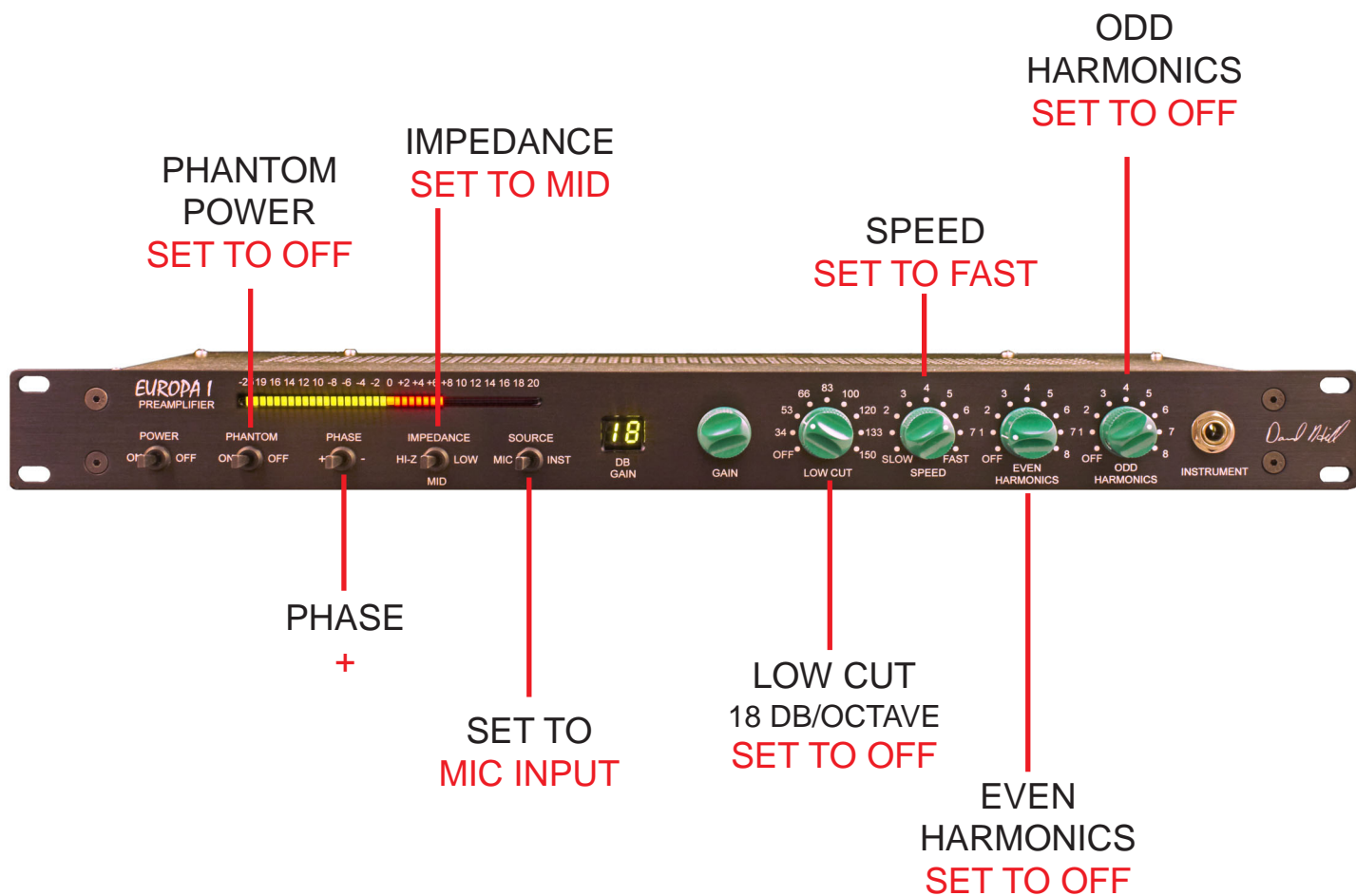# EUROPA I

PREAMPLIFIER
MANUAL VER 1.04
20120521

2117 E5th street
Superior WI USA
54880
davehilldesigns.com

See the next page for startup switch settings

SETTINGS TO START WITH

ODD HARMONICS
SET TO OFF

PHANTOM POWER
SET TO OFF

IMPEDANCE
SET TO MID

SPEED
SET TO FAST

PHASE
+

SET TO
MIC INPUT

LOW CUT
18 DB/OCTAVE
SET TO OFF

EVEN HARMONICS
SET TO OFF

IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions
2. Keep these instructions
3. Heed all warnings
4. Follow all instructions including Calibration Instructions
5. Do not use this apparatus near water
6. Clean only with dry cloth
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat
9. Protect the power cord from being walked on or pinched particularly at plugs and the point where they exit from the apparatus
10. Only use attachments/accessories specified by the manufacturer
11. Unplug this apparatus during lightning storms or when unused for long periods of time
12. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped
13. CAUTION: To disconnect the unit completely from the MAINS, unplug the unit. Turning the power switch off does not disconnect the unit completely from the MAINS.
14. Unit must be operated with a minimum distance of 18" from any object
15. The unit shall not be exposed to dripping or splashing and that no objects filled with liquids, such as vases, shall be placed on the unit.
16. THIS EQUIPMENT MUST BE USED IN A STANDARD RACKMOUNT CONFIGURATION. DO NOT USE AS A DESKTOP OR MOUNTED ON OR BELOW ANY OTHER EQUIPMENT.

CHECK THE LINE VOLTAGE SETTING BEFORE PLUGGING THE UNIT IN

INTRODUCTION

Europa 1 is a preamplifier that is constructed with 91 transistors in it's main audio path and it is of discrete Class A topology. The preamplifier controls are either traditional pre-amplifier type controls or color controls. It is also necessary to understand that distortion may not sound like what one normally thinks distortion is. Distortions can be very pleasing colors - sounds.

POWER UP Allow a 20 minute warm up period for optimum operation.
The gain display shows the firmware version on power up, this is the left most digit of the gain display

GAIN The gain control circuit uses some of the latest technology that allows digital gain control over analog circuits. The preamplifier circuit with it's gain control elements has 1 db gain steps that range of 0 db of gain to 66 db of gain. The maximum signal level is +24dbu. Balanced in, balanced or unbalanced out. The 0 db gain setting allows for post processing during mixing, and eliminates the need for a pad switch. Gain is displayed on a 2 digit display.

Other standard preamplifier type control functions are also available. They are, phase flip and 48 volt phantom power.

INPUT IMPEDANCE The input impedance of the mic preamplifier has 3 choices.
