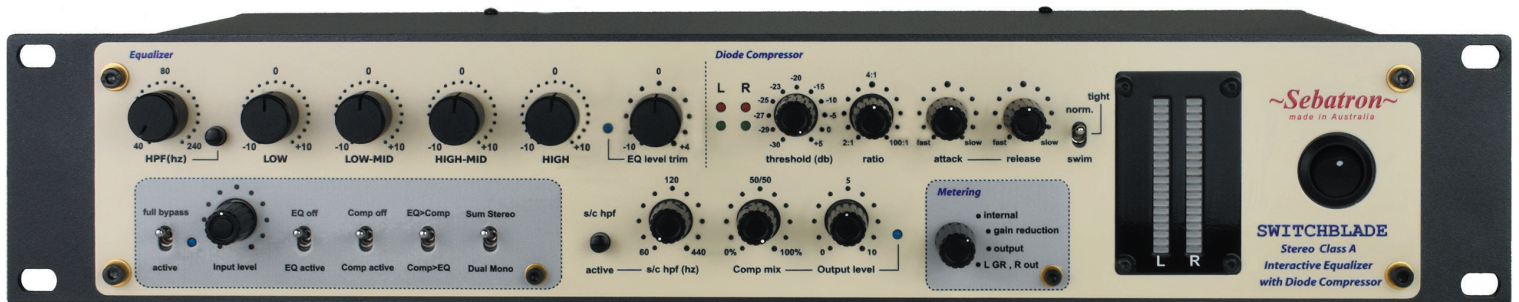


~Sebatron~

Innovative Australian Audio



SWITCHBLADE - operating manual

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SWITCHBLADE

STEREO EQUALIZER WITH DIODE COMPRESSOR



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1. Introduction

The Sebatron Switchblade is a high quality Stereo Class A solid-state Equalizer and Diode Compressor housed in a rugged 2U rack chassis, designed for tracking, mixing or mastering purposes.

The Switchblade audio signal path uses optimised discrete op amps with high voltage transistors as input/output buffering stages. Processing circuitry for the Equalizer and Compressor comprises of multiple transistor gain clusters which are fed by an internal high current 60 volt fully regulated power supply.

All circuitry is operated in single ended mode to provide maximum musicality with absolutely no cross-over distortion.

Components have been carefully selected to provide an accurately matched stereo signal path with little or no deviation between the channels.

In operation the Switchblade adds punch, depth and sparkle to any material fed into it when the appropriate adjustments are made. The Equalizer frequencies have been chosen to provide maximum sculpting ability with minimal phase error. The carefully configured analog circuitry enhances the signal while keeping the sonic integrity of the original material intact.

The combination of Equalizer and Compressor in one housing means that the two stages work as a unified tool that effectively process and polish the incoming signals.

Additionally, the ability to configure the Compressor side-chain before or after the Equalizer stage (EQ>Comp or Comp>EQ) increases the Switchblade's versatility in processing material without it ever sounding over processed or unnatural.

Other features such as the side-chain High Pass Filter and the means of mixing the dry signal with the compressed wet signal using the mix/dry control allow for quick and easy parallel compression without the low frequency pumping artifacts.

The Sebatron Switchblade is undeniably a versatile and valuable recording tool that will elevate your mixes to a new sonic level.

2. Features and Description

FOUR BAND EQUALIZER :

- Relay driven bypass*
- Variable High Pass Filter 40hz-240hz 6db per octave*
- Four Bands of Stereo Class A Solid State Equalization*
- HIGH shelf 8khz-16khz*
- HIGH-MID band 1khz-8khz*
- LOW-MID band 80hz-500hz*
- LOW shelf 40hz-120hz*
- Variable makeup gain/attenuation*

The Switchblade Stereo Equalizer consists of a variable high pass filter followed by a four broad EQ bands.

Two inner mid peak bands and two outer shelves.

When the EQ is switched to bypass the EQ section is completely switched out of the circuit by relay and has no effect on the colouration or shape of the signal. The equalizer circuit is completely class A using high voltage transistors arranged in discrete clusters for signal gain and current management. The circuit runs off a +60v main supply rail for maximum headroom, low noise floor and wide frequency response.

