SOUND DROPS

FULLERTON

GUITAR AMPLIFIER

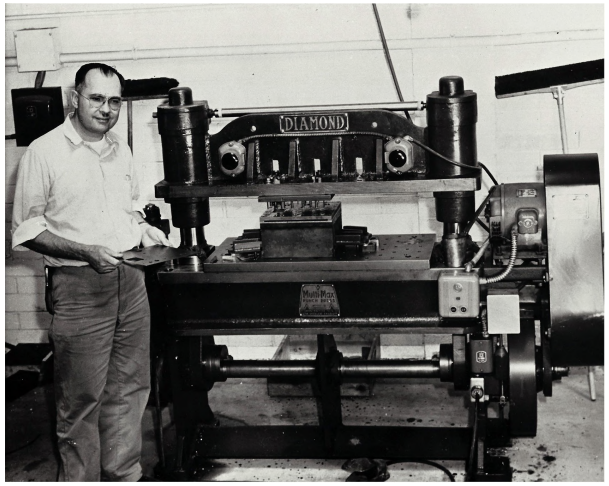
User Manual

Index

'If an alien came to earth and wanted to hear an American guitar sound, I'd play him my Twin with a set of Jensens'.

(anonymous internet user)

Introduction



Leo Fender was a practical man. In his head he was able to envision things that didn't exist yet, and then he had a special knack for turning them into real objects in the most efficient and sturdy way.

Today he is fondly remembered above all for his iconic electric guitars and basses that literally shaped the sound of the music from the '50s onward, but his real lifetime passion was electronic engineering. After losing his job as an accountant (because that was what he was actually qualified for), in 1947 he opened a radio/TV repair shop in *Fullerton*, California (such an apt name for a town in this story, by the way…). After a while word got out within the local music scene that Leo was very good at servicing instrument amplifiers and P.A. systems, despite the fact that he never received a formal education in electronics, least of all in that particular field.

It wasn't long before he felt that he could do better than what was generally available at the time on the market, and so he began to build his own line of amplifiers, constantly improving and refining his designs year after year. The story goes that he used to step on the stage of the local music clubs between sets (actually, in few occasions even *during* sets…) with a screwdriver in his hand (he always carried a tool pouch with him), only to adjust the bias of one of his amps that he deemed not working at its best. That was pure Leo.

In 1952, that is three years after the Tele and two before the Strat, he designed the first version of what was to become an iconic guitar amplifier in the coming decades: the Twin. The dual speaker, tweed covered cabinet was there from the start, but at first its two 6L6 tubes provided just 25W of output power. Between 1957 and 1958 the power was increased to 40W and then to 80W. There's a design choice at this point that is worth noting: from the beginning Leo Fender aimed to create a clean and dynamic amp, so in this version he went for an unusual double rectifier design. This circuit allowed to partially overcome the limited current capability of tube rectifiers, a constraint that used to cause power sag and a kind of 'compressed' sound in most tube amplifiers of that time.

Finally, in 1963 Leo came to what is generally regarded as the 'perfect version' of the Twin: the Blackface. This amplifier is a masterpiece in its own right, and what a chunky piece of art it is, weighing about 35kg (77 lb)! At the time it was the cleanest and most powerful amp of its breed. By setting the volume control up to about 5, the user can enjoy a huge amount of crystal clear power; after that point and up to 10, the beast inside starts to rear its angry head, but it does so at such a painful ear-shredding level that your band mates (and your audiologist) won't be very happy about that.

Then the story goes on with Leo sadly having to sell its company to CBS for health problems, the Blackface turning into Silverface towards the end of the '60s, only to undergo constant revisions of the original design which, more often than not, were dictated just by corporate economical reasons, and on and on…

But our story may as well stop here, since the **FULLERTON Guitar Amp** plug-in is an extremely faithful ITB reproduction of an original Blackface Twin built in 1966 that I had the chance to buy from an amateur who carefully preserved it over the years. This amp now happily resides in Nitön Lab Recording Studio, where I performed all the sampling sessions with the help of the two studio engineers and old friends Luca Martegani and Henry Mangione.

And so, without further ado, let's introduce…

...The FULLERTON!

The **FULLERTON Guitar Amp** plug-in reproduces with utmost accuracy the sound of a 1966 Twin (S/N A07091, based on the classic AB763 circuit) equipped with two original Jensen 12" speakers, captured in all its punchy bite and powerful clarity by four microphones (selectable in pairs) plus two different stereo room ambiences. Great care has been taken in reproducing to the fullest extent possible the same user experience as that of a real amp, down to such details as the true-to-life scaled action of the various controls, the unique waveform of the opto-cell vibrato circuit and the ever popular, gorgeous reverb tone.

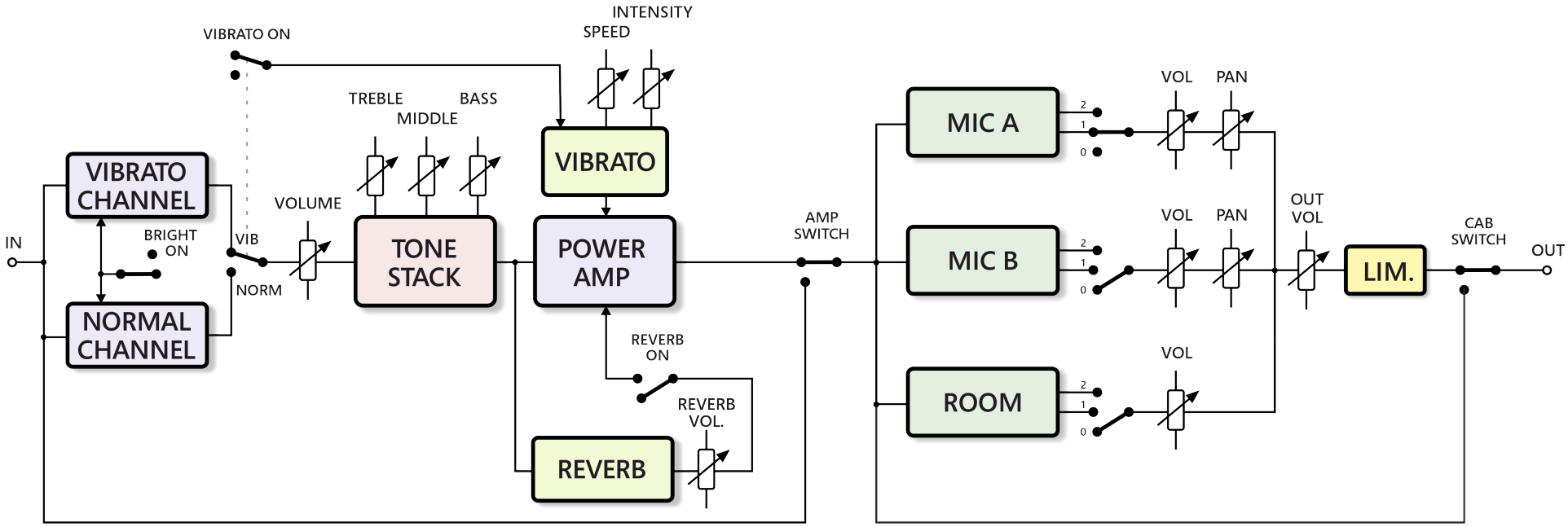
This amplifier has a strong personality of its own, one that at least as a starting point reflects the sonic vision of its creator… Leo Fender had a specific tone in mind, a sound defined by a scooped frequency balance that favors the high and low ranges at the expense of a lighter midrange. Actually, one could jokingly say that Leo loved all three music genres: Country, Western and Country & Western, and maybe it's just because of his musical tastes that he always aimed for (in his own words) "*…a sound like lemonade, clear, bright and punchy*".

