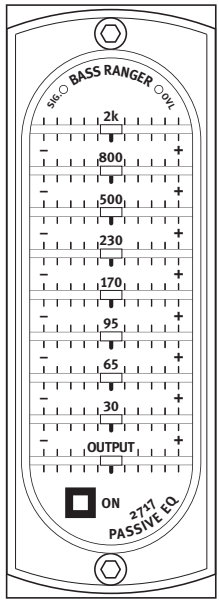
Manual



Bass Ranger

RackPack Module, Model 2717

Graphic Equalizer For The Bass Range

Version 1.0 – 6/2008

Designer: Wolfgang Neumann

This user's guide contains a description of the product. It in no way represents a guarantee of particular characteristics or results of use. The information in this document has been carefully compiled and verified and, unless otherwise stated or agreed upon, correctly describes the product at the time of packaging with this document.

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CE Declaration of Conformity

Manufacturer: SPL electronics GmbH, Type of Equipment: Audio Signal Processor, Product: RackPack/Bass Ranger, Model 2717, Compliance Engineer: Wolfgang Neumann
Test base: EN50081-1:1992, EN50082-1:1992, EN60065:1993, EN61000-3-3:1995, EN60065:2002, EN55013:2001, EN55020:2002, EN61000-3-2:2000, 73/23 EWG; 93/68 EWG.
We herewith declare, that the construction of the Bass Ranger, Model 2717, is in compliance with the standards and regulations mentioned above.

Notes on environmental protection

At the end of its operating life, this product must not be disposed of with regular household waste but must be returned to a collection point for the recycling of electrical and electronic equipment. The "wheelie bin" symbol on the product, user's manual and packaging indicates that. The materials can be re-used in accordance with their markings. Through re-use, recycling of raw materials, or other forms of recycling of old products, you are making an important contribution to the protection of our environment. Your local administrative office can advise you of the responsible waste disposal point.

WEEE Registration: 973349 88

Content

Important Security Information

Please note and retain this information. Carefully read and follow all of the safety and operating instructions before you use the machine. Be doubly careful to follow all warnings and special safety instructions noted in this manual and on the unit. The following information refers to modules built into the RackPack frame.

Connections: Only use the connections as described. Other connections can lead to health risks and equipment damage.

Water And Humidity: Do NOT use this machine anywhere near water (for example near a wash basin or bath, in a damp cellar, near swimming pools, or the like). In such cases there is an extremely high risk of fatal electrical shocks!

Insertion Of Foreign Objects Or Fluids: NEVER allow a foreign object through any of the machine's chassis openings. You can easily come into contact with dangerous voltage or cause a damaging short circuit. NEVER allow any fluids to be spilled or sprayed on the machine. Such actions can lead to dangerous electrical shocks or fire!

OPENING THE DEVICE: Open the device only to fit or exchange modules. The fitting and/or exchange of modules should only be carried out by qualified persons. In the light of possible physical damage or injuries any manipulation is at your own risk. In order to avoid any residual voltage, the device should be disconnected from any power source at least 5 minutes prior to opening it. If you handle the device improperly or ignore the manual (part of the delivery of the RackPack frame) you risk to damage the device or expose yourself to an electric shock. In these cases SPL electronics GmbH denies any responsibility.

Electrical Power: Run this machine ONLY from sources which can provide proper power at the prescribed rating. When in doubt about a source, contact your dealer or a professional electrician. To be sure you have isolated the machine, do so by disconnecting the power cord from your wall connection. Be sure that the power cord plug is always accessible. When not using the machine for a longer period, make sure to unplug it from your wall power socket.

Power Cord Protection: Make sure that your power cord is arranged to avoid being stepped on or any kind of crimping and damage related to such event. Do not allow any equipment or furniture to crimp this power cord.

Power Connection Overloads: Avoid any kind of overload in connections to wall sockets, extension or splitter power cords. Always keep manufacturer warnings and instructions in mind. Overloads create fire hazards and risk of dangerous shocks!

