



Audio Speakers & PA

□ Ribbon Speaker Kits

SIGNATURE SERIES RIBBON LOUDSPEAKER KITS

USING THE FOUNTEK JP3.0 RIBBON SUPER TWEETERS

Designed by Russell Storey of Stones Sound Studio These new kit speakers use the very-high-performance audiophile grade Fountek JP3.0 Ribbon Tweeters with the latest in Peerless Mid-woofers. After the success of our Peerless HDS Series of audiophile monitor kits, Customers have been requesting them adapted to suit our new range of ribbon tweeters for unsurpassed fidelity & transient response up to 40KHz Kits are now supplied with assembled crossovers, so no-soldering required! In development for over 12 months, we are proud to present our new kits: For more information, please see the Signature Series Home Site:

www.fountek.com.au

FEATURES FOR SPEAKER KITS WITH RIBBONS

High quality Australian made enclosures supplied fully assembled Pre-drilled screw holes. Port installed, internal edges chambered Made from 18mm MDF with double thickness 36mm for the front panel Internally braced for excellent rigidity reducing cabinet resonance Available in bare MDF for painting, etc. Or in Black Vinyl veneer Kit also includes attractive front cloth-grille on frames assembled LMS developed crossover is assembled with premium grade components Linkwitz & Riley with Bessel-Butterworth response for linear phase Air-core copper inductors and non-inductive resistors are used SCR 400V metalised polypropylene capacitors manufactured in France 4mm Gold-plated binding posts can be wired singular or Bi-wired Low capacitance OFC Cable with no-soldering speaker connectors Professional development time as produced a solution that offers Very low distortion, linear sound and very accurate phase response

SPECIFICATIONS FOR KIT260

| | |
|--------------------------|----------------------------------------------------------------------------------------|
| Frequency Range | 44Hz-40kHz (On Axis) |
| Efficiency (Averaged) | 92.5dB SPL (1M/2.83Vrms) |
| Nominal Impedance | 4 Ohms |
| Recommended power | 5 to 120W Unclipped program material |
| Harmonic Distortion | THD 0.3% @ 1 Watt (2.83Vrms) 1kHz |
| Relative Phase Coherence | ±30° 400Hz to 10kHz |
| Crossover Network | No Soldering required. Finished ready to go. |
| Internal Wiring | High Quality OFC 384 Strand Low-Capacitance Quick-Install Push-On connections |
| Speaker terminals | 4mm Dual gold plated binding posts (x4) For single or Bi-Wire/amplifier connections |
| Crossover Filter | 2-Way Off-Set Bessel/Butterworth Linear-Phase |
| Crossover Frequency | 3.8kHz |
| Crossover Low Pass | 2nd Order 12dB/Octave Low Pass |
| Crossover High Pass | 3rd Order 18dB/Octave High Pass |
| Mid-Bass Peerless | 832873 Woofer 5" Nomex Cone Cast Alloy Frame with inverted dust cap |
| Tweeter | Fountek JP3.0 Ribbon |
| Dimensions | 555x180x*365mm (*380mm w/ grill) |
| Weight | 15Kg each. |

PAIR



Manual

Includes full-face speaker grills.
Cabinets are supplied in bare MDF.
Requires painting or veneer.

KIT260 STEREO PAIR COMPLETE KIT

D'Appolito MTM design offers a very high 92.5dB efficiency with pin-point imaging for a beautifully accurate sound stage. Complete Kits supplied in pairs for the stereo front channel Includes fully assembled cabinets, drivers, all hardware & assembled crossovers.

| Description | Code |
|-------------------------------|-----------|
| 5" MTM Ribbon Kit Plain MDF | KIT260MDF |
| 5" MTM Ribbon Kit Black Vinyl | KIT260BV |

PAIR

KIT AVAILABLE WITHOUT CABINETS

Includes the SIX drivers & both Assembled crossovers

| Description | Code |
|--------------------------------|--------|
| Speakers & crossovers. No Box. | SPK260 |

PAIR

KIT260C SINGLE CENTRE CHANNEL COMPLETE KIT

Designed for use as a Home Theatre Centre Channel Single Unit To match acoustically & aesthetically with the KIT260 Speakers.

| Description | Code |
|-------------------------------|------------|
| 5" MTM Ribbon Kit Plain MDF | KIT260CMDf |
| 5" MTM Ribbon Kit Black Vinyl | KIT260CBV |

EACH

KIT ALSO AVAILABLE WITHOUT CABINETS

Includes the THREE drivers & Assembled crossovers

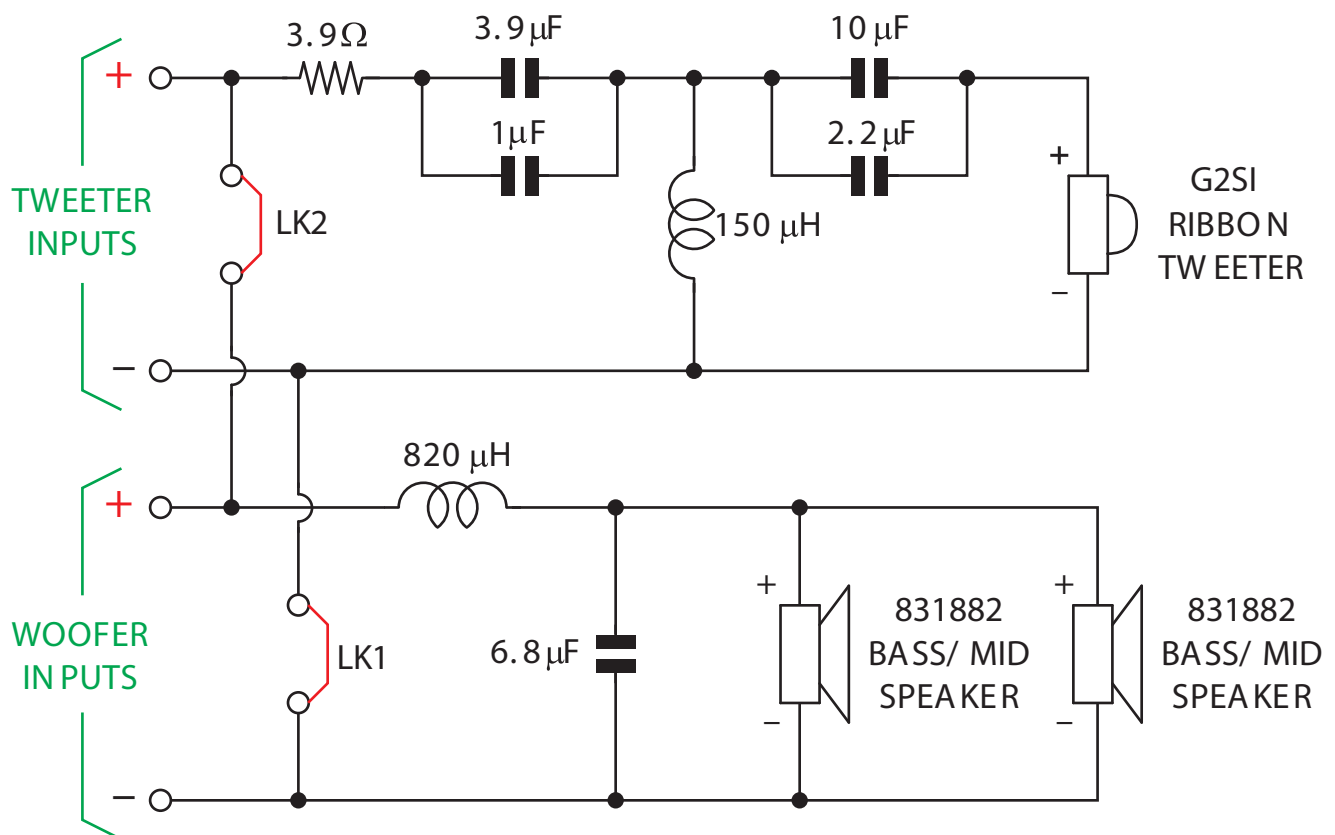
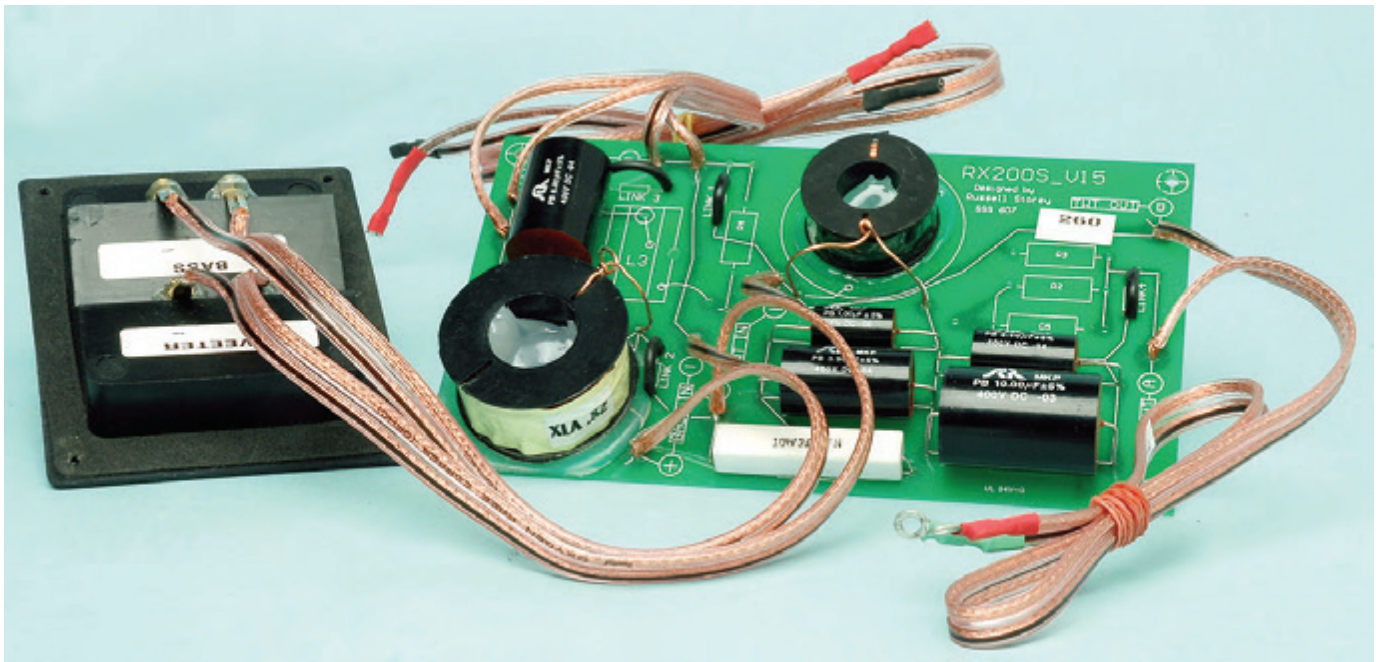
| Description | Code |
|--------------------------------|---------|
| Speakers & crossovers. No Box. | SPK260C |

EACH



Cabinets are supplied in bare MDF and will require paint or veneer.
Image shows cabinet painted in Blue Two-Pack for illustration only.

SPK260



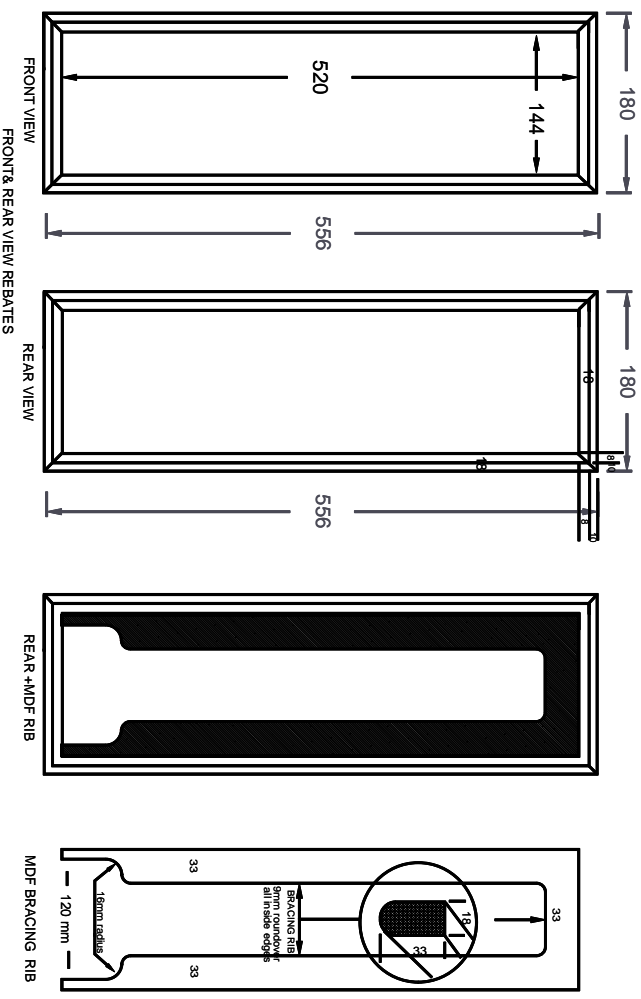
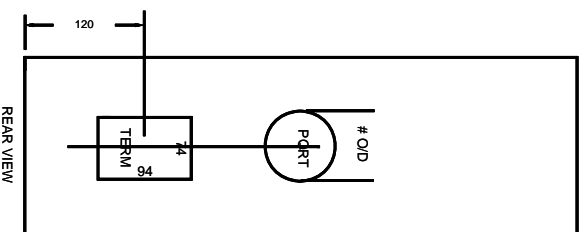
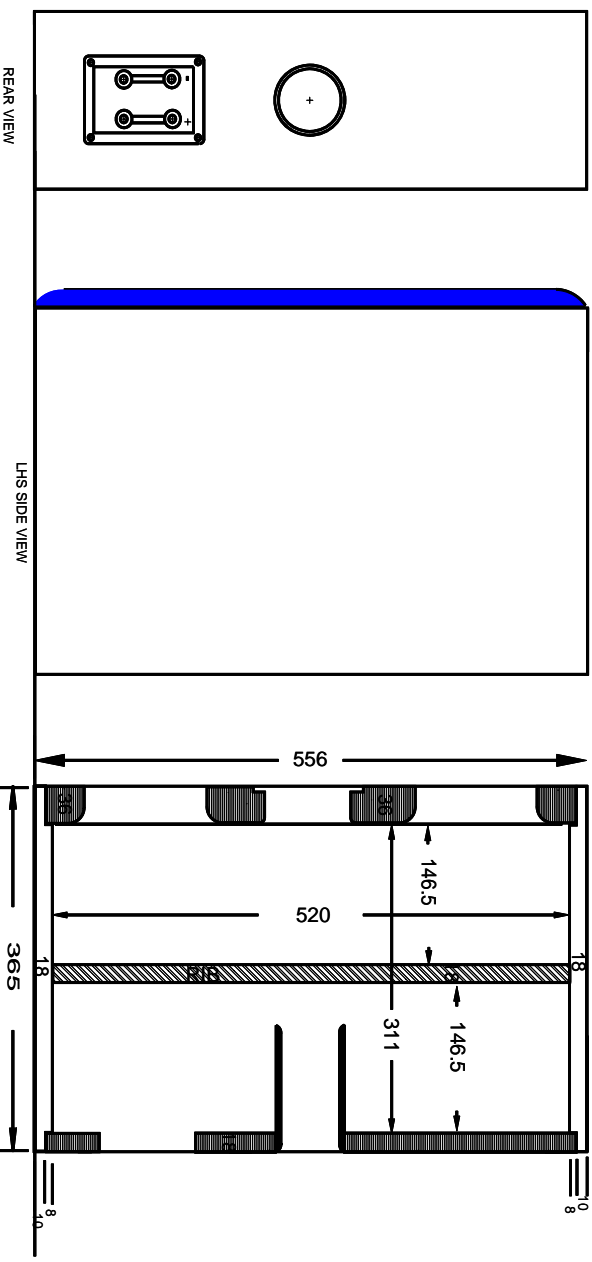
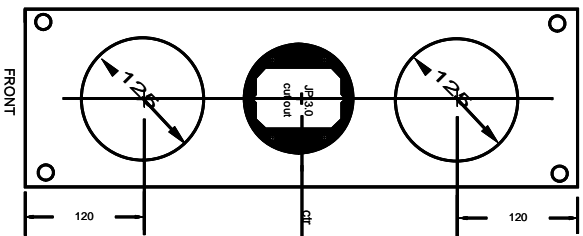
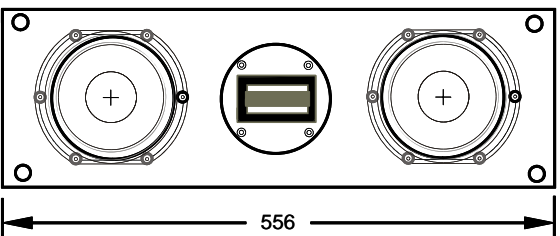
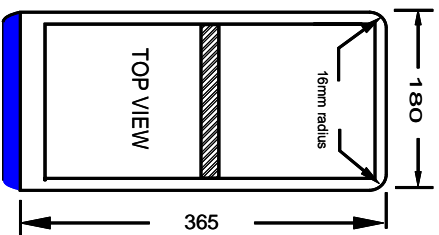
(REMOVE LINKS LK1 AND LK2 FOR BI-AMP OPERATION)

| 280 280c ENCLOSURE NOTES | |
|-------------------------------------|--------|
| DRIVERS | |
| Perkins Nomex 62327 | 5" X 2 |
| Formtek J-20 Robdon | 3" X 1 |
| ENCLOSURE | |
| Front Barite 12x16mm/35mm thick | |
| Mite Joe Steel Under Panel at 45deg | |
| ADF Pracing 10.18mm thick | |
| POST | |
| (Lb)=1.26 mm | |
| (Dp)=33mm (Internal) | |
| Formtek 65 mm DAV | |
| Front Barite 62.5mm | |
| FEILDOWING | |
| 6.6 mm acoustic under panel | |
| BARBON | |
| 280c Rotula Robdon Tweezer | |
| Industrial Sledge chisels | |

| 260 260C BOX DIMENSIONS | | | |
|-------------------------|----------|-----------------|---------|
| | # INSIDE | CALCULATION | OUTSIDE |
| W | 144 | $144+36=180$ | 180 |
| D | 311 | $311+36+18=365$ | 365 |
| H | 520 | $520+36+56=596$ | 596 |

Diagram of the top view of a rectangular box. The box is white with a blue shaded vertical strip on the left side. The word "TOP" is written vertically in the center. Dimension lines indicate a width of 366 and a height of 180.

