SUPERTRAX

FYNE ADVICE

ESSENTIAL INFORMATION GUIDE

FYNE
AUDIO

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1 INTRODUCTION

Thank you for choosing the Fyne Audio 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 SuperTrax before positioning on your loudspeakers, to avoid damage to the suface. These should be positioned at each corner, and spares are included in the accessories.

Your accessories include:

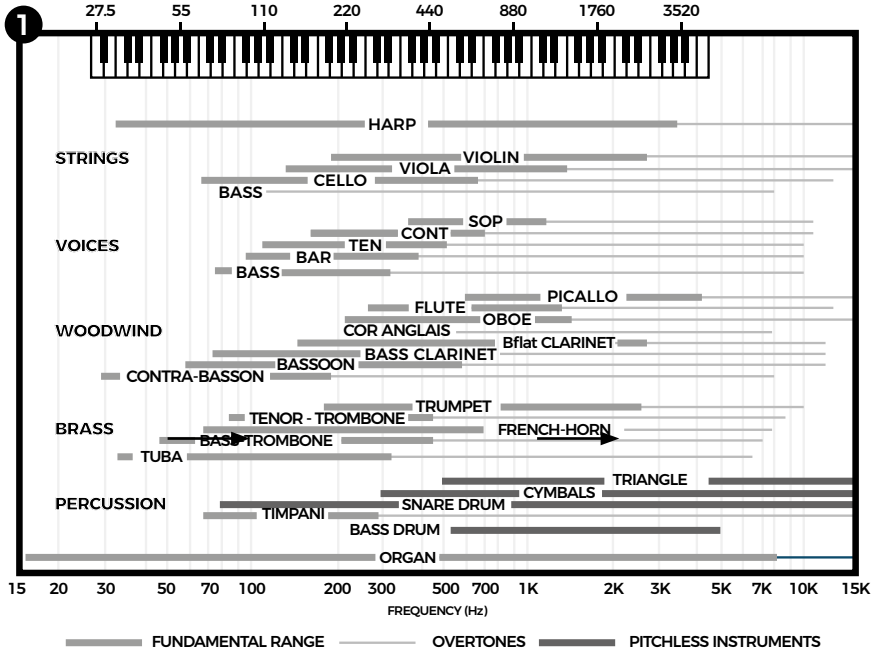
- Self-adhesive protective feet: x12
- Manual
- Quality certificate
- Welcome letter
- 2 x 1.5m lengths speaker cable
- 4 x rear spacer legs, 4 x locking thumb nuts (NOT included with Vintage model)

2 TECHNOLOGY

Unlike a conventional direct radiating super tweeter, the Fyne Audio patented SuperTrax, radiates energy through 360 degrees brings further important benefits in performance, incorporating an innovative thin ply carbon diaphragm (TPCD).

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.

The SuperTrax 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.

THIN PLY CARBON DIAPHRAGM

To give an extended high frequency response, it is typical to use a metal dome radiator. All these materials can suffer from a break-up mode, where the dome stops acting as a piston, and becomes uncontrolled resulting in a peak in the response of some 10dB or more, from around 20kHz to 30kHz and whereas considered out of the audio band, this can be perceived as harshness as well as limiting the maximum frequency the tweeter can operate.

The solution we have adopted is to use a new and unique Thin Ply Carbon Diaphragm (TPCD), the result of the material science and technology used to engineer TeXtreme® thin ply carbon fabrics. Where a conventional carbon fabric is woven from thick round yarns, a TeXtreme carbon fabric is woven from ultrathin carbon tapes.

This results in higher stiffness, lower weight and tailored properties.
By optimising the thickness and stiffness in all areas, the Composite Sound Metamodal diaphragm can be engineered for a tailored modal behaviour, frequency response linearity, improved pistonic motion and moving mass optimization, as required. The modal behaviour can be tailored by optimising thickness and stiffness in different parts of the cone or diaphragm.

The concept of distributed break up ensures a controlled break up behaviour with low distortion. By varying the properties of the TPCD in different areas and directions, the symmetric break up modes are eliminated and replaced with smaller and local distributed break up modes, enabling a more linear and extended frequency response, without any high level resonances. This makes use of COMSOL composite and acoustic simulations to optimize thickness, stiffness and damping at every given point of the diaphragm to achieve this. Thus, the frequency response of our SuperTrax super tweeter extends to over 60kHz.

Thus, by using this newly developed patented time aligned omnidirectional super tweeter, the reflected energy in the room has the same harmonic structure as the direct on axis energy, thus giving advantages in perceived air and space compared to a more conventional forward firing super tweeter.