Lightning: Before thunderstorms or other severe weather, disconnect the machine from wall power (but to avoid life threatening lightning strikes, not during a storm). Similarly, before any severe weather, disconnect ALL the power connections of other machines and antenna and phone/internet cables which may be interconnected so that no lightning damage or overload results from such secondary connections.

Air Circulation: Chassis openings offer ventilation and serve to protect the machine from overheating. NEVER cover or otherwise close off these openings. NEVER place the machine on a soft surface (carpet, sofa, etc.). Make sure to provide for a mounting space of 4-5 cm/2 inches when mounting the machine in racks or cabinets.

Controls And Switches: Operate the controls and switches only as described in the manual. Incorrect adjustments outside safe parameters can lead to damage and unnecessary repair costs. Never use the switches or level controls to effect excessive or extreme changes.

Repairs: Unplug the machine and immediately contact a qualified technician when you think repairs are needed – or when moisture or foreign objects may accidentally have gotten in to the housing, or in cases when the machine may have fallen and shows any sign of having been damaged. This also applies to any situation in which the machine has not been subjected to any of these unusual circumstances but still is not functioning normally or its performance is substantially altered.
In cases of damage to the power cord or its plug, first consider turning off the main circuit breaker before unplugging the power cord.

Replacement/Substitute Parts: Be sure that any service technician uses original replacement parts or those with identical specifications as the originals. Incorrectly substituted parts can lead to fire, electrical shock, or other dangers, including further equipment damage.

Safety Inspection: Be sure always to ask a service technician to conduct a thorough safety check and ensure that the state of the repaired machine is in all respects up to factory standards.

Cleaning: In cleaning, do NOT use any solvents, as these can damage the chassis finish. Use a clean, dry cloth (if necessary, with an acid-free cleaning oil). Disconnect the machine from your power source before cleaning.

Hook Up

Fitting A Module

The fitting and/or exchange of modules should only be carried out by qualified persons. Please read the manual of the RackPack frame. It contains all information needed to fit a module as well as all safety and notes and warnings. If you don‘t have the manual at hand, you can download it like all SPL product manuals from our website http://www.soundperformancelab.com.

Symbols And Notes

IN THIS MANUAL A LIGHTNING SYMBOL WITHIN A TRIANGLE WARNS YOU ABOUT THE POTENTIAL FOR DANGEROUS ELECTRICAL SHOCKS – WHICH CAN ALSO OCCUR EVEN AFTER THE MACHINE HAS BEEN DISCONNECTED FROM A POWER SOURCE.

AN EXCLAMATION MARK (!) WITHIN A TRIANGLE IS INTENDED TO MAKE YOU AWARE OF IMPORTANT OPERATIONAL ADVICE AND/OR WARNINGS THAT MUST BE FOLLOWED. BE ESPECIALLY ATTENTIVE TO THESE AND ALWAYS FOLLOW THE ADVICE THEY GIVE.

The symbol of a lamp directs your attention to explanations of important functions or applications.

Attention

Do not attempt any alterations to this machine without the approval or supervision of SPL electronics GmbH. Doing so could nullify completely any and all of your warranty/guarantee rights and claims to user support.

Scope Of Delivery

- The module
- This manual
- Two Philips screws to mount the module to the back panel (if module is delivered separately from the frame). Further screws needed for mounting the module remain when you remove front and rear covers from the RackPack frame.

The Bass Ranger EQ Module is a graphic equalizer for the bass range with passive coil filters in eight bands. It employs bell filters, each with individually optimized bandwidths, boost and cut values.