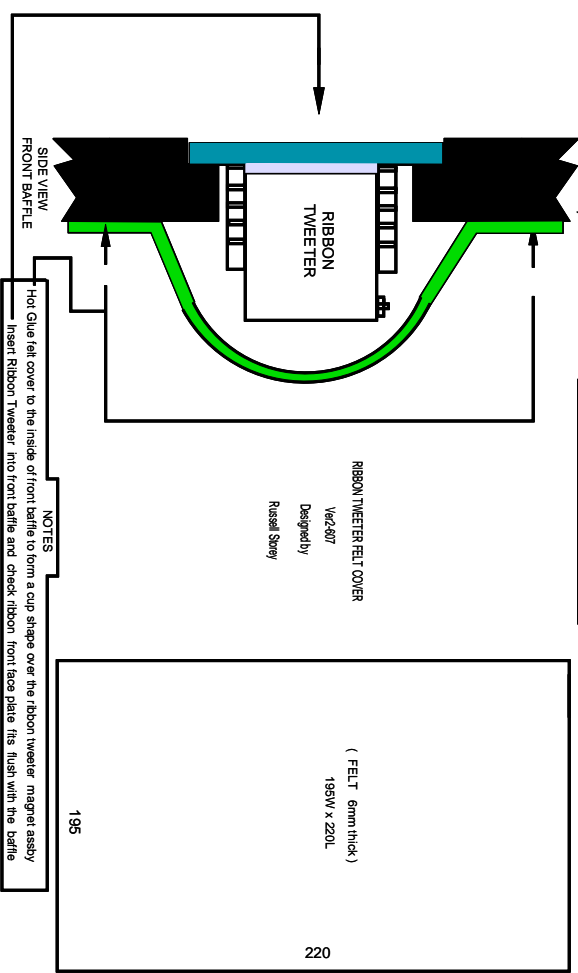
| | | | | |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| <p>ENCLOSURE NOTES 200 200C</p> | <p>DRIVERS Printers: Nexmex 632673 5" X 2 Fountek JP20 Ribbon 3" X 1</p> | <p>ENCLOSURE MCF 11mm thick Front Baffle 12X18mm/36mm thick Mite box Side Panels at 45deg MCF practice rig 11mm thick</p> | <p>FOAT 1/4" = 128 mm (Dish-SSRM (Internal) Pol pipe = 66 mm Dia/7 Pol pipe = 66 mm Dia 6.25mm</p> | <p>ELI DRAINING 1/4" = 6 mm acoustic under/rail</p> |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|



STONES SOUND STUDIO

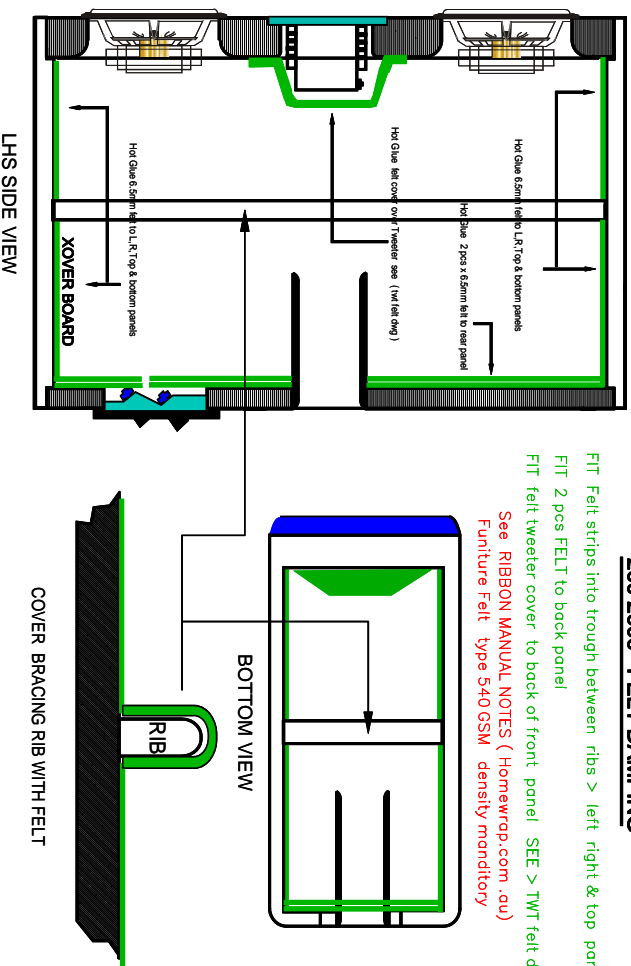
Model SHDS-R260
Designed by Russell Storey

260 260c TWT FELT CUP

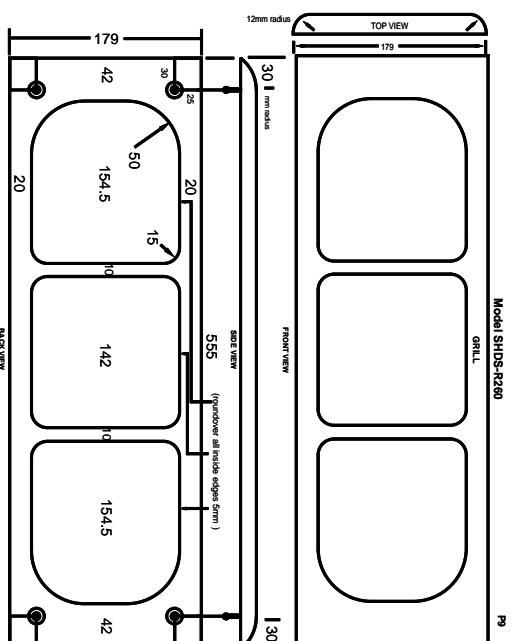


260 260c FELT DAMPING

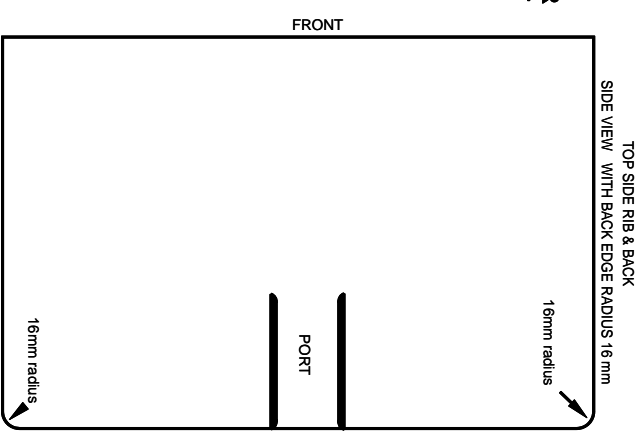
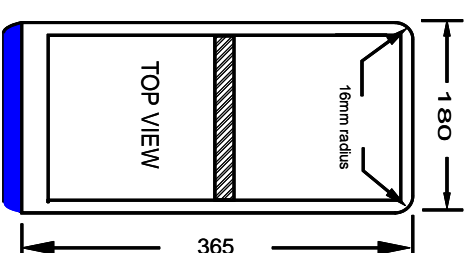
FIT Felt strips into trough between ribs > left, right & top panels
FIT 2 pcs FELT to back panel
FIT felt tweeter cover to back of front panel SEE > TWT felt dwg P12
See RIBBON MANUAL NOTES (Homewrap.com.au)
Furniture Felt type 540 GSM density mandatory



260 260c GRILL PANEL



260 260c REAR PANEL ROUNDOVER



STONES SOUND STUDIO

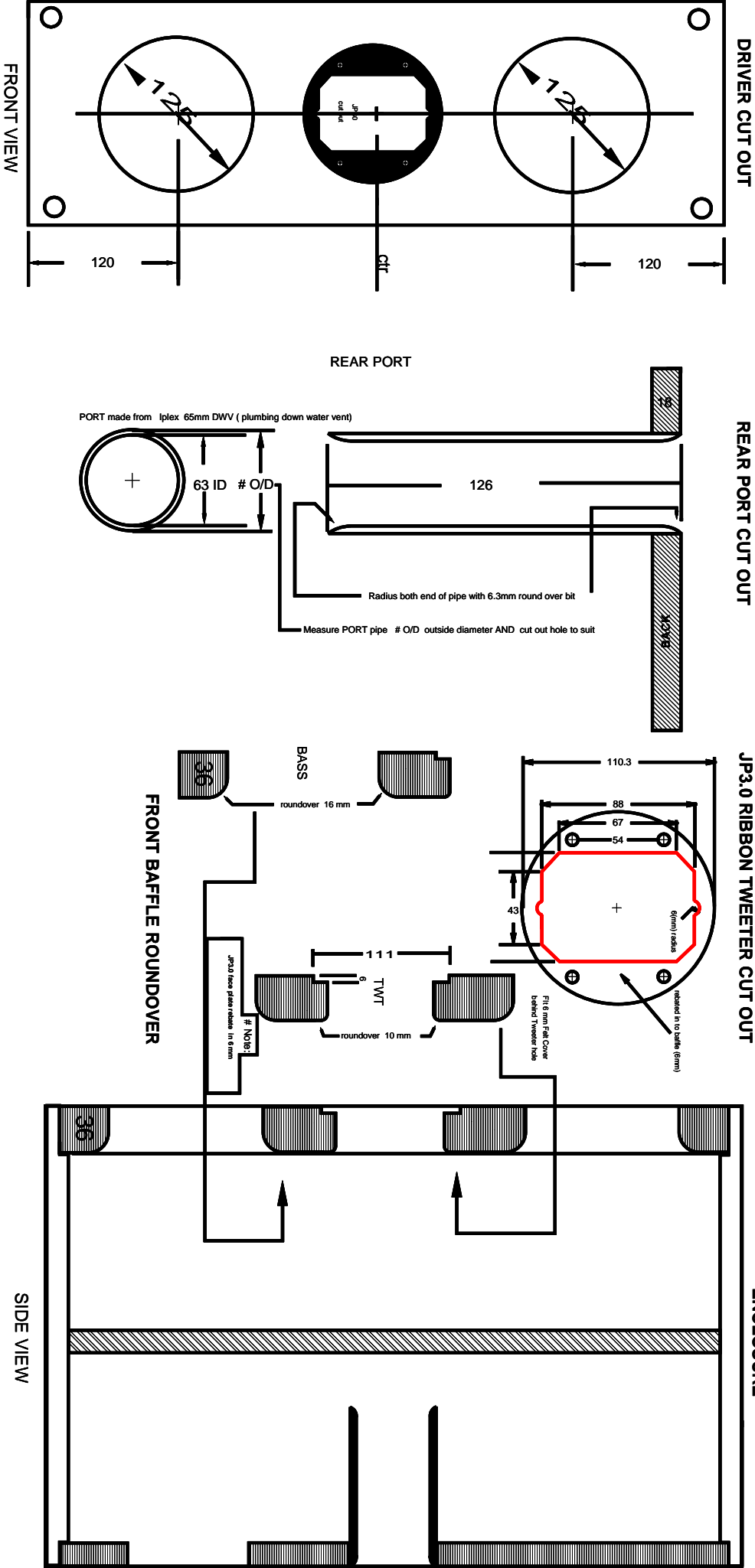
Model SHDS-R260

Designed by
Russell Storey

ISSUE V2 28 OCT 07

P3

260_02d MAIN ALL #.dcd



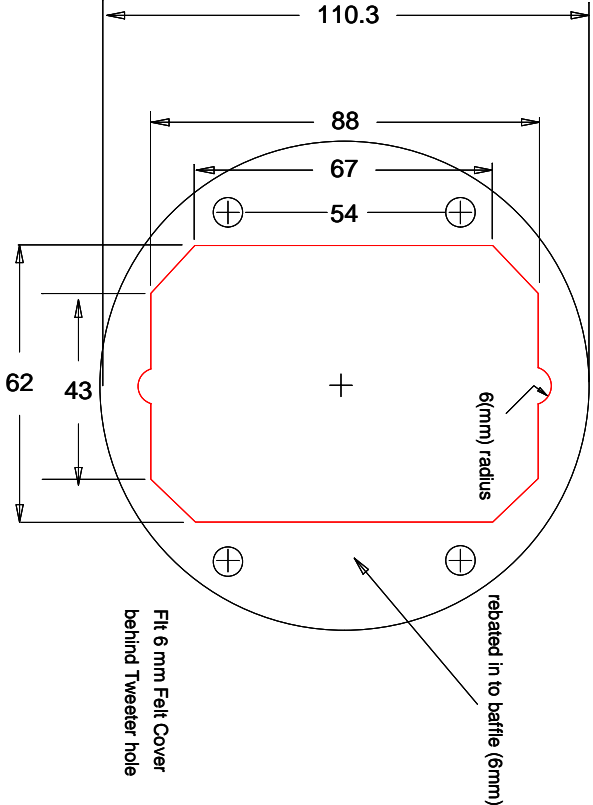
STONES SOUND STUDIO

MODEL SHDS-R260

JP3.0 RIBBON TWEETER CUT OUT

P9

260_02e MAIN ALL #.dcd



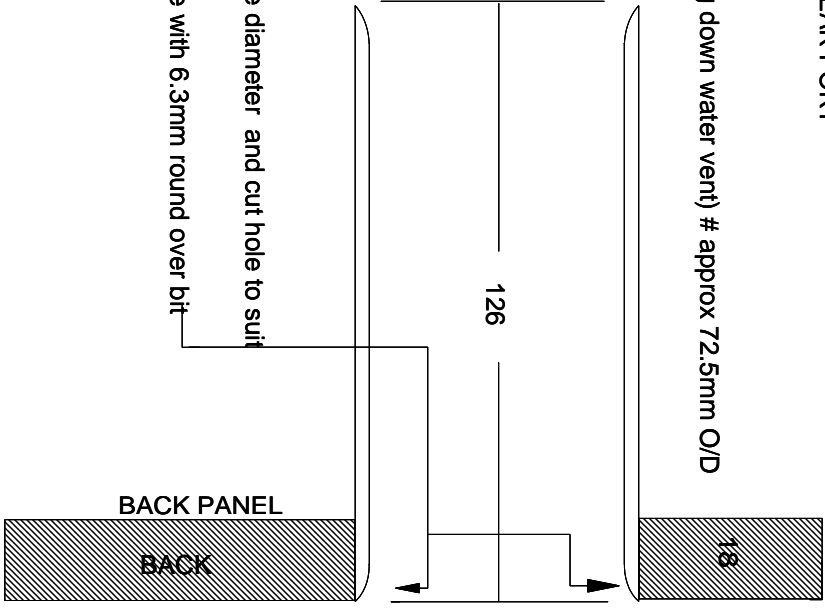
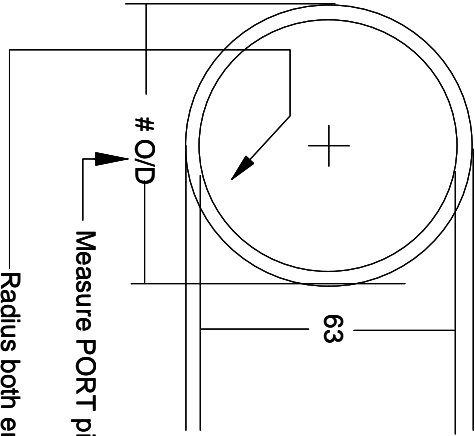
STONES SOUND STUDIO

Model SHDS-R260

REAR PORT

P10

PORT made from Iplex 65mm DWV (plumbing down water vent) # approx 72.5mm O/D



SILICON CHIP



DECEMBER 2007

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BUILD THESE SENSATIONAL RIBBON TWEETER SPEAKER SYSTEMS



PERFECT
for stereo or surround sound!



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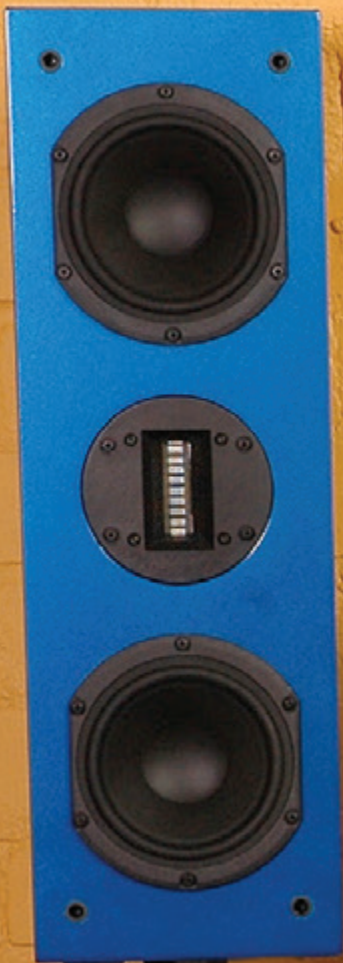
**Bringing a
Vintage TV
Back to Life**

Sensational sound from ribbon t

Build the Signature

*These new speakers are among the very
They use the very-high-performance Founte
They will be a very good match to our-recent*

Design by RUSSELL STOREY



tweeters

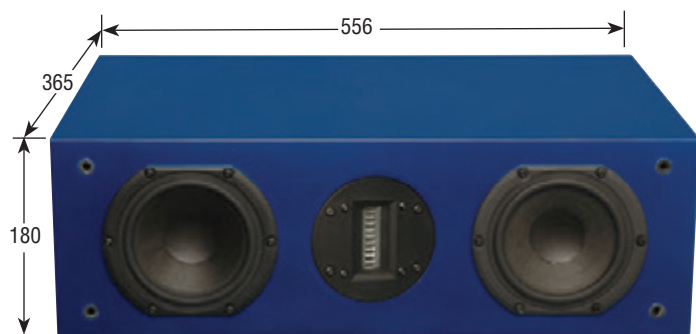
Series Loudspeakers

***best kit speakers that money can buy.
Black ribbon tweeters and Peerless woofers.
Fully described 20W class-A stereo amplifier.***

Words by LEO SIMPSON



At far right is the HD260 tower system and its dimensions while below is its centre channel variant the HD260C. The HD360, at right, uses a 6.5-inch woofer. The pick of the two systems is the HD260 because of its considerably higher efficiency: 92.5dB/1m/1W. Both systems produce commendably low harmonic distortion.



Since we completed our description of the 20W class-A stereo amplifier a few months ago, readers have been asking us for a kit speaker system to match its performance.

As it happens, the Signature Series have been in development for over a year now and we are very pleased to present a complete set of speakers which can be used in stereo or home theatre systems.

They provide excellent stereo spread and definition, very wide and smooth frequency response with very low harmonic distortion. And while they are eminently suitable for our Class-A amplifier, they can be matched up to any amplifier with a power output up to 120 watts per channel, when running normal program material.

The heart of these speakers are the very high performance Fountek ribbon tweeters. For those who are not familiar with ribbon tweeters, consider them as an extremely light filament of aluminium foil suspended between the poles of an extremely strong magnet. The audio signal from the

amplifier is passed directly through the ribbon and the interaction of the current with the strong magnetic field deflects the ribbon back and forth to produce sound.

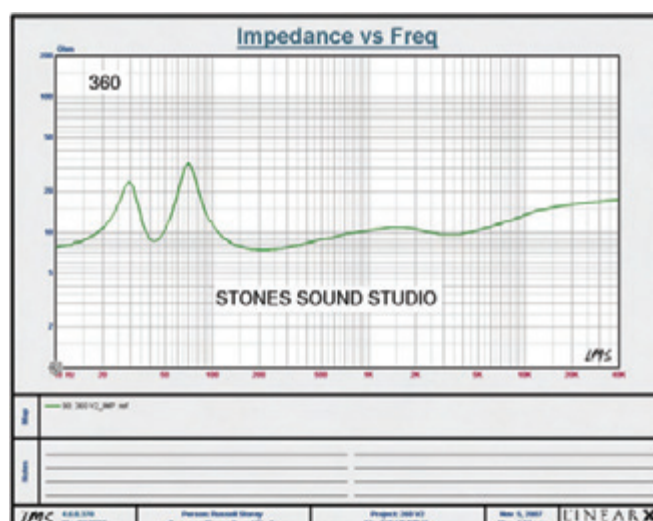
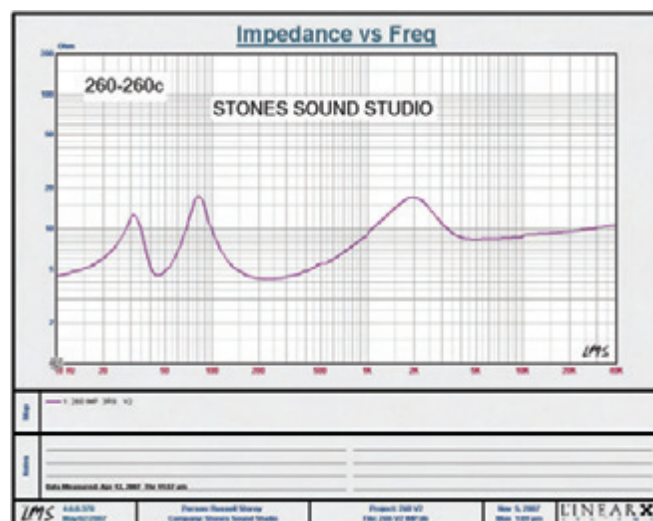
Incredibly, such an apparently flimsy system can produce deafening sound levels and with unsurpassed fidelity, transient response and so on.

