

JORDAN SYSTEMS

JXR6 HD SYSTEMS

For traditional applications, a single JORDAN JXR6 HD is an exceptional drive unit, covering the entire audible range from 80Hz upwards.

The low frequency response of the JXR6 HD has been extended to a remarkably low limit to enable its in-box performance to be directly matched to appropriate high quality sub-woofers. To achieve this the conventional rear suspension has been omitted and the system resonant frequency and 'Q' values are set primarily by the 'acoustic suspension' provided by the volume of air enclosed within a small box. This technique also provides a significant reduction in low frequency distortion.

This table gives the values of F_b , Q_b and F_{-3dB} , plotted against box volume in litres:

V_b	F_b	Q_b	F-3
4	106	0.66	115
3	113	0.7	114
2	126	0.78	115
1.5	139	0.86	119
1	160	1.0	127

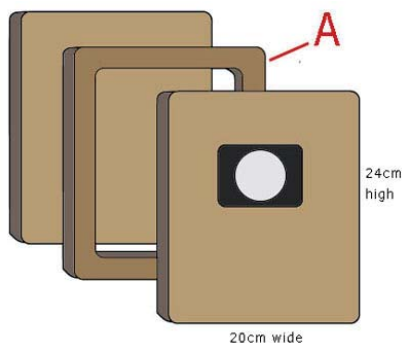
These values are computer modelled, based on unfilled boxes and will be modified by the inclusion of damping materials.

The best compromise is a 3 litre closed box, giving an F_{-3dB} of 114Hz. These sizes are for a single drive unit. The enclosure could be sized to accept a further three units and enable you to upgrade to a Linear Array at a later date.

Alternatively, the JXR6 HD and its enclosure can be integrated into a bass system, either by incorporating into the bass enclosure (with allowance for the JXR6 HD's enclosure volume) or mounted on the top of the bass enclosure (this is more versatile and decouples the JXR6 HD from the bass).

One suggested design for a stand-alone system is shown below, made from 12mm ply or MDF. Two panels are cut for front and back - the sizes shown below are external. Then a matching frame (A) is cut to the same external dimensions. The hole inside the frame should be 15cm (h) x 19cm (w). Five frames, clamped between the front and back panels, will give approximately 2 litres. The number of frames can be altered to match the volume required. The hole inside the frames could be cut in an irregular shape, to help break up internal reflections.

The JXR6 HD should be inset to be flush with the front panel and the outer edges of the cabinet rounded. Place four small pieces of dowel at irregular points between the front and back panels to brace the enclosure and the inside should be lined with felt, BAF wadding or similar absorbant material.



As we work further with this new driver, we will put further enclosure designs on this page.

JORDAN Linear Array

This definitive statement of JORDAN technology is, as would be expected, deceptively simple in concept.

The system is based upon a vertical linear array of four JORDAN JXR6 HD drive units for each channel. Their rectangular chassis format permits close stacking. The units are driven with equal power and full bandwidth. Bass 'roll-off' components are unnecessary and, indeed, detrimental to the performance of the system.

For optimum performance, the arrays should be wall mounted in front of the listening area. They may be up to 15 feet apart and the wall space between them should be unobstructed and preferably lined with a soft covering.

The linear array generates near-cylindrical wave formations which project along the wall and develop a continuous full width soundstage between the arrays with remarkable image stability regardless of listening position within the room.

Together with the intrinsic ability of the system to preserve low level detail this image stability will, programme permitting, sonically 'open up the wall' to reveal an unprecedented spatiality and depth of live stage realism.

The JORDAN Arrays should be used in conjunction with a suitable bass system, such as our powered subwoofer. If using a passive bass system, low pass roll-off should be achieved with a series 9mH inductor. System power rating is determined by the bass system.

