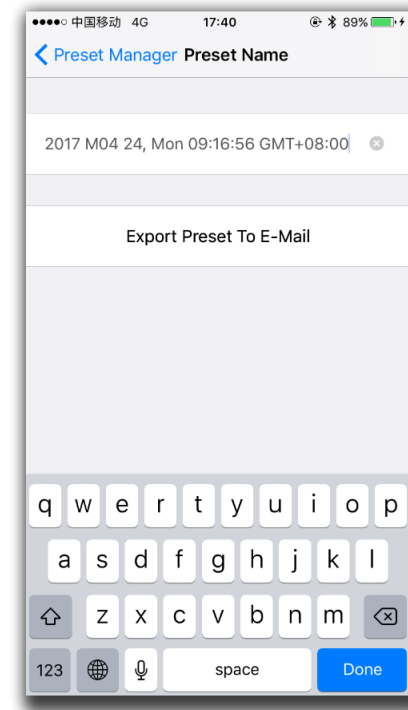
Fig 3. Main control menu.

Fig 4. Preset name menu

Xover - control of Low Pass and High Pass Filters (LPF/HPF), double tap(or tap&holdon > 1S) on the slope to select one, slide left/right to control a frequency (20:500Hz), and up/down to control an order(2:4:8 or 12/24/48 db/oct Butterworth).

Also LPF/HPF frequencies limits the frequency range for Room Correction. Xover controls up to 25 bands fully Parametric EQualizer (PEQ), to add a new PEQ tap to "+" icon, to delete "Trash" icon. Slide right/left to set a frequency, up/down to set a gain (db), zoomin/zoomout to control a Q factor (PEQ bandwidth), double tap(or tap&holdon > 1S) on PEQ to select it.
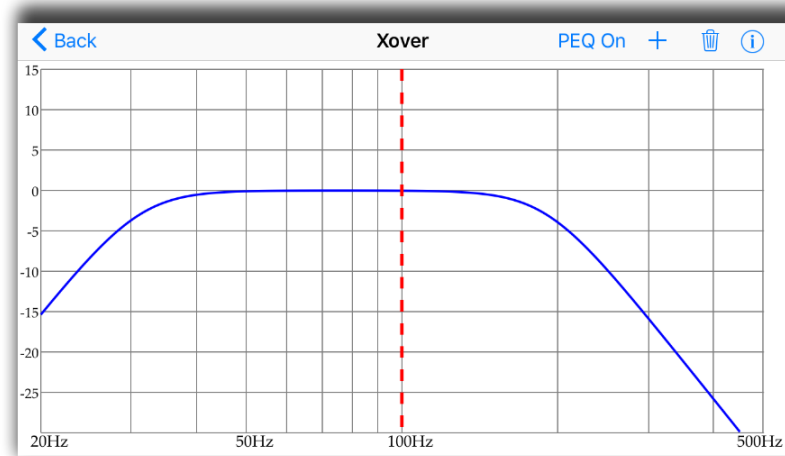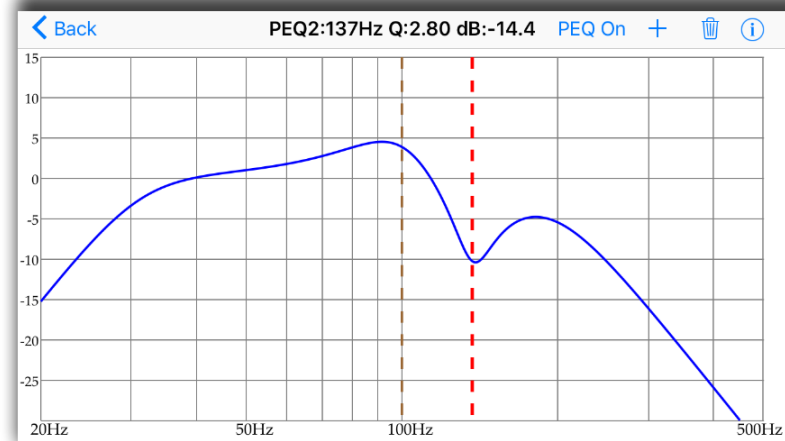

Fig 5. Xover menu.