Ribbon tweeters have been around for a long time but until recently they have been largely confined to very expensive esoteric loudspeakers systems and their reliability and ruggedness was always a little suspect.

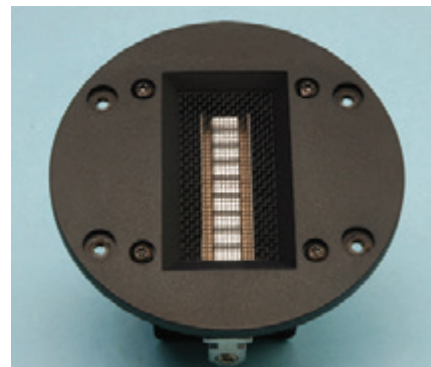
In the particular Fountek JP3.0 ribbon speakers featured here, the aluminium ribbon weighs a mere 11 milligrams and is just 9 microns thick – much thinner than the proverbial human hair!

The aluminium ribbon is 66mm long and 8mm wide and suspended between the poles of a Neodymium magnet with a gap flux of 0.6 Tesla.

As you might expect, such a short piece of aluminium represents a very low resistance and it cannot be driven



The impedance curves for both the Signature Series speaker systems show the classic “double hump” at the bass end, due to the tuning provided by the bass reflex port.



This series of photos show the lineup of the drivers used in the Signature series. The woofers are made by Peerless and both have rugged dies cast chassis. The ribbon tweeter is made by Fountek and incorporates very high quality matching transformer. Note the fine mesh protecting the ribbon from curious fingers.

directly by any normal audio amplifier. Hence, the tweeter has an integral matching transformer with a frequency response to 120kHz. This results in a very flat tweeter impedance of 7Ω from 1kHz to 40kHz. The basic tweeter is also extremely efficient and in fact, is used with resistive attenuation to match the Peerless woofers used here.

Two separate stereo pairs of loudspeakers are presented, the Signature Series HD260 and HD360 systems. In addition, a centre channel variant of the HD260, the 260C was designed to complement the 260 and 360 for high-end Home Theatre A/V systems.

Depending on your budget, you may decide to build

either the HD260s or HD360s for a high performance stereo system. Alternatively, for high-end Home Theatre A/V system, you may decide on a mix of the HD260 (front) and HD360 (rear) together with the HD260C for the centre-front channel.

Whichever approach you take, you can be sure that you will be getting a sensational speaker system. Make no mistake, these ribbon units are the finest tweeters we ever heard. They are so clean in their definition and the pin-point localisation of instruments in a stereo spread has to be heard to be believed.

On top of that, these speakers have very low distortion – measured at around 0.3% THD at 1kHz and 1 watt.

HD260 & HD360

The HD260 is a small tower speaker using the Fountek ribbon tweeter and two Peerless HDS 832873 5-inch midrange woofers. This uses a Nomex paper cone, a very large ferrite magnet and neoprene rubber roll surround. The HD260 system has exceptional efficiency of 92.5dB/1m/1W and will provide very good volume levels from the SILICON CHIP 20W class-A amplifier, even in large rooms.

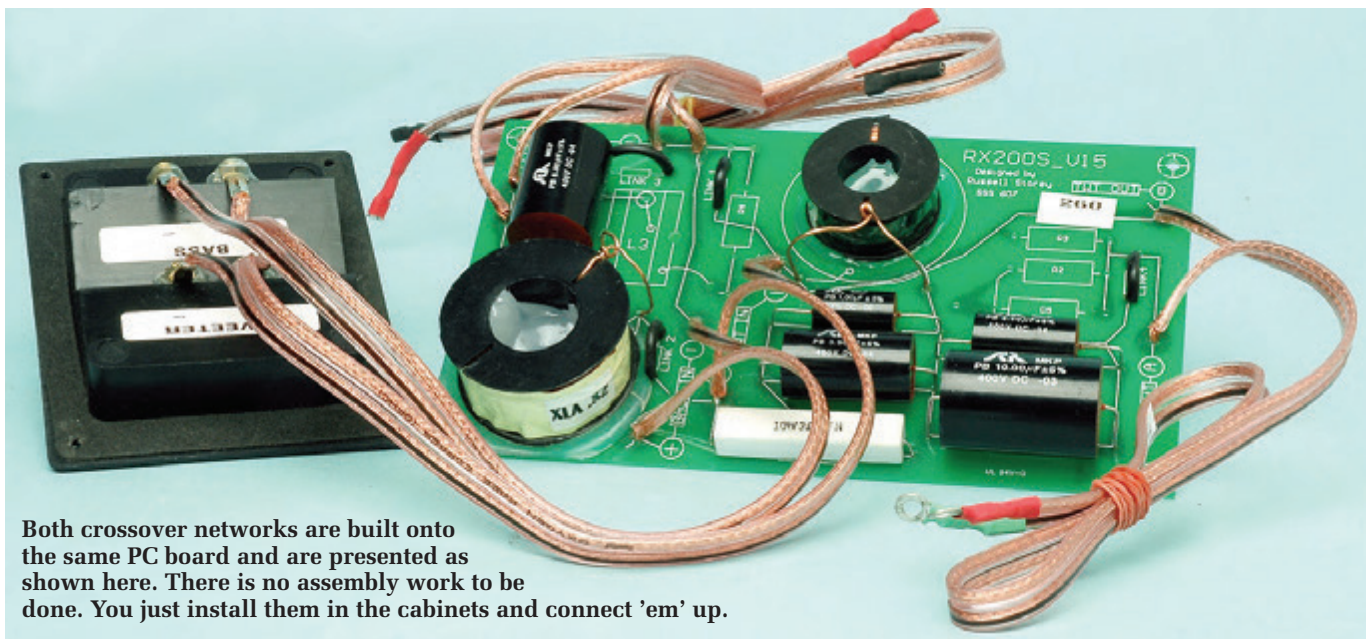
The HD260 is a MTM (midrange-tweeter-midrange) arrangement (also known as D'Appolito) with a rear bass reflex port. The HD260C centre speaker is identical in every respect except that the tweeter is rotated through 90° , so that it will be vertical when the cabinet is laid on its side.

The smaller HD360 bass reflex system uses the Fountek ribbon tweeter and Peerless 830883 6.5-inch midrange woofer, also with a rear port. Its efficiency is somewhat lower but still quite respectable at 87.5dB/1m/1W.

Both speaker enclosures were developed using LEAP



The overall frequency response of the Signature Series HD260 and HD360 speakers is commendably flat to below 50Hz. This is the response of the HD260.



5 wave diffraction analyser and FFT vibration analysis software. The resulting enclosures have a Butterworth low pass filter response to ensure optimum bass and transient response.

While the enclosures are relatively small, they are very strong and rigid to ensure very low panel resonances. They are made from 18mm MDF (medium density fibreboard) while the baffle is made from two thicknesses (36mm), to allow the ribbon tweeter to be flush-mounted and still provide maximum rigidity.

In addition, the inside edge of the woofer holes are chamfered to prevent diffraction effects at midrange frequencies and the HD-260 has internal bracing of the large side panels.

Rear bass port

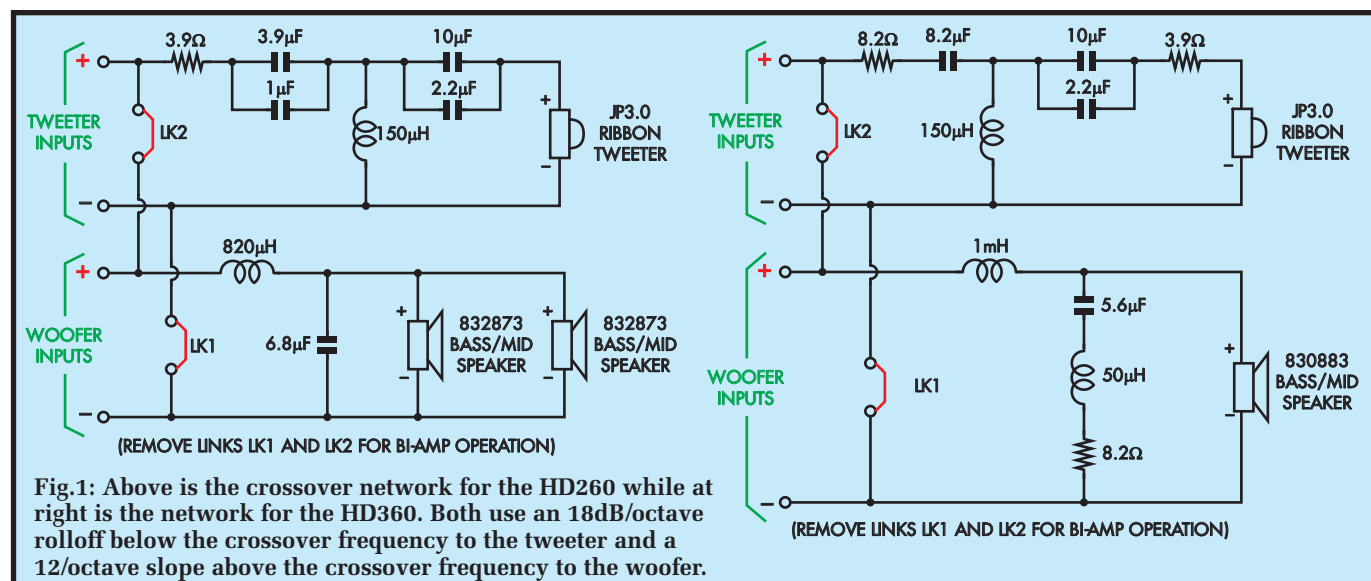
Both enclosures employ a rear port to ensure a reduction of overall driver distortion and cross-modulation which can be generated by front ports. According to the designer, with a front port a form of speaker (low frequency) distortion and cross modulation is generated by the compressed air exiting the port out of phase with the woofer creating (modulation) interference of the woofer cone. This interference of the woofer cone occurs at medium to high playback levels (port velocity) and is one of the factors reducing overall dynamic range or head-room of the transducers and speaker system.

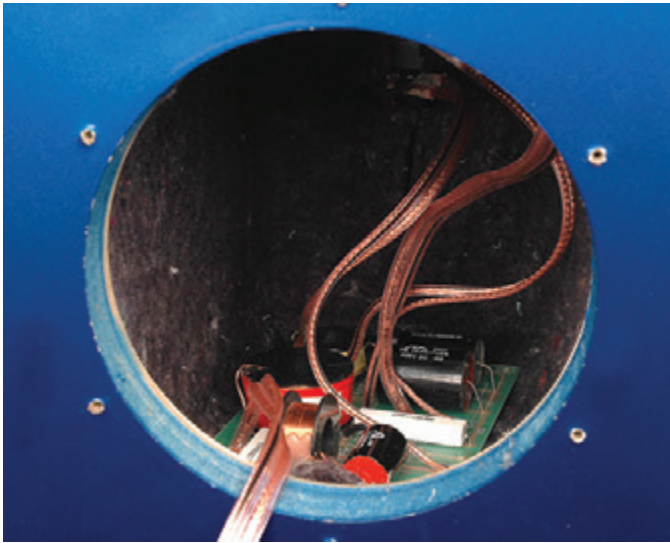
The port itself is 63mm in diameter with small flared ends. All this is done to keep distortion at a minimum.

Crossover networks

Using the best drivers and a carefully designed cabinet would be a waste of time without an equal standard in the crossover networks. In the Signature Series the crossover networks are quite complex (Linkwitz Riley with Bessel /Butterworth response). They were developed to enable good linear phase and minimum distortion through the passband and overlap regions of both the woofer and ribbon tweeter.

They have been developed with bi-wiring in mind so





This photo shows the crossover network installed in the base of the HD360 enclosure.

the tweeter and woofer filter networks are essentially quite separate, as shown in the diagrams of Fig.1 & Fig.2.

The tweeter is fed with a third-order high pass (18dB/octave) filter and the woofer is fed with a second-order (12dB/octave) low pass filter. In the case of the HD-260, the crossover frequency is 3.8kHz and 3.2kHz in the HD-360.

Both crossover networks are based on the same PC board but there are differences. Each crossover network employs air-cored inductors, non-inductive wirewound resistors and 400V metallised polyester capacitors. High quality components are used throughout.

Building them

The designer of these Signature Series loudspeakers has been very particular in specifying how everything must go together, from the initial specification of the drivers, down to the very last detail of the cabinets, crossover components and even oxygen-free copper wiring. We don't think that last detail is really necessary but that is a story for another time.

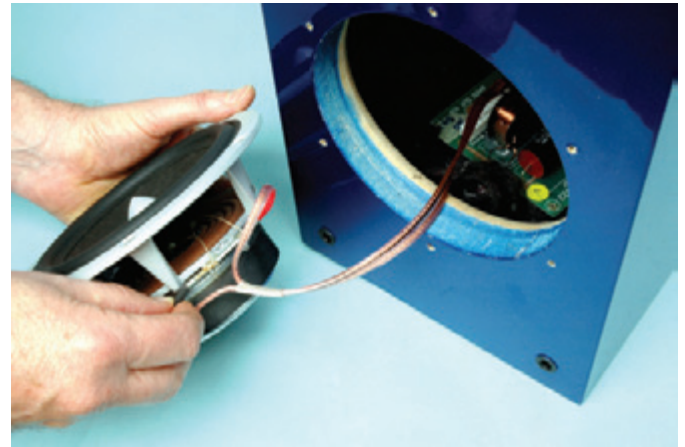
This very fine attention to detail on the part of the designer has made the task difficult for the kit supplier but it means that you, the ultimate kit-builder, will have an easy time putting them together.

The loudspeaker cabinets are supplied fully assembled in two forms, unfinished MDF or black vinyl. In the case of the unfinished MDF cabinets, it is up to you as to how you finish them.

The prototype cabinets featured in this article were spray-painted to a very high standard. If you have access to a high-pressure spray gun and spray booth, so much the better.

Alternatively, if you intend painting them, we recommend using a roller, to avoid leaving brush marks – it is amazing how brush marks can catch the light and become noticeable, especially if gloss paint is used.

Not only are the cabinets fully assembled but they also come fully lined with a grey felt, to damp internal reflections and they are also supplied with the fully finished grille cloth frames.



Making the connections to the woofer. The terminals are colour-coded and differently sized so that you cannot make a mistake.



Fit the woofer carefully and do not touch the cone at this point, otherwise you may damage it. It is secured to the baffle with six Allen screws.



Making the connections to the tweeter. Do it exactly as the photo depicts. Don't over-tighten the nuts on the tweeters – it would be a shame to damage such a magnificent performer.

No special tools are required to assemble the kits and no soldering is required. You will need a Phillips head screwdriver, a 3mm Allen key to install the speakers to the baffle and an adjustable wrench to attach the crossover connections to the terminals of the tweeters.

The fully assembled crossover networks even include the wiring to the speaker terminal panels – as we said, there is no soldering at all!

Order of assembly

The order of assembly is the same, regardless of whether you are putting together the HD260s, HD360s or HD260C (centre speaker). The first step is to install the crossover network in the base of the cabinet. Check the back of the cabinet make sure you do not have it upside down – the rectangular hole for the terminal panel should be below the circular bass port.

Fit six Velcro tabs to the underside of the crossover PC board and then pass it through the lower woofer hole and secure it to the felt on the base of the cabinet. Pass the terminal panel out through the rear of the cabinet, making sure that you do not disturb the felt which covers the rectangular hole. Then secure the panel with four countersunk MDF wood screws.

Bring out the wires for the woofer(s) through their respective holes in the front baffle. Fit the push-on connectors from the crossover speaker cables to the woofer(s). The wires are colour-coded (red for positive and black for negative) are differently sized so that you cannot make a mistake when you do the connections.

Carefully place the woofer into its hole in the front baffle and secure it with six Allen head screws using a 3mm Allen key. It is important that you do not over-tighten these screws otherwise you will strip the holes in the MDF panel.

Mounting the tweeter

Now is the time to mount the highly prized Fountek ribbon tweeters. Important: do not remove the protection label from the front of the tweeter until you have completed the assembly.

First, check that acoustic cover is fitted behind tweeter cutout hole is in place. Then bring out the tweeter wires from the crossover. These are fitted with colour-coded (red for positive, green for negative) ring terminals to suit the threaded posts of the tweeter.

Make the connections and tighten them with a small adjustable wrench – do not over-tighten them! Hint: angle the connector lugs to allow enough room between the felt cover and back of the ribbon magnet when installing the tweeter.

Then install the tweeter to the front baffle with four Allen head screws. Again – do not over-tighten them. Next, you can carefully remove the protection label from the tweeter faceplate.

Bi-wiring option

Just back-tracking for a moment – if you intend running these speakers are bi-wired, with separate stereo amplifiers driving the tweeters and woofers, then the installation procedure is slightly different. You need to cut links LK1 and LK2 on the crossover PC boards and then remove the gold plated links from the 4-terminal panels.

Keep the plated links (possibly stick them to the rear of

the cabinets, in case you ever want to run the speakers with conventional amplifier drive (ie, not bi-wired).

A final step is to connect a 1.5V battery across the terminals of the completed loudspeaker. With the battery positive to the red terminal, the woofer cone should move forward. If that's OK, you can fit the grille cloth frames.

You are now almost ready for a listening session. When positioning your speakers in the room, make sure that they are not in the room corners and are out from the walls by around a metre or so. Ideally, they should be placed on stands so that the tweeters are at your ear level, when you are seated.

Making your own enclosures

If you want to save some money by building your own enclosures, all the necessary dimensions and other information is accessible on the designer's website at www.stonessoundstudio.com.au.

If it was our choice, we would pick the complete kits rather than going to all the trouble to make the cabinets. Sure, you will save some money but there is a great deal of work involved. Consider that the front baffle needs to be laminated from two 18mm sections and you need to make the bass port with its carefully flared ends.

There are really no short cuts to making the cabinets and if you don't follow the diagrams very closely, you will prejudice the sound quality. The above site has all the information on these speakers so if you want to check any aspect of the design, you can readily do so.

SC

Kit availability

Fountek ribbon speakers, Peerless speakers and all of the kits for the Signature Series are exclusive to Wagner Electronics, 90 Paramatta Rd, Summerhill, NSW 2130. Phone 02 9798 9233; fax 02 9798 0017.

Website: www.wagneronline.com.au

COMPLETE KITS

Include speakers, cross-overs, all hardware and cabinets. (Price per pair [except 260c] including GST).