Technical background to the Linear Array

Conventional loudspeakers radiate sound randomly in all directions where the perceived loudness is proportional to the inverse square of the distance between the loudspeaker and the listener. This means that if the listener moves a little to the left or right from a central 'hot seat' position, images cluster toward the nearest loudspeaker. A cylindrical wave front has an inverse linear loudness/distance relationship which maintains a far greater image stability.

The spatiality and 'depth' of the soundstage is a result of the low level detail intrinsic to JORDAN foil cone technology, and the absence of the masking influences of wall reflections and crossover circuitry.

JX92S SYSTEMS

A feature of the JX92S is its 'designer' tailored polar response. The axial response above 2kHz exhibits a linear rise. The response at 30 degrees off-axis shows a complementary fall. The power response, therefore, is substantially level. If the loudspeakers are positioned so that the axes cross well in front of the listening area, this achieves remarkable stereo imagery.

The JX92S is highly adaptable to a very wide range of enclosure designs, from elaborate, horn-loaded cabinets to simple, ceramic pots. Whilst it is not feasible to detail all the possible options, the following guidelines will assist the home constructor in achieving a system which is simple to construct but superior to the majority of commercially-built loudspeakers using conventional units.

The LINKS page details other designs available on the web, although we should stress that we have not heard most of these.

3 litre IB enclosure

The smallest 'full range' system using the JX92S. A closed box, 15cm sides all round, constructed of 18mm

MDF and completely filled with acoustic wadding is all that is required to make an excellent stand-alone mini monitor. It will provide a remarkably balanced sound and can be either free-standing or wall mounted.

Where a full bass extension is required the 3 litre system should be augmented by a matching, passive bass system using a first order roll off centred at 112Hz (e.g. a series 9mH inductor). The JX92S system should continue to handle the full frequency range, with no bass roll off circuit required.

8 litre reflex enclosure

For many applications a more traditional design may be preferred. This offers an outstanding performance for its size and offers an ideal entry level system for the smaller room. The enclosure should be lined with acoustic wadding to a depth of 30-40mm, keeping well clear of the vent.

The internal volume is 8 litres, which can be built as an internal size of (HxWxD) 30 x 15 x 18cm. The vent should be 3cm diameter x 11cm long.

If configured as a closed box system, completely fill the interior with acoustic wadding.

VTL transmission line enclosure

The VTL elicits the ultimate low frequency performance from the JORDAN JX92S full range drive unit and provides a superior standard of sound quality to many larger, conventional multi-way systems. This has been carefully designed to offer the positive qualities of the TL whilst maintaining an elegant and domestic-friendly appearance. The broad shape enhances the sound and makes it easy to place against a wall. The system is capable of operating from 45Hz to 20kHz.

