



eq two
designed by Langley

ASSEMBLY MANUAL

500 Series

TOTALAUDIOCONTROL

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INTRODUCTION

Thank you for purchasing our TOTALAUDIOCONTROL EQ TWO in kit form. You will have a lot of fun in building and using it.

EQ TWO is one of our flagship “Designed by Langley” series of pro-audio products. Yes, as the name reveals it is designed by Mr Graham Langley, a name that requires no introduction. Premium quality components are used without exception to provide the highest performance and most reliable operational life. The PCBs are fully gold plated. Nothing is compromised.

EQ TWO follows the topology of the four band parametric equaliser that Graham first used in the Amek M3000 mixing console in 1979. This was later adapted for use in M1000 and M2500 consoles and formed the basis of the equaliser design in many other Amek and Total Audio Concepts consoles.

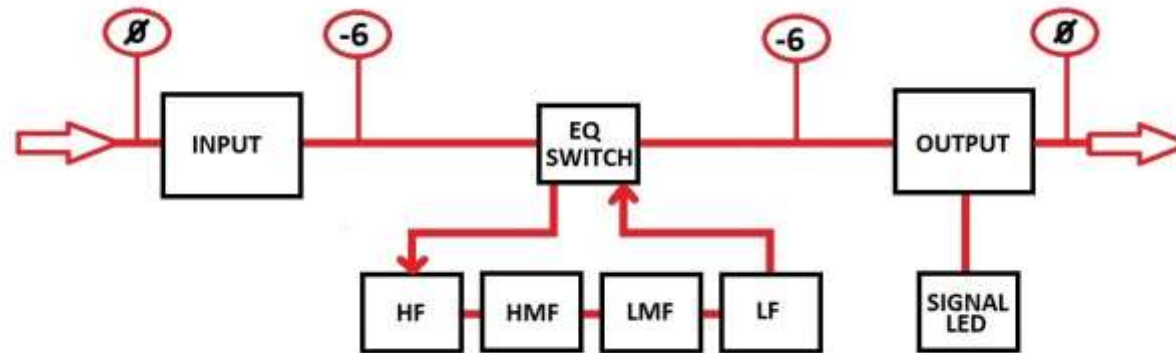
The topology differs from many other state variable filter designs in that each band is composed of a 6dB/octave high pass and a 6dB/octave low pass filter with different turnover frequencies. This enables the bandwidth to be varied over a wide range and also facilitates the Bell/Shelf switching on the High and Low frequency ranges.

Default Q is 0.5 on HF and LF bands. However, these can be increased for sharper response by changing two resistor values for personal taste.

The frequency dividing range switch shifts the HMF range one octave lower to 160Hz to 5kHz, giving more control over instrument frequencies.

A single LED provides indication of signal level. This has quasi-PPM ballistics and illuminates green for signal present (-18dBu), yellow for signals above +4dBu and red for signals above +18dBu.

Block Diagram:



Typical specification:

High frequency: 680Hz to 20kHz, +/-15dB, Q: 0.5 plus shelf mode.
High mid frequency: 320Hz to 10kHz, +/-15dB, Q: 0.5 to 3.2.
Low mid frequency: 100Hz to 3kHz, +/-15dB, Q: 0.5 to 3.2.
Low frequency: 32Hz to 1kHz, +/-15dB, Q: 0.5 plus shelf mode.

Frequency response (EQ out):	+/- 0.5dB, 20Hz-80kHz.
Phase response (EQ out):	+/-20 degrees, 20Hz-80kHz.
Maximum input and output (100k load):	+27dBu.
Internal operating level/headroom:	-6dBu/+27dBu.
THD&N (EQ in or out, +10dBu input signal):	better than 0.05%, 20Hz-80kHz.
Noise (no EQ in), 22Hz-22kHz, RMS, 40 ohm source:	-98dBu.
Noise (typical EQ setup), 22Hz-22kHz, RMS, 40 ohm source:	-89dBu.
Input/output impedance:	20k ohms/75 ohms

ALL SPECIFICATIONS ARE SUBJECT TO CHANGE

A FEW WORDS ON ASSEMBLY

Before rushing into building your EQ TWO, please study this manual thoroughly and familiarise yourself with the design. As the expression says “one picture tells a thousand words” therefore each sequence is photographically presented in detail.

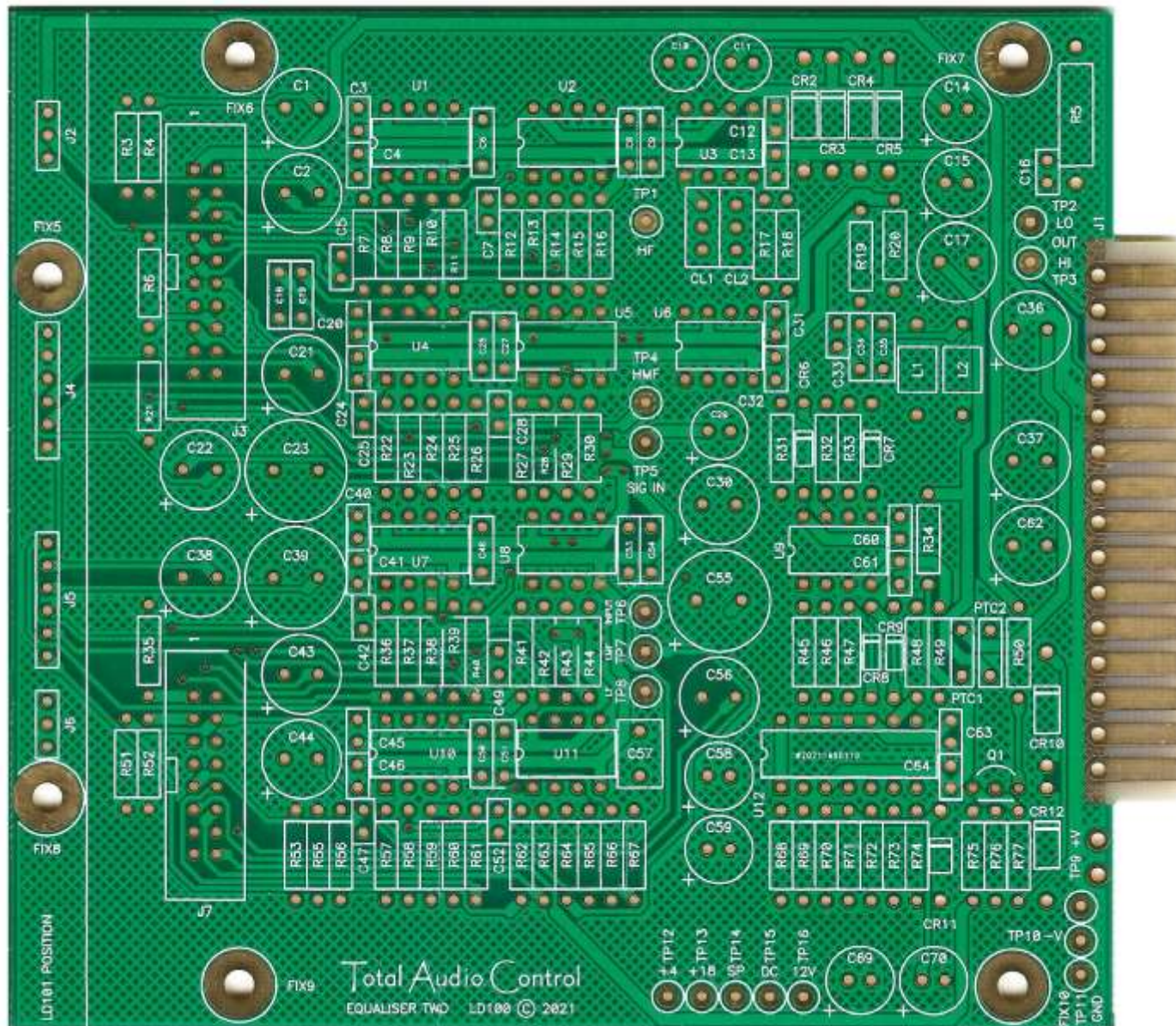
Populating a PCB always begins with the smallest components, resistors and small signal diodes being the first. If you solder the larger components first you’ll have a hard time soldering the resistors or the small signal diodes. Do therefore follow the bill of materials for this.

Before soldering a component, visually check its value and designation. Measuring the values of the resistors and small capacitors is also good practice. We are extremely lucky to be living at a time when a reasonably well-performing digital multimeter with semiconductor testing capability, or a capacitance meter, can be picked up from E-Bay literally for the cost of a burger. Investing in a few hand-held meters will pay dividends in the long run.

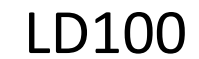
A good quality soldering iron, a de-soldering pump and a set of hand tools are essential. A miniature close-cutting side cutter should be part of your tool-kit. Equally, having a set of miniature screwdrivers in your tool-kit will be invaluable.

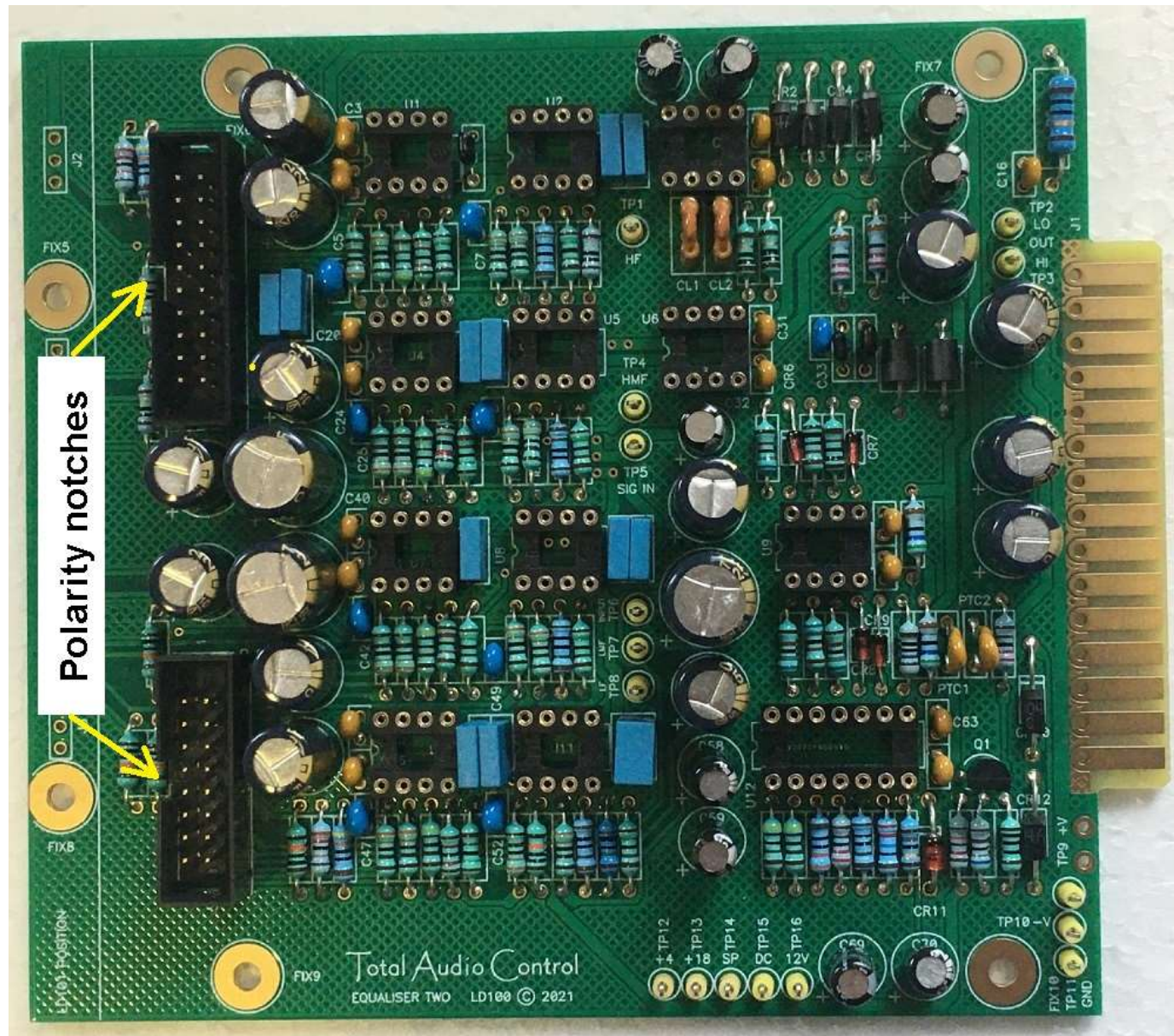
Most faults arise due to incorrect components being inserted or due to solder bridges. Therefore, always work one component at a time. Do not insert all of the resistors and try to solder them at once. Insert one, solder it, trim the leads and check the solder node, then move onto the next one. It is particularly important to closely examine the soldering of components. Therefore, having a good quality hand-held magnifier in your tool-kit will save you a lot of trouble.

Do not leave the soldering iron in contact with the components for too long as there can be a possibility of causing damage. You should be able to get in and out of a solder node within a couple of seconds. There is no need to crop connectors, potentiometers or switches unless specified. In general do not rush. Work methodically and have fun.

