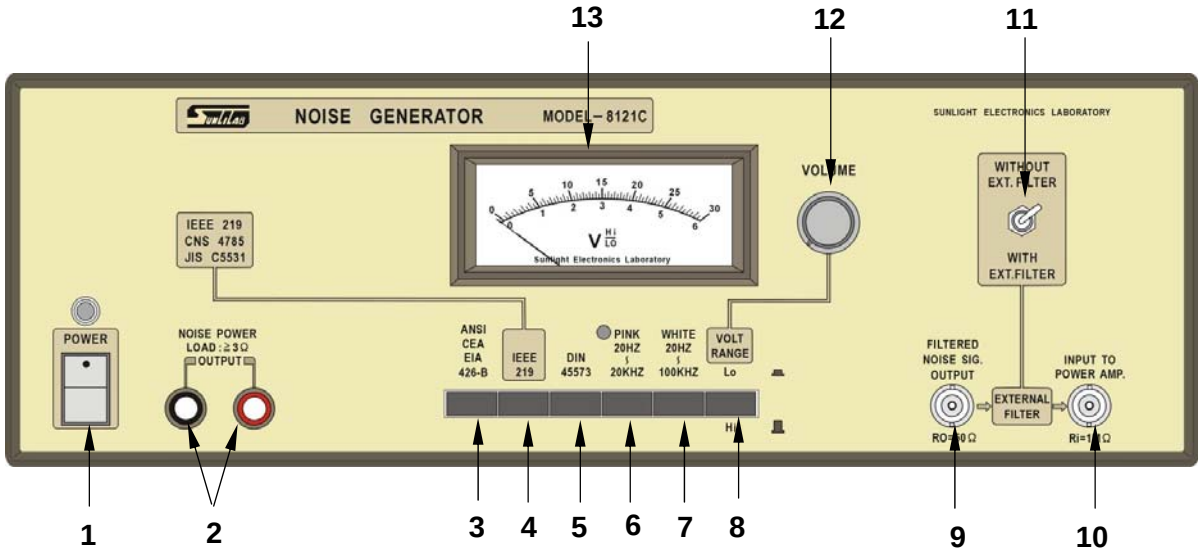
NOISE GENERATOR MODEL-8121C

I. Introduction:

1. Model-8121C uses a logic circuit to generate "Pseudo Random Noise", it is the newest and the most advanced design to generate audio white noise. It has much flatter frequency response than using diode. Model-8121C has: (1)White noise source.(2)Weighting filters.(3)Built-in power amplifier.(4)" TRUE RMS " voltage meter circuit. It can generate five different kinds of noise's spectrum, including White Noise, Pink Noise and three kinds of "Weighted Noise", conforms to following nation's standards:
   (1) JIS C5531, IEEE 219, CNS 4785
   (2) EIA 426B
   (3) DIN 45573
2. Since the Noise Generator (Model-8121C) is mainly designed for loudspeaker testing, thus, it is equipped with a 50W or 100W power amplifier, and "TRUE RMS" voltage measuring circuit , to measure the "TRUE RMS" of output noise. Never use a general VTVM, AC millivoltmeter or a digital voltage meter to measure noise voltage, unless when these meters have specially noted that its AC testing function is a TRUE RMS mode, otherwise, the testing result of RMS value is only precise for a sinusoidal signal, because these meters are designed for sinusoidal RMS voltage testing. If these meters are used to test nonsinusoidal signals (including noise signals), the results of measured RMS values will be inaccurate, therefore, the 8121C is equipped with "TRUE RMS" testing circuit, to measure the noise output voltage. Since noise voltage itself is not highly stable, thus, the voltage meter's indicator needle will have a slight deflection, don't mistake this as 8121C was faulted.
3. Model-8121C has also provide a selectable "Filtered Noise Sig. Output" terminal (9), which has the following two usages: (1) It can connect externally with another power amplifier ; (2) It can connect externally with another weighting filter, usage of an external weighting filter is: When users or other national standards required " weighting filter network with special specification ";then, users can connect (9) to the external needed filter, for necessary filtering, then, connect the output of an external filter back to the built-in power amplifier input terminal (10) of Model-8121C, for power amplifying, thereby measuring the pre-measure

II. Panel Introduction:



1. Power Switch & Indicator.

2. Output terminals :

   Directly provide the signal to the pre-measure loudspeaker, loudspeaker box and headphone, The amplitude of its power amplifier lies completely on the setting of volume adjusting knob (12).

