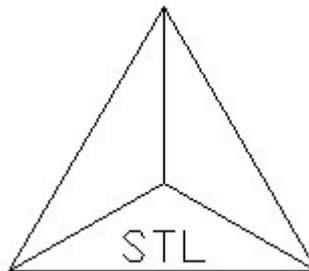


User Manual

Audio Tube Tester

ATT-3.0

Ver. 1.02

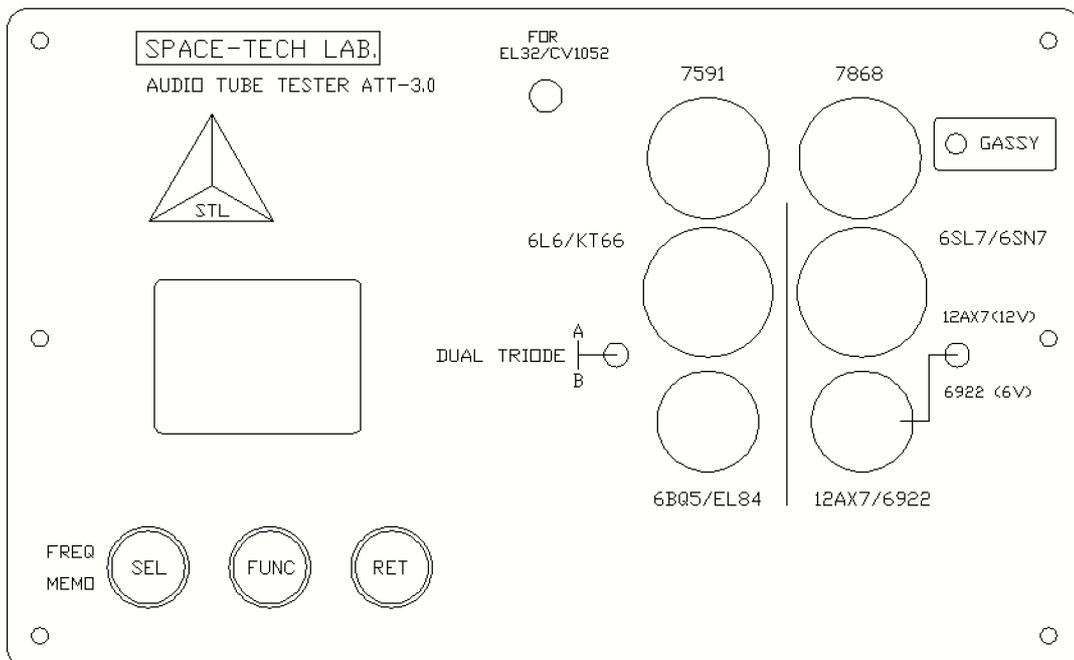


Product description:

This is an automatic audio tubes tester with super user friendly human interface, no need for steep learning curve, just plug and play and get a very reliable and repeatable result on 'Gain', 'Gm mutualconductance (mS)' and 'anode current (mA)', so that you can select and match them for best audio experience. There are 6 test sockets include single pentode in octal 8 pin + regular 9 pin socket, as well as dual triode in octal 8 pin + regular 9 pin sockets. Please do not leave tubes under test for unreasonable long period of time (over 20-30 minutes) without attention, since the test condition might be reaching the maximum spec of the tubes under test, a very old tube might be damaged due to extreme stress. Maximum test voltage is 200V with max.150mA current limit for safety of the tubes under test.

This tester equipped with an advanced A.I. Algorithm and will perform self-calibration when power up the system, which can eliminate the biggest problem in old school tube testers. You will need to spend several hundred dollars to completely calibrate an old school tube tester for proper operation. With this intelligent self-calibrate features, thousands of dollars can be saved and still keep the tester in top notch condition.

Capacitance touch key mechanism with beep sound, which ensures no break down of mechanical key switches and provide maximum reliability and audible feedback of valid key pressed.





