

RUPERT
NEVE
DESIGNS



Portico™ 5032

MIC PRE/EQ

USER GUIDE

Serial No:

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IMPORTANT

For your convenience, write your serial number on the box above and keep this guide in a safe place. The number can be found on the bottom of the product and also on the packaging materials.

This number must be quoted in all communications in order to obtain technical support and spare parts from either the factory or your dealer.

BUILT ON CORNERSTONES OF TRADITION

SOARING TO TRANSCEND THE CONFINES OF CONVENTION

Rev. A Copyright 2005

Thank you for your purchase of the Portico™ 5032 Microphone Pre-amplifier and Equalizer module. Everyone at Rupert Neve Designs hope you enjoy using this tool as much as we have enjoyed designing and building it. Please take note of the following list of safety concerns and power requirements before the use of this or any Portico™ Series product.

Safety

It's usual to provide a list of “do’s and don’ts” under this heading but mostly these amount to common sense issues. However here are some reminders:

The Portico™ 5032 dissipates about 8 watts, which means that it will get warm in use. The heat generated is radiated through the case work and by convection through the ventilation holes. Therefore the holes should not be covered or blocked. Portico™ modules may be stacked horizontally on a desktop or mounted vertically in a rack without heat problems. The anti-slip feet may be removed while used in a rack, but should be retained for desktop use. To avoid overheating, Portico™ modules should not be stacked immediately above or adjacent to other equipment that gets hot. Also bear in mind that other equipment may radiate strong hum fields which could spoil the performance of your Portico module.

Don't operate your Portico™ module in or around water! Electronic equipment and liquids are not good friends. If any liquid is spilled, such as soda, coffee, alcoholic or other drink, the sugars and acids will have a very detrimental effect. Sugar crystals act like little rectifiers and can produce noise (crackles, etc.). SWITCH OFF IMMEDIATELY because once current starts to flow the mixture hardens, can get very hot (burnt toffee!) and cause permanent and costly damage. If it gets wet and you suspect that good clean water may have gotten in, immediately unplug the unit, and remove it from the source of water. Please contact support as soon as possible at support@rupertneve.com for resolution.

Don't be tempted to operate a Portico™ with the cover removed. The cover provides magnetic screening from hum and R.F. stray fields.

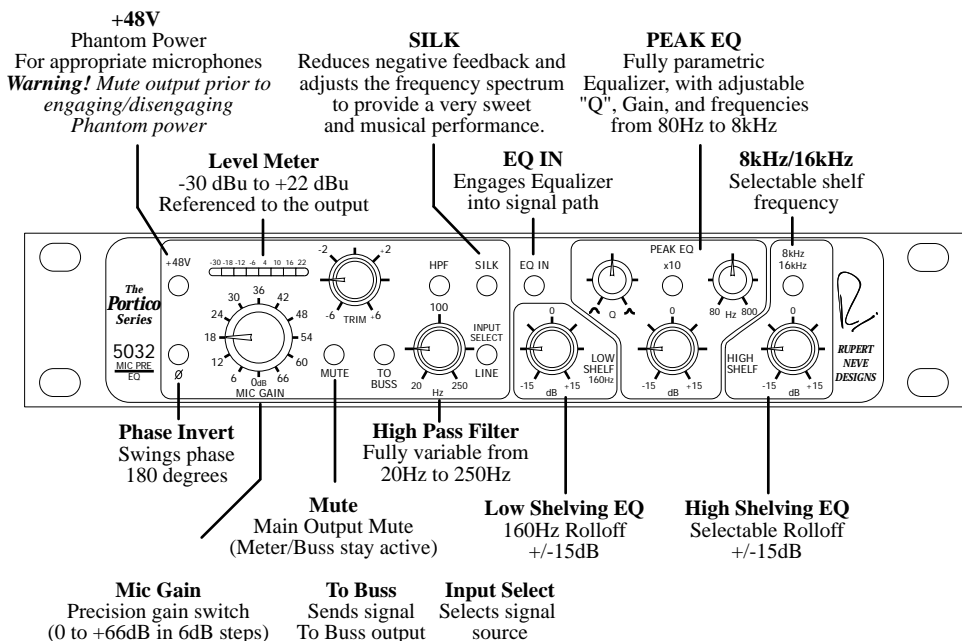
Power Requirements

Each Portico™ 5032 module has two built-in DC to DC converters that provide +/- 17.5 VDC for the amplifiers and + 48 VDC for microphone Phantom Power. The input is protected from reverse polarity. The connector center pin must be positive. The converters will work from virtually any DC supply from 9 to 18 volts that is reasonably “clean”. Avoid using a Power Outlet on the same circuit as air conditioning or other equipment that regularly switches on and off. Unplug the Portico™ power unit(s) during a thunder storm or if it will be unused for a long period.

