

Dayton T1503A Subwoofer

by Tom Nousaine



Dayton Audio T1503A Titanic Subwoofer
\$899.95 assembled
\$749.99 kit
19 1/8" wide × 19 1/8" high × 19 3/8" deep
88 lbs
DaytonAudio.com

This interesting product actually turns out to be a real subwoofer. By that, I mean it actually produces sound pressure from 12-20Hz. Most of what manufacturers call a subwoofer these days is simply a woofer that runs out of gas by 25Hz. Many of them also have a dynamic (SPL) capability that peaks at 50Hz or 62Hz and then falls by 12-20dB per octave as frequency falls.

None of that is true with the Dayton T1503A, which will produce a true 81dB of SPL (relative to 2m, a real possible listening distance) at 12Hz and 105dB SPL

at 25Hz. Of the dozens of commercial "subwoofers" I've tested, this is only the third one I've found that is capable of the title.

to prevent two of the four plastic snap-ins from being broken during shipment. The cabinet also had a small amount of exterior shipping damage at one corner. I recom-

“It's kind of like getting a date with Charlize Theron and finding her lipstick already smeared when you pick her up.”

FEATURES

This sealed box system contains a 15" driver and a claimed 1000W amplifier with a single band parametric 18 to 80Hz equalizer. The 19 3/8" depth includes the front panel cloth grille but fails to include the 1/2" depth of the rear panel controls. The enclosure appears to be painted particleboard that has a definite hollow sound when knuckle-rapped.

However, because the system is a subwoofer and the relatively small cubical enclosure is highly resistant to ballooning, the box must be just stiff "enough" and not in need of the excessive weight and damping sometimes seen in commercial and DIY products. While there's nothing wrong with an enclosure that is stiffer or heavier than it needs to be, someone must pay for the materials and labor. And that is usually the customer. Suffice it to say I wasn't able to hear any cabinet sound when listening to the product.

The grille is nicely done but the packaging for shipment wasn't sturdy enough

mend that Parts Express spiff up the packaging. It's kind of like getting a date with Charlize Theron and finding her lipstick already smeared when you pick her up.

Performance

The following chart describes the frequency response (taken at 0.5m ground plane) and actual response of the crossover at marked points.

Frequency Response

LFE Input: 36Hz to 219Hz ±2.2dB

Stereo Input: 34Hz to 189Hz ±2.5dB

Low Pass Characteristic

Low Pass Dial Marking	True Low Pass Turnover Frequency	Level Change
LFE	219Hz	-
200Hz	189Hz	-
3 pm	164Hz	-
105Hz	111Hz	-
9 am	56Hz	< 1dB
30Hz	46Hz	-9dB

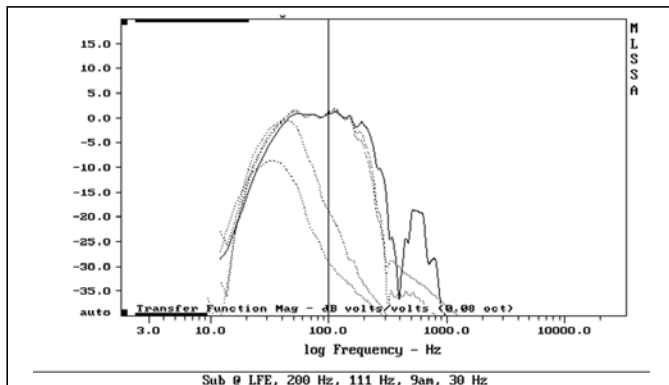


FIGURE 1: Crossover control action from LFE (solid) and all subsequent positions counterclockwise.

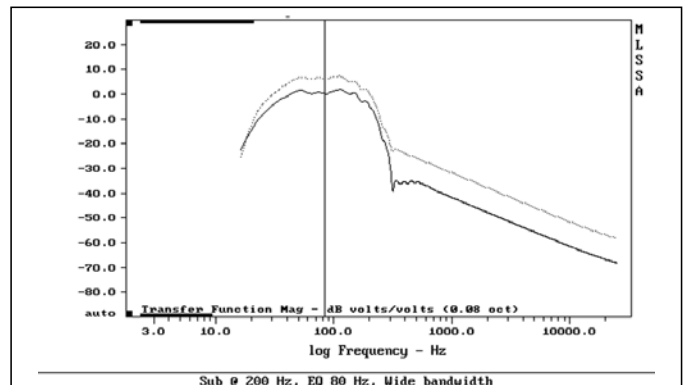


FIGURE 2: Equalizer with wideband 1.0 setting simply works like a level control.