Certainly, both his guitar and amp designs are a testament to this intention of his; what back then Leo couldn't imagine, though, was the huge variety of musical contexts in which his creations have left their mark in contemporary music history throughout the decades. The FULLERTON Guitar Amp, just like the real hardware that inspired its creation, is no exception to this scheme. Its unmistakable trademark clean tone can be pushed to venture into distant musical territories, always with absolutely classy results.

Disclaimer: Fender© is a trademark owned by Fender Musical Instruments Corporation. SoundDrops is in no way affiliated with Fender Co.

FULLERTON Guitar Amp In Detail

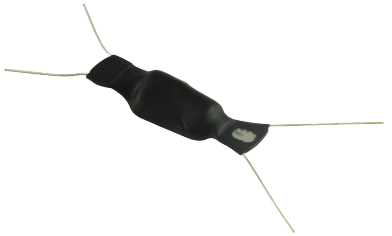
The **FULLERTON Guitar Amp** plug-in closely follows the internal structure of its hardware forerunner (except for a small detail, see below).



The user can choose between two input channels, Normal and Vibrato; these two channels have slightly different responses (for graphs see page 18), the Normal channel being the flatter and less sensitive of the two. Obviously, the signal sent to the Vibrato channel can also be modulated by the vibrato circuit.

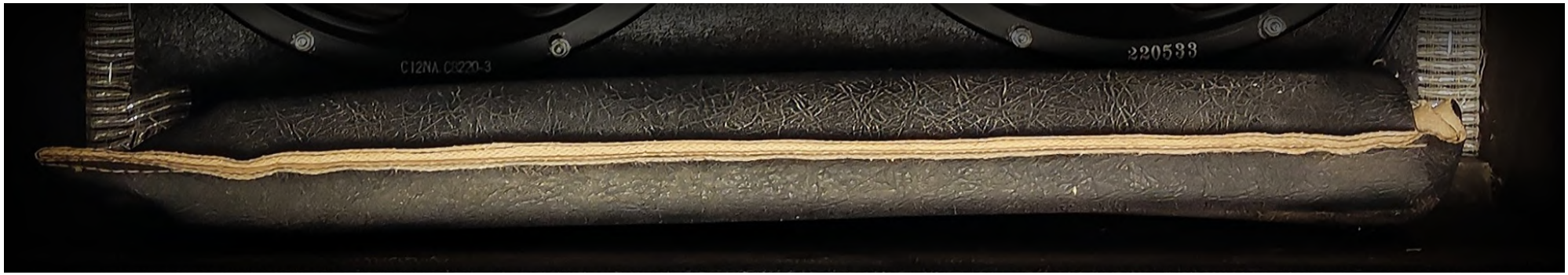
Two quick notes about this subject: for starters Leo Fender always misnamed both the vibrato and the tremolo (or tremelo) effects, exchanging their names and unwillingly causing confusion in years to come. So let's set the record straight: *vibrato* is a pitch modulation, *tremolo* is an amplitude (= volume) modulation. The lever often mounted on the bridge of a Strat should be called 'the Vibrato Arm'; the modulation effect found in many guitar amps (**FULLERTON** included) is a 'Tremolo'. For the sake of comprehension, however, let's respect Leo's choice of words, at least throughout this manual.

Secondly, the circuit here employed for the amplitude modulation is the '2nd generation' opto-cell circuit, in which a blinking neon lamp illuminates a photoresistor that periodically shunts part of the signal to ground. This arrangement (affectionately named 'the Opto-Bug' by amp technicians because of its looks) generates a unique wave shape, a kind of smoothed square that gives the distinctive sound of this effect, one that has been carefully reproduced in FULLERTON.



Then, after going through a classic tone-stack stage (again, for graphs see from page 20), the signal is sent both to the reverb circuit and to the power output section. And here is the one small deviation from the hardware: in the original amp, only the Vibrato channel is affected by the reverb effect, while in FULLERTON any signal can be affected, regardless of the chosen input channel.

Here it's worth spending a few words about the reverb itself… the amp is called 'Twin Reverb' for a reason, after all. This amp has always been held in high esteem also because of the sheer quality of its reverb.



The Hammond spring tank rests on the bottom of the wooden case, enclosed in a padded bag designed to minimize any acoustical feedback problem. Two 16.25" (40cm) long springs give that inimitable 'dripping' reverb that was unrivaled among the guitar amps of that era. FULLERTON also captures this important feature of this iconic amp with astonishing realism.

Four 6L6 output vacuum tubes deliver 85W of (almost) clean power: this was quite an achievement for the technology available in the early '60s. As opposed to what he had done until then, Leo Fender employed for the first time a then state-of-the-art high-current silicon rectifier for the power supply section, doing so in his constant pursuit of clarity and dynamics, that 'sound like lemonade' he was always aiming for.

The power amp drives a pair of Jensen C12 speakers; in FULLERTON each cone has been captured by two microphones, one placed at the center and the other towards the edge of the membrane. Now, there's something to report that struck all of us involved in the sampling sessions: the bass response of this cabinet extends well into the 20/30 Hz range! (see page 24 for graphs) This apparently defies any known law of physics, since here we're talking about a pair of 12" speakers built almost 60 years ago, designed for guitarists and mounted in an open cabinet... Anyway, there it is. Come to think of it, this behavior must surely contribute to the dynamic 'thump' that this amp is capable of throwing around whenever guitar strings are picked hard. Another unwanted, yet welcome side effect in this regard is that FULLERTON, just like its hardware counterpart, can also provide good service as a bass amp, in particular when microphone A-2 is selected (see below for further details).