The HI-z selection is in the range of 200K ohm and will provide very little loading of the source. The second position has an impedance of approximately 2.2K ohms. With the third position having an input impedance of 300 ohms for color choices.

SPEED Speed is the first control in the color set. All color controls are series connected. They affect each other. The speed control changes the slew rate of the preamplifier. This is the same as rate of change. The result of this is that low level signals are unaffected, but a large signals that changes quickly will be slowed down. See wave form photos.

EVEN HARMONICS The even harmonic control changes the amount of even harmonic content. This is a color that can thicken a sound and is very difficult to describe. This is mostly second harmonic.

ODD HARMONICS The odd harmonic control changes the amount of odd harmonics that are added to the audio path. Odd harmonics can make a sound brighter and the way this control works it can also add detail and a compression effect. The compression happens because of amplifier overload.

LOW CUT The hi-pass filter is a third order 18 db pre octave filter of a type that has good time domain response. The filter has 8 frequencies 148 Hz, 130 Hz, 117 Hz, 100 Hz, 81 Hz, 63 Hz, 48 Hz, 33 Hz, and off.

INSTRUMENT INPUT The instrument input has 1.2 Meg ohm impedance and has a gain range of 0 db to 30 db. The *input impedance* switch should be set to HI-z. The other settings will load the instrument pre and cause gain loss an increased distortion. This may or may not be useful

METER The meter is calibrated so that 0VU on the meter is +4 dbu, the top of the meter shows +20 db above +4. The maximum level is +24 dbu.

A GUIDED TOUR
a self guided sound test

Controls that change the color or add distortion are always difficult to describe

The Speed control is a control that changes the way the preamp responds to transits. It is a control that changes the slew rate, it is a rate of change filter. The fast position removes it from the audio path. This is the default setting.

Low amplitude signals will pass unaffected, but large signals that quickly will be slowed down. The easiest way to learn what this does is to do an experiment. Apply a snare drum to the preamp; adjust the level so the peak is at +10 on the meter. Then move the Speed control from fast to a setting of 1 and then to 0. Compare this to the sound with the Speed control set to fast. Now go back and do the same speed settings but increase the level of the drum until the drum peaks at max level. Note how the sound changes as the level increases. Rate of change – *how much level and how fast.*

Now switch to a clean unprocessed voice. Set the Speed control to 5 and slowly increase the level of the voice from peaking at +4 to max level. Note how it changes as the level increases. I have found that the settings of 4 to fast to be most useful with vocals. It depends on the level so it can be played with. Level is one half of the rate of change function.