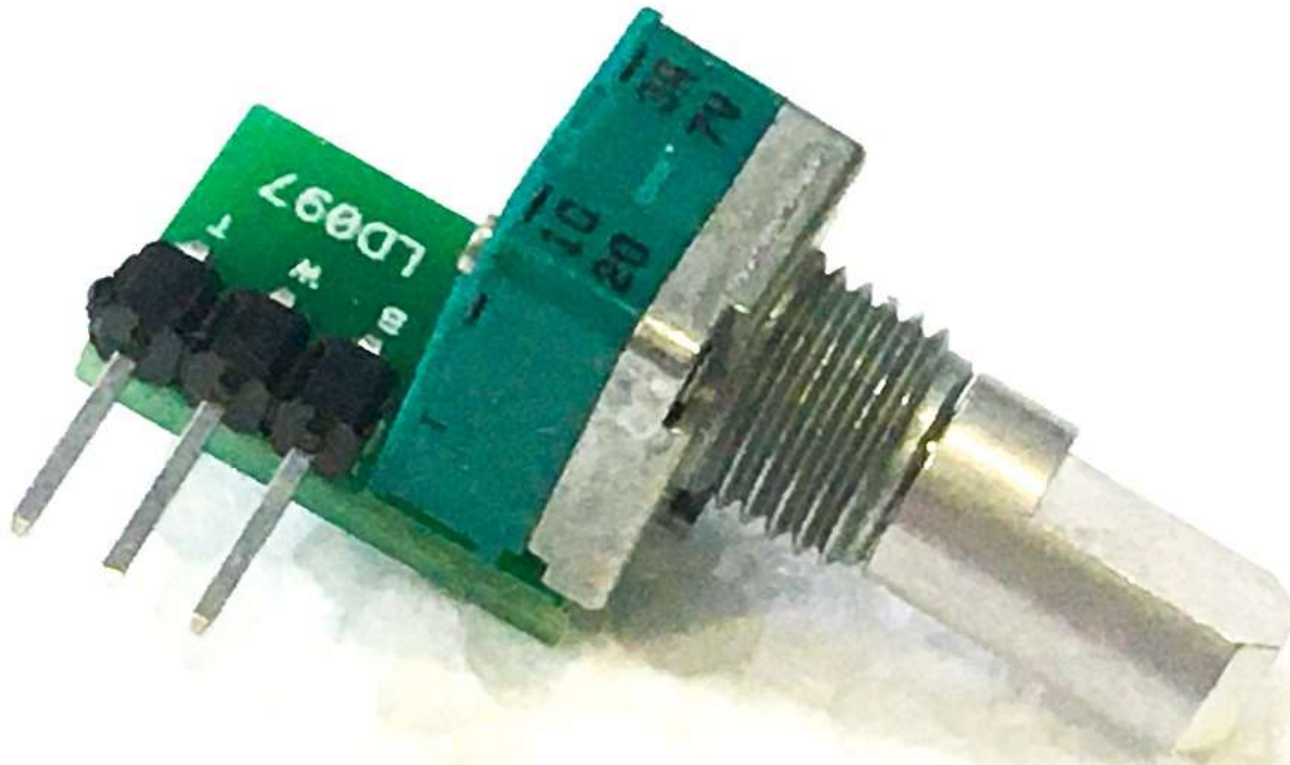


LD100

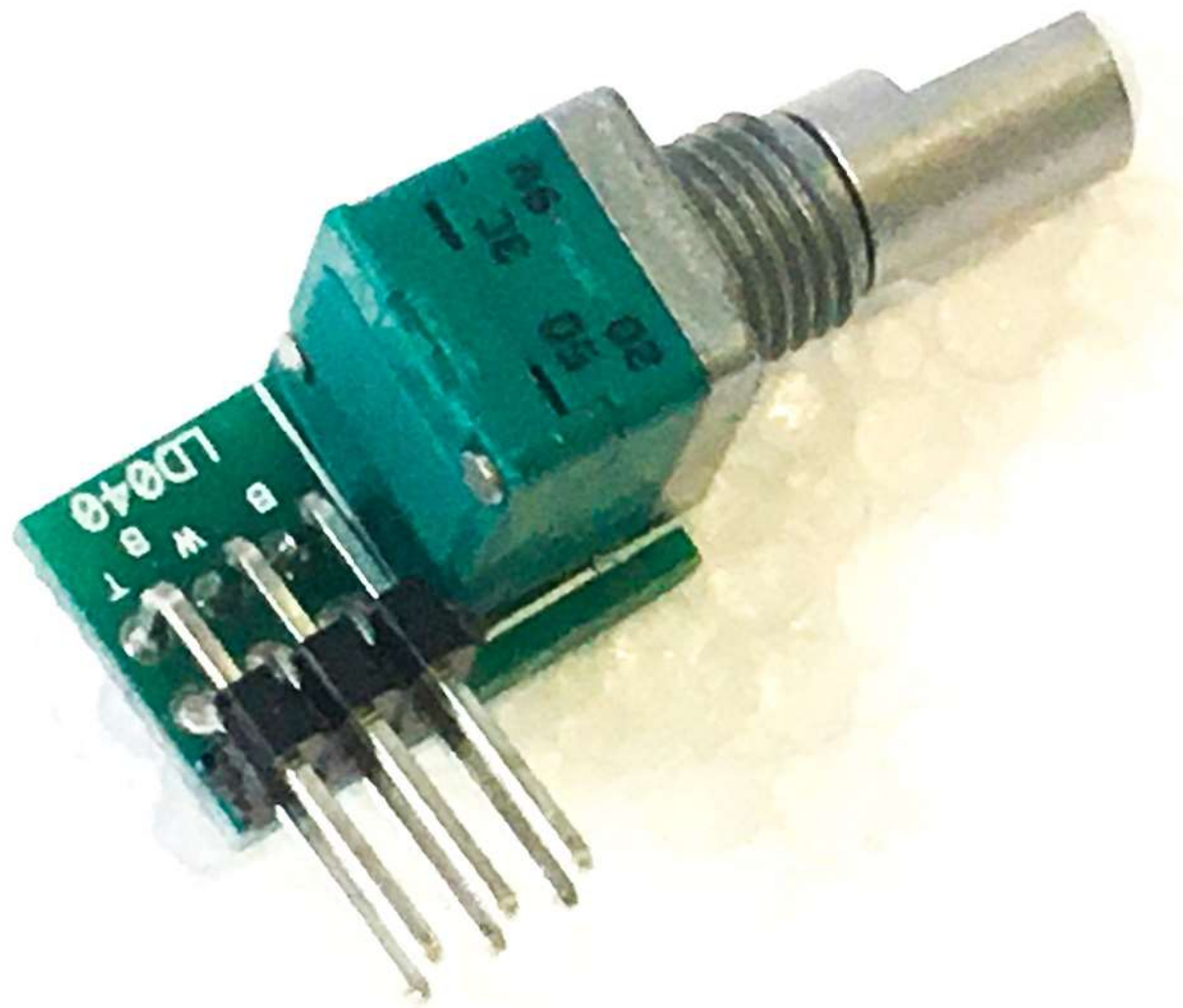




LD100

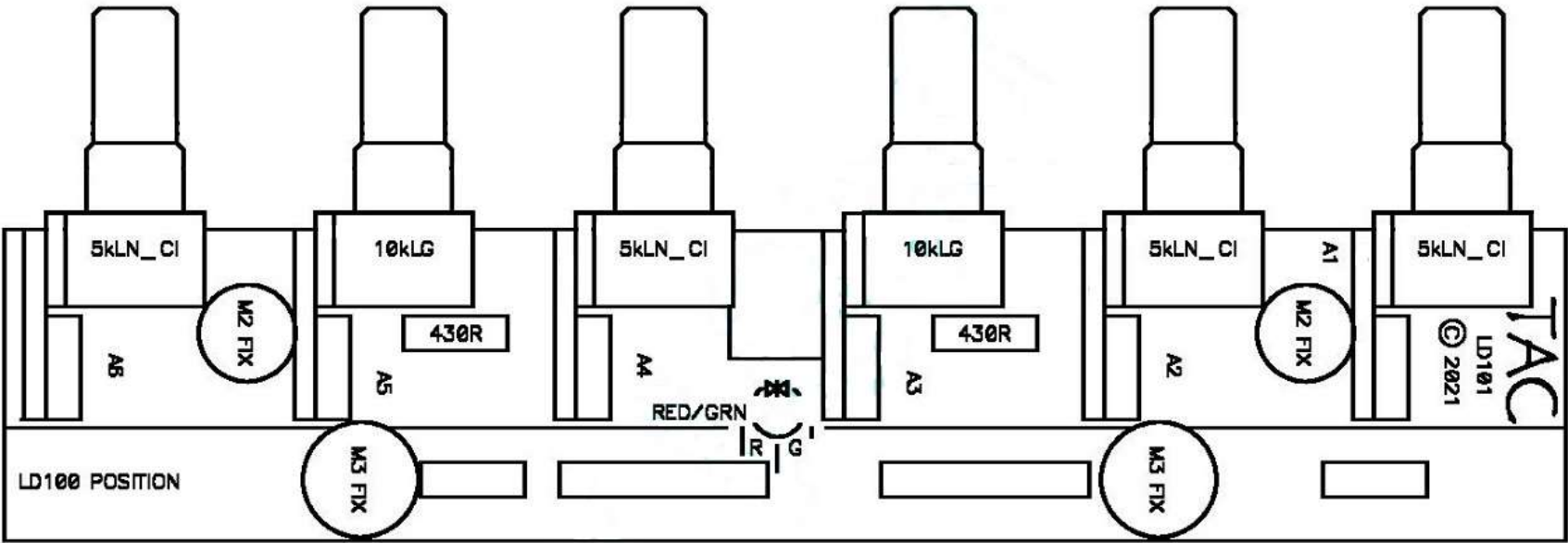
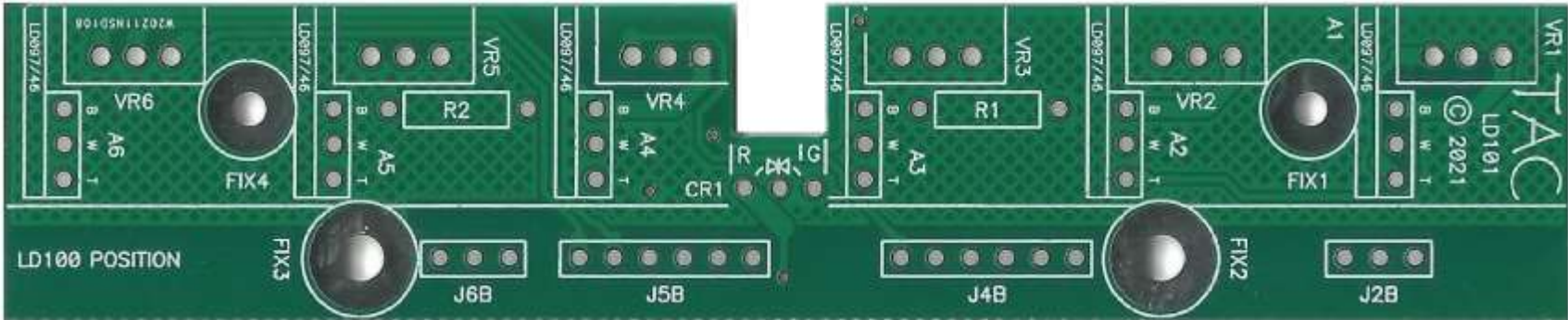