260

| | | |
|-------------------|-----------------|-----------|
| Plain MDF | KIT260-MDF..... | \$1299.00 |
| Black vinyl | KIT260-BV | \$1399.00 |

260C (one unit only)

| | | |
|-------------------|-------------------|----------|
| Plain MDF | KIT260C-MDF | \$649.00 |
| Black vinyl | KIT260C-BV | \$719.00 |

360

| | | |
|-------------------|------------------|-----------|
| Plain MDF | KIT360-MDF | \$1159.00 |
| Black vinyl | KIT360-BV | \$1299.00 |

SPEAKER KITS (without cabinets)

Include speakers and crossovers but no cabinets and hardware. (Price per pair [except 260C] including GST).

| | | |
|---------------|--------------------------------|----------|
| 260 Kit | SPK260 | \$799.00 |
| 260C kit..... | SPK260C (one driver only)..... | \$399.00 |
| 360 kit..... | SPK360 | \$699.00 |

STONES SOUND STUDIO

RIBBON SPEAKER KIT

MANUAL



260C

360

260

Designed

By

Russell Storey

(Version V6)

19/1/08

Loudspeaker Description and Building Instructions

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Loudspeaker Description

The Ribbon Speaker Performance

Here at Stones Sound Studio we have engineered Super High Definition Ribbon Speakers to reproduce all analogue and digital stereo programs including CD, HD-DVD, SACD analogue turntables and multi channel A/V home theatre sound systems

The 260 260c & 360 Ribbon Speakers provide excellent depth of field, holographic 3D sound staging, fast tight bass midrange, crystal clear top end detail, extreme dynamic range with very low distortion on any type of program material from low to high volume levels

The 260C centre channel speaker complements the 260 and 360 ribbon speakers for high-end Home Theatre A/V systems. I recommend complementing the ribbon speakers with the high quality R1000 12" subwoofer for very low frequency articulate bass for medium to large rooms

The 260 and 360 ribbon speakers have been designed to become a sound reference for both home theatre and audio systems enabling listeners to hear finer instrument detail in analogue and digital recordings

The low distortion, wide bandwidth and large dynamic range provided by this Ribbon Speaker series enables listeners to appreciate the effects of any upgrades or changes made to their electronic equipment , cables ,components and program material providing many years of enjoyable listening.

Russell Storey

Loudspeaker Description

Ribbon Speaker Kit Design Concept

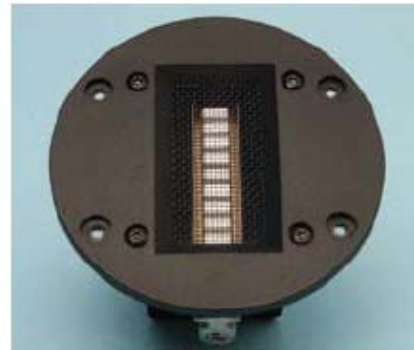
The aim of a good high definition loudspeaker is to reproduce any instrument or sound as realistically and as close as possible to the original sound source .While these attributes are achievable to a degree using a standard woofer /soft, dome tweeter combination an even better solution is a woofer /ribbon tweeter loudspeaker. I chose a Pure Ribbon tweeter because of the speed low mass and detail to enable a speaker design with true super high definition sound reproduction of any instrument or sound effect



832873 5"



830883 6.5"



JP3.0



Tweeter: Fountek Ribbon

The Fountek Jp3.0 pure ribbon tweeter with high frequency transformer has the ability to deliver extremely fast transient detail and low distortion from very low to high volume levels and enables a truly realistic sound when compared to planar ribbon or dome tweeters.

The Jp30 ribbon tweeter diaphragm has a very low moving mass of only 11mg (dome tweeter > 300mg) and is fitted with High Flux density rare earth neo magnets. To convert very the low impedance of the ribbon diaphragm to an 8-ohm primary the Jp3.0 is fitted with an ultra wide bandwidth 120 KHz transformer, resulting in a flat frequency response minimum phase change from 1 to 40 kHz.

Woofer: Peerless Bass/Midrange

To complement the speed ,dynamics and accuracy of the JP3.0 ribbon tweeter the Peerless HDS 832873 5" and HDS 830883 6.5" with Nomex paper cones were selected for their natural sound signature, excellent bass lower mid range detail very low distortion , wide dynamic range , fast transient time , phase and frequency response.

Loudspeaker Description

The Ribbon Speaker Enclosures

The Bass Reflex enclosure was developed using LEAP 5 wave diffraction analyzer and FFT vibration analysis. An Extended Bass Shelf (EBS) / Butterworth low pass filter response was implemented with the enclosure to ensure optimum low extended bass and fast transit speed from the woofers.

The Enclosures feature flush mounted ribbon tweeter, rear port and are manufactured from 18mm MDF.

The Front Baffle is 36mm thick laminated MFD which ensures minimum movement of driver chassis and maximum enclosure damping for very tight bass and low cabinet resonance.

Centre Speaker

The 260C Centre Speaker has a wide horizontal sound field due to the use of an MTM speaker configuration and provides excellent detail of voice and home theatre effects. The enclosure and crossover network are the same as the 260 except the ribbon tweeter has been rotated 90 degrees on the front baffle to complement the woofer sound fields.

Enclosure Bracing Rib

Acoustically bullet shaped internal bracing ribs are fitted to the side and top panels to provide strength and further improve bass transients and reduce panel resonance modes.

Enclosure Felt Damping

The enclosure is fitted with acoustic felt damping to the top, bottom, left & right and rear internal panels of the woofer chamber to reduce internal mid frequency standing waves and slightly damp the mid frequency back waves from the woofer cones. In addition, two layers of acoustic felt are fitted inside the back panel.



Loudspeaker Description

- **Enclosure Rear Port**

A rear port was employed in the ribbon speaker design to ensure a reduction of overall transducer distortion and cross modulation generated by front ports.

With a front port a form of speaker (low frequency) distortion and cross modulation is generated by the chamber compressed air exiting the port out of phase with the woofer creating (modulation) interference of the woofer cone and ribbon diaphragm. This interference of the woofer cone occurs at medium to high playback levels (port velocity) and is one of the factors reducing over all dynamic range or head room of the transducers and speaker system.

This mechanical process is similar in principal to FM & AM radio wave modulation only in this case, the radio carrier wave is the transducer cone or ribbon diaphragm and the modulator is the low frequency compressed air radiated from the port.

Port Flare

A simple 63 mm (ID) port size with small flared ends was chosen over large flared ports to provide minimum port velocity, cone excursion and minimum woofer power compression at average to high volume levels.

At average to high volume levels, large radius ports cause eddy current airflow resistance at the inlet, exit flare, and thus more power compression, less dynamic range and increased driver distortion.

Enclosure Bracing and Felt Acoustic Damping:

An MDF timber acoustic bracing rib was designed with a bullet round over on the edges to reduced unwanted chamber resonance, standing waves (pressure particle bunching) caused by the back waves of the bass/ mid woofer and to reduce unwanted side panel resonant modes

Grey Felt 6mm thick acoustic material is fitted to the top, bottom, left, right and rear panels and carefully folded over the bracing rib to act as an absorber (air brake) on lower midrange frequencies that cause modulation of the cone and port vent. Two layers of 6mm felt are added to the inside of the rear panel and further damping is added the rear of the ribbon tweeter to reduce air turbulence of the rear port and interference from the back of tweeter magnet assembly

Grill Panel

The grill panel is located on the front baffle by grill pegs and cups and incorporates the use of low loss acoustic grill cloth. The grill frame features round over of the timber grill frame internal and external edges which reduce diffraction of the sound generated by the speaker drivers. A special low loss grill cloth has been used to reduce attenuation of high frequencies from the ribbon tweeter and woofer. *"To enable the very best sound quality and listening experience I recommend the grill panel be removed from the speaker box"*

Enclosure Features Summary:

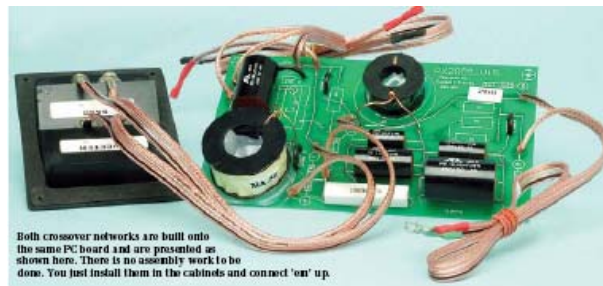
- Low resonance baffle design with 36mm thick laminated 18mm MDF
- High volume level High Velocity low compression port with round over at both ends
- MDF acoustic bracing rib with bullet shaped round over on edges
- Acoustic felt damping on all walls and rear panel
- Acoustic Felt cover behind ribbon tweeter
- Acoustic grill panel cloth Low loss
- Grill panel frame internal & external frame round over's
- woofer hot cut outs 16mm roundovers on inside edge

Loudspeaker Description

Crossover 260 260C 360

The Linkwitz Riley (Bessel /Butterworth) crossover unit was developed to enable good linear phase and minimum THD distortion through the pass band and overlap regions of both the woofer and ribbon tweeter whilst providing wide dynamic range and excellent low mid and high level continuity of detail .

A 2nd order low pass with a 3rd order high pass filter slope was chosen after evaluating many different design combinations to provide optimum isolation between low and high frequencies. Time compensation of the driver xyz location and rising peaks response in the woofer and tweeter on and off axis were reduced by fine tuning crossover component values thus enabling coherent coupling from bass to tweeter combination through out the crossover region. The fully finished crossover PCB includes all components, high quality internal wiring and Velcro mounting tabs



Components used in the Ribbon Speaker crossover are High quality Non-Inductive resistors, Copper Air core Inductors, SCR 400V metalized MKP capacitors.OFC 384 strand copper wiring

Crossover Features Summary

- Fully finished PCB includes all components and wiring ready to install
- Soldering: None required Wiring cable: Internal speaker cable high quality OFC 384 strand with push on connections
- Speaker terminals: 4mm twin gold plated binding post
- Filter 2 way off set Bessel / Butterworth, linear phase
- Frequency: 260 260c 3.8 KHz 360 Freq 3.2Khz
- Order: 2nd Lp, 3rd Hp

Speaker Cable type internal wiring & amplifier

OFC 384-speaker cable is made from a low loss pure OFC copper. The cable is a type of Litz wire construction formed from 384 thin copper wires woven into a low profile flat rectangular shape and then insulated with a clear polymer jacket. This excellent combination of shape and size ensures the OFC 384 speaker cable has minimal HF loss from the skin effect found in round conductors and also enables a lower overall impedance which provides better bass depth, midrange transients and dynamics.

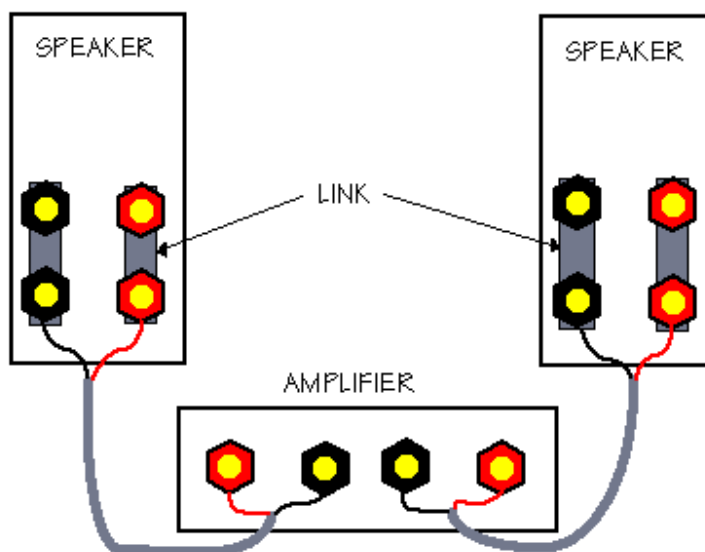
Other speaker cable I recommend to are QED Nordost Chord Kimber Audio Quest

Loudspeaker Connection

260 260C 360

Speaker Cable Wiring (Standard)

Connect the speaker cables to the bottom pair of terminals on the rear speaker terminal cup for a standard connection to your amplifier



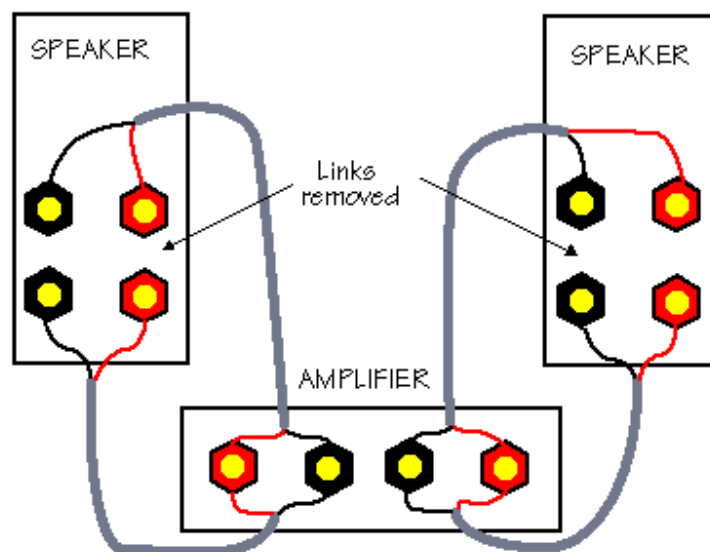
Loudspeaker Connection

260 260C 360

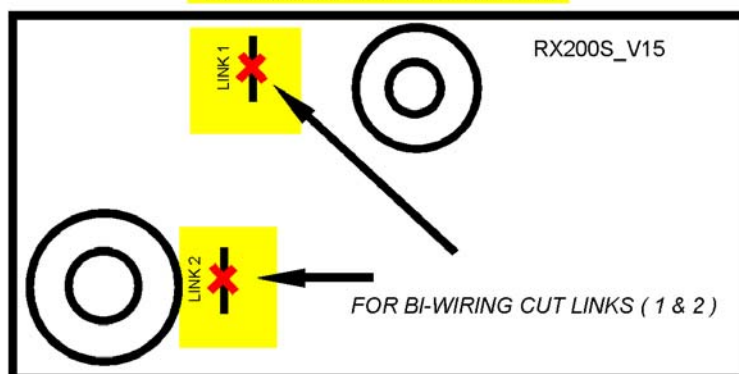
Speaker Cable (BI Wiring)

The term bi-wire simply refers to the fact that you will be running *two sets* of loudspeaker cables from your amplifier to *each* of your speakers.

- ✓ Remove the 2 links from the *rear* speaker terminal cup .
- ✓ Cut links (1,2,) on the *internal* crossover board



CROSSOVER BOARD BI-WIRING



Building Instructions

260 260C and 360

Installation of the Woofer & Crossover PCB

1) Crossover Board (Bottom) 260-260C 360

- ✓ Fit Velcro Tabs to underside of the crossover PCB (see p17)
- ✓ Fit crossover assembly through lower woofer hole and secure with 5 Velcro tabs onto the felt at bottom of speaker box (see p18)
- ✓ Fit speaker 4 terminal plate through felt and rear panel mounting hole then secure with 4 MDF countersunk wood screw(see p19 p20)

2) Woofer (Bottom) 260-260C 360

- ✓ Fit Lower bass /mid speaker crossover cables through the front baffle hole (see p21)
- ✓ Fit push on connectors from the crossover speaker cables Red (+V) and Black (-ve) to the speaker terminals of the lower woofer (see p21)
- ✓ Fit lower bass /mid speaker to the front baffle with six Allen head screws using a 3mm Allen key
- ✓ Re check all driver screws but do not over tighten (see p22 23)

3) Fountek Jp3.0 Ribbon Tweeter (Installation Check List)

- ✓ Check acoustic felt cover is fitted behind tweeter cut out hole before installing tweeter
- ✓ Do not connect a battery or dc (direct voltage) across ribbon terminals .Ribbon has been pre tested in factory
- ✓ *Do not remove Ribbon protection label until speaker box the installation and dc testing is completed (see 27*

4) Fountek Jp3.0 Ribbon Tweeter 260-260C 360

- ✓ Fit ribbon tweeter crossover cables through the bottom edge of felt cup through the front baffle hole and secure the 2 cable lugs **Red (+V)** and **Green (-ve)** to the ribbon terminal posts with a small wrench and tighten nuts firmly but do not over tighten **See (photo p24)**
Hint: Angle tweeter cable lugs to allow enough room between felt cover and back of the tweeter when installing
- ✓ Fit ribbon tweeter to the front baffle with four Allen head screws using a 3mm Allen key Re check all screws but do not over tighten

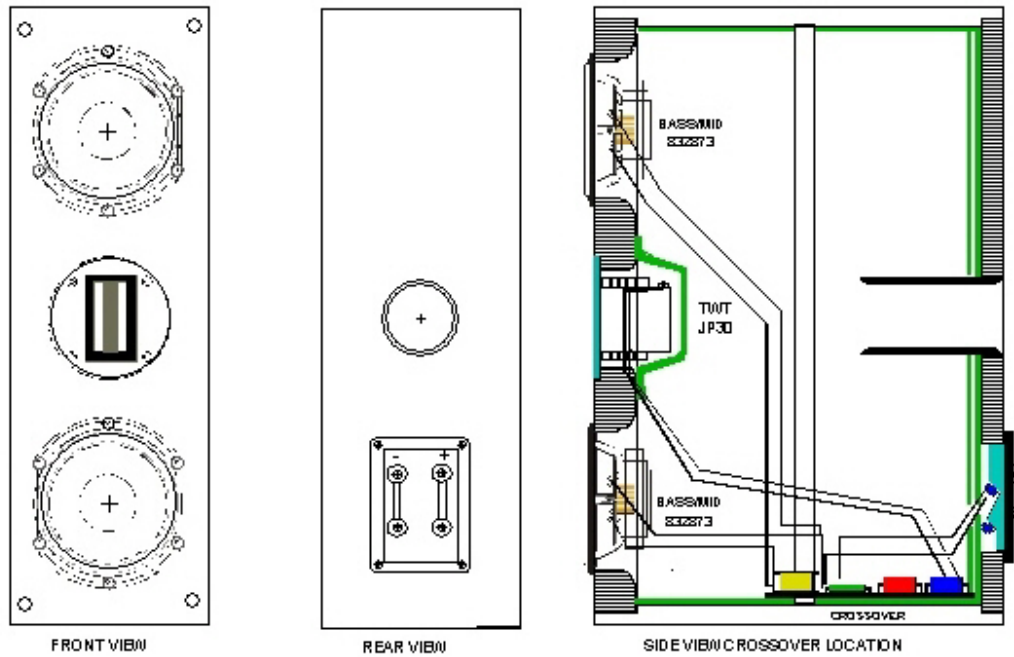
5) Woofer (Top) 260 260C

- ✓ Fit upper bass /mid speaker crossover cables through the top front baffle hole
- ✓ Fit push on connectors from the crossover speaker cables Red (+V) and Black (-ve) to the speaker terminals of the top woofer (see p21)
- ✓ Fit upper bass /mid speaker to the front baffle with six Allen head screws using a 3mm Allen key
- ✓ Re check all driver screws but do not over tighten
- ✓ **6) Ribbon 260C Centre Speaker**
- ✓ Fit Crossover Board ,bottom woofer , top woofer and ribbon tweeter as per 260 Installation steps (1,2,3,4,5) above (see Centre Speaker tweeter location p22 ,23)

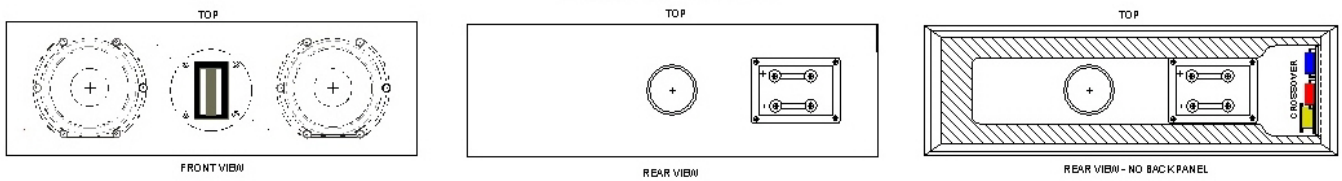
Building Instructions

Location of Crossover PCB and Wiring

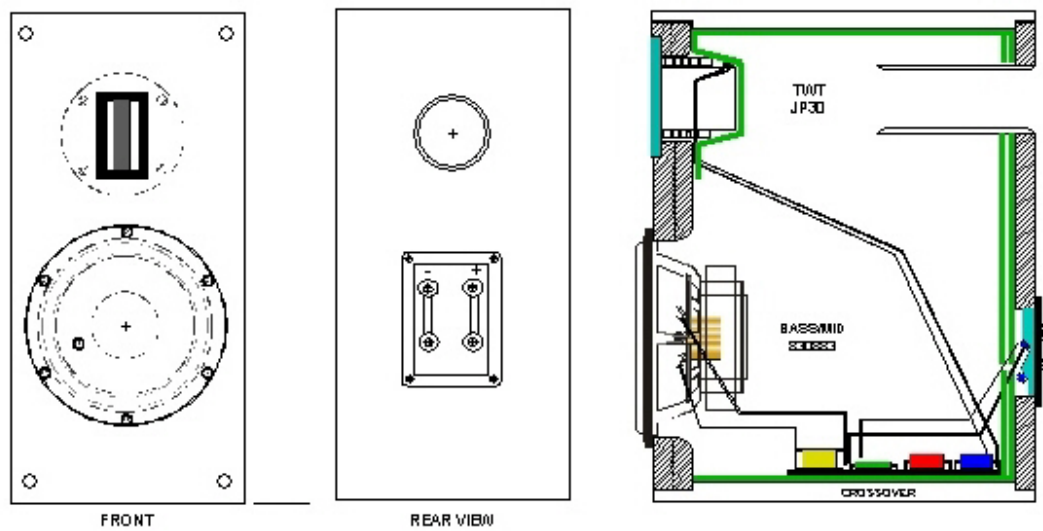
260



260C CENTRE



360



Building Instructions

260 260C and 360

Testing the Finished Speaker Box

Bass Speaker phase test (dc only).is all that is normally required to test the pre built crossover wiring and speakers

Connect a 1.5v battery with a pair of clip leads across the bottom pair of speaker terminals (+ve to +ve) RED and (– ve to –ve) BLACK. Check that the battery is connected as per photo (**Photo 2 page 14**).