A final note about FULLERTON's scalable CPU load: the internal structure is designed in such a way that it utilizes only the system resources it actually needs at any given moment, depending on the settings chosen by the user. So, for instance, using only one mic instead of two can ease the system load. In particular, the carefully sampled reverb is quite resource hungry, so if the user wants to use FULLERTON in real time with an extremely low latency, the first thing to try is to switch the reverb off, in case his/her system is having a hard time coping with the settings.

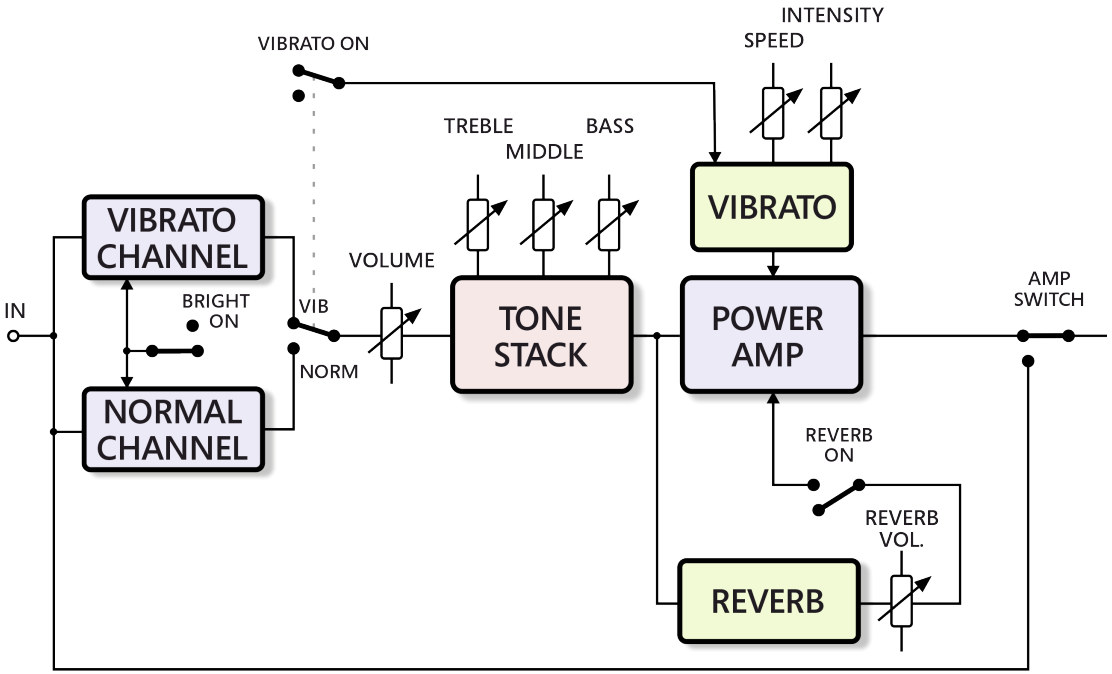
This design choice explains why, differently from previous SoundDrops releases, there's no 'light version' on offer this time. Just switch something off, and probably you won't be needing it...

Happy twangin'!

FULLERTON Operating Instructions

1 – Amplifier Section

The upper section of the front panel of **FULLERTON** shows all the controls that affect the internal settings and the response of the amplifier; it refers to this part of the block diagram:



The controls in detail:

1 – VOLUME: controls the level of the input signal, and as such also the general level of distortion of the amp. Settings up to 5 are generally clean sounding.

2 – BRIGHT SWITCH: boosts the high frequency range. The strength of its action depends on the setting of the Volume control. At minimum volume the boost is very apparent, then it's gradually reduced towards higher volume settings; finally, it has no action at all when the Volume control is at 10 (see page 19 for graphs).

3 – TREBLE: controls the high frequency content of the signal.

4 – MIDDLE: controls the mid frequency content of the signal.

5 – BASS: controls the low frequency content of the signal.

Please note: these three tone controls are part of a classic 'tone stack' circuit (see page 20 for graphs). This amp uses a particular tone stack version that shuts completely off the signal when all three controls are at their minimum position. The flattest response is given by these settings:

TREBLE = minimum
MIDDLE = maximum
BASS = minimum

6 – NORMAL/VIBRATO SWITCH: selects one of the two input channels. Only the Vibrato channel can be modulated by the Vibrato circuit, while the reverb effect (see below) can be applied to both channels. In addition, the Vibrato channel has a slightly different voicing, has a bit more gain and inverts the polarity of the input signal.

7 – VIBRATO SPEED: controls the speed of the amplitude modulation.

8 – VIBRATO LAMP: indicates the speed and depth of modulation with its blinking. When the Intensity control is set at minimum, the lamp is solidly lit.

9 – VIBRATO INTENSITY: controls the depth of the amplitude modulation.

10 – REVERB SWITCH: enables (up) or disables (down) the spring reverb effect.

Please note: since this is possibly the most demanding section in FULLERTON as far as CPU load, it is advised to turn the Reverb off whenever the user's system struggles to process the input signal in real time.

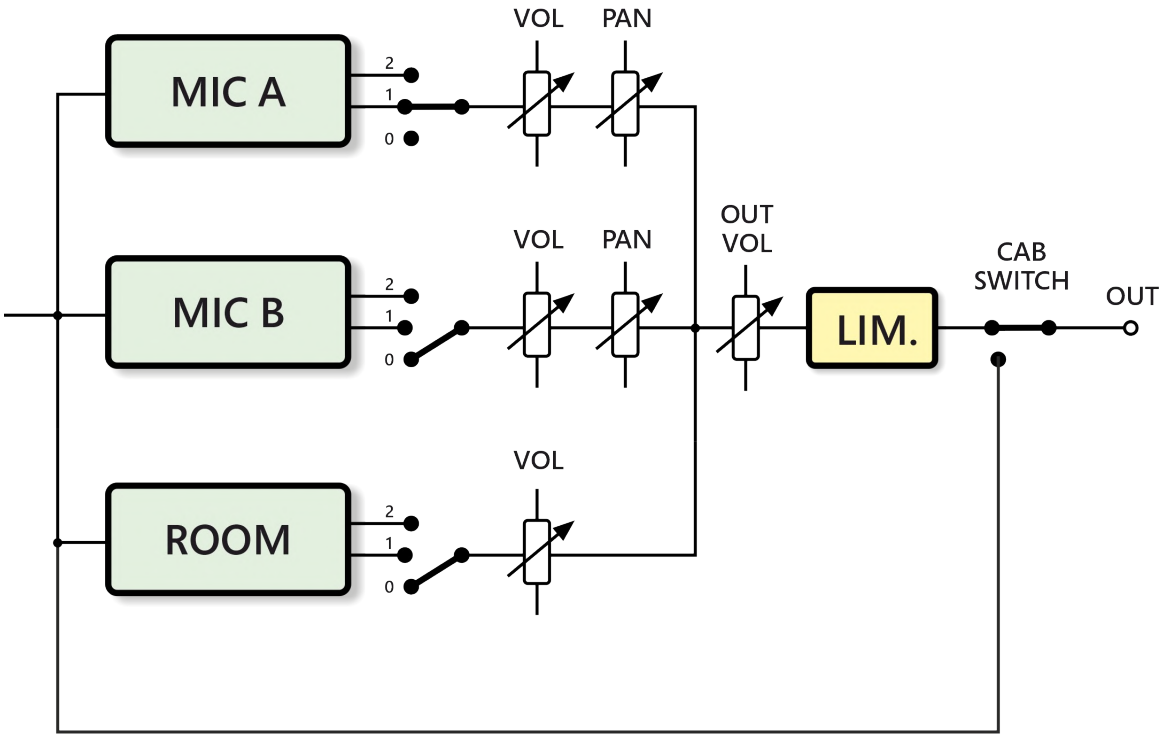
11 – REVERB: controls the level of the reverb effect applied to the signal.