The Even harmonic control generates mostly second harmonic, but other harmonics as well. It is the most subtle of the color controls because the second harmonic is the hardest to hear. This control is also level dependent and will affect the audio more as the signal increases from 0VU to the maximum level of +20 VU. Try a clean unprocessed acoustic guitar, if you set the control to 8, the maximum control setting, and increase the level of the instrument, you should hear a change that I would describe as thickening.

The control for Odd harmonics does two related things. First it adds odd harmonics, but it also compresses. The odd harmonics and the compression are related. It brings up the low level part of the signal and brings down the peaks.
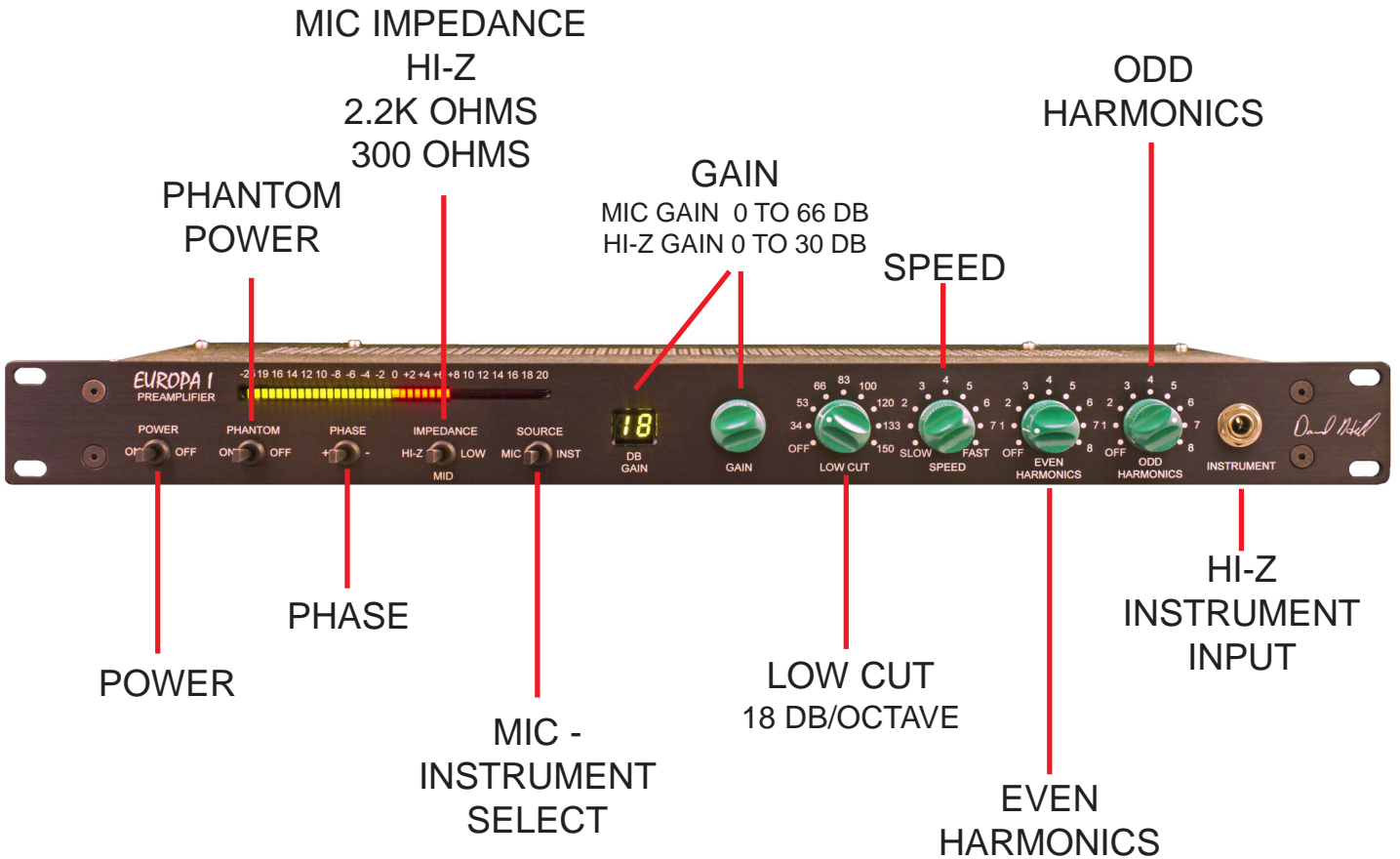
Try a clean unprocessed voice if you set the control to 8, the maximum control setting and increase the level of the voice, you should hear, more detail, and a brighter sound. But compared to the unprocessed voice, there is a dynamic and transit change. The low level material will be louder, the peaks will be less.   As how the other color controls work, the odd harmonic control is level dependent and will affect the audio more as the signal increases from 0VU to maximum level.