Observe that the woofers cone moves out as per (**Fig1 below**).

This means the speaker and crossover wiring is connected in phase.,

If the speaker cone moves in then the connection of the bass speaker or crossover wiring are incorrect out of phase

Crossover Network Resistance (dc only). (DIY optional extra for experienced Diy speaker builders and technicians)

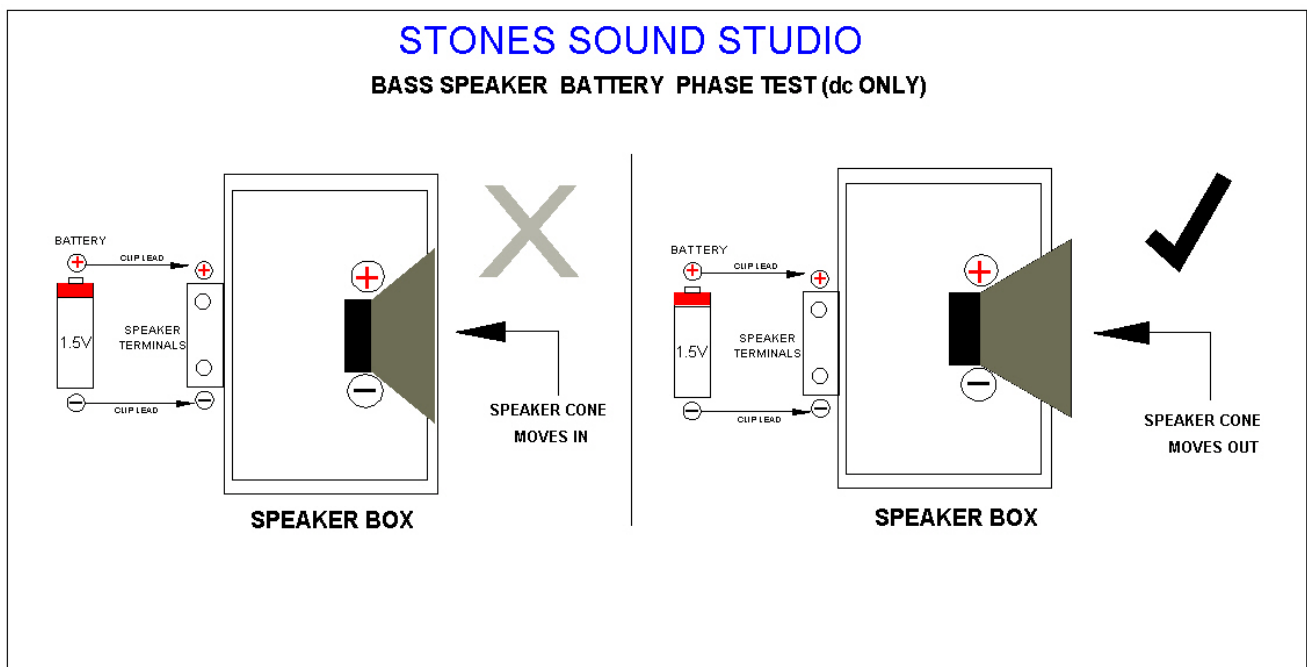
Connect a DMM (digital multi-meter) across the bottom pair of speaker terminals then switch the DMM to the ohms range and measure the (dc resistance) of the crossover network. see DMM photo (**Photo 3 page 14**)

Digital Multi Meter (DMM) Readings (average)

| | | |
|----------|-------------------------------------|-------------------|
| 260 260c | DMM reading range > 3.4 to 4.4 ohms | (Nominal 3.9 ohm) |
| 360 | DMM reading range > 5.8 to 6.7 ohms | (Nominal 6.1 ohm) |

Warning: If the DMM meter ohm readings are lower than the range given above then contact the Kit dealer for advice

Fig 1



Building Instructions

260 260C and 360

Testing the Speaker Box Photos 2 &3

Photo 2

Bass Speaker Battery phase test (dc only)



Photo 3 DMM ohm measurement of the 260-260C speaker Crossover Network Resistance (dc only)



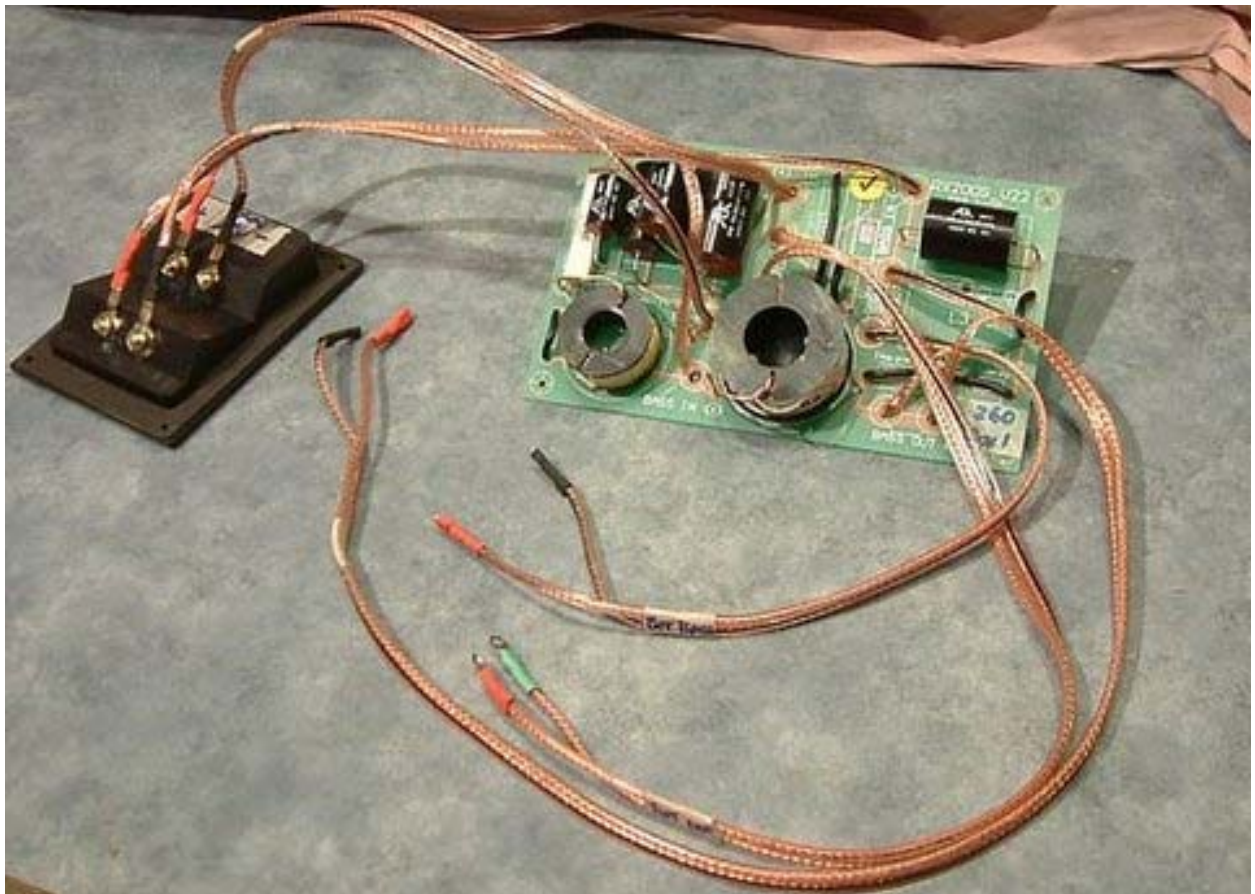
DMM ohm measurement 3.9 ohms 260-260C speaker

DMM ohm measurement 6 ohms 360 speaker

Building Instructions

260 260C and 360

Installation Photographs



Crossover PCB assembly includes pre-wired (soldered) 4 terminal speaker cup



Crossover PCB assembly with 260 enclosure



Fit crossover assembly through lower woofer hole and secure with the Velcro tabs onto the felt at bottom of speaker box



Fit crossover assembly through lower woofer hole and secure with six Velcro tabs



Fit speaker 4 terminal cup through felt and rear panel mounting hole then secure with 4 MDF countersunk wood screw



Note: Fit speaker 4 terminal cup so terminal post faces toward the top of the box

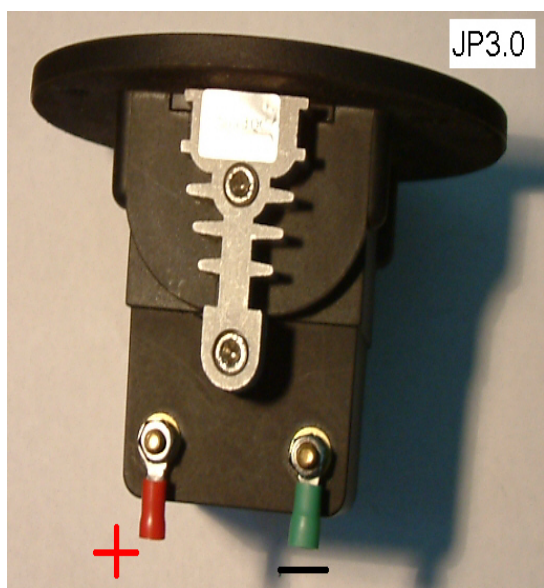


Speaker push on connector cables fitted through front speaker mounting whole cutouts



260 FRONT showing ribbon tweeter and Woofer with 3mm Allen key





JP3.0 Ribbon

Terminal polarity Models 260 and 360 (top view)



260 C CENTRE ribbon tweeter terminals



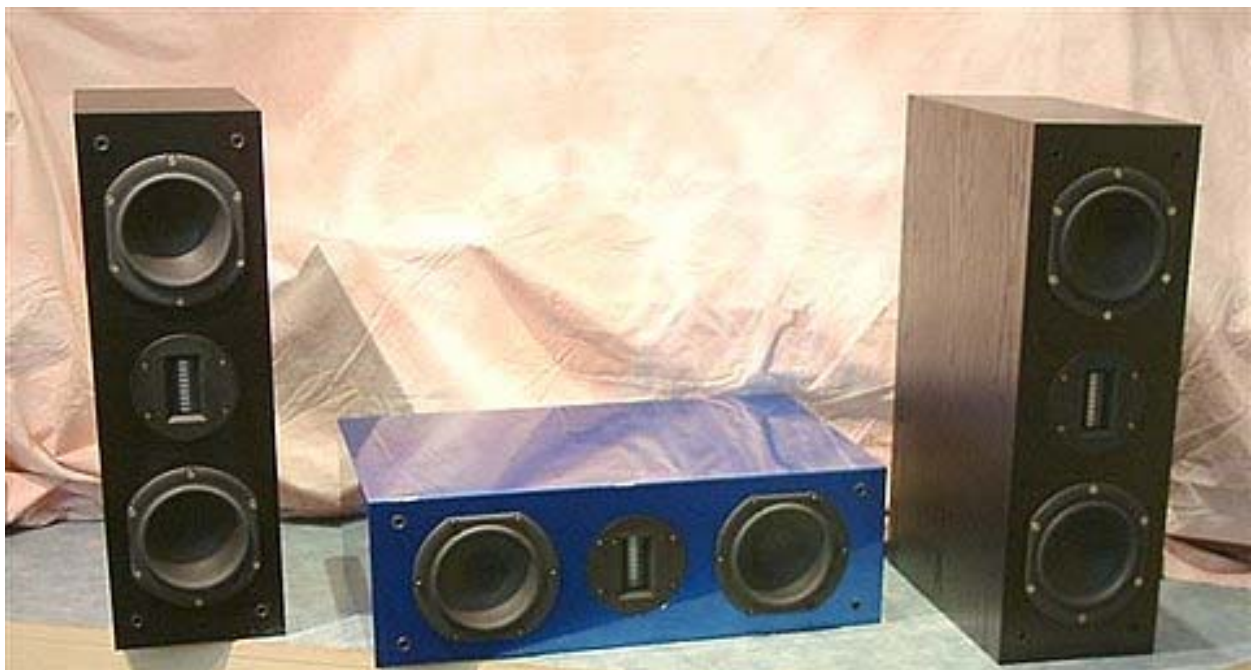


260 C CENTRE showing peerless bass/mid connections



260 C CENTRE ribbon tweeter with protection label

Fully Assembled 260-260C



260

260C Centre

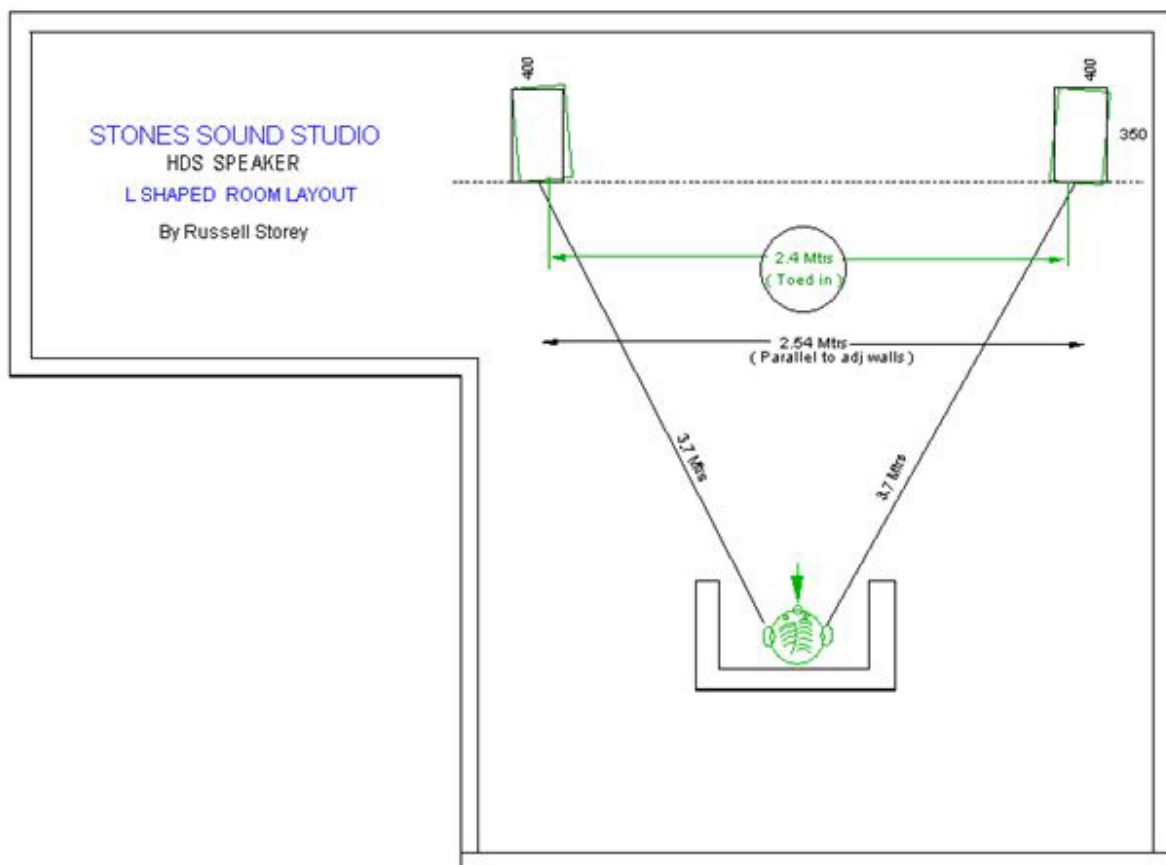
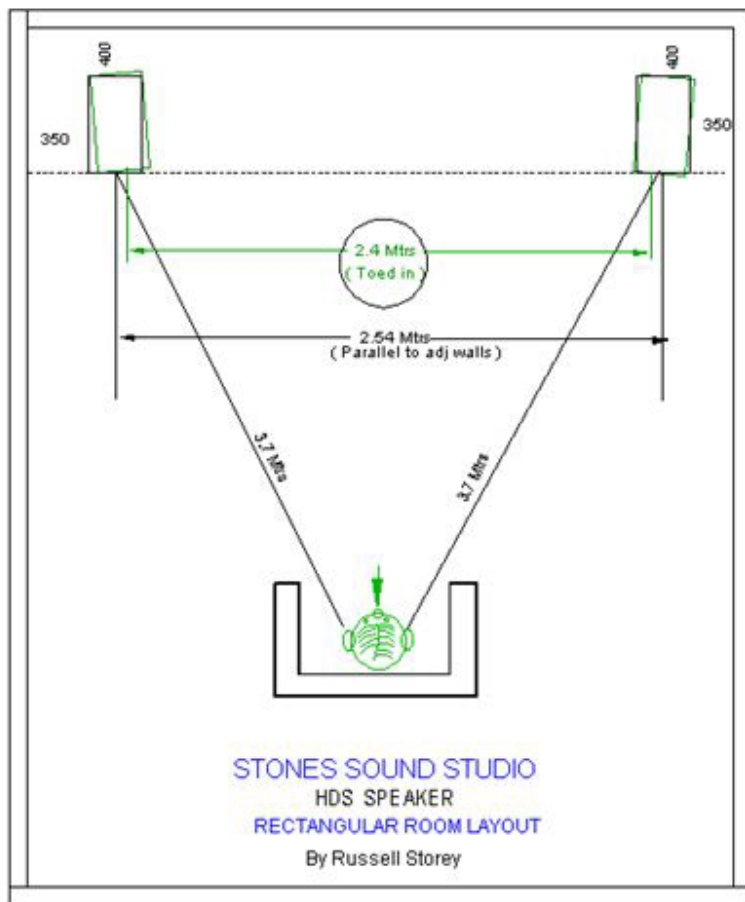
260

Fully Assembled

360



Recommended Loudspeaker Room Location



NOTES

260 260C 360

Enclosure Felt Damping

Use Furniture Felt Pad 540gms / Kg around 7mm thickness

Available in Australia from Home wrap <http://www.homewrap.com.au/>

The screenshot displays the Homewrap website interface. At the top, the Homewrap logo is on the left, and links for 'Australian Homepage' and 'New Zealand Homepage' are on the right. A green search bar with a 'Go!' button is positioned below the logo. A navigation menu with icons and labels for 'Removalists', 'Packing & Shipping', 'Self Storage', 'General Packaging', and 'All Products' spans the width of the page. On the left side, a vertical menu lists 'About Us', 'Products', 'Services', 'Specials', 'Contact Us', and 'Login'. The main content area is titled 'Products' and features a sub-header 'All Products - Furniture Protection - Pads & Wraps - Furniture Felt'. A large image of a folded grey felt pad is shown. To the right of the image, the product is identified as 'Furniture Felt Pad' with code 'TRUP3.3'. Below this, the dimensions are listed: 'Length 3.3m', 'Width 1.83', and 'Thickness 540GSM'. At the bottom of the image, there are two buttons: 'View Enlargment' and 'PDF Brochure'.