TABLE 1: EQ PERFORMANCE

Setting	Frequency	Bandwidth	Level
EQ80 1.0 +6dB	Full Band	Full Band	+5.8dB
EQ80 0.1 +6dB	78Hz	55-99Hz	+5dB
EQ80 0.1 -14.5dB	83Hz	48-117Hz	-12.9dB
EQ73 0.1 -14.5dB	64Hz	46-92Hz	-10.9dB -1.5dB
EQ60 0.1 -14.5dB	62Hz	44-80Hz	-9.7dB -3.7dB
EQ53 1.0 +6dB	Full Band	Full Band	+ 5.6dB
EQ53 0.1 -14.5dB	55Hz		-7.6dB
EQ53 1.0 -14.5dB	Full Band	Full Band	-13dB
EQ48 0.1 -14.5dB	48Hz		-7.0dB

This is very good for a subwoofer low pass. Typically there is little relationship to dial markings and actual low-pass frequency, and often there is significant level/crossover control interaction. With the T1503A, you can use the controls with confidence without needing to always rebalance levels when changing crossover frequency.

Table 1 shows measured performance of the equalizer at various settings of frequency (EQ80 to EQ18), bandwidth (0.1 narrow or 1.0 full wide) and level (+6dB or -14.5dB). The band-

width and level measurements are all simply the maximal settings. In general at narrow bandwidth settings the equalizer true frequency is close to the dial markings, but the higher level control settings simply work like a full bandwidth volume control.

TABLE 2: DYNAMIC PERFORMANCE

Frequency	SPL
62Hz	104.8dB
50Hz	105.5dB
40Hz	102.6dB
32Hz	104dB
25Hz	104.9dB
20Hz	96.7dB
16Hz	86.3dB
12.5Hz	80.8dB
Average	104.4dB 25-62Hz
Uniformity	98.9%

Manufacturer specifications seem to always overstate dynamic capability. For example, Dayton specifies the T1503A at 115dB SPL with no frequency specified, but this product isn't capable of

“ This product is fantastic in two ways that make it preferable to most commercial speakers. ”

For example, setting the frequency to 80Hz and level to +6dB with a 1.0 bandwidth simply raises the full band by 5.8dB. Also, setting the equalizer frequency to 18Hz through 32Hz has little effect other than cutting the level below 66-75Hz, depending on dial frequency. In other words, at settings from 18 to 32Hz the equalizer simply has no effect when set to gain and simply sharpens the nominal high-pass slope when set to cut. There is also occasionally an overall level interaction with certain EQ settings, meaning that you may need to rebalance the level at certain EQ settings.

This performance is typical of single band EQs on active subwoofers although the Dayton seems to work more closely to marked settings than many others. However, it will still be difficult to use the equalizer except in rooms with an obvious single mode problem at a relatively high frequency.

Table 2 depicts the actual sound pressure reproduced by the subwoofer at 1/3 octave frequencies using the Linkwitz/Keele 6.5 cycle ramped sine waves at 2m in an optimal listening position in a 7600ft³ great room. In a smaller 2100ft³ room 2-3dB more SPL was generated by identical subwoofers in a previous experiment. This measure tells you what kind of actual dynamic performance to expect.

generating 115dB even at 1m listening distance at any given frequency.

That said, this product is fantastic in two ways that make it preferable to most commercial subwoofers. As mentioned before, it is a real subwoofer capable of reproducing real sound pressure as low as 12Hz. But, even better, the dynamic capability is fantastically even. For example, it averages 104dB SPL from 25 to 62Hz with nearly perfect uniformity. Most commercial models tend to have maximal SPL at 50 or 62Hz and then fall off at 12-24dB per octave at lower frequencies. This tends to give them a slight advantage in my 25-62Hz SPL “Heart of Bass” average.

That's why I invented the “Bandwidth Uniformity” statistic so a “subwoofer” that can do 110dB at 62Hz but only 98dB at 25Hz, which gives a 104dB SPL average 25-62Hz, only gets a 94.6% Bandwidth Uniformity score while a subwoofer, like this one, that can produce 104dB at practically every frequency gets a 98.9% score. However, the T1503A would occasionally “pop” and “fart” at 12.5 and 16Hz when overdriven, so users should exercise care when using new program material that has super low frequency content.

So, the T1503A is a true subwoofer



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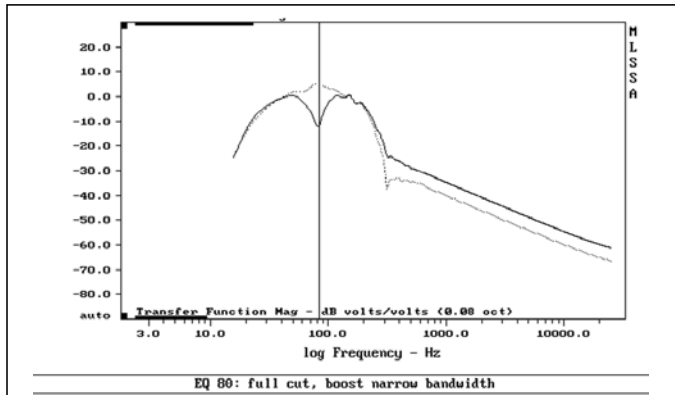


FIGURE 3: Equalizer with an 80Hz setting, narrow bandwidth (0.1), and full cut and boost.