Fig 6. Xover menu. Add new PEQ..

Room Correction - minimum phase FIR based compensation algorithm with 5mS of total latency. Uses precise frequency sweep with adjustable settling time (Room Correction/ Settings/ Frequency step delay), to compensate echo's decay time.

Auto range recognition function for a reasonable frequency response definition. Uses iPhone mic with model related LUT correction, Fast 20:500Hz sweep + FFT analysis. Controls: On/Off (with self-reset to Off position), Optimism 5:15 (more means wider). The function sets HPF and LPF frequencies, and builds preliminary response, as dashed blue.

Auto level function obtains optimal volume level for an accurate frequency response measurement. Controls: On/Off, Target -30:-8db (-8db means louder).
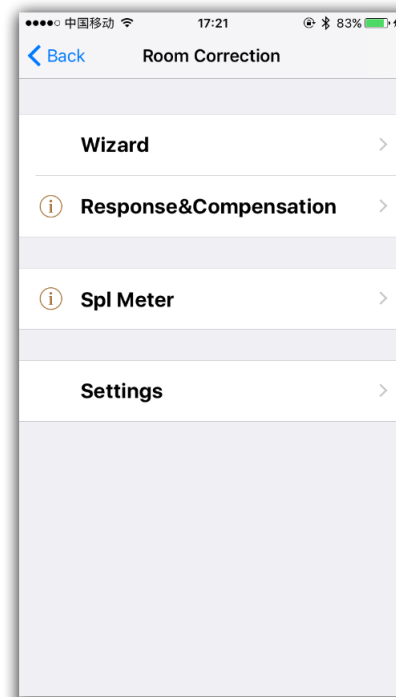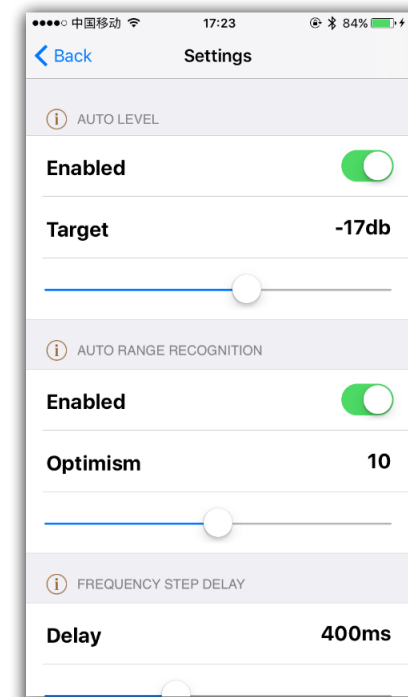
Fig 7. Room correction menu.

Fig 8. Room correction settings menu.