HOMEWRAP
Packing & Supplies Pty Ltd

Australian Homepage New Zealand Homepage

Search Products Go!

Removalists Packing & Shipping Self Storage General Packaging All Products

Products
All Products - Furniture Protection - Pads & Wraps - Furniture Felt

Furniture Felt Pad
Code: TRUP3.3

Dimensions

Length
3.3m

Width
1.83

Thickness
540GSM

View Enlargment PDF Brochure

260 260C 360

Enclosure Felt Damping

Application

Cut Furniture Felt Pad to size to fit box panels

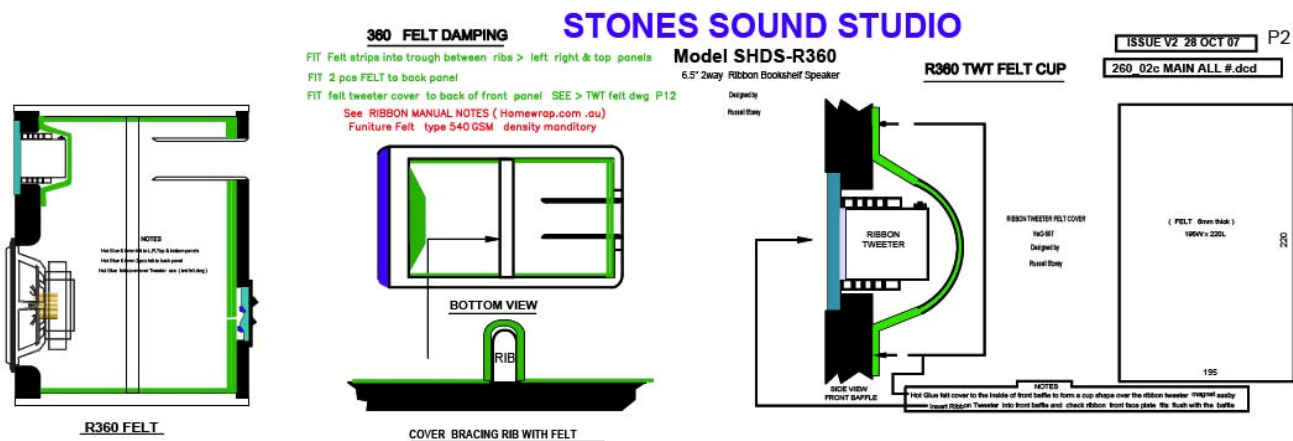
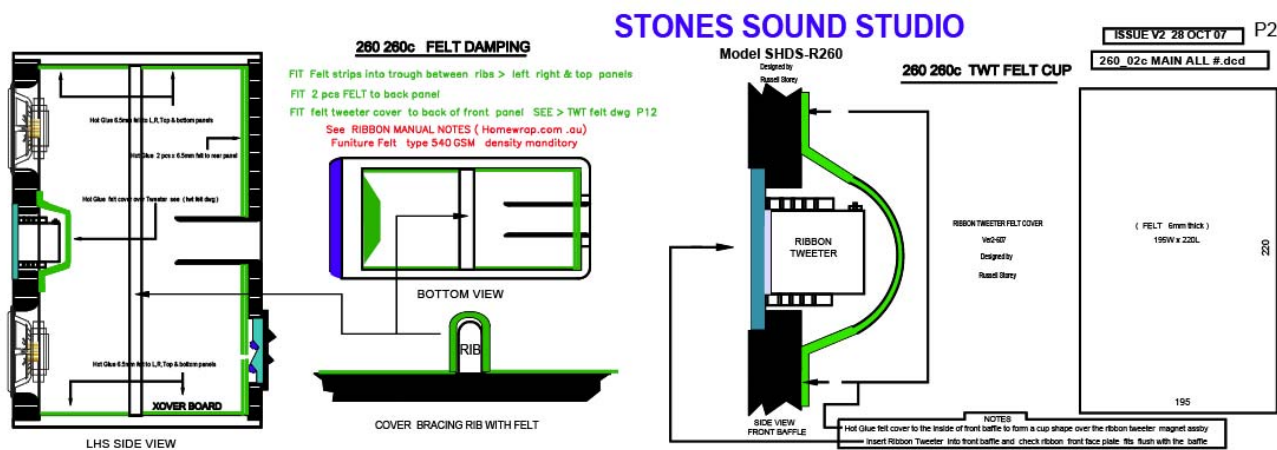
Fit Furniture felt pad with staple gun or Water based vinyl tile glue

Fold Furniture felt pad over bracing ribs

Fit Furniture felt pad to top bottom left right and rear panels of cabinet

Fit 2 pcs of Furniture felt pad to real panel only

Fit Furniture felt pad TWEETER cover to inside wall front baffle cabinet with air tight seal



NOTES

260 260C 360

How to make Port and Port Flare

Brand : Iplex PVC pipe 65 DWV

Availability : Reece Plumbing Stores, Bunnings, Mitre 10, Plumbers Supplies, Plumbers Australia

Type = PVC pipe 65 DWV (down water vent pipe) with thick wall

Pipe Inside diameter (mm) = 63mm !!! MANADATORY !!!!!

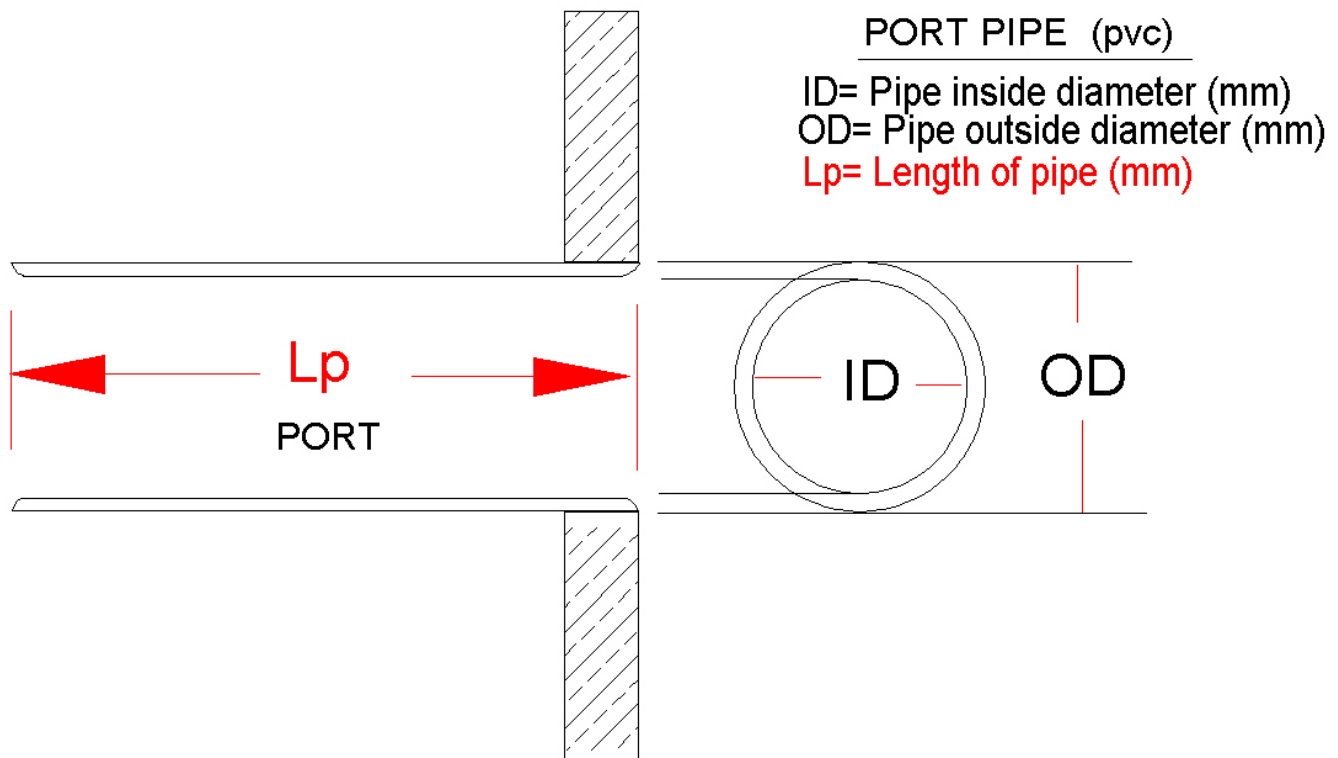
Outside diameter (mm) = pipe thickness varies between 70-72 mm depending on manufacturer brand

Hints:

Cut Port Pipe to correct length with drop saw or saw bench

Measure pipe diameter before cutting hole to suit in MDF and practice cutting & routing ends

STONES SOUND STUDIO



NOTES

260 260C 360

How to make Port Pipe /Port Flare

- ✓ Cut pipe to length with drop saw or saw bench (90deg edge)
- ✓ Use Router with 6.3 mm roundover bit
- ✓ Cut hole in a piece of MDF to hold pipe tight
- ✓ Router BOTH ends of PORT 6.3mm roundover bit





HDS Exclusive 5¼" Midwoofer



Type Number: 831882

Features:

This High Definition Sound (HDS) line of products push the performance limits of midbass audio transducers in a range of sizes - from the standard 205mm (8-inch) model, down to the very small 106mm (4-inch) model. Feature-rich and utilizing copper for the lowest distortion possible, the high-end HDS Exclusive Series takes maximum advantage of over 80 years of R&D experience to help systems designers build the world's best audio products.



Driver Highlights: Nomex diaphragm, 26 mm coil, AL, CU, Phaseplug

[Go to Architecture Notes](#)

Specs:

Electrical Data

| | | | |
|-----------------------|------|------|-----|
| Nominal impedance | Zn | 8 | ohm |
| Minimum impedance | Zmin | 6.7 | ohm |
| Maximum impedance | Zo | 58.3 | ohm |
| DC resistance | Re | 5.9 | ohm |
| Voice coil inductance | Le | 0.8 | mH |

T-S Parameters

| | | | |
|-------------------------|-----|------|-----------------|
| Resonance Frequency | fs | 64.5 | Hz |
| Mechanical Q factor | Qms | 3.85 | |
| Electrical Q factor | Qes | 0.43 | |
| Total Q factor | Qts | 0.39 | |
| Ratio fs/Qts | F | 165 | |
| Force factor | Bl | 7 | Tm |
| Mechanical resistance | Rms | 0.93 | Kg/s |
| Moving mass | Mms | 8.8 | g |
| Suspension compliance | Cms | 0.69 | mm/N |
| Effective cone diameter | D | 10.5 | cm |
| Effective piston area | Sd | 87 | cm ² |
| Equivalent volume | Vas | 7.2 | ltrs |
| Sensitivity | | 88.2 | dB |
| Ratio BL/√(Re) | | 2.9 | |

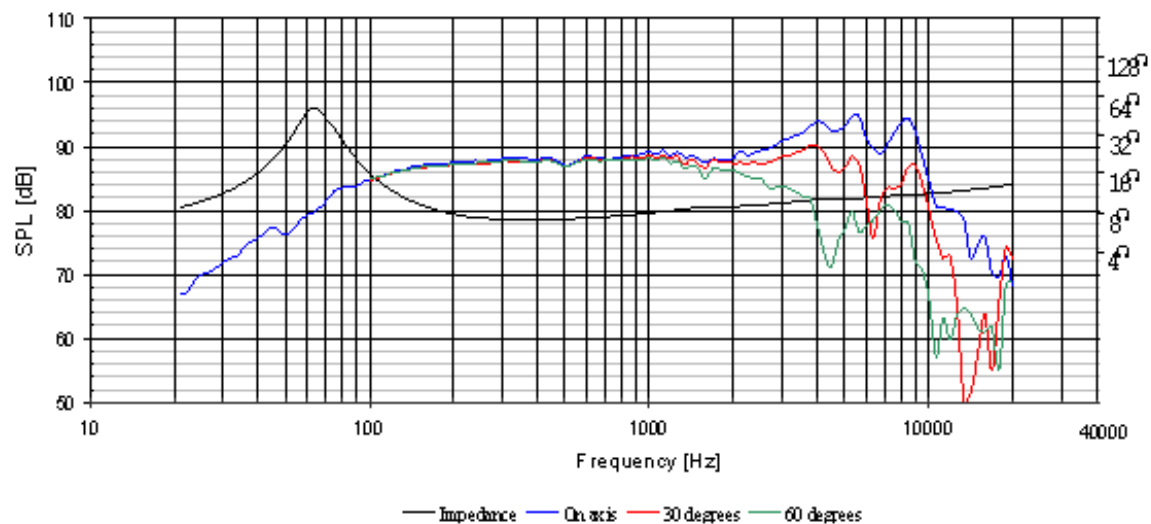
Power handling

| | | |
|----------------------------------|----|------|
| 100h RMS noise test (IEC) | -- | W |
| Long-term Max System Power (IEC) | -- | W |
| Max linear SPL (rms) @ power | -- | dB/W |
| Short Term Max power | -- | W |

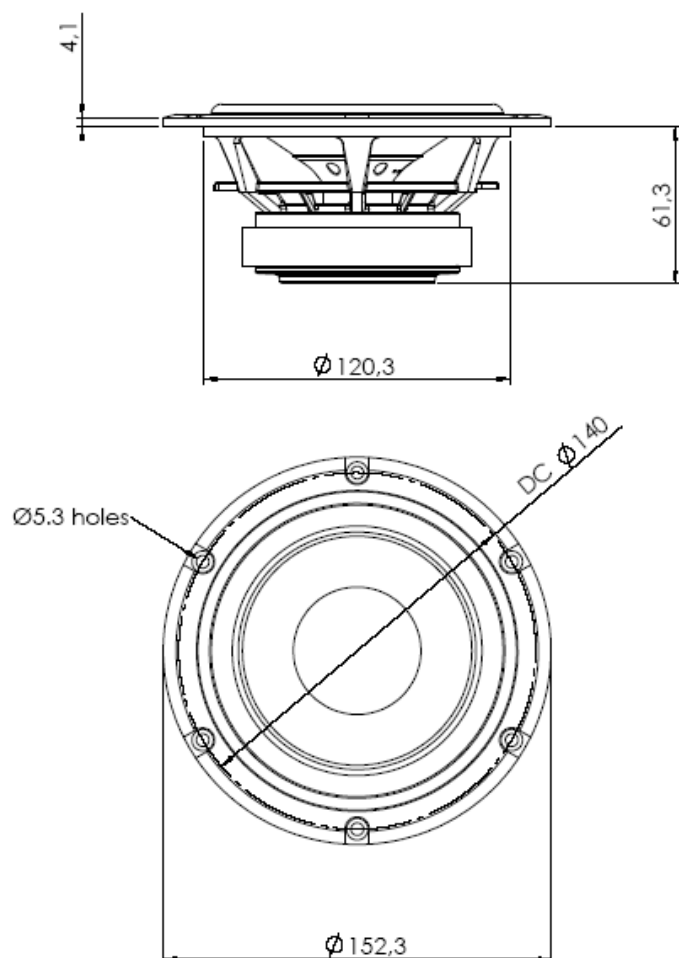
Voice Coil and Magnet Parameters

| | | |
|-------------------------|------|-----|
| Voice coil diameter | 26 | mm |
| Voice coil height | 13 | mm |
| Voice coil layers | 2 | |
| Height of the gap | 6 | mm |
| Linear excursion +/- | 3.5 | mm |
| Max mech. excursion +/- | -- | mm |
| Flux density of gap | -- | mWb |
| Total useful flux | 0.89 | mWb |
| Diameter of magnet | 90 | mm |
| Height of magnet | 15 | mm |
| Weight of magnet | 0.4 | Kg |

Frequency:



Mechanical Dimensions:



G2Si Aluminum Ribbon Tweeter



Impedance: 6ohms

Rated Power: 30W

Sensitivity: 96dB/W/m

Frequency range: 1700Hz-40kHz

Dimension of ribbon(mm): 8.5W×60L×0.01T

Shape of ribbon: wave

Mass of ribbon: 12mg

Moving area of ribbon: 510 square millimeter

Gap flux: 0.58Tesla

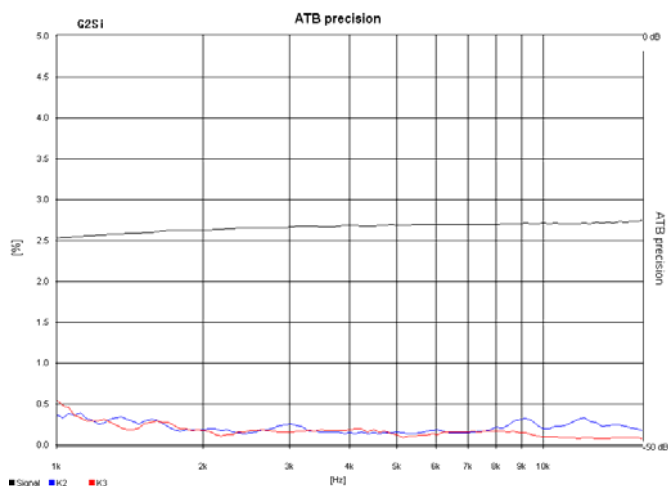
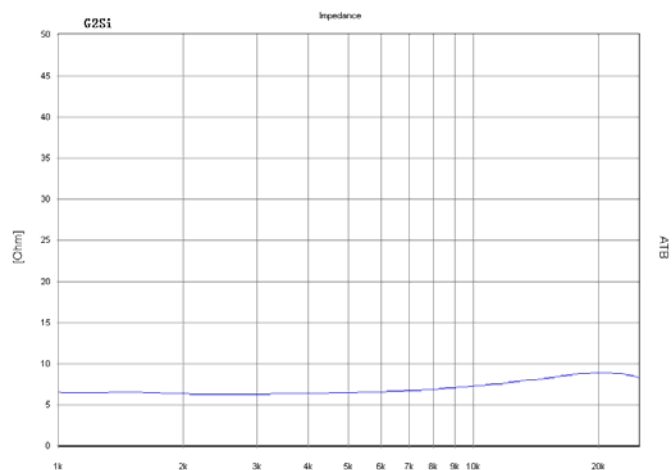
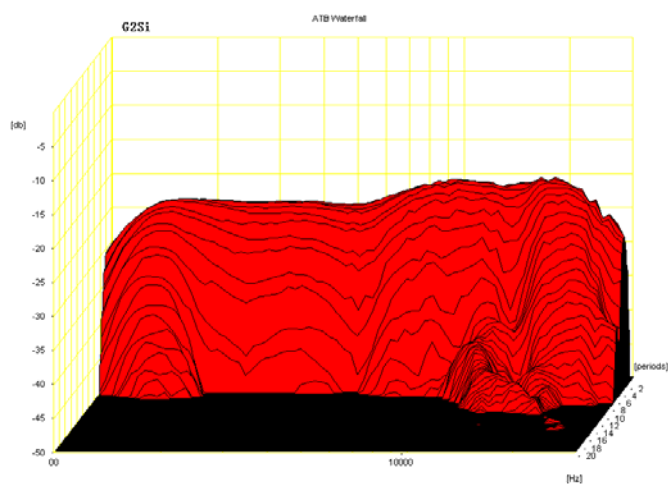
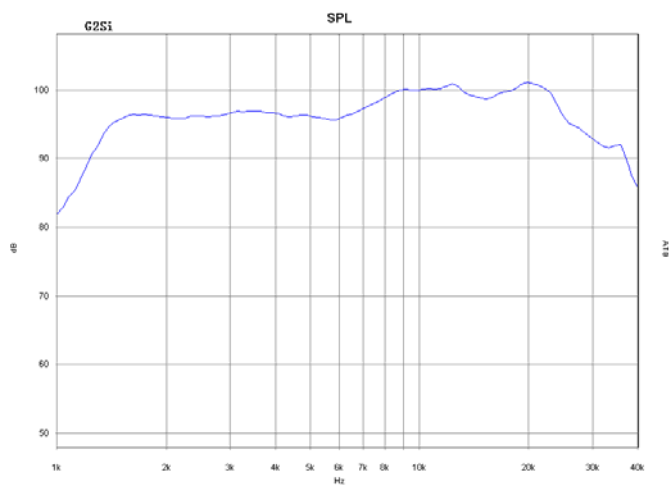
Recommended crossover frequency: 2500Hz

Material of faceplate: aluminum

Dimension of faceplate(mm): $\Phi 110 \times 4T$

Outside dimension(mm): $\Phi 110 \times 84D$

Net weight: 1.05kg/pc



AURUM CANTUS AUDIO CO.,LTD.