Being the controls are in series, try the a drum and or voice and bring up both the
Speed control and the Odd Harmonic control. Compare this with the unprocessed audio.

The level dependence is that same thing that happens with all vintage analog gear. This is not about
making a color by adding a little LF boost or a little HF cut; it is changes in amplifier linearity.
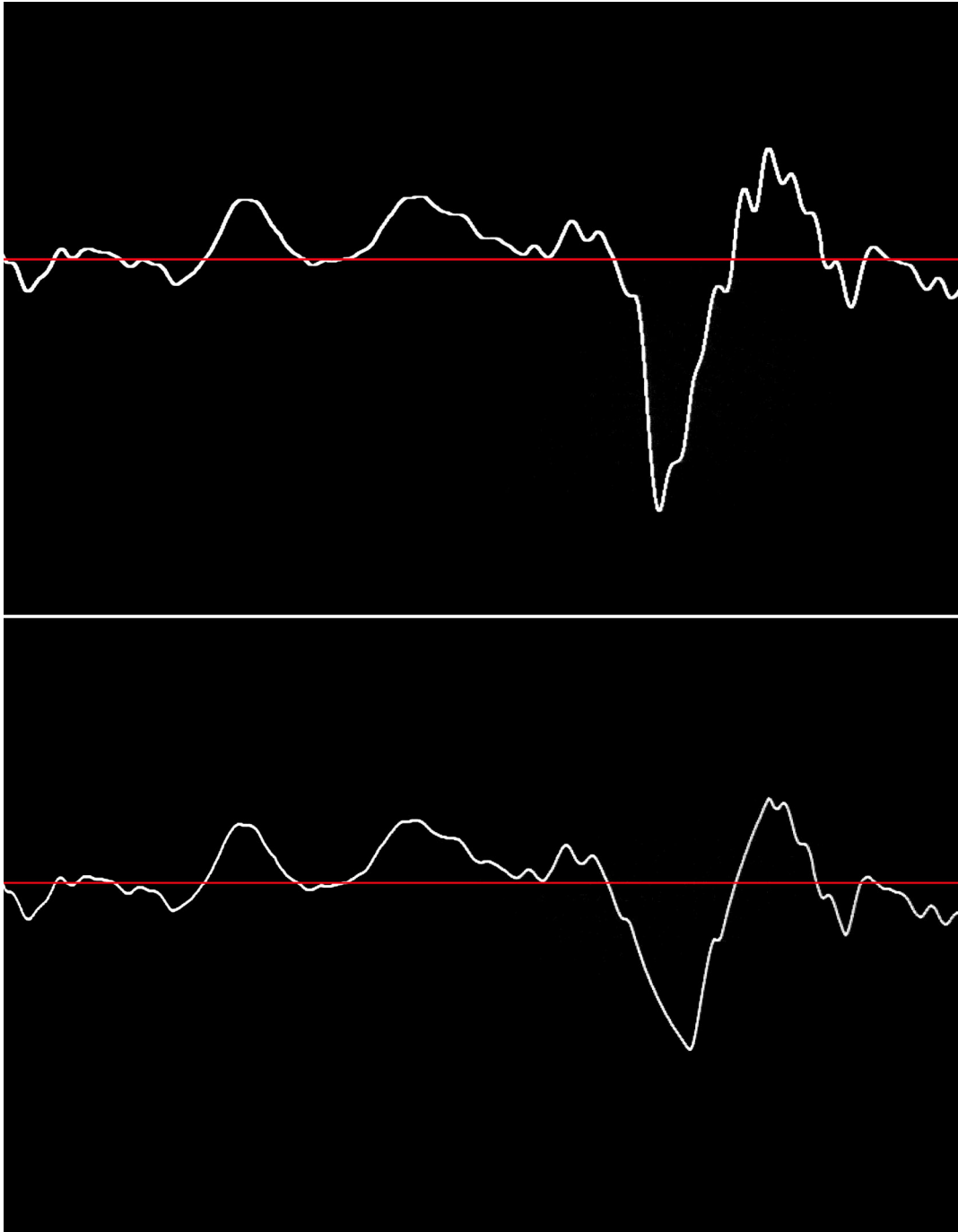
POWER UP

One thing to note, is on power up, a number is displayed in the left most gain digit. This is the
firmware version number. It takes about 4 seconds for the internal microprocressors to boot up.