Get Response function using a convolution of the iPhone's mic signal (corrected by model related LUT) to build frequency response plot across the slow and accurate sweep within HPF to LPF range. The function builds THD plot as well, as an easy way to see if high distortion levels affect an accuracy. The last one frequency response plot could be set as Reference by double tap on that plot or tap & hold > 1S, slide up/down on the Compensate/Resp window to adjust a smoothness.
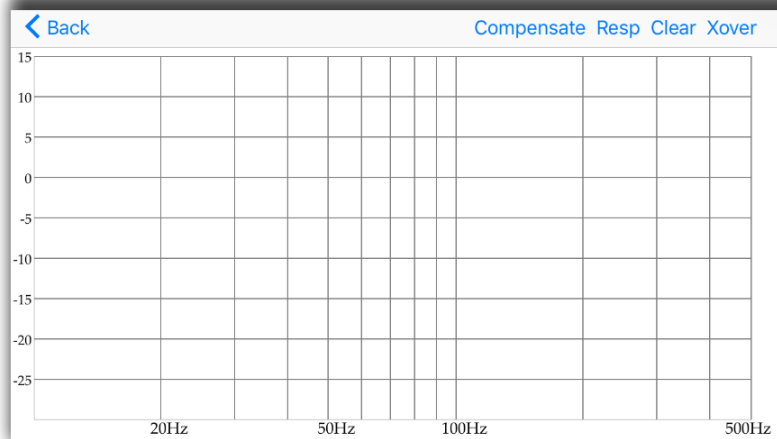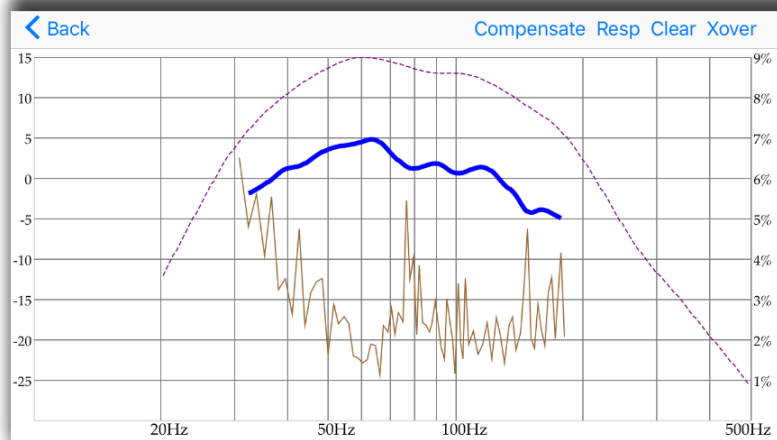

Fig 9. Response&Compensation window.

Fig 10. Response&Compensation window after response.

Compensate is the function using a minimum phase FIR filter (resolution 2.9Hz, range 20:500Hz, 5mS total latency) to fitting final response to the Reference Shape within the range defined by HPF and LPF frequencies. The Reference Shape could be an exact copy of Near Field response (even copy of another subwoofer's response if user wishes, furthermore – the preset saves all parameters data + ref. shape, so one user can export it with preset by email, another one user may receive the preset and build a copy of this response on his own subwoofer) or simply horizontal line 0db, depends on smoothness.

Controls: Frequency step delay 50:1000mS (a large hall may need a longer delay to compensate echo's decay time), Reference Shape Smoothness 0:100% (the target curve becomes 0db line if Smoothness = 100%), Max Boost 0:10db.
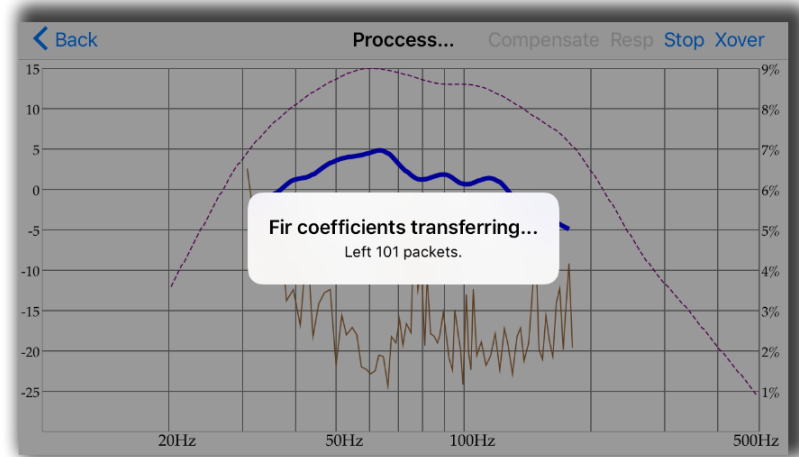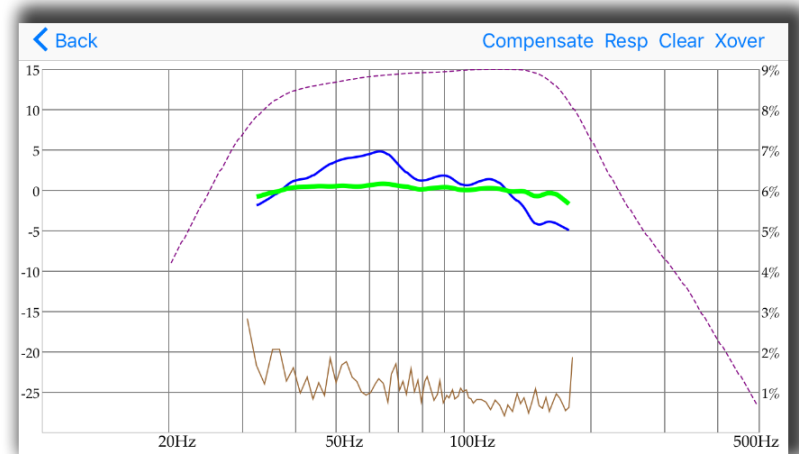