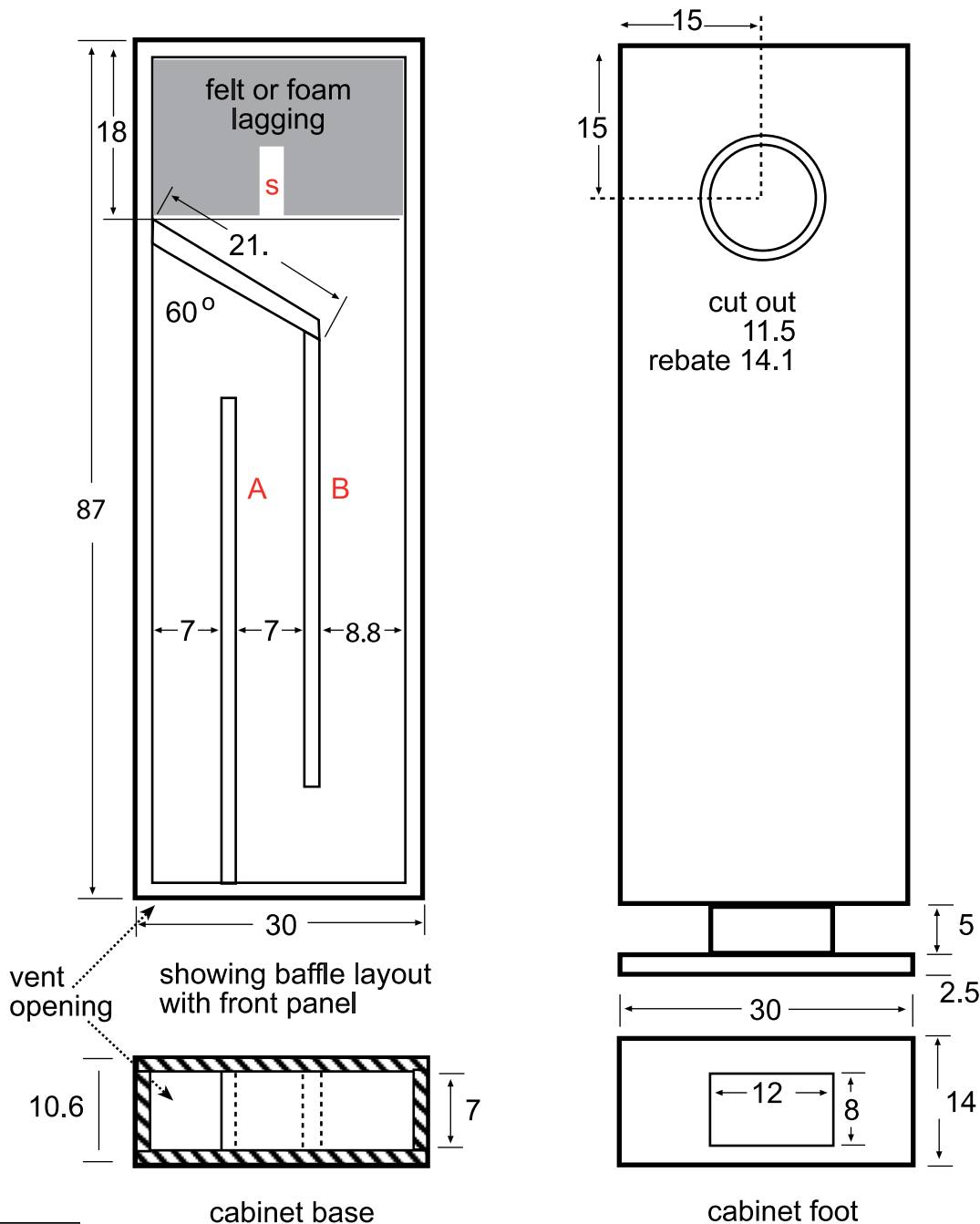
The only acoustic wadding necessary with this enclosure is a piece of felt or foam, lining the rear wall of the driver cavity. A slot should be cut in the felt to match the hole in the rear of the JX92S magnet assembly. No wadding is required in the line itself, although some constructors have adjusted the sound to their own taste by placing a small amount of wadding in the vent opening.

An alternative, bass reflex version of this cabinet can also be built and full details can be seen on the next pages.

JORDAN JX92S VTL transmission line design

This slim enclosure is only 100mm (4 inches) deep and offers visual elegance plus the opportunity to secure optimum low frequency performance from transmission line loading. The wide baffle supports upper bass frequencies giving a full, balanced sound. The transmission line vents through the base of the cabinet, as shown. All dimensions in centimeters.

- Driver** 1 x JORDAN JX92S.
- Materials** 18mm MDF or Baltic birch plywood.
- Filling** 10mm felt or foam as shown compressed under magnet on rear surface only, with 20mm slot **S** cut to allow air access to vent at the rear of the magnet.
- Fixing** 4 x 5mm screws into shown rebate. Captive T-Nuts rather than woodscrews are recommended.
- Partition A** 50cm long (top to bottom).
- Partition B** 45cm long (top to bottom).