3. EIA 426B :

   When press in this push-button, output terminals (2) will output noise that passes through EIA 426B weighting filter and power amplifier. While the filtered noise signal output terminals (9) will output noise signal that filtered through EIA 426B weighting filter, thereby provide connection of another power amplifier or weighting filter.

4. 5. 6. and 7.

   These push-buttons represent IEEE 219, DIN 45573, Pink, White Noise respectively, these push-buttons have functions similar to (3), the only difference is that the output noise differs from to another, when press in push-buttons (4), the output noise is not only of IEEE 29,but also of CNS 4785, (12) JIS C5531, since the noise spectrum of these national standards are completely similar to each other.

8. Volt Range LO / HI :

   True R.M.S. voltmeter (13) has both high or low range voltage scale, when (13) is in press-out position (in HI position), reading value of voltage should base on high voltage scale. Conversely, when (13) is in press-in position (in LO position), then, reading value of voltage should be based on low voltage scale.

9. Filtered Noise Sig. O / P :

Noise signal output of filtered noise sig. output terminal (9) is completely determined by push-buttons (3), (4), (5), (6) & (7). Press-in push-button (3), terminal (9) will output IEEE 219 noise signal; when press-in push-button (6),terminal (9) will output pink noise signal instead, so on & so forth. Noise signal output level of (9) is approx. at 0.9 to 1.0V R.M.S., output impedance: 50 ,it can be used to connect externally with another power amplifier or an external filter.

10. Input To Power Amp. :

Built-in power amplifier input terminal (10) can accept external signal in audio range (Ex.: Sine wave, noise signal), and such signal will be amplified through the built-in power amplifier, then, output from terminals (2), to driving the under testing loudspeaker, loudspeaker box and headphone. To use this terminal, users should set the external filter selecting switch (11) at "with ext. filter" position, input terminal of the built-in power amplifier will then accept signal from input terminal (10), otherwise, built-in power amplifier will only accept signal from the internal noise source. Input impedance of terminal (10) is 1M , noise signal input should be at around 0.1Vrms, not beyond 0.2V, otherwise, crest factor of noise will be affected.

11. Without Ext. Filter / With Ext. Filter :

External filter selecting switch. When users need a "weighting filter network with special specification" to test the power rating or life testing of loudspeaker, users may use this selecting switch; firstly, select the desired noise signal by pressing either (3),(4),(5),(6) or(7) push-buttons, then, from the filtered noise sig. output terminal (9), apply the desired noise signal into " Special weighting filter network " (external filter), then, connect the output of this external filter to the built-in power amplifier input terminal (10), set the external filter selecting switch (11) to " With external filter " position, steps on using the "external filter" is thereby completed.

12. Volume :

Volume adjusting knob, it is being used to adjust the output voltage.

13. True R.M.S. Meter :

"True R.M.S. meter has HI/LO voltage scale, and is being controlled by volt range LO/HI push-button, to determine whether the reading value should be based on HI scale or LO scale.