MIC IMPEDANCE
HI-Z
2.2K OHMS
300 OHMS

ODD
HARMONICS

PHANTOM
POWER

GAIN
MIC GAIN 0 TO 66 DB
HI-Z GAIN 0 TO 30 DB

SPEED

EUROPA I
PREAMPLIFIER

-2 19 16 14 12 10 -8 -6 -4 -2 0 +2 +4 +6 +8 10 12 14 16 18 20

POWER
ON   OFF

PHANTOM
ON   OFF

PHASE
+   -

IMPEDANCE
HI-Z   LOW
MID

SOURCE
MIC   INST

18
DB
GAIN

GAIN

66 83 100
53   120
34   133
OFF   150
LOW CUT

3   4   5
2   6
7 1
SLOW   FAST
SPEED

3   4   5
2   6
7 1
OFF   8
EVEN
HARMONICS

3   4   5
2   6
7 1
OFF   8
ODD
HARMONICS

INSTRUMENT

David N. Hill

PHASE

POWER

MIC -
INSTRUMENT
SELECT

LOW CUT
18 DB/OCTAVE

EVEN
HARMONICS

HI-Z
INSTRUMENT
INPUT

LINE VOLTAGE
SELECTION

INPUT

CAUTION

TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK DO NOT EXPOSE THIS
EQUIPMENT TO MOISTURE OR RAIN. NO USER SERVICABLE PARTS INSIDE. DO NOT
REMOVE COVERS. CAUTION HIGH VOLTAGE INSIDE
MADE IN U.S.A.
DH DESIGNS   2117 E 5TH ST SUPERIOR WI 54880 USA

OUTPUT

POWER 50, 60 HZ 25 WATTS CAUTION: TO REDUCE THE RISK OF FIRE
REPLACE ONLY WITH THE SAME TYPE AND RATING FUSE
100V - 120 V GMD .315, 220 - 240 V GMD .150

110V

The top wave shape is a vocal recoding
The bottom is the same slowed down by the Speed control;
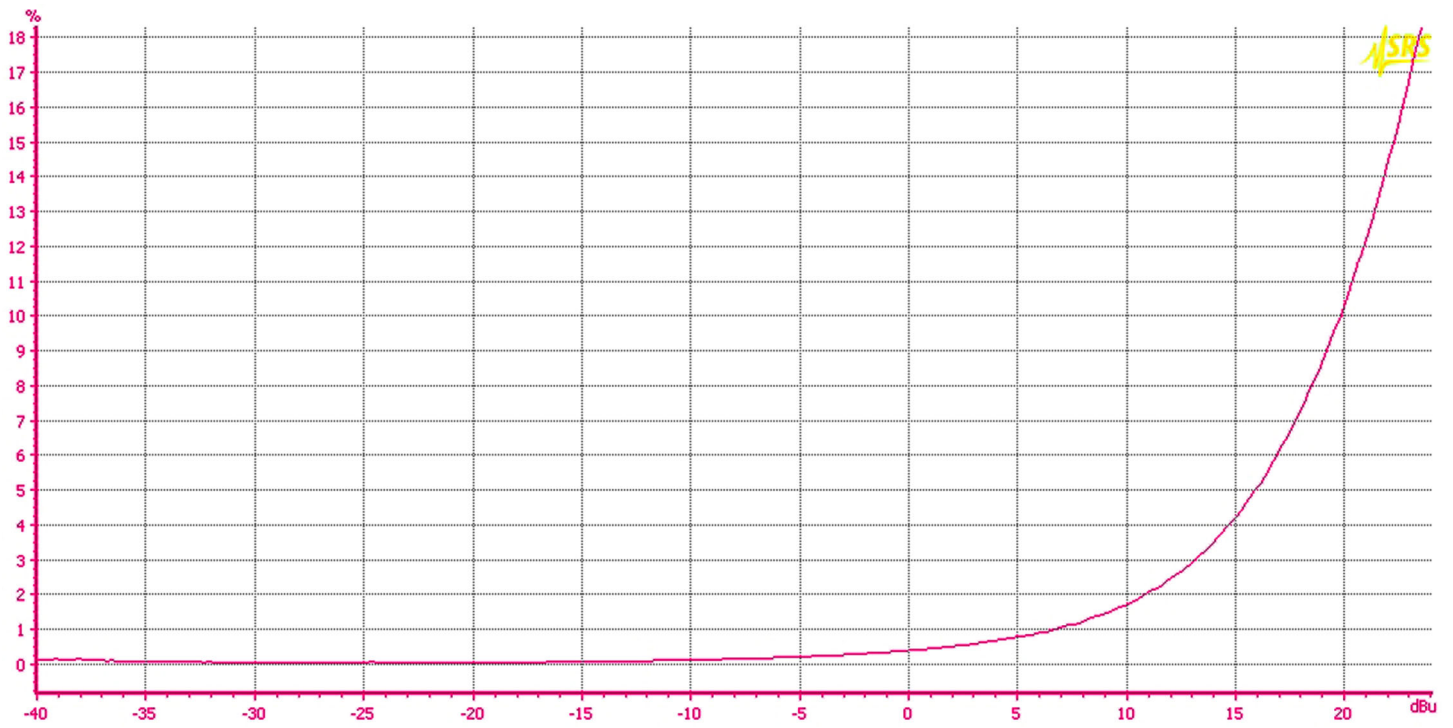this is an extreme case to show the effect on the wave shape