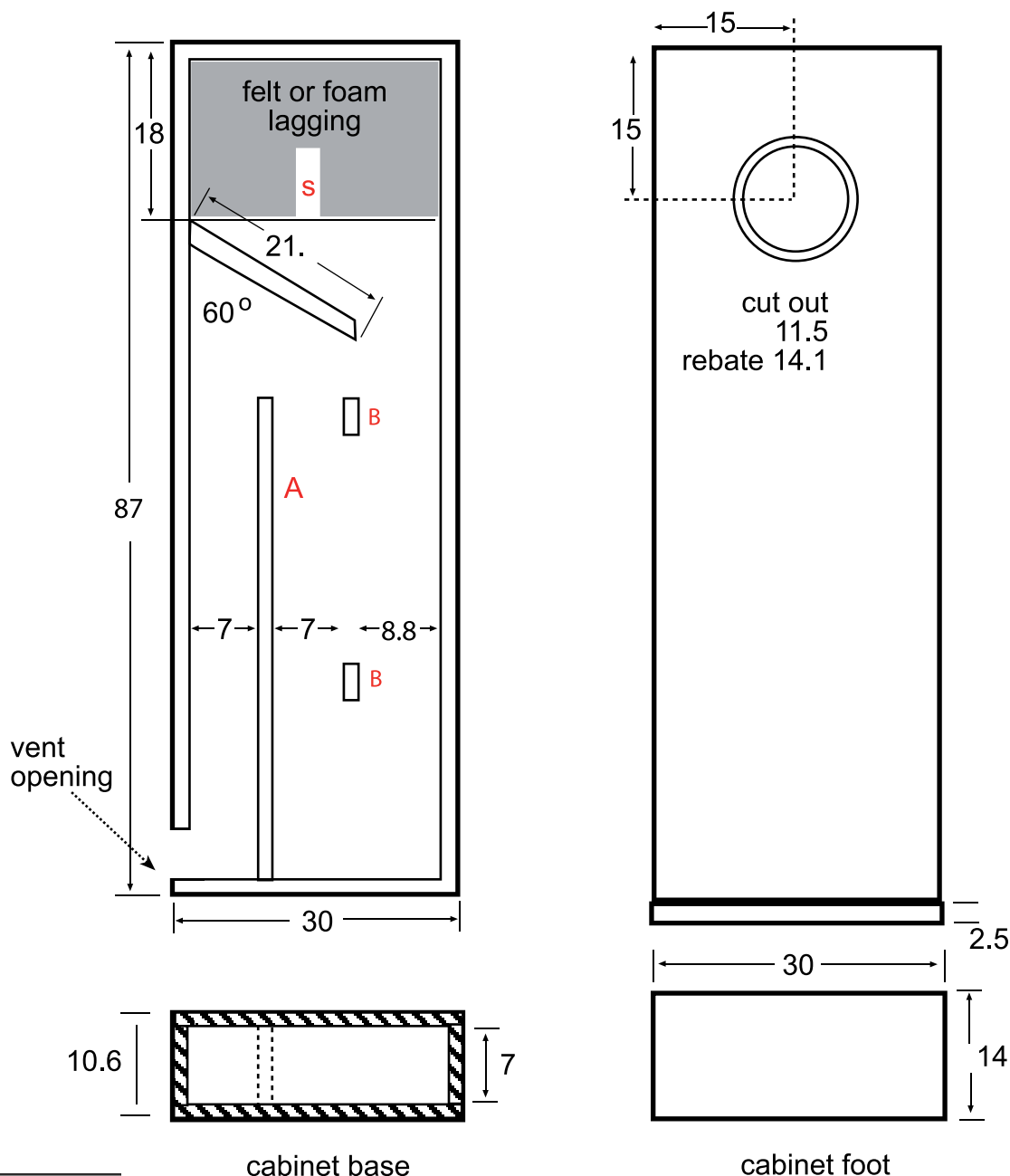


Design ©Ted Jordan
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JORDAN JX92S VR reflex cabinet

This slim enclosure is only 100mm (4 inches) deep, visually elegant and easy to place. It can be placed with back against the wall in normal use or toed in for critical listening. Based on the VTL cabinet, it offers an alternative loading - bass reflex or vented. Overall sound is very similar but this cabinet is marginally easier to construct. The reflex port vents through the side of the cabinet, as shown. The base aids stability of the finished enclosure. All dimensions are given in centimetres.

