

***To design and build a ported bass cabinet
featuring the CF18VJD loudspeaker***

APPLICATION NOTE

CELESTION

www.celestion.com

CF18VJD Bass Cabinet: Design/Build Notes

Celestion have designed a ported bass cabinet, specifically for use with the **CF18VJD** ferrite magnet, cast aluminium LF driver. Cabinet specifications are:

Material	18mm birch plywood
Cabinet Volume	167 litres (5.9 cu. ft.) Total 135 litres (4.8 cu. ft.) Effective
Cabinet Resonance (Fb)	37Hz
Max SPL (1-watt/1m)	127dB (-0.5dB at 40Hz, -3dB at 36.5Hz)
Recommended high pass filter	Butterworth 24 dB/octave 33Hz cut-off

A ported or reflex cabinet is a simple box enclosure with one or more holes (ports) added on the front baffle. For most PA uses, this offers the best option for building a clean sounding loudspeaker cabinet that makes the most of the bass driver used. The addition of the port can extend bass driver performance and will also marginally improve the speaker's low frequency power handling and efficiency.

The energy from the front of the driver is radiated to the outside world. But the sound from the back of the speaker also has an effect, as it vibrates the air in the port(s). This has a resonant frequency, like an organ pipe, adding to the sound output of the system. If the port(s) are designed correctly, the additional energy will extend bass performance without adding distortion or sacrificing a smooth response.

As with all ported boxes, it would be sensible to use with a high pass filter. This will ensure that no high level input is presented to the box below its lower limit. This is because, for very low frequency signals, the driver becomes unloaded, (i.e. the box effectively

disappears.) Under these circumstances, driver excursion increases rapidly and the potential for driver damage is significant.

For this **CF18VJD** cabinet, a suitable value for this filter is 33 Hz. A sharp corner to the cut-off would be desirable, so a 24 dB/octave Butterworth filter or similar is recommended.

The cabinet should be built as a solid and non-resonant box with well sealed and secured joints. This particular design uses 18mm plywood the advantages of this are strength, durability and availability.

The panel joints shown are simple butt joints that are screwed and glued. For those with advanced wood-working skills, more sophisticated joints can be used. Whatever joint type you use, it is important they are secure and airtight. In addition, to reduce panel resonances, bracing battens have been added.

Electrical connectors such as a high quality ¼" jack 4mm binding posts, speakons or XLRs can be used. When fitting these it is recommended you solder on flying leads, mount the socket then make airtight using a sealing compound.

Use mounting bolts and T-nuts to fix the driver to the baffle. **CF18VJD** is compatible with M6 bolts.

There is a wide range of speaker cabinet accessories available, including wheels, hands, grilles and corners, adding to convenience and durability. These should be fitted carefully so as not to weaken the box or cause leaks.

CF18VJD Specification

General Specifications

Nominal diameter:	460mm/18in
Power rating:	1600Wrms (AES Standard)
Nominal impedance:	8Ω
Sensitivity:	97dB
Frequency range:	25Hz-1500Hz
Voice coil diameter:	125mm/5in
Chassis type:	Cast aluminium
Magnet type:	Ferrite
Coil material:	Round copper
Former material:	Glass fibre
Cone material:	Carbon and Kevlar loaded paper
Surround material:	Cloth sealed
Suspension:	Double
Xmax:	9mm/0.35in
Gap depth:	12mm/0.47in
Voice coil winding width:	30mm/1.18in