LD097

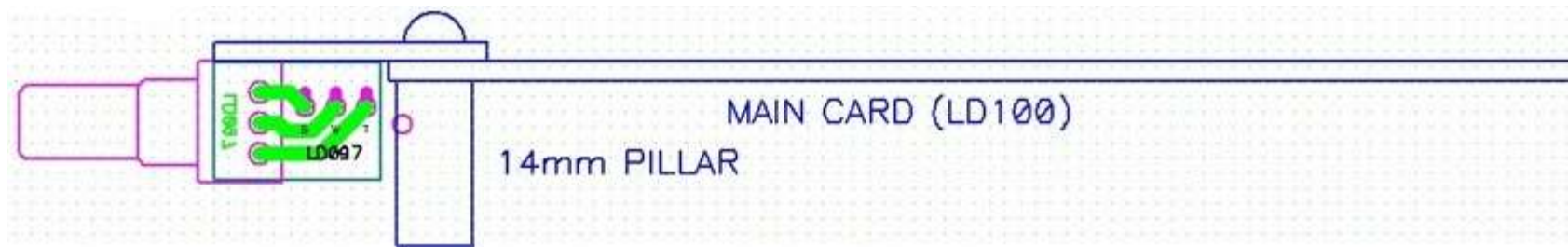


LD040

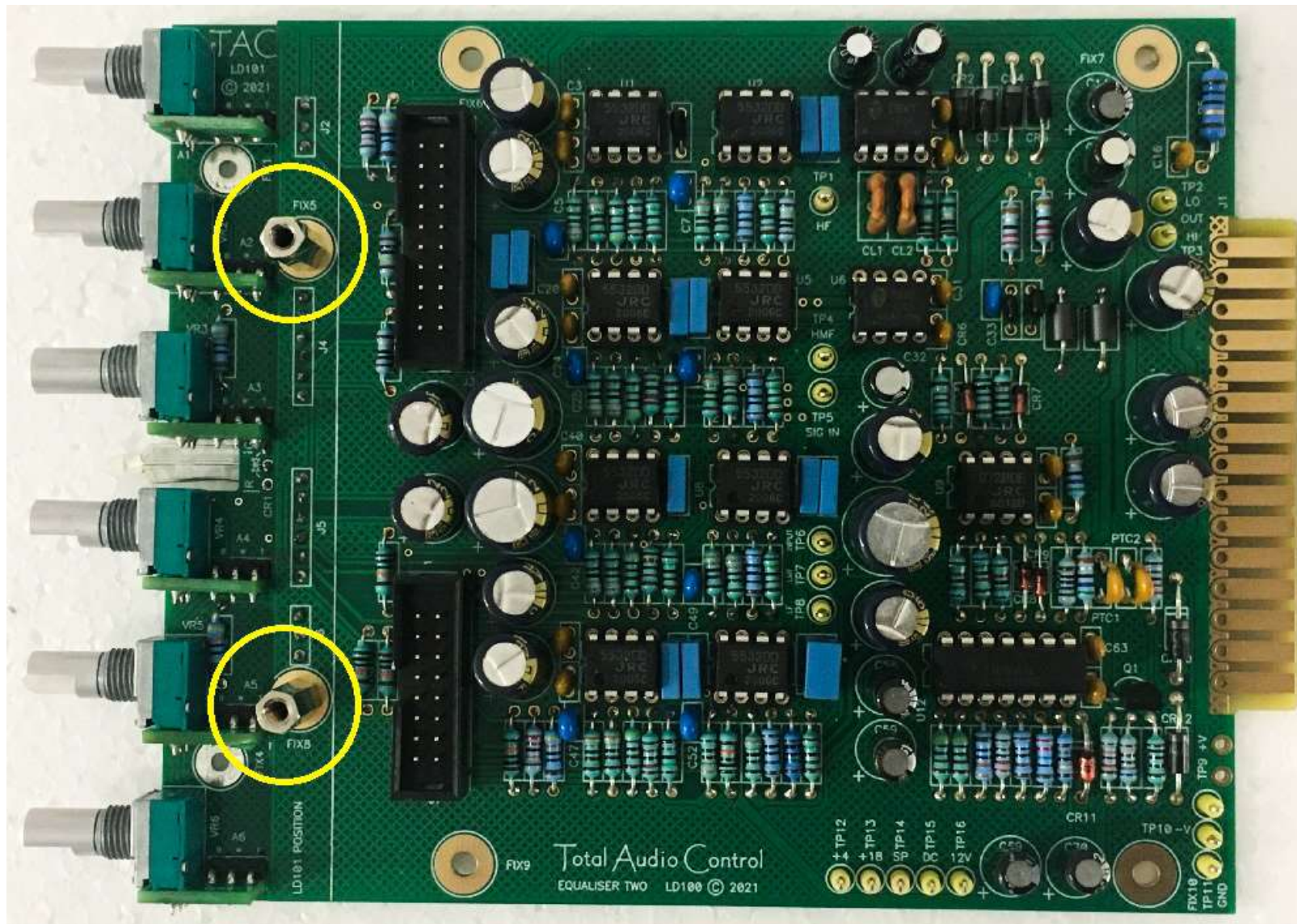
LD101



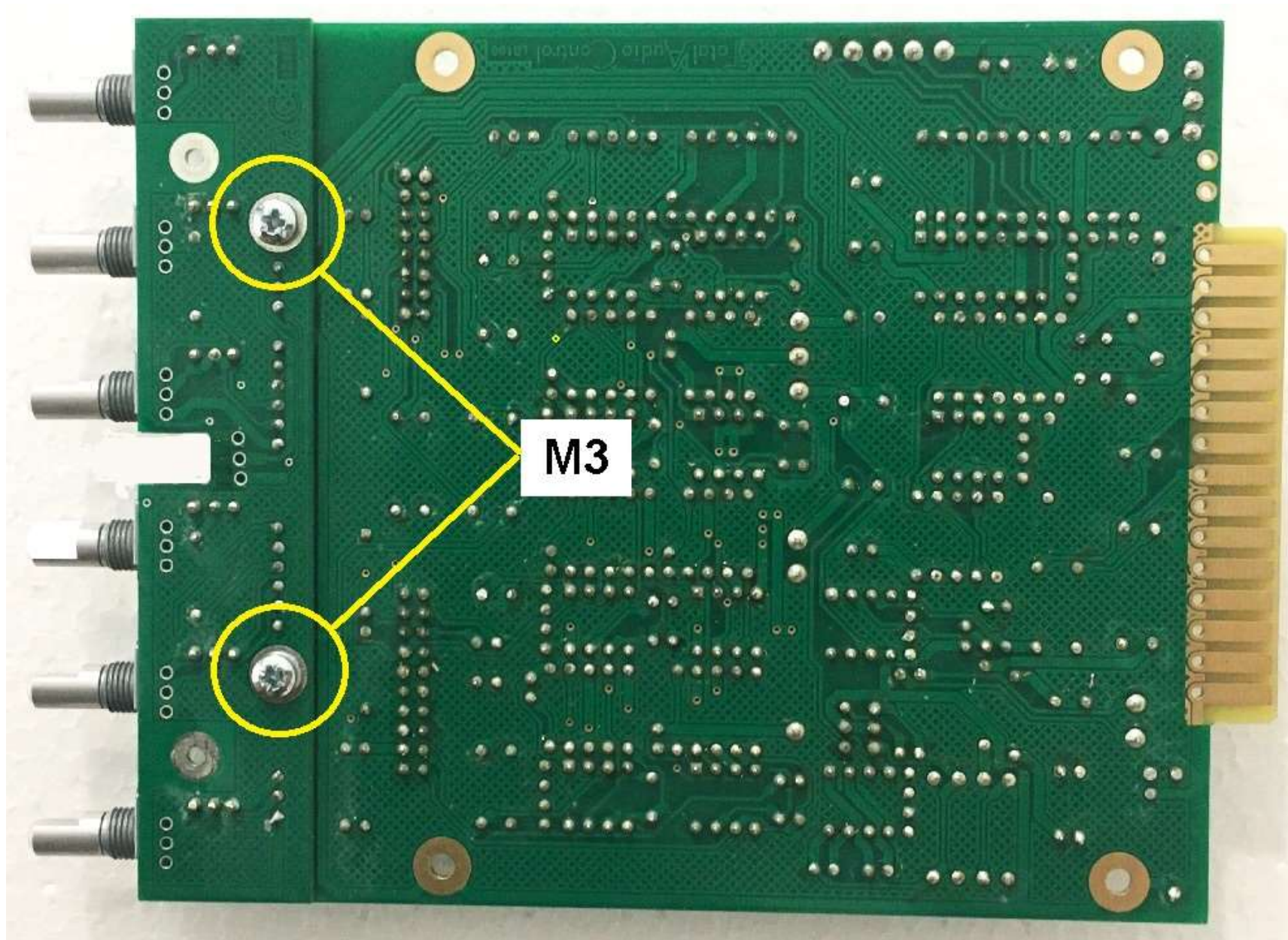
LD101

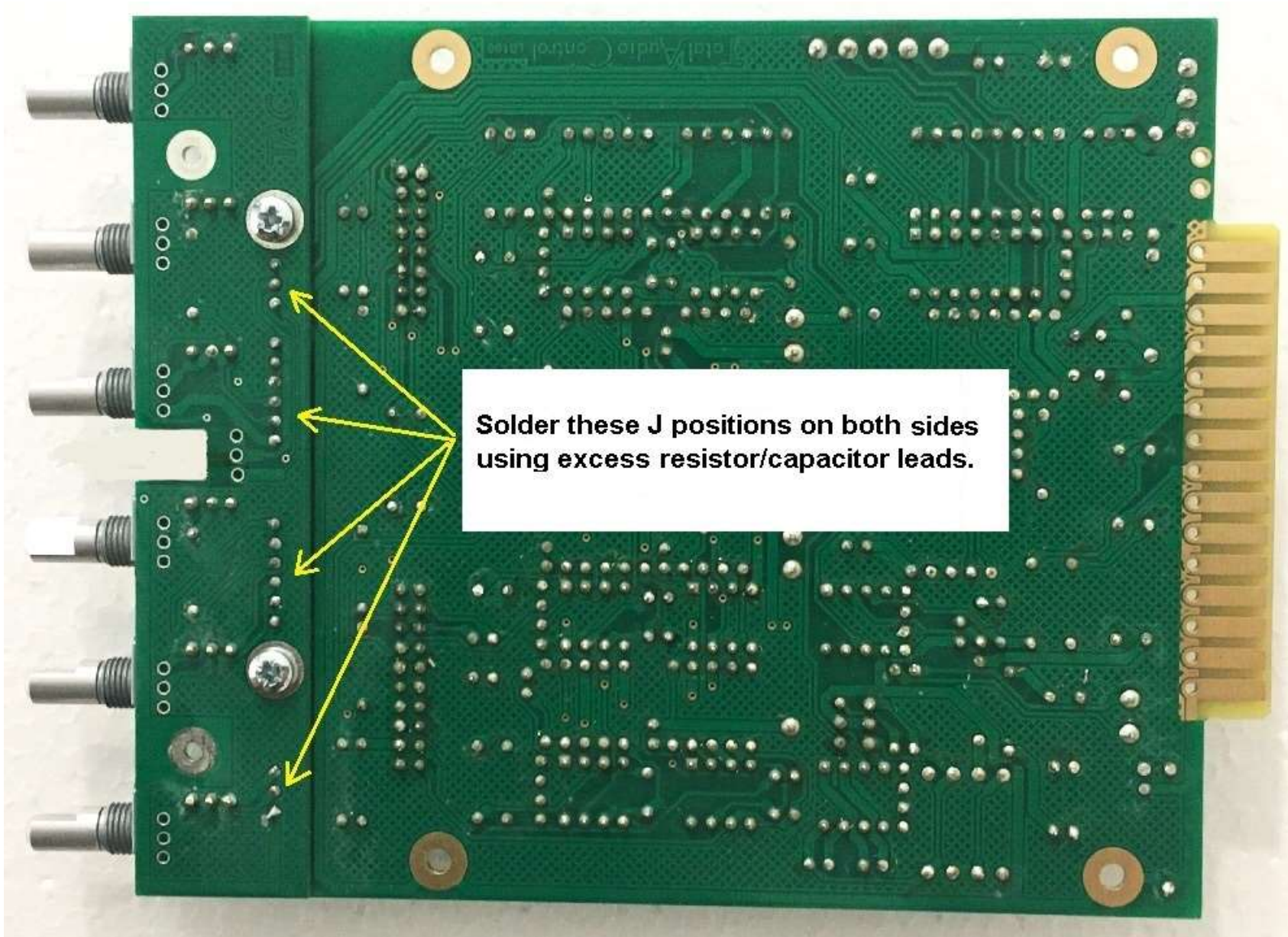


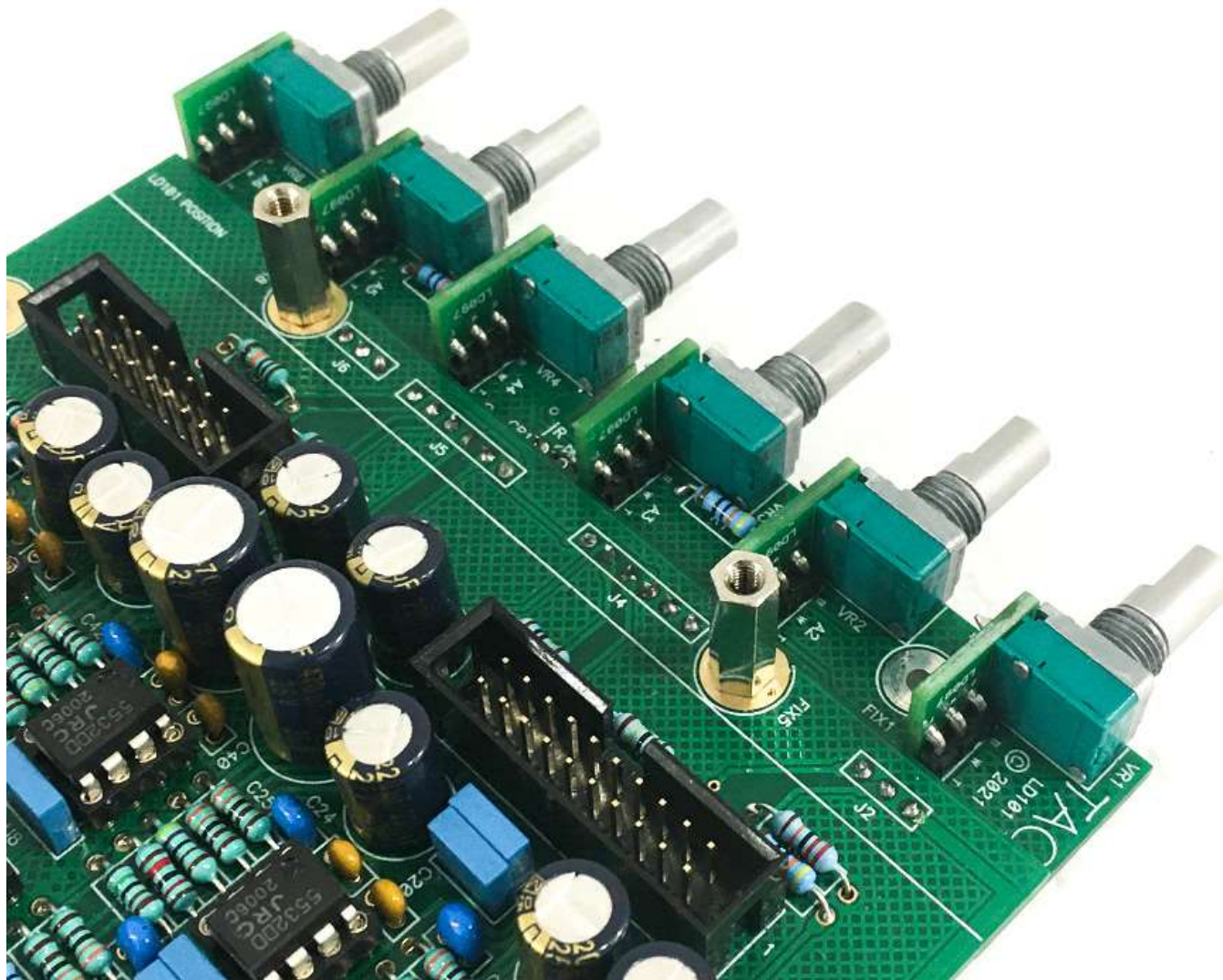
LD101 is fixed to LD100 from the bottom of LD100 using the 13mm hex pillars as shown above. Please also see below images.



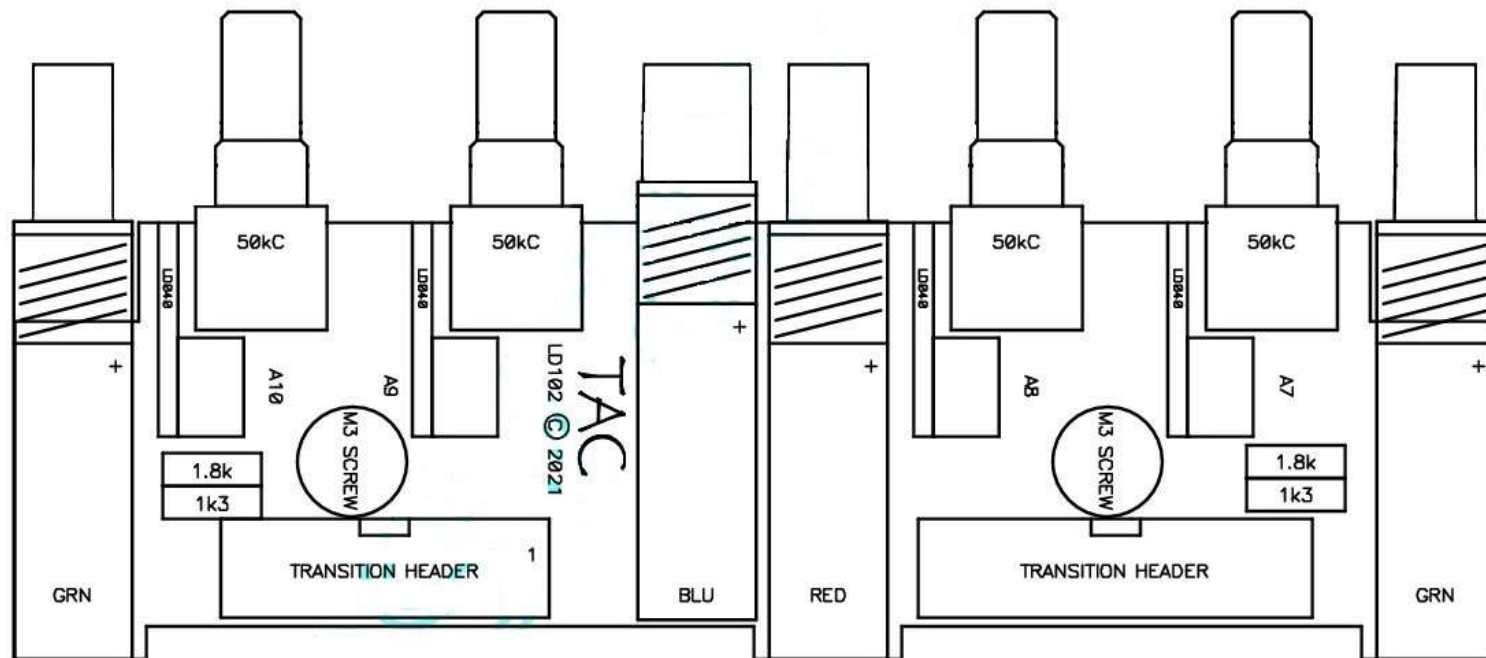
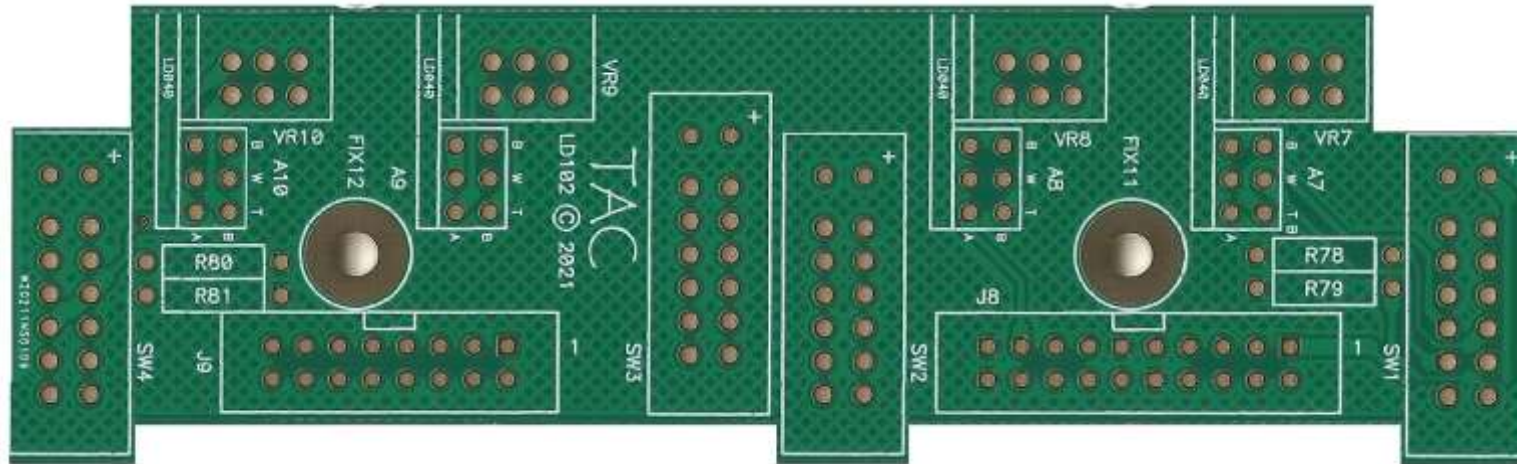
13mm hex pillars made up of 12mm hex pillar + two washers. Fix from the solder side using M3 screws.