- Driver** 1 x JORDAN JX92S.
- Materials** 18mm MDF or Baltic birch plywood.
- Filling** 10mm felt or foam as shown compressed under magnet on rear surface only, with 20mm slot **S** cut to allow air access to vent at the rear of the magnet.
- Fixing** 4 x 5mm screws into shown rebate. Captive T-Nuts rather than woodscrews are recommended.
- Partition A** forms the reflex port and is 50cm long (top to bottom).
- Blocks B** brace front and rear panels to reduce resonance, they are 7cm long and exact placement is not critical.
- Port** vent exit is 7cm x 7cm square.



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Frequency compensation

Due to the excellent frequency range, efficiency and low distortion of the JX92S, the bass performance in small enclosures can be enhanced by the use of a simple passive network in series with the driver, comprising a series resistor 'R' with an inductor 'L'. Values for different box volumes are given below.

The circuit will further enhance both the phase and impedance characteristics. There will be an efficiency loss of 3 - 4dB but since the initial driver efficiency is 88dB, this is not too serious.

Vol	3 litres	8 litres	VTL
R	4.7 ohms	4.0 ohms	4.0 ohms
L	1mH	1.5mH	2mH

DIY SYSTEMS

In addition to our own enclosure designs, there are a number of interesting designs published on the web. Whilst we have not heard all of these and cannot vouch for them directly, the various on-line forums discuss their merits in great detail. We will feature some of these from time to time, authors permitting.

Please note that we cannot enter into email correspondence regarding these designs. To discuss them further with people who have built them, see the online forums listed on our links page.

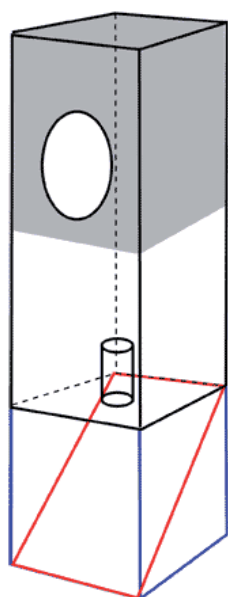
JX92S MLTL

This enclosure is designed by Greg Monfort and originally appeared on the fullrange driver forum <http://www.fullrangedriver.com/>. It is a quarter wave, mass-loaded TL designed with the aid of Martin King's MathCad software <http://www.quarter-wave.com/>.

Two versions are shown below. The original MLTL-31 has been widely built and has a bass extension to around 45Hz. The more recent MLTL-48 extends the JX92S to below 35Hz. Both designs may benefit from frequency compensation if used well away from the wall or corner.

The dimensions shown come directly from the computer simulations and can be rounded off.

MLTL-31



All dimensions are internal

Height - 31.04" (78.8cm)

Width - 6.97" (17.7cm)

Depth - 4.31" (11cm)

Driver - JX92S centred 11.14" (28.3cm) from top

Port - 2" diameter x 5" long (5 x 12.7cm)

Stuffing - 0.54lb

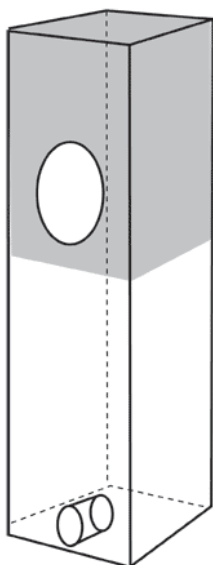
The stuffing suggested (shown in grey on the drawing) is based on computer simulations - as always adjust to suit. Stuffing fills the top section of the cabinet, stopping just below the driver.