The EQ is activated by its toggle switch located on the first level of switches just right of the input level control. A blue LED near the EQ output trim control indicates when the EQ is active and in the audio path. The variable high pass filter is a smooth 6db per octave roll off that is engaged when the push button switch is depressed. This is located at the start of the EQ block to improve headroom and signal to noise ratio.

This is a handy feature to roll off low frequencies that have little or no relevance to the main signal like rumble or low subs. The frequency as to which the high pass filter begins to roll off is adjusted by the frequency control located at the start of the EQ section.

2. Features and Description

FOUR BAND EQUALIZER :

The variable high pass filter section is followed by the four main EQ bands. Each band has significant width to allow for wide musical boosts and cuts. Additionally, each band interacts with its neighbouring band to provide an increased adjustment factor for greater equalization control and can have a ‘tilting’ effect.

At the end of the EQ section is a variable make up gain control called EQ level trim. This level trim or gain makeup is completely transparent and sits at unity (0db gain) when set at approximately 12 noon or middle of the dial. This is used for matching the equalized signal to the bypass or unequalized signal so that easy A/B ing or comparisons can be made of the two by using the EQ in/out toggle switch located below the EQ section.

The EQ level trim control should also be used to ensure that the compressor section is not overloaded by excessive signal due to large amounts of EQ boost.

This is done by switching the metering to ‘internal’ and confirming that the signal does not go over full scale on the LED metering display. If the LEDs indicate full scale and distortion is apparent when the compressor is engaged then the EQ output level trim may need to be adjusted to get the signal in the right range.

If the signal is still too hot then further reduction of the level can be obtained by adjusting the main input level control located near the lower row of switches below the EQ.

2. Features and Description

DIODE COMPRESSOR :

- Relay driven bypass*
- Fully variable threshold, ratio, attack and release*
- Three switchable and overlapping attack/release ranges*
- Mix control from fully dry (0%) to fully wet (100%)*
- Side chain variable High Pass Filter from 60hz to 440hz*
- Switchable detection from pre EQ to post EQ*
- Switchable dual-mono or sum-stereo (buss) operation*
- Transparent compressor make up gain*

The Switchblade compressor section comprises of the side-chain peak detection circuitry consisting of threshold, ratio, attack and release controls and an audio path circuit where attenuation or compression of the audio signal is done by diodes.

The side-chain circuit features separate phono inputs and outputs on the back of the unit so that an external EQ can be patched in if required to assist in ducking or de-essing etc.

The side-chain inputs and outputs are unbalanced and wired into a TRS configuration with Ring being the send and Tip being the return. In normal compression practices these side-chain phono inputs are rarely used and best left untouched.

The side-chain circuit also features a variable high pass filter that can be switched in from the front panel so that low (sub) frequencies can be rolled off or eliminated. This is an effective means of preserving some bottom end punch if the lower register is predominantly triggering the compressor and causing it to over compress or pump in an undesirable fashion. Upon engaging this switch it may be necessary to re-adjust the threshold control to accommodate for the loss in intensity of the side-chain signal so that gain reduction remains consistent.

2. Features and Description

DIODE COMPRESSOR :

The detection point at which the compressor senses the dynamics of the incoming signal can be selected to be either before or after the equalizer section by use of the EQ>Comp/Comp>EQ toggle switch located below the four bands of the equalizer. This gives the choice of either compression first and then equalization or equalization first and then compression which in some settings can be either subtle or drastic depending on how much cut/boost is applied by the equalizer on the main audio path. Re-adjustment of the threshold control may need to take place when flicking between the two settings as the intensity of the signal before and after equalization may differ.

The Switchblade compressor section has two detection circuits (one for each channel) that can be selected to run either independently or bridged together. This is done by using the 'Sum Stereo' or 'Dual Mono' toggle switch located below the equalizer section. For the majority of applications we highly recommend the toggle to be set to 'Sum Stereo' as this provides the most accurate response from the compressor due to both channels being compressed equally and evenly. The 'Sum Stereo' setting is the default setting for mixes, sub-mixes (stems) and mastering applications where the 'glue' effect of the compressor is most apparent. For other recording situations (like tracking stereo sources - piano etc.) the switch may be better suited to the 'dual mono' setting as this maintains the fully independent nature of the left/right dynamics of the stereo (or two channel) signal.

