



Black Knight 5 Band Eq

Rack Extension for Reason
Instruction Manual



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THANK YOU

Thank you very much for expressing your confidence in our products by purchasing one of our equalizers, Black Knight. This 2-channel high-quality equalizer was designed with our experience of both filtering capabilities in the digital realm as well as the crafting of audio for all types of users; producers, engineers and artists alike.

We hope you continue to enjoy using Black Knight in your projects for now and for future.

Lab:One Recordings © 2013

ACKNOWLEDGEMENTS

Thanks to the Black Knight betatesters for helping with this product;

Timo "Shokstar" Schönbeck Dipl.Audio-Engineer" – bug hunter, head tester & preset designer

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Shawn "Fretless Fingers" Washington – promotional video producer

...Plus many more (you know who you are, and thanks for participating)

Propellerhead Software (for Reason, the SDK and the concept of the Re)

Presets by users can be found within the Black Knight RE folder.

DEDICATIONS & ACCOLADES

To my wife Alicia who after waiting for me to code this up is now a happy bunny (again) :D

This Re is dedicated to all the Propellerhead Reason users & forum threaders, friends, & colleagues we have spoken to over the years.

Dj Fresha: Thanks goes out to my studio buddies; DOS aka ORCO, PUGGY, Dj EQ, for the support & feedback, SHOKSTAR & NAVI RETLAV STUDIO for your hard work, shouts go out to all who know me, including FLAVAUNIT crew, REBIRTH massive & SUBTRONIK crew, and not forgetting Simon @ MASSIVE SOUND STUDIOS for the support, and of course the Propellerheads, and the Reason Users & Community

Now let's get using the Black Knight....

Introduction

The Black Knight 5 Band EQ is a dedicated rack unit, built as a Rack Extension for the Propellerhead Reason environment. This device has a maximum of what would be 2U space in the real world. Being a Rack Extension (Re), this gives you various options of versatility within your projects.

The Black Knight features 5 frequency bands; each band has its own dedicated frequency, resonance and gain control, band-activation button and band-mode button. Additionally, Black Knight includes a feed in trim control (to raise input to Black Knight), a Gain Out trim control (to level the final output of Black Knight) and a Saturation trim control, to add some warm to hard harmonics either Pre-Eq or Post-Eq to your signal.

The Black Knight also has 3 modes available, allowing you to choose between Parametric (for surgical work or smooth filtering), Graphic 1 (ISO band frequency settings for the frequency controls), or Graphic 2 (musically selected frequency settings for the frequency controls).

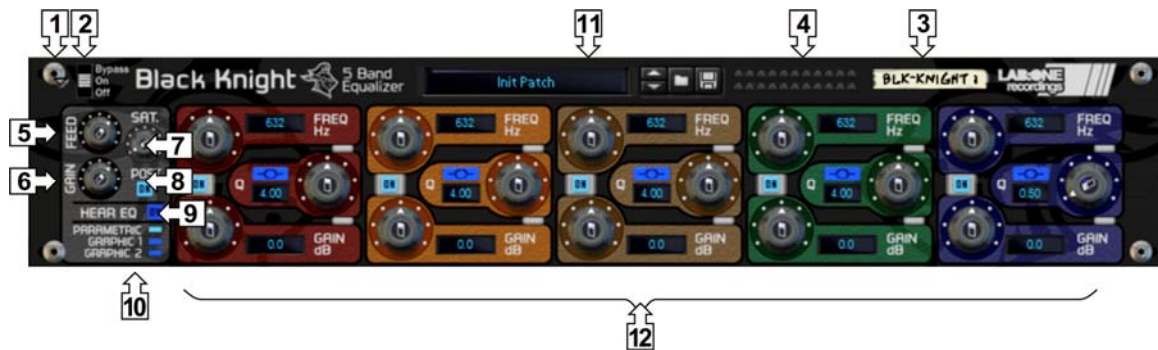
The Black Knight features two audio inputs and two audio outputs, which are split-stereo channels (the left and right signals are not mixed within Black Knight).

Additionally, Black Knight incorporates a stereo peak meter (running from -30dB to 0dB, 3dB per LED), and a patch browser, allowing you to load up your favourite presets, or save your newly created eq curves.

The Black Knight is designed to be a transparent effect, meaning that if no adjustments are made on the device, the audio passing through the effect is 'clean' and has not been affected by the equalisation filters or the saturation control. This is the ideal, so that no coloration is applied to the sound.

A tour of Black Knight

Black Knight is based on most hardware 5 Band equalizer units.



