SPACE-TECH
HI-END AUDIO LABORATORY
www.space-tech-lab.com

User Manual

Model : Easy Audio Tester

EAT-100

DSP based universal audiophile

equipment tester

(can perform tube matching and burnt-in)

Version 1.3

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Product description:

This is a private technical assistance with Digital Signal Processor (DSP). An integration of several powerful automatic measuring instrument which cost $10K or over in one compact chassis (FFT spectrum analyser, Digital signal generator, Digital CRO, Harmonic Distortion Analyser, Gain tester and Frequency response tester) , This automatic tester can help audiophile , DIYer and technicians to perform professional testing even without technical know how. If you are an audiophile but without any in-depth technical knowledge, you have no choice but need to ask for help from technicians or engineers when your system is down. With this new age automatic tester on hands, you have no longer needed to pay for expensive diagnostic fees. You can easily check out the health condition of every audio gears in your system, and also be able to easily sort out any problematic or degraded unit. You can also check out whether an audio gear as good as it said before paying for it.

This tester can power up by a DC-12V to 15V power supply(>or = 500mA). You can also power it up with a car battery from cigarette lighter in the car. So it can be use to perform audio testing almost anywhere, especially suitable for field test technicians and engineers.

If you are a experienced technician or engineer with great skill, you might thing this tester seem too simple. Yes, you are right, this tester is exactly design for simple and easy to use, and try to make novice perform testing professionally without the need to spend years in MIT.

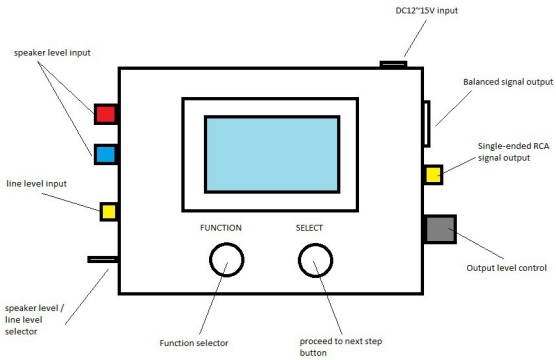
This automatic tester can test and burnt-in, and not limited to the following items:

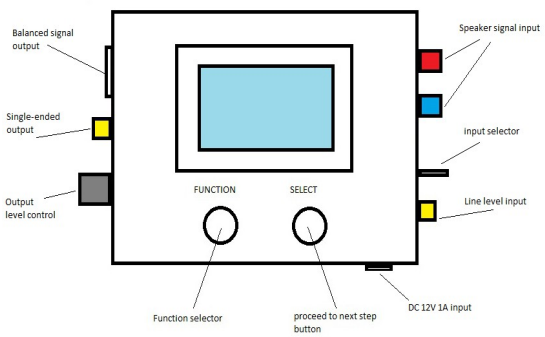
1. **Phono stage (MC and MM)**
2. **Pre-amplifier**
3. **power amplifier**
4. **integrated amplifier**
5. **buffer amplifier**
6. **Cd player**
7. **DAC**
8. **music server**
9. **equalizer**
10. **active crossover**
11. **passive speaker crossover**
12. **active speaker system**
13. **passive speaker system**
14. **interconnects and power cables**
15. **matching of vacuum tubes**

Basic operations:

There are 6 different modes of testing can perform on the above mentioned equipment.

Input, output and control keys layout for different version





Frequency Response Test

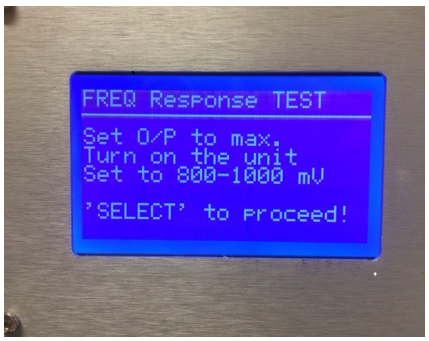
This is the most important parameter for all audiophile quality equipment. Typical human ear can hear from 20Hz to 20Khz of frequency range, which means an audio equipment with reasonable performance, should at least be able to regenerate this range of frequency or even wider, with more or less the same level relative to each others (+/- 1db typical, +/- 3db max.)

This tester equipped with a high precision digital synthesis signal generator. It will automatically sweep from 10Hz to 100Khz with equal output level as test signal, and by connect this test signal to the “device under test” (DUT), by measure the output of the DUT, we can found out the frequency response of the device. This is one of the key factor to judge the health condition of an audio gear.