12 – OUTPUT LIMITER WARNING: similarly to previous releases by SoundDrops, also FULLERTON is equipped with a safety output limiter set at +1 dBFS. It is meant to protect the signal chain from any excessive output level, definitely a likely event given the wide range of global gain available in this plug-in. In order to enjoy FULLERTON's best tone, though, it's advisable not to trigger the limiter's action: the 'Fullerton Amp' sign will issue a warning and glow bright red whenever the output level reaches the dangerous zone between 0 and +1 dBFS.

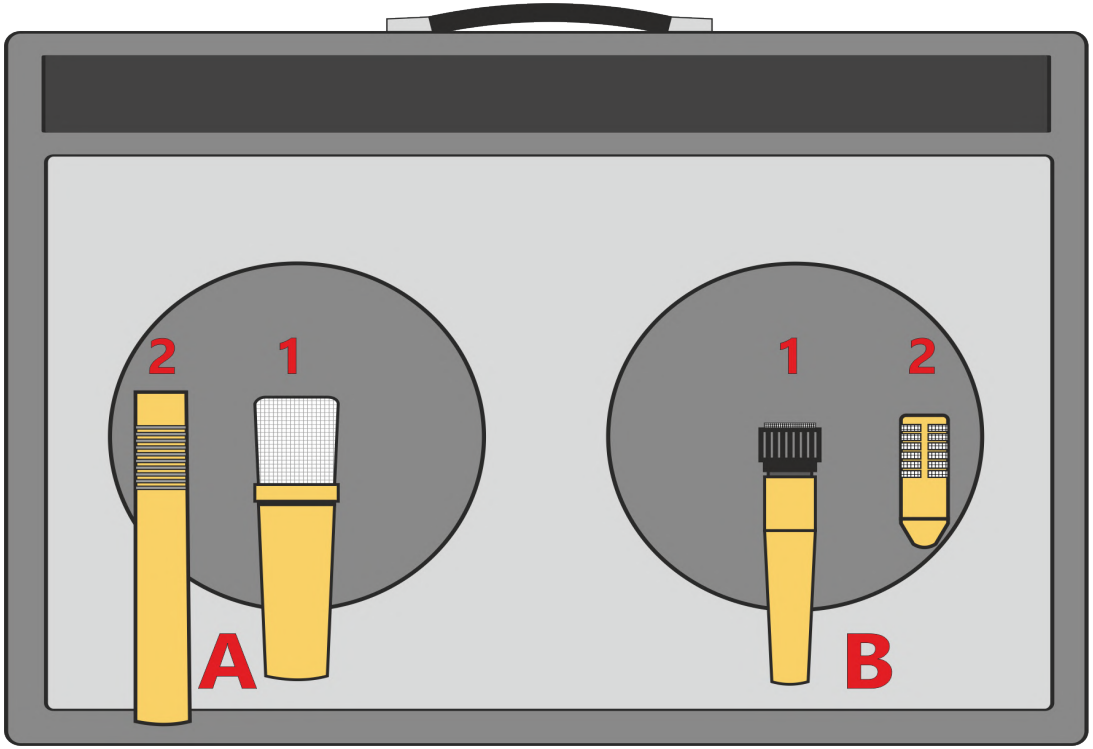
13 – AMP SWITCH: enables (lit) or bypasses the amp section of FULLERTON.

2 – Cabinet Section

The lower section of the front panel of **FULLERTON** shows all the controls that affect the cabinet, the microphones and the output section; it refers to this part of the block diagram:



This is the diagram of the microphones used during the **FULLERTON** sampling sessions:



Microphone **A-1** is a classic German condenser model (speaker #1, center);

microphone **A-2** is a Latvian ribbon microphone (speaker #1, side);

microphone **B-1** is a widely used American dynamic model (speaker #2, center);

microphone **B-2** is a small-diaphragm, hi-quality German condenser mic (speaker #2, side).

The controls in detail:

15 – MICROPHONE A VOLUME: controls the volume of the first microphone (MIC A).

16 – MICROPHONE A PAN: controls the L/R panning of the first microphone (MIC A).

17 – MICROPHONE A SWITCH: selects or disables the first microphone (graphs at page 24). Available choices:

0 – microphone disabled (no load on the CPU);
1 – a classic 87 German condenser, center placed;
2 – a Latvian ribbon microphone, placed halfway to the edge.

18 – MICROPHONE B VOLUME: controls the volume of the second microphone (MIC B).

19 – MICROPHONE B PAN: controls the L/R panning of the second microphone (MIC B).

20 – MICROPHONE B SWITCH: selects or disables the second microphone (graphs at page 24). Available choices:

0 – microphone disabled (no load on the CPU);
1 – a classic 57 American dynamic, center placed;
2 – a small-diaphragm German condenser, placed halfway to the edge.

21 – ROOM MICROPHONE VOLUME: controls the volume of the stereo room microphone.

22 – ROOM MICROPHONE SWITCH: selects or disables the stereo room microphone (graphs at page 25).