The Front Panel

- [1] FOLD-UNFOLD – To allow the RE to be maximized or minimized
- [2] BYPASS SWITCH – To determine signal flow (BYPASS effect, effect ON, or effect OFF)
- [3] TAPE STRIP – Used to identify the RE. Double click to edit
- [4] PEAK METERS – to indicate the level of output from Black Knight (disabled when bypassed)
- [5] FEED TRIM – Used to increase or decrease input signals
- [6] GAIN TRIM – Used to increase of decrease output signals
- [7] SATURATION TRIM – Used to add additional harmonics to your signals
- [8] SATURATION PRE/POST EQ BUTTON – Used to determine if you want to saturate your input before equalization, or after equalisation
- [9] HEAR EQ – to hear what is being added or removed from the signal
- [10] EQ MODE selector – to change the mode of Black Knight between parametric, graphic 1 and graphic 2 modes
- [11] PATCH NAME AND BROWSER – for loading and saving presets
- [12] EQ SECTION – each of the 5 bands have a frequency control, a resonance control, a gain control, a band-activation control and a 2-stage band type button



The Back Panel

- [1] FOLD-UNFOLD - To allow the RE to be maximized or minimized
- [3] TAPE STRIP - Used to identify the RE. Double click to edit
- [13] CV INPUT SOCKETS AND TRIMS - Used to accept control voltage signals from other devices
- [14] AUDIO INPUT SOCKETS - Standard Left/Right audio input sockets
- [15] AUDIO OUTPUT SOCKETS - Standard Left/Right audio output sockets, plus additional Mid signal audio output sockets, and Side signal output sockets
- [16] SATURATION CV AND TRIM – Used to connect control voltage signals from other devices, to externally control the saturation amount

How to connect audio

To connect the Black Knight you can use Reason's own auto-connection system, and the Black Knight will decide the best way to auto-wire; if you have a mono-output device (Subtractor, for example), and you wish to add a Black Knight to it, the Black Knight will auto-connect the Subtractor output to the Left input, and then continue to route the Left output of the Black Knight to the Left input of the mix-channel (or next device in your processing chain).

You can do any of the following to create the Black Knight;

- a) right-click (Win) / CTRL-click (Mac) on the device, select 'Create Device', choose sub-menu 'Studio Effects', and select 'Black Knight 10 Band 3 Mode EQ' from the listing.
- b) with the device selected, use the 'Create', select 'Create Device', choose sub-menu 'Studio Effects' and select 'Black Knight 10 Band 3 Mode EQ' from the listing
- c) using the Tool Palette in Reason (F8), select 'Studio Effects' when in the 'Devices' tab, and locate the 'Black Knight 10 Band 3 Mode EQ' device, click on the icon and drag it to the device you wish to add it to.

Working with Black Knight

So now you know the controls, how to connect Black Knight into your signal chain and the available options for your equalizing tasks; now you want to put your new RE into action. Depending on the task you want to do will determine the approach of what you need to do to set up Black Knight. The following walkthroughs will show you how Black Knight can be used.

First thing is to decide how you want to use Black Knight – are you wanting to colour the final mixdown, or correct an audio signal, or use Black Knight as a creative tool?

For colouration ('character' sound control), we advise using either of the Graphic equalizer modes, as this would use specific frequency settings, with freedom to adjust the resonance gain freely.

For corrective & surgical tasks, we advise using the Parametric equalizer mode, as this allows you to freely set the frequency and resonance controls as well as the gain control.

For creative use, we advise using Parametric mode and use the CV connections for even more modulations and automations

How to use the master controls – an objective approach:

Ideally you can use the master controls to aid with setting the initial input, checking the signals pre- and post-filters and EQ, and setting the final make-up level. The way we would advise to do this is as follows:

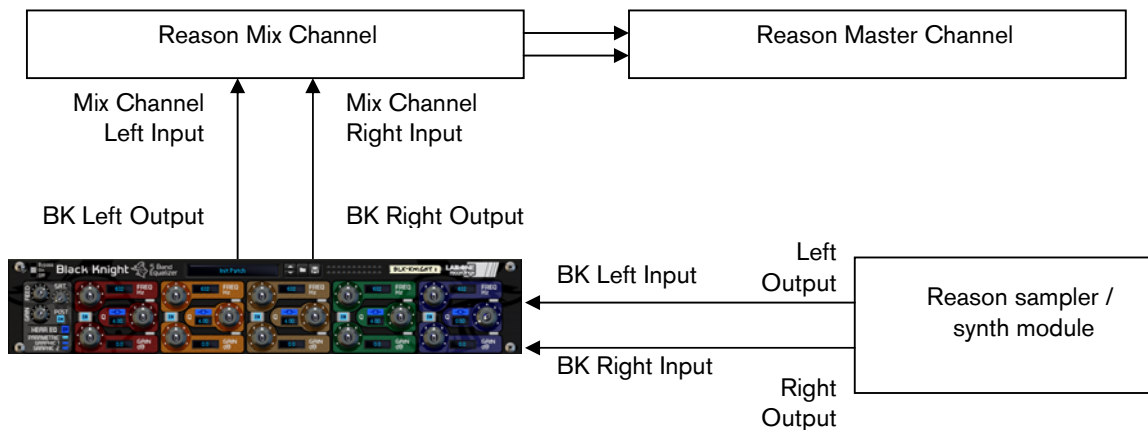
- 1) set your level using the FEED control, so you are getting around the first YELLOW LED (around -9dB if your signal is at unity level)
- 2) Equalize / filter your audio,
- 3) Use the SATURATION GAIN and PRE-/POST-EQ Saturation path (optional)
- 4) Use the GAIN output control to raise / lower the final equalized signal so the final meter level matches closely to the pre-Black Knight affected signal.

The note with regards to biased equalization settings comes from an old yet well known observation that louder signals seem coherently 'better', but the listener is not 100% sure why. Black Knight aids with your decisions objectively, so you get the best possible sound you can without compromising of your productions.