The comp mix control adjusts the amount of comp signal to dry signal blend. Fully left is dry (0%) and fully right is wet (100%) or total compression with no dry signal mixed in. For normal operation this dial is best left in the fully wet position (turned extreme right) so compression adjustments can be clearly heard and then once compression is set then rotate the dial to the left to include some dry signal if desired.

The dry signal has been adjusted internally to be approximately 2db lower than the compressor signal to accommodate for the loss in amplitude when applying compression.

2. Features and Description

DIODE COMPRESSOR :

The comp output control controls the compressor level output after the mix control to make calibration of output levels easy when compared to the dry bypassed signal.

The attack/release controls adjust the timing envelope of the compression characteristics. These are spread out over three ranges that are selected by the three way toggle. Each setting has a multitude of uses and it is up to the user to find which setting suits the program material the best.

The compressor active/inactive leds (located to the left of the threshold control) indicate when compression takes place and precede the bar graph when it is switched to gain reduction. These LEDs illuminate when there is a control voltage present right at the start of the compression curve and at the lowest ratio will indicate the first 1db of compression before the main LED bargraph registers in gain reduction mode. This is done to facilitate fine tuning of low ratio compression for mastering purposes. As ratio is increased these LEDs will illuminate at the onset of compression or just after.

It must be noted that when the metering indicator selector is switched to gain reduction that half gain reduction will still be displayed on the LED bargraph even when the compressor is switched to bypass. This is to enable seamless A/B'ing when the compressor has long and/or short attack and release times dialed in.

When the unit is in full (or global) bypass, however, the gain reduction setting will display no gain reduction regardless of whether the compressor itself is in bypass or not.

2. Features and Description

METERING :

The Switchblade features a 20 segment LED bargraph display for each channel. There are four modes of display that the LED bargraph can be switched to.

INTERNAL : The first setting allows signal monitoring at the junction of Equalizer output and the compressor input. Ideally this should rarely get to full scale and over otherwise the compressor section may overload and there may be the likelihood of audible distortion.

GAIN REDUCTION : The second setting indicates how much gain reduction is taking place in the compressor with each LED representing approximately 1db.

*When the compressor is in bypass mode this will still show approximately half gain reduction if the threshold has been adjusted to compress. This facilitates easy switching between comp active and bypass states without the compressor becoming unbearably loud when a slow attack time is used. When the full bypass toggle switch is set to bypass on the bottom left however the LED readout when switched to gain reduction will show no gain reduction.

OUTPUT : The third setting indicates the main output level of the unit after the output level control. This is connected directly to the output of the unit and confirms that the signal is being processed and the unit is outputting the signal correctly and in the right range.

L GR, R OUTPUT : The fourth metering setting is a combination of gain reduction and output level. This is configured to display gain reduction of the left channel in the left channel LED bargraph and right output level on the right channel LED bargraph so that both gain reduction and output level can be viewed simultaneously for stereo signals.

3. Functions and Dials

i. Global Controls :

-Full Bypass Toggle Switch and LED

This switch selects between relay driven full bypass or active. In bypass mode the signal is directly routed from input to output without colouration. The blue LED to the right of the full bypass switch indicates that the Switchblade is active.

-Input Gain control

This is used as the initial level control going into the Switchblade unit. For normal operation this control is best left in the 12'o clock or noon position. This is used to level trim the incoming signal so that it sits in the right processing range. If the signal is too light then the level trim control can be dialed for more gain by turning to the right. If the signal is too hot then the level trim control can be used to pull back the signal so it sits in the right range by turning to the left.

The appropriate level range is determined by switching the metering selector switch to 'internal' and observing that the signal averages half to full scale on the LED readout.

-EQ in/out toggle switch

This switch activates the EQ circuit into the signal path. A blue LED located near the EQ level trim control indicates when the EQ is active.

-COMP in/out toggle switch

This switch activates the Diode Compressor into the signal path. A blue LED located near the comp output control indicates when the Compressor is active. When switched to bypass the compressor is still operating but not switched into the audio path so LEDs and the main LED readout will still register gain reduction. This is to facilitate easy switching between comp active and bypass without the compressor becoming overbearingly loud when a slow attack time is used.