SPEED CONTROL
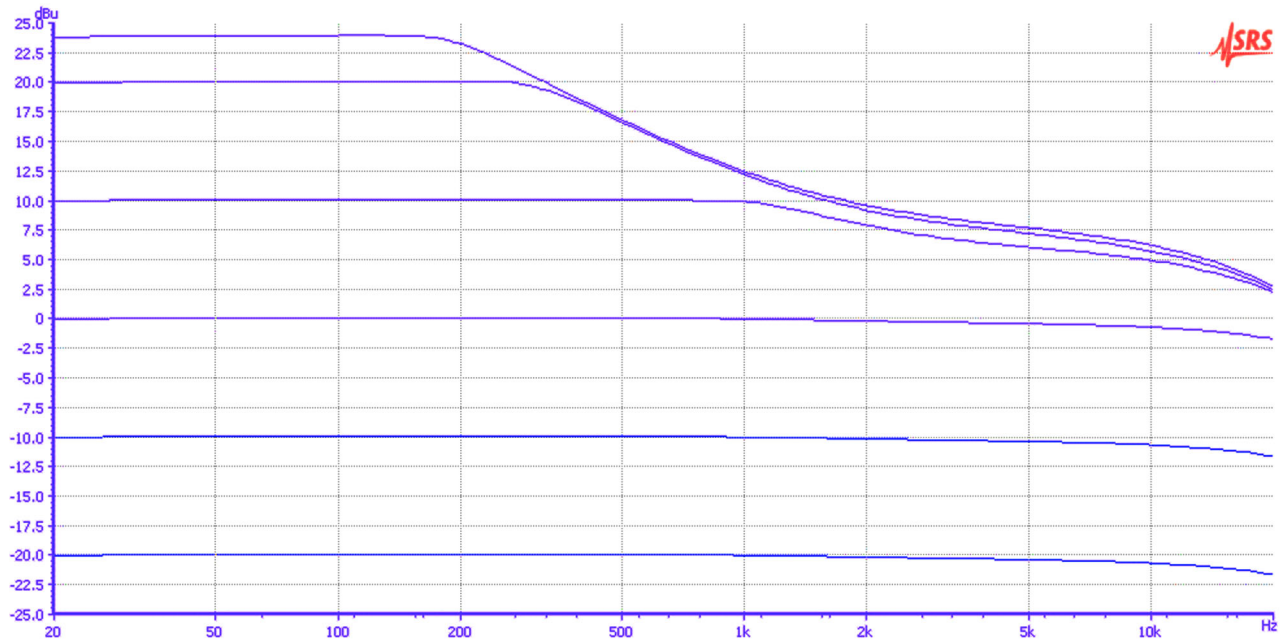
FREQUENCY RESPONCE OF WITH THE SPEED CONTROL SET TO 1