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TOCUH KEY DEFINITION :

SEL – This key can change the test frequency between 300Hz, 225Hz and 150Hz during the Waveform testing. It also can memorize the test reading in the tube matching mode as a reference data for comparison (GM or Gain matching)

FUNC – This key use to scroll between different options on the screen

RET – This key use to confirm the function being selected or start the testing

(Note : Press “SEL” and hold, then press “FUNC” and “RET” all at once will start the self-calibration process)

SELECTOR SWITCH DEFINITION:

DUAL TRIODE A/B – This switch select between the A side and B side of a dual triode (such as 6922, 12AX7, 6SL7...etc) . For testing of power tubes and single pentodes, always set to A side.

GASSY – During Gain testing, this LED will not lit up with a normal tube, but will lit up if a tube has gas inside or shorted circuit of the Grid to the Plate.

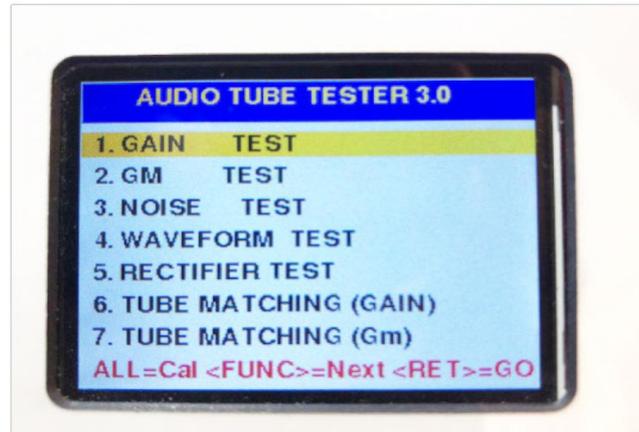
12AX7/6922 – this switch select between 12v filament or 6V filament for 9 pin dual triodes (pin 4-5), wrong setting just will not lit up the filament of the tube and will not create any damage to the tube.

TEST FUNCTIONS

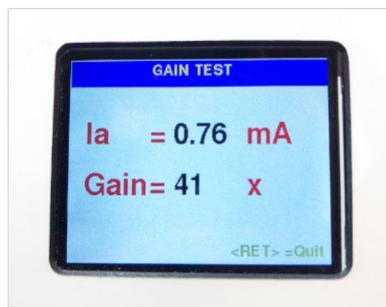
1. GAIN TEST
2. GM TEST
3. NOISE TEST
4. WAVEFORM TEST
5. RECTIFIER TEST
6. TUBE MATCHING (GAIN)
7. TUBE MATCHING (GM)

Press “FUNC” key to rotate between different functions, and press “RET” to start the testing procedure

Press “SEL” key first, then hold and press the “FUNC” and “RET” at the same time to start the self-calibration process.



1. GAIN TEST



Select this function to perform Gain Test on the tube under test. Fully automatic and no need to set anything and get the reading directly. Due to the need of proper warm up of tubes in order to get the most accurate result, please wait till the reading is stable, then you can take the test data.

<Ia> reading is anode or plate current of the tube under test

<Gain> is the mu or gain of the tube under test

2. GM TEST

When first enter into the GM test, you will prompt with following choices to choose from

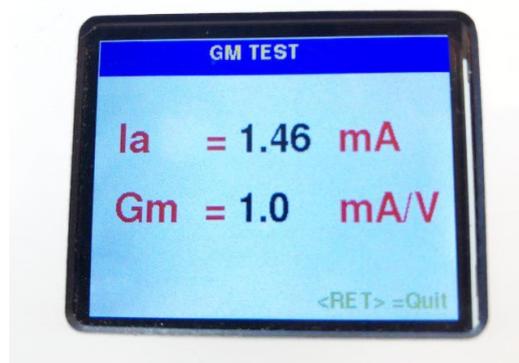
1. 12AX7 12AT7 6SL7 6N1 6N2
2. 12AU7 6BQ5 EL84 SV83
3. 6SN7 6922 ECC88 6DJ8
4. EL34 6CA7 7189 7591 7868 DHT
5. 5881 6550 6V6 6L6 KT88-KT170
6. 2A3 300B 845 211 (w/module)
7. Other settings...

12BH7 can use #2. KT66, 6G6,6Y6,6F6,6K6... can use #5

Note: you will need to add the optional expansion module to test the DHT and rectifier tubes such as 45, 50, 2A3, 300B, 845, 211, 5u4G..etc

If you want to use a specific -ve bias voltage for the testing, then you can choose "other settings", in there you can choose between 0 to -10V as the -ve bias voltage..