Possible scenarios integrating Black Knight

Black Knight is designed to be a flexible device, allowing it to be used however you see best fit. Only typical applications will be listed in this manual. You are however free to choose your own setup.

A) Using the Black Knight as an insert (mix channel setup).



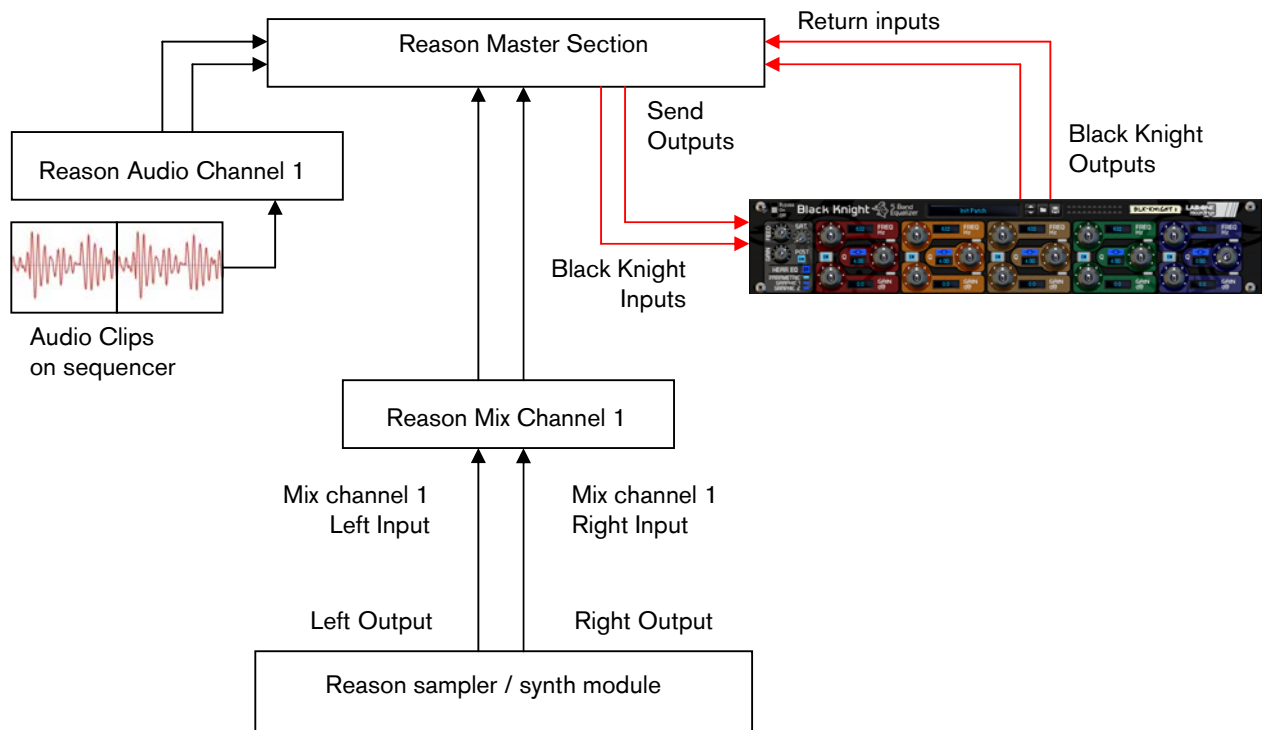
In setup (A), this would use the Black Knight as an insert effect (works within the signal chain directly, and only this signal chain). This means that whatever control you adjust on the Black Knight, it will affect the total sound coming out of the sampler / synth module.

NOTE: If the Black Knight is in bypass mode or has the 'INIT PATCH' preset loaded, the audio playing would sound 'clean' and unaffected.

To affect the sound, begin with adjusting the FEED gain if you have a low signal (or alternatively, raise the signal on the sampler / synth module). Adjust the filter knobs, band types, resonance (Q) controls and gains to taste (not compulsory).

To help you, refer to Appendix 1: Frequency Band 'character' descriptions. To finalise the adjustments, use the gain dial to return the audio back to the same level pre-equalization. What this allows you to do is to be more subjective with your EQ'ing decisions, to see if improvements have occurred. If you leave the level higher after equalization, the natural 'boost' in level gives a false pretence to the ear, making you believe it is better sounding (purely because of being at a slightly higher level). Remember to equalize carefully, so not to make wrong decisions too quickly (the 'louder is not always better' principle)