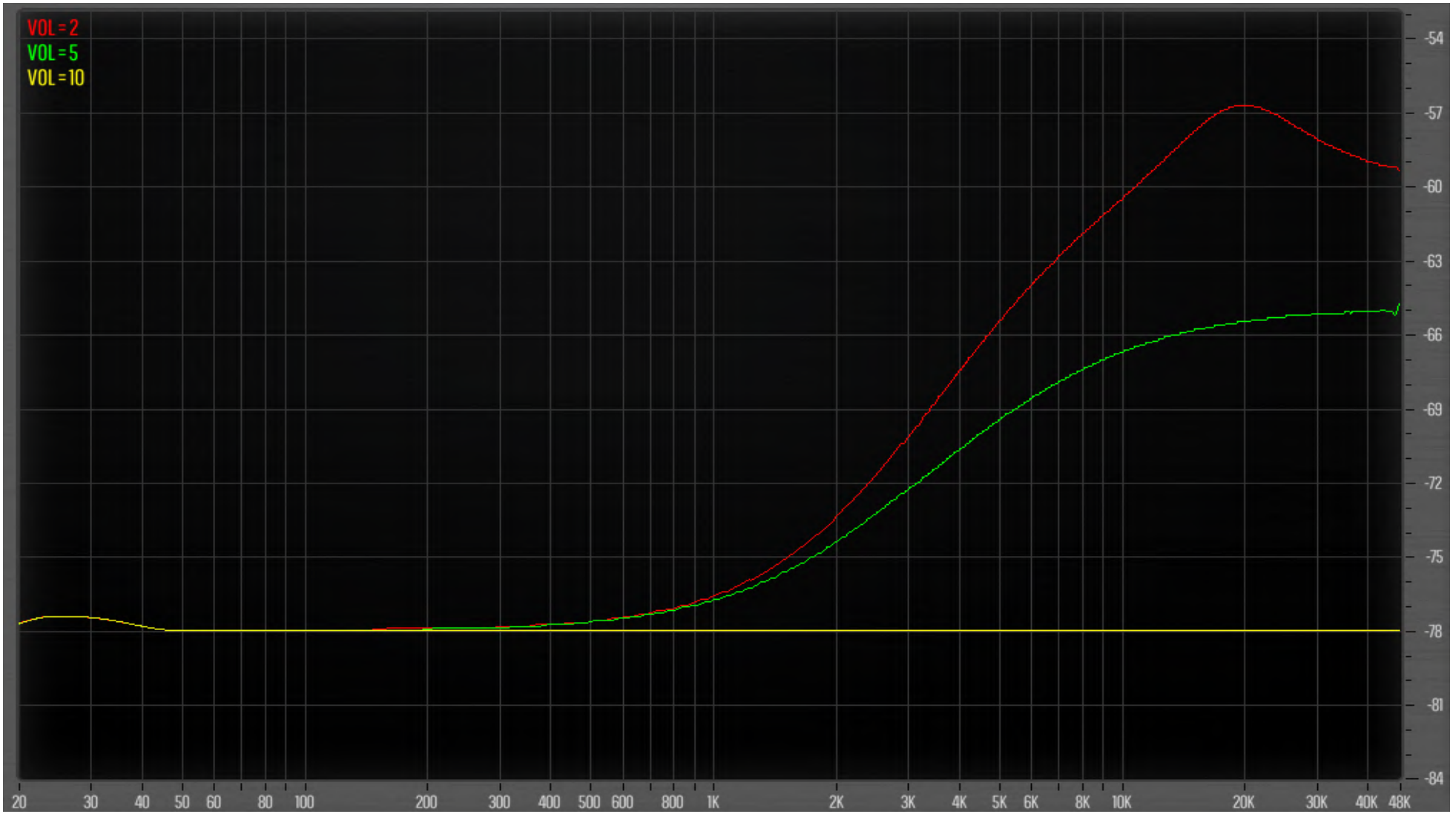
Available choices:
0 – microphone disabled (no load on the CPU);
1 – a stereo condenser microphone placed at about 1.8m (6 ft) from the amp;
2 – a stereo ribbon microphone placed at about 4m (13 ft) from the amp.

23 – OUTPUT VOLUME: controls the global output level of FULLERTON. It is placed before the safety output protection limiter set at +1dBFS. In order to enjoy FULLERTON's best tone, it's highly recommended not to exceed this output level. This control should be adjusted so that the Output Limiter warning light (#12) never glows bright red.

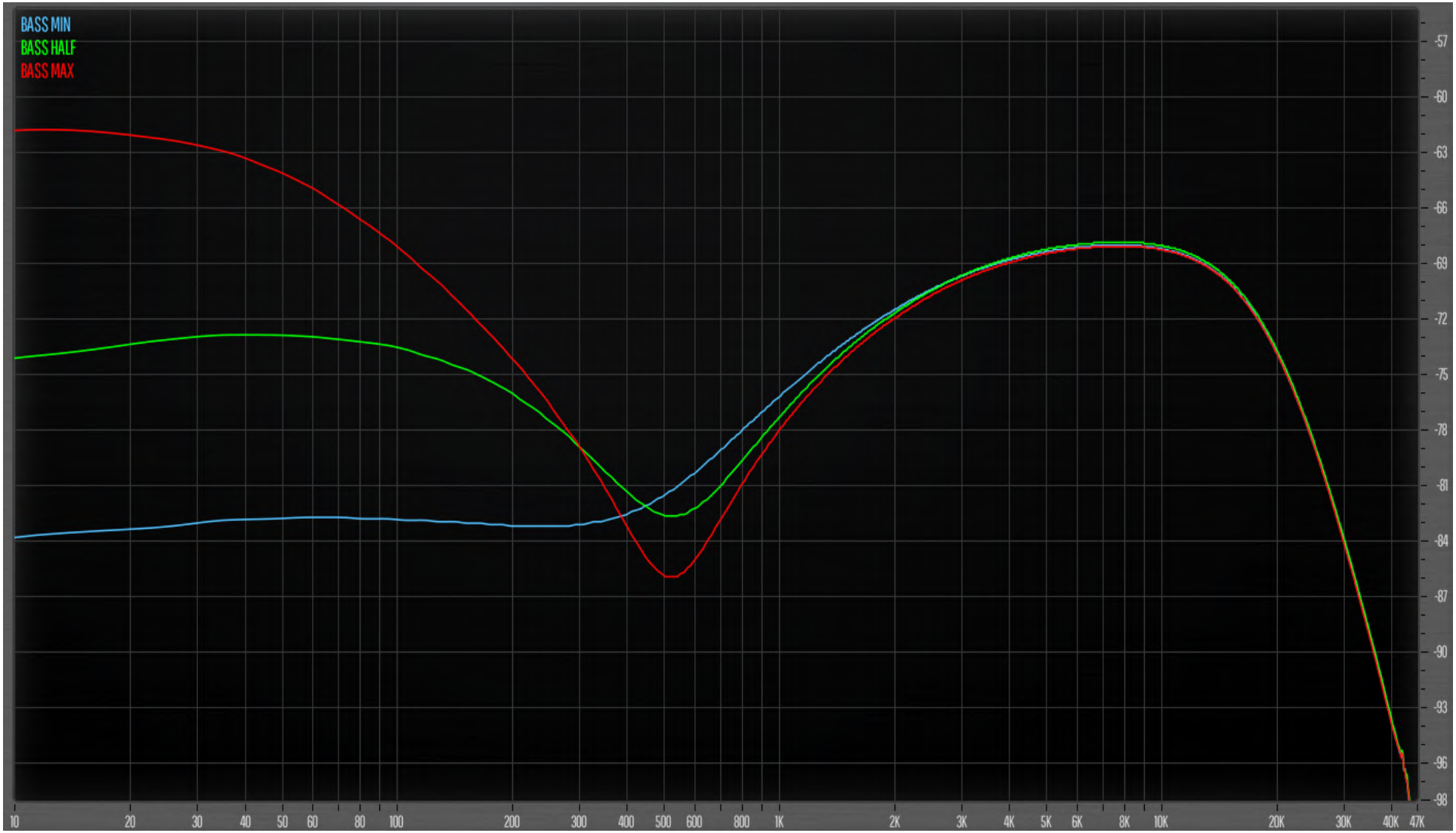
24 – CAB SWITCH: enables (lit) or bypasses the cabinet/microphones section of FULLERTON.