3. Functions and Dials

i. Global Controls (cont.) :

-COMP>EQ, EQ>COMP toggle switch

This selects whether compression detection takes place after or before the equalizer stage. At minimal cuts or boosts the difference may be negligible but when generous amounts of EQ are used differences become significant and can alter the whole contour of a mix. Switching between the two may require re-adjustment of the threshold control as heavily equalized signals may have an increased amplitude which makes the compressor active at a different point.

-SUM STEREO/DUAL MONO toggle switch

This essentially selects whether the Switchblade operates as a stereo linked compressor where the sum of the detector voltages, both left and right, are used to drive the compression element or whether the two sides, left and right, run separately but are driven by the same set of dials. Depending on the width of the stereo mix this may or may not have an obvious effect.

For general operation we recommend leaving the Sum Stereo/Dual Mono toggle on Sum Stereo setting so that compression is exactly equal on both channels and is working from the top.

3. Functions and Dials

ii. Equalizer :

-Variable High Pass Filter frequency control

Allows fully variable adjustment of the frequency at which the high pass filter becomes effective. To the right of the high pass filter frequency control is a push button switch which selects whether the high pass filter is active or not.

-LOW SHELF - adjusts the level of the lower frequencies
(approximately 40hz to 80hz)

-LOW MID BAND - adjusts the level of the low-mid frequencies
(approximately 80hz to 500hz)

-HIGH MID BAND - adjusts the level of the high-mid frequencies
(approximately 1Khz to 8Khz)

-HIGH SHELF - adjusts the level of the high frequencies
(approximately 10Khz to 14Khz)

-EQ Output level trim

Adjusts the output level of EQ stage so that bypass and active levels can be easily compared and to prevent clipping of the compressor stage if the compressor is activated.

3. Functions and Dials

iii. Diode Compressor :

-Threshold control

Adjustment for when (or what signal level) compression takes place. When turned fully right the threshold is at least sensitivity and makes the compressor only deal with the louder/heavier aspects of the signal. As the threshold is turned from right to left it gets more sensitive and starts to react to lighter signals. The amount of gain reduction can be observed by switching the metering to 'gain reduction' and observing the activity on the compressor active/inactive LEDs. When these LEDs are flickering the compressor is lightly touching the heavier aspects of the signal and thus reducing these peaks by an amount that is set by the ratio control.

-Ratio control

Adjustment for how much compression from less than 2:1 to infinity. As this is increased more gain reduction will take place which needs to be compensated for by the comp output level control.

-Attack control

Adjustment for compression attack time or how long before compression takes place when over the threshold.

-Release control

Adjustment for how long compression is held for when over the threshold.

-Attack/Release factor toggle switch

Selects three different ranges or modes of attack and release times.

-Side-chain HPF

This control adjusts the frequency at which the sidechain high pass filter becomes effective. To the right of the side chain high pass filter frequency control is a push button switch which selects whether the side chain high pass filter is active or not.

-Comp mix control

Adjusts the ratio of compressed signal from fully dry to fully wet.

-Comp output control

Adjusts the final output level of the compressor.

3. Functions and Dials

iv. Metering :

The metering selector switch has four positions to provide a visual means of monitoring the Switchblade operation and signal flow.

In all modes one red LED segment equals approximately 1db.

-Internal - displays the internal signal level at the junction of the equalizer output and the input of the diode compressor.