Recommended material is 18-25mm birch ply. The backside of the driver cutout should be bevelled at 45 degrees to reduce reflections.

To raise the driver to ear height, a stand can be incorporated by extending the back and sides downwards (shown in blue). The front is left open.

The port exits through the base and can be augmented by a reflector panel (shown in red), angled towards the open front of the stand. The back of the stand can be filled with dry, sterile sand to add mass to the enclosure.

MLTL-48



All dimensions are internal

Height - 48" (122cm)

Width - 6.97" (17.7cm)

Depth - 4.31" (11cm)

Driver - JX92S centred 15.46" (39.3cm) from top

Port - 2" diameter x 2.75" long (5 x 7cm)

Stuffing - 0.54lb

The stuffing suggested (shown in grey on the drawing) is based on computer simulations - as always adjust to suit. Stuffing fills the top section of the cabinet, stopping just below the driver.

Recommended material is 18-25mm birch ply. The backside of the driver cutout should be bevelled at 45 degrees to reduce reflections.

No stand is required for this design.

The port exits through the front panel and should be placed as close to the bottom of the enclosure as practical.

As long as the cross-sectional area is kept the same, alternative cabinet shapes can be used. A trapezoid MLTL-31 has been built and is reported to have a tighter bass than the rectangular cross-section enclosure. An alternative for the MLTL-48, is the triangular enclosure below.

TRIANGULAR CROSS-SECTION CABINETS

To reduce internal reflections, the MLTL cabinets can be made with an equilateral triangular cross-section. The example shown has interior sides 8.33 inches (21.2 cm) wide and has the same cross-sectional area as the rectangular design. This would allow room for a front-firing port in the MLTL-31 cabinet.

This shape has the additional advantage of placing the JX92S at the recommended toe-in angle, when side (A) is parallel to the back wall.



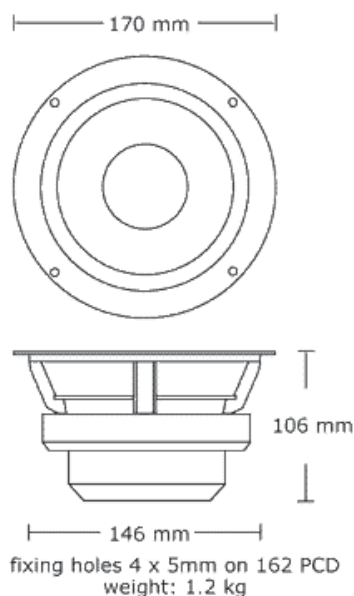
JX125 & JX150 MLTL DESIGNS

JORDAN BASS DRIVERS. (These are the old versions of 125 and 150, not to be confused with the newer MKII versions not yet released)

The JX125 and JX150 are enhanced technology, high performance bass drive units, designed to complement the JORDAN JX53. Used in conjunction with a first order crossover, they provide a seamless, step free sound quality throughout the audio spectrum. The unique JORDAN Axiline suspension system keeps parameter values constant at all power levels, facilitating accurate enclosure design.

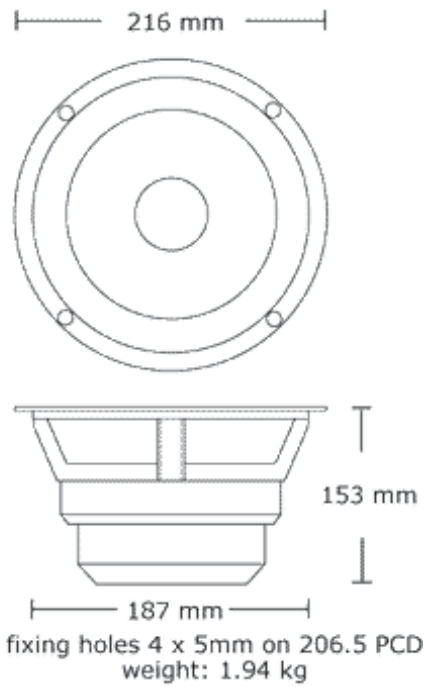
Although the units are no longer available, the basic specifications are given below for those who still have these units. Greg Monfort, the designer of the MLTL enclosure for the JX92S has also supplied MLTL designs for these drivers.

