

Technical Description

Jamo D 7 system



Jamo[®]
Let's get personal

Technical Description

Jamo D 7 System

<u>Contents:</u>	<u>Page</u>
1. General system description	3
2. The products:	
2.1. D 7LCR	5
2.2. D 7SUR	6
2.3. D 7SUB	6
3. Driver explanation	
3.1. Tweeter	7
3.2. Midrange	8
3.3. Woofer	8
3.4. (Sub) woofer	9
4. Electronics (D 7SUB)	9
5. Cabinets	10

General description

With the **Jamo D 7 System**, the goal was to create a THX certified system, where the famous qualities from our two predecessors are kept i.e. a wide and high listening window, design and compact size, but with an even more dynamic, open and detailed sound reproduction.

This was done through the choice of very high quality in materials and development of completely new and very powerful driver units.



The sound reproduction of the **D 7 System** is very detailed, clear and open in the entire spectra, with a large listening window making it easy to locate instruments, vocals and subtle details when listening to music or experiencing a movie.

With – 6dB points at 20Hz and 40.000Hz, compatibility with multi channel audio is obvious.

The **D 7 System** fulfils the new THX Ultra2 standard and is at the same time a true **high-end hi-fi system**. And probably being the most compact THX Ultra2 certified system in the market enables most people to integrate the system into a “normal” home interior.

A complete 7.1 set up requires 5 x **D 7LCRs** (3 pcs. as front speakers and 2 pcs. as surround back speakers) and 2 x **D 7SURs** as surround speakers. Finally 2 x **D 7SUBs** complete the system. However, as the THX certification applies to a 3000 cu. ft. /110 cu. m room which approximately refers to 400 sq. ft. /40 sq. m., one subwoofer will be more than sufficient for rooms smaller than this. This is in fact one of the reasons why Jamo has chosen to make a more compact subwoofer – giving the consumer freedom of choice depending on his room size and personal preferences – we call this “Individual Sound Solutions”.

Also, using two “small” subs instead of one “big” sub, makes it easier to obtain a smooth power response throughout a large room.

In some aspects, the **THX Ultra2** requirements are not as restrictive as the “old” THX Ultra as a wider vertical dispersion from the front speakers is allowed.

We welcome this, as it fits well into our philosophy about not having a narrow vertical dispersion. In our previous THX systems we have always kept this focusing to a minimum.

In the development of the **D 7LCR**, great efforts have been put in getting as wide vertical dispersion as possible.

Our philosophy is lived out through the **D 7LCR** - you will simply experience a large open listening window, regardless of the listening height.

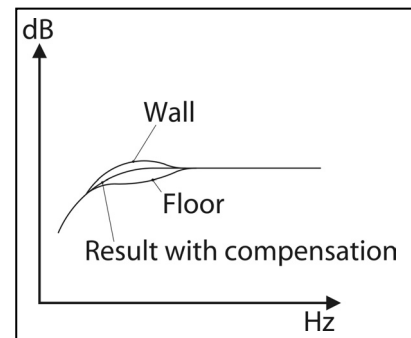
All seven main speakers in the **D 7 System** are designed for wall mounting. But as a new option, the **D 7LCR** is also designed for free standing – on an extremely sturdy dedicated floor stand.

When wall mounted more parameters are “controlled” than with a free standing position: As there is no distance from the speaker to the rear wall, we know the room amplifies low frequencies and how much. We recommend placing the speaker 1 metre above the floor.

The most common listening distance is 2 – 4 metres, so we can quite accurately predict the contribution from floor reflections too.

Wall mount:

The rear wall “amplifies” low frequencies and the floor actually gives a dip in approximately the same range. With a carefully calculated compensation in the crossover we end up with a linear frequency response, down to 80 Hz (-3dB).



With the speaker placed “freely” on the **D 7FS** (D 7 Floor Stand) there is little or no influence from the wall behind the speaker, it then acts as any other speaker placed on a stand. – i.e. with “normal unpredictable” room influence.