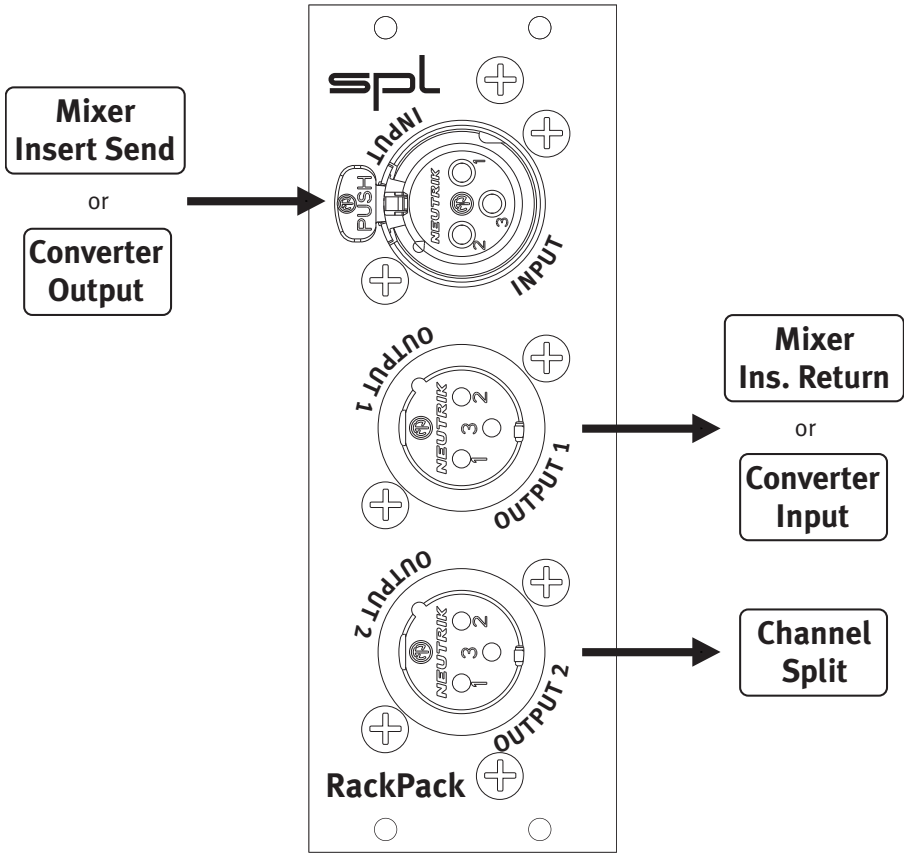
The concept of the Ranger EQs for the RackPack modular system is characterized by two decisive features that separate them from traditional designs. First there is the basic idea of specialized modules for typical instrument or vocal ranges. This follows a consistently musical approach, but also the design of each filter is based upon musical demands alone—center frequency selection is not governed by technical ISO rules, but relies on our own experiences and the preferences of well-known colleagues.

In contrast to statical graphic EQs with always the same center frequencies in repeating octave distances, the Ranger EQ modules are much better suited to work with specific instruments and their peculiarities—and only different frequency ranges do allow to effectively separate instruments in a mix.

The second characterizing feature follows the idea of a modular design and affects both the filter technology and the user interface. Why did we chose a graphic EQ design? For a fully parametric EQ with all necessary controls there would be space for one band on the module front. Our graphic EQ offers eight bands—a bandwidth control is less important, and different EQ modules can be combined to configure a large and, if needed, complex EQ system.

But a traditional graphic EQ with an active filter design did not seem to match our idea of a holistically musical approach. We decided for a rare technical solution: the combination of passive filters with a graphical user interface. Based upon individually specified, custom-made coils, these filter designs convince with outstanding musical qualities.

Finally, the general advantage of modular systems becomes clearly obvious when planning individual systems: A vocal recording channel with RackPack modules can be configured in very specific ways, while a complex EQ system may have a completely different focus.


Mixer
Insert Send
or
Converter
Output
spl
INPUT
PUSH
NEUTRIK
1
2
3
INPUT
OUTPUT 1
NEUTRIK
OUTPUT 1
Mixer
Ins. Return
or
Converter
Input
OUTPUT 2
NEUTRIK
OUTPUT 2
Channel
Split
RackPack

The Bass Ranger is fitted with one XLR input and two XLR outputs for balanced operation.

