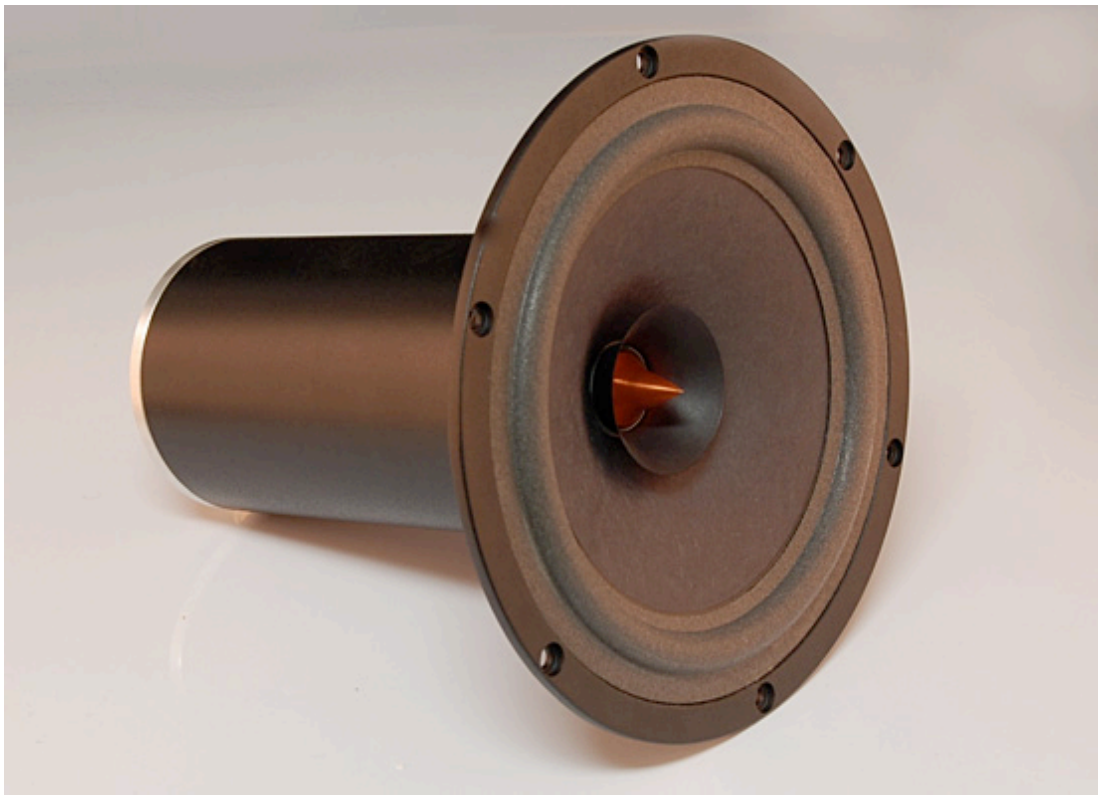
OWNERS MANUAL

MANUAL NO. 02 REV. DATE: 7/2011

The Full Range Project-X Loudspeaker



MODEL-FRX

DECWARE

OWNERS MANUAL

INTRODUCTION:

The FRX drivers are designed for open baffle applications employing low power amplifiers. The driver is 8 inches and has a full range response.

They are hand made and therefore very limited production drivers with superb frequency balance that has been made possible by electromotive coupling. Electromotive coupling is a magnetic circuit that has been tuned to offer spectacular performance within a narrow power window. Put another way, these speakers are not meant to reach party listening levels, instead they were designed for intimate listening at sane volumes. Exceeding this volume restriction will result in completely harmless, but nonetheless objectionable, distortion. You'll quickly know when you are over driving them because they'll tell you. The distortion is in the magnetic circuit itself, not the physical speaker. We designed the magnetic circuit to handle about 7 watts, whereas the physical speaker can handle 30 watts. Naturally if you use an OTL or Solid State amplifier that faults and puts DC voltage on the speaker, it will fry the FRX without hesitation just at it would any speaker.

INSTALLATION

The FRX driver can be installed at any angle without effecting performance. The binding posts on the rear of the driver accept up to 8 AWG wire, SPADES or BANANA jacks. In open baffle applications is it recommended to hook your speaker cables directly to these binding posts.

AMPLIFICATION

The ideal amplifier for these drivers is a 6 watt per channel TRIODE amp with no negative feedback. The perfect amplifier is our Zen Torii push pull amplifier because it adds substantial weight to the lower frequencies, and has an adjustable treble control so you can flatten out the highs in any room.

ENCLOSURE

The perfect enclosure for these drivers is the DECWARE Zen Open Baffle (ZOB) of which plans are available on the web site, www.decware.com. A picture of the ZOB enclosure design is shown in the back of this manual.

