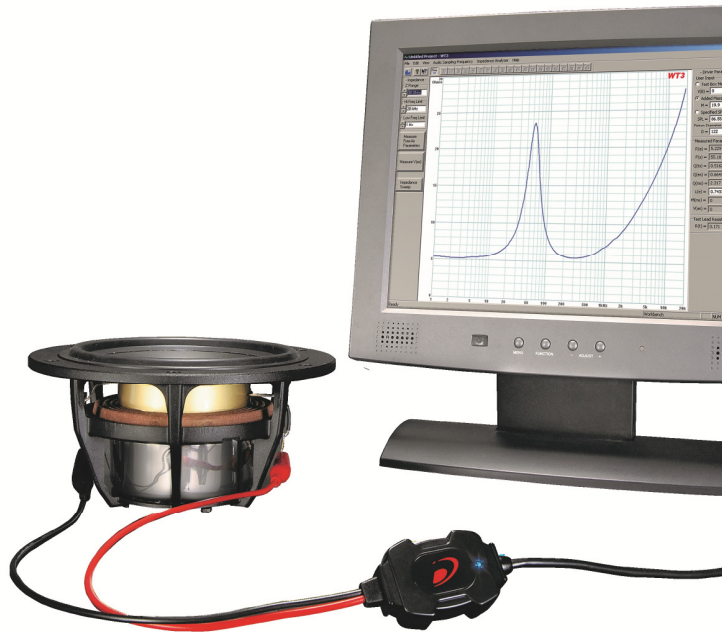




WT3TM

WOOFER TESTER

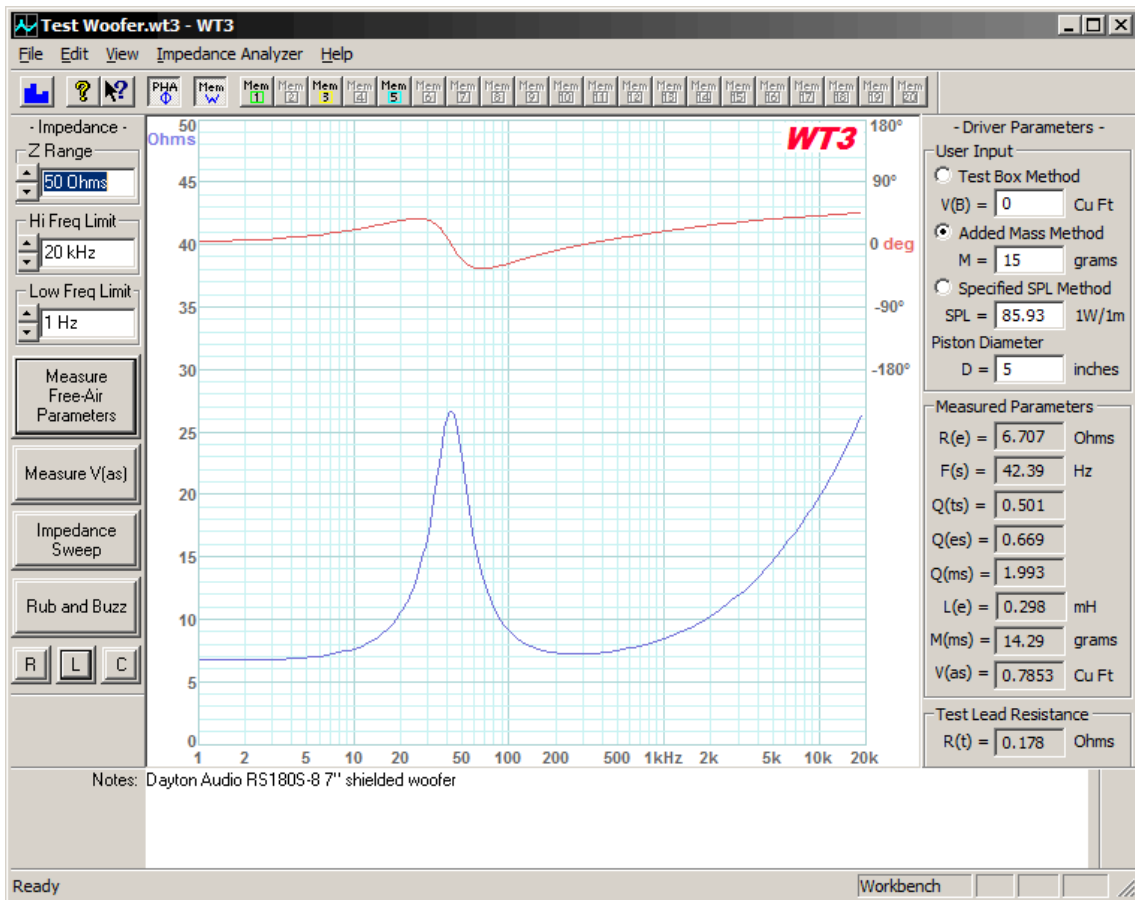
Since its introduction Dayton Audio's WT3 Woofer Tester has been setting new standards for speed, accuracy and precision in measuring loudspeaker driver parameters. Now, WT3 with QC Pack raises the bar with an exclusive (patent pending) Rub and Buzz Test based on the new discovery that driver defects due to mechanical rubbing are clearly revealed by very low level impedance measurements. The price of WT3 remains unchanged at \$99.95. Users of earlier versions can upgrade to the new version with QC Pack for \$19.95.