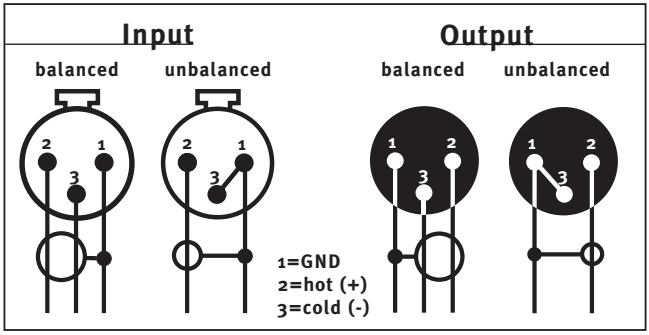
Pin-wiring of all XLR sockets:
Pin 1 = GND, Pin 2 = hot (+), Pin 3 = cold (-)

Discrete balancing stages for both in- and output provide high common mode rejection and are capable of driving long cables (depending on the capacity of the cables and the following input balancing stages).

The illustration shows the correct pin-wiring of the balanced XLR sockets if an unbalanced wiring is required.

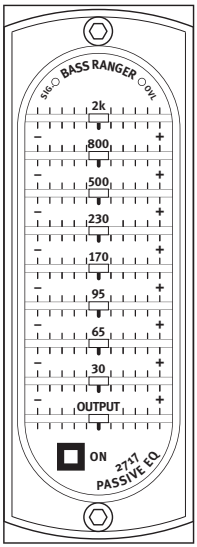
Lundahl I/O Transformers

The Input and Output 1 stages may be transformer-balanced if ordered (please refer to page 20 for detailed information). Otherwise, all inputs and outputs are balanced electronically. Output 2 cannot be fitted with a transformer. It is actively decoupled and allows for the input signal to be split into two output signals.



Channel Split

The channel split option through Output 2 always provides alternatives in processing or routing of the input channel. While one output may be used directly for mixing, the second output can be routed in any other way—for example to further RackPack modules, to other effect units etc.



ON

With the ON button you can turn the device on or off. The ON button is illuminated when the device is active.

Relay hard bypass circuits ensure signals to be directly switched from input to output in the case power failures – this “Power Fail Safety“ feature guarantees signal flow in any situation.

Signal LED

The SIG. LED indicates that an audio signal reaches the input with a level above -20 dB. This LED helps the operator especially in complex setups to determine immediately whether the Bass Ranger actually receives any signal.

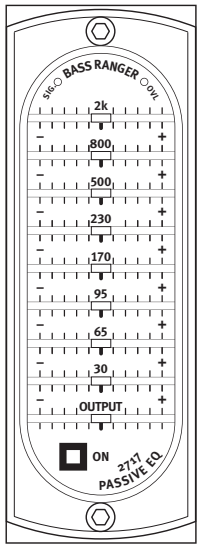
Overload LED

The OVL LED indicates a potential internal overload. It begins indicating approximately 3 dB ahead of any expected overload to leave headroom for peak levels.

Overloads must be avoided to exclude audible distortions. The gaining is still perfect in most cases when the OVL LED is illuminating shortly since there’s still a headroom of 3 dB for peak levels.

Permanent illumination of the OVL LED indicates overloads with possible audible distortions. Reduce the OUTPUT Gain control if the OVL LED illuminates permanently until the OVL LED goes out or flashes shortly.

OUTPUT



With the OUTPUT control you can readjust levels that were changed by previous EQ settings. For example, if you have by and large applied cut values to the signal, the overall output level can be lifted again to meet the input level's value.

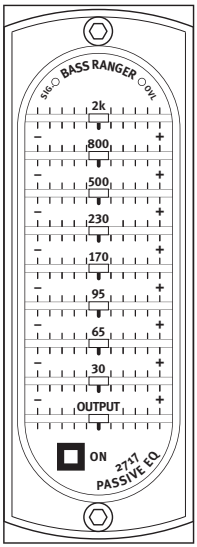
The same of course applies vice versa: simply lower the output to compensate for boosts that may result from your processing.