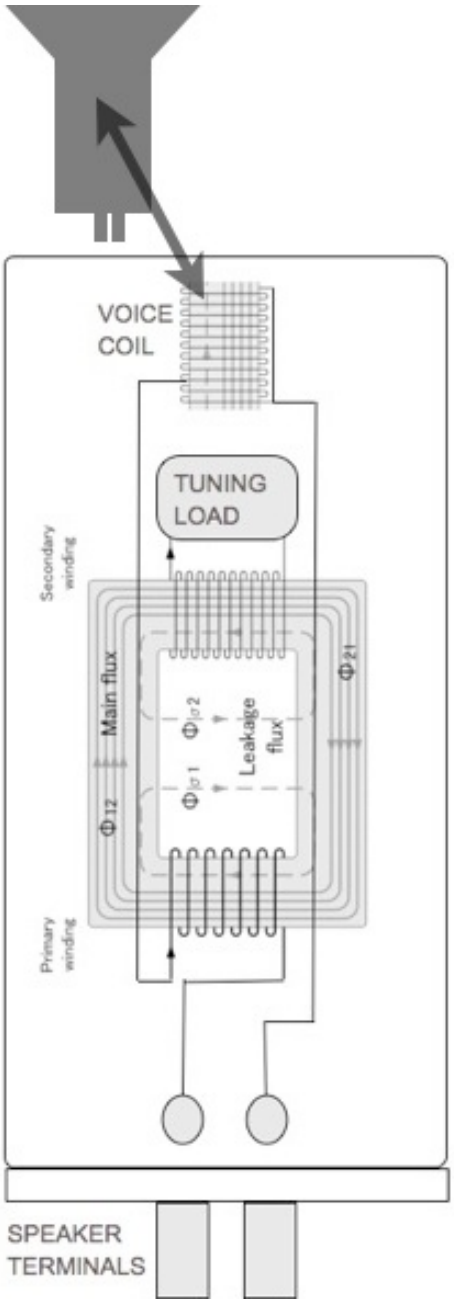
PRINCIPLE OF OPERATION

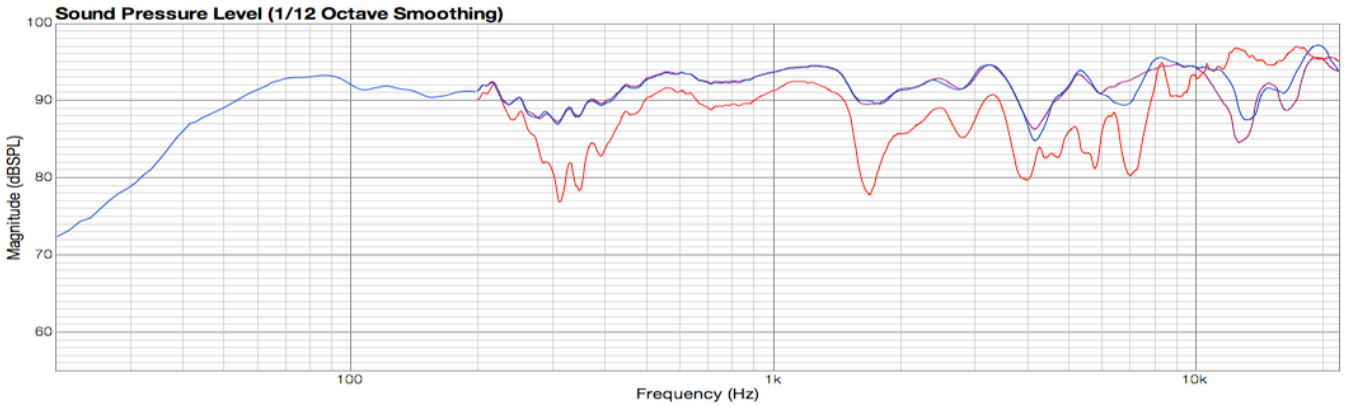
The varying current entering the FRX motor from your amplifier creates a varying magnetic flux in an air gaped grain-oriented silicon steel laminated core via a primary coil winding and thus a magnetic field through a secondary winding is developed. This varying magnetic field induces a varying electromotive force (EMF) in the secondary winding called mutual induction. Once this secondary winding is properly tuned with a resistive load, AC current is allowed to flow through this air-gaped circuit via the primary and out to the voice coil. Since the EMF at a given flux density increases with frequency, the secondary (tuning coil) absorbs the artificial rise in response and ringing caused by the high strength motor assemblies used in this type of low mass driver. Despite appearances, when the tuning load is removed no current can flow to the voice coil.

This exotic approach to magnetically coupling current from the amplifier to the voice coil is what gives the FRX it's uniquely smooth and highly present sound.

This approach works by designing a driver that is over the top in high frequency projection and then offsetting it with electromotive force. The result is smooth linear response without loosing the hyper speed and insane detail that comes from the overly strong neo magnet.

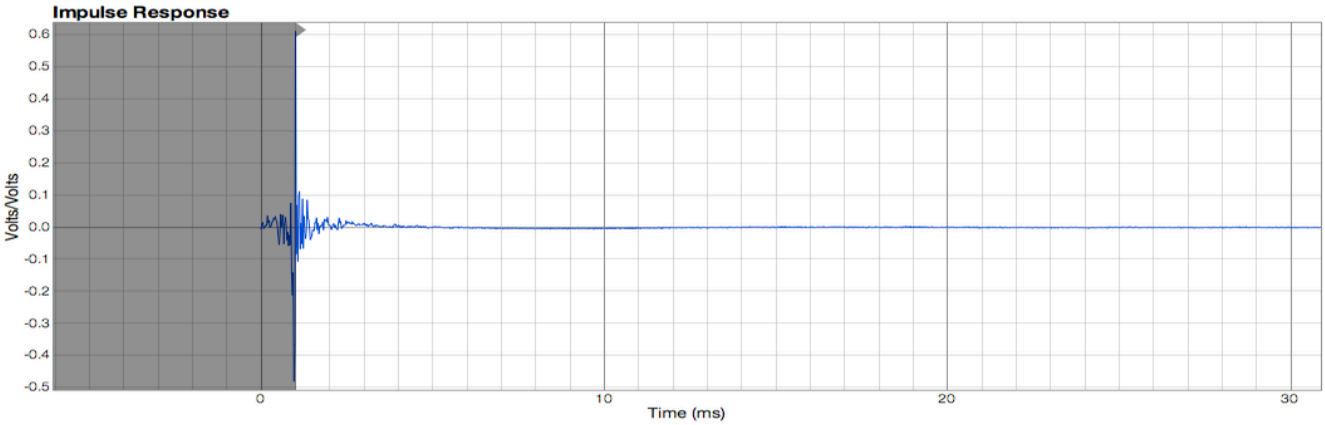
The FRX design also brings significant if not profound improvements to the overall phase angle and sense of timing and pace when compared to normal drivers. I believe it is part of what brings absolutely lucid imaging to the table when a pair of these are used with good tube amplification





FRX in Zen Open Baffle - FREQUENCY RESPONSE

FULL FREQUENCY RESPONSE Shown in Blue.
(15,30 degrees) OFF AXIS taken from 200Hz to 20KHZ.
Mic distance 12 inches.