Fig 11. Fir coefficients transferring to hardware.

Fig 12. Result response after compensation

SPL Meter is a simple FFT visualization instrument for checking and manual tweaking of frequency response.

Controls: White Noise generation On/Off. Peak hold reset by windows change. For instance, go to Xover window and back again to the SPL Meter to reset Peak Hold data.
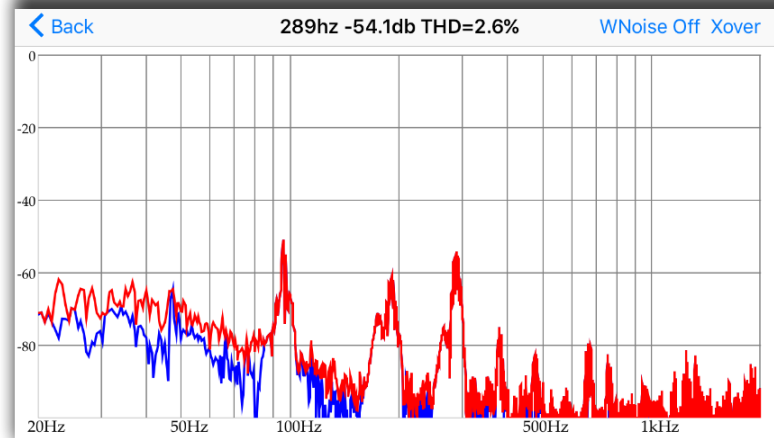

Fig 13. SPL meter window.

Wizard is the automation script leading thru the Room Correction process step by step. First, the Wizard offers to turn On a sub, and adjust volume knob, analog one, on the rear panel. Next to put the sub to a side from walls, ideally in the center of a large room, and place iPhone equally close to woofer cone and to the bass reflex port. This is an attempt to get more accurate near-field (NF) frequency response of your subwoofer.

Why NF? Because it is the way to get a reasonable and safe frequency range of the particular subwoofer. During 1-2 seconds you'll hear a few fast sweeps (Autolevel and Autorange recognition), and you'll see a message with the choice of correction types.
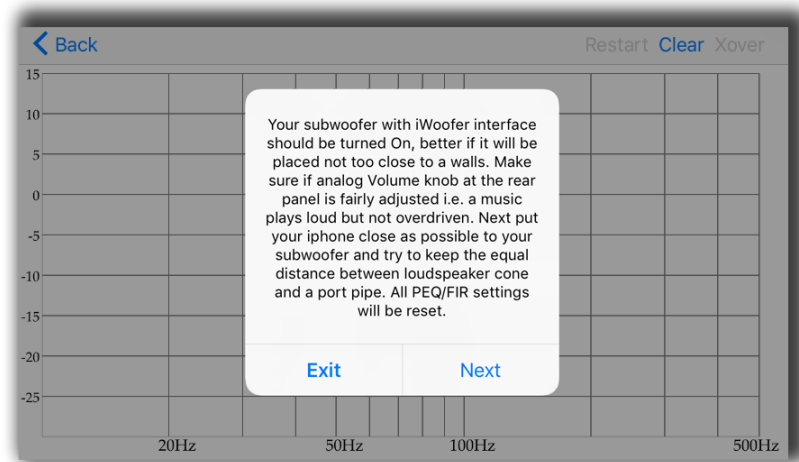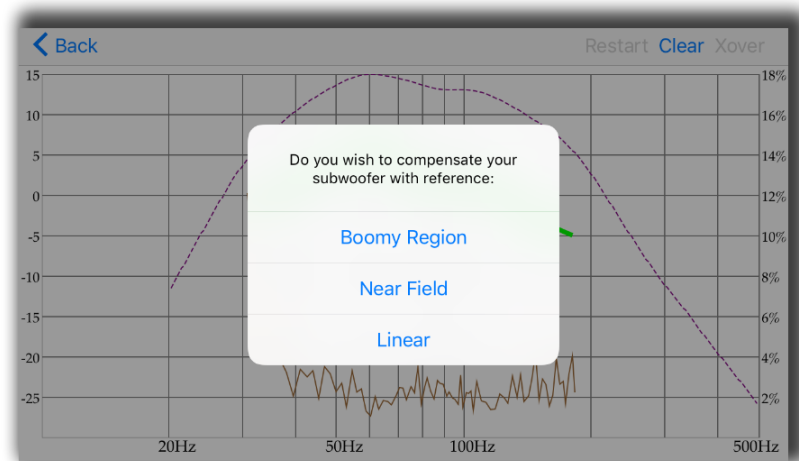