NOTE: LOW LEVEL SIGNALS HAVE A NEAR FLAT RESPONCE
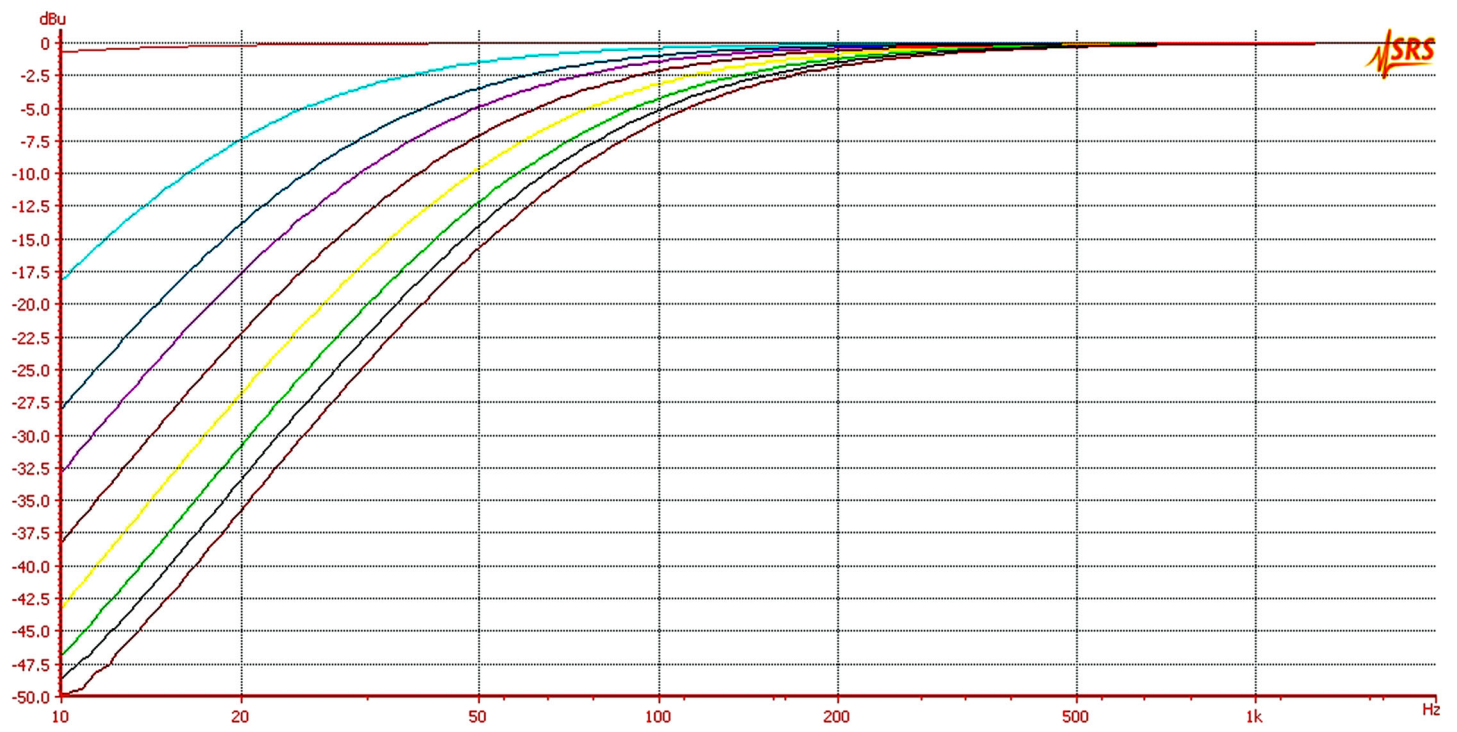HIGH LEVEL SIGNALS ARE CHANGED