If source and receiving units do not display levels, rely on setting the output by ear. An A/B comparison can be made with the ON switch. Please note that differences in sound, resulting from EQ processing, should not influence your loudness judgement when setting the output level by ear.

Fader

The Bass Ranger module offers nine fader controls. The upper eight faders control the eight frequency bands, the lowest fader controls the output stage. All faders are manufactured by Bourns and show high-grade quality specifications. Their handling is featuring a perfect balance between smoothness and resistance.

All center positions are detended and all faders are illuminated to ensure safe operation also in dark environments.



The Eight EQ Bands

Each filter is designed as bell filter with individually optimized bandwidths and boost/cut values. Each filter is regulated by a fader control. The frequency range around the center frequency can be boosted (fader to the right into direction "+") or can be cut (fader to the left into direction "-") directly.

Here is a short list with examples for setting each band. This list is of course not complete or demands general validity—we just want to give some suggestions and orientation to start from.

Band 1: 2kHz Center Frequency
Boost: Improves attack; metal strings and slap becomes clearer

Band 2: 800 Hz Center Frequency
Boost: Accentuates the bass sound that can be localized, good alternative to more volume. Can intensify the material sound of an instrument (wood).

Band 3: 500 Hz Center Frequency
Boost: accentuates bass lines, in general clearer sounds
Cut: makes room for vocals

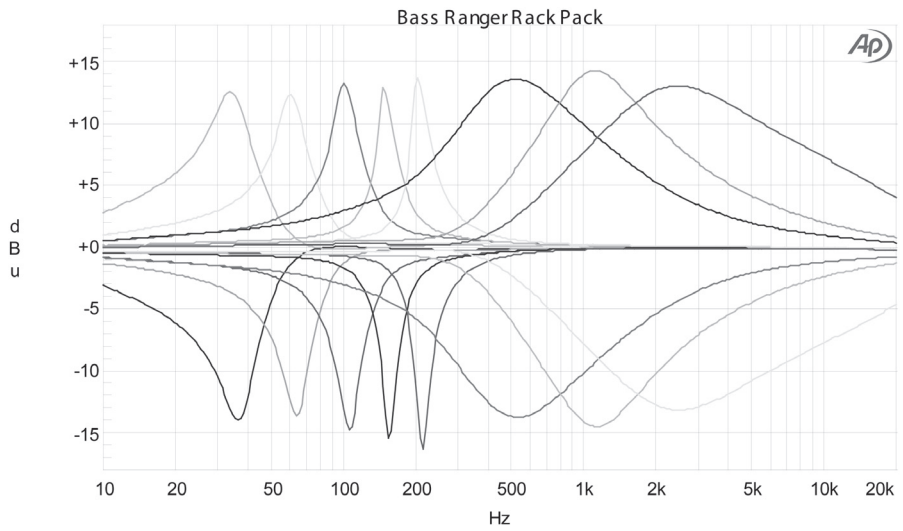
Band 4: 230 Hz Center Frequency
Boost: more warmth
Cut: reduces pulpy sounds

Band 5: 170 Hz Center Frequency
Boost & Cut: this is the area where a bass has its main impact. Boost produces harder bass sounds with all deep instruments.

Band 6: 95 Hz Center Frequency
Cut: makes room for the tonal area of a kick drum

Band 7: 65 Hz Center Frequency
Boost: fuller sound, more body
Cut: reduces boomy sounds of all instruments. Implicit emphasizing of overtones improves assertion of bass lines, reduction usually in favour of a kick drum, especially makes room for the deep bass punh of a kick drum.

Band 8: 30 Hz Center Frequency
Boost: fuller sounds for all deep sounding instruments, Cut reduces boominess and improves assertion.



The diagram shows the different filter characteristics. The lower bands have relatively narrow bandwidths for fundamental tones. The upper bands have broader bandwidths to process groups of overtones in common.