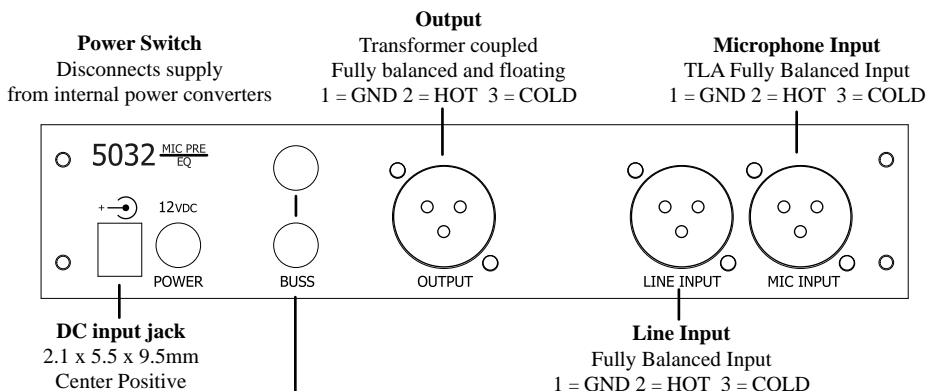
When using a 12-volt battery, choose one that has enough capacity to power your Portico™ 5032 - or your complete assembly of Portico™ modules – for the expected duration of your session. For example, a 48 ampere-hour battery will power 8 Portico™ 5032 modules for 9 hours.

*See power requirement on specifications page.

5032 Mic Pre / Equalizer - Front Panel



5032 Mic Pre / Equalizer - Back Panel

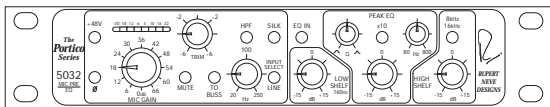


Portico™ Bussing System

Connect as many units together as you'd like to create your own mixes using optional bussing modules

Top and bottom rows are normalled together to allow for an IN / OUT / THRU configuration

The Rupert Neve Designs Portico™ 5032 MICROPHONE PRE-AMPLIFIER AND EQUALIZER MODULE



The Rupert Neve Designs 5032 module is a half rack width, 1.75" (1U) module in the now well-known Portico™ style. The 5032 is ideal for both tracking and mixing applications with selectable mic or line inputs.

Both paths have full access to the EQ, phase, silk and mute making it the ideal choice for either standalone operation, or forming the core of a larger mixing system. As with the entire Portico™ range, the construction is a heavy and robust steel shell that provides total magnetic screening and exceptional mechanical stability. The front panel is machined from a solid .20 inch aluminum plate with a steel sub panel behind it.

Alternative front panel layouts are available providing a choice of vertical or horizontal mounting. When the horizontal front panel is chosen, a single 5032 can sit firmly on a bench or desktop on its detachable rubber feet. Two 5032s can be joined with the optional Horizontal Joining Kit, model number 5221-RM, and mounted across a standard 19" rack.

When the vertical option is chosen, up to eight 5032s can be mounted in the optional vertical frame, model number 5285-RM. This leaves a 3" wide space that can be used to house a power supply or other future modules. The vertical frame assembly is designed for rack mounting and includes basic rear cable management. Blank panels are available to fill any unused spaces when the full complement of eight modules is not fitted into the vertical frame.

MICROPHONE INPUT

The microphone input is balanced but not floating, being a variant of an instrumentation amplifier. My well-proven "Transformer-Like-Amplifier" (T.L.A.) configuration is used, which includes an accurate toroidal Common Mode Low Pass Filter that rejects Common Mode signals and excludes frequencies above 150 kHz. (There are high powered broadcast transmitters at and above this frequency in several Continents and, even if you can't hear them, any vestigial intermodulation products must be excluded!)

The Common Mode Coil effectively takes the place of a traditional input transformer at high frequencies and is able to handle low frequencies over a wide range of levels with virtually no additional distortion.

The T.L.A. is followed by an actual input transformer. This imparts galvanic signal isolation and the sweetness for which good transformers are known. The transformer works at an approximately constant level with more predictable performance.

When the Mic Gain switch and Trim controls are set to Unity (0 dB) the Portico™ 5032 microphone pre-amplifier can handle a balanced input signal of more than +20 dBu