Ⅲ. Feature And Usage :

Noise Generator "Model-8121C" has four features for loudspeaker test, which are:(1)Loudspeaker's continuous load test.(2)Loudspeaker's rated power handling capacity specifying based on the above testing results.(3)Feeding noise signal to the loudspeaker to measure the sound pressure sensitivity (dB). The following is the details:

1. Loudspeaker's Continuous Load Test

The IEEE 219 recommends that a signal from a white noise generator which passes through a specified weighting filter can be filtered and then be amplified, for continuous load test. Thereafter, most nations use the same rule for their national standard, for example CNS 4785, JIS C5531 etc. But U.S. EIA 4264A uses another kind of weighting filter, there are more high frequency than IEEE 219 at this spectrum, it might be because of a wider frequency band in late music.

For loudspeaker's continuous load test, select first the needed noise signal push-buttons (3) to (7),set the external filter selecting switch (11) to "Without ext. filter" position, then, estimate the rated power handling capacity of pre-measure loudspeaker, to adjust the volume adjusting adjusting knob (12), thereby obtaining the needed testing voltage.

REMARK: If either one of the noise signal push-buttons (3) to (7) is not being pressed in, then, no single noise signal output will occur, it means that the filtered noise signal output terminal (9) will have no output signal, besides no matter the volume adjusting knob is being adjusted to the largest volume, still, no single output will occur from output terminals (2).

If the pre-measure loudspeaker is not a full range type (like woofer, midrange or tweeter) and a crossover network is installed, the IEEE recommends that the crossover network should not be taken apart, and should be measured together. Furthermore, if the pre-measure loudspeaker is a single unit without crossover network, then the manufacturer should specify an adequate crossover network for buyers to connect with loudspeaker for this testing, at this time, the total impedance should be measured from the terminals of crossover network, not from the loudspeaker (noted from IEEE std.) The IEEE recommends the continuous loading period should be 100 hours at a power of specified level, then let the pre-measure loudspeaker rest a non-working condition for another 100 hours. After these procedures, if there is no significant change in the electrical, mechanical and acoustical characteristics of this loudspeaker, the testing is consider qualified. If the testing result is not acceptable, then reduce the noise signal power and fed to the pre-measure loudspeaker, and do the test at the same condition till the loudspeaker can pass the test. On the other hand, if an initial testing result is acceptable, users should increase the loading power & repeat the same procedures till the pre-

measure loudspeaker fails to handle such loading power, After these repeating test, the maximum power of a loudspeaker for continuous loading can be defined.

2. Loudspeaker's Rated Power Capacity Specifying :

Up to the present time, there isn't any instrument that can indicate a loudspeaker's rated power capacity immediately after the two terminals are being connected. All these data are the result of continuous load test. According to this value, Users can specify the rated power capacity of a loudspeaker. The IEEE recommends that a loudspeaker must pass continuous loading test at it's specified rated power capacity.

3. Sound Pressure Test For Loudspeaker :

According to CNS & JIS, they recommend that; choose four neighbouring frequency points from twenty one different frequency points and fed into an under testing loudspeaker with 1W power, one point at a time, then take an average of these four values, which are the sound pressure level that measured at 1M from the center of the loudspeaker. Since only four fixed frequency points are used, this measurement is not conceded as an objective measurement by many famous loudspeaker manufacturers, instead, they use pink noise to measure sound pressure level as IEEE recommended. The IEEE recommends that feed the pink noise through a band-pass filter to get a desired frequency band, and feed into a loudspeaker after amplified with 1W power, then measure the sound pressure level (in dB) at 1M from the axis of the pre-measure loudspeaker, the measured value is the sound pressure level (dB) of the loudspeaker. The 8121C is designed for these purpose that stated on the above. But, if the pre-measure loudspeaker is not a full range loudspeaker unit or system, then, since IEEE recommends using a band-pass filter which has equal band width to the specified working frequency range of the pre-measure loudspeaker, users can output the pink noise from terminal (9) of 8121C, from the needed external filter (with roll off -24dB/Oct.), feed the pink noise to terminal (10) and amplify pink noise through a built-in power amplifier, and feed into the pre-measure loudspeaker.

Special remark: Voltage of signal fed into output terminal (10) should be at around 0.1Vrms, it should not beyond 0.2Vrms, otherwise, inaccurate.