Here is the test procedure:

1. Connect DUT according to “Appendix A”
2. Select “FREQ RESP” by press the 'FUNCTION' key until it high-lighted. Then press 'SELECT' to proceed to the following screen

3. Select 3db or 10db per division and proceed to the following screen



3. Set the tester signal output to maximum level (this is very important for response test, fail to do so will lead to early roll-off of high frequency).
4. Turn on the DUT and wait for it to be ready.
5. Set the output level of the DUT to around 800-1000mV.
6. press 'SELECT' to proceed the automatic testing process.

7. There will be self calibration before actual testing for max. accuracy

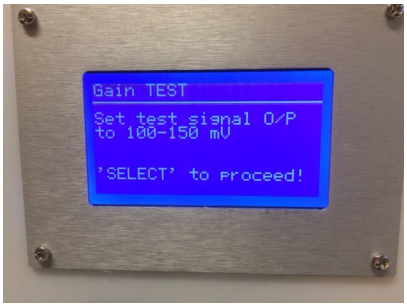
You will be able to observe a frequency response curve as follow, and the tester will tell you the low and high -3db point frequency of the DUT. If the high -3db point is higher than 100Khz, then it will simply shows “Hi-3db > 100Khz”. If the low -3db point is lower than 10Hz then it will simply show “Lo-3db < 10Hz”

Gain Test

This is another most important test for all audiophile quality equipment. It can test whether the DUT has equal gain for L and R channel, or to match the gain of vacuum tubes (use the same channel for test base, and replace with different tubes then record the reading of their gains, provided that the device for tube testing is non-feedback design in order to show the real gain of the tubes). We have designed add-on tube test module to work with this tester as optional.

Here is the test procedure:

1. Connect DUT according to “Appendix A”
2. Select “GAIN TEST” by press the 'FUNCTION' key until it high-lighted. Then press 'SELECT' to proceed to the following screen



3. Press 'SELECT' again to proceed test signal calibration, set output level to around 100mV-150mV

4. Set the DUT to max. volume / gain . Press 'SELECT' to proceed and view the test result.

5. If the DUT is a stereo unit, then remove the channel just been tested and connect to other channel, the gain reading of the other channel will show right away.

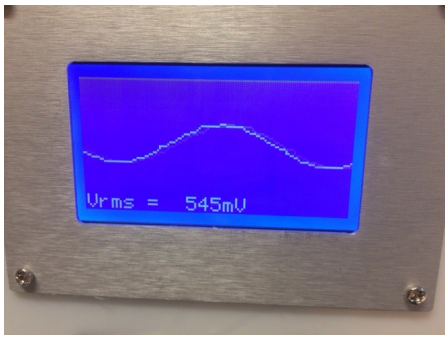
THD (Total harmonic distortion) Test

This is an important test parameter to show whether the DUT is in healthy condition or something wrong with it. The tester will output a very low distortion 1Khz sine wave as reference signal, then by measure the output signal from the DUT, the tester can calculate the harmonic distortion generated and display in %, and show the harmonics distortion pattern at the same time. If the distortion is in even harmonics (2^{nd}, 4^{th}, 6^{th}, 8^{th} and 10^{th}) then the output signal of the DUT might be even better than the original input signals, because even harmonics is just like the resonance of the musical instrument, the more the richer sound it can be. If the distortion is in odd harmonics (3^{rd}, 5^{th}, 7^{th}, 9^{th} and 11^{th}), just a tiny bit of it will make the sound very unpleasant and irritating.

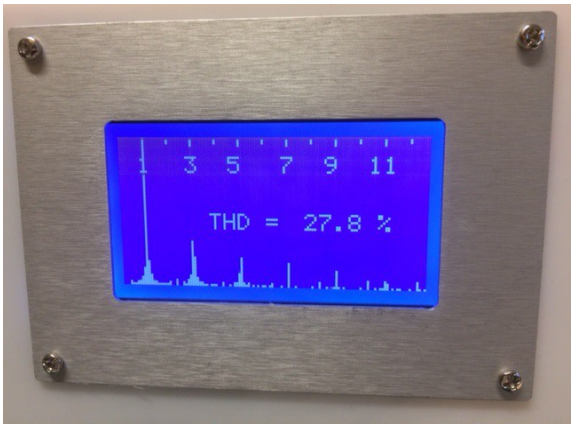
Here is the test procedure:

1. Connect DUT according to “Appendix A”, then turn on the DUT
2. Select “THD” by press the 'FUNCTION' key until it high-lighted. Then press 'SELECT' to proceed to the following screen

3. Press 'SELECT' again to proceed test signal calibration, set output level to around 500mV-600mV



4. Press 'SELECT' to proceed and view the test result. The following is an example of heavily distorted output from DUT with lots of odd harmonics.