...and now for something completely different: The Graphs!

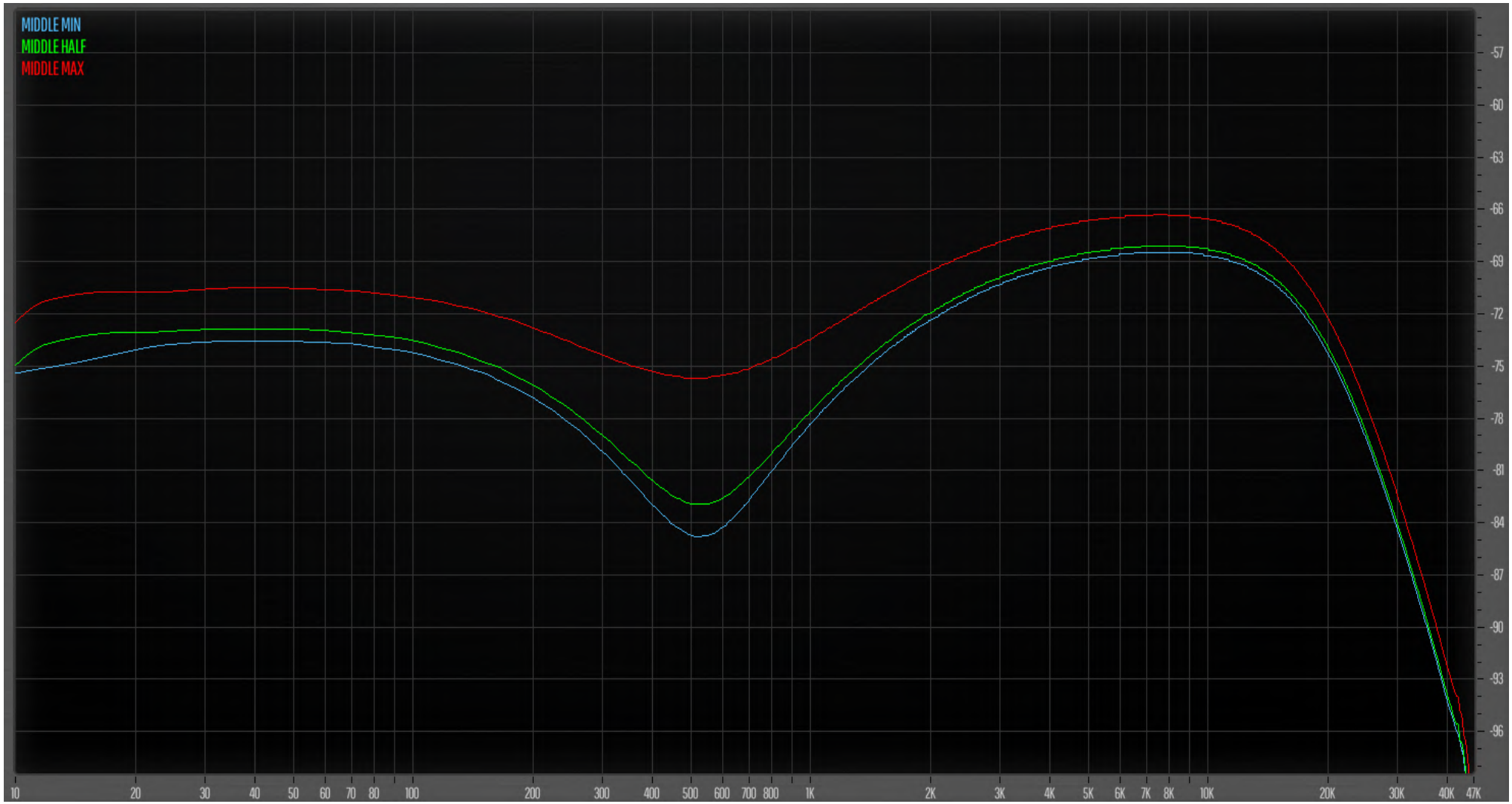
NORMAL and VIBRATO channels response. Green = Normal, Red = Vibrato.