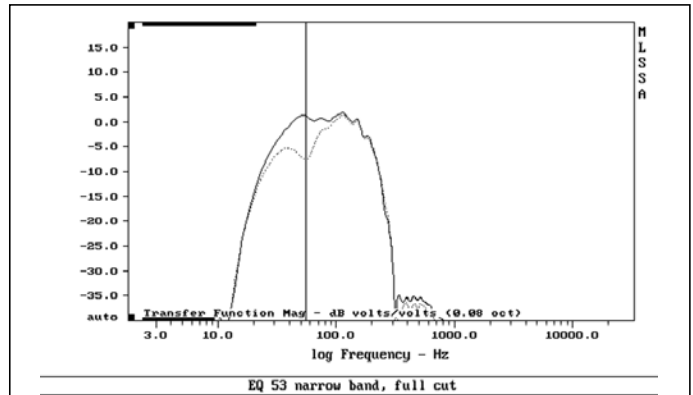


FIGURE 4: Equalizer set to 53Hz with full cut and narrow bandwidth (0.1) setting.

with wonderfully uniform dynamic capability. Bravo!

Setup and Listening

Setup is mostly straightforward for me because I've already response-mapped my room for subwoofer position with MLS-SA. So I just left it in the optimal corner position in this room. Because the crossover has no level interaction and I already knew that the crossover control markings were reasonably accurate in the middle of the dial and didn't have any level interaction, it was easy just to dial in 111Hz and set the level to 80dB with my sound level meter. This matched up with my personal subwoofer (eight 15" TC Sounds drivers in an 8' infinite baffle built into the floor), and with a dB Sound switch box I was able to switch directly between the two systems for a casual listening session.

Just for clarification, I use the 120Hz low-pass filter on my Anthem processor. Why so high? Well, my subwoofer system has a natural low-pass function that begins at 70Hz, meaning that it begins rolling off acoustically at 70Hz relative to the listening position. So 120Hz electronically is a natural. This also let me match the Dayton with its internal crossover to the system.

How about listening? Well, I find it fascinating that many folks seem to think there will be a difference in performance and sound quality between movie and music programs. This is just plain silly. A good subwoofer will perform equally well no matter what the program choices. Sure, if you only watch drama and listen only to

chamber music you may not need a "subwoofer," but that's a completely different question. It might be useful to distinguish between bass-head low-frequency music versus regular rock, which has no real deep bass, but again that's a different question.

The truth is the frequency content matters and not the artistic venue. There are now plenty of movies—as well as plenty of compact discs—with deep bass. That seems to be a result of two factors: First, the advent of digital recording equipment means that true subsonic sound can be captured. Second, the advent of the THX Cinema with active subwoofers that have their own electronic high-pass filters means that soundtracks no longer need to be high-passed at 25Hz or even higher.

In fact, recordings of nature often have the deepest bass. The thunderstorm has really low deep bass. And recordings of locomotives and aircraft also can have groundshaking, deep bass. So if you watch/listen to adventure movies, organ music, and nature recordings, you need a subwoofer, but the one you choose will function equally well with anything you put through it.

WOOFER MYTHS

Also, there's another myth relating to subwoofer driver size: the idea that an 8 or 10" "subwoofer" (there's an oxymoron) will have better "punch and speed" than a 12, 15, or 18" model. The truth is that an 8 or 10 will just have less low bass. Think about musical instrument speakers, for example. They just prove that a 15 or 18" speaker can reproduce mid and up-

per bass and midrange just fine.

For example, when I first built my custom subwoofer, I experienced an interesting problem, mid-bass compression. That is, the subwoofer (122dB SPL from 12-62Hz <= 10% distortion) had way more dynamic capability between 60 and 100Hz than my left and right upper channel speakers each with a pair of 6.5" woof-

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ers. In other words, at high output levels my main speakers couldn't keep up with the subwoofer in the mid-upper bass region. Or, it could be said that my main speakers weren't *fast enough* dynamically to keep up with the subwoofer. The solution was to add an active bandpass 10" "subwoofer" to the left and right main speakers that function between 45 and 90Hz.

The myth of woofer speed is also just silly. The "speed" of sound at any given frequency is a function of the frequency. If a speaker can reproduce the frequency, it is simply "fast" enough. If it were too slow, it couldn't do the frequency. What happens is that if the speaker lacks the displacement to produce the frequency loudly enough, then to some people it may sound "fast," but what it really means is that it doesn't have sufficient bass for the program.