NO.1 XIANQIAO ST., BEIGUAN RD., PENGLAI, CHINA

E-MAIL: aurumcantus@aurumcantus.com TEL: ++86-535-5643369 FAX: ++86-535-5610809

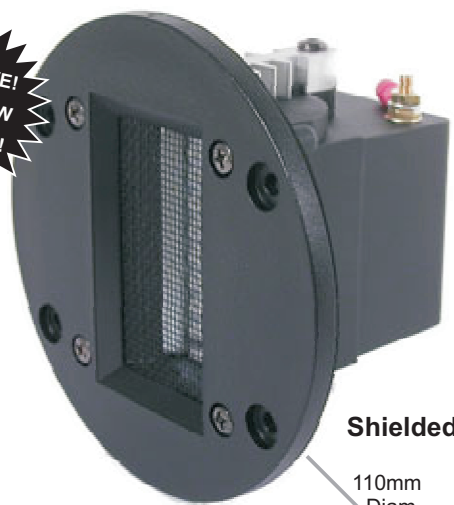


FOUNTEK RIBBON TWEETER SOLD IN MATCHED PAIRS

Features

High-pressure injection molded 5mm faceplate.
Pure Aluminum ribbon (not a metalised film type).
Super strong Neodymium magnet for high efficiency.
Built-in Impedance conversion transformer
Incredibly flat impedance for easy crossover design.
Effective from 1,700 Hz upwards due to the large diaphragm area and low self-resonance.
Extremely thin diaphragm (0.009mm Aluminum foil) best for a High degree of signal fidelity and broad frequency response.
Only 11mg mass for instantaneous signal response and micro-detail.
Low distortion factor, good power-handling capabilities, highly linear impedance and amplitude frequency response and broad frequency response range. Flat impedance curve from 1KHz to 40KHz.
Individually factory tested and assessed then paired for efficiency and response matching.
Very competitively priced for this level of technology.
Upgrade to the ultra high frequency response of today's equipment.

**EXCLUSIVE!
SUPER LOW
PRICE PAIR!**



Shielded

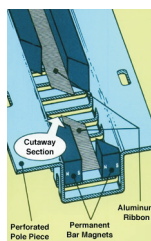
110mm
Diam.

PURE RIBBON TRANSDUCER - 2KHz → OVER 40KHz!

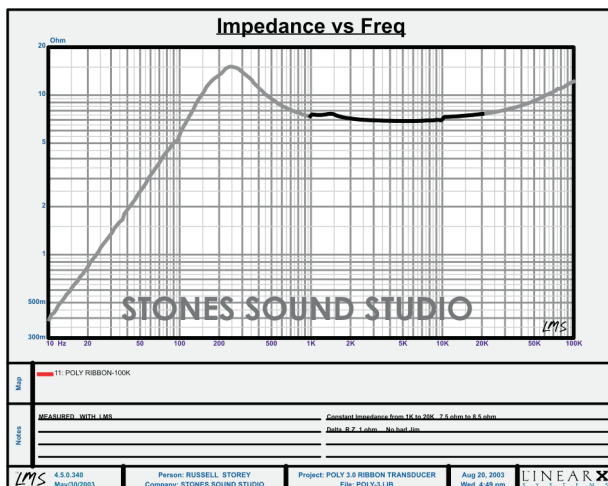
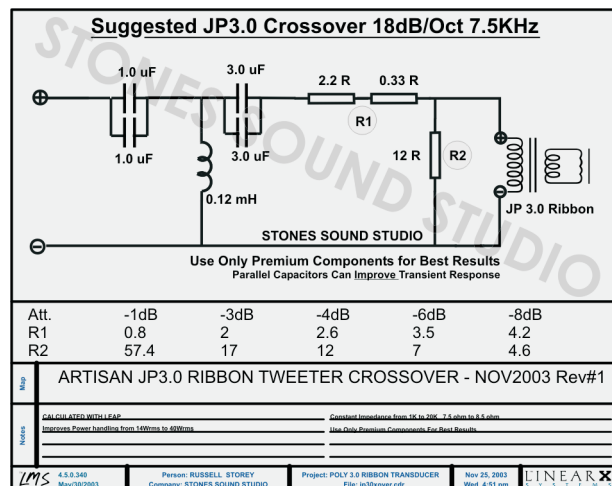
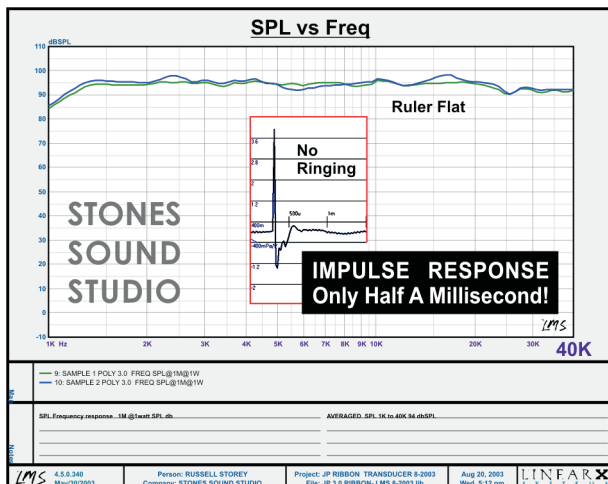
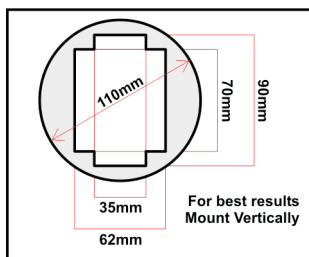
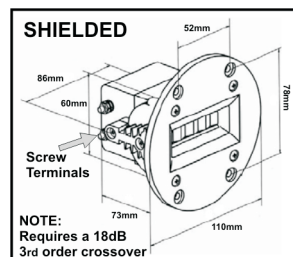
World renowned as one of the best high-end loudspeaker drivers available. This technology is based on the use of a pure aluminium ribbon element suspended in a high flux magnetic field. This diaphragm weighs 30x less and has a surface area 10 times larger than a conventional dome tweeter. The specifications and sound quality is the next step up in performance offering instantaneous signal reproduction, rarely heard micro-detail with exquisitely fast decay times. This translates into incredible realism. A built-in coupling transformer is used to match the impedance giving a very smooth response for easy crossover design and minimal phase errors. This tweeter is sold in factory tested matched pairs. Buy 1 to receive 2.

Ribbon 11mg 480mm² Al.
TX 6 ohm nominal (DC=0.01 ohm)
Sens 96dB (2.83V/1m)
Power 14Wrms (Max 40W)
Pair JP30
Sold in matched pairs only.

**PURE
AUDIOPHILE
HI FI**



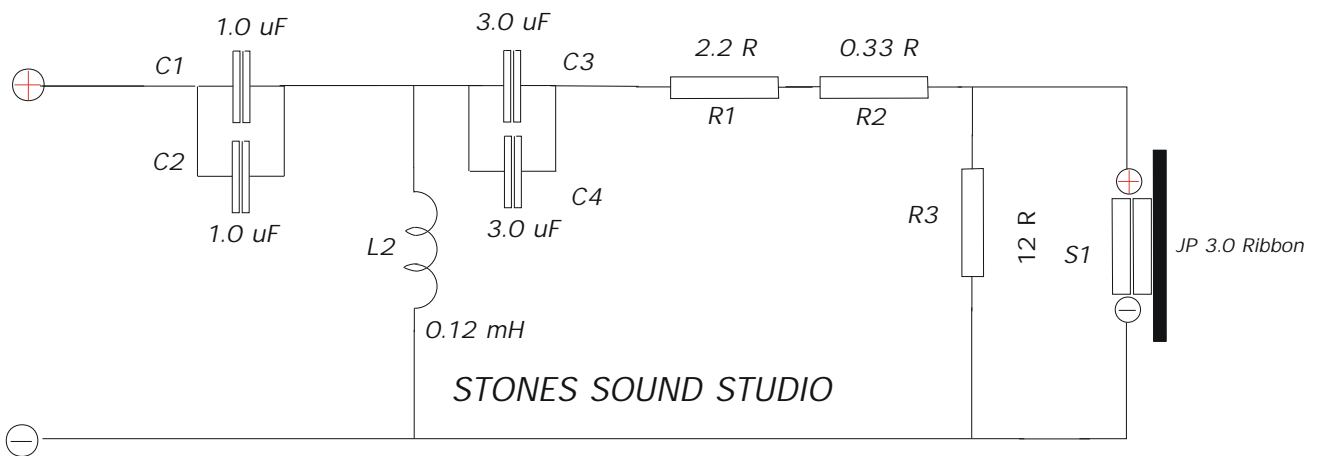
SOLD IN MATCHED PAIRS ONLY



Stone Sound Studio is an independent Audio Assessment company.

STONES SOUND STUDIO

ARTISAN JP3.0 RIBBON CROSSOVER



REVISION (1) NOV-2003

Stones Sound Studio

ARTISAN JP 3.0 RIBBON XOVER

Designed by Russell Storey

Date NOV 2003

Audiophile Speaker Xover

DWG No
PR3-008

COMPONENTS

L1 = 0.12 mH

S1 = JP 3.0 Ribbon Tweeter

C1/C2 = 1uF

C3/C4 = 3.0uF

R1 = 2.2 R 10W

R2 = 0.33R 10W

R3 = 12 R 10W

STONES SOUND STUDIO

Audio and Acoustic Engineering Consultants

Ref JP3.0 XO Version 2

29 June 2005

Please find attached JP3.0 XO Version 2 schematic diagrams. The new circuit has been designed with a lower cut of frequency to meet the customer requests for building 2 way Speakers systems using Scan Peerless and Vifa drivers from WES .

The original ribbon crossover circuit is designed for 3way speaker systems with a higher cut off frequency

Version 1 "in catalogue" 18db/oct @ 7.5 kHz with attenuator chart for 3way speaker

Version 2 18db/oct @ 4 kHz with attenuator chart for 2way speaker

Find attached Version 2

Jp3.0 ribbon crossover 18db/oct@ 4 kHz for bass mid drivers with early roll off in two-way speaker systems.

The new Crossover circuit incorporates a ladder attenuator with 2 resistor values required for 0, 3,4,5,6 db of attenuation

The SPL frequency graph attached is the 0db attenuator ref level. The Crossover cct drive level of 5.149 v is only relative the Spl frequency graph was referenced to the standard 2.83v@ 1M.

Jp3.0 Crossover Resistor Attenuation table

| | | Attenuation | R2 | R1 |
|-------------|------------------|-------------|-----|-----|
| Jp3.0_Xover | 18db_3.8Khz_ + | 4db | 6.8 | 4.7 |
| Jp3.0_Xover | 18db_3.8Khz__ + | 5db | 4.7 | 5.6 |
| Jp3.0_Xover | 18db_3.8Khz_ + | 6db | 4.7 | 4.7 |
| Jp3.0_Xover | 18db_3.8Khz__ + | 0db | 22 | 2.2 |
| Jp3.0_Xover | v18db_3.8Khz__ + | 3db | 12 | 4.7 |

Regards
Russell
Stones Sound Studio

JP3.0 Ribbon Tweeter

- SSS I recommends a of 3rd order filter between 3.7K to 9Khz
- Large Alloy ribbon heatsink assy
- Shielded neo magnetic structure ensures home theatre applications in medium powered systems
- Effective from 2000 Hz upwards due to the large diaphragm area and low self-resonance.
- Extremely thin diaphragm (0.009mm Aluminum foil) weighing 15mg in mass gives extreme speed and transient response with detail and a wide dynamic range
- low level detail
- High efficiency is guaranteed by the double neodymium boron magnets.
- Very Low distortion factor, good power-handling capabilities, highly linear impedance and amplitude frequency response with wide frequency response range make this suitable for any high end sound system
- High definition wide bandwidth rear mounted matching transformer couples the alloy ribbon diaphragm to impedance match for a nominal 7.5 ohms ac resistance at 1Khz and constant to 20Khz where it reaches 8.2 ohm making this an excellent load for crossover designs with minium phase variations



Specifications



Mechanical Drawing

Round Face ribbon 110mm diameter for flush mounting into speaker baffle

STONES SOUND STUDIO

PR3.0 Ribbon Tweeter

Application Notes.

NOV 2003 Revision 1

by Russell Storey Stones Sound Studio

Ribbon V/S Dome tweeter

The Pr3.0 Ribbon tweeter is completely different to a conventional anular coil driver dome tweeter in its characteristics and should to be treated with care because of the wide bandwidth fragile low mass diaphragm and impedance matching transformer .

Power Rating

Applied power to the ribbon should be limited by careful Xover design for the particular application be it a 2way of 3way Xover as this ribbon has a built in transformer with a primary impedance of 4ohms (ac) 0.2 ohms DC . So this can act as a short circuit to an amplifier below Xover frequencies of 1 KHz

Because of the ribbons low mass diaphragm (11mg) they are susceptible to low frequency damage below 1Khz and I recommend should be normally operated at frequencies above 3khz in any speaker system . The tweeter has a rating of 15watts RMS sine wave at 3 kHz or 100 watts with music program material with a professionally designed crossover over a limited period of time. This is a very efficient tweeter so it does not require a lot of power to achieve high SPL sound levels.

Bandwidth

Because of the PR3.0 ribbon tweeter wide bandwidth to 40 KHz the crossover type is very important.

The use High Quality wide bandwidth Audio components are necessary to hear the benefits of a ribbon tweeter. Use HQ interconnects / Speaker leads/Speakers /Home theatre amplifiers / SACD /DVD players. I recommend professionally designed crossovers using Audio high grade capacitors non inductive resistors and coils to achieve the optimum performance from this excellent ribbon tweeter.

Xover Filters for the Ribbon tweeter

If a simple 6 db/octave filter (single capacitor in series with the ribbon is used below frequencies of 5Khz KHz low frequencies can damage the ribbon diaphragm.

6db/Filter Single Capacitor 3way speaker systems

I recommend that the tweeter is used above 7.8Khz as a super tweeter in a 3way speaker system with a 2.2uf /400V metalized polypropylene .

12bd/18db/Filter Xover for 2 and 3 Way speaker systems

For lower Xover frequencies in the range from 3 to 7.8Kh KHz the ribbon requires a minimum of a 2nd 12bd/oct or 3rd order 18db/octave high pass filter design which I have developed specifically for the PR3.0 ribbon tweeter for general applications .

A 3rd order Xover was customdesigned and developed by Stones Sound Studio using the LEAP Professional Crossover Program to optimize the high quality and power bandwidth of this ribbon.

Regards

Russell Storey



Ribbon Replacement Instructions

Tools: Hex Keys of proper size to unscrew face plate
2 pieces of scotch tape

We'd like to suggest you checking the tweeter to be repaired firstly if you need to see how it is assembled.

1. Remove face plate
2. Remove tape which cover the holding blocks, and clean up the surface of two conductive plates. Prepare 2 new pieces of tape whose size is the same as former one (Plain scotch tape is OK).
3. Remove ribbon holding blocks on the two conductive plates, and remember which goes where, they are not interchangeable.
4. Remove the two plastic wedge pieces (this part is used for G2, G3 and G3i-130).
5. Remove old ribbon and clean all areas.
6. Take one end of new ribbon, shiny side facing down, and insert in the groove of conductive plates, so the first ribbon corrugation is hanging in the gap.
7. Carefully center the ribbon in the gap and place the first holding block over it. Apply strong pressure on the block with a finger (double check to insure the ribbon is still centered in the gap), put a piece of scotch tape over the excess ribbon on the conductive plates.
8. Once the ribbon is hold by the tape firmly, with a pencil, punch a hole in the ribbon through the screw hole of the holding block and then screw the block tightly. (The premise is that the ribbon must be still centered in the gap).
9. Stretch the ribbon slowly in the gap lining up the last corrugation with the end piece, center the ribbon, place the second block and apply strong pressure on the block with a finger, put a piece of scotch tape over the excess ribbon on the conductive plates.
10. Punch a hole through the ribbon and screw the holding block tightly. (The premise is that the ribbon must be still centered in the gap).
11. Screw the face plate.

Notes:

- Magnets are extremely strong and will pull any tool through the front grill if you are not careful.
- Don't blow air into the ribbon, it will destroy it.
- Ribbon definitely will not touch the edges of the gap anywhere along the whole length.
- Remember how tight the screws were initially and match when you rebuild it.

10 August 2004

How to replace the ribbon in the Fountek JP3 tweeter



These are the tools needed to replace the ribbon. The slide gauge is not needed; any ordinary ruler will do. A scalpel (+ fresh blade) is great, but if you're good with scissors this will do. The "limstift" (Danish) is a glue stick. The plastic hammer is good but not necessary.



