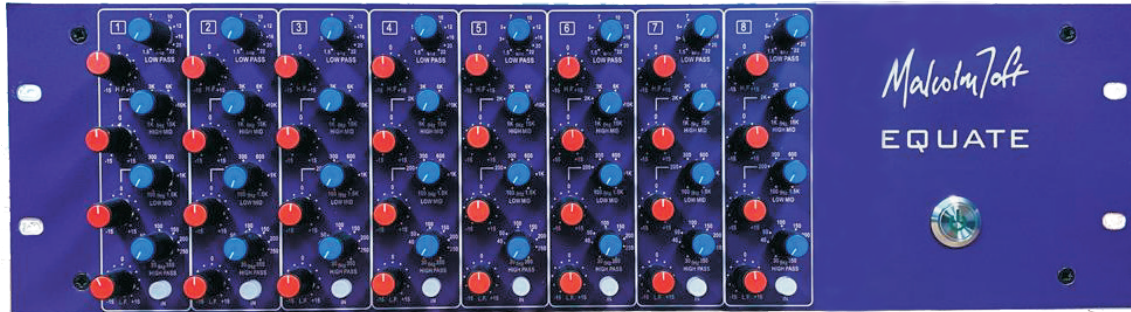


# EQUATE

## 8 CHANNEL EQUALISER



*Malcolm Joff*

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## ABOUT THE DESIGNER

Malcolm Toft has had an illustrious career in the recording industry that spans more than fifty years. He is unique in that he has worked as a top level recording engineer as well as a designer of recording consoles and associated equipment. He was the first recording engineer to be employed at the now legendary Trident Studios in London when it first opened in 1968. During those exciting times, he engineered and worked on records by The Beatles, David Bowie, James Taylor, Paul McCartney, Joe Cocker, Rod Stewart, T-Rex and many more. A few years later he became studio manager and was tasked to oversee the rapid growth the studio had made from 8 to 24 track in just a few years. This meant the purchase of a new console that would suit the specific requirements that the studio engineers required.



Malcolm at Trident Studios in 1968

After looking at the small number of companies able to provide high quality recording consoles, it became apparent that none of them could provide the advanced facilities that were needed such as full 24 track routing and monitor equalisation (this was considered taboo in those days!) After visiting these companies and realising this, Malcolm made the bold suggestion to the studio owners that perhaps they could build their own console that would fit their needs exactly.

As a recording engineer, Malcolm had always felt it important to understand how the electronics of a console worked. This he felt would enable him to make the best use of the equipment. At 17 he had in fact built his first console in his parents front room where he recorded his own and many local bands on a mono tape recorder that his father owned!



Malcolm's first console!

Trident agreed to let him build a new console provided that he took full responsibility and oversaw the project. He knew he would need some help with the electronics side while he took care of the ergonomics, systems and feature set. Fortunately, Trident had a young maintenance engineer, Barry Porter, who had been giving Malcolm advice while he was

building another console at his home (this was later to become the Trident B Range mixer). During the building of this first console for Trident studios, a number of clients showed an interest in the facilities and features of the new console and soon wanted to buy one. Malcolm discussed this with the studio owners and they agreed to start a new division which they would call Trident Audio Developments with Malcolm as managing Director. The console that started it was the now legendary A Range and Malcolm went on to design the Series 80, TSM, Trimix, Fleximix, Series 65 and many other consoles. He sold Trident in 1988 and later founded Malcolm Toft Associates (MTA) and has continued to design consoles and studio equipment up to the present day. In 2010 he was made a visiting professor at Leeds College of music in recognition of his history in the studio industry. So you know that with a Malcolm Toft design it has a great pedigree and a wealth of experience behind it.



Malcolm wiring the very first Trident A Range in 1972

To find out more about the range of Malcolm Toft products, please go to: [www.malcolmtoft.com](http://www.malcolmtoft.com)

## PRODUCT OVERVIEW

The Equate provides eight channels of highly flexible and intuitive to use, six band equalisation in a 3U rack mount, mains powered unit which will work on any a.c. voltage from 90 to 250v. The eight individual channels are the same width as 500 series modules making it easy to integrate in a studio centered around the 500 series format. All inputs and outputs are balanced and both 1/4" trs jacks and Dsub connectors are provided on the rear panel.