EQ Table

Instrument	Frequency	up to	+/-	Effect
All	0	35	-	cut sub harmonics
All	50		+	fuller sound deep instruments
All	50		-	reduces boomy sounds of d. instruments
All	100		+	harder bass deep instruments
All	150	250	+/-	warmth, reduces pulpy sound of d. instr.
All	500	1,7K	+	bass definition, phone sound, presence
All	1700	8K	+/-	sharp sounds, intelligibility, attacks
All	8000	20K	+	more air, transparency, brighter, hi-fi
All	12000	20K	-	red. noise/hiss, digital “S“ sounds
Bass	50	60	-	improves assertion, room for kick drum
Bass	60	80	+	fuller sounds
Bass	75	150	+/-	main impact of bass instruments
Bass	350	400	+	accentuates bass lines
Bass	500	800	+	more clarity
Bass	600	1,2K	+	bass tone/material sound (wood)
Bass	2000	3K	+	improves attack, metal strings, slap
Kick Drum	35	75	+	deep bass punch, supports kick drum
Kick Drum	60	80	+	more punch
Kick Drum	80	100	-	makes room for bass
Kick Drum	90	100	+	punch, assertion on small monitors
Kick Drum	250	400	-	reduces wooden and pulpy sounds
Kick Drum	300	500	+	accentuates, cripsy
Kick Drum	350	400	-	reduces cardboard sound
Kick Drum	2K	4K	+/-	emphasizes/reduces drumhead kick
Snare	140	260	+	snares sound fuller, rounder
Snare	200	400	+	more punch
Snare	300	500	-	softens snares
Snare	200	2K	+	resonance frequencies
Snare	3K		+	more attacks
Snare	5K	6K	+	emphasizes typical snare sounds
Snare	8K	12K	+	punch
Toms	80	120	+	emphasizes tone of floor toms
Toms	80	110	-	reduces sustain of floor toms
Toms	240	400	+	more belly
Toms	400		-	reduces hollow sounds
Toms	300	500	-	softer sounds
Toms	3K	6K	+	more attack for deep toms
Toms/Perk	7K		+	more attack
Cymbals	200		-	reduces gong sound
Cymbals	800	1K	-	reduces metal in a hi hat
Cymbals	6K	8K	+	more glitter on ride cymbals
Cymbals	10K	11K	-	reduces harshness

Vocals	0	150	-	avoids collision with bass and kick
Vocals	100	140	+	fills deep vocals
Vocals	180	300	-	slenderizes spoken voices
Vocals	200		-	reduces pulp in vocals
Vocals	200	350	+	belly of vocals
Vocals	200	400	-	clarity
Vocals	300	400	+	more warmth, full-bodied
Vocals	600		+/-	foundation
Vocals	1,8K	4K	+	presence; vocals up front
Vocals	3K	4K	+	lead vocals up front/more clarity
Vocals	3K	4K	-	more air in backings
Vocals	3K		-	masks wrong intonation
Vocals	4K	6K	+	singing voices: more intelligibility
Vocals	4K	6K	-	feedback-sensitive range (live)
Vocals	7K	11K	-	reduces sibilants
Vocals	8K	10K	+	brightens vocals; presence
Vocals	12K		+	more brilliance, air
Guitar	80	120	+	fuller basses with acoustic guitars
GTR/Keyb.	100		-	less booming sound, more clarity
Guitar	100	200	-	resonances (106Hz, 212Hz) of ac. guitars
Guitar	180	280	+	makes guitars fuller, more fat
GTR/Keyb.	250	500	-	less pulp
GTR/Keyb.	300	400	+	more warmth
Guitar	800	1K	-	reduces cheap sound of e-guitars
GTR/Keyb.	1,2K	2K	-	reduces dullness, metal; room for vocals
GTR/Keyb.	2K	3K	+/-	more/less aggressive; overexposure
Guitar	3K	5K	+	more attack for e- and ac. guitars
Guitar	3K		-	masks badly tuned guitars
Guitar	5K		+	brightens up e- and ac. guitars
Guitar	5K		-	softens thin guitars
Guitar	10K	12K	+	brightens up guitars
Piano	80	160	+	saturated depth
Piano	2,5K		+	(narrow band) boost: Honky Tonk sound
Piano	3K		+	more attack for lower tones
Piano	5K		+	more attack for normal tones
Piano	10K		+	brightens up
Piano/Bläs.	100	300	+	more warmth and belly
Brass	100	300	+	fuller sound
Brass	700	1,5K	-	reduces metal
Brass	4K	8k	+	places instruments up front
Brass	4K	8K	-	reduces sharpness
Strings	200	300	+	fuller strings
Strings	7K	11K	+/-	emphasizes/reduces brilliance