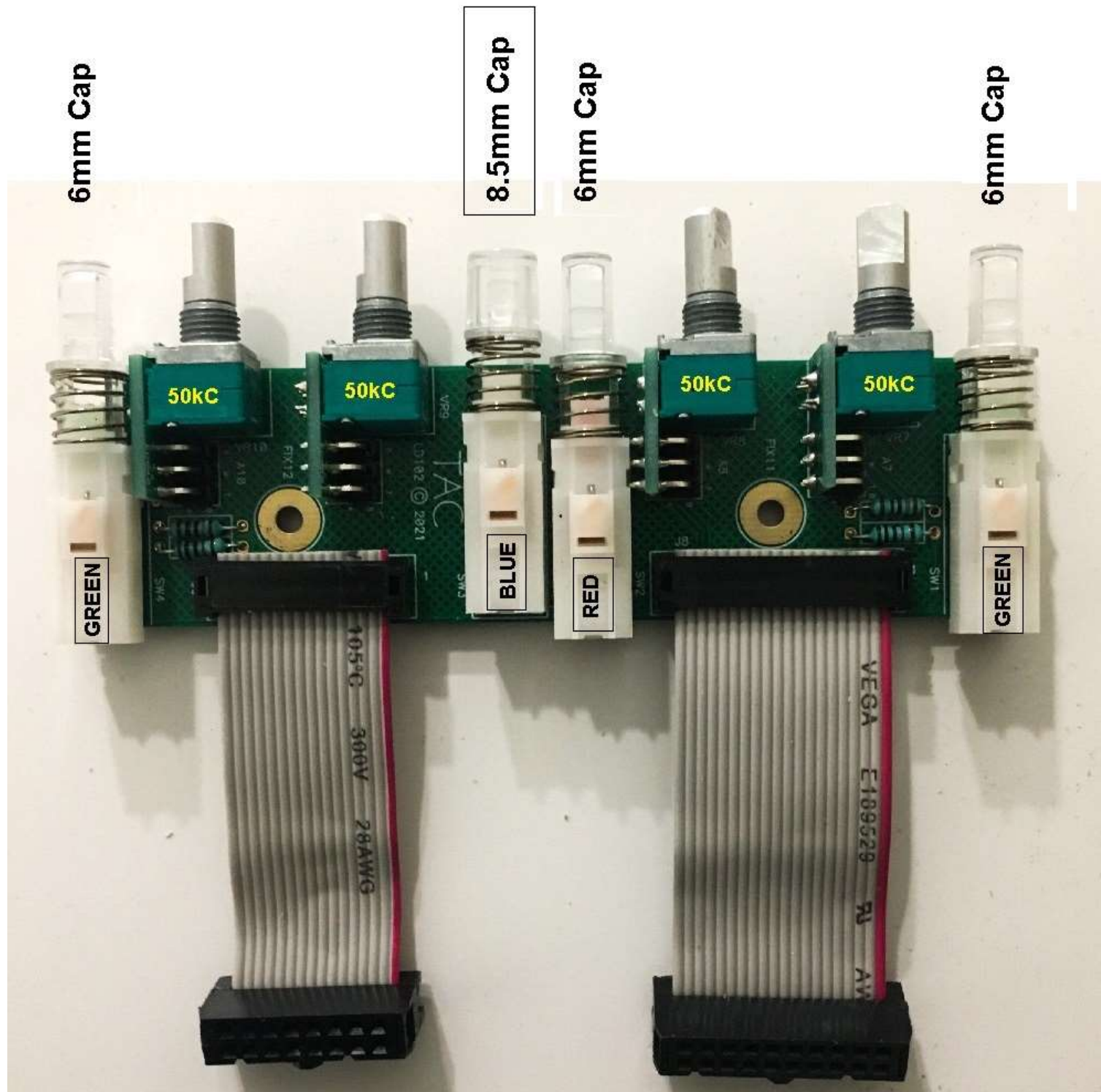


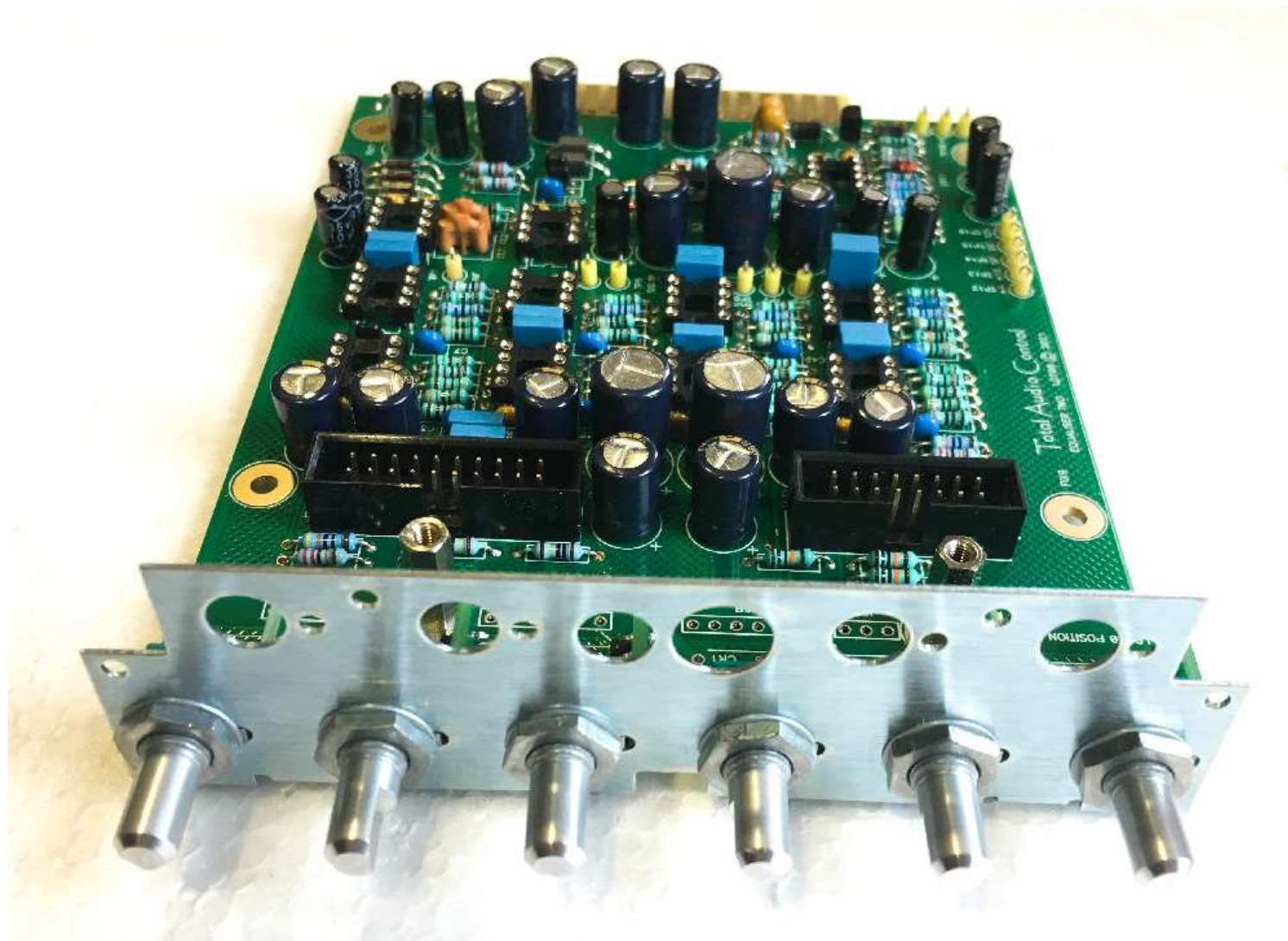




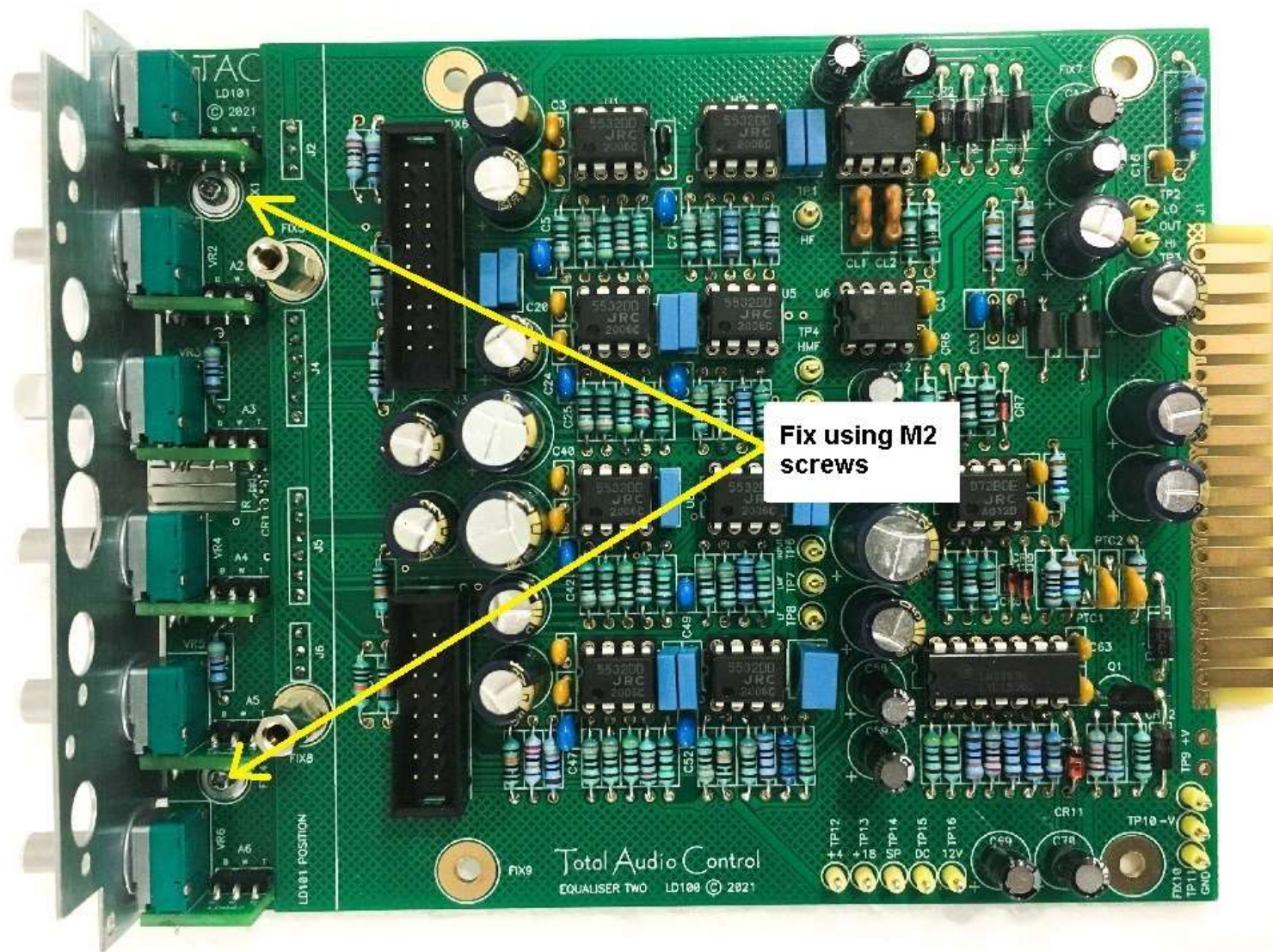
LD102



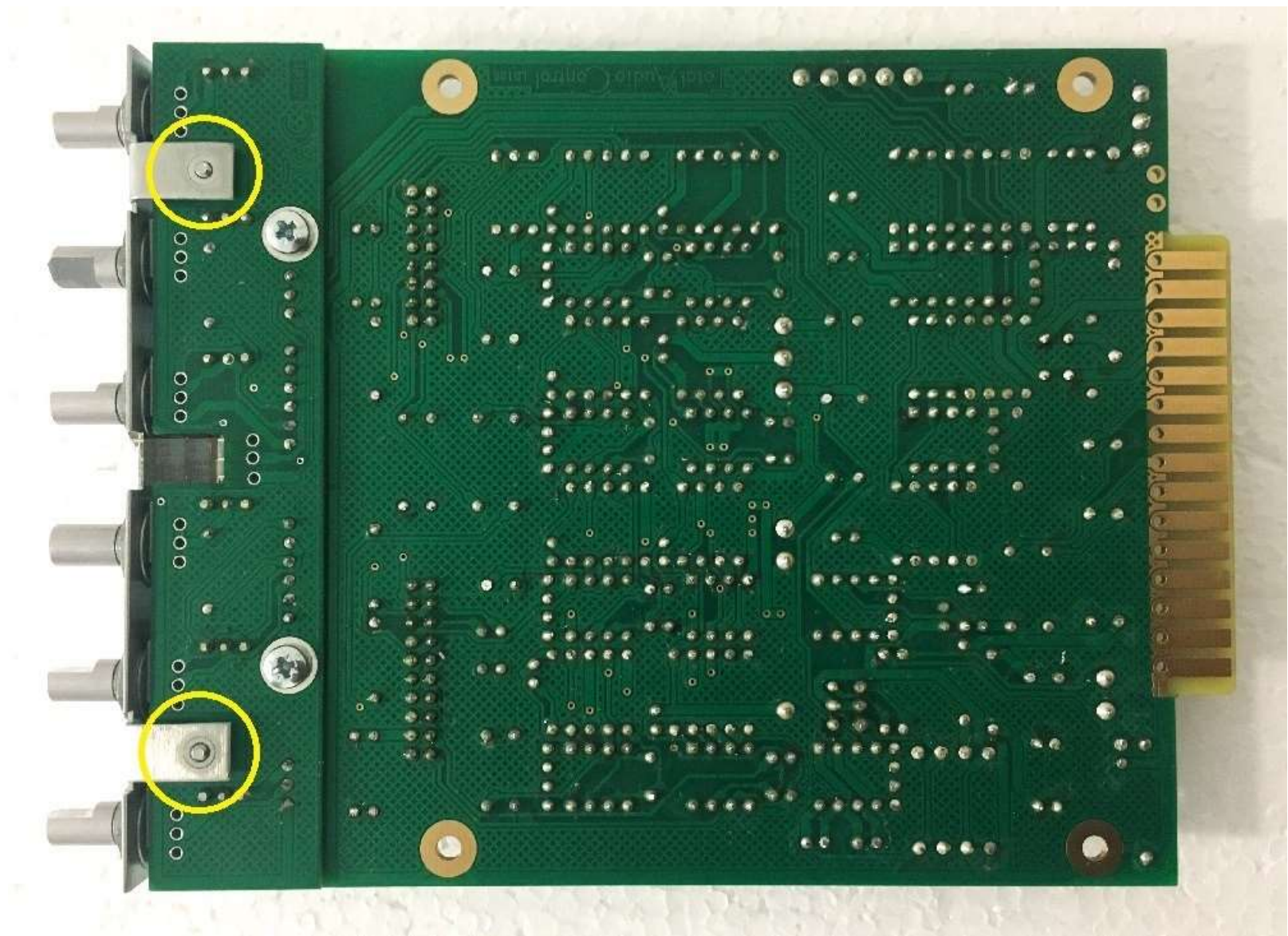


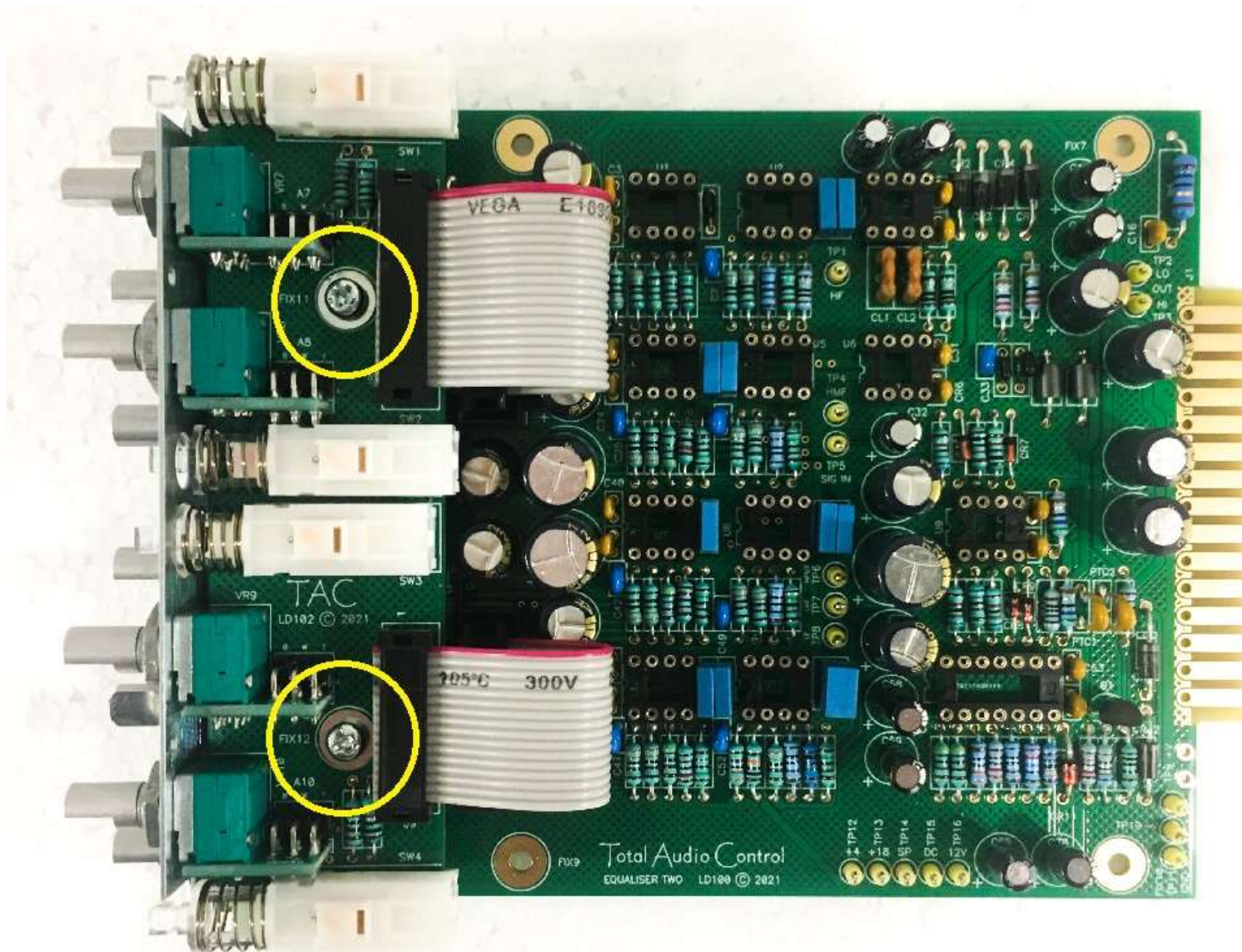


Insert the back plate and fit the potentiometer washers and nuts. Do not over tighten.

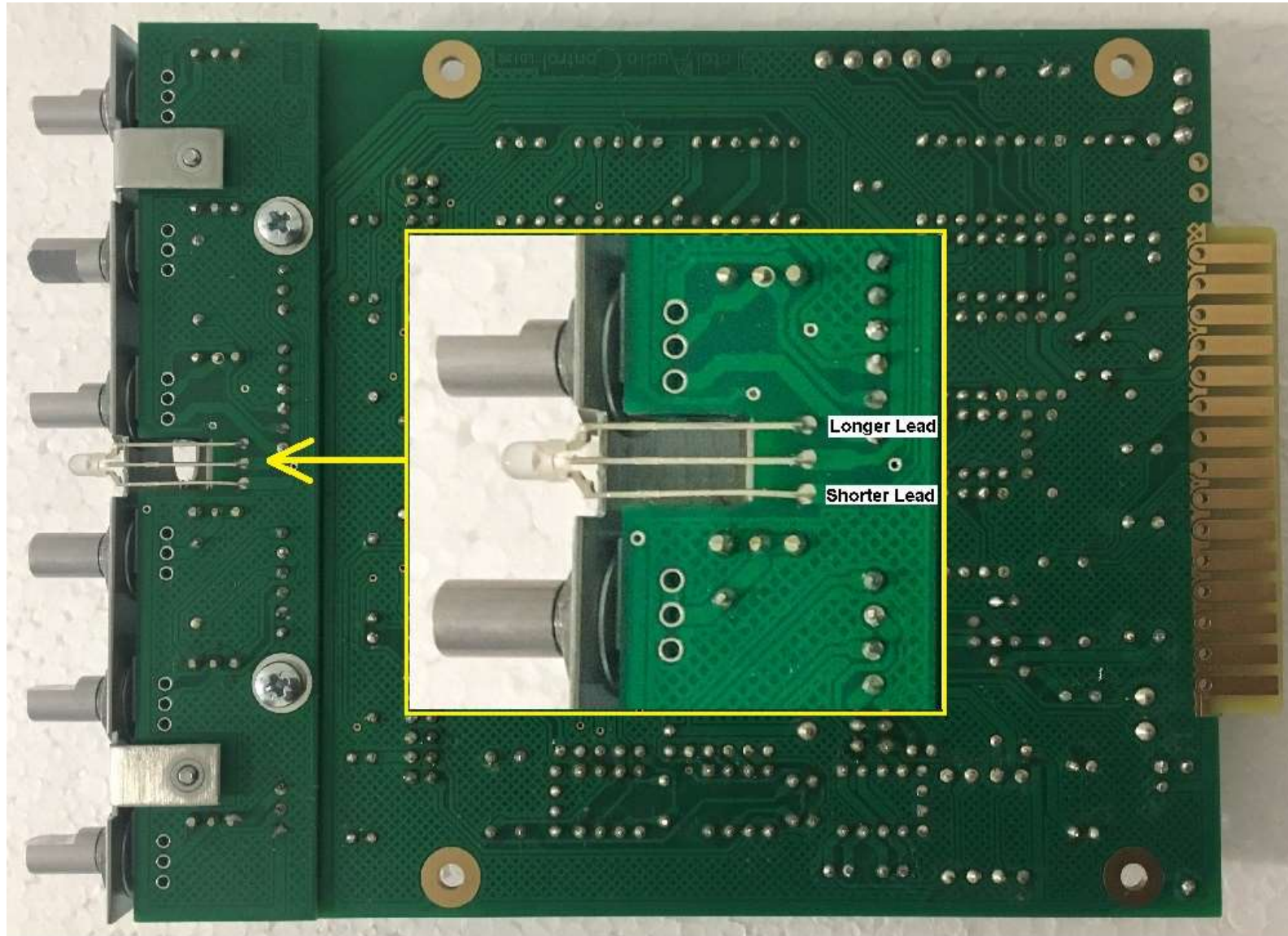


Fix the two M2 screws.

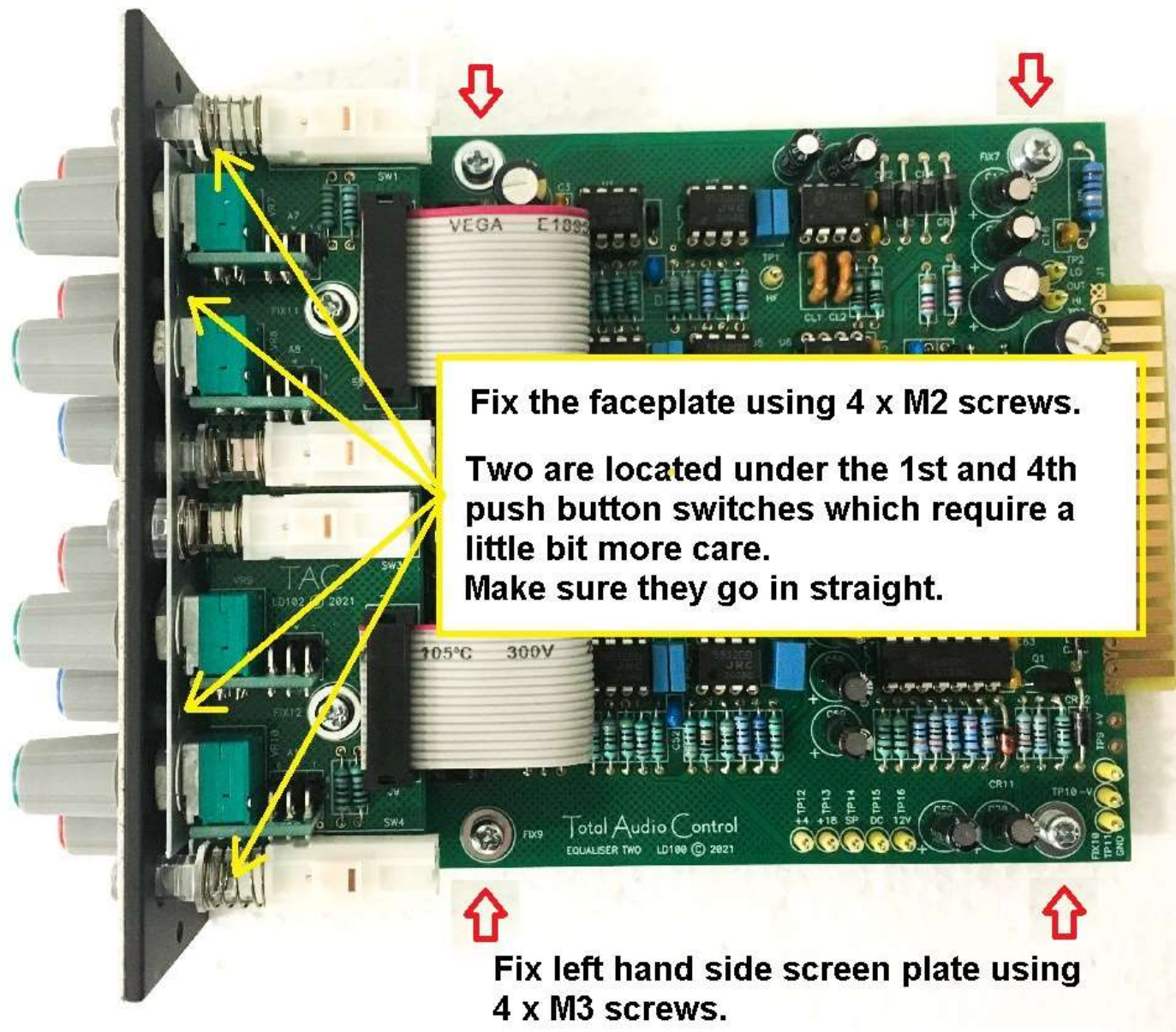




**Plug in the ribbon cables of the LD102 board and insert it to the back plate.
First fix the potentiometers using the washers and nuts. Again do not over tighten. Then fix the two M3 screws.**



Solder the tri-colour signal status LED as shown. Make sure that the leads do not touch the back plate. However, the face plate will also align it to clear off the back plate edges when fitted.





PERFORMANCE TEST RESULTS AND FREQUENCY RESPONSE CURVES

All measurements carried out using Audio Precision Apx520 unless specified.

All measurements use 40 ohm balanced source and 200k balanced load unless specified.