Below is a perfect non-distorted output from DUT

SIG GEN (Signal Generator)

This mode can set the output signal of the tester to either “sine”, “triangle” or “square” waves, with frequency range from 10Hz to 100Khz of your choice.

This signal will output to both the XLR and RCA output of this tester, and can be fully controlled by the output level control knob on the right hand side. You can then use the CRO mode to check the wave output from the DUT feed by this signal.

Here is the test procedure:

1. Connect DUT according to “Appendix A”, then turn on the DUT
2. Select “SIG GEN” by press the 'FUNCTION' key until it high-lighted. Then press 'SELECT' to proceed to the following screen

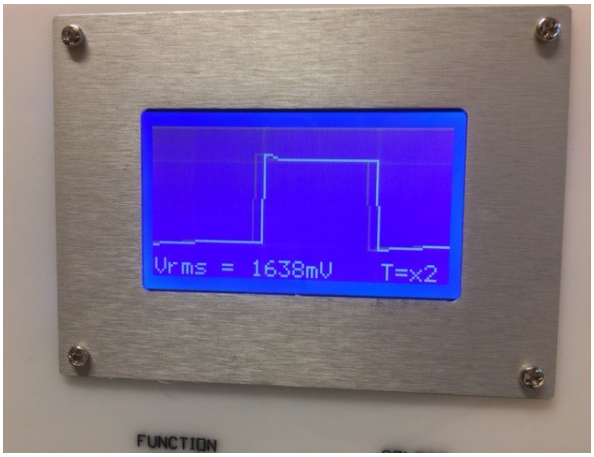
3. you can press “SELECT” on high-lighted option to change the setting, and press “FUNCTION” to go to next option.
4. when 'Quit' is high-lighted, press “SELECT” will back to main manual.

CRO (Digital oscilloscope)

This mode can monitor the input signal as a digital oscilloscope, you can connect the output signal from this tester to the input of the DUT, and use this mode to check the output signal from it.

When the signal from DUT is connected to the 'speaker level' input, the CRO can automatic calculate the measured value of the signal and display in “Watt”. With this feature, one can tell the max. output power of an amplifier easily.

During the monitoring process, press “FUNCTION” key can change the sampling timing of the display.

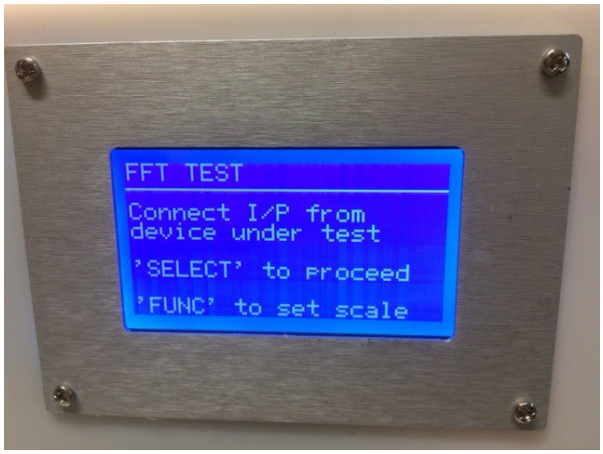


FFT (Fast Fourier Transformer – Spectrum analyser)

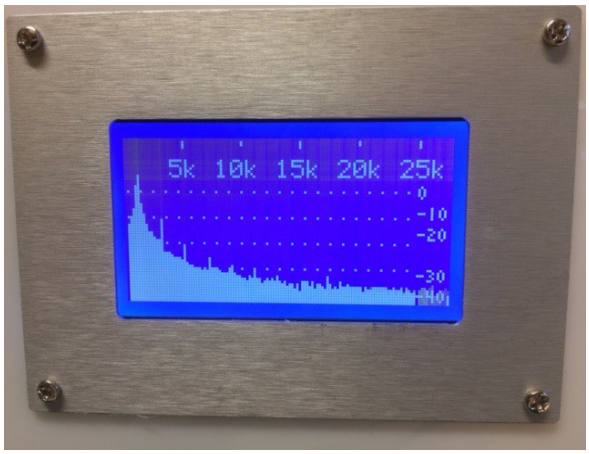
This mode is a very powerful test mode for real time display of a spectrum of frequency from 10Hz to 28Khz. With the “white noise” CD / file come with this tester, you can test the real time frequency response of a CD player, DAC and music server. Just play the 'white noise' CD / file thru the DUT, then set the tester to FFT mode, you can check if there is any problem in frequency response of the DUT.