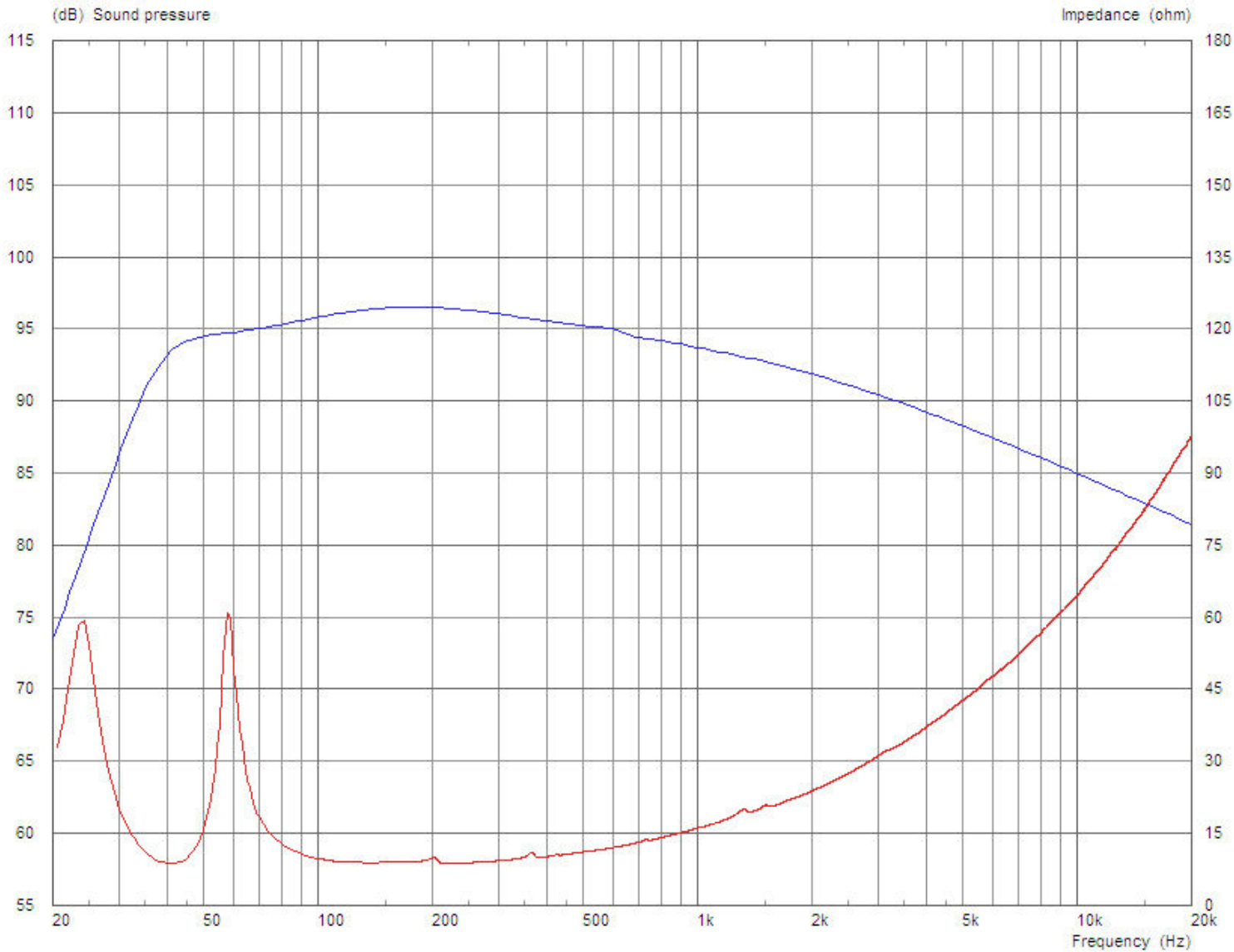
Small Signal Parameters

D:	0.38m/14.96in
Fs:	33.1Hz
Mmd:	235.488g/8.31oz
Qms:	9.464
Qes:	0.315
Qts:	0.305
Re:	5.51Ω
Vas:	164.01lt/5.79ft3
Bl:	30.54
Cms:	0.09mm/N
Rms:	5.644kg/s
Le (at 1kHz):	1.987mH

