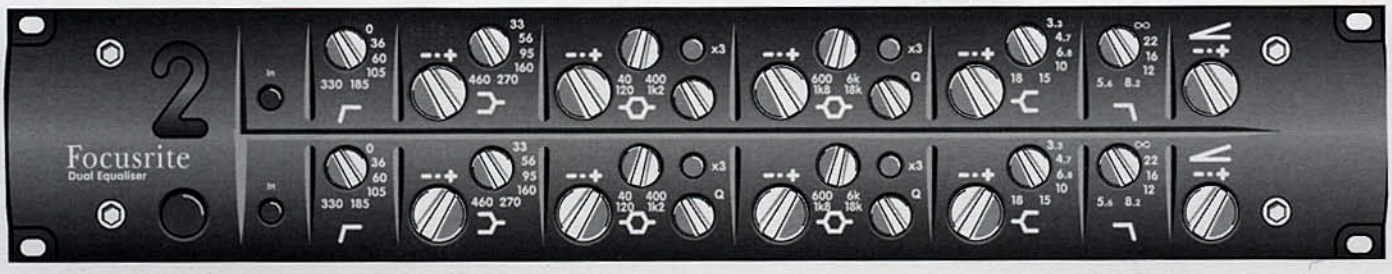
Red 2
parametric equaliser



The Red 2 is a 2-channel parametric equaliser that you can use to equalise individual vocals and instruments, or equalise across stereo signals. It accepts line level input (such as from a tape machine or high level instrument output).

An equaliser is a sophisticated tone control, that boosts or cuts selected frequency bands, and so alters frequency response. By modifying different frequency bands in this way, you modify the tonal quality of instruments and vocals, which can fix problems with the original sound, or help a track stand out in the mix, for example. For more details, see the section *How to Use Equalisation.*

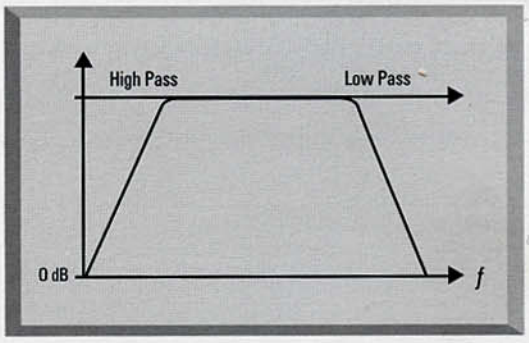
When you are getting to know the unit, particularly if you are not familiar with using a parametric equaliser, use it on a track that you are familiar with (for example, run a favourite CD through the unit). Try all of the controls in turn, and hear how they affect the sound. Working with a familiar track makes interpretation of the results easier.

There are three types of equalisation on a Red 2:

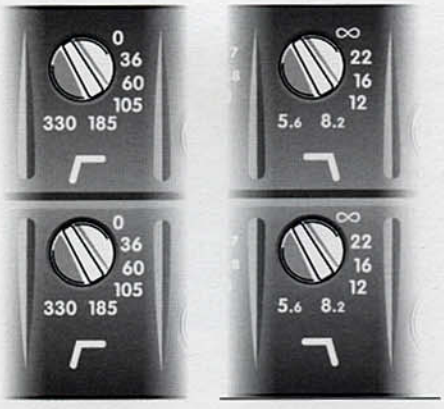
- High- and low-pass filters
- Shelving filters
- Parametrics

High and Low-Pass Filters

The high-pass filter allows everything above a certain frequency to pass through, hence it removes very low frequency signals. Setting the high-pass filter to a certain frequency attenuates (reduces the volume of) all frequencies below that. Similarly, the low-pass filter removes high frequency signals, so setting the low-pass filter to a certain frequency attenuates all frequencies above that.



Controls



The high- and low-pass filters have only a single control, for setting frequency. For the high-pass filter, all frequencies below the specified frequency are attenuated. For the low-pass filter, all frequencies above the specified frequency are attenuated.