Driver Parameter Measurement with WT3:

Dayton Audio's WT3 makes measuring loudspeaker driver parameters easier, faster and more accurate than ever before. While previous generation woofer testers took around 6 minutes to measure 30 impedance points, WT3 measures over 30,000 data points in just a few seconds using a swept sine technique first introduced with WT3. The result is a very high-resolution impedance measurement that allows the extraction of highly accurate driver parameters, suitable for the finest loudspeaker design work. Free air parameters are measured in just a few seconds. VAS can be measured by the test box method, added mass method or more conveniently, by specifying the 1W/1m SPL of the driver. No other loudspeaker impedance tester is as fast, versatile or as easy to use as Dayton Audio's WT3 Woofer Tester.

Here is the main WT3 screen when measuring speaker driver parameters.



Below is the Parameters page of the WT3 Driver Editor. Note the provision for additional data beyond that which is measured.

Driver Editor		
General Information	Parameters	Physical and Mounting Information
Manufacturer: Dayton Audio		
Model: RS180S-8		
Nominal Diameter = 180 mm (7 inches)		
Resonance in Free Air	f(s) = 42.39 Hz	Sensitivity (1W/1m)
Resonance on Baffle	f(sb) = 0 Hz	SPL = 85.93 dB SPL
Total Q	Q(ts) = 0.501	Voice Coil Inductance
Electrical Q	Q(es) = 0.669	L(e) = 0.298 mH
Mechanical Q	Q(ms) = 1.993	Flux Density
Equivalent Volume	V(as) = 0.7853 cu ft	B = 0 Tesla
Compliance	C(ms) = 0.99 mm/N	Length of Wire in Gap
Mechanical Resistance	R(ms) = 0 kg/s	L = 0 meters
DC Resistance	R(e) = 6.707 Ohms	BL Product
Maximum Impedance	Z(max) = 26.68 Ohms	BL = 6.178 N/Amp
Minimum Impedance	Z(min) = 6.707 Ohms	Effective Mass
Max Thermal Power	P(t) = 0 Watts	M(ms) = 14.29 grams
Thermal Resistance	R(t) = 0 deg C/W	Voice Coil Diameter
Max Linear Excursion	X(max) = 0 mm, peak	D(vc) = 0 mm (0 in)
Max Excursion	X(peak) = 0 mm, peak	Voice Coil Depth
Piston Area	S(D) = 0.01267 sq m	D(cd) = 0 mm
Peak Volume Displ	V(D) = 0 liters	Magnetic Gap Depth
Reference Efficiency	n(0) = 0.2414 %	D(mg) = 0 mm
		Voice Coil Material:
		Voice Coil Former:
		Voice Coil Layers:
		Voice Coil Wire Gauge:
		Voice Coil Vent:

Rub and Buzz Testing with WT3:

Finally the loudspeaker industry has a rub and buzz test that is affordable enough to allow routine testing of all types and sizes of speakers. WT3's new QC Pack adds loudspeaker rub and buzz testing at a price point unheard of until now. This is made possible by the discovery that impedance measurements can reveal that rubbing is occurring in a loudspeaker. Up to this time rub and buzz problems could be detected only by resorting to acoustic measurements using expensive and specialized distortion measurement systems. Our new rub and buzz test relies on precision low level impedance measurements to detect rubbing problems. This greatly simplifies rub and buzz testing. Using the new method WT3 can detect the slightest rubbing even in noisy production environments. The sensitivity of the rub and buzz test is easily adjustable for efficient and adaptable production testing. Below is a screen shot of the Rub and Buzz Test setup page showing the default settings and the scope of the rub and buzz test:

Rub and Buzz Test

Test Signal Level
The test signal will be reduced by the amount you specify compared to normal full output level.
Enter a value in the range from 0 to -40 dB.

Test Level dB

Guidelines
0 dB : Resonance Testing Only
-20 dB : Less Sensitive
-30 dB : Normal Rub and Buzz Test
-40 dB : More Sensitive

Note that the Rub and Buzz test sweep may be inaudible.

Resonance Tolerance
Enter the F(s) tolerance to be used for the Pass/Fail test.

+/- %

Guidelines
50% : Less sensitive Rub and Buzz test
40% : For normal Rub and Buzz testing
30% : More Sensitive Rub and Buzz test
10% : For screening resonance frequency along with Rub and Buzz testing

Z(max) Tolerance
Enter the Z(max) tolerance to be used for the Pass/Fail test.

+/- %

Guidelines
150% : Less sensitive Rub and Buzz test
100% : For normal Rub and Buzz testing
50% : More sensitive Rub and Buzz test

Production Test Mode
Select continuous testing to efficiently test multiple drivers in a continuous sequence.
Deselect for individual driver testing

Continuous Production Testing

Skip Dialogs
Select to skip prompts to connect driver.

Skip Rub and Buzz Connection Dialogs

PATENT PENDING NOTICE
The new technique used here for detecting rub and buzz defects in loudspeakers is the subject of a pending patent.

This uniquely sensitive "Rub and Buzz" test is EXCLUSIVELY AVAILABLE in:

WT3 Woofer Tester

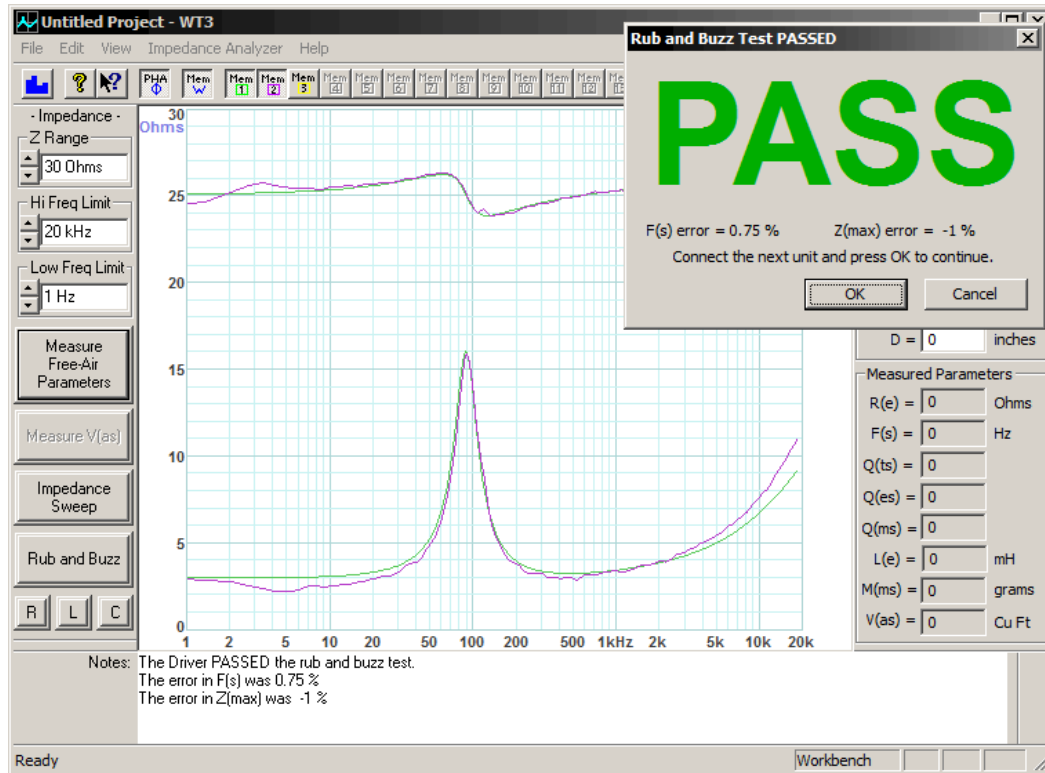
Initialize and Begin Testing
Resume Testing
Cancel