SPEED CONTROL FREQUENCY RESPONCE
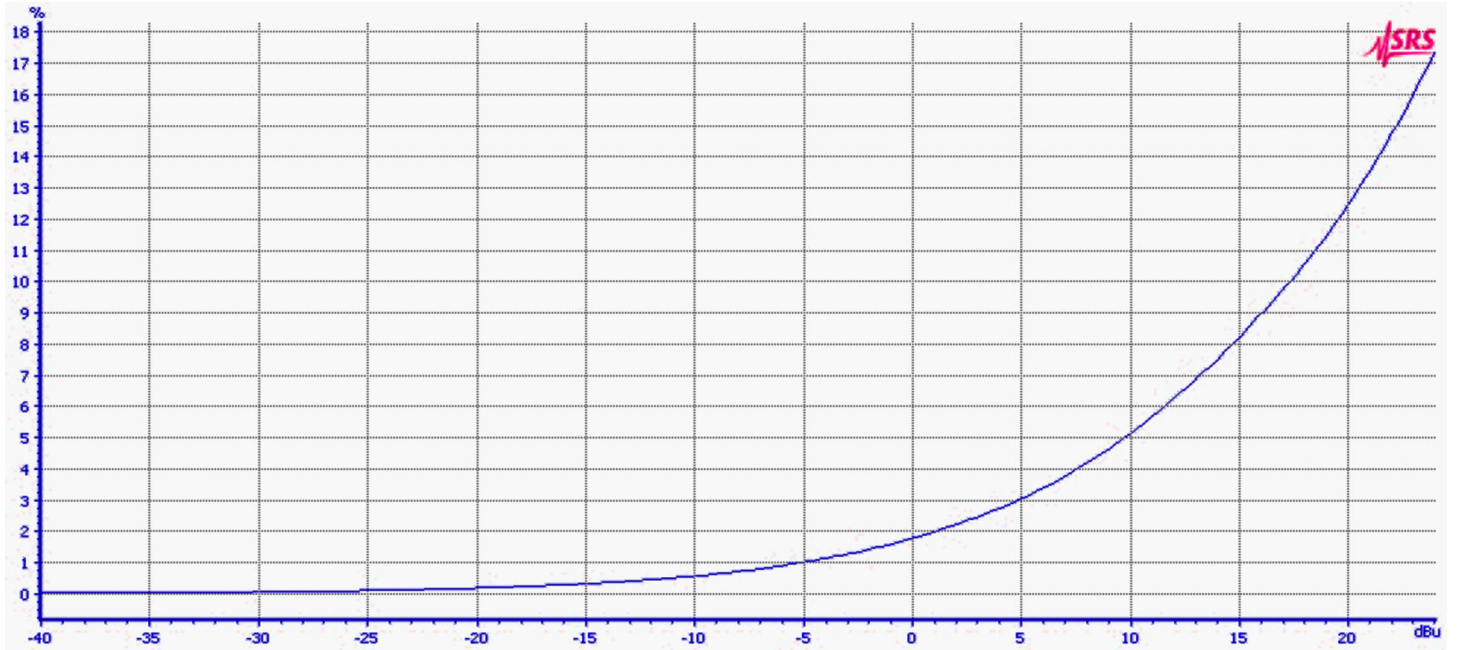
EVEN HARMONIC DISTORTION WITH LEVEL

ODD HARMONIC DISTORTION WITH LEVEL

LOW CUT FILTER

EUROPA 1

REFERENCE MEASUREMENTS

SIGNAL LEVEL	HARM 2	HARM 3	SPEED = 0	SPEED = 1	HARM 2 GAIN	HARM 3 GAIN
+24 DBU	17.3%	19.7%	15.5%	21.9%	-0.7DB	-0.7DB
+14DBU	7.6%	3.5%	16%	14.2%	0.9DB	2.9DB
+4DBU	2.8%	0.6%	1.3%	.05%	1.3DB	3.6DB
-6DBU	0.9%	0.2%	.04%	.03%	1.3DB	3.6DB

Gain change is referenced to having the color function off, it shows some compression with both the even and odd harmonic controls. Harmonic control at maximum.

All distortion wave measurements use a very low distortion sine wave as the source They are analog measurements.

SPECIFICATIONS

Maximum input: +24dbu balanced, +16dbu unbalanced

Maximum output: +24dbu balanced

Hipass Filter: 3 pole, 18db per octave, 8 frequencies 148 Hz, 130 Hz,
                 1   17 Hz, 100 Hz, 81 Hz, 63 Hz, 48 Hz, 33 Hz

Gain: 0 to 66 db, 1 steps

Gain Insturment Input: 0 to 30 db, 1 db steps

Mic Impedance: 200K, 2.2k, 300 ohms
                        at gains < 13db the Hi-z position will be around 15K ohms

Insturment Impedance: 1.2 Meg ohm

Noise: EIN -127.5 dbu, 20KHz Bw

Power: 25 watts at 115 or 230 volts, 50 or 60 Hz.
                        Fuse size is GMD .315A for 115 volts; GMD .15A for 230
                        volts

                        for 100 - 120 volts set to 115v
                        for 220 - 240 volts set to 230v

Shipping Weight: 15 lbs (6.7kg)

Depth Behind Panel: 8.625 inches plus user input/output connectors