

Baby Bloomer

Compact but commanding, advanced DSP helps shrink the subwoofer, says **Keith Howard**

Velodyne DD-10 subwoofer

PRICE £2000 (black)/£2150 (cherry or maple)

Velodyne styles itself as the 'global leader in high performance, low distortion subwoofers', and few familiar with its impressive range of products would challenge that claim. Right at the pinnacle is the awesome 1812 Signature Edition, so named because it combines an 18in and 12in driver in one box – although the allusion to Tchaikovsky's famous overture is probably no coincidence. Next in the pecking order, and using the same core technology, comes Velodyne's four-model Digital Drive range. The 'baby' £2000 DD-10 is featured here and auditioned as a pair in place of one, commensurately larger subwoofer.

Baby indeed, because a distinctive features of all Velodyne subs is their compactness – remarkably so for the punch they pack. The DD-10 measures just 298 × 298 × 343mm and is also relatively light at under 9kg thanks, in part, to the efficiency of its integrated, Class D amplifier. This is rated at 1250 watts continuous output power or 3kW peak! The DD-10 also utilises the smallest version of Velodyne's in-house, servo-controlled woofer which is hooked into the Digital Drive DSP module that provides for the measurement and correction of its in-room response. This Digital High Gain Servo system uses a digital accelerometer to measure and control cone excursion at a sampling frequency of 16kHz.

Velodyne pioneered the fitment of on-board digital parametric equalisation to subwoofers with its Digital Drive system and in its latest (version 2) guise the software offers important enhancements. In particular it now incorporates a self-EQ feature, measuring the in-room response using a supplied microphone and optimising it automatically.

Optimised is, perhaps, too strong a word because in self-EQ mode the centre frequencies of the eight available filters are set to their defaults (20, 25, 32, 40, 50, 63, 80 and 100Hz), the Q (sharpness) of each filter is fixed and only their gains are adjusted. Either way, there's no substitute for manual adjustment of the filters if you want the best results. It is far better to get the sub and listening positions right and then use EQ to gild the lily than it is to hope its EQ will cure all ills. In



particular, you should avoid wide, deep dips in the response since these can only be filled by expending extra amplifier power and cone excursion. Because of this, the maximum boost available for each filter section is 6dB, whereas up to 12dB cut can be applied.

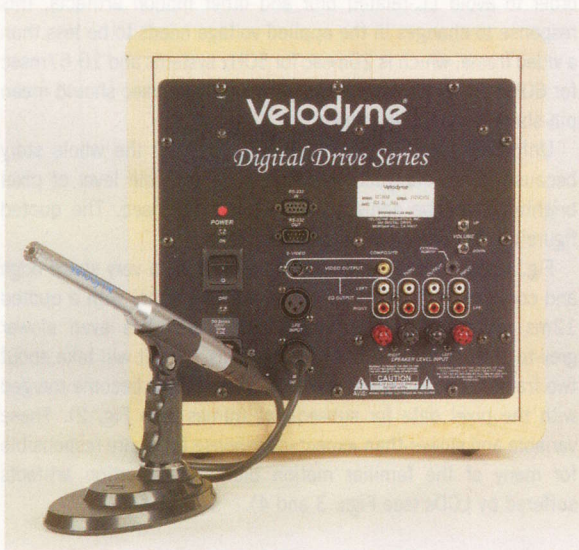
Digital Drive also provides control over other factors including low-pass crossover filter frequency and slope, subsonic filter frequency and slope, and polarity. Six presets are available that allow settings to be stored for different circumstances, such as music replay or home theatre. All this is controlled via Velodyne's remote handset in conjunction with a TV or other display, for which composite and S-Video outputs are provided.

As you would expect, audio connections can be made at either speaker or line level, via binding posts and phono or XLR sockets respectively. Serial (RS-232) input and output sockets are also provided to allow easy daisy-chaining of two or more subwoofers. One then acts as the master, ensuring that volume and preset changes are carried across all the units in a system. Two DD-10s were requested for this review since two subwoofers always perform better than one, and not just in respect of enhanced output capability. Correctly positioned, two subs also enhance the spatiality of the image down to low frequencies and provide more consistent results over a wider listening area. Velodyne has a suggested procedure for setting up more than one sub, which was followed to the letter for this review.

PERFORMANCE

Although there is no room here to reproduce the results, I performed a number of measurements on one of the review samples which confirmed the DD-10's inherently flat frequency response and established that the lowest cabinet structural resonance (assessed using a lightweight accelerometer attached to the centre of one of the side panels) occurs at 148Hz.

Although this is almost an octave above the frequency range over which the DD-10 will typically be operated, this is perhaps one aspect of its performance that could usefully be improved.



In addition to the usual audio inputs and outputs, the DD-10's back plate has video outputs to attach a display, serial inputs and outputs for daisy-chaining and a microphone input for the on-board EQ system. Output level is normally set using the supplied remote but volume up/down buttons are also provided

Similarly, and Digital High Gain Servo System notwithstanding, you can hear harmonic (distortion) content when driving the DD-10 hard with a 20Hz sine wave. Moreover, if you increase the volume setting there comes a point at which an obvious modulation sets in at a frequency of about 2Hz, which presumably is caused by internal driver protection. I'm not one for flashing lights on equipment but a visual indication of when this occurs would be welcome. If you prefer a 'dirtier' bass sound then you can back off the servo control of its cone motion via the setup menu. This has a 'Theater/Music' setting that's variable between 1 (least control, highest distortion) and 8 (maximum control, least distortion). Changing between these settings on a 20Hz sine input makes a clearly audible difference. For my listening I used setting 8 throughout.

There isn't a great deal to say about the DD-10's sound because it delivers just what you would expect and hope for. Take appropriate pains over the setup, first by positioning the sub(s) to minimise significant response 'holes' and then by using the EQ to smooth out the remaining ripples (it is not necessary or even desirable to achieve a perfectly flat response at the listening

Take appropriate pains over the setup and deep, even, clean bass in ample quantity is the reward

position), and you are rewarded with deep, even, clean bass in ample quantity to suit most of us. Only on the most extreme programme material, in an usually large room or for unsociable listening levels would you need to consider DD-12s or larger.

I subjected the review pair to all my favourite bass test tracks and they sailed through them. Even the Bass Outlaws' formidable *Kill the Competition* was accommodated at the loudest I would want to play it, by which time I was quartering the listening room to quell window and other rattles. If your listening room has a suspended wooden floor, as mine does, then you may well want to consider some form of compliant isolation to reduce its excitation.

AVTECH SAYS...

At £2000 (black) or £2150 (cherry or maple) each, a pair of DD-10s – and a pair really do sound better than one – represent a substantial investment for most of us. But factor in that extraordinary bass driver, the servo control, 1.25kW power amp and the flexible room EQ function, and it begins to look like good value. Recommended, if you want the best. ■

Supplier

Redline
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Hi-FiNews verdict

A substantial subwoofer in all but size, the exceedingly dense construction of the DD-10 commends it to one of the most important AV markets here and in the US: custom installations where the entire speaker system has to be housed, out of sight, in wall cavities.