Here is the test procedure:

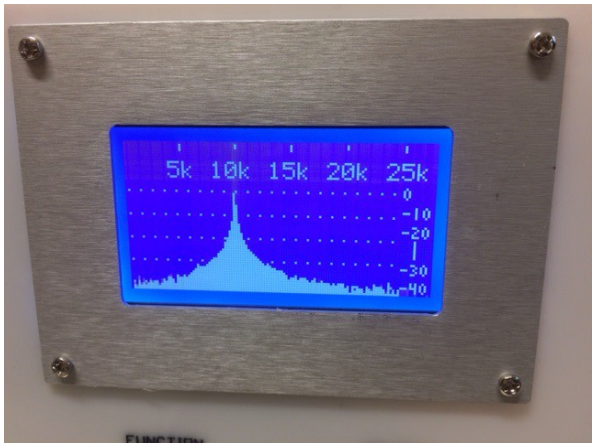
1. Connect DUT according to “Appendix A”, then turn on the DUT, put in the CD or play the file.
2. Select “FFT” by press the 'FUNCTION' key until it high-lighted. Then press 'SELECT' to proceed to the following screen



3. Connect from DUT to the input (line level or speaker level) , then press 'SELECT' once more to proceed the testing



Press “FUNCTION” during testing can change the vertical scale between 5db / 10db

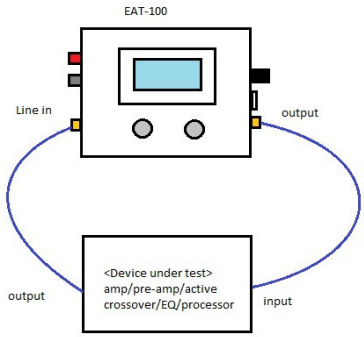


Press “SELECT” during testing will quit back to main manual.

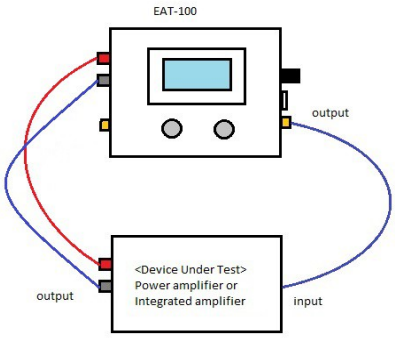
Appendix A :

Connect different device for testing

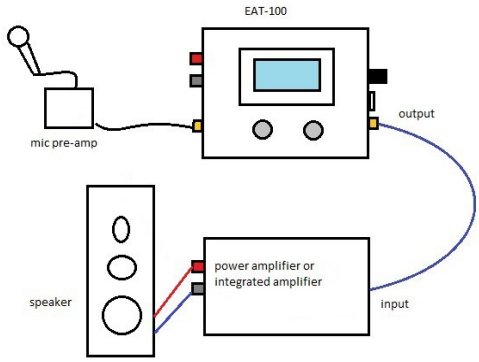
For pre-amp, phono amp, buffer amp, equalizer, connect as follow, and set input selector of the tester to 'line level':



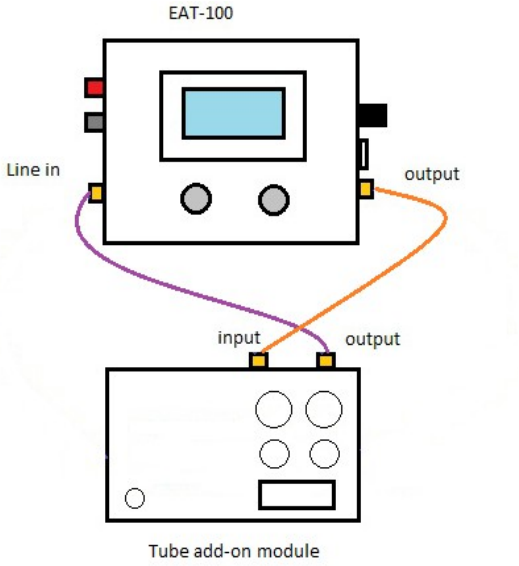
For power amp or integrated amp connect as follow, set input selector of the tester to 'speaker level' :



For active speaker or passive speaker system connect as follow, an optional mic pre-amp is needed, and set input selector of the tester to 'line level' :



For tube testing with optional Tube-test add-on module



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Warranty : One year free parts and labor warranty apply under normal operation condition , physical damage or normal wear out will not covered.