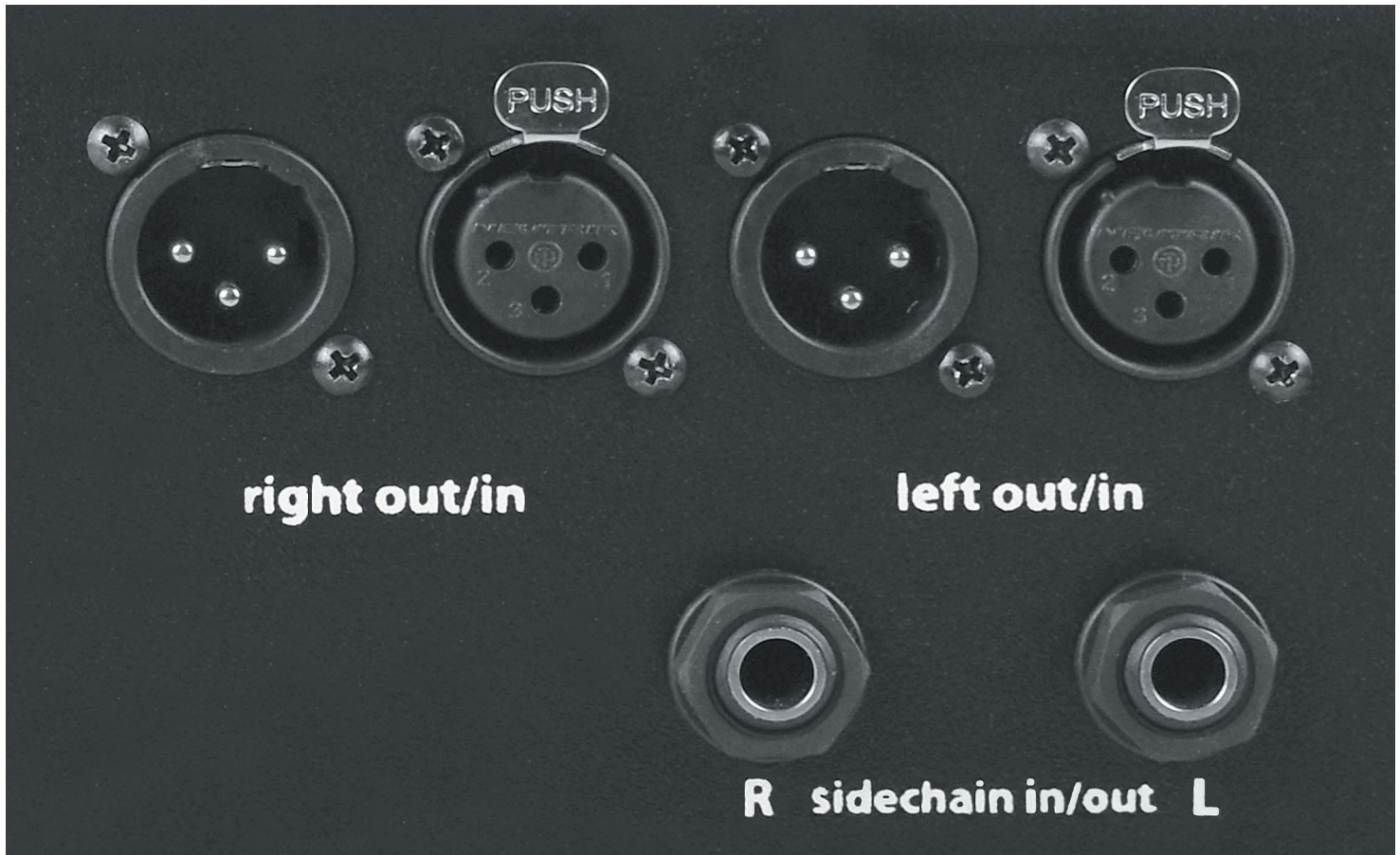
This is important to monitor as to prevent the compressor overloading and distorting from heavy signals.

-Gain Reduction - displays the amount of gain reduction of the compressor.

-Output - displays the main output of the Switchblade.

-L GR, R output - displays gain reduction of left channel and output level of right channel simultaneously.

4. Inputs and Outputs



-Main audio inputs and outputs

The Switchblade features fully balanced XLR inputs and outputs so that interfacing with external audio equipment is straightforward.

The XLR pin configuration is :

pin 1 - earth, **pin 2** hot or +, **pin 3** cold or -.

-Side-chain inputs/outputs *(these are not main outputs)*

To facilitate de-essing applications the Switchblade is equipped with TRS phono sockets on the back so that an external EQ can be inserted in the side-chain signal path. These phono sockets wired are in a TRS configuration where the ring is the send and the tip is the return much like an insert. The side chain inputs can also enable the possibility of using an external sound source as the side chain source to assist with ducking applications.