Note that you cannot change the amount of attenuation - setting one of these filters always attenuates the affected frequencies by a preset amount of 12 dB per octave. For example, setting the low-pass filter at 12 kHz attenuates the signal at 24 kHz by 12 dB and the signal at 48 kHz by 24 dB (for any frequency, the octave above it is at double the frequency).

Off position: For the high-pass filter, 0 is off. For the low-pass filter, ∞ is off.

Using the High and Low-Pass Filters

High and low-pass filters are usually used to correct problems with a signal rather than being used in a creative way (for example, to create a special effect).

Use the high-pass filter to remove:

- Unwanted rumble
- Bass lift (a proximity effect of microphones, giving a bass boost as the singer gets closer to the microphone). This is most apparent with unidirectional microphones
- Hum from noisy sources

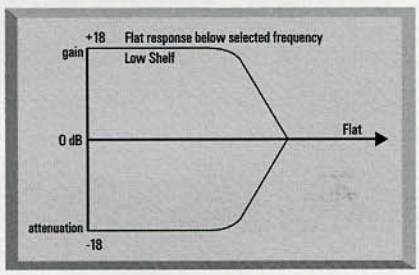
Use the low-pass filter for hiss rejection.

A possible creative use of high- and low-pass filters is to put them full on together, which gives an effect similar to a telephone or transistor radio.

Shelving Filters

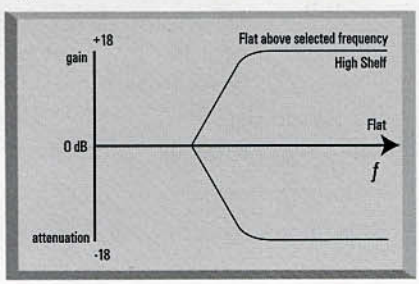
Like the high and low-pass filters, the shelving filters affect all frequencies below or above a given frequency. However, unlike the high- and low-pass filters, you can modify the amount of attenuation, or can add gain instead. Thus, a shelving filter lifts or cuts one end of the frequency spectrum.

Low Shelf



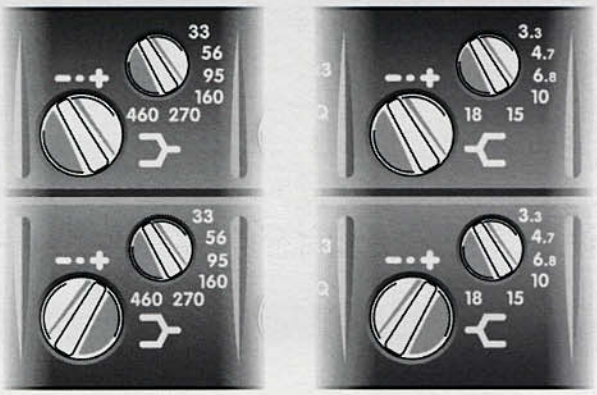
There are two shelving filters - one for the low-frequency end and one for the high-frequency end of the spectrum. Using them together you can, for example, boost the low end and cut the high end of the frequency spectrum, so appearing to tilt the frequency response towards the low end.

High Shelf



Controls

You can set the frequency and the amount of attenuation or gain applied beyond that frequency.



Off position: To turn off a shelving filter, set the gain control in the middle position, so that it is neither boosting nor cutting frequencies.

Using the Shelving Filters

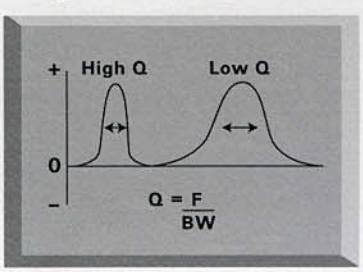
Like the high and low-pass filters, the shelving filters are often used to correct problems with a signal. Use the shelving filters:

- To compensate for a lack of something in the original recording (for example, if you had to roll off a lot of bass during recording because you were getting a lot of bass lift)
- To replace something you lost in the recording format (particularly top end)
- To reduce something excessive (such as a very bassy sound)