Jordan JX125



JORDAN JX125 technical specifications		
free air resonance	FO Hz	30.0
mechanical Q	Qm	3.6
electrical Q	Qe	0.52
total Q	Qt	0.45
mechanical resistance	Rm N*s/m	0.68
force factor	B*1 T*m	5.31
DC resistance	Re ohms	6.0
dynamic mass	Md grams	12.94
system compliance	Cs m/N*E-0.4	21.75
equiv air volume	Vas ltr	53.66
cone area	Sd sq.cms	132.73
sound pressure level	SPL 1m 1w	87.76
min box volume (1B)	litres	18.0
max box volume (vented)	litres	
power, continuous	watts	60
power, music, in system	watts	100
Xmax p-p	mm	9.0

Jordan JX150



JORDAN JX150 technical specifications	
free air resonance	FO Hz
mechanical Q	Qm
electrical Q	Qe
total Q	Qt
mechanical resistance	Rm N*s/m
force factor	B*1 T*m
DC resistance	Re ohms
dynamic mass	Md grams
system compliance	Cs m/N*E-0.4
equiv air volume	Vas ltr
cone area	Sd sq.cms
sound pressure level	SPL 1m 1w
min box volume (1B)	litres

ENCLOSURES

The JX125 and JX150 will work with either closed or vented enclosures. Recommended volumes are:

Driver	Units	Format	Net volume	Vent length	Vent diameter
JX125	1	closed	25-50 litres	none	none
JX125	1	vented	33 litres	28 cm	5 cm
JX125	2	vented	66 litres	31 cm	10 cm
JX150	1	closed	40-80 litres	none	none
JX150	2	vented	100 litres	33 cm	22 cm

MLTL ENCLOSURES

Using Martin King's MathCad program, Greg Monfort has kindly provided the following designs for the JX125 and JX150. (Please note that we are unable to enter into correspondence regarding this design.)

MLTL-JX125

Height - 57.28"

Width - 8.3"

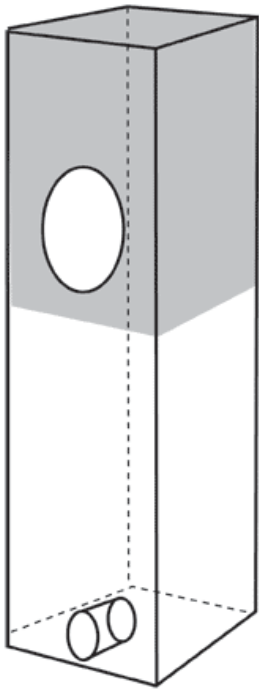
Depth - 10"

Driver centred 20" from top

Port - 3" diameter x 4.75" or 6" long (experiment with port length to give the desired in-room roll-off)

Stuffing - 0.2lbs per cubic foot Polyfil

MLTL-JX150



All dimensions are INTERNAL.

Height - 59.1"

Width - 10"

Depth - 11.37"

Driver centred 21.33" from top

Port - 3" diameter x 4.5" long

Stuffing - 0.2lbs per cubic foot Polyfil

The stuffing (shown in grey on the drawing) is based on computer simulations - as always adjust to suit.

Recommended material is 18-25mm birch ply. The backside of the driver cutout should be bevelled at 45 degrees to reduce reflections.

The internal depth, width and shape can be adjusted as long as the overall cross-sectional area remains the same.

The port exits through the front panel and should be placed as close to the bottom of the enclosure as practical.

MORE TO COME.....