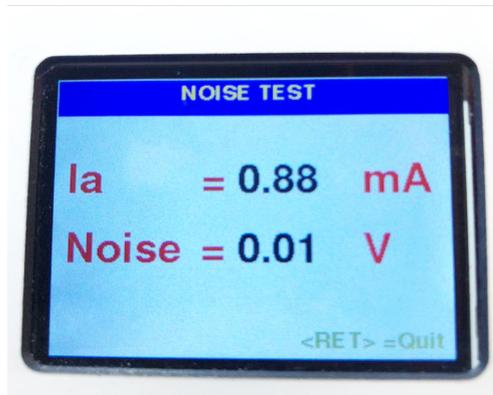
Once you have chosen the proper setting, then the GM test will be started. Please note that tubes need warm up to have a stable reading, you will see the testing result increase with time, when it reaches a stable reading which means the tube is fully warm up.



<Ia> reading is anode or plate current of the tube under test

<GM> is the mutual conductance in mA/V (1 mA/V = 1000 uA/V)

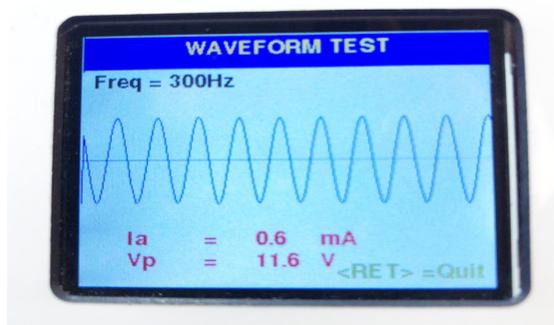
3. NOISE TEST



<Ia> reading is anode or plate current of the tube under test

<Noise> is the noise level in Volt. You can also connect CRO or amplifier to the noise output RCA socket at the rear side of the tester for further monitoring purpose. Knob on the glass of the tube under test can trigger a higher noise for verification of valid readings.

4. Waveform TEST



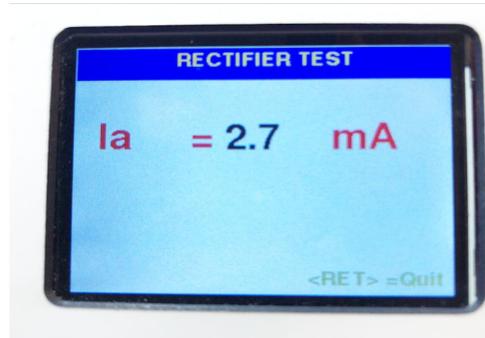
This is a very powerful feature which no other tube tester can offer up to this day.

With this function you can real time monitor and check the output waveform of the tube under test as a pure class A common cathode amplifier.

Even though a tube shows good Gain and Gm reading, it might have distorted sinewave output due to the faulty fabrication of the tube. This feature can detect this problem which no other tester can.

Press the "SEL" button can change the test frequency between 300Hz, 225Hz and 150Hz for more clear observation and check up of the waveform.

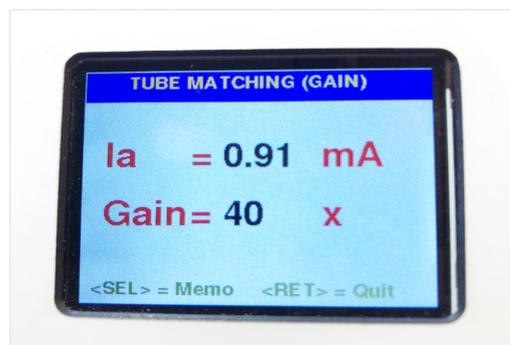
5. RECTIFIER TEST



<Ia> reading is anode or plate current of the rectifier tube under test (This testing feature requires an optional rectifier testing module).