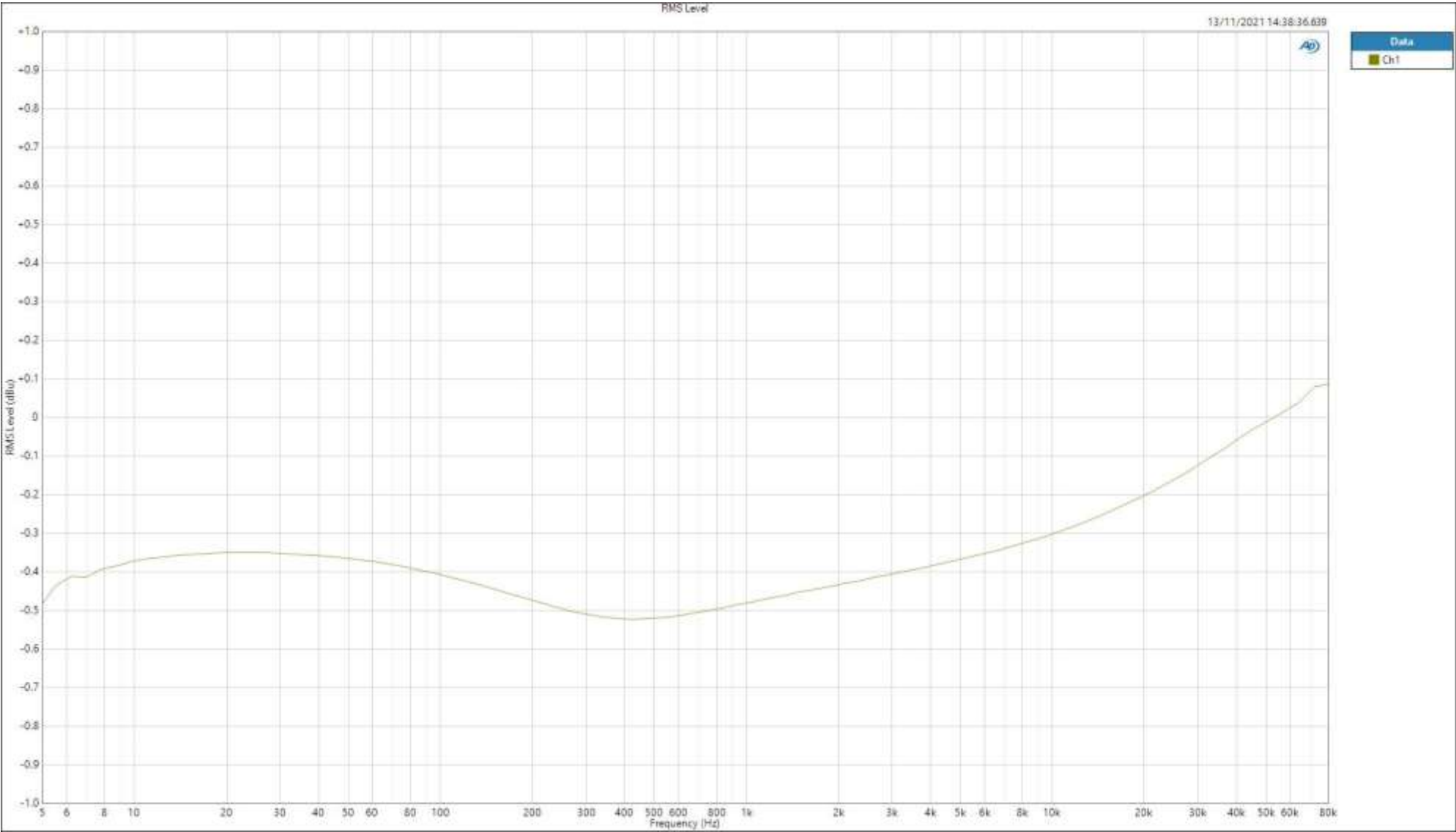
THAT devices are used for the through path.

JRC 5532s are used throughout the parametric sections.

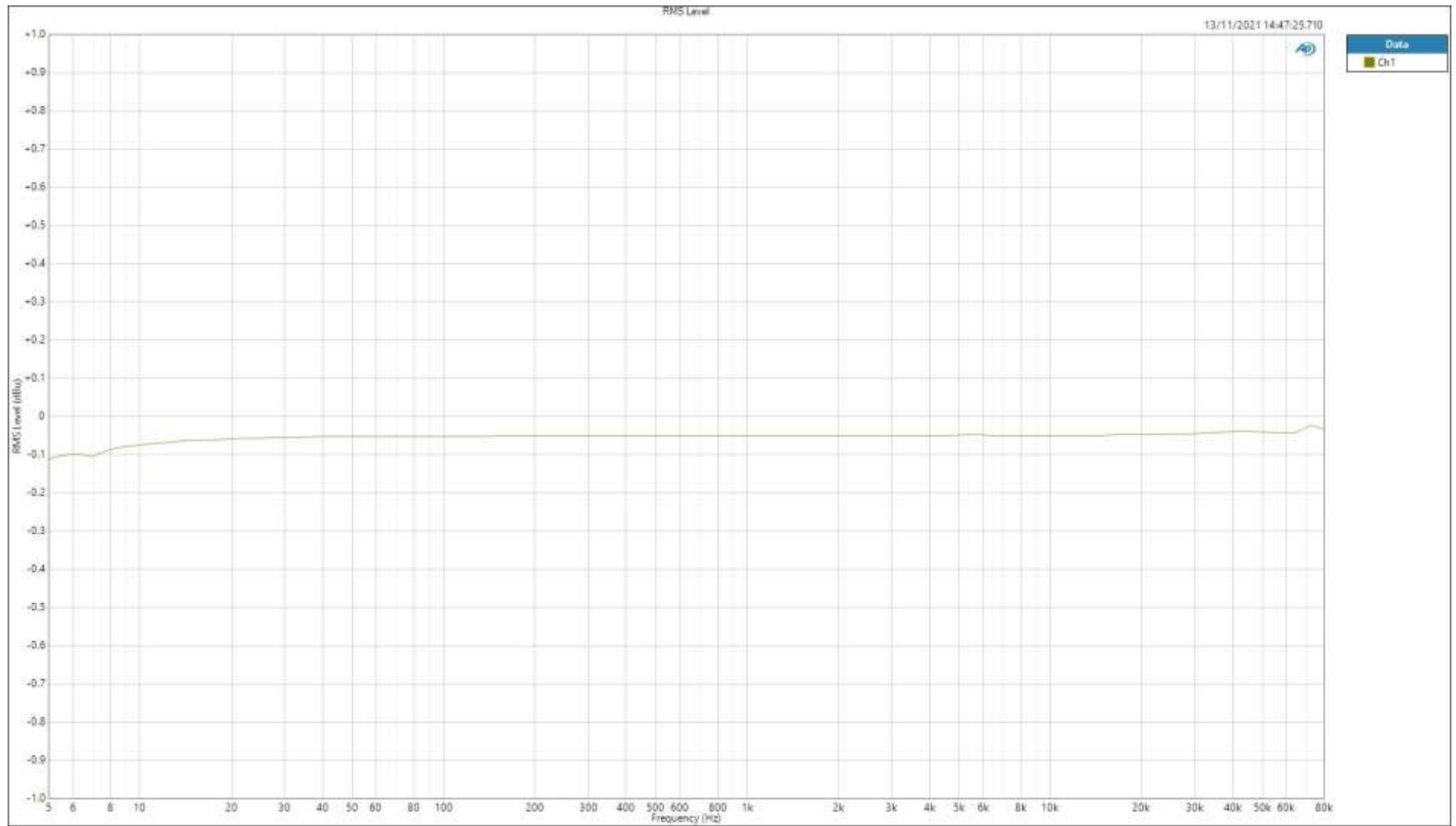
Noise measurements are 20Hz-20kHz RMS.

Module supply rails +/-16V.