The IsoFlare driver, with its superior time alignment in the first place, benefits particularly from the addition of the SuperTrax super tweeter, while still acting effectively as a coincident point source, as it is still responsible for generating the vast majority of musical information.

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-supertrax-correctly

ILLUSTRATION OF PLACEMENT

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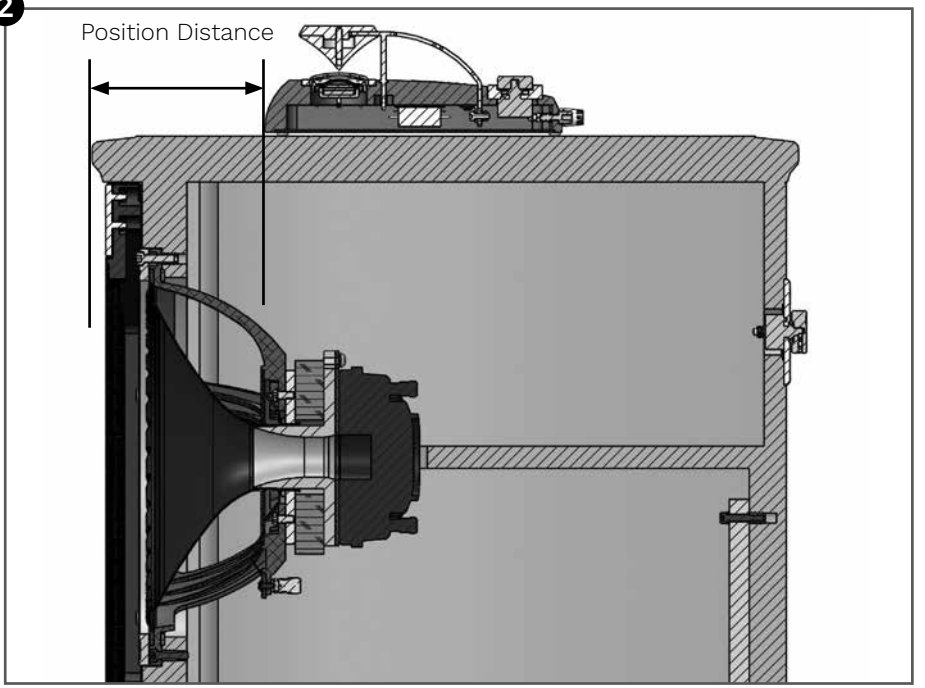

4 FITTING REAR SPACER LEGS

Certain models are supplied with 2 adjustment legs and locking thumb nuts to thread into the rear of the enclosure (Fig. 3). This enables levelling on models such as the F700 series, which have a sloping top surface. These are available as an option for the Vintage walnut model.

When level, tighten the locking thumb nuts.

CAUTION: Ensure protective self-adhesive feet are present on the spacer legs, to avoid damage to the top surface of your loudspeakers.

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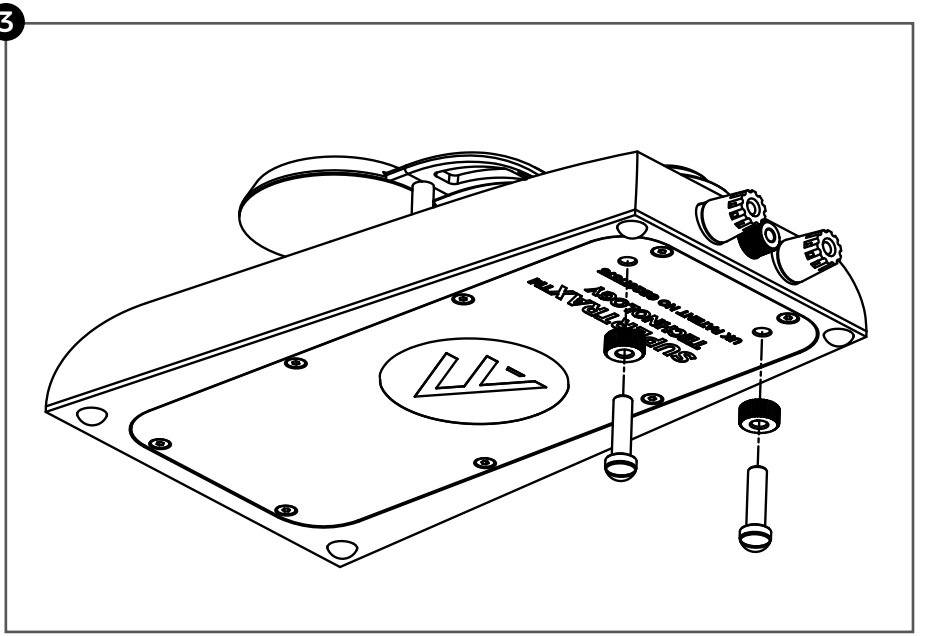

5 CONNECTING SPEAKER CABLES

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. 3).
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 SUPERTRAX 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 SuperTrax.