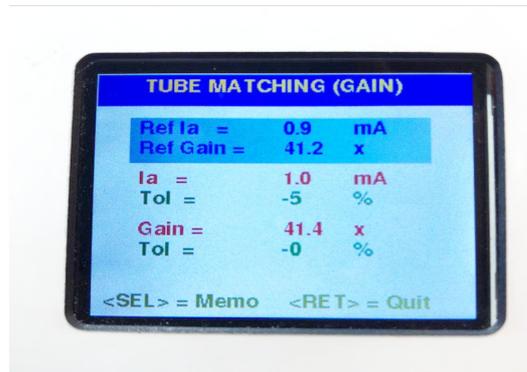
You can also use this feature to test the zero bias current of a signal tube when use as a rectifier.

6. TUBE MATCHING (Gain)



Initially this testing display is the same as GAIN TEST . Assuming you have 10 tubes of the same model want to be matched. Just put in the first tube to the tester, A/B switch set to A , then wait for a stable reading.

Then press “SEL” to memorize the tested data as the reference set of data.



If you are testing a dual triode, set the A/B switch to side B, it will then show the difference (Ia and Gain) of the B side from the A side in %, you can drop down the TOL reading to a label and stick to this tube.

If you are testing a single pentode, keep the A/B switch in the A position and proceed.

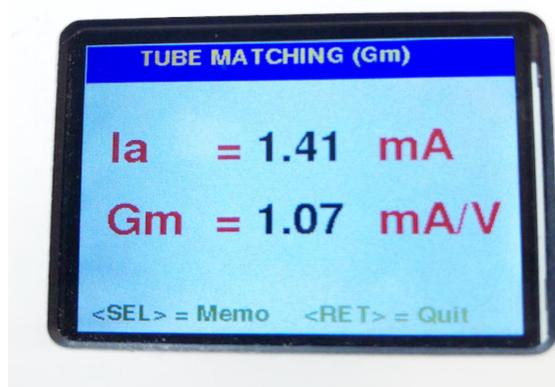
Take out the first tube and put in the second tube, set A/B to A and wait for it to warm up, take the Tol reading of A and B (if it is a dual triode) respectively and label to the 2nd tube.

Repeat this testing process and you will end up 10 tubes with 10 sets of difference TOL data for Ia and Gain.

You can then found out the closest pair or quad or sextet or octet of tubes according to the TOL data.

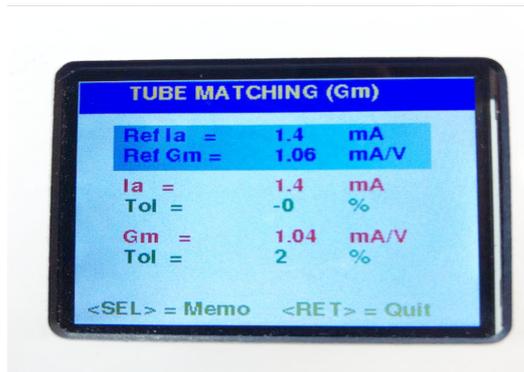
The first priority is to find tubes with the cloest gain as a match. If a lot of tubes has the same gain then find out the tubes with cloest Ia for further matching.

7. TUBE MATCHING (GM)



Initially this testing display is the same as GM TEST. Assuming you have 10 tubes of the same model want to be matched. Just put in the first tube to the tester, A/B switch set to A, then wait for a stable reading.

Then press "SEL" to memorize the tested data as the reference set of data.



If you are testing a dual triode, set the A/B switch to side B, it will then show the difference (Ia and Gain) of the B side from the A side in %, you can drop down the TOL reading to a label and stick to this tube.

If you are testing a single pentode, keep the A/B switch in the A position and proceed.

Take out the first tube and put in the second tube, set A/B to A and wait for it to warm up, take the TOL reading of A and B (if it is a dual triode) respectively and label to the 2nd tube.

Repeat this testing process and you will end up 10 tubes with 10 sets of difference TOL data for Ia and Gain.

You can then find out the closest pair or quad or sextet or octet of tubes according to the TOL data. The first priority is to find tubes with the closest gain as a match. If a lot of tubes has the same gain then find out the tubes with closest Ia for further matching.

The following tubes can be tested, as well as all their pin compatible models

(for 6922 / 12AX7 socket) 6V filament tubes set to 6922 position, 12V filament tubes set to 12AX7 position.