The two placement options require separate input terminals for wall mounting and for free standing.

As earlier indicated the design idea of the **D 7 System** is kept in the same way as the D 6 system, with three identical speakers as front/centre. Due to the flat planar design the 3 **D 7LCRs** can be mounted in a horizontal line which prevents the sound image from “jumping up and down” when the sound pans between the speakers. The sound image also benefits from the 3 identical front/centre speakers, as there is no difference in timbre and dispersion pattern.

The aesthetic impression from the system is quite unique with the three elegant identical speakers at the front. The black fabric is shaped with an arc shape over the “midrange/ tweeter array” in the centre and with a thin vertical aluminium line on each side of the arc. On the top of the front frame is an exclusive oval aluminium badge with the Jamo - and THX Ultra2 logo.

The cabinets come in Stone Grey.

The surround speakers **D 7SUR** and the subwoofer **D 7SUB** match the design of **D 7LCR**.

D 7LCR / D 7SUR / D 7SUB description

D 7LCR

D 7LCR is a 3-way speaker with two 5½" woofers, two 2½" midrange drivers and one 1" tweeter, see more details about the driver units below.

The compact drivers improves the dynamics: As they weigh less they can move faster. Of course under the precondition that they are equipped with very powerful motors (magnet/voice coil) as is the case here.

The two midrange drivers are placed vertically over / under the tweeter and the woofers are placed on each side of the midrange/tweeter array.

The crossover frequencies are 400 Hz and 2k Hz.

There are several advantages of these low crossover frequencies when you, as in this case, have the drivers to match them.

Every diaphragm has a break up point and it is important that the driver is used in a range where break ups are controllable or do not appear.

Of course the further away from the break up point the better. In **D 7LCR** the crossover frequency for the woofers is 400Hz and the diaphragm's break up point occurs above 2k Hz. Therefore using a 2'nd order crossover is fully applicable and phase errors that often occur with higher order crossovers are avoided.

The two woofers in the **D 7LCR** are mounted horizontal beside each other which at higher frequencies (over 2k Hz) normally would result in phase cancellation, when listening off axis. However, since the x-over point is as low as 400 Hz this problem is eliminated.

The midrange drivers could easily work up to 4k Hz, but then again phase cancellation would occur, just here in the vertical direction.

The tweeter takes over at 2k Hz to obtain a wide vertical dispersion - thus the listening height is uncritical. Any listening height between 70 - 120 cm will result in a perfect listening window. This is not done better with any "normal" configuration.

The resonance frequency of the tweeter is as low as 600 Hz, and when cut off at 2k Hz, it is not stressed in any way. Therefore reproduction is very clear with a lot of "air" and details.

Due to the construction **D 7LCR** has a very wide **horizontal** and **vertical** dispersion resulting in a perfect listening window also in 2 channel stereo, where you typically listen off axis.

The **D 7LCR** is magnetically shielded so it can be placed close to a TV-set.

D 7SUR

The dipolar surround speaker **D 7SUR**, use the same drivers as the **D 7LCR**.

This is done to achieve seamless timbre matching with **D 7LCR** and to obtain the same high level of detail in the sound reproduction.

D 7SUR is equipped with one 5½" woofer, four 2½" midrange drivers and two 1" tweeters. At both ends of the speaker, there is a midrange/tweeter array with two midrange drivers, mounted close to each other with the tweeter above them - all in a vertical line.

This is done because the surround speakers, due to their positioning in relation to the listening position, must have a different dispersion characteristic than the front speakers. The dispersion pattern must be to the sides and upwards to "paint" the walls and ceiling with sound.

The D 7SUR features a single woofer mounted in the centre of the front baffle.

This configuration was chosen as conventional dipole speakers often suffer from poor bass reproduction, due to phase cancellation between the two woofers.

When equipped with one woofer, the depth of the cabinet can also be minimized, further adding to the ease of installation in the room.

