S-TRAX

FYNE ADVICE

ESSENTIAL INFORMATION GUIDE

FYNE
AUDIO

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1 INTRODUCTION

Thank you for choosing the Fyne Audio S-Trax™ super tweeter, using our proprietary patented SuperTrax™ technology. Proudly designed by our experienced team of engineers and constructed to the highest standards by artisans in our own facility in Scotland, we believe they will give you many years of listening pleasure.

- Before installing these super tweeters please read this manual in full, both for safety reasons and to ensure you achieve the best performance possible.
- Please retain packing for possible future use.
- Check contents of the accessories bags.
- **ALWAYS** ensure the self-adhesive protective feet are in place on the underneath of S-Trax before positioning on your loudspeakers, to avoid damage to the suface. These should be positioned at each corner.

Your accessories include:

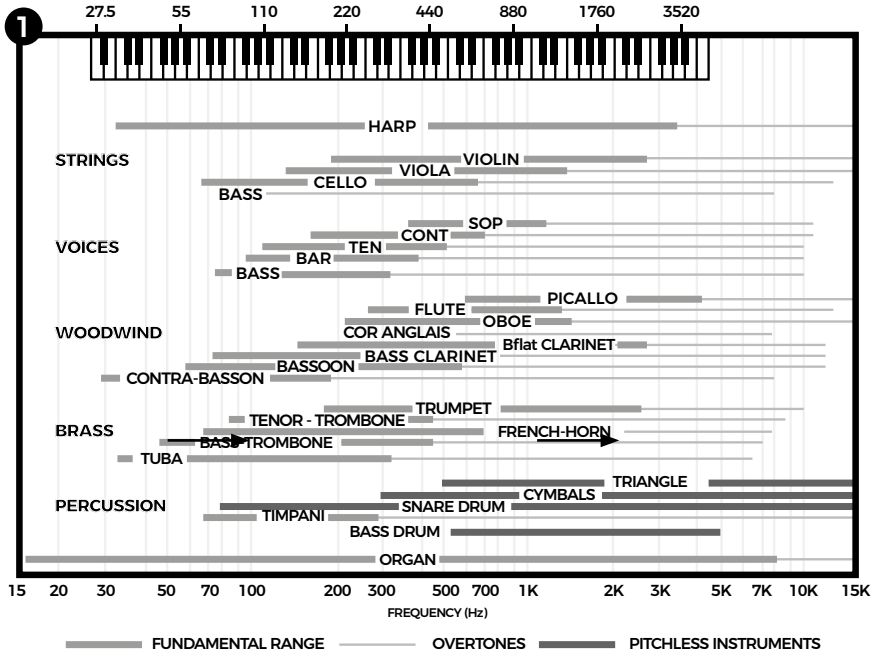
- Manual
- 8 x self adhesive rubber feet
- 2 x 1.5m lengths speaker cable

2 TECHNOLOGY

Unlike a conventional direct radiating super tweeter, the Fyne Audio patented S-Trax, radiates energy through 360 degrees bringing further important benefits in performance. S-Trax not only enhances our point source IsoFlare drivers, but any point source or conventional discrete speaker system too.

HUMAN PERCEPTION OF ULTRASOUND

Looking at the frequency range of musical instruments and human hearing, the accepted range is taken as extending from 15 to 20kHz including the harmonics of instruments. It is these harmonics that give instruments their character (Fig. 1). However more recent research has shown there is considerable energy above 20kHz, with most instruments showing energy above 40kHz. Even sibilants in speech were found to have energy above 40kHz. It is the pitchless instruments, such as members of the percussion family that generate the greatest amount of ultrasound. A cymbal crash has been measured as having 40% of its energy above 20kHz, while a triangle was found to have a healthy output at 100kHz. Research has shown we are able to perceive this energy, concluding the mechanism was through bone conduction, probably to a small organ in the inner ear called the saccule, that responds to acceleration and gravity, which is effectively linked to the cochlea, the organ responsible for hearing as we know it.



HARMONICS, PHASE & THE IsoFlare™ POINT SOURCE

Fyne Audio's IsoFlare driver is a point source system whereby the bass / midrange driver shares a common time aligned centre with the high frequency unit. Providing outstanding stereo imaging, even off axis, energy is radiated isotropically with constant directivity, following the flare of the driver cone. Sound is produced as if emanating from a single point in space.

Over the frequency range that the IsoFlare operates, it does a far better job of preserving the harmonic content of instruments compared with a conventional discrete drive unit arrangement. This is because the low and high frequency sounds are generated from the same point in space (point source), and there are no time and phase differences between harmonics below and above the crossover point, as with discrete speakers.

Also, the relationship in amplitude of fundamental and harmonics is accurately preserved both on axis and at points off axis. In a normal room, the majority of sounds perceived by the human ear are reflections generated by the off axis response of the speaker. The even off axis response of the IsoFlare means that the reflected energy has the same harmonic structure as the direct on axis energy.