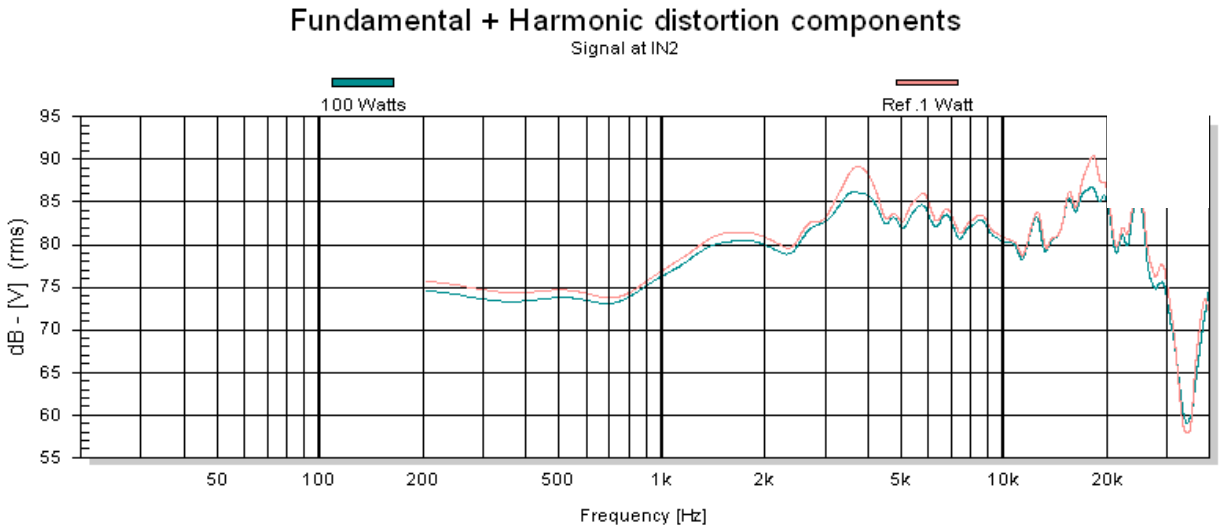
FRX in Zen Open Baffle - IMPULSE RESPONSE

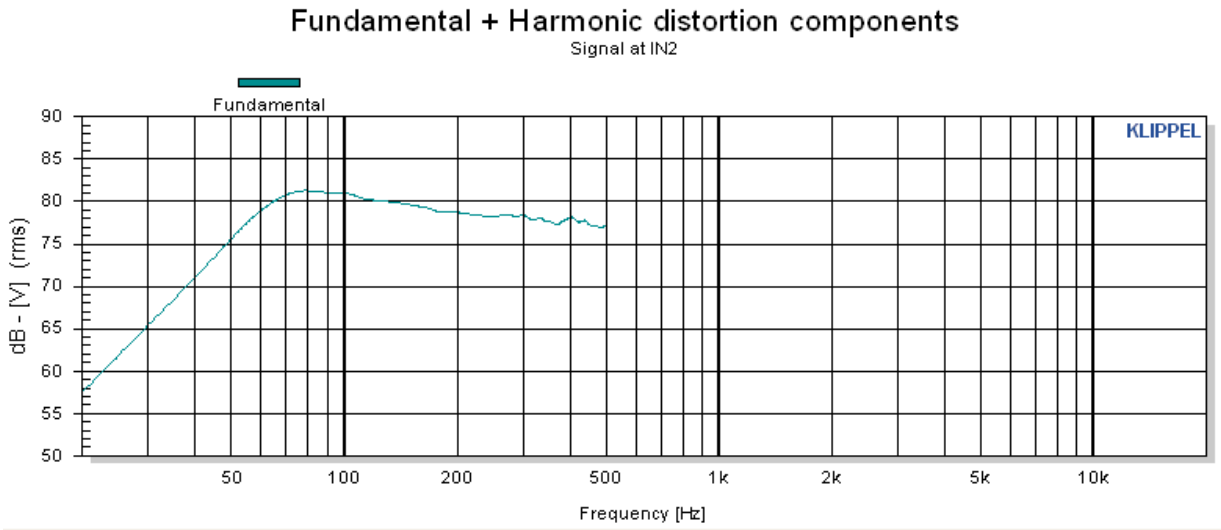
Measured in
ZEN OPEN BAFFLE ENCLOSURE
with TORII MKIII amplifier using voice coil feedback and treble control adjusted for flattest response.