In normal compression useage however, these side chain inputs and outputs are best left untouched with nothing plugged in.

4. Inputs and Outputs

IEC Mains Power Input



Voltage Selector Switch

The Sebatron Switchblade can be switched between different global mains voltages via the Voltage Selector Switch on the back of the unit.

This switch is usually set in the factory for the appropriate voltage that the unit is destined for, however, in cases of resale etc. it is always recommended to check this switch before initial power up.

If the Voltage Selector Switch is set to the wrong position the fuse should blow before any damage occurs. This situation would occur when the switch is set to 115VAC but the input voltage is 230VAC.

Fuse rating is 0.8 amp @ 240/250 volts (or 1.6 amp @ 110/120 volts).

5. Example of Operation

1. Power up the Switchblade unit with all toggle switches on the bottom left row including bypass switched to inactive/bypass or up. Set the input level control to midway or 12 o'clock. This is the default position for the input level control. Set EQ bands to flat and set HPF of the EQ and side-chain to inactive. Dial compressor threshold to fully right, ratio to 4:1 and attack release to noon positions with the toggle set to normal.
2. Input a stereo signal to the Switchblade unit via the XLR inputs on the back and adjust its level externally so that the LED bargraph is reading comfortably half to three quarters lit on average program material when switched to 'internal' on the metering selector.
3. Confirm bypass and active levels are of similar amplitude by flicking the bypass/active toggle on the far left. Adjust input level control as a trim to get both these levels equal if they are not.
4. Flick the EQ toggle switch to active (down) and proceed to equalize the program material to taste using the four broad bands of the equalizer section. Check the equalized level against the bypass level by flicking the EQ active/inactive toggle switch and if they are drastically different then adjust the EQ output level trim to get these two levels matched.
5. Activate compressor by flicking Comp off/Comp active toggle switch to active or down. Gently turn threshold control from fully right to left slowly to find the right spot as to which compression is desired to take place. Adjust ratio, attack and release settings to taste. Adjust Comp mix and Comp level controls to taste and to maintain seamless switching output levels when switching between comp active and bypass and full bypass. Switch metering selector to 'internal' to visually monitor signals and confirm levels are not full scale so as to cause the compressor to distort.

6. Specifications

Maximum input level : +28 dBu

Maximum output level : +30 dBu

Optimum operating level : +4 dBu

Frequency response : 10hz-90 khz +/- 3db

Signal to Noise ratio : 120 db

EQ bands :

-HIGH shelf 8khz-16khz

-HIGH-MID band 1khz-8khz

-LOW-MID band 80hz-500hz

-LOW shelf 40hz-120hz

Compressor min attack time : 4 ms (tight)

Compressor max attack time : 800 ms (swim)

Compressor min release time : 20 ms (tight)

Compressor max release time : 1 sec (swim)

Input impedance : 1k

Output impedance : 600 ohm

Power consumption : Less than 40 watts

Chassis : 2 Unit 19" rack mount (482mm x 88mm x 190mm)

Weight : Approx 5 kg

Power requirements : selectable 230V/115V, IEC power input for global useage

Topology : Discrete Class A circuitry using high voltage silicon transistors running off a +60V rail

Intergrated circuits used for indication

7. Precautions

- Do not operate unit in moist or wet environments
- To prevent overheating unit must have adequate air flow
- Avoid moisture and excessive heat
- Do not remove lid when mains power cord is connected
- Always replace with same type of rated or recommended fuse
- Operating temperature range : 0C to +50C approx
- To prevent the risk of electric shock, do not operate with lid removed
- Do not expose to dripping or splashing and do not place objects filled with liquids, such as vases, on top of the unit
- For proper safety, the unit must be connected to a mains socket outlet with a protective earthing connection
- Unit is live even when switched off. Indicator lamp beside the on switch does not mean the apparatus is disconnected from the mains
- To disconnect completely from the mains supply cable needs to be removed from the apparatus
- The mains power disconnect device for apparatus is the appliance coupler on the rear of the apparatus and shall remain readily operable
- No user servicable parts inside. Refer service to qualified professional
- Refer to manual illustration for input and outputs connect

Service/Repair queries:
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