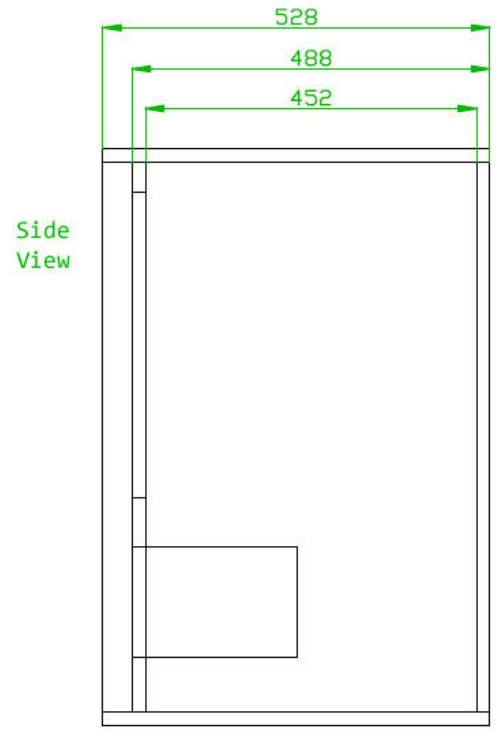
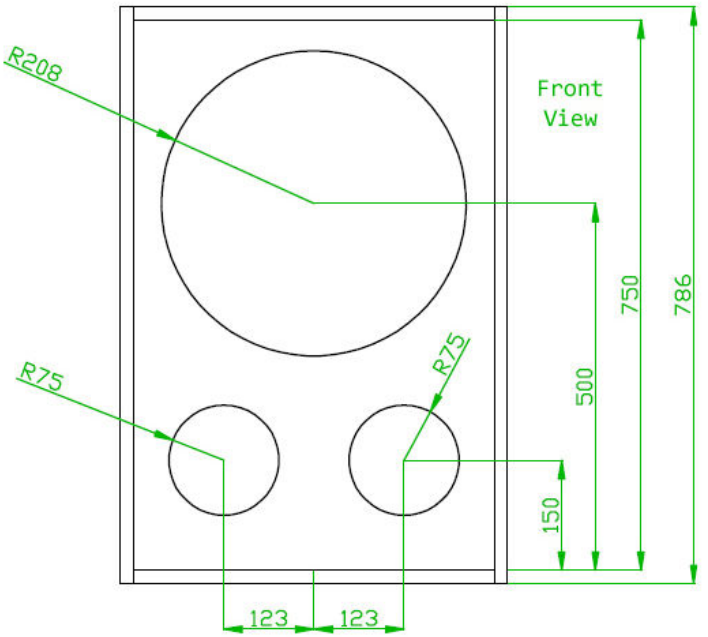
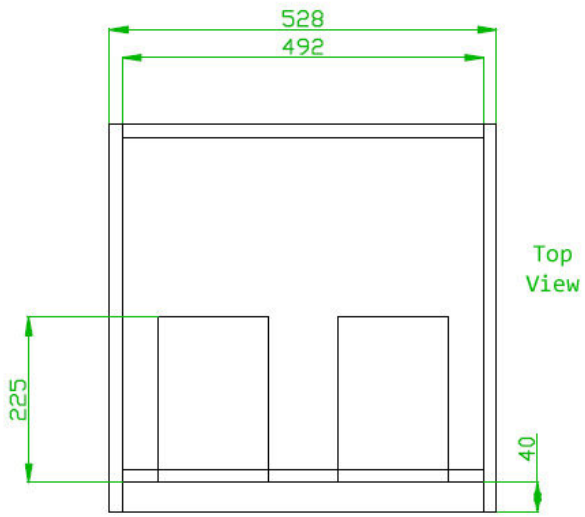
Mounting Information