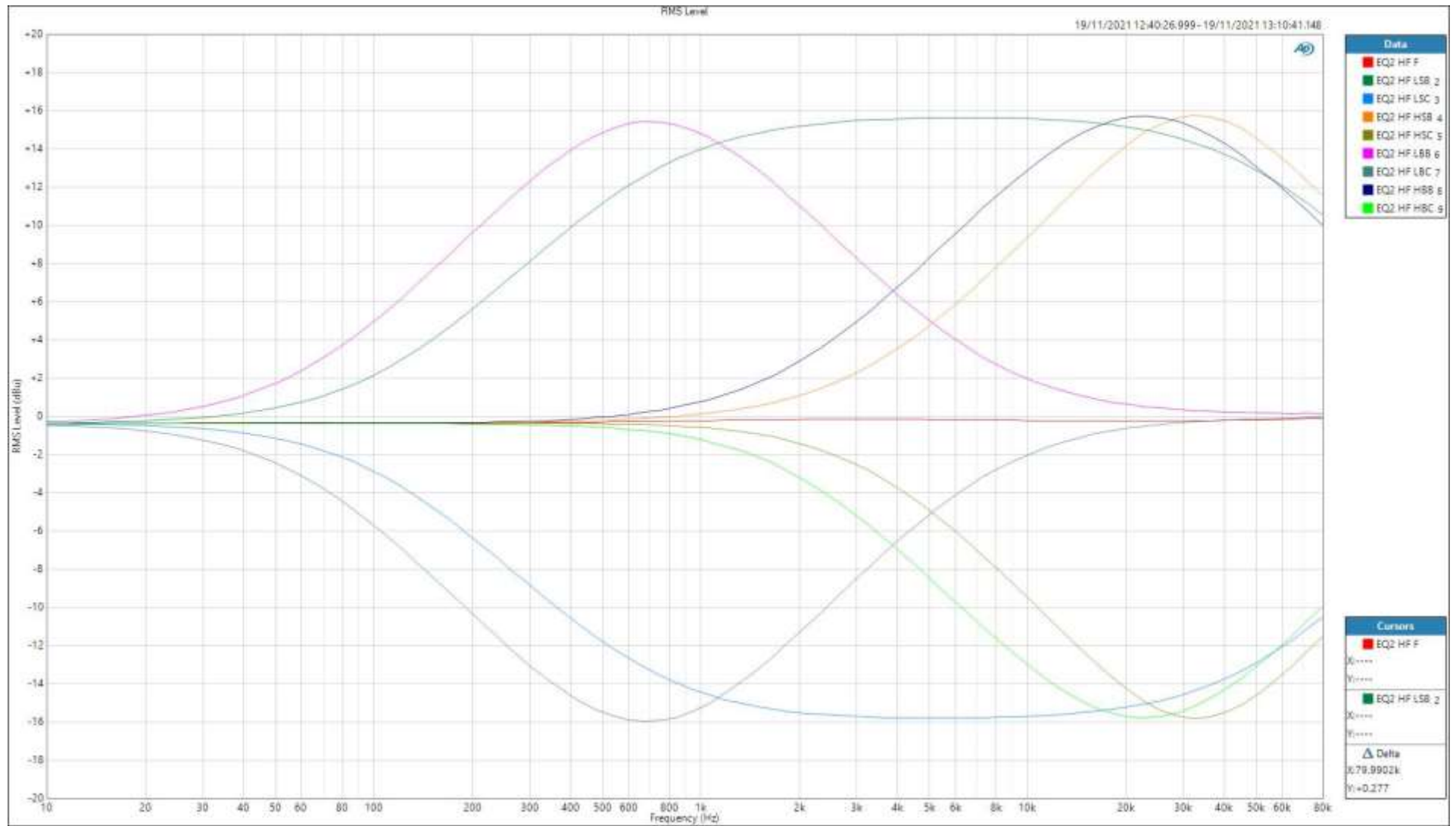
1). EQ IN ALL FLAT FREQUENCY RESPONSE



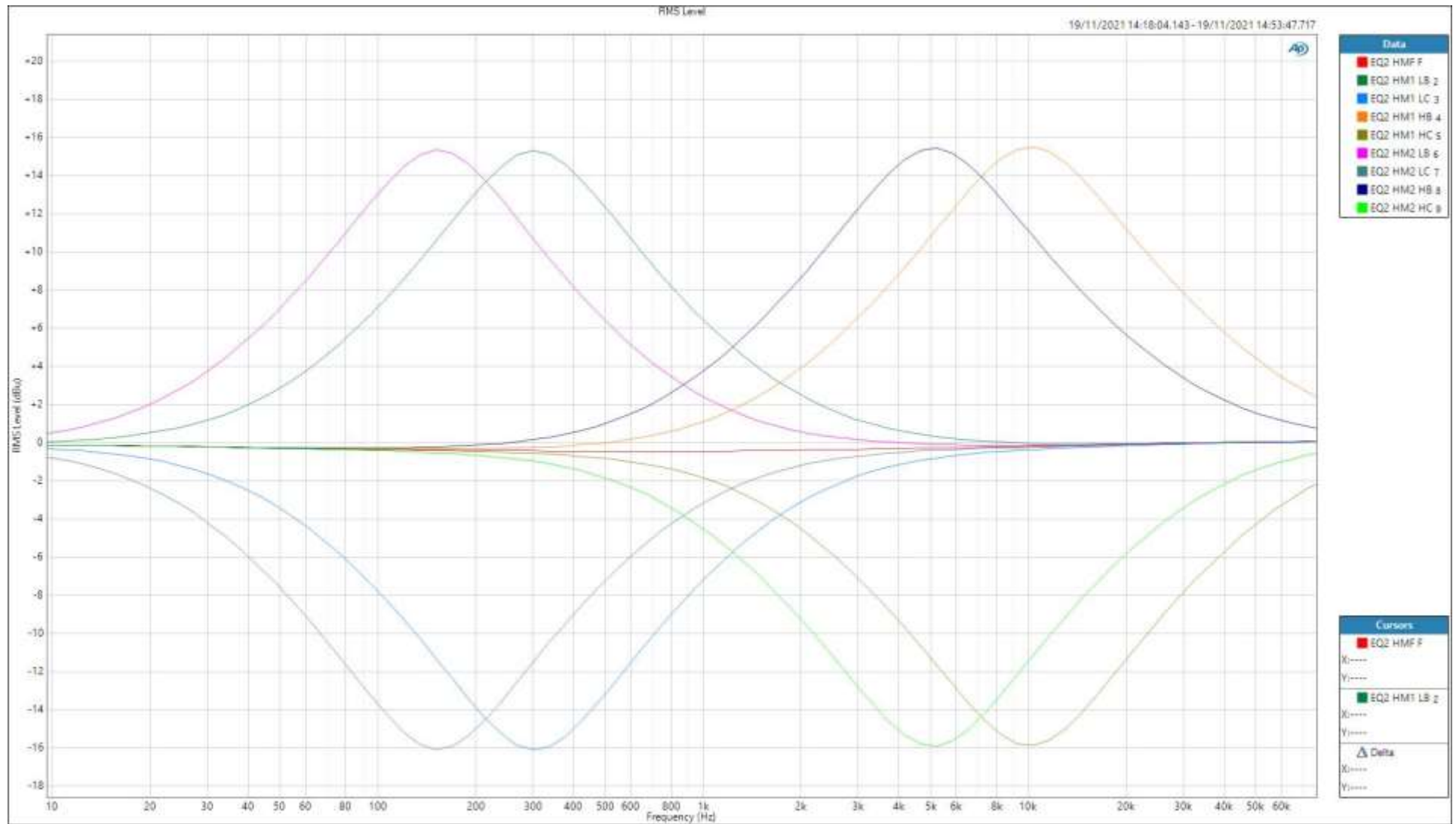
2). EQ OUT FREQUENCY RESPONSE



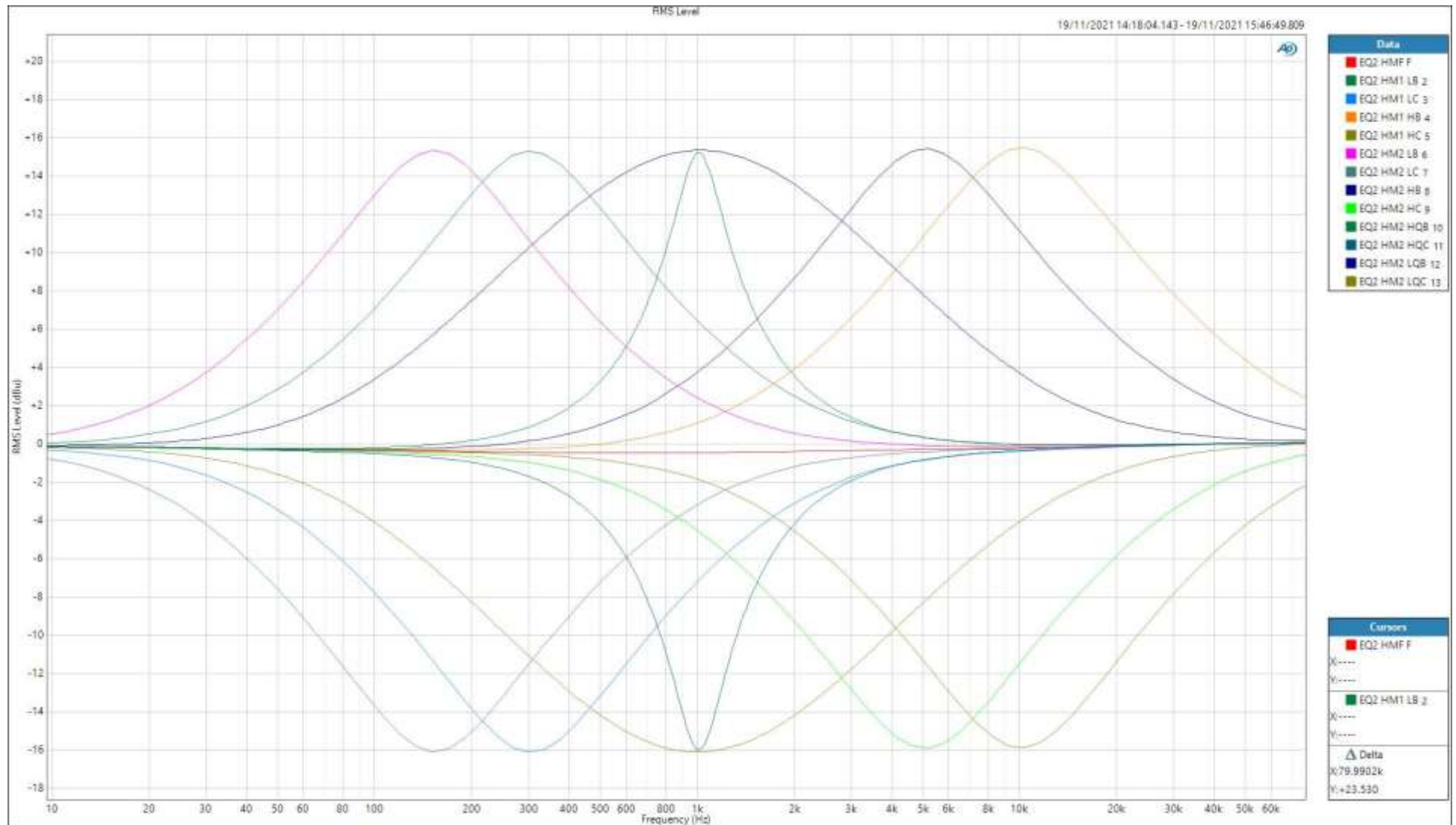
3). HIGH FREQUENCY



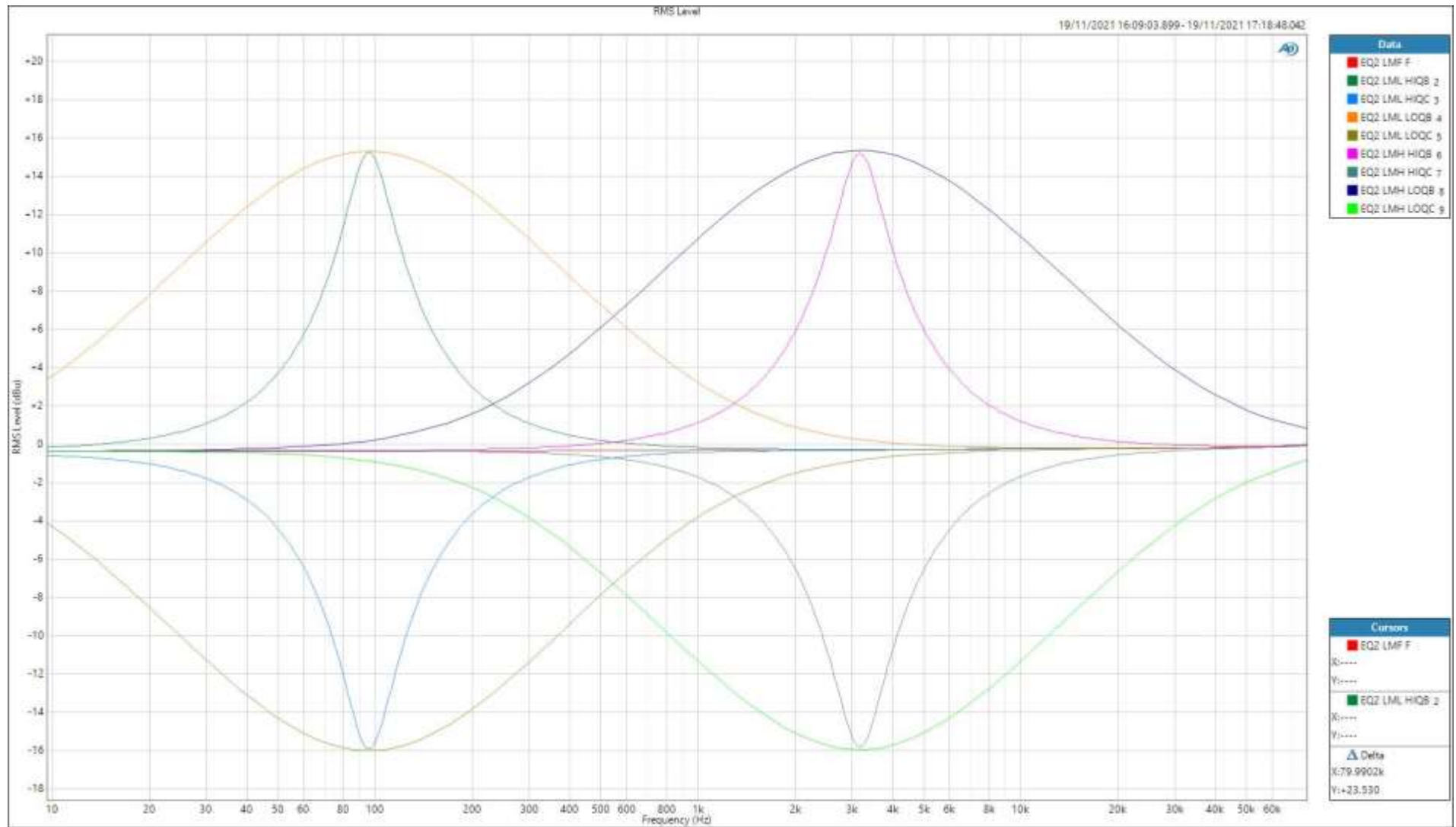
4). HIGH MID FREQUENCY - MID Q



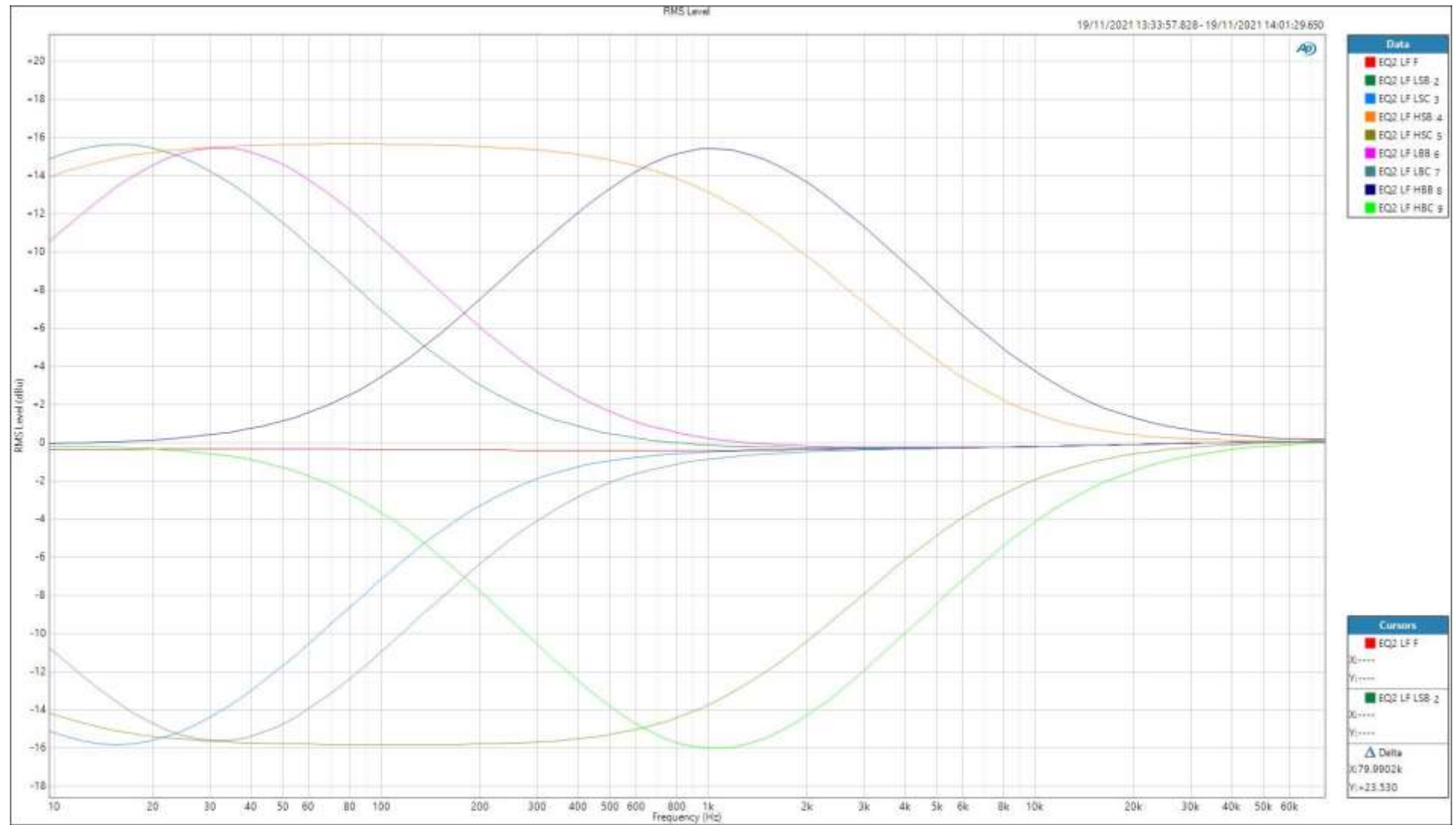
5). HIGH MID FREQUENCY