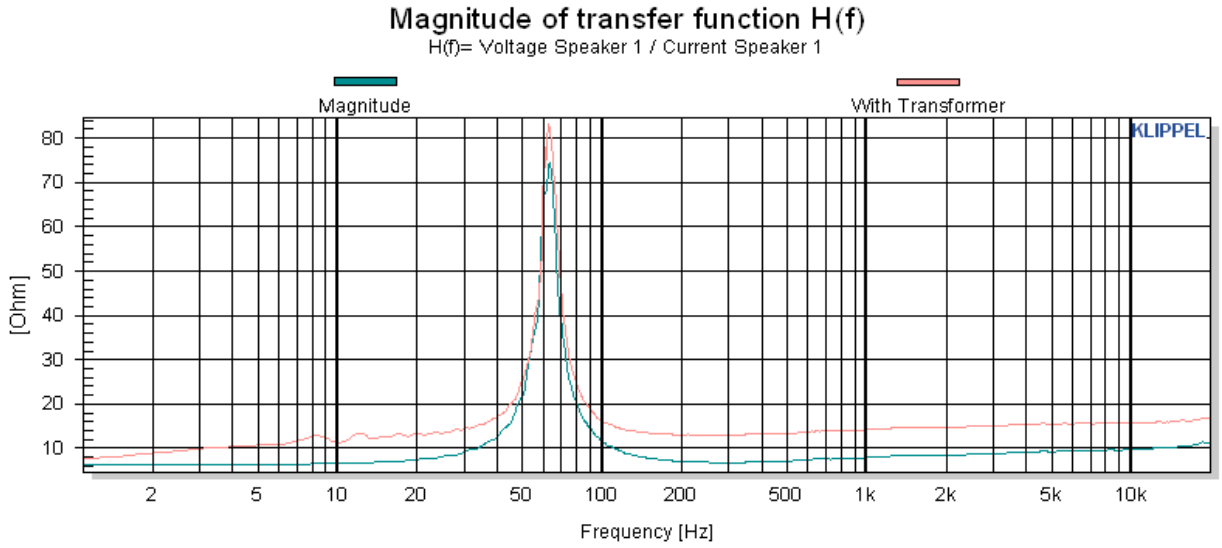
DRIVER FREQUENCY RESPONSE

Since it is unlikely everyone using FRX drivers will have our enclosure and amplifier we sent the FRX driver by itself to an independent lab to be measured according to industry standards on an IEC baffle. These results will give you a more accurate comparison between the FRX and other drivers on the marketplace.

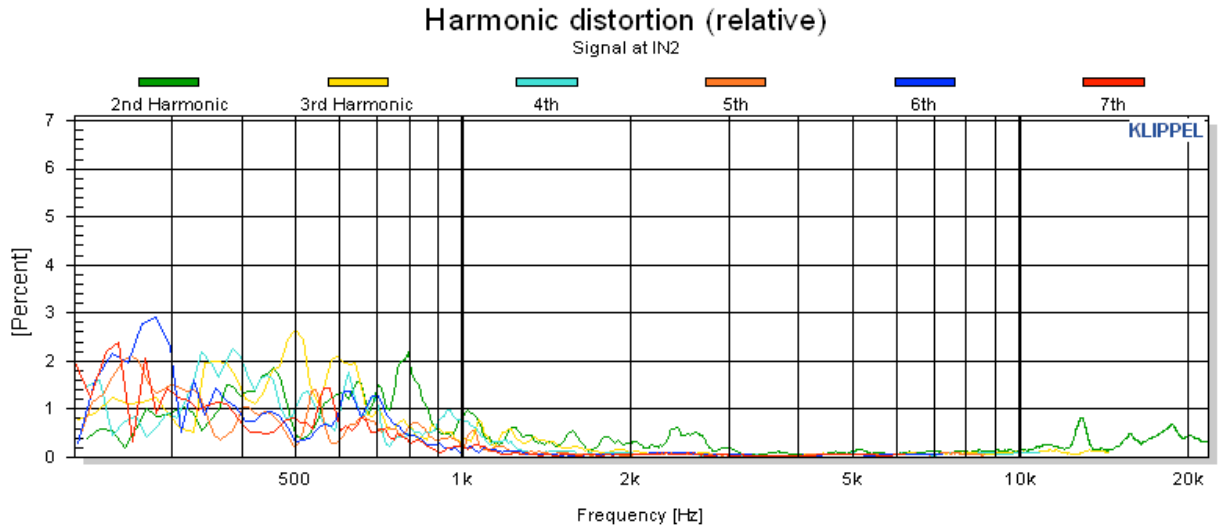
The chart above is from 200 cycles to 30,000 cycles. Note the response is closer to our in-room measurement (green line) in the previous page.