The crossover frequency for the woofer is set at 200Hz, making it impossible to locate the speaker placement.

With this configuration we have a dipole surround speaker with the "best of two worlds": It is capable of reproducing the deepest bass - and still able to disappear physically in the sound picture.

D 7SUB

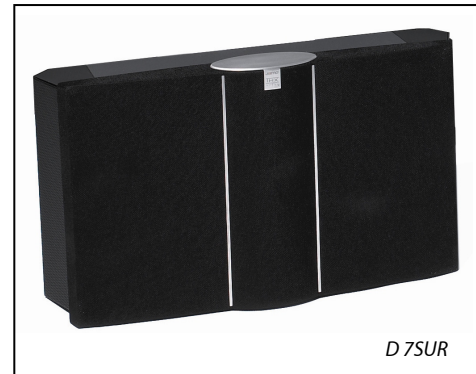
The **D 7SUB** is equipped with a very powerful 15" woofer. It is controlled by our **Motional feed back (MFB)** circuitry and equipped with a solid 400 watt (continuous output) class D amplifier, capable of delivering peak power of up to 700 watt.

The stand by power consumption is <1 watt.

Thanks to the heavy MDF board cabinet, the powerful amplifier, and the **MFB** circuitry, the **D 7SUB** delivers a deep, precise and detailed reproduction of the low register - perfectly matching the sound from **D 7LCR**.

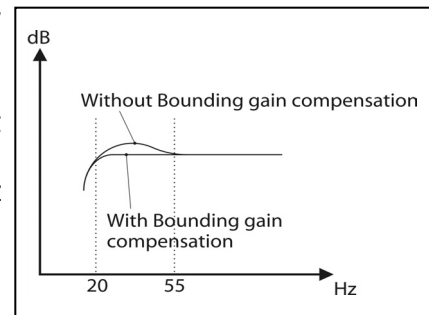
D 7SUB visually matches **D 7LCR** as width and design are identical.

A change in **THX Ultra2** compared with THX Ultra is the frequency range. In **THX Ultra2** the subwoofer is required to operate down to 20 Hz -6dB, compared to 35 Hz -3dB.



However, under certain circumstances this can create a problem, which is why THX Ultra2 decoders feature a Boundary Gain Compensation filter.

This filter compensates for the room influence at low frequencies, as any room amplifies the lowest frequencies. The magnitude of the room's amplification depends on the room and where you are positioned – normally it increases the closer you get to a wall. This can result in too high bass level from approx. 60 Hz and increasing downwards. In the range between 20-30Hz it peaks up to 5-10dB in an average room.



At first impression this could sound really impressive, but especially when listening to music the sound can be “boomy” and rather annoying. The Boundary Gain Compensation starts at 55 Hz -3dB and drops to -10 dB at 20 Hz.

For users of THX decoders without Boundary Gain Compensation, the D 7SUB has a quite unique feature:

Boundary Gain Compensation is built into the **D 7SUB** on a separate input, thus granting optimum benefit from the **D 7 System** with existing equipment.

The level control is placed on top of the **D 7SUB** elegantly integrated in the design. When it is turned to the point of THX reference level a LED lights up – indicating the THX specified input sensitivity.

Drivers

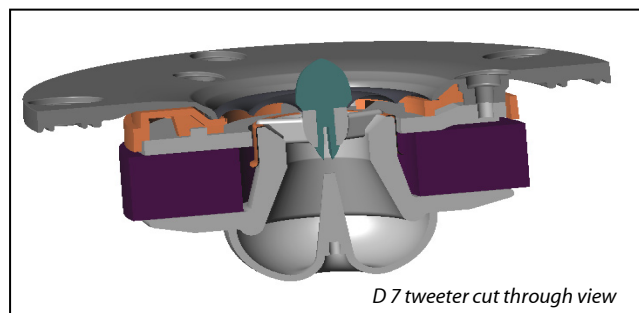
Tweeter

The tweeter was chosen for 3 main reasons:

1. Extremely low distortion
2. Totally freedom of accentuation of “s” sounds.
3. The low range extension

The 1" tweeter features a completely new design of the diaphragm/dome called Dual Concentric Diaphragm.