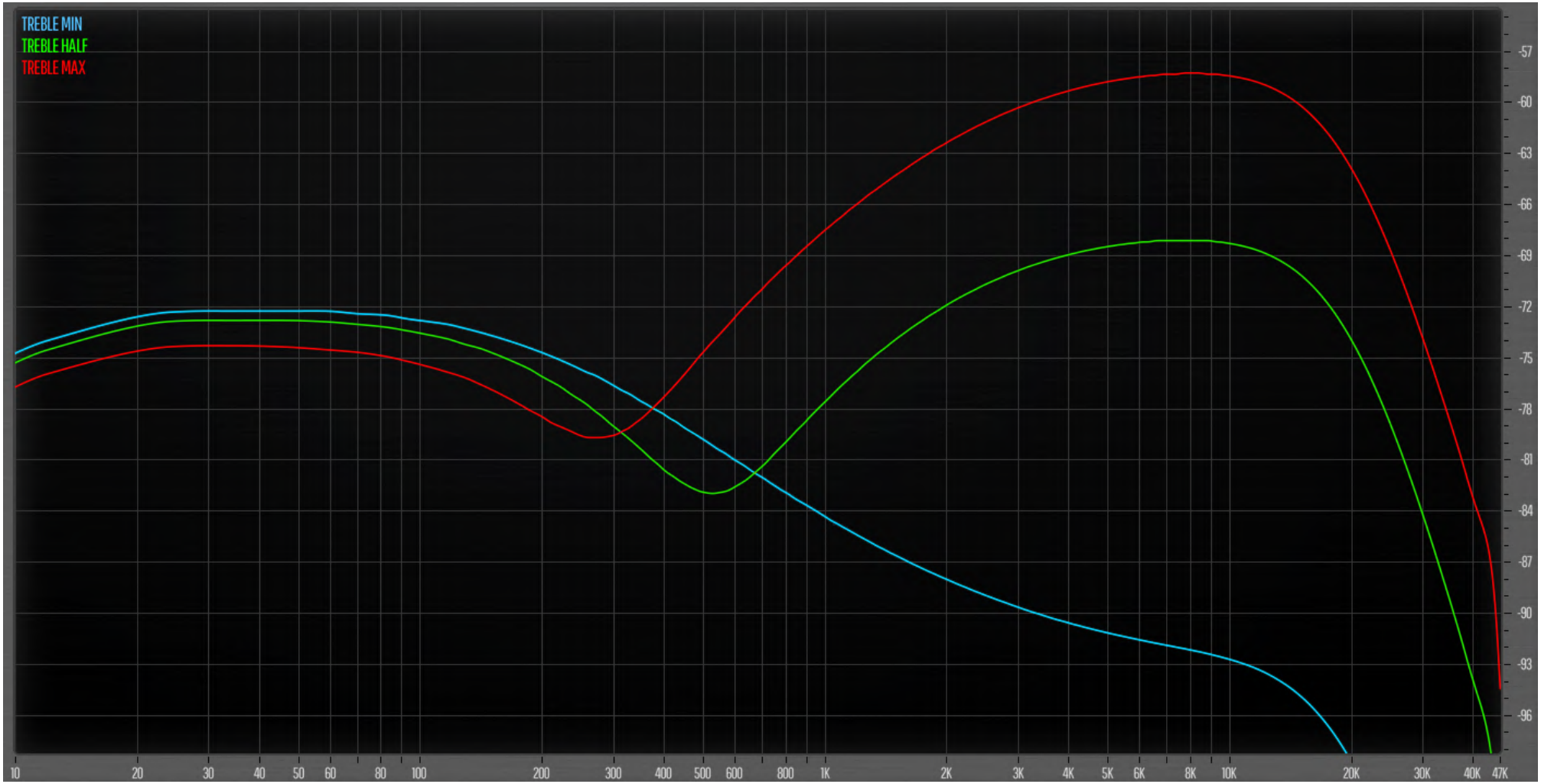
Bright switch on. Red = min vol. Green = half vol. Yellow = max vol.