Fig 14. Start wizard window.

Fig 15. Choice of correction type window.

The first recommended type is a Boomy region compensation i.e. FIR affecting a most annoying room reflections artifacts from 70Hz and higher, and keep original subwoofer punch energy.

A typical subwoofer always designed as a compromise between box+speaker size and lowest audible frequency SPL (Sound Pressure Level) performance in a typical room. The same room, which may produce ugly boomy coloration in the midbass, for sure doing serious SPL "amplification" +5:15db within 20-40Hz. In terms of power, it's a huge advantage, +10db equals to x10 watts - 500W vs 5000W! So we believe that better to keep lowest frequencies as they are and linearize only midbass, boomy region to make the bass more transparent, fast and well controlled.

One more reason to put this type of correction to the first position is microphone tolerance. IOS devices use a modern MEMS mics with very good consistency of frequency response, especially higher 50-70Hz. So this is a practical approach, but for enthusiasts, we offer 3rd correction type i.e. entire range correction or even go to "low level" Response/Compensation menu to get the control on a lot of parameters.

Please keep reading an app's hints (!), which contains info about many, if not for all, functions.
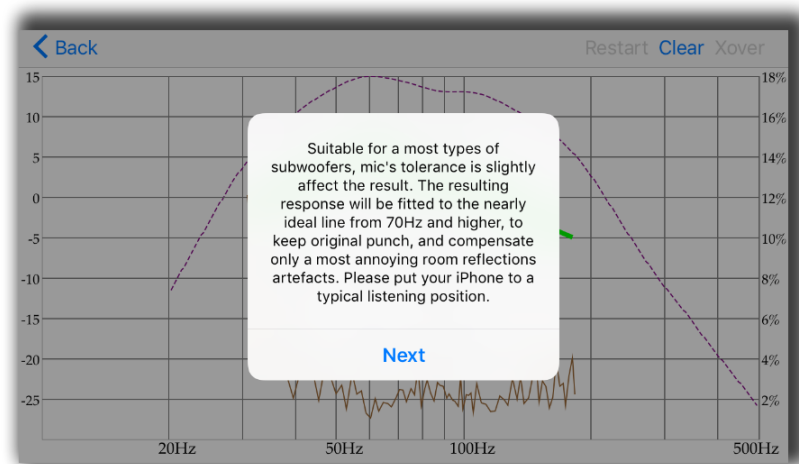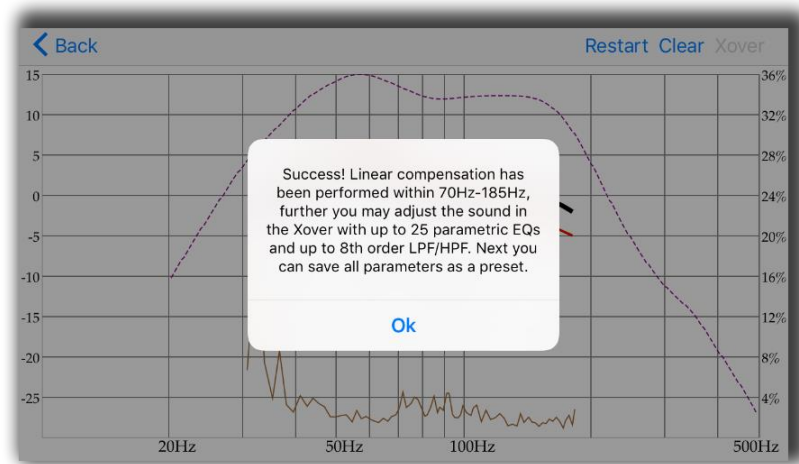