The other element of the IsoFlare that is a function of its point source nature, is it provides linear phase response. Every loudspeaker or audio device exhibits a low pass filter function and consequently acts as a frequency independent time delay in the pass band, otherwise known as a linear phase response. However, with discrete drive units that are not time aligned, severe phase errors occur in the pass band, while the IsoFlare offers an almost ideal linear phase response. This better preserves the harmonic relationship of instruments and improves the transient performance. Note though that the phase response does deviate from the ideal at very high and very low frequencies. This is a natural result of the high and low frequency roll off points of the system. To reduce the low frequency phase error, we would add a subwoofer, which does more than just add bass. It is this reduction of phase error that is one of the main benefits of a well integrated subwoofer. Music with no apparent bass content will sound more natural when this error is removed.

Likewise, the addition of a super tweeter, time aligned to the acoustic centre of the IsoFlare, will reduce the high frequency phase error by moving the low pass roll off point much higher. So even if we ignore for now the perception of sound above 20kHz, the addition of a super tweeter will better preserve the harmonic relationship between instruments and is apparent down to low frequencies. This is a very

important fact which is not intuitive, and it means a super tweeter will affect the overall sound across the frequency domain, not just at high frequencies.

So, for a super tweeter to work correctly in the time domain, it has to be positioned backwards on the cabinet, to match the acoustic source of the main driver. Positioning the super tweeter at the front of the cabinet, as is often seen is not ideal, although it could be argued that with a discrete non-point source loudspeaker this is of little importance, as the design concept is already compromised as outlined above.

We can now appreciate how adding a super tweeter improves system performance, not just with wide band material such as hi-res digital files, vinyl and tape, but with limited bandwidth material such as 22kHz CD Red Book standard.

WHY AN OMNIDIRECTIONAL SUPER TWEETER?

As we stated initially, the concept of a super tweeter is by no means new and over recent years, commercial examples have come to market by manufacturers over the year. These are designed to sit on top of the main loudspeaker cabinet and radiate energy directly at the listener, either from a directly radiating dome, a ribbon transducer or similar device.
Such devices will have a very narrow dispersion at these ultrasonic frequencies, which means they will beam like a torch.

We noted earlier that the relationship in amplitude of fundamental frequency and harmonics needs to be accurately preserved both on axis and at points off axis. In a typical room, a high proportion of sounds perceived by the human ear are reflections generated by the off axis response of the speaker. The even off axis response of a point source IsoFlare driver, means that the reflected energy has the same harmonic structure as the direct on axis energy. Therefore, any enhancements by means of a super tweeter are best served by an omnidirectional device with even response at any angle, placed at the acoustic centre of the main driver, rather than a forward facing one, that beams energy directly at the listener.

S-Trax makes use of an upwards firing super tweeter, designed to be placed on the main loudspeaker cabinet, above which is mounted a contoured acoustic diffuser. The acoustic diffuser makes use of a Tractrix profile. The Tractrix profile is known to maintain a 90 degree angle at each intersection of the expanding wavefront. The plane acoustic wavefront generated by the dome is translated into a spherical wavefront into the room, where it meets the diffuser. Fyne Audio made use of the Tractrix profile in their patented BassTrax™ loading system, where the principles are similar.

MAGNESIUM DIAPHRAGM

The S-Trax diaphragm makes use of a new magnesium dome, which has not only high stiffness and high sonic velocity, but good damping properties for a smooth frequency response. This gives a frequency response extending to 50kHz.

3 POSITIONING

The SuperTrax should be set back from the front of the loudspeaker according to the reference table found using the below QR code and illustrated by Fig. 2. This aligns the SuperTrax to the acoustic point source to any given Fyne Audio model.

If used with other of point source driver brands, we suggest a similar placement according to driver size, though some experimentation may be required to achieve the optimum results. Significant performance gains are still apparent with discrete speaker systems. We recommend positioning the super tweeter at the front of the cabinet with such loudspeakers.

PLACEMENT FOR VARIOUS FYNE AUDIO MODELS CAN BE FOUND HERE:

www.fyneaudio.com/how-to-position-your-s-trax-correctly

ILLUSTRATION OF PLACEMENT

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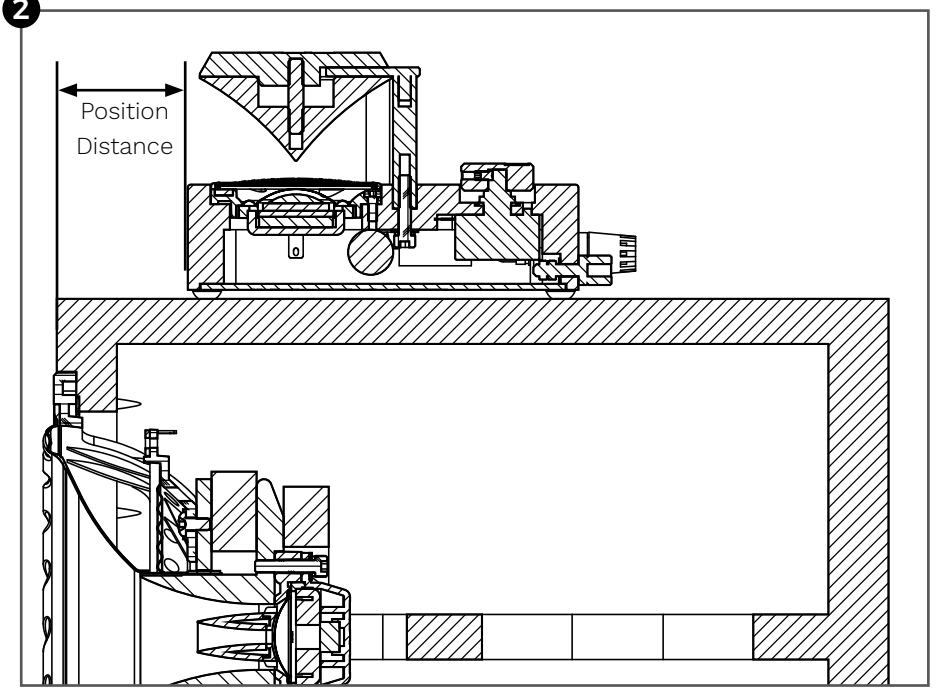

4 CONNECTING SPEAKER CABLES

The super tweeter should be connected to the terminal panel on your loudspeaker, positive to positive and negative to negative.

For speakers which are bi-wired, connect to the HF terminals (Fig. 2).
In both cases, you can use an optional earth cable, to ground the super tweeter to your loudspeakers, then back to the amplifier chassis or other earth point.
This grounding effect can improve detail and clarity, by reducing radio frequency interference.

A high quality speaker cable should be used between the S-TRAX and the main speakers. 2 x 1.5m lengths of suitable cable are provided with the product.

However, we would recommend using our specially developed SC1 cable which includes the earth connection, in order to gain maximum performance from S-Trax.

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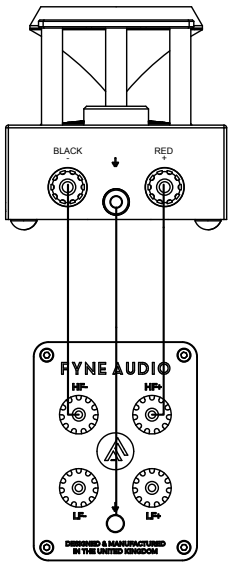

SPEAKER TERMINATION PANEL

5 ADJUSTMENT

The super tweeter is provided with a level adjustment, which enables a +/- 4.5dB range. The main audible effect is to increase the sense of air and space within the soundfield, to give a more realistic experience. Just like a subwoofer, the super tweeter should not draw attention to itself, but rather offer a natural enhancement. Using well recorded program material that you are familiar with, start with the level control in the centre position and experiment from there. You may well find yourself setting the level too high initially, so take your time in finding the correct setting.

6 CARE OF CABINET

The cabinet may be dusted with a lint free cloth such as muslin, which can be slightly moistened.

On no account use solvents or abrasive materials, as this will cause damage and invalidate the warranty.

7 WARRANTY

For the latest product news and information, please visit www.fyneaudio.com.

All Fyne Audio products purchased from an authorised distributor or retailer are covered by a manufacturer's warranty, subject to presentation of a valid proof of purchase. This warranty is provided in addition to, and does not affect, your statutory rights as a consumer under applicable national or local laws.

Full warranty terms and conditions are available at www.fyneaudio.com/warranty. Alternatively, you may request a copy or obtain further assistance by contacting our Customer Service Department by telephone on +44 (0)141 428 4008 (charges may apply for calls made from outside the UK), by email at enquiries@fyneaudio.com, or by post at:

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8 SPECIFICATIONS

	S-TRAX
Maximum Recommended amplifier power (Watt RMS)	300
Sensitivity (2.83 Volt @ 1m)	Suitable for loudspeakers up to 98dB typically
Nominal impedance	8 Ohm
Frequency response (-6dB typical in room)	16kHz -50kHz
Drive unit complement	25mm (1”) Magnesium dome with neodymium magnet system
Crossover type	3rd order high pass 16kHz, CryoLite treated
System adjustments	+/- 4.5dB from nominal setting
Dimensions - HxWxD	79 x 82 x 149mm (3.1 x 3.2 x 5.9”)

Thank you for choosing Fyne Audio loudspeakers, proudly designed by our experienced team of engineers in Scotland, and constructed to the highest standards.

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This information was correct at the time of print, for our most recent products and information visit www.fyneaudio.com

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