At the top left of the window the user can adjust the signal level used for the test which (by default) is set to 30 dB below the standard test level or -30 dB. The other edit fields allow the user to adjust the pass/fail tolerances for F(s) and Z(max). Together, these three settings give the user total control over the sensitivity of the test and they are saved along with the reference sweep and other memories as part of each WT3 project file. Guidelines are provided on screen for each test setting with the default values being at the center of the useful range.

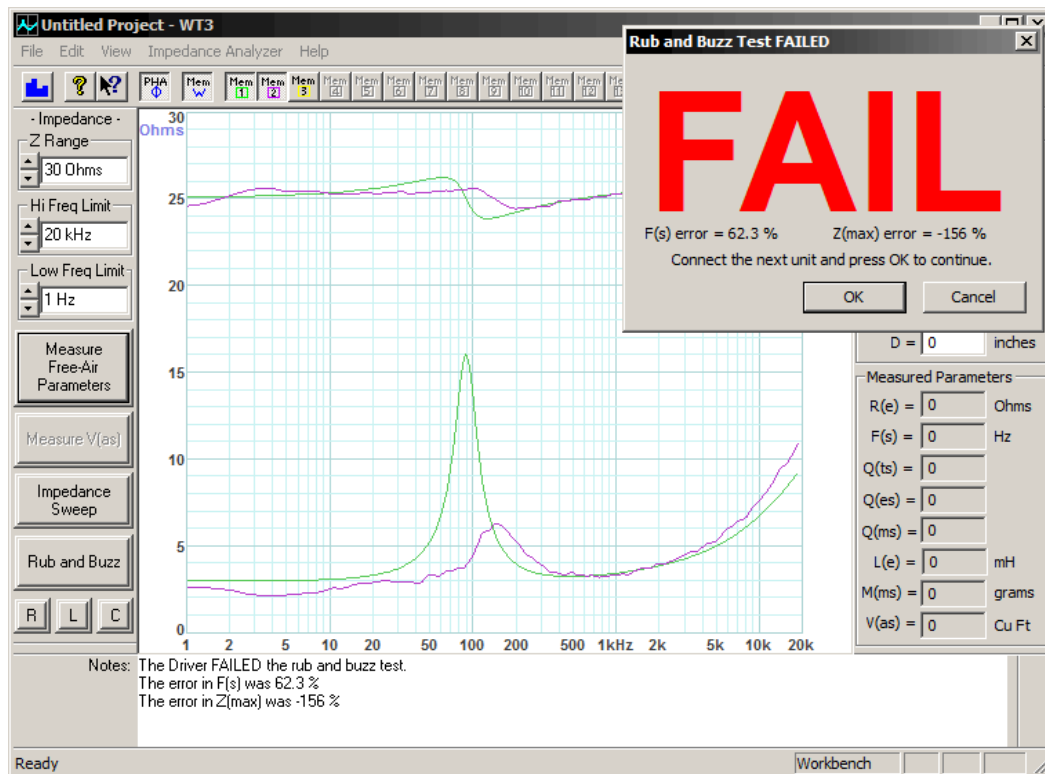
The two screens on the following page show typical test results for passing and failing drivers. The smoother of the two plots (green) in each screen is the reference plot made at full signal level. The noisier plot (purple) is the test plot made at the reduced signal level. The test compares the F(s) and Z(max) of the reference unit at full signal level to the same parameters of the test unit at the reduced signal level, -40 dB in these examples. In addition to indicating the pass/fail status of the unit just tested the pass/fail dialogs also show the percent deviation from the reference unit. This information can be helpful for production technicians when fine tuning the thresholds to be used to reject test units.