EQ Principles

First cut, then boost: The hearing system is more used to energy reductions in a frequency range, thus boosts attract more attention. That is, a 6 dB boost is perceived to be similar in amount to a 9 dB cut. Therefore when wishing to emphasize one frequency, it is typically better first to consider a reduction in others. The result will bring more transparency and clarity as well as reduce possible unwanted coloration of the signal.

Boost harmonics: Harmonic enhancement is one of the foremost techniques for increasing the clarity and definition of an instrument. Examples for bass instruments: 400 Hz—bass lines will be accented, 1500 Hz—more clarity and attack sounds.

Note that each instrument will have at least two frequencies where EQ can achieve a greater clarity or brilliance.

Cutting fundamental levels: Cutting fundamental frequencies provides for a perceived increase in harmonics and is therefore an effective alternative to boosting harmonic levels. This is a common practice in Rock/Pop productions that can be effective in all musical recording genre. An example for the bass: reduction at 40 Hz may limit boominess and increase presence.

Boosting fundamental levels: Inexperienced audio engineers will often first try to make corrections by boosting fundamentals, something which in fact should be the last thing one considers. Boosting fundamentals typically lowers clarity and produces a muddy sound. If two instruments are playing the same part and thereby produce the same fundamental, raising these levels will lead to a decrease in the sonic difference between them, (i.e., will make the two instruments sound more alike and lower their intelligibility in the mix). This is also true when two instruments play similar parts in the same key.

Exception: When an instrument sounds thin or small, boosting the fundamental can help. Or perhaps a microphone was poorly placed or the harmonics had been raised excessively through EQ. Finally, increasing fundamental levels can also play a constructive role when instruments play alone or as soloists with others in the background.

Bell Filters

A bell filter boosts or cuts a chosen frequency's energy with a maximum amplitude and a definable frequency range around this frequency with a fall off of up to 3 dB to both sides. The chosen frequency with the maximum amplitude is called center frequency—it takes place in the middle at the peak of the response curve. The response curve forms a bell, but bell filters are also often referred to as peak filters (also refer to page 13, "Diagram Of Filter Curves").

Passive Filters

The filters in a passive network employ no intrinsic amplification elements and therefore need no external power, which means in effect that they can really only cut the energy of a chosen frequency. In order to expand this capability to include boosting the energy of a bandwidth (that is, to be able to boost and cut frequencies), the overall filter input signal level is reduced. Based on this overall reduction and relative to the original input signal, one can achieve a further cut or boost in the form of a return to that original signal level. Thus a passive filter is always followed by an amplifier which is responsible to regain the initial energy reduction.

Advantages of Passive Filters

- Typically coil inductance in virtually all active filters is achieved through simulation. True passive coil filters, on the contrary, can only deliver the genuine, characteristic sound associated with inductive components.
- Inherent distortion elements of active filters are ruled out by passive filter design.
- For any number of reasons stemming from design and component advantages over active filters, passive filters achieve a very natural aural quality and through their harmonic treatment (THD, distortion, phase response, etc.), offering at the very least, a clear sonic alternative—in our ears often an extremely attractive one.
- All passive filter components (variable resistor, capacitor and coil) work in concert to produce this beautiful sonic result. An important part of this process is played by coil and condenser loading and saturation characteristics. The resulting difference in latency from characteristically extremely fast reaction of active filters provides for more pleasant, musical sonic qualities. We tend to perceive these attributes in terms of an increased suppleness and transparency, with perceptibly improved, silky highs and robust basses.