12AX7, 12AU7, 12AT7, 12AY7, 12AV7, 12BH7, ECC81, ECC82, ECC83, ECC85, ECC88, 5814A, 5751, 6922, 6H30, 6N1P, 6DJ8 and all their pin & filament voltage compatibles..etc

(for 6SL7 / 6SN7 socket)

6SL7, 6SN7, 6SU7, ECC32, ECC33, ECC35, 5691, 5692 and all their pin & filament voltage compatibles..etc

(for 6L6 / KT66 socket)

6L6, 6V6, 6Y6, 6G6, 6F6, 6550, EL34, KT66, KT77, KT88, KT99, KT100, KT120, KT150, 6CA7, 5881, EL32, CV1052, VT52 and all their pin & filament voltage compatibles..etc

(for 6BQ5 / EL84 socket)

6BQ5, 6V6, EL84 and all their pin & filament voltage compatibles..etc (EF86 and 6267 require converter)

(for 7591 socket)

7591, 7591A and all their pin & filament voltage compatibles..etc

(for 7868 socket)

7868 and all their pin & filament voltage compatibles..etc



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Those tubes not in the above listing can still be tested as long as the pin configurations and filament voltage can fit this tester

With the upgrade of our 300B or 845 expansion adapter, the test capability can be further expanded. Simply plug in the included small adapter cable, with the 8 pin octal end to the 6L6G socket, the 4 pin metal connector to the expansion adapter rear 4 pin input, and set to proper test voltage (between 2.5 to 12V) will do. Please make sure connector orientation must correct otherwise serious damage might happen to either the tube test or the expansion unit.

for typical Gain and G_m of different tubes, search tube datasheet on the web to have more details. For example if you want to check the data of 6550, just type in "6550 tube datasheet" on the search bar, once data sheet pop up, look at the μ / u / amplification factor for GAIN, and transconductance / mutualconductance for the GM (unit is either $\mu A/V$ or mA/V)

Power input :

DC version 12V DC 5A

Reference Data of common audiophile tubes

When perform Gain testing, the Ia (mA) will be much lower than when performing the Gm testing, this is normal and no need to be concerned

Model No.	typ Gain	typ Gm (mA/V)	Ia (mA) Gm test
6922 / E88CC / 6DJ8	33	12.5	10-20mA
6N1P	33	7.5	10-20mA
12AX7 / ECC83	80-100	1.6	1-2mA
12AU7 / ECC82	17	2.2	8-12mA
12AT7 / ECC81	60	5.5	8-12mA
6SL7/ 5691 / ECC35	70	1.6	2-3mA
6SN7/ 5692 / ECC32	20	2.6	8-12mA
6BQ5 / EL84	19	11.3	20-40mA
6L6	8	6.0	30-50mA
6V6	9.8	3.5	20-40mA
6G6	9.5	2.0	8-12mA
6Y6	5.5	7.1	5-10mA
6550	8	11.8	40-60mA
EL34	11	8	30-50mA
CV1052/EL32/VT52	8	2.1	15-30mA
KT66	8	7	30-50mA
KT77	11.5	8	30-50mA
KT88	8	7	40-60mA
KT120	8.5	8	40-60mA
KT150	8.5	8.6	40-60mA

note : different datasheet use different terms, equivalents as follows

Gain = μ = amplification factor (no units)

Gm = transconductance = μ (units can be mA/V= mS , uA/V= μ S= μ MHOS)

(Gm also = mutual conductance in certain databook)

1 mA/V = 1000 μ A/V = 1 mS = 1000 μ S

The above data is just for reference purpose, different tubes will have certain variations as well as different manufacturers, most of the cases a +/- 20% variation should be well expected and still consider a healthy working tube.

The Gm reading is highly depends on the testing bias - V, change of the -V can change the test result accordingly. For tube matching just simply use our preset value will be fine.



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Caution: There is high voltage inside this unit and its attached modules , should not open the box unless by qualified technician, or under proper instruction. Make sure you know what you are doing, and do it at your own risk !!

Disclaimer:

In no event shall our company be liable for any direct, indirect, punitive, incidental, special consequential damages, to property or life, whatsoever arising out of or connected with the use or misuse of our products

Warranty : One year free parts and labor warranty apply under normal operation condition , buyer pay for shipping. Physical damage or abuse of system will not covered.