6). LOW MID FREQUENCY



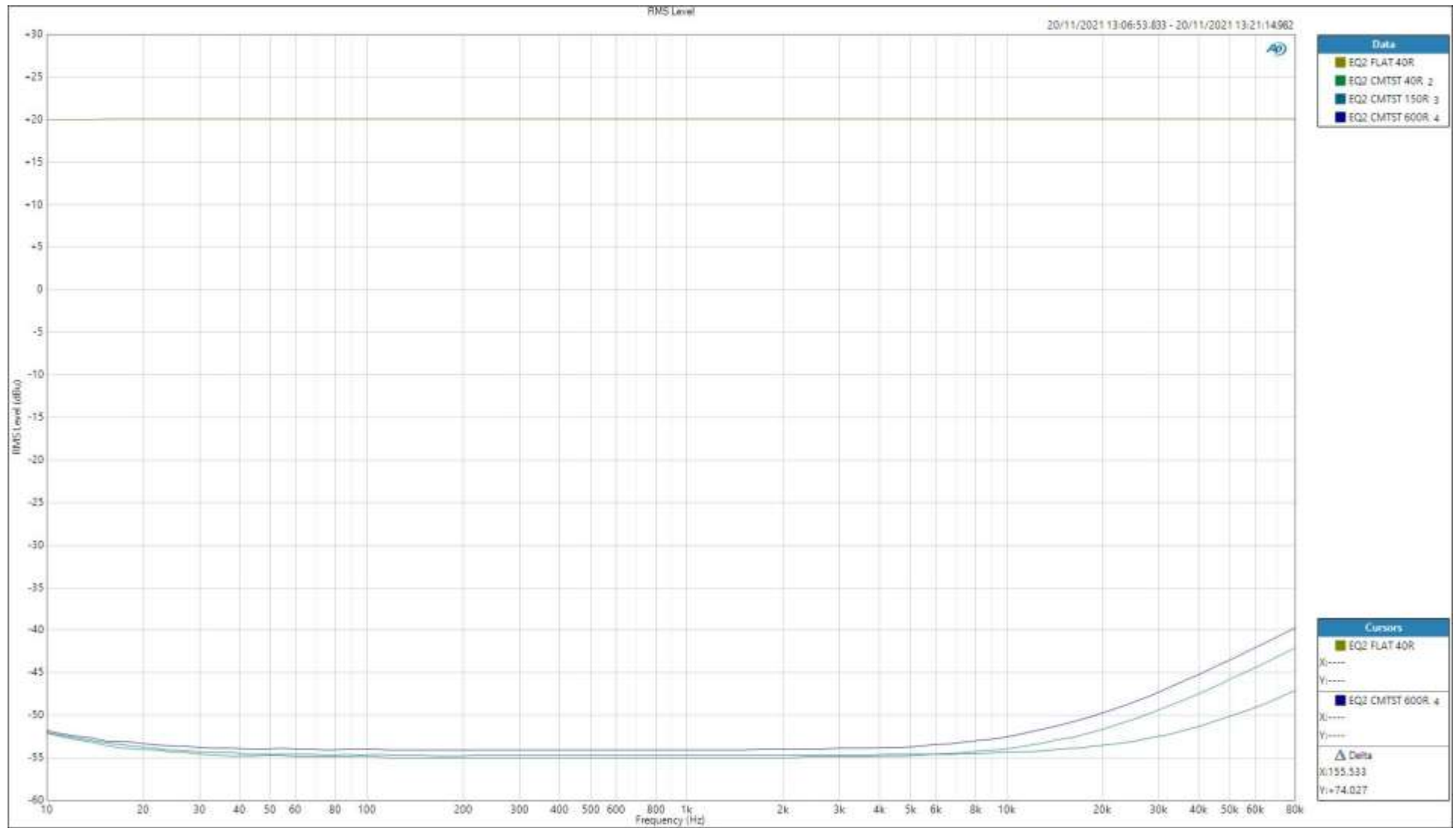
7). LOW FREQUENCY



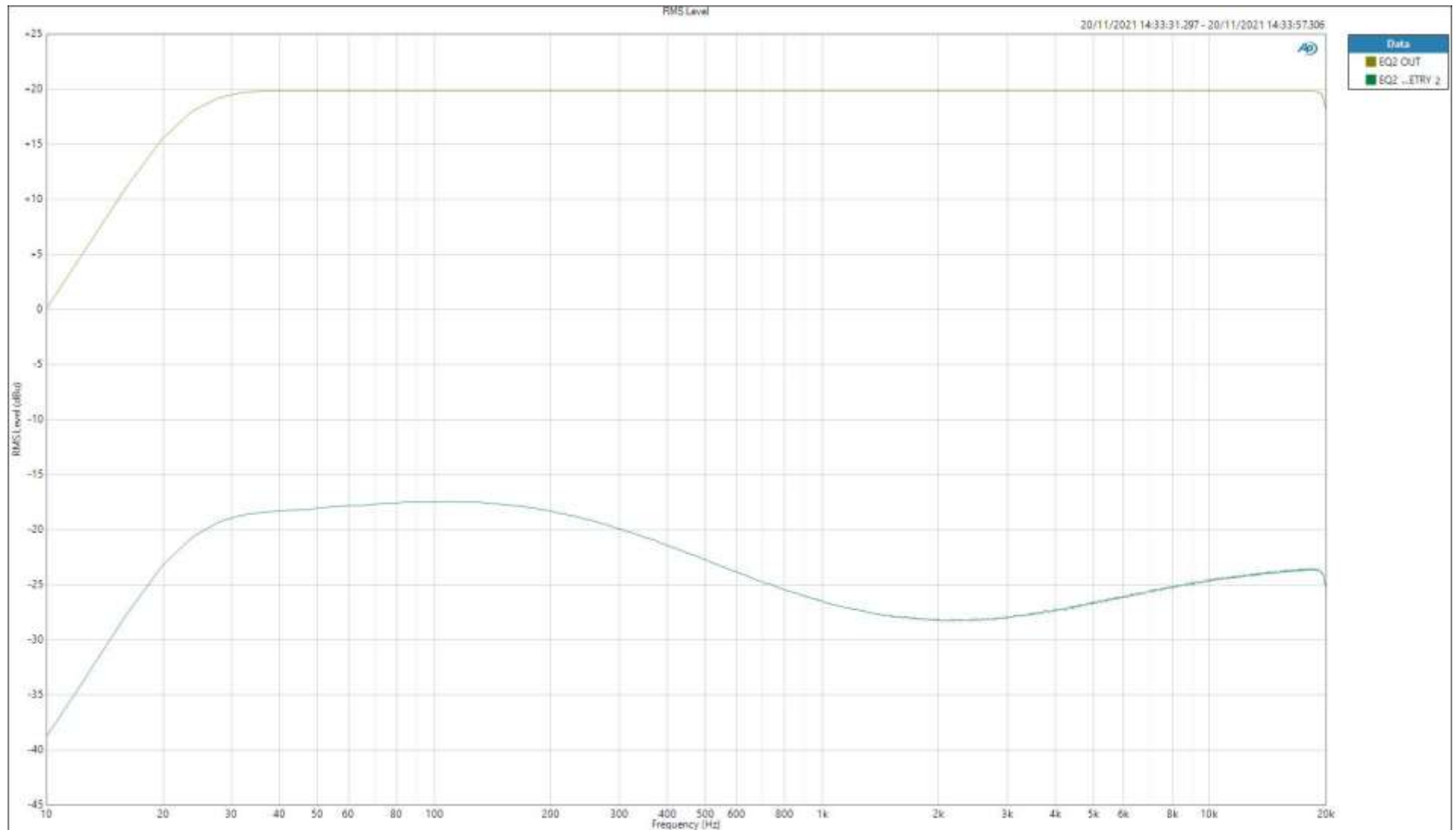
8). LEVEL



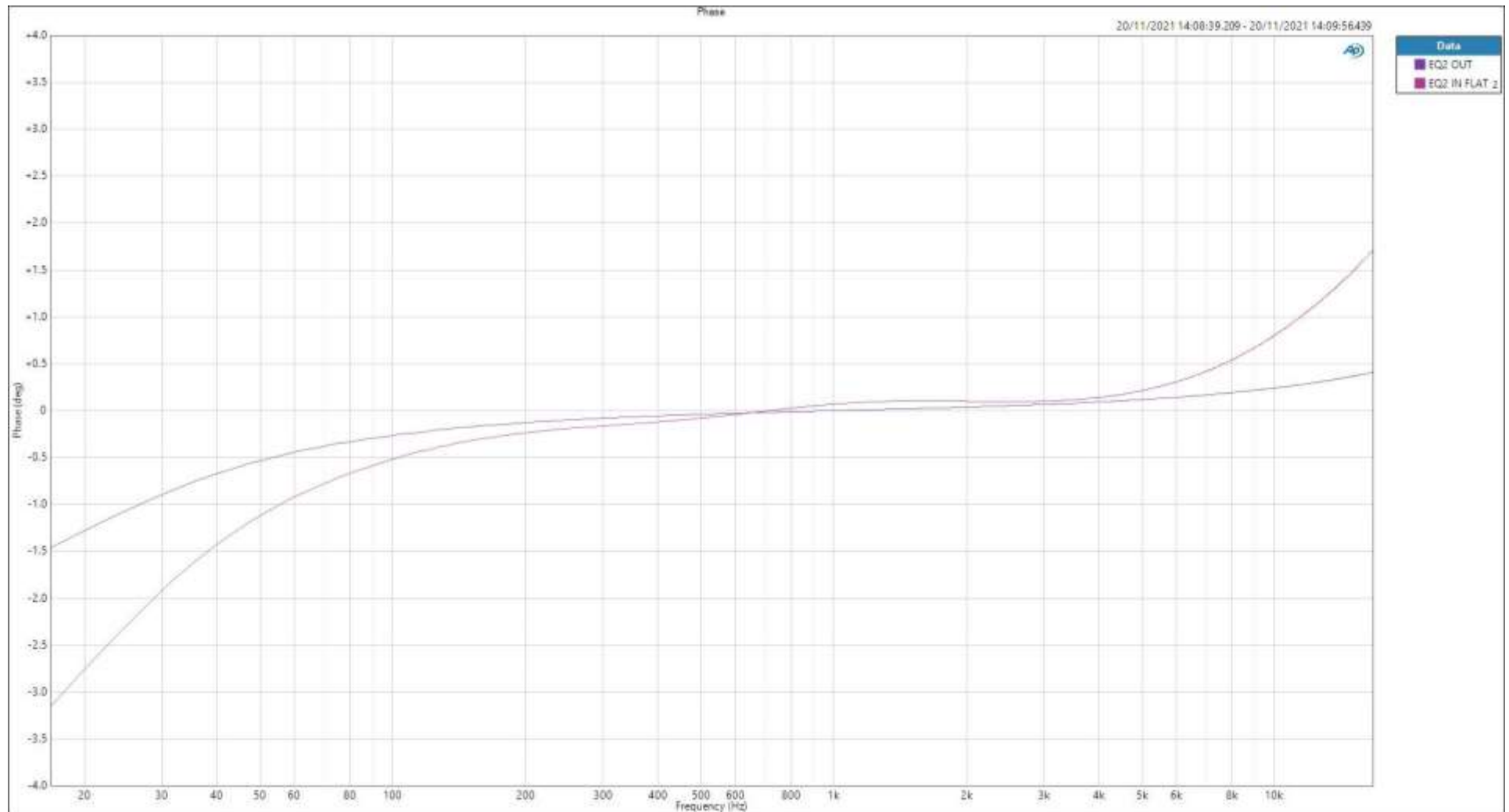
9). COMMON MODE



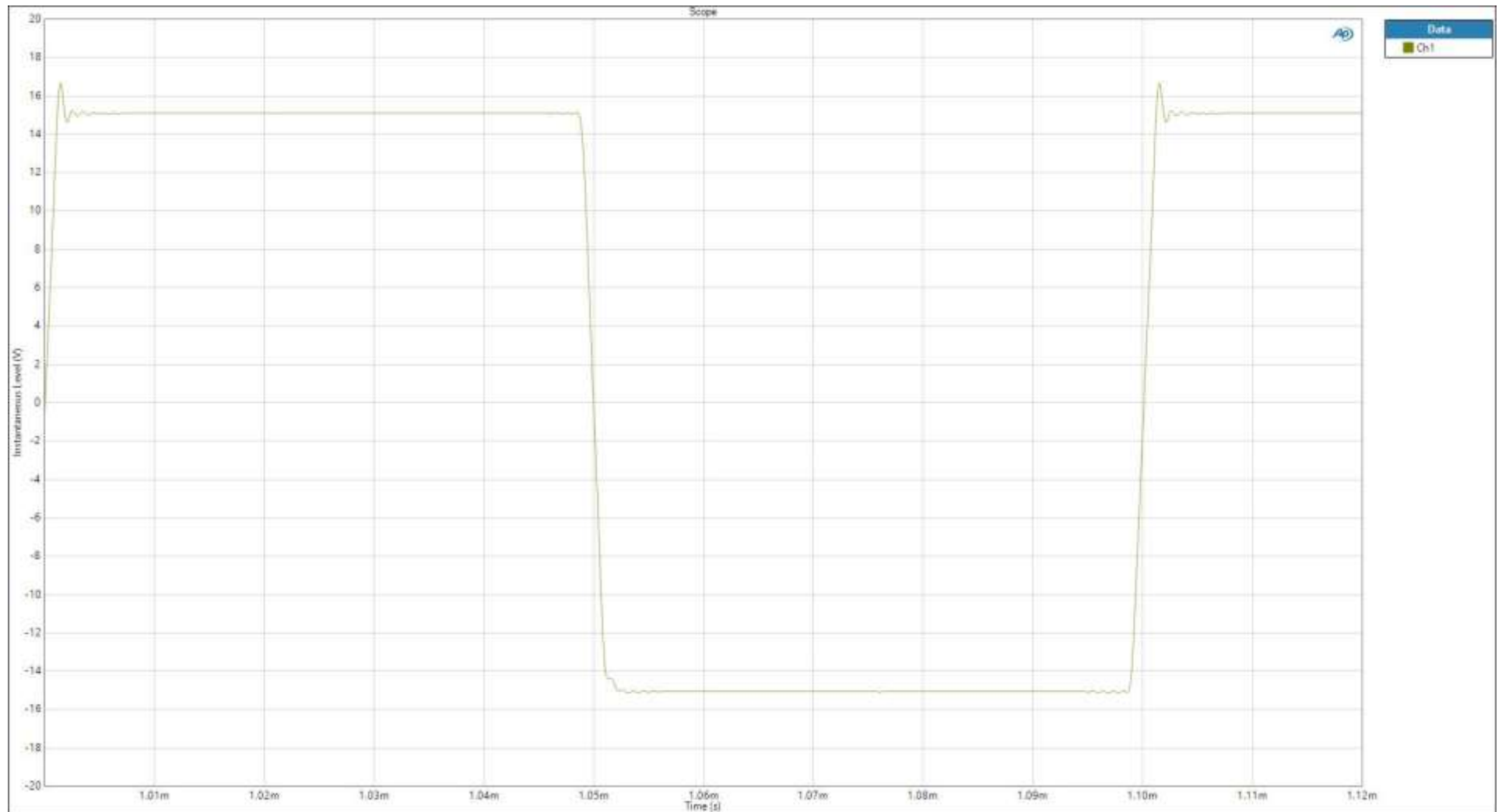
10). OUTPUT SYMMETRY



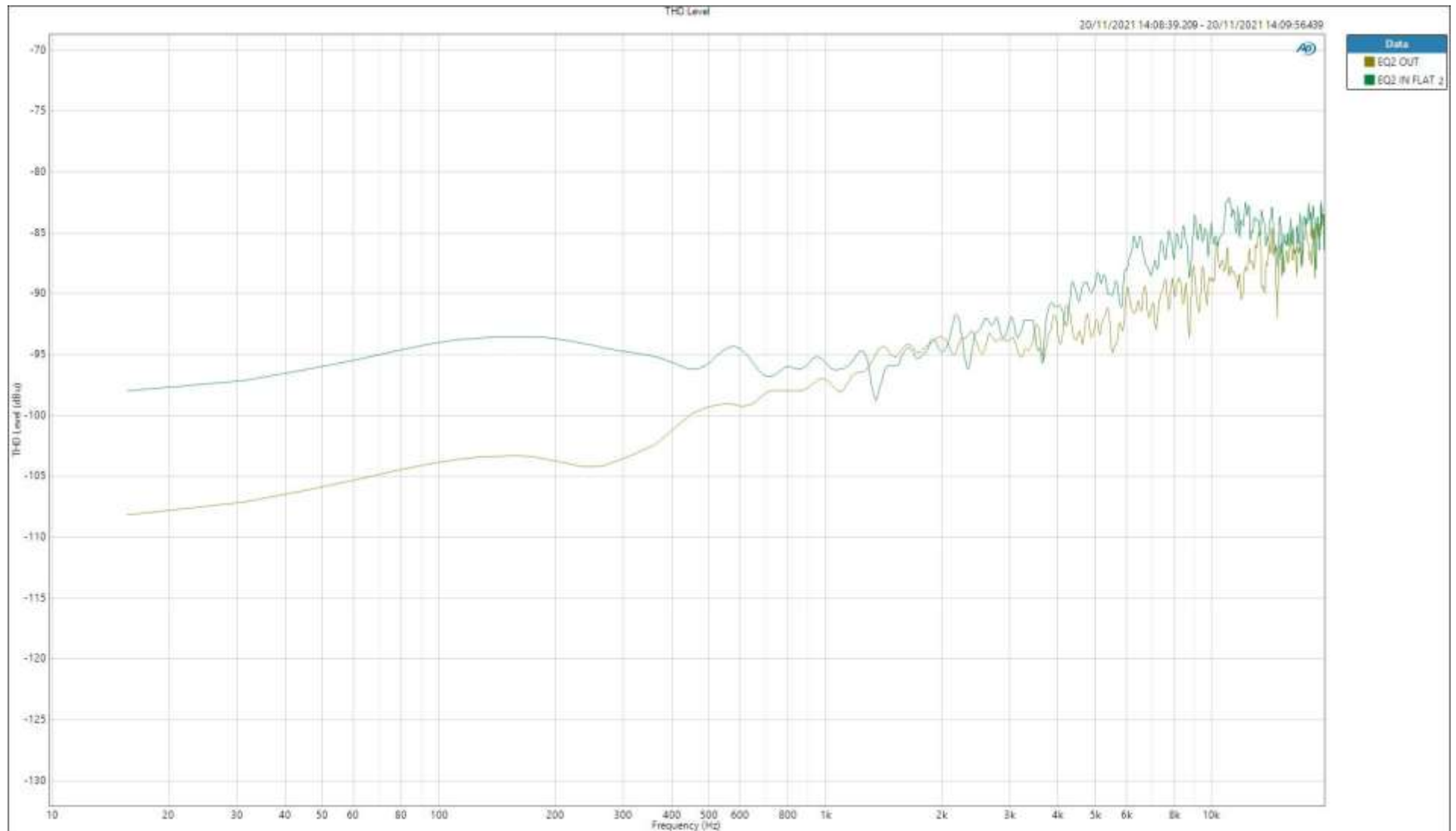
11). PHASE



12). SQUARE WAVE TEST



13). THD&N LEVEL



14). THD&N RATIO