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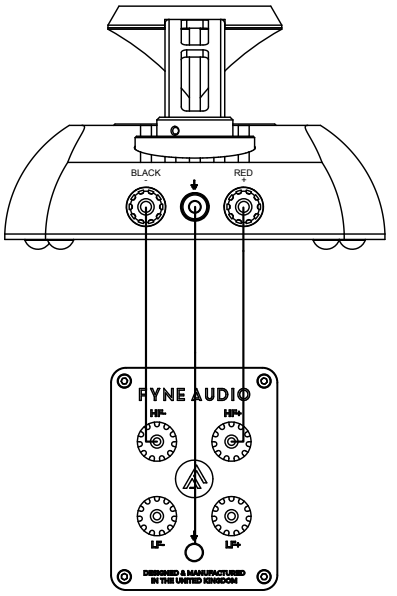

SPEAKER TERMINATION PANEL

6 ADJUSTMENT

The super tweeter is provided with a level adjustment, which enables a +/- 3dB 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.

7 CARE OF CABINET

The cabinet may be dusted with a lint free cloth such as muslin, which can be slightly moistened. As wood is a natural material, avoid exposure to extremes of heat, humidity and direct sunlight for extended periods of time.

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

8 WARRANTY

1. No maintenance of the loudspeaker is necessary.
2. Please register your Fyne Audio Limited product online at www.fyneaudio.com. All of our products have been produced and tested with care and precision to give first-class service.
3. All passive loudspeakers are guaranteed for a period of 7 years from the date of purchase from an authorised Fyne Audio Limited dealer. This warranty is subject to the absence or evidence of misuse, overload, or accidental damage, applies only to the original registered owner, it is non transferable, and covers only genuine Fyne Audio Limited products with the original undamaged serial number and proof of purchase.
4. All active and electronic components are guaranteed for a period of 2 years from the date of purchase from an authorised Fyne Audio Limited dealer subject to the absence of, or evidence of, misuse, overload or accidental damage.
5. If at any time during this warranty period the equipment proves to be defective for any reason other than accident, misuse, neglect, unauthorised modification, incorrect installation or connection, matched with improper equipment or fair wear and tear, we will repair any such manufacturing defect or, at our option, replace it without charge for labour, parts or return carriage.
6. If you suspect a problem with a Fyne Audio Limited product, in the first instance, discuss it with your Fyne Audio Limited dealer. If you require further assistance, then we ask that you deal directly with your local Fyne Audio Limited distributor. If you cannot locate your distributor please contact Fyne Audio Limited Customer Services, via our website listed above or at the e-mail enquiries@fyneaudio.com
7. Do not ship any product to Fyne Audio Limited without previous authorisation.
8. LIABILITY
Other than the warranty and services set out in this warranty, to the fullest extent permitted by law, Fyne Audio Limited and its Authorised Distributors shall not be liable to you and/or any third party or entity whatsoever for:- any loss, damages and/or malfunction caused to any product(s) which is/are connected to any of the Fyne Audio Limited products any damages, loss and liability (except for any personal injuries or death), whether direct, indirect, incidental, consequential special, punitive or otherwise, howsoever caused by, arising out of, or otherwise in relation to the installation, delivery, use, service, repair, replacement and/or maintenance of the Fyne Audio Limited product; or any damages, loss and liability (except for any personal injuries or death) under this warranty in respect of any act, omission, or negligence of any of their technicians, employees, agents, representatives or independent contractors relating to the actual or purported performance of any of the obligations under this warranty.
Without limiting the above, the maximum liability of the Fyne Audio Limited and its Authorised Distributors under this warranty shall not in any event or under any circumstances exceed the actual purchase price paid for the Fyne Audio Limited product(s).

9 SPECIFICATIONS

	SUPERTRAX
Maximum Recommended amplifier power (Watt RMS)	400
Sensitivity (2.83 Volt @ 1m)	Suitable for loudspeakers up to 98dB typically
Nominal impedance	8 Ohm
Frequency response (-6dB typical in room)	16kHz -60kHz
Drive unit complement	25mm (1") Thin Ply Carbon Diaphrahm (TPCD) with neodymium magnet system
Crossover type	3rd order high pass 16kHz, Cryogenically treated
System adjustments	+/- 3dB from nominal setting
Dimensions - HxWxD	86 x 140 x 257mm (3.4 x 5.5 x 10.1")

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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