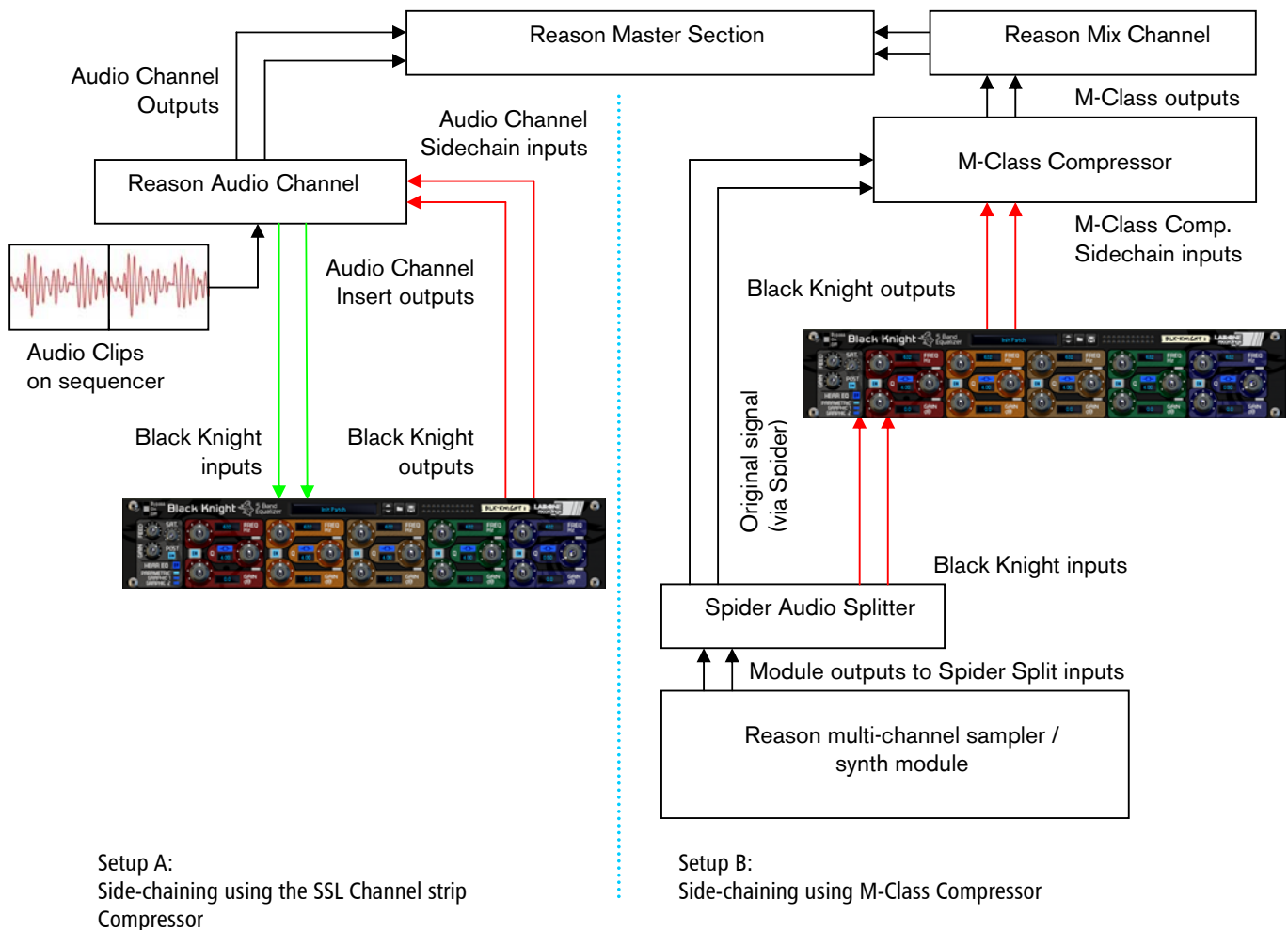
B) Using the Black Knight as a send effect (mix / audio channel setup).



In setup (B), this would use Black Knight as a send effect (works in parallel, and as a global device). This means that whatever control you adjust on Black Knight, it will affect the sound coming from the Master Section at a set amount, determined by the Send Effect dial on that specific Mix / Audio channel. This means you can have a clean sound mixed with an altered equalized sound. This is known as Parallel Processing, and may be desired in some cases.

Again you can adjust Black Knight as mentioned in setup (A) above, with the addition of the SEND dial located on the Main Mixer in Reason. Full left setting of the SEND dial has no effect on the sound, while full right setting of the SEND dial will send a maximum level possible to Black Knight. This means you can have one Black Knight as a send device for all your audio channels. However, latency may have a side effect of cancellation of audio (aka phasing), due to the processing time needed to perform the filtering of the Black Knight, when used as a Send effect. Black Knight has been designed so that latency is as close to zero latency as possible.

C) Using Black Knight as an insert to a side-chain (mix / audio channel setup)



Above you will see two alternative setups using Black Knight as part of a side-chain effect signal path. The method on the left utilises the Audio Channel insert sockets, to send signal from the Audio clips on the sequencer through the SSL desk channel strip. The insert sockets send the original signal to Black Knight, which then can alter the signal by using the band controls and master controls to 'exaggerate' the signal more. Reason for doing this may be to use Black Knight to help with sibilance and plosive sounds which can be found in vocal recordings. From Black Knight the outputs are then fed into the channel strips own side-chain sockets, and the 'KEY' button will become active on the SSL desk, indicating that the side-chain functionality of the compressor found on the SSL desk is in operation.

Method 2 on the right shows a similar setup, but using a Spider Audio Splitter unit to divide the original signal / sound source into two parallel pairs of signals, one set is sent to the M-Class Compressor unit audio inputs, while the second pair from the Spider is sent to the audio inputs of Black Knight, and the outputs of Black Knight are connected to the side-chain input of the M-Class Compressor. This frees the side-chain of the SSL compressor, so another sound source could be used to control the main SSL dynamics for that channel strip.