Power supplies are often overlooked and taken for granted. However a good power supply can often bring the best out of circuitry and conversely a bad supply can be detrimental, especially if they run hot. This often means that not only is it not capable of delivering 'clean' power, but it can cause capacitors and other critical components to dry out.

Having had extensive experience in designing a range of power supplies for large format SSL and Neve consoles, Malcolm has put this knowledge into designing a highly energy efficient and cool running power supply that consumes no more electricity than a light bulb! Long term reliability is therefore assured.

Malcolm Toft has always been credited with designing musical sounding eq due in no small part to his background as a recording engineer as well as console designer.

The Equate takes this to another level, since it is the first design which includes swept high and low pass filters together with individual control of four other bands ranging from low to high frequency.

During extensive beta testing it soon became apparent just what versatility the high and low pass filters added to the already very effective control the rest of the eq provided.

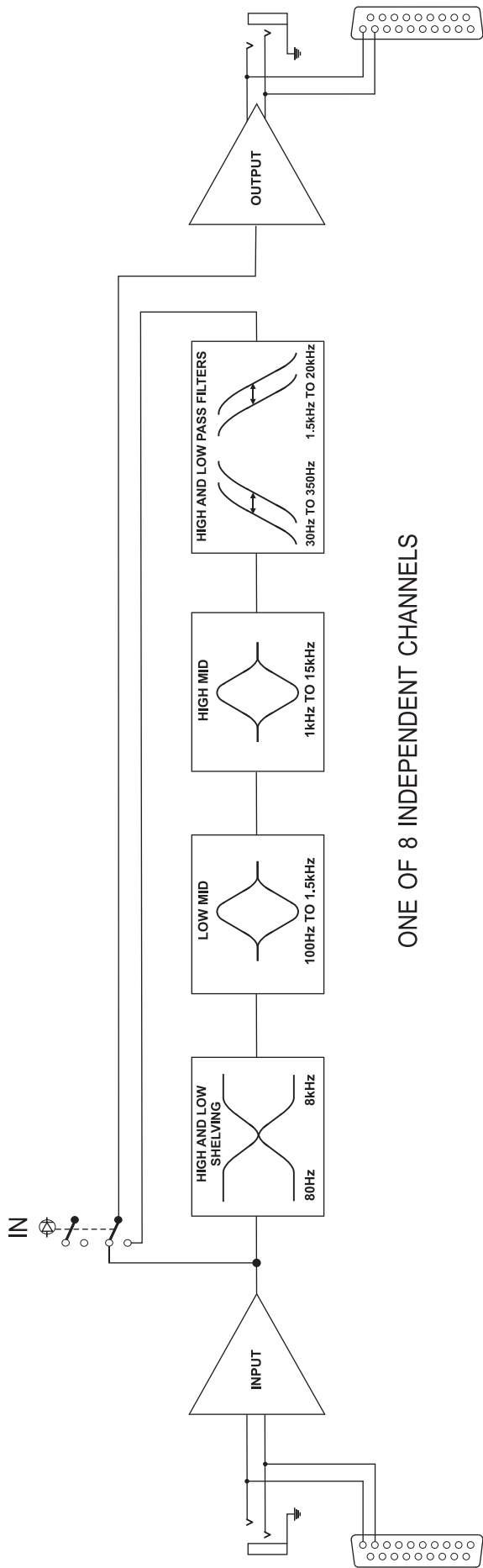
Especially effective is when the high pass filters are used in conjunction with the low and high frequency shelving boost and cut sections. The combinations are endless! When large amounts of low frequency shelving boost are added, it often causes too much very low frequency emphasis which speakers can have trouble reproducing. It can often sound 'woolly' as a consequence. By tuning out some (or a lot!) of the low frequencies with the high pass filter, this can be avoided.

Similarly, when large amounts of high frequency shelving boost are added, it can often emphasise too many ultra high frequencies which can also be objectionable. Use of the low pass sweep filter can remove too much ultra high frequency emphasis.