Diameter:	462mm/18.19in
Overall depth:	233mm/9.17in
Cut-out diameter:	416mm/16.38in
Mounting slot dims:	11mm x 7mm/0.43in x 0.28in
Number mounting slots:	8
Mounting PCD range:	432-441mm/17.0-17.36in
Unit weight:	23kg/50.6lb

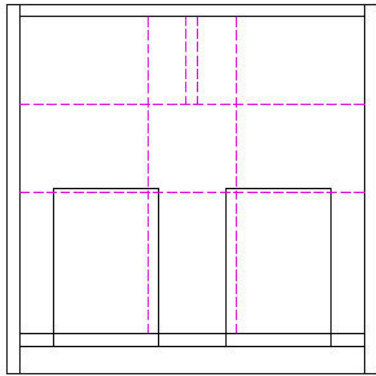
CF18VJD Bass Cabinet: System Response Curves



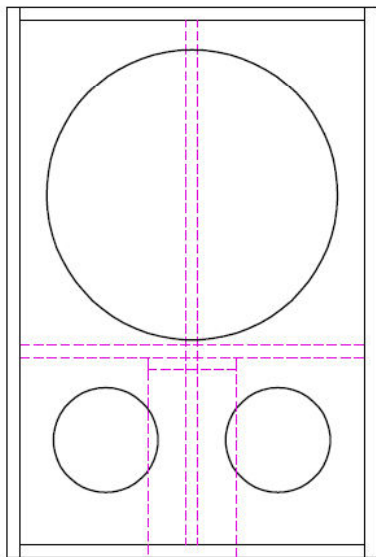
- Unfiltered SPL Response (predicted)
- Impedance Response (measured)