The coated textile diaphragm looks like two rings, one on the “inner” and one on the “outer” side of the voice coil – hence the name “Dual Concentric”.



The quite eye-catching centre plug has two purposes: It is a wave-guide and it clamps the diaphragm.

The magnet features a vented pole piece leading into a chamber at the backside. The chamber and the "ventilation hole" in the pole piece are tuned in for achieving the very low resonance frequency at 600Hz (normal res. freq. for a tweeter is around 1.5k Hz). The voice coil former is made of aluminium for optimum heat disposal. The voice coil is made of copper plated aluminium wire, because aluminium weighs less than copper, but the copper plating is needed because of its conducting qualities. In fact, the choice of "motor" materials makes use of magnetic oil for cooling and resonance damping superfluous! The "wire" from the driver's terminal to the voice coil is a thin litz wire. Usually, the voice coil wire continues to the terminals. However, litz wire features much higher compliance and therefore it has less influence of the movements of the voice coil.

All these features in combination allow the diaphragm to move effortlessly and the result is a very natural, detailed, dynamic and open sound reproduction.

Midrange

The 2½" midrange was developed especially for the **D 7** as it had to fit into our high demands to the system. The compact size alone makes it very fast - resulting in good dynamics. The sound is very open and detailed.

The unit is equipped with a rigid polypropylene diaphragm. The surround is made of rubber, providing excellent absorption of edge reflections.



The diameter of the voice coil former is 25 mm - quite large for a 2½" unit.

The large voice coil in combination with a powerful neodymium magnet, results in a very powerful motor, making the unit capable of high sound pressure level/power handling. The magnet is magnetically shielded.

Woofer

The 5½" was also developed specially for the **D 7**. The aluminium diaphragm material was chosen due to high rigidity and the fact that it is "airtight" (the air pressure inside the cabinet cannot penetrate the diaphragm). A pattern of small round stamps in the diaphragm makes it even more rigid.

The basket is made from rigid and open-structured ABS. The ABS material features a higher internal damping than that of a conventional metal basket.

The open structure of the basket, also behind the spider, ensures high airflow and prevents under- /overpressure at low frequencies - allowing free and fast movement of the diaphragm. This becomes an extremely important feature as excursions of +/- 8 mm were necessary in order to achieve the required SPL from the compact woofer.



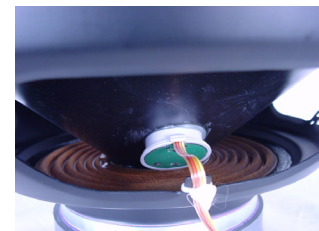
The woofer operates without break-ups until 2k Hz, which is far beyond its working range as the x-over frequency is 400 Hz.

Instead of a dust cap, the driver features a solid aluminium centre plug. This construction results in effective heat disposal and prevents airflow obstruction when the diaphragm moves.

The result is clean, natural and detailed sound reproduction.

(Sub)Woofer

The 15" woofer features a vented double magnet system and a capton voice coil former, 65 mm in diameter and 40 mm long. The 4 layer voice coil and the double magnet system make the motor of the driver very powerful, capable of very high power handling.



D 7SUB Woofer with transducer

The diaphragm is made from polypropylene which is very rigid and the foam surround allows fast movement at its low frequency working range.

The long throw woofer is capable of linear movements up to +/- 15 mm.

It is equipped with a transducer at the back of the diaphragm that measures the acceleration, which is used for the **MFB servo control**.

Electronics (D 7SUB)

Amplifier

The **D 7SUB** features a **400 Watt** Class D amplifier that operates at a highly efficient 85%. This means that 85% of the power consumption is dedicated to the speaker, and only 15% is dissipated as heat.