Ⅳ. Primary Trouble Shooting & Maintainance Of Model-8121C

Model-8121C is mainly composed of the following 4 printed circuit boards, namely: (1) PAAS P.C.B.; (2) NS92 P.C.B.; (3) NS92M P.C.B. and (4) Mother Board. Since P.C.B.'s of 8121C are plug-in designed, thus, in case faulty's symtom occurred, based on the following detecting methods, users may be able to determine by themselves which P.C.B. is faulted, they only have to send the faulted P.C.B. back to Sunlight for repair, (If 8121C is within one year warranty period, and such P.C.B. is faulted without manual destruction, Sunlight will provide a new P.C.B. to users (free of charge), provided that the faulted P.C.B. should send back to Sunlight).

A. <u>Indicator did not light up</u> :

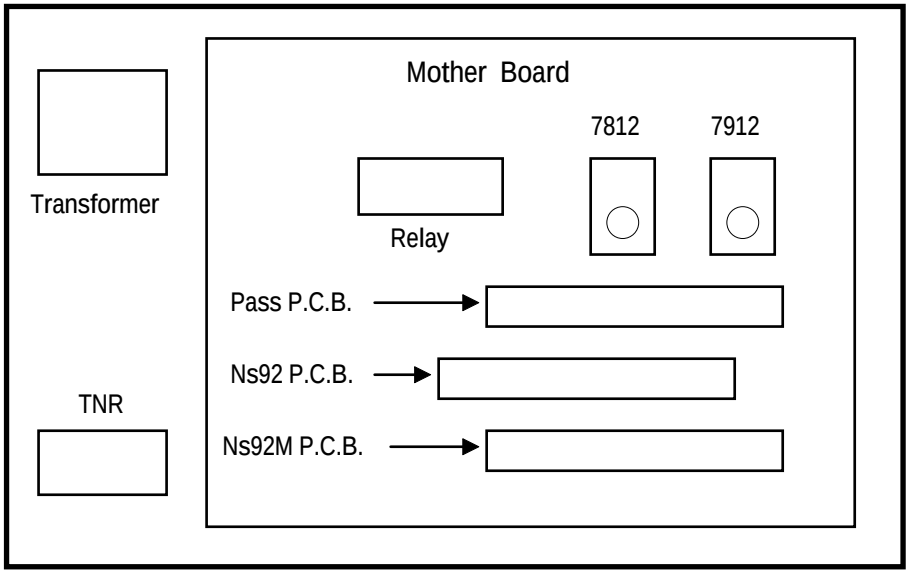
1. Check if the cord is properly connected to socket,(if not, plug the cord properly).
2. Check if the fuse of 8121C is O.K.? if fuse was burnt out, it is usually caused under following two circumstances:
   a. Misconnection of power to higher voltage, causing the permanent damage of an internal metal oxide varistor (TNR), in this case, it is in vain to replace only a new fuse, instead, users should replace first a new TNR, then, replace a new fuse, otherwise, the replaced fuse will still be burnt out again. If users have no TNR on hand, they may cut off the TNR, but without the TNR, when misconnection of power occurred, the circuit of Model-8121C will no longer be protected, thus, it is advisable to replace a new TNR.
   b. Internal circuit severely damaged, 8121C should send back the instrument to Sunlight for repair.