As will be seen from the eq curves shown further on in this manual, broad and musical frequency shaping can be achieved that would not be possible even with a fully parametric design, since these would never be able to provide such a broad bandwidth.

Needless to say, we are real advocates of analogue eq rather than 'plug ins', but as you will see from using the Equate, being able to turn more than one control at a time makes it far more intuitive to get the exact sound that you are looking for. Enjoy!

SIGNAL FLOW



Each channel of the Equate provides control over six individual bands within the range of 20Hz to 20kHz and uses three different types of frequency control. The first is high and low shelving. It is called this because once boost or cut is applied, it affects all frequencies beyond a certain point. Reference to the Signal Flow page of this guide shows this in graphic form. Shelving eq can be useful when a wide range of either high or low frequencies need to be amplified or attenuated. It can therefore be considered to provide overall rather than precise control.

The second type of control is called 'peaking' and is used for the low and high mid ranges. Like the shelving control, its name is descriptive, however its effect on the signal is quite different. It consists of two controls for each section. Like the shelving control one provides boost or cut, but another selects the frequency to be affected. This gives more precise control as the band of frequencies affected is more sharply defined. Instead of a broad control, the boost or cut rises quite quickly to the chosen frequency and then drops away afterwards. This can be very useful for tuning into a small area of frequencies that need to be affected. This is also shown in graphic form on the Signal Flow page.

The third type of control is high and low frequency filtering and consists of a single control for each range. The one affecting the low frequencies is termed 'high pass' and the one affecting the high frequencies is termed 'low pass'. Unlike the other two ranges, these controls only provide attenuation of the audio and the particular frequency point at which attenuation starts is selected by a continuously variable control. These are a particularly useful addition to the range of facilities provided and open up a whole range of possibilities, especially when used in conjunction with the high and low shelving sections. On their own, they can be used for tuning out unwanted low frequency 'rumble' in a particular range or unwanted high frequency 'sibilance' for example. Together with the high and low shelving sections, they can create endless combinations of tonal shaping.

First make sure that all controls are in their 'default' position. This means that all boost/cut (red) controls are in their centre positions (which is denoted by a click). The high pass filter, mid and high range frequency controls (blue) are set to their minimum (anti-clockwise) positions. The low pass filter control should however be set to its maximum clockwise position. It needs to be at its maximum position of 20kHz to prevent high frequency roll off when the equaliser is engaged.

When depressed, an illuminated switch will bring all sections of the equaliser into circuit. Use of this switch therefore makes it possible to compare the original signal with the one that has eq added.

The Equate is extremely versatile owing to the range of frequencies it can control. As its applications can vary from use while tracking to mixing, it is virtually impossible to guide the user precisely in its use and application. Equalisation (or tone control) should only be used when it is necessary to add or subtract frequencies to a signal that is already close to that which is required. The adage 'less is more' is very applicable to the use of equalisation. It can often be more effective to attenuate frequencies rather than amplify them. A common mistake in over use of equalisation is to think it sounds better when in fact all you have really done is amplify virtually all frequencies and it is simply louder!

The circuit has been designed as unity gain. This means that when added to a signal chain it will not amplify or attenuate the signal when all controls are in their default position and the equaliser is either in or out of circuit.

All inputs and outputs are 'balanced' so as to reduce the possibility of stray interference from other equipment should it be necessary to connect the signals over long distances,

**TECHNICAL SPECIFICATIONS****ELECTRICAL**

<b>INPUT:</b>	Impedance: > 10k ohms Maximum input level +22dbu Frequency response: 20Hz to 20kHz ±1db
<b>OUTPUT:</b>	Impedance:< 100 ohms Maximum output level: +22dbu Frequency response: 20Hz to 20kHz ±1db
<b>NOISE::</b>	< -80dbu 20Hz to 20kHz
<b>A.C. Input:</b>	100 to 240 volts Consumption: 30 Watts

**MECHANICAL**

<b>SIZE:</b>	48 cm wide (19") x 13.2cm high (5.2") x 17cm deep (6.5")
<b>WEIGHT:</b>	2.5kgs. (4.7lbs)