While it is true that high-quality low-frequency drivers often have heavy cones, it is also equally true that they have heavy frames and heavy magnets which have more energy than those in a "fast" midrange or tweeter. So the idea of fast woofers is just a myth, and the systems that sound slow and heavy will simply be a function of sub-optimal installation and setup.

If "speed" was an issue, then the Dayton should be faster than my eight 15" system. But, on the other hand, was it fair to compare a single 15 with a system eight times bigger? Well, why not? Shouldn't a single 15 walk circles around a big system on acoustic bass?

The truth of the matter was that on material with acoustic bass the systems sounded essentially the same. It was true that on oc-

casional the big system had obviously more moving air than the Dayton, and you could argue that it was too much. Remind yourself that the air pressure, while it may have been more than that you'd receive in a club with an acoustic bass with either of these subwoofers, it didn't lack in frequency definition, instrument position, or clarity. The Dayton sounded just as good and arguably slightly more natural. But I could have made them sound exactly the same with a lower high-pass filter on the big system.

Where it lacked equality was with CDs with super deep bass. On the Bass Connection bass-head "Pure and Perfect Bass," the downward sweep to 5Hz was not as strong and floor-shaking with the Dayton. But the Dayton was impressive nonetheless, reproducing sound that the high-end system with four 12" woofers or the one with a 12 and 18 driver wouldn't even attempt. That's because the former was a 19Hz bass reflex where the system falloff below 18Hz would be 24dB per octave even if it weren't also electronically high-passed. And the other system was electronically high-passed at 15Hz.

This is a real subwoofer and at \$899.95 must be considered the best bargain on the market for those who want a true subwoofer. True meaning it doesn't give up at 20 or 25Hz, and properly set up will sound great with any program material. The operating controls are functional enough to allow proper setup, but using the equalizer will be much easier if measurement equipment is available.

Although my unit came fully assembled, the "preassembled" option saves you \$150

and is a simple screw and strip method. That is, you must strip the speaker leads and need only a utility knife, a 5/32" hex driver, a wire stripper, and a screwdriver. No solder or other equipment is necessary. It appears that you could finish assembly—including unpacking and storing packaging material—inside an hour. So the DIY option is a great value, unless, of course, you know somewhere else you can get more than \$150 for an hour of your labor.

Manufacturer's Response:

Thank you for reviewing the Dayton Audio T1503A Subwoofer. We feel the review addressed many of the attributes of what really makes a subwoofer a true performer. We also feel the review was a fair analysis of the T1503A and supports our belief that the subwoofer is an exceptional value for anyone looking for a new sub. As mentioned in the article, it is also available in kit form, thereby saving the consumer money while providing an excellent "I did it myself" experience. Though many instances of shipping damage come from mishandling, we are working to improve our packaging in order to prevent any shipping damage to the Titanic Subwoofers in the future.

Rich Taylor
Marketing Manager
Dayton Audio

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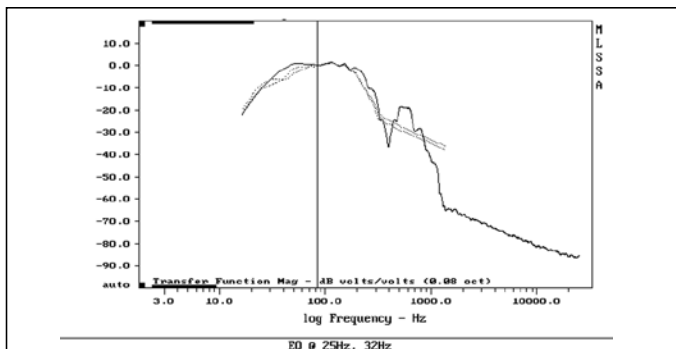


FIGURE 5: With the equalizer set to 25 and 32Hz cuts simply work more like high-pass filtering.

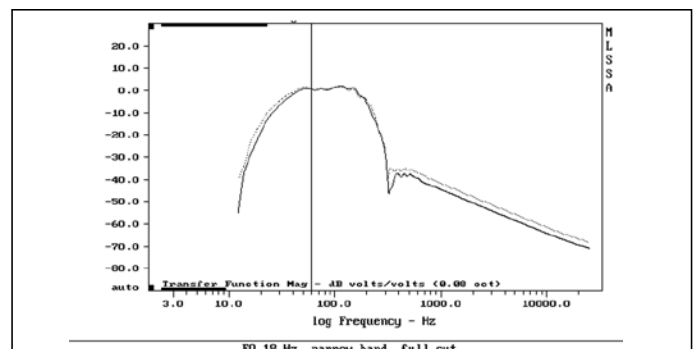


FIGURE 6: With the 18Hz setting the equalizer has little functional action.