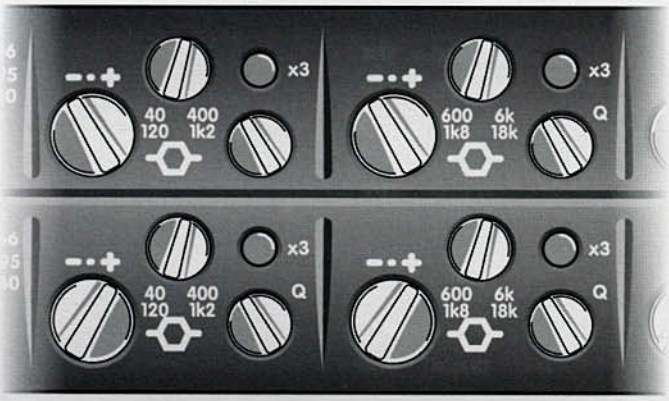
Use the low-frequency shelving filter to boost low frequency information, thus giving a bassy sound, or to attenuate a sound that is too bassy. Use the high-frequency shelving filter to boost ambience and reverb in a room, or to attenuate an over-bright sound.

Parametrics

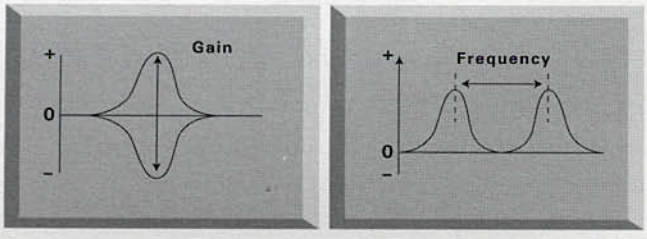
The parametrics give you control over the entire frequency spectrum. Unlike the filters, the parametrics affect only a given frequency, plus some frequencies to either side. The range of frequencies affected is determined by the bandwidth (controlled by Q). Low Q is a wide bandwidth, and high Q is a narrow bandwidth.



Controls

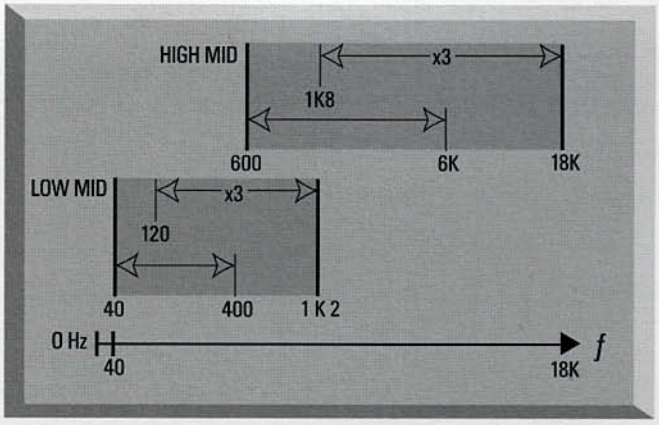


The parametrics let you set every parameter: the gain or attenuation, the frequency affected, and bandwidth.



The low-frequency parametric covers the frequency range from 40 Hz to 1.2 kHz, and the high-frequency parametric covers 600 Hz to 18 kHz. You can see that they overlap, which gives access to the middle frequencies from either parametric. For example, this is useful if you are attenuating a high frequency, but still want to work on the middle frequencies, since you can use the low-frequency parametric on them.

Note that the control for each parametric does not cover the entire sweep of its spectrum. Instead, its range is split into two - this means that the control does not have to cover its entire spectrum in a single sweep, so increasing its sensitivity. Thus, the low-frequency parametric covers 40 to 400 Hz or 120 to 1.2 kHz, and the high-frequency parametric covers 600 Hz to 6 kHz, or 1.8 kHz to 18 kHz. You determine the range of the parametric by using the x3 button. When it is not lit, the parametric covers the lower band, and when it is lit, the parametric covers the higher band.