Experiment with setups to your own way of working, use these as a guide, but not necessarily as the be-all-and-end-all approach.

Alternative setups

For devices which have multiple outputs (ie NN-XT, Redrum, Thor, Spider Audio), then if required additional Black Knight's could be added as either mono-devices (only connecting left audio input & output sockets), or as stereo devices. This in turn allows you to edit specific sounds within a preset if you so wish (ie split zone instrument patches may have a bass guitar for one half of the keymap, while a synth lead is using the other half, and you wish to effect the sounds independently). See the next page for more examples of setups.

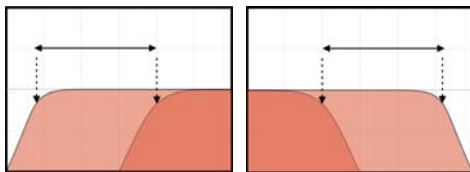
Another possible option would be to use one instance of Black Knight, and have 2 mono devices linked into it, and process both inputs in parallel, and output the two signals to two separate mixer channels. This may be desired to help use the same eqing settings on two mono devices at the same time.

Some extra notes on Band Types

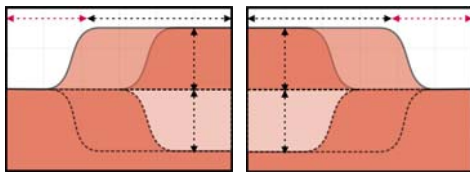
Black knight is equipped with 5 bands which can have their type changes between two different filtering curves. The bands are all based on 12dB/Octave filters. These selectable modes are:

- Band 1: EQ or HP
- Band 2: EQ or LS
- Band 3: EQ or BP
- Band 4: EQ or HS
- Band 5: EQ or LP

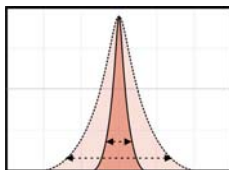
This opens up more possibilities of filter curves, where simply selecting the different types can drastically affect your sound or how you want to filter your audio.



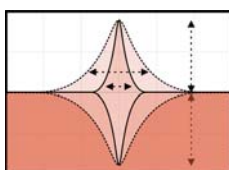
High Pass / Low Pass filters do exactly as they say – they let signals pass that are higher or lower than the frequency centre (at the cost of a filter slope).



High Shelf / Low Shelf can be thought of your 'treble' and 'bass' controls on a car stereo or your home TV or stereo system – they raise or lower the specific range leaving the rest of the audio intact



Band Pass only allows signals through a set range of frequencies, controlled by the resonance (known as bandwidth when using Band Pass filtering)



EQ mode is a peaking or notching filtering type, dependent on the gain control to determine the amount of the effect applied.

HEAR EQ and how it works

Black Knight has the option to listen to the affect of the EQ itself, via the HEAR EQ button, without the original content. This can be beneficial to help identify if certain instruments or sounds should be brought forward or sent to the back of the mix, in any of the signal path modes, making the sounds clearer out of context

- When you turn HEAR EQ on with all faders set to zero, you should hear no signal at all. This is because the EQ is having no effect on the final audio
- If you raise any of the gains above the zero line, you will hear portions of audio based on that specific frequency centre; this will indicate what you are ADDING to the final signal.
- If you lower any gains below the zero line, you will hear portions of audio based again on that specific frequency centre, with the difference that this will be the audio REMOVED from the final signal. NOTE: this will invert audio frequencies whilst in HEAR EQ mode, so even though it sounds alike the original, the phase relationship with the original is an inversion. Also be aware that lowering the gain also sounds quieter than raising the gain, even though the signals sound similar when HEAR EQ is on. This is purely down to the decibel rating. To get an even balance between these two, a 'boosting' gain half the value of a 'cutting' gain will sound more even ie:

6dB Gain while HEAR EQ is active = -12dB Gain while HEAR EQ is active.

This function can be very convenient to tell what you are adding or removing, giving you more insight to what the equalisation is doing to your final signal – raising the gain informs you of what signals are being added to the final signal, while lowering the gain informs you of what you will be taking away from the final signal. Depending on which mode you select also depends on what you may hear. For example with stereo modes, you will here both left and right channels in sync, in left/right modes you have independent controls so left may be louder than right etc, in mid/side modes the signal you hear depends on what amount of mid information and what amount of side information exists in the original content (if no side signal then you won't hear anything when you raise / lower the controls, and if one channel is phase inverted you may not hear any mid information due to signal cancellations)

HEAR EQ can also be used creatively if you so desire, especially useful for sound design

The different modes: Parametric, Graphic 1 and Graphic 2

PARAMETRIC MODE

In Parametric mode, Black Knight frequency and resonance controls are free from any step restriction and work within a set range for each, giving you opportunity to use Black Knight as a corrective tool.

Each of the band frequency cover the audible hearing range between 20Hz to 20kHz, found on most parametric hardware units and software plugins & DAWs.

GRAPHIC 1 & GRAPHIC 2 MODES

In Graphic modes, Black Knight frequency and resonance controls are step-selectable, giving you some freedom to choose your required setting, and is primarily used more as a final 'colourising' of your audio, be it on an individual sound or your final mix.