This is the tricky part. Two screw caps, here from some laboratory test tubes. I can't tell you where to get anything similar, but take a look around the supermarket and see if you can source anything similar. These have rounded

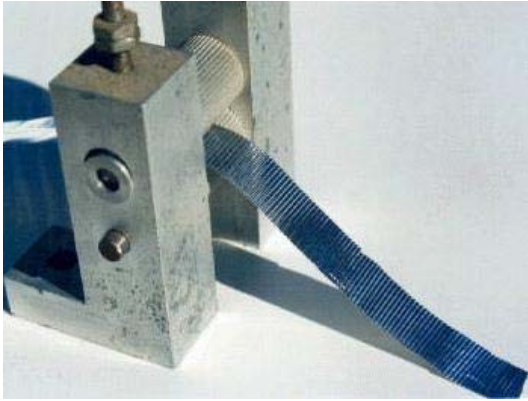
“waves”, which give – to my experience – the best elasticity in the corrugated ribbon. Very sharp bends appear to have less elasticity and we need a ribbon with some elasticity. Aluminium is definitely not a material that is characterised by having high elasticity



Household aluminium foil, 11 μm thickness. Cut some 8 mm wide strips of aluminium foil with the ruler and the scalpel.

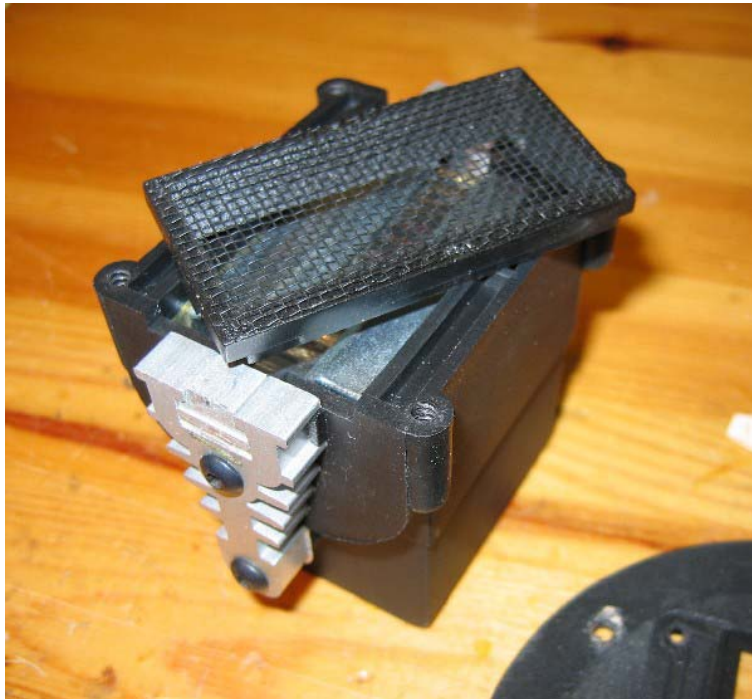


Corrugate the alu foil between the two screw caps as seen here. This takes some practice and people have produced all sorts of nice machinery for this, but we only have to corrugate 10 cm of foil, so this can all be done by hand as seen here.

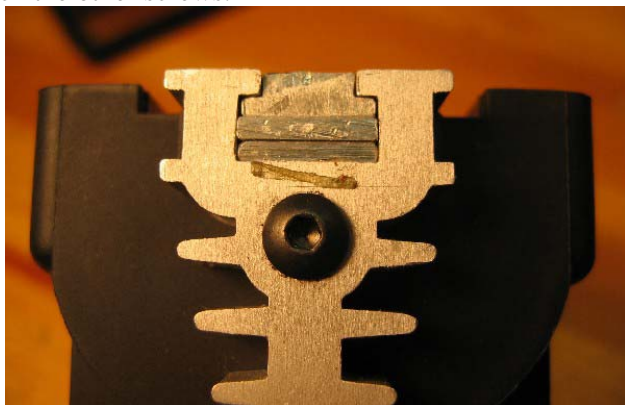


Here's a nice one somewhere from the web.

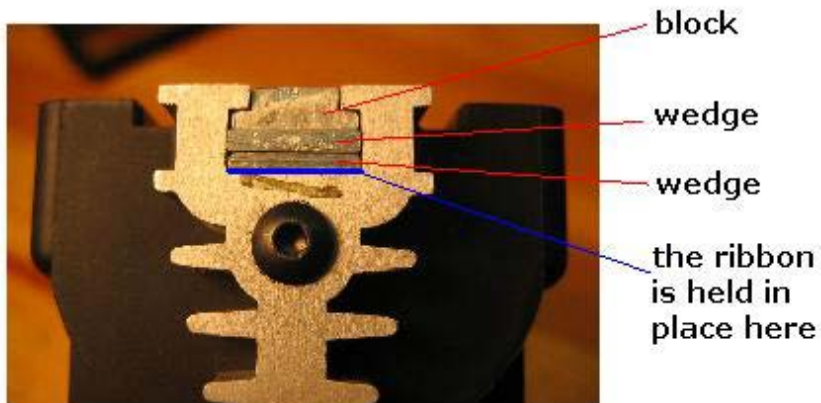
Believe me, the most ugly ribbons I have made have measured just as fine as the perfect ones. What is important is that you are able to gently stretch out the ribbon between the magnets without the ribbon touching them. There has to be just enough space between the ribbon and the magnets – on average something like max. 0.5 millimetre.



Dismantle the driver by removing the four screws that hold the faceplate. DON'T touch the other screws.

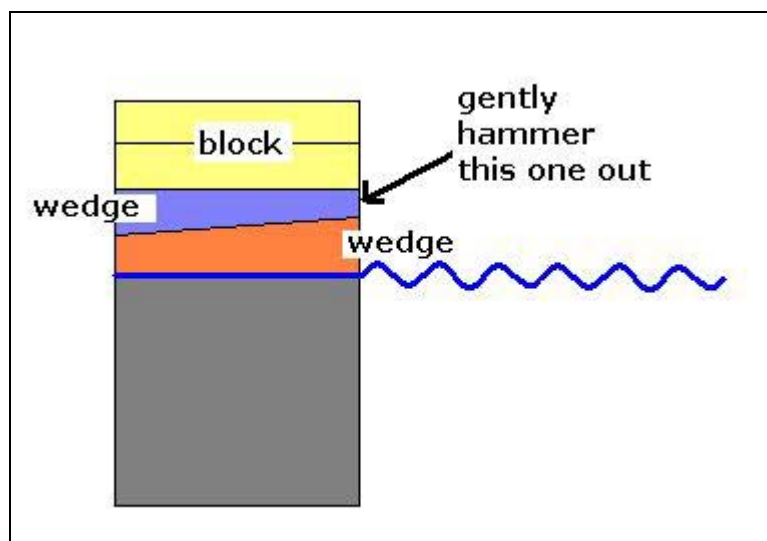


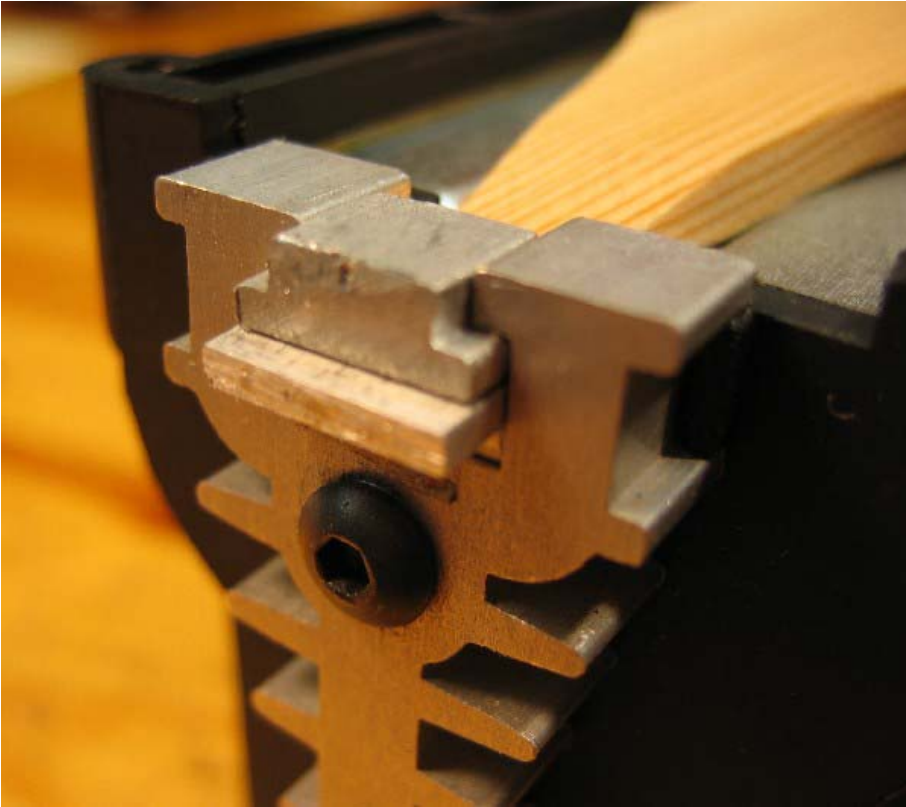
This is how the ribbon is held in place. Three small pieces of aluminium, where two really are wedges. Hard to see before they are free.



These neodymium magnets are killers! Any metal that can be magnetized will be sucked in, so use a wooden spatula to gently hammer out the wedge in the middle.

The aluminium block and wedges are oriented like this:

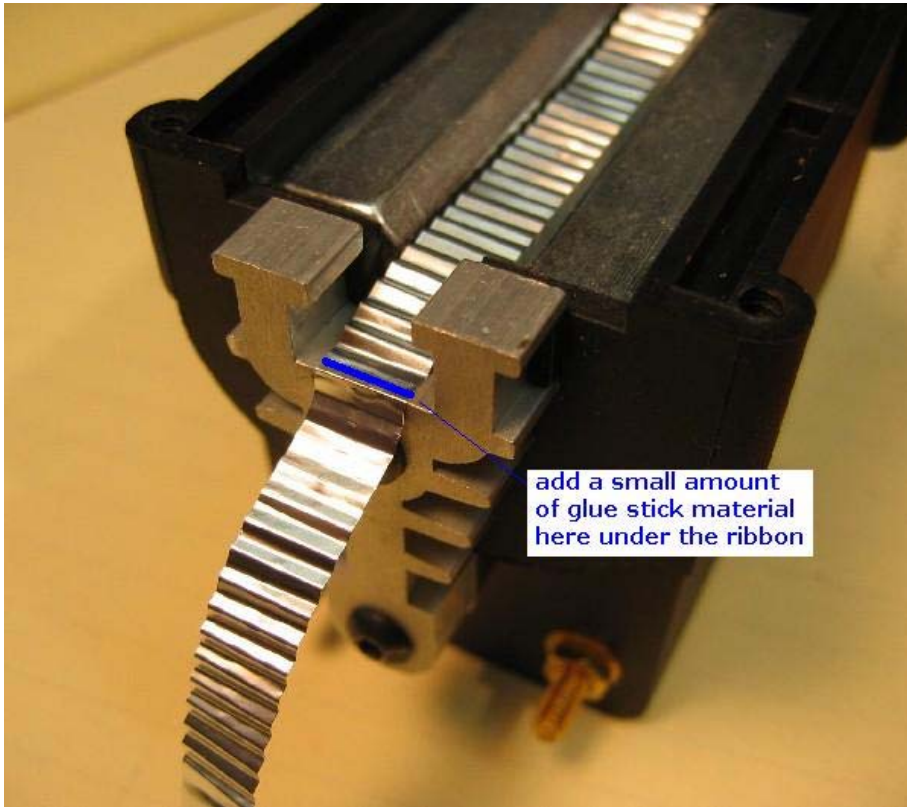




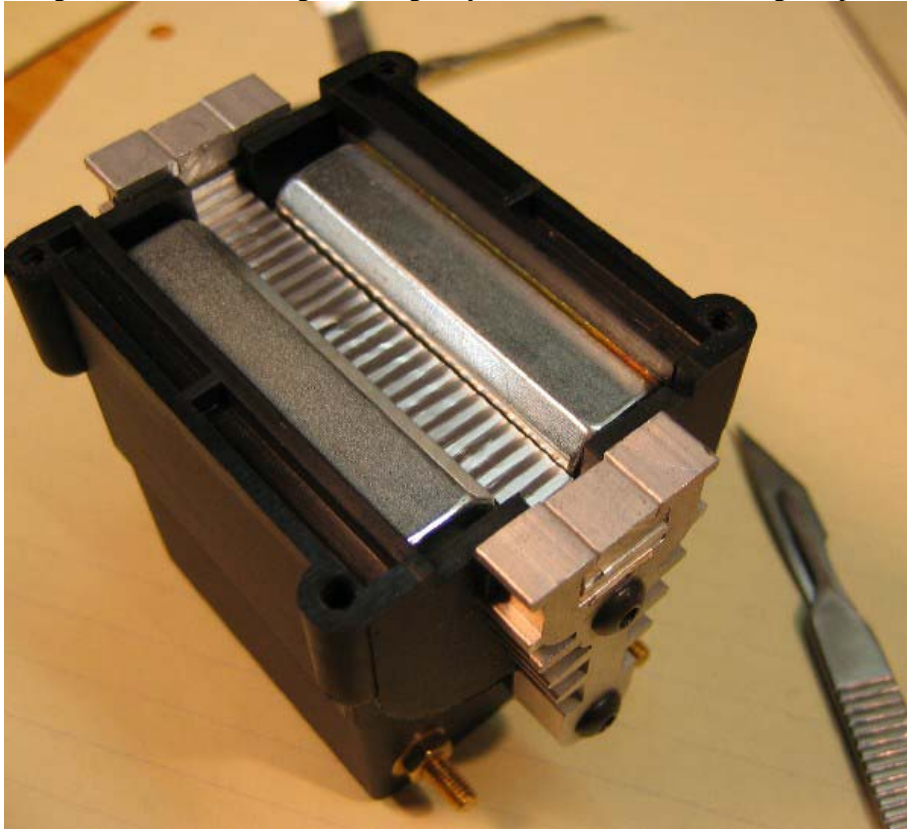
Here you see the upper wedge and aluminium block moving out.



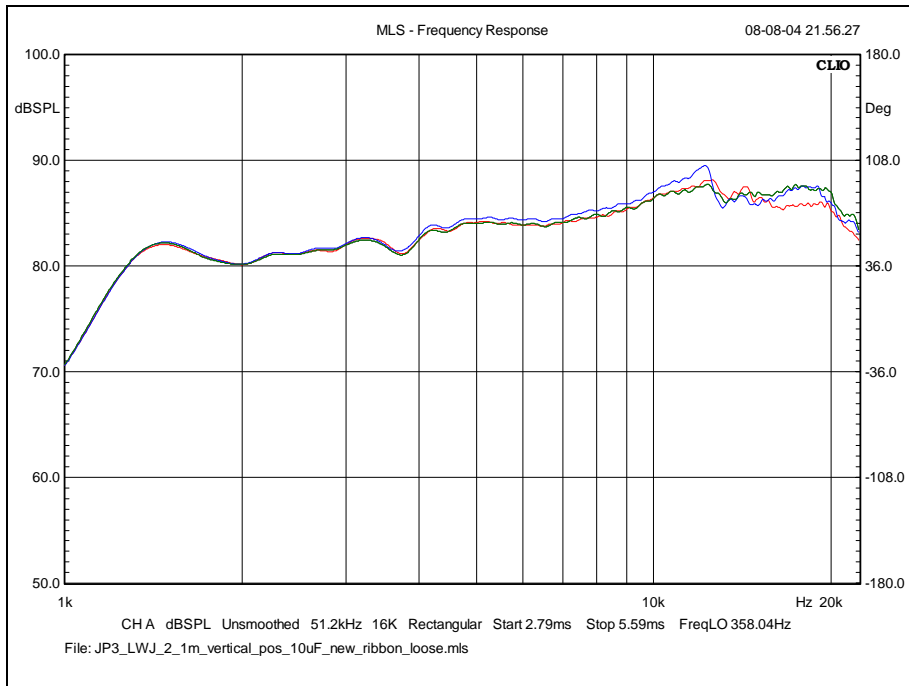
Remove the old ribbon.



Insert ribbon between magnets and gently press the aluminium ribbon against the sticky glue at one end. Gently stretch the ribbon and attach at the other end. Make sure the ribbon does not touch the magnets. It can be close in some places, but it must not touch or it will buzz. Gently insert the lower wedge with the narrow end facing out. Insert upper T-block and middle wedge (narrow end facing in) and gently hammer the middle wedge in place.

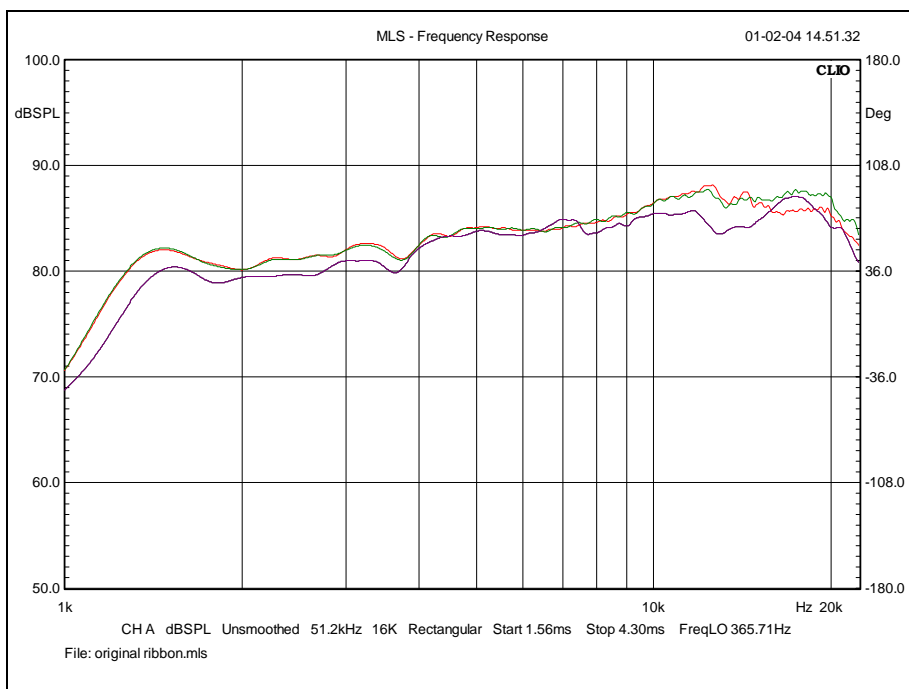


If you stretch the ribbon too tight it will produce a peak at 13–14 kHz. Touch the ribbon gently at the middle and test it for elasticity. It must be able to bend slightly and retract to its former position but it must not droop in the magnet gap.



Blue curve is when the ribbon is too tight.

Red and green = response from two newly replaced ribbons.



Purple = original ribbon response (taken some months ago. Don't pay attention to different sensitivity here). Actually the homemade ribbons perform better than the original ribbons.

Ordinary thin household aluminium foil is 11 micrometers thick on these shores. Check yours. The original aluminium ribbon is only 9 μm giving approx. 1 dB higher sensitivity. This is no problem here as the sensitivity of the JP3 is some 95 dB. If you are using 5R6 for the series resistor in the Acapella, replace by 4R7. If you use 4R7, replace by 3R9 or 3R3.



Waste!

Fiddling around with 11 μm aluminium foil requires some practice. Fortunately the raw material comes for (almost) free and it only takes practice. Good luck!

Further tests:

1. If you have test equipment, insert 10 μF in series with the JP3 before performing the measurement. With the CLIO I'm using an output setting of -25dB to the power amp driving the tweeter.
2. If you want to check the polarity of the JP3 tweeter do like this:



Only connect the battery for less than a second and observe the ribbon movement. When the ribbon is moving OUT, the terminal applied POSITIVE voltage is the PLUS terminal.

The terminal with the red wire clip is NOT the plus terminal on the JP3 tweeter.

Troels Gravesen

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