Fig 16. Start Boomy region correction.

Fig 17. Boomy region correction is complete.

The second type of correction is the Near-field compensation, that's true room compensation, the final result will be close to how sounds your subwoofer in the ideal room aka no echo chamber.

Don't be surprised if it sounds too dry, ideal world supposed to be boring, and above we've explained why ;)

A good news - the mic's tolerance now is completely out of brackets, and has zero effect on the final result (relative SPL value is measured).
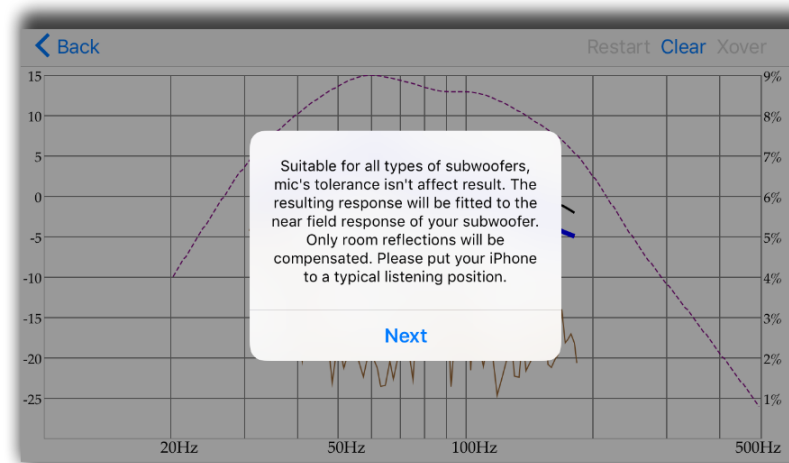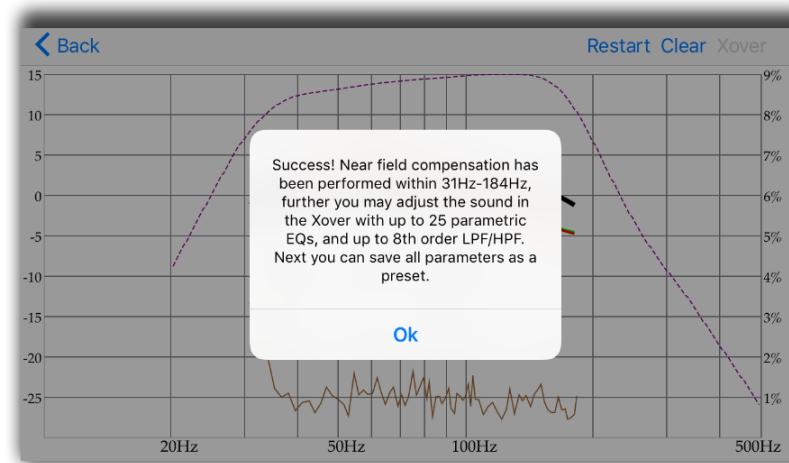

Fig 18. Start near field correction.

Fig 19. Near field correction is complete.

Name, by default the Name field filled with UDID, you may rename it there. UDID shows the MAC address of the connected iWoofer Hardware.

Restore Factory Setting in case if you have a trouble with controls or sound and you want to reset all parameters to defaults. Be aware that this defaults is not exactly the same as was preset by the manufacturer of your subwoofer. As mentioned before, the very first connected iWoofer hardware will offer app to import preset from DSP, this one is the manufacturer's default preset.