Each of the band frequency controls have 7 selectable frequencies, and are based on the ISO band frequencies (Graphic 1) and carefully selected 'musical' sounding frequencies (Graphic 2).

The frequencies are:

Graphic 1:

BAND 1: 20Hz / 25Hz / 31Hz / 40Hz / 50Hz / 63Hz / 80Hz
BAND 2: 80Hz / 100Hz / 125Hz / 160Hz / 200Hz / 250Hz / 315Hz
BAND 3: 315Hz / 400Hz / 500Hz / 630Hz / 800Hz / 1kHz / 1.25kHz
BAND 4: 1.25kHz / 1.6kHz / 2kHz / 2.5kHz / 3.15kHz / 4kHz / 5kHz
BAND 5: 5kHz / 6.3kHz / 8kHz / 10kHz / 12.5kHz / 16kHz / 20kHz

Graphic 2:

BAND 1: 30Hz / 40Hz / 50Hz / 100Hz / 200Hz / 300Hz / 400Hz
BAND 2: 75Hz / 150Hz / 180Hz / 240Hz / 500Hz / 700Hz / 1kHz
BAND 3: 350Hz / 500Hz / 1kHz / 1.5kHz / 2.5kHz / 3kHz / 4kHz
BAND 4: 800Hz / 1.5kHz / 3kHz / 5kHz / 8kHz / 10kHz / 12kHz
BAND 5: 2.5kHz / 5kHz / 7kHz / 10kHz / 12kHz / 15kHz / 20kHz

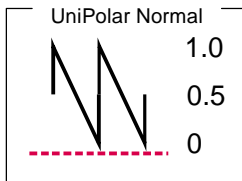
As you can see some of the frequencies overlap; allowing for more flexibility than a common graphic equalizer.

In all modes, the band resonance controls have a range from 0.5 (2^{1/2} octave range) to 32 (1/22nd octave range) from very wide to needle-tight settings. This gives you total control over the recognised range of audio signals for human-hearing (20Hz – 20kHz). Also, the gain controls allow you to raise or lower the effect of the filter on the signals.

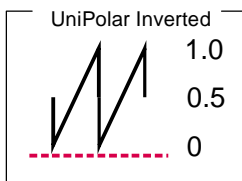
CV inputs and controls

Black Knight has 3 CV inputs & trim knobs (to scale CV input signals) for each band of controls, plus an additional Saturation CV input and trim control. Each of the CV sockets connect to its relevant counterpart on the front of Black Knight, giving more creative use of the equalizer where the user sees best fit (labelled above each control)

To use the CV inputs, simply connect a CV output from another device. Default settings for CV trim knobs are at maximum, so be aware of possible loud signals (especially if using Z-plane mod CV control and have the SCALE setting at +/-200%, and gains set to +/-18dB)



From the example on the left, we can see two CV versions, Unipolar normal and Unipolar Inverted.



NOTE. CV signal patching will remain only within Mixer / Audio Channel effect chains, or within a Combinator, and of course your template rack setups. Black Knight will not save CV input chains, but will keep CV trim scale settings within the presets.

How to save and load presets

Black Knight comes with a collection of basic presets as a 'starting' point. Depending on your application may depend on how you wish to use the Black Knight. Listed within the presets are some general application setups which may help guide you to the type of sound you want, and you may adjust them to suit accordingly.

As default, every time you create a Black Knight, either the default preset or the 'INIT PATCH' preset will load, initializing all the settings ready for you to use from scratch, 'fresh-out-of-the-box'. To browse the bundled presets, simply use the browser up & down buttons to activate the next preset in the listing, or alternatively you can click and hold on to the preset name to show a popup windows, for faster browsing and preset selection.

To save your own presets, simply click the 'save' button located next to the preset name display, and select where to save the preset (ideally create a new folder and keep it as a favourite in the Reason browser window, for easier finding and retrieval at a later date). The presets are saved as a .repatch name, and can only be used with that specific Rack Extension.

To load alternative presets, click the 'browse patch' button to locate presets (which are not part of the bundled pack within Black Knight). To preview the patch, simply play the sequencer with Black Knight setup so it is in use, and select the 'load patch' button, and select within the browser the specific preset. Black Knight will update whilst you are previewing, so you can hear the effect before finally committing to the chosen patch. If you cancel browsing Black Knight will reset back to its prior state before patch browsing.

How to 'latch' your own MIDI via Remote Overriding

Reason allows the user to re-define certain controls via MIDI devices by using the Remote Override configuration. This means that a control on Black Knight can be mapped by any MIDI controller you have connected to your DAW. Black Knight has a comprehensive list of available controls for Remote Control already, but not all controls have this 'out of the box' functionality (due to the heavy load of controls already within).

You can only map one specific control to any of the available Remote 'receiving' controls on the Rack Extension – if you use a specific control and want to re-map it afterwards, you will lose the original Override. Also, custom-set Remote Override controls are only saved within each independent Reason song file. Ideally, if you use a dedicated piece of MIDI equipment for Black Knight, a template start-up file would be a better option, so that the Remote Override template is pre-defined on each new song/project.