Off position: To turn off a parametric filter, set the gain control in the middle position, so that it is neither boosting nor cutting frequencies.

Using the Parametrics

Use the parametrics to colour the sound and create a presence. For example, you can take the sound of an instrument and improve its clarity in the mix. You can also use the parametrics in narrow Q mode to notch out a frequency (for example, to remove fret buzz). However, when doing this be careful that you do not adversely affect the tone elsewhere, since you will affect all occurrences of the selected frequency.

To isolate the frequency you want to boost or cut:

1. Add some gain to the signal, so that you can hear the effect easily
2. Set a very wide bandwidth (low Q), which again makes it easier to hear the area you are affecting
3. Modify the frequency until you find the area you want to work on
4. Adjust Q and frequency together until you get the desired combination
5. Modify the gain to control the amount of the selected frequency that is added to or subtracted from the signal

How to Use Equalisation

1. Ensure that the microphone placement is correct. Listen to the sound from the microphones with no equalisation applied, and modify the microphone placement until you get the sound you want

2. Set the operating level
3. Consider what you don't want (for example, you don't want too much bass on an analogue tape machine). This varies with the recording format and varies with the input signal. If necessary, use the high and low-pass filters to remove parts of the signal
4. Listen to the ambience and room sound that comes back off tape, and check that it has the frequency response that you are looking for (for example, the room may be a bit dull in the top end, or there may be too much bass). If the frequency response is not correct, use the shelving filters to correct it
5. Create a sound and bring out the character of the instruments by using the parametrics. The figure below shows the frequency range of different instruments. Also see the section on Bringing an Instrument Forward in the Mix.

When to Use Equalisation

You can apply equalisation when recording or while mixing down a finished track. You usually record flat (without equalisation) and then apply equalisation at mixdown, unless you are assigning several instruments to a single track, in which case you need to get the equalisation correct during recording.

Use equalisation to:

- Remove unwanted noise, such as rumble, bass lift and hum (by using the high-pass filter)
- Reduce hiss (by using the low-pass filter)
- Replace missing bass or treble (by using the shelving filters)
- Reduce excessive bass or treble (by using the shelving filters)
- Boost room ambience (by using the high-frequency shelving filter)
- Improve tone quality (by using all the controls)
- Help a track stand out in the mix (by using the parametrics)
- Reduce noise and leakage (by using the high and low-pass filters)
- Boost lows and highs when recording loud bands (by using the shelving filters)

Bringing an Instrument Forward in the Mix

You can use equalisation to bring an instrument forward in the mix (that is, to make it easier to hear when mixed with the other instruments). However, when doing this, beware of using equalisation simply to make the instrument louder.

An instrument's sound is made up of a fundamental frequency (the musical note) and harmonics, even when playing a single note, and it is the harmonics that give the note its unique character. If you use the equaliser to boost the fundamental frequency, you simply make the instrument louder, and don't bring it out of the mix. Boosting the harmonic frequencies, on the other hand, boosts the instrument's tone quality, and so make it stand out in the mix. The table below shows useful frequencies for a number of common instruments;

Instrument	Tone Quality	Useful Frequencies
Voice	Presence	5 kHz
	Sibilance	7.5 - 10 kHz
	Boominess	200 - 240 Hz
	Fullness	120 Hz
Electric guitar	Fullness	240 Hz
	Bite	2.5 kHz
Bass guitar	Attack or pluck	700 - 1000 Hz
	Bottom	60 - 80 Hz
	String noise	2.5 kHz
Bass drum	Slap	2.5 kHz
	Bottom	60 - 80 Hz
Snare drum	Fatness	240 Hz
	Crispness	5 kHz
Hi hat and cymbals	Shimmer	7.5 - 10 kHz
	Clank or bell	200 Hz
Tom toms	Attack	5 kHz
	Fullness	240 Hz
Floor toms	Attack	5 kHz
	Fullness	80 - 120 Hz