Change Pairing Code let you to set a password to you subwoofer/app. In case if the password is forgotten, please press and hold the Pair button on the rear panel of your subwoofer during 3Sec. The subwoofer password will be reset to zero.

Preset Manager allow you to save/load and export presets. Please note that only after saving a preset the subwoofer will memorize a new parameters. Without saving a preset, subwoofer loses a new parameters after turn Off. Export presets carried out thru the IOS email account, but the import could work by hyperlink on website.
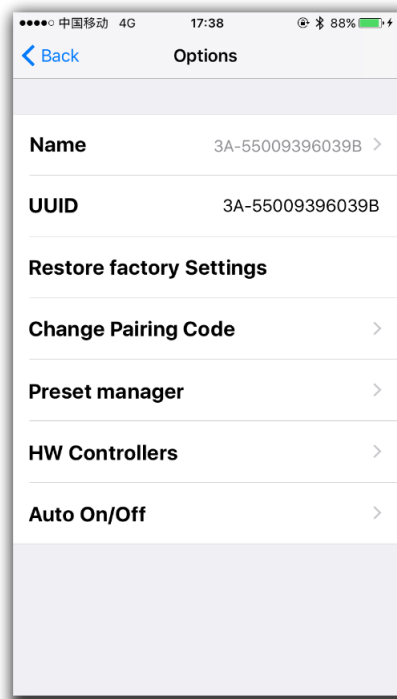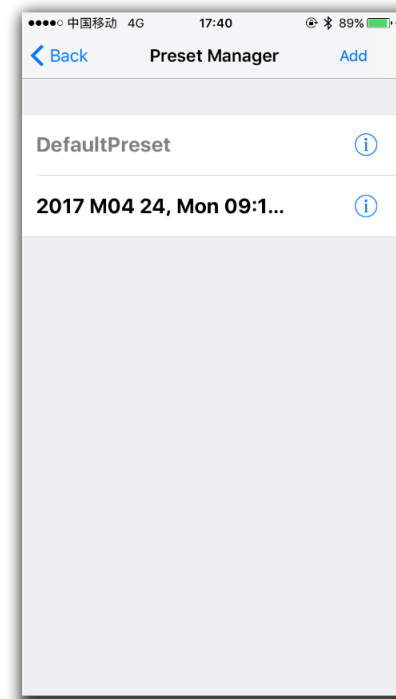
Fig 20. Options window.

Fig 21. Preset manager window.

HW Controllers.

Hardware controllers options lets you to adjust or deactivate up to four knobs or switches on the rear panel of your subwoofer. For a full control by app, please switch Off all controllers, otherwise turning Off/On of the subwoofer will return the control to the rear panel knobs.

Auto On/Off allows you to adjust auto On threshold in mVRMS units, and hold On time in minutes. 10mVRMS and 2 minutes are default values.
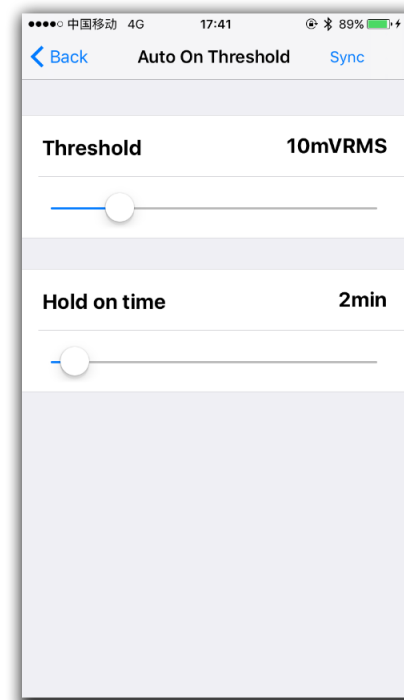
Fig 22. HW controllers window.

Fig 23. Auto on/off window.

Gain slider, very conventional one, the volume slider with Input Level indication (gray/green/red means, signal is less/more than Auto On Threshold, or input clipped).