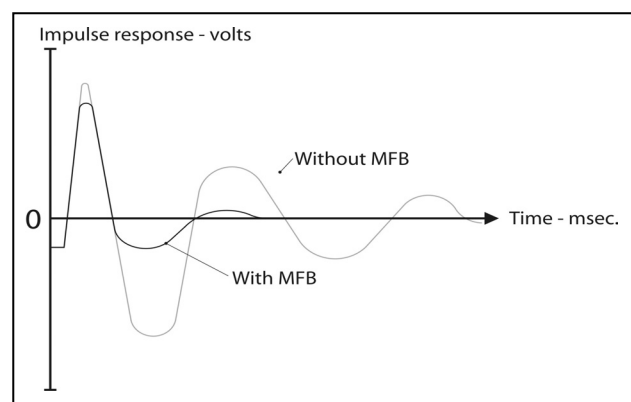
MFB (Motional Feed Back), servo control

We have given precise timing extremely high priority in the D 7 design. To enable the relatively compact subwoofer to reach very low frequencies with perfect timing the D 7SUB features **MFB**.

Even at high SPL the sound is precise and distortion very low.

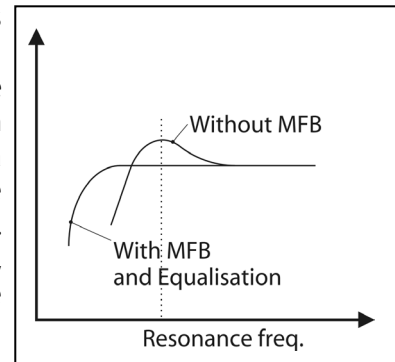
Thanks to **MFB** the driver "overshoot" is dramatically reduced adding to the perfect timing. The figure shows the overshoot of a woofer with and without MFB.

MFB controls the woofer and eliminates the overshoot very quickly. The woofer is simply able to start and stop correctly.



The MFB circuit is comparing the diaphragms movements with the input signal.

The transducer at the back of the diaphragm monitors the movement of the diaphragm by measuring the acceleration of it. In the feedback circuitry the signal is converted to a signal proportional to the speed. The speed is highest at the resonance frequency and so is the negative feedback. Consequently, the woofer receives less power in this area, and combined with equalization the frequency response reaches 20 Hz (-6dB).



It would be possible to make a subwoofer this size reach 20 Hz just with pre-filtering/equalizing, but that would create severe timing problems. This would be heard as the subwoofer “rumbling” all the time – i.e. not able to start and stop correctly. This might sound quite “impressive” when listening to surround with a lot of explosions etc., but it is also the reason why many consumers prefer to turn off the subwoofer when listening to music - it simply sounds annoying no matter how low you adjust the subwoofer level.

The very powerful amplifier combined with the **MFB** makes the bass reproduction deep, precise and detailed.

Auto On/Off

Forget all about the subwoofer once it is connected as this feature automatically sets the subwoofer in stand-by after approximately 20 minutes without input signal.

The “start up” sensitivity is 3mV and it stays on as long as the signal is above 1mV.

Phase and Cut-off controls

Place the subwoofer where it is most convenient - the controls ensure that the sound from the subwoofer can be adjusted to blend seamlessly with the sound from the rest of the speakers.

Cabinets

Due to their compact size and the fact that the cabinets are made of MDF board, they are a heavy and resonance dead base for the drivers to work in.

The MDF board used for the **D 7LCR** front baffle is 22 mm , the rear baffle is 25 mm, and the bottom/sides are 19 mm thick.

D 7SUR has two arrays for the midrange/tweeter and the wood part of the cabinet is made of 16 mm MDF board.

The cabinet for the **D 7SUB** is made of 25 mm MDF board which makes it very rigid and resonance dead, contributing to the precise reproduction of the low register.

The finish of the system is Stone Grey with black fabric front.