Patent Pending Notice: This newly discovered method of performing rub and buzz testing is the subject of a US patent application.

The first screen shows a unit that passes the (-40 dB) test. We see that the low level impedance of the test unit is a good match to the response of the reference unit at full level.



Next we see a speaker that has failed the Rub and Buzz Test by exceeding both the F(s) and Z(max) tolerance limits.

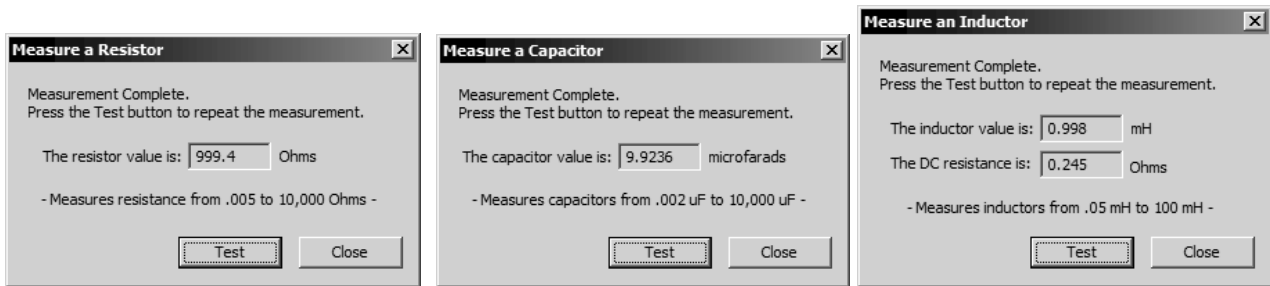


The F(s) is in error by 62% with a tolerance setting of 40% so it fails the F(s) test. The Z(max) is in error by 156% which exceeds the 100% tolerance setting for Z(max) causing the driver to also fail this second aspect of the rub and buzz test.

The purple plots in each of the last two screens are the low level test plots which are compared to the reference green plots. The noise on the purple plots confirms that the signal level is low. The green curve (made at full signal level) is quite smooth and noise free by comparison. The shifted and miss-shaped resonance of the failed test unit is indicative of rubbing and is readily detected by the software. Good units and rubbing units are distinguished by comparing the $F(s)$ and $Z(\max)$ of the test unit to that of the known good reference unit. Only if both parameters are within their tolerance settings does a unit pass the rub and buzz test.

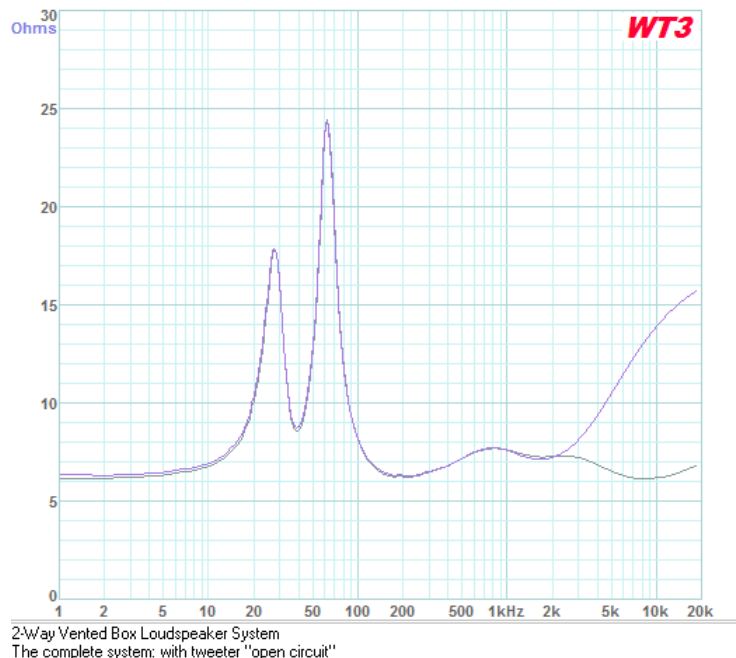
Measuring Resistors, Capacitors and Inductors with WT3:

The new resistor, capacitor and inductor measurements employ a unique adaptive measurement procedure. The R, L and C values are measured at many frequencies and then the most accurate data is identified and averaged to obtain the final R, L or C measurement. This results in highly accurate and repeatable measurements of resistors, inductors and capacitors. Below are the R, L and C measurement windows following typical measurements.