SHS – sub harmonic synthesizer (old tracks bass restoration, good example is Jackson Sisters - I Believe In Miracles or Diana Krall - Temptation). Controls: dry/wet 0:100%. Brings a lot of tectonic punch, better if limiter is On, ideal for closed box subwoofers.

Delay. Controls: 2.5:65mS or 5:67.5mS for the FIR room correction mode (latency 2.5/5mS). Sometimes needed to match delay with full range speakers if delayed.

Phase - the 1st order allpass filter F 10:10000Hz. Sometimes needed to match a phase with full range in the crossover point.
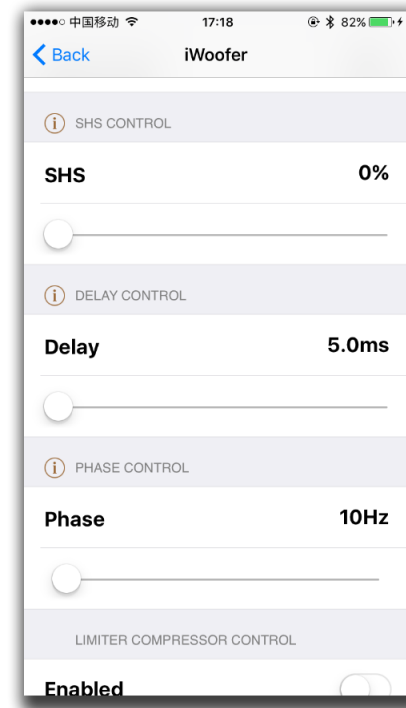
Fig 24. Main window.

Fig 25. Main window (continuation).

Limiter Compressor (RMS detector type), better to listen up the sound during adjustment, but if you need kind of "classical limiter", try to set Pregain to 0db and Decay for 10-20db/S. In case of "autolevel", set Pregain to +12db and slowdown Decay to 2-5db/S. Faster Decay could be suitable rather for a club's subwoofers. The Attack time at max db/S for a most case.

Dynamic Bass is one more dynamic processing algorithm aka band compressor, you can adjust the frequency range, bass boost and threshold for the effect.
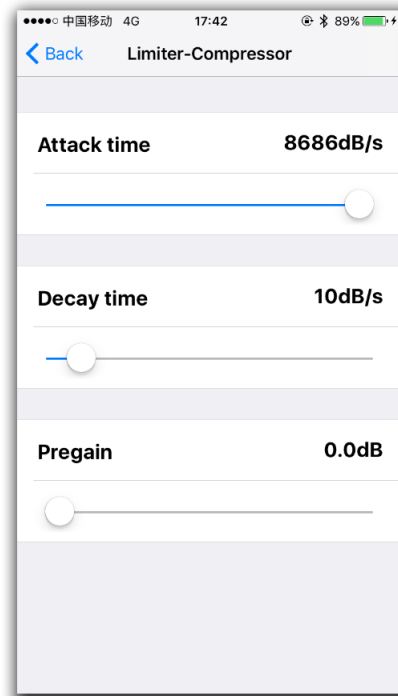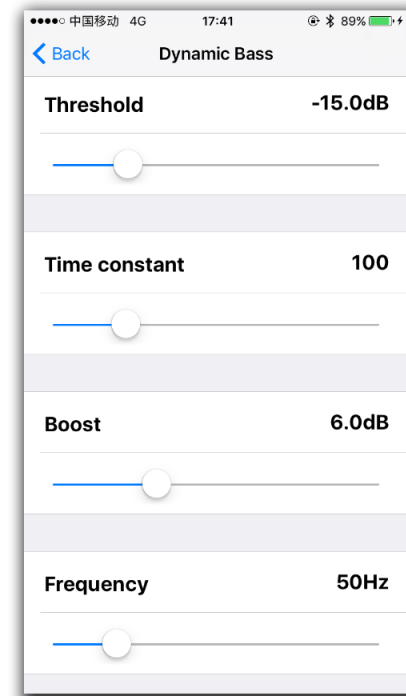
Fig 26. Limiter-Compressor window.

Fig 27. Dynamic Bass window.