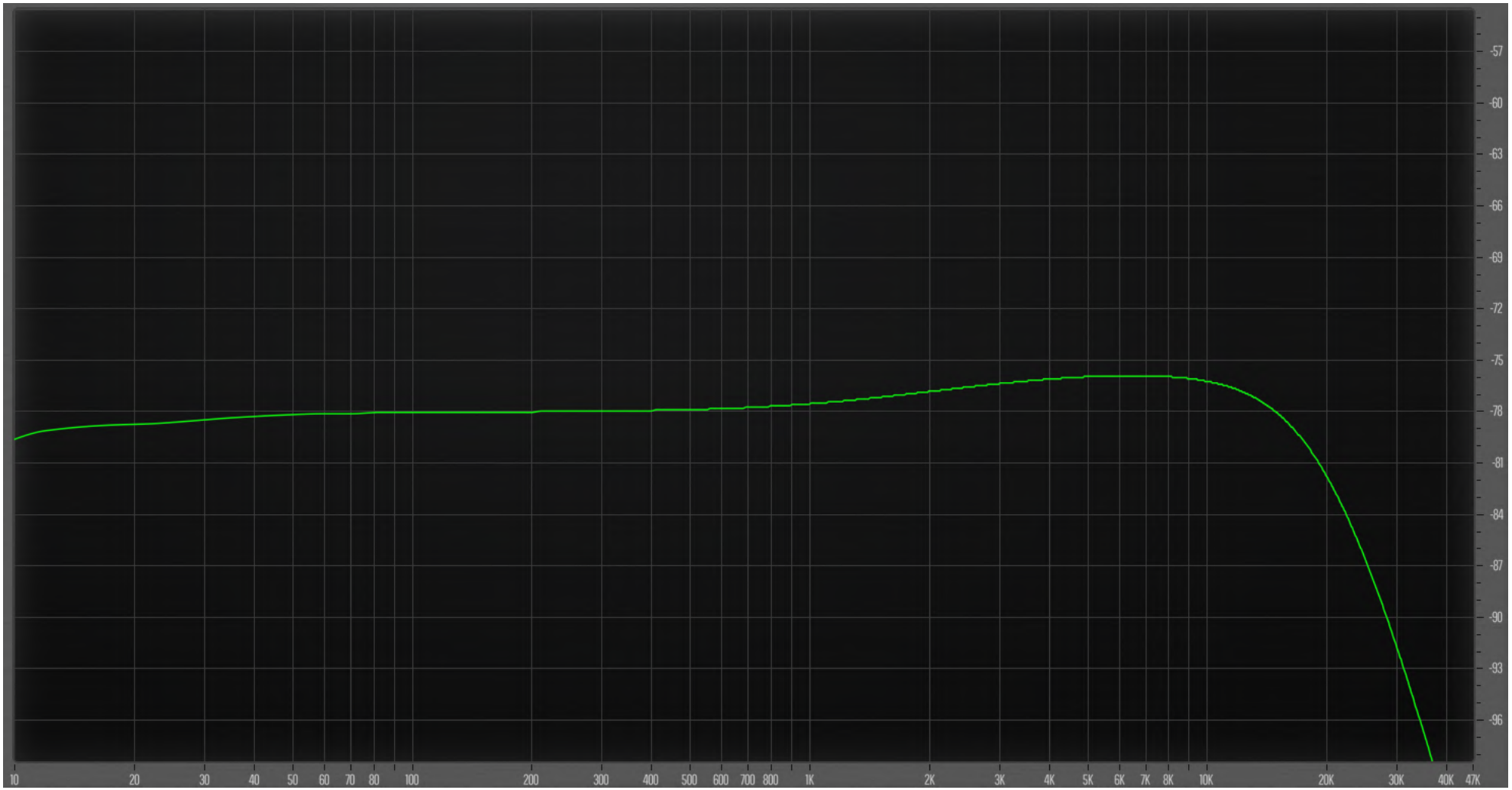
BASS control range. MID and TREBLE = 5



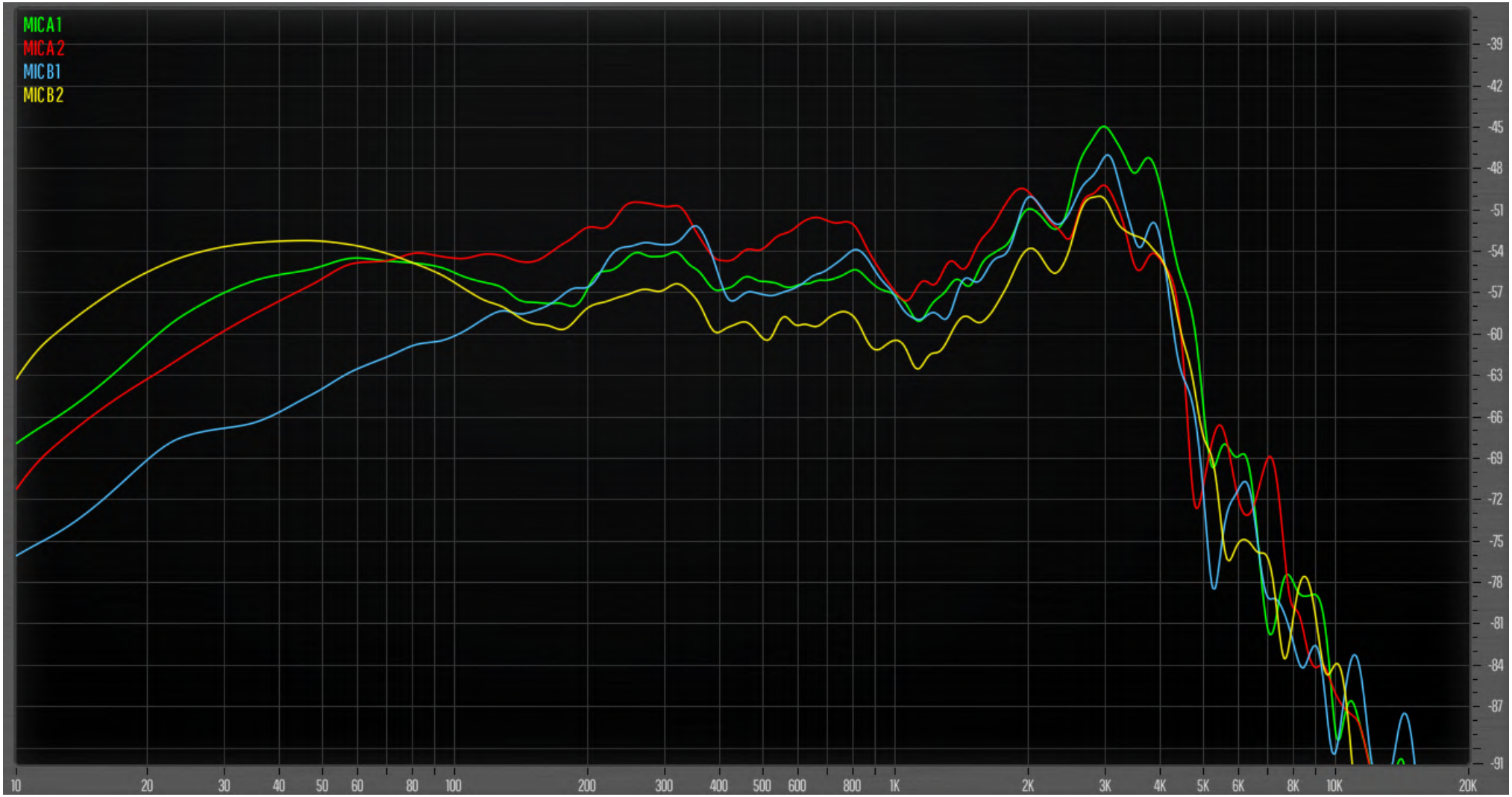
MIDDLE control range. BASS and TREBLE = 5



TREBLE control range. BASS and MID = 5



Flat tone setting: Treble = min, Mid = max, Bass = min.



Microphones responses: A-1 = green, A-2 = red, B1 = blue, B2 = yellow.

Room responses: green = mic 1, red = mic 2.

INSTALLATION

- After purchase, you will need to install Acustica Audio's proprietary **AQUARIUS** application. You may find it here.

- It is mandatory to first install either N4 Player (fully functional and completely free) or N4 (paid commercial version). Once your chosen version of N4 is installed, it is possible to proceed with the installation of 3rd party products such as **FULLERTON**.

- It is also mandatory to update N4 or N4 Player to the latest available version!

- **FULLERTON** is loaded into **N4** or **N4 Player**. All the included plug-ins can then be found under the '**Acqua Library or Effect (AQP)**' menu entry in N4/N4 Player.

- Please do not install both N4 Player and N4 – use only one of them to guarantee proper functionality of SoundDrops plugins.

- Also make sure that you use an up-to-date version of **N4 Player** or **N4**.

- The legacy **N4 FREE** (discontinued) and the current **N4 Player** cannot coexist.

- PLEASE NOTE: **N4 Player** can't load non-official 3rd party libraries for Nebula/N4.

F.A.Q.

Q: Why is N4 Player or N4 required to run an ACQUA 3rd party plugin?

A: Because of the technology back-end, and because in this way it will be easier to buy, install, register the plugin, and update its engine in a matter of seconds, directly from the technology provider. This is the best way to protect and guarantee your investment.

Q: Can I run 3rd party libraries as standalone plug-ins?

A: Yes, but in any case N4/N4 Player is required and must be installed beforehand.
Then just follow the instructions here.

SYSTEM REQUIREMENTS

	WINDOWS		OSX	
	minimum	recommended	minimum	recommended
CPU	**Quad Core**	**latest multi core CPU**	**Quad Core**	**latest multi core CPU**
OS	**Windows 10**	**Windows 10**	**OSX 10.13**	**OSX 10.15**
HDD/SDD	**100 Gb**	**1 Tb**	**100 Gb**	**1 Tb**
RAM	**4 GB**	**16 to 128 GB**	**4 GB**	**16 to 128 GB**
Audio Host	**VST2/AAX 64 bits**	**VST2/AAX 64 bits**	**VST2/AAX/AU 64 bits**	**VST2/AAX/AU 64 bits**
Screen Resolution	**1024x768**	**1920x1080**	**1024x768**	**1920x1080**
N4 version	**the latest**	**the latest**	**the latest**	**the latest**

ABOUT DYNAMIC SAMPLE RATE CHANGES: N4 libraries (such as **FULLERTON**) converted to standard plug-ins via Aquarius Setups presently don't support online sample rate changes.

If you are changing the DAW project sample rate online, please save, close and open it again in order to let N4 to load the correct sample rate library.