All of the controls on Black Knight are Remote Override-able. To access the override editor, select from the 'Options' Menu 'Edit Remote Overrides'. The Rack will now display the specific device selected, with either pre-defined Remote control indicators (the Remote symbol), yellow Lightning bolts (over-ridden Remote controls pre-defined) or blue arrows (unassigned Remote controls)

You can right-click one of the controls and select 'Edit Remote override'. This will open a new popup window, with some available options, and to show you which MIDI controller is currently set to that specific Remote Override. This may be a better option to edit, and make use of the CHANNEL setting so you can define your own controls if you so desire.

By moving one of the controls on your MIDI device (already pre-defined in Reason), you should then see MIDI activity indicator display that a MIDI message was received. Note also the control surface and the control itself on the MIDI device that was adjusted relays to the new Remote Override.

Once you are happy with the control being set, you can click 'OK' to continue with the new setting, or 'CANCEL' to abort the mapping. Also note that if you accept this mapping, the control (if already linked to another) will be fixed to the new mapping. Any previously set mappings will be 'moved' to the new mapped control. This should be used with care if you already have pre-defined Remote Override mappings.

This Remote Overriding method can be handy if you don't know how to set up your own MIDI controller to the dedicated MIDI controls mentioned in the previous chapter. For speed, you can simply double click a blue arrow, and the arrow will turn into a spinning yellow Lightning bolt, indicating that Reason is awaiting a MIDI signal to that control. You can then adjust a MIDI control on your MIDI device, and the control will map automatically without the need to use the popup previously mentioned. Double-click each specific control you want to map to save time and to use the mapping in a faster method.

All Remote Overrides can then be used to record automation within Reason, which can be fine tuned using the Sequencer and the clips (see the Reason Operating Manual for more information on how to edit & record automation)

Remote templates (which are currently in use by supported manufacturers) are currently not available for Black Knight, but may be implemented and available in the near future

MIDI Implementation table

Below is a listing of all MIDI Control Change (CC) numbers, which can be applied to your choice of device.

MIDI CC	Control	MIDI CC	Control	MIDI CC	Control
04	FEED INPUT	22	BAND 2 PARAMETRIC FREQ	39	BAND 5 PARAMETRIC FREQ
05	GAIN OUTPUT	23	BAND 2 GRAPHIC 1 FREQ	40	BAND 5 GRAPHIC 1 FREQ
07	HEAR EQ (ON/OFF)	24	BAND 2 GRAPHIC 2 FREQ	41	BAND 5 GRAPHIC 2 FREQ
08	EQ MODE	25	BAND 2 RESONANCE	42	BAND 5 RESONANCE
12	BAND 1 ACTIVE	26	BAND 2 GAIN	43	BAND 5 GAIN
13	BAND 2 ACTIVE	27	BAND 3 PARAMETRIC FREQ	44	BAND 1 TYPE
14	BAND 3 ACTIVE	28	BAND 3 GRAPHIC 1 FREQ	45	BAND 2 TYPE
15	BAND 4 ACTIVE	29	BAND 3 GRAPHIC 2 FREQ	46	BAND 3 TYPE
16	BAND 5 ACTIVE	30	BAND 3 RESONANCE	47	BAND 4 TYPE
17	BAND 1 PARAMETRIC FREQ	31	BAND 3 GAIN	48	BAND 5 TYPE
18	BAND 1 GRAPHIC 1 FREQ	33	BAND 4 PARAMETRIC FREQ	49	SATURATION GAIN
19	BAND 1 GRAPHIC 2 FREQ	34	BAND 4 GRAPHIC 1 FREQ	50	SATURATION PRE/POST
20	BAND 1 RESONANCE	35	BAND 4 GRAPHIC 2 FREQ		
21	BAND 1 GAIN	36	BAND 4 RESONANCE		
		37	BAND 4 GAIN		

Appendix 1:

Instrument Frequency ranges

To understand EQ and its complexities you need hands-on experience, but through practice and use of the Black Knight you will start to become accustomed to certain 'ranges' of the frequency spectrum.

Also, every sound that you use may sound different to someone else, even if you use the same sound – different variables come into play (amplitude, pitch, envelope, bit rate,.. etc.), so you need to keep in mind that the below listed frequency settings can be used with 'a pinch of salt'; EQing is like seasoning of your sound, it adds flavour (and can also take it away too).

The Kick Drum

Any apparent muddiness can be rolled off around 300Hz. Try a small boost around 5-7kHz to add some high end.

50-100Hz ~ Adds bottom to the sound

100-250Hz ~ Adds roundness

250-800Hz ~ Muddiness Area

5-8kHz ~ Adds high end presence

8-12kHz ~ Adds Hiss

The Snare

Try a small boost around 60-120Hz if the sound is a little too wimpy. Try boosting around 6kHz for that 'snappy' sound.

100-250Hz ~ Fills out the sound

6-8kHz ~ Adds presence

The Hi hats, The Cymbals, The Rides & The Other High-end Percussive sounds

Any apparent muddiness can be rolled off around 300Hz. To add some brightness try a small boost around 3kHz.

250-800Hz ~ Muddiness area

1-6kHz ~ Adds presence

6-8kHz ~ Adds clarity

8-12kHz ~ Adds brightness

The Bass

Try boosting around 60Hz to add more body. Any apparent muddiness can be rolled off around 300Hz.

If more presence is needed, boost around 6kHz.