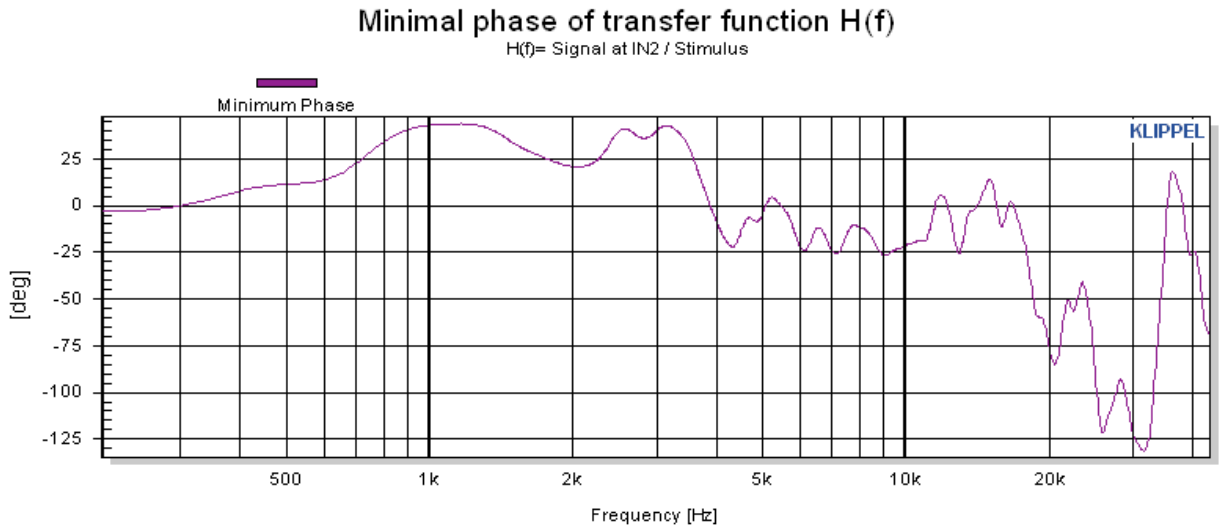




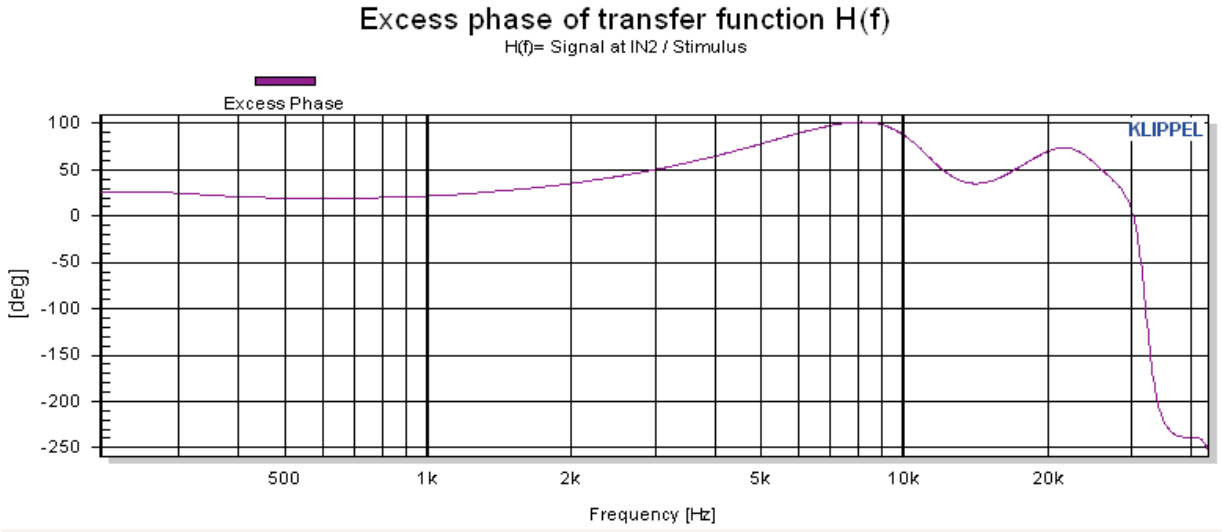
Note that the graph above is the impedance of the FRX driver with and without it's magnetic coupling transformer.



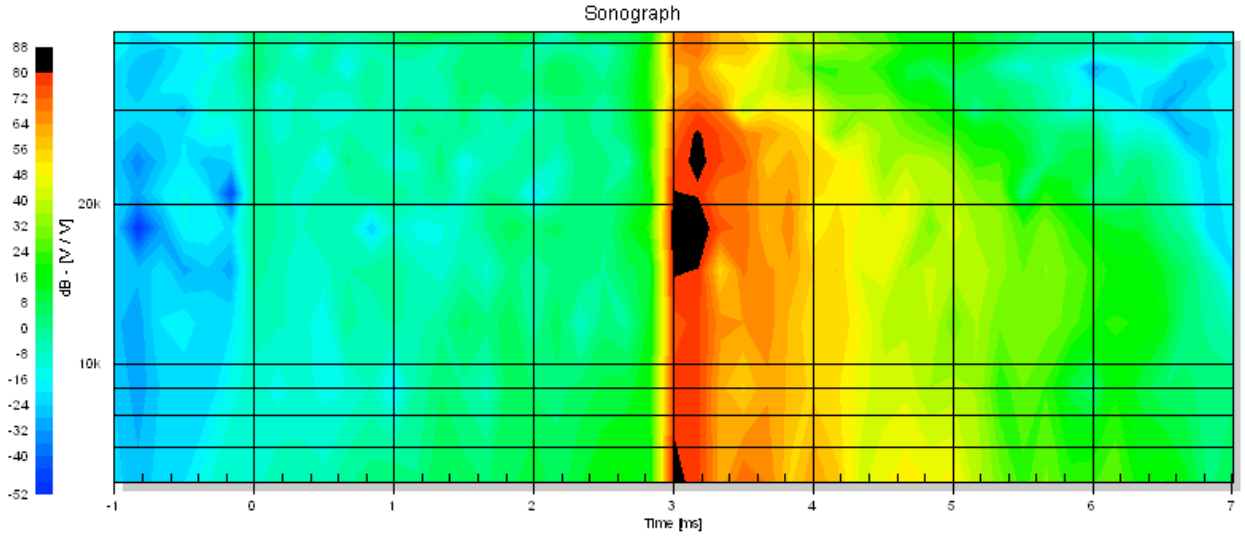
Harmonic distortion is from 200 cycles to 20,000 cycles.



Phase is displayed from 200 cycles to 30,000 cycles.