Specifications

Audio

Frequency Range:	10 Hz-30.000 Hz
CMR@ 1kHz:	-85 dBu @ 100 Hz, -80 dBu @1 kHz
THD @ 1kHz:	0,03% @ 0 dBu/0,01% @ +10 dBu
Noise, A-weighted:	-83 dBu
Dynamic Range:	› 107 dB
Fast Fourier Transformation (FFT):	› -85 dBu (@ 1 kHz)

Input

XLR connection, electronically balanced (optionally transformer-balanced)

Impedance:	balanced ›20kOhm/unbal. ›10kOhm
Max. Input Level:	+22 dBu

Outputs

Output 1: XLR connection, electronically balanced (optionally transformer-balanced)

Impedance (‹600 Ohm):	bal. ca. 150 Ohm/unbal. ca. 75 Ohm
Max. Output Level:	+22 dBu

Output 2: XLR connection, electronically balanced

Impedance (‹600 Ohm):	bal. ca. 150 Ohm/unbal. ca. 75 Ohm
Max. Output Level:	+22 dBu

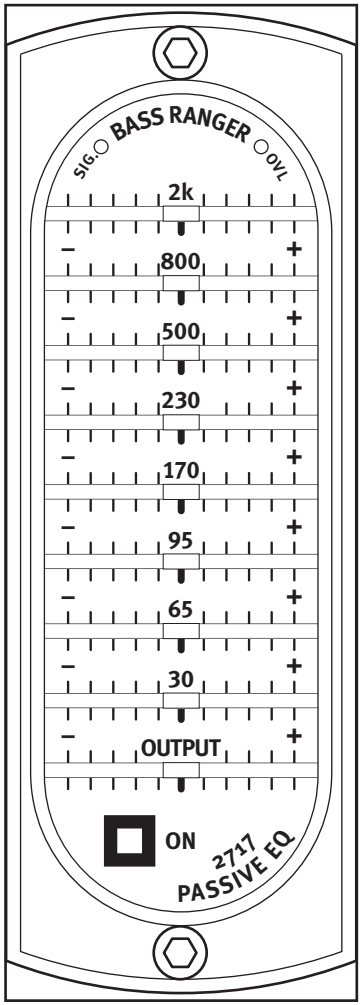
Control Elements

Signal LED (SIG.):	-20 dBu
Overload LED (OVL):	+21 dBu

Dimensions & Weight

Height x Width x Depth	132 x 46,9 x 315 mm ca. 5,2x1,85x12,4 in
Weight	0,45 kg/0,99 lbs
Weight w. Transformers	0,65 kg/1,43 lbs

0 dBu = 0,775 V. Specifications subject to change without notice.



Artist:

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Album:

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Title:

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Engineer:

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Track(s)/Group(s):

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Date:

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As an option, the DynaMaxx RackPack module can be fitted with input and output transformers from Lundahl. The transformer options can only be ordered by purchase, a later upgrade is not possible.

Information On Lundahl I/O Transformers

Transformers have a pleasant sound characteristic, especially the low end sounds rounder and more full-bodied. The top end benefits from a softer and silky atmosphere without being emphasized.

Further advantages are aspects of improved operational safety: galvanic insulation excludes the transmission of damaging currents. Electromagnetic, high frequency or digital interferences have no influence on the signal quality, hum potentials are cancelled out.

From our listening experience we can recommend Lundahl I/O transformers in any case, and their improved operational safety is an advantage that can not be overestimated in any critical or complex studio, broadcast or sound reinforcement installation.

Guarantee

All SPL products come with a two-year manufacturer's guarantee against defects in material or assembly from the date of factory delivery. Tubes have a guarantee period of 3 months.

End users are supported in the two-year guarantee through their distributor or dealer. In such cases, please contact your dealer for full guarantee conditions and service.

Direct SPL product support requires product registration. Please fill out the guarantee card enclosed in the package legibly in printed letters and send it directly to SPL. Or use the **online registration** form that may be reached at **www.soundperformancelab.com** (international clients) or **www.spl-usa.com** (US clients).