Fault Detection with WT3:

WT3 can also be used to diagnose fault conditions in complete multi-way speaker systems and even large installations with numerous speakers. Below we see a comparison of a normal vented box 2-way speaker (green) versus another speaker with a tweeter that has failed with an open circuit (purple). Most importantly, WT3 shows that the impedance is significantly different between the two speakers thereby revealing that a problem exists.



WT3 Woofer Tester with QC Pack allows you to:

- Measure Speaker Parameters Quickly and Accurately (F(s), Q(ts), Q(ms), Q(es), R(e), V(as), etc.)
- Perform Rub and Buzz Testing (with Continuous Mode for Production Testing)
- Measure Values of Resistors, Capacitors and Inductors (both L and Re)
- Design and Verify Impedance Compensation Networks
- Extract Parameters from Imported Driver Impedance Data
- Characterize Complete Loudspeaker Systems (F(tc), F(B), etc.)
- Diagnose Loudspeaker Fault Conditions (open or shorted drivers, cables or components)
- Perform General Purpose Impedance Measurements (1Hz to 20k Hz, and 1 Ohm to 10k Ohms)

Additional Features of WT3:

- Standard Windows interface to save and load .wt3 project files and print custom reports
- Parameters can be exported into popular box design programs
- 1 Hz - 20,000 Hz response, measures any loudspeaker driver, including tweeters
- USB connection provides power from and data transfer to PC
- Compact USB interface includes molded test leads
- Measured data can be printed or saved to create a driver parameter library
- Parameters can be exported to WinSpeakerz and other popular box design programs
- Measures VAS using added mass, test box or SPL method
- Straightforward, easy-to-use measurement software
- Manufactured with state-of-the-art equipment using surface mount components
- Blue LED power indicator
- Limited One Year Warranty

Package Contents

- USB Speaker Measuring Interface with leads
- CDROM with Software and Operation Manual
- Quick install guide



What the Critics Say about WT3:

“The WT3 is a very fast and capable impedance measurement instrument which has a lot of flexibility that is very handy in speaker work. It showed good accuracy and repeatability on drivers, but a little less accuracy on inductors. To me a main advantage is its small size offering great portability when used with a laptop computer. For my work it is a must have. Now I must contact Parts Express to see whom I pay to keep the evaluation sample!”

Conclusion of the Koonce and Wright review of WT3 in audioXpress magazine, November 2008

“The product is easy to install and easy to use. Though purposely limited in its capabilities, what it does do it does very well, in a number of important ways comparing favorably to a system costing better than 10 times as much. Not bad!”

Conclusion of the review at Audioholics.com Online A/V Magazine, April 2008

User Review Summaries from the Parts Express product pages:

Dayton Audio WT3 Woofer Tester

Brand: [Dayton Audio](#) | Model: WT3

Reviews

★★★★★ (66 Reviews)

Dayton Audio WT3P WT3 Bundled with Precision Scale

Brand: [Dayton Audio](#) | Model: WT3P

Reviews

★★★★★ (28 Reviews)

System Requirements

- IBM PC or compatible system with 64MB Memory RAM or more
- 500Mhz Pentium III processor or higher
- Compliant with both USB2.0/1.1 interface
- Windows XP, Windows Vista or Windows 7

The price of WT3 remains unchanged at \$99.95. Users of earlier versions of WT3 can upgrade to the new version with QC Pack for \$19.95.

Buy it at: <http://www.parts-express.com//pe/showdetl.cfm?Partnumber=390-803>

Upgrade at: <http://www.trueaudio.com/wt3>