Cabinet Plan
External and Port Dimensions

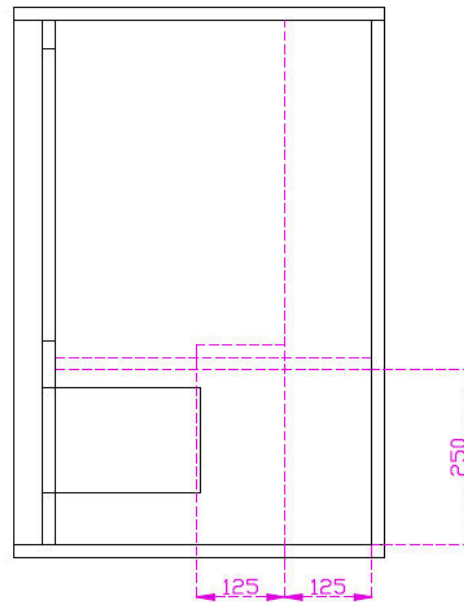


Top View



Front View

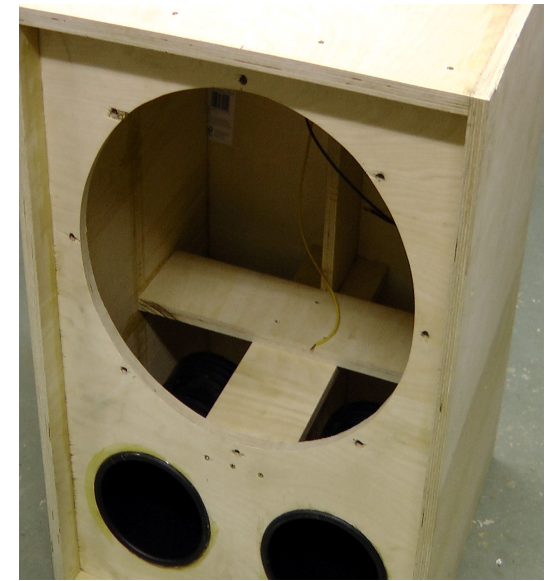
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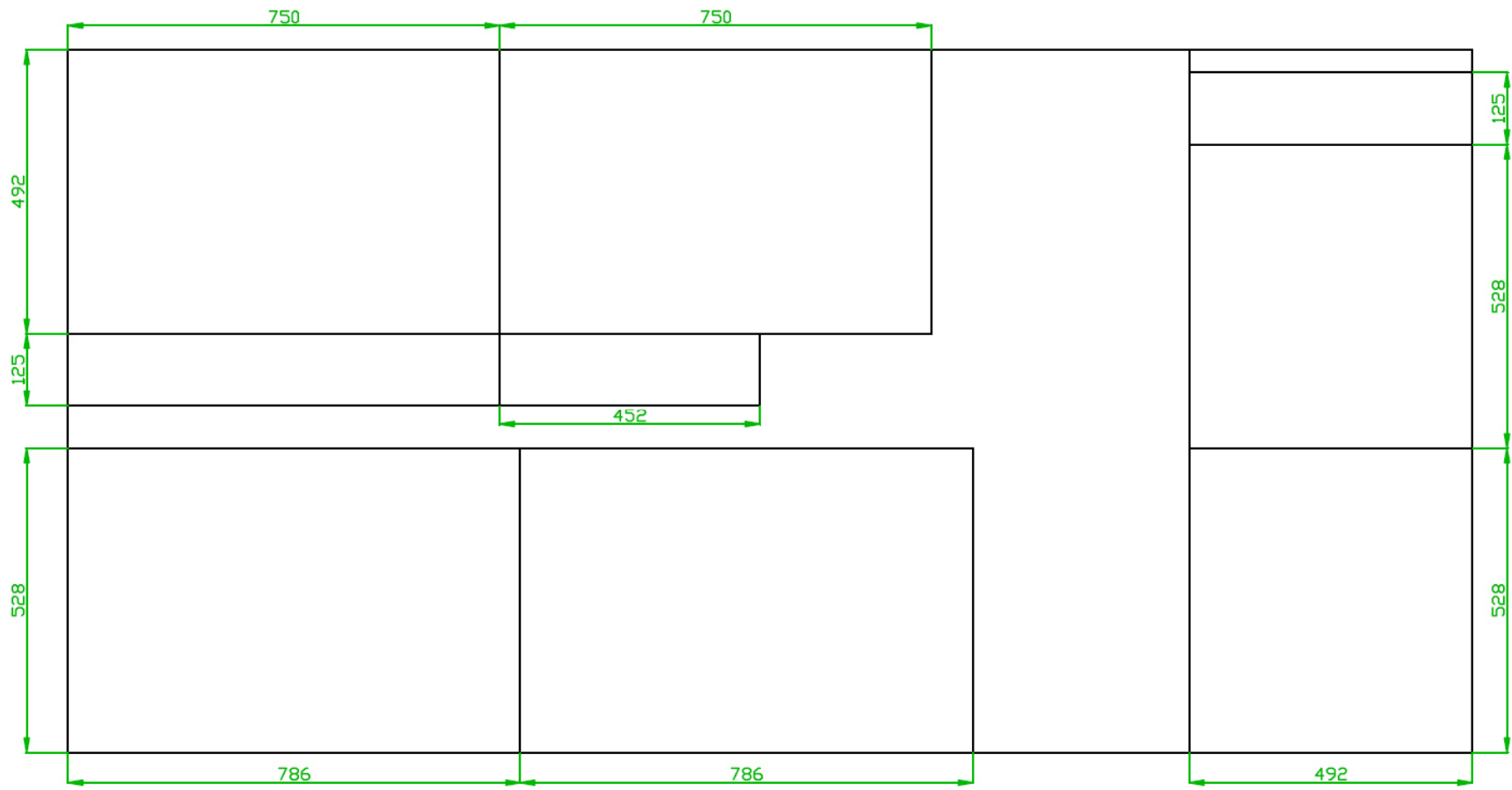
Side View

125 125

250



Cabinet Plan
Internal Bracing Dimensions



Cut-Out Guide
2.4m x 1.2m Sheet (8' x 4'); 18mm Birch Plywood