50-100Hz ~ Adds bottom end

100-250Hz ~ Adds roundness

250-800Hz ~ Muddiness Area

800-1kHz ~ Adds beef to small speakers

1-6kHz ~ Adds presence

6-8kHz ~ Adds high-end presence

8-12kHz ~ Adds hiss

The Vocal

This is a difficult one, as it depends on the microphone that was used to record the vocal. Apply either cut or boost around 300hz. Apply a very small boost around 6kHz to add some clarity.

100-250Hz ~ Adds 'up-frontness'
250-800Hz ~ Muddiness area
1-6kHz ~ Adds presence
6-8kHz ~ Adds sibilance and clarity
8-12kHz ~ Adds brightness

The Piano

Any apparent muddiness can be rolled off around 300Hz. Apply a very small boost around 6kHz to add some clarity.

50-100Hz ~ Adds bottom
100-250Hz ~ Adds roundness
250-1kHz ~ Muddiness area
1-6kHz ~ Adds presence
6-8kHz ~ Adds clarity
8-12kHz ~ Adds hiss

The Electric Guitar

Again this depends on the mix and the recording. Apply either cut or boost around 300hz, depending on the song and sound. Try boosting around 3kHz to add some edge to the sound, or cut to add some transparency. Try boosting around 6kHz to add presence. Try boosting around 10kHz to add brightness.

100-250Hz ~ Adds body
250-800Hz ~ Muddiness area
1-6 kHz ~ Cuts through the mix
6-8 kHz ~ Adds clarity
8-12 kHz ~ Adds hiss

The Acoustic Guitar

Any apparent muddiness can be rolled off between 100-300Hz. Apply small amounts of cut around 1-3 kHz, to push the image higher. Apply small amounts of boost around 5 kHz to add some presence.

100-250Hz ~ Adds body
6-8kHz ~ Adds clarity
8-12kHz ~ Adds brightness

The Strings

These depend entirely on the mix and the sound used.

50-100Hz ~ Adds bottom end
100-250Hz ~ Adds body
250-800Hz ~ Muddiness area
1-6kHz ~ Sounds crunchy
6-8kHz ~ Adds clarity
8-12kHz ~ Adds brightness

Appendix 2: EQ Tables

Below is a general guide to what specific frequencies may do to your sounds / mix.

50 Hz

1. Increase to add more fullness to lowest frequency instruments like foot, toms, and the bass.
2. Reduce to decrease the "boom" of the bass and will increase overtones and the recognition of bass line in the mix. This is most often used on bass lines in Rap and R&B.

100 Hz

- Increase to add a harder bass sound to lowest frequency instruments.
Increase to add fullness to guitars, snare.
Increase to add warmth to piano and horns.
Reduce to remove boom on guitars & increase clarity.

200 Hz

1. Increase to add fullness to vocals.
2. Increase to add fullness to snare and guitar (harder sound).
3. Reduce to decrease muddiness of vocals or mid-range instruments.
4. Reduce to decrease gong sound of cymbals.

400 Hz

1. Increase to add clarity to bass lines especially when speakers are at low volume.
2. Reduce to decrease "cardboard" sound of lower drums (foot and toms).
3. Reduce to decrease ambiance on cymbals.

800 Hz

1. Increase for clarity and "punch" of bass.
2. Reduce to remove "cheap" sound of guitars

1.5 KHz

1. Increase for "clarity" and "pluck" of bass.
2. Reduce to remove dullness of guitars.

3 KHz

1. Increase for more "pluck" of bass.
2. Increase for more attack of electric / acoustic guitar.
3. Increase for more attack on low piano parts.
4. Increase for more clarity / hardness on voice.
5. Reduce to increase breathy, soft sound on background vocals.
6. Reduce to disguise out-of-tune vocals / guitars

5 KHz

1. Increase for vocal presence.
2. Increase low frequency drum attack (foot/toms).
3. Increase for more "finger sound" on bass.
4. Increase attack of piano, acoustic guitar and brightness on guitars.
5. Reduce to make background parts more distant.
6. Reduce to soften "thin" guitar.

7 KHz

1. Increase to add attack on low frequency drums (more metallic sound).
2. Increase to add attack to percussion instruments.
3. Increase on dull singer.
4. Increase for more "finger sound" on acoustic bass.
5. Reduce to decrease "s" sound on singers.
6. Increase to add sharpness to synthesizers, rock guitars, acoustic guitar and piano.

10KHz

1. Increase to brighten vocals.
2. Increase for "light brightness" in acoustic guitar and piano.
3. Increase for hardness on cymbals.
4. Reduce to decrease "s" sound on singers.

15KHz

1. Increase to brighten vocals (breath sound).
2. Increase to brighten cymbals, string instruments and flutes.
3. Increase to make sampled synthesizer sound more real.

Formant filters:

Formants are a very particular sound which the human vocal tract can make, and commonly in synthesizers, vocoders and equalizers you can emulate this by using two or three formant frequencies, to give the listener the impression of a 'speaking' sound. Black Knight comes bundled with a collection of formant filter setups, ready for you to use.

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To contact Lab:One Recordings, please send correspondence to:

info@lab-one-recordings.co.uk

Or by post:

Lab:One Recordings
41 Sedbergh Road
Corby
Northants
NN18 0NT
UK



www.lab-one-recordings.co.uk

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