OWNERS MANUAL



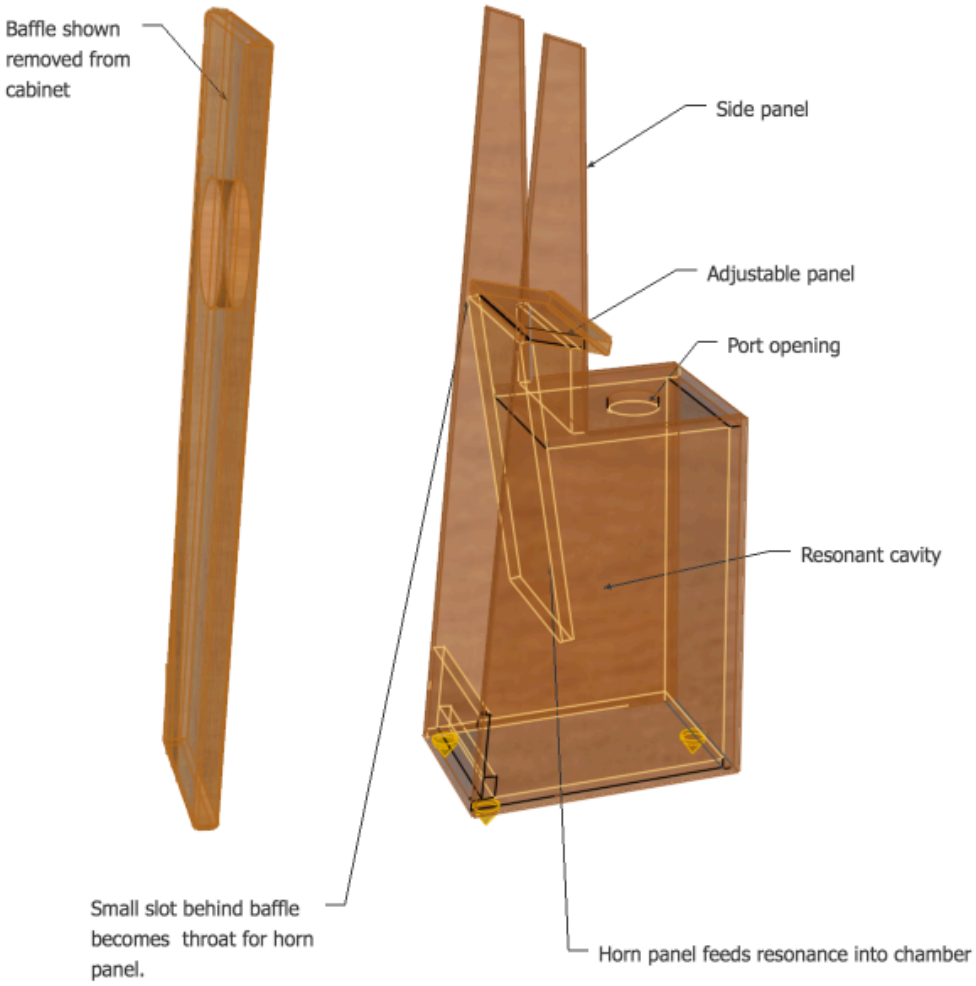
SPECIFICATIONS

95 dB with 1 watt at 1 meter
Response is 38Hz ~ 25kHz
8 ohm nominal impedance
7 watts RMS
Dimensions: A: 8.7", B: 7.2", C: 4.0" D: 9.8"
1 inch voice coil
machined copper phase guide
5 way machined gold plated binding posts on rear
Shipping weight 15 lbs ea.

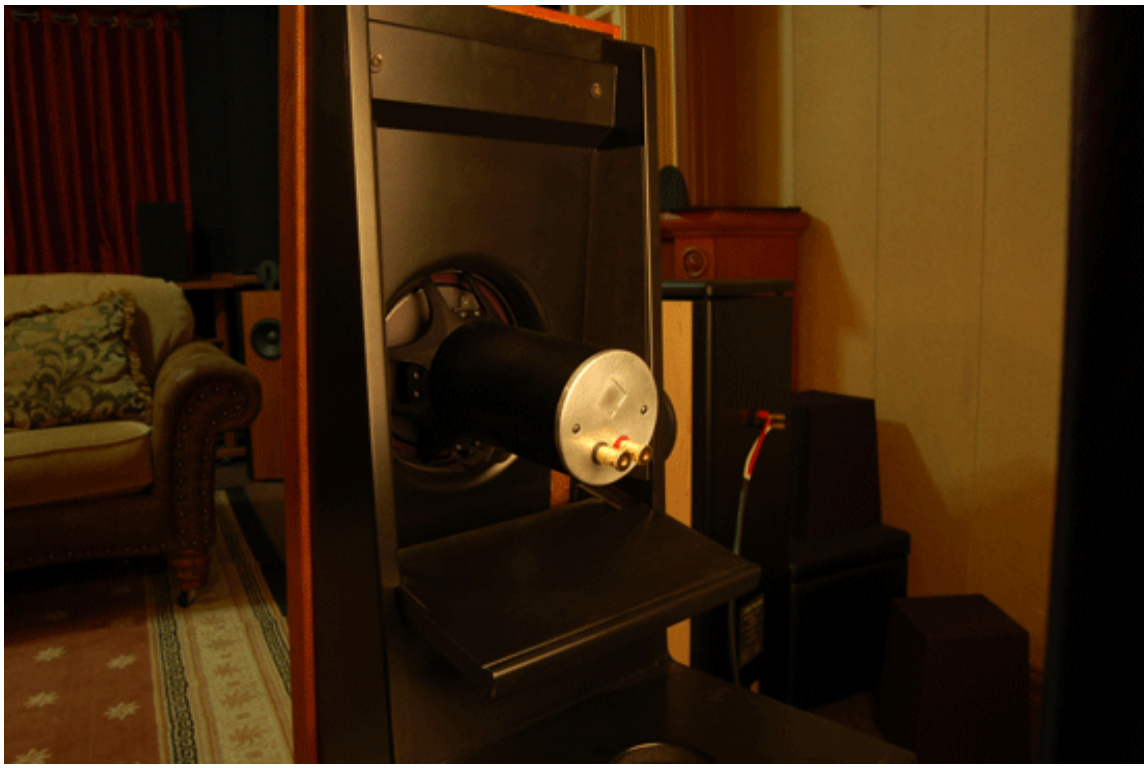
T&S	PARAMETERS
Re	7.36 ohms
Fs	70 Hz
Qe	0.83
Qm	8.45
Qt	0.76
Le	1.88
Vas	2.04
Xmax	4.22 mm
Ef	95dB 1w/1m
Zmin	7.4 ohms
Zmax	72 ohms

IDEAL FRX CABINET

Below is an illustration of the Zen Open Baffle cabinet design that we recommend for use with the FRX driver if you're trying to get full range response without bass augmentation from additional drivers or subs.