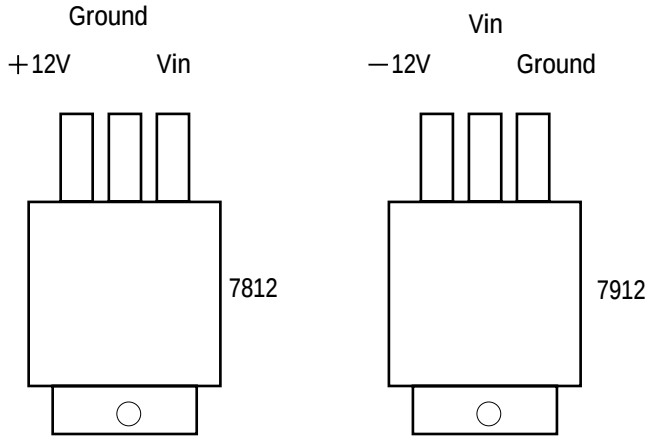
B. <u>Indicator did light up, but no function occurred, even-though volume knob had been adjusted to largest position, still, needle of voltmeter (13) can't move.</u> :

1. Check whether if the " External filter selecting switch " is in " WITHOUT EXT. FILTER " position? (If not, set it on "WITHOUT EXT. FILTER" position).
2. Make sure that either one push-button of (3) -(7)push-bottoms is in press-in position, (If not, press-in either one push-button of (3)-(7) push-buttons).
3. After steps (1)-(2),if needle of voltmeter (13) still can't move, uncover top cover, check if the output voltage of "7812" & 7912" regulators on Mother Board are O.K.? (Should have a output of +12V and -12V respectively.) If either "7812" or "7912" regulator is faulted, then, replace a new one with the same specification, in case both "7812" & "7912" regulators are O.K., then, continue with step (4).
4. Use an oscillator to measure the output of noise signal output terminal (9), if 0.9Vrms noise signal appeared on the screen of oscillator, it means that "NS92" P.C.B. is O.K., if not "NS92" P.C.B. is faulted, and should send back to Sunlight for repair.

5. Input 1Vrms,1KHz external sinusoidal signal onto the built-in amplifier input terminal (9) , then, set the "External filter selecting switch" to "WITH EXT. FILTER " position, and set the volume adjusting knob to approx. on middle position, if still no display on voltmeter, it means that either the "PAAS" or "NS92M" P.C.B. is faulted. Users may use an oscillator to measure the output terminals (2), if 1KHz sinusoidal signal appeared on the screen of oscillator, it means that "PAAS" P.C.B. is O.K., while the "NS92M" P.C.B. is faulted, otherwise, if oscillator has no 1KHz sinusoidal signal, it means that "PAAS" P.C.B. is faulted. Users are require to send the faulted P.C.B. back to Sunlight for repair.

Inner Top View Of 8121C





Regulators 7812 & 7912 On Mother Board

Ⅴ. Specification:

A. <u>Noise type</u> :

1. White noise: Range:

   20Hz--100KHz (-3dB point, roll off -24dB/Oct.) .

   Flatness: -1dB.

   Generate mode: Digital technique, pseudo random noise.

2. Pink noise:

   Range:20Hz--20KHz (-3dB point, roll off -24dB/Oct.) Crest factor: 4 (as IEEE recommended).

3. IEEE 219 Weighted Noise: Adequate for IEEE 219, CNS 4785, JIS C5531.

4. EIA 426B Weighted Noise: Adequate for EIA 426B.

5. DIN 45573 Weighted Noise : Adequate for DIN 45573.

B. <u>Voltmeter: TRUE R.M.S. response Has 2 ranges: HI & LO , 50W or 100W differs one from another.</u> :

50W	HI : 0 - 25V	100W	HI : 0 – 30V
	LO : 0 - 5V		LO : 0 - 6V

Accuracy : < ± (1% rdg＋1% F.S.)

C. <u>Power Amplifier; There are 0-50W and 0-100W , both are continuously adjustable (defined at unclipped maximum output of sine wave)</u>:

frequency response: 20Hz---20KHz ± 0.2dB.

20KHz--100KHz ± 1 dB.

Distortion: ≦ 0.1%.

Output: With permanent short circuit protection.

D. <u>Input to power amp. terminals : Largest input signal voltage capacity: -0.2Vrms, most ideal in between:0.1V --0.2V.</u>

E. <u>Min. Loading impedance : must be≧3Ω</u>