Shown fully assembled below, the ZOB is available fully finished from the Decware web site and for the D.I.Y. guys and gals, plans are also available.



BREAK-IN

Regrettably this driver has an unusually long break-in period of 3 weeks with 24 hour operation at normal listening levels. That's 504 hours total time before the FRX will sound it's best.

The reason for this lengthy break-in is because the FRX not only has the cone and suspension that has to break-in but also has the magnet circuit that also has to break-in.

During the break in process, the sound is less than stellar. Please be advised. Steve Deckert can be quoted as saying he thought he had made a huge mistake during the first couple weeks, so it's likely you will too.

SPEED and DISTORTION

Next to direct-coupled servo-charged electrostatics, the FRX is one of the fastest and most phase coherent drivers we've heard. The speed is disarming and takes a long time to get used to. In particular, you will notice that when there is any distortion in the recording, or the amplifier, YOU WILL HEAR it so well, you'll think it's the FRX driver that's actually distorting when it's often not the case.

WARRANTY

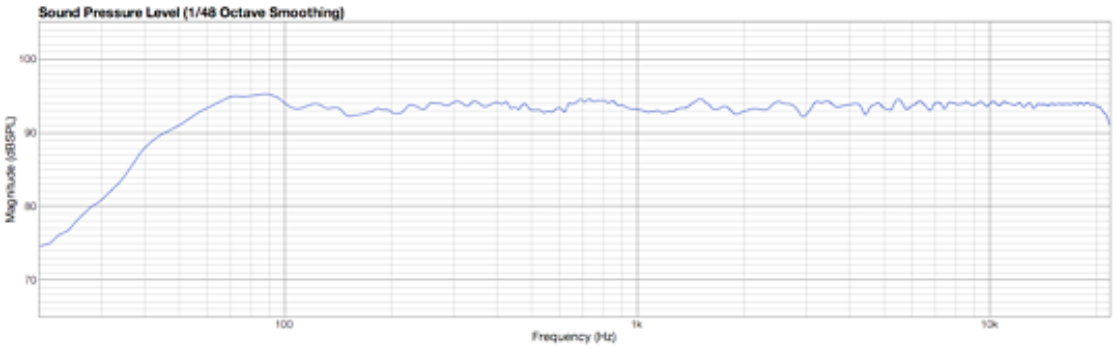
The FRX drivers are warrantied against any defects in material and workmanship that effect their performance for a period of 5 years. Things that are not covered under warranty are scratches, dirt or debris in the voice coil gap, tears or dents in the cone, damaged wires and or burnt voice coils.

All warranty claims will require a phone call prior to shipping us the drivers so we can issue an RA number and go over packing details. Anything that comes in without an RA number or proper packaging will be sent back.

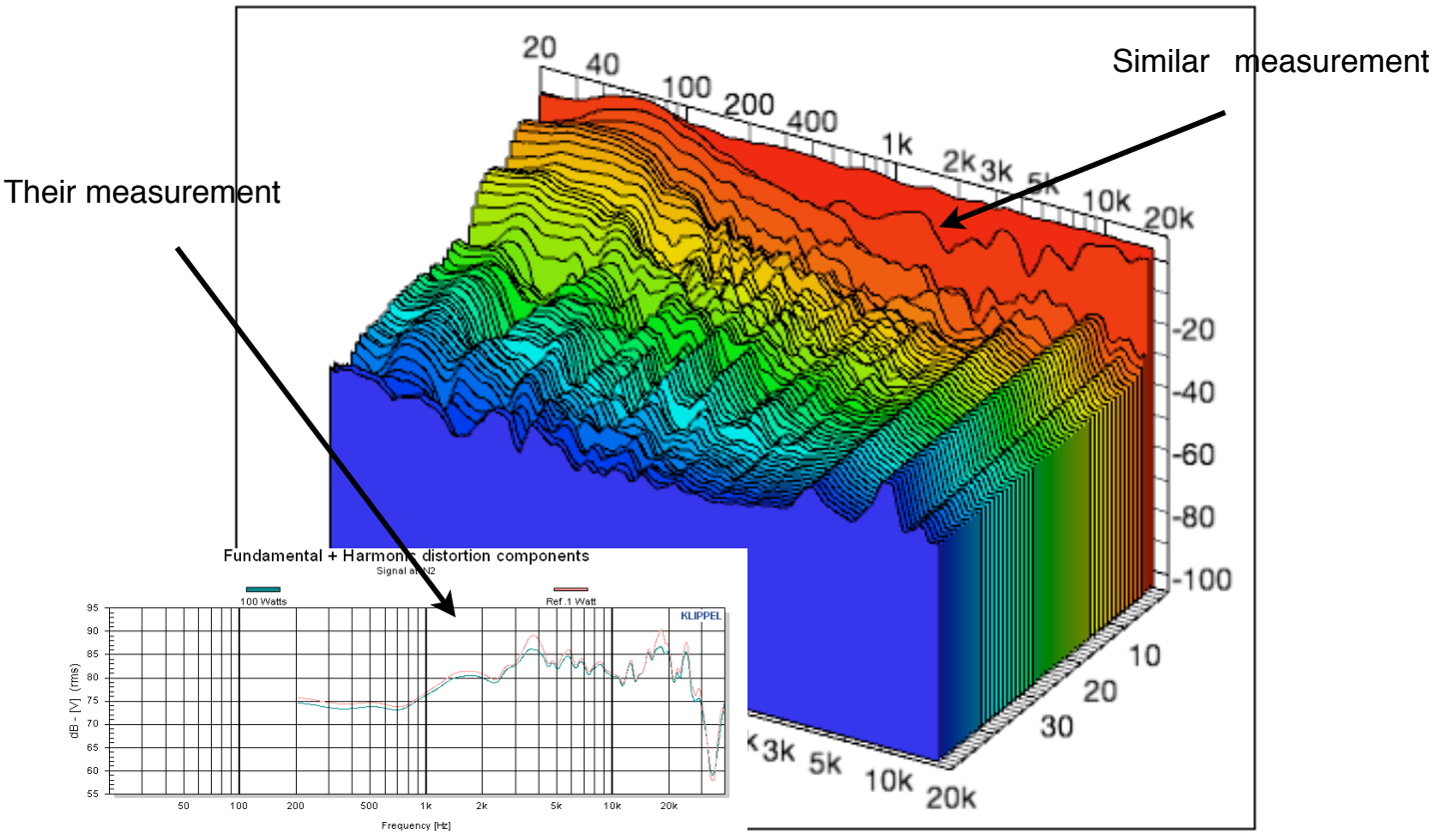
DECWARE / High Fidelity Engineering Co.
75. S. Riverview Dr. East Peoria IL 61611 USA
(309) 822 5255

Designer's Note:

When the FRX driver was originally released I published the following frequency response:

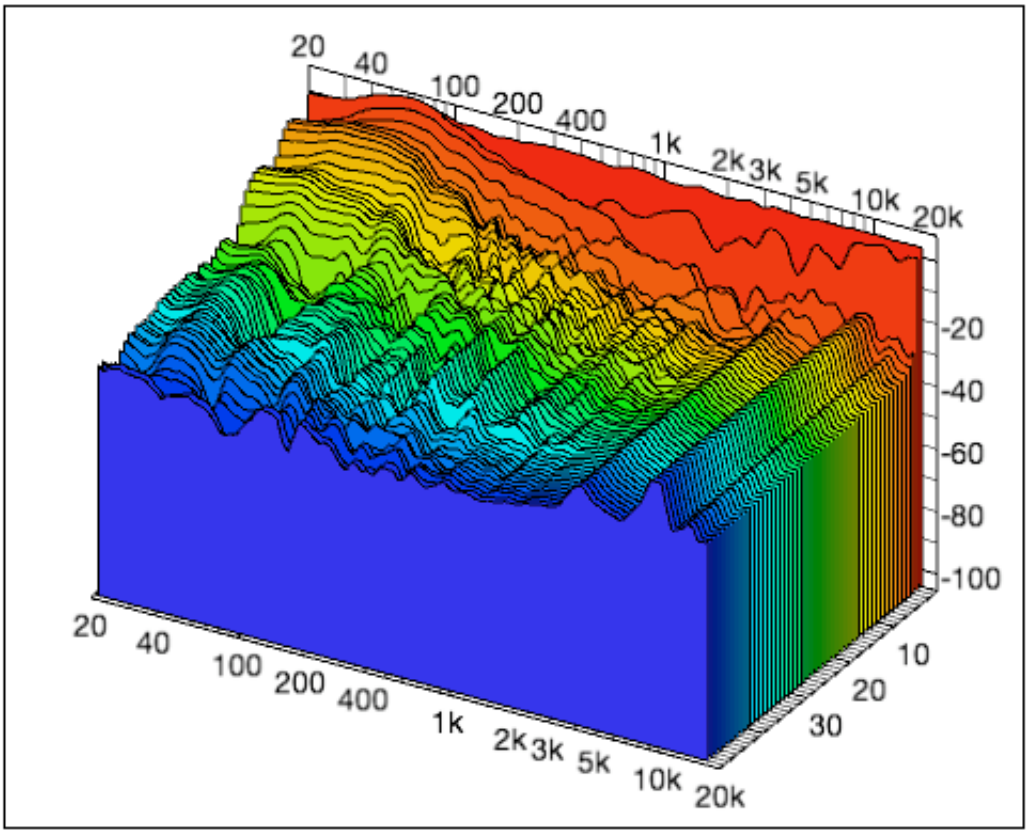


I said I'd never seen anything this good and commented that it seemed too good to be true...This response turned out to be a glitch in the measurement software. After sending the driver to an independent lab I noticed that I had a very similar response to theirs at the 1ms mark on the waterfall plot below:



It then became obvious that there was a 1ms delay in the measurement software causing it to read the response just before the stimulus signal. Even though I thought it was awfully good response, I also knew the measurement system was working because of the waterfall plots and a myriad of other reasons. And what I was hearing was unusually smooth which helped to confirm it. So I guess the joke was on me.

But keeping it all in perspective, a speaker has many frequency responses. The response depends on where the microphone is placed. The response it measures at 1 foot or 1 meter is certain to be what you DON'T hear unless you listen at that distance. At an average of 12 feet away from the speakers it has taken about 13.2 milliseconds for the sound to travel from the speaker to your ears. As it travels through the room it is modified by the room and the natural dispersion patterns of the speaker. If you look below, 13.2 milliseconds is just where the color starts to turn yellow, which short of a little peak at 10K is fairly smooth. This is what you actually hear.



So adjusting the software for the 1ms delay I was able to publish what I'm sure is a far more accurate response and it is very similar to the independent lab's IEC baffle measurements. Sorry for any trouble this has caused, it wasn't intentional and I was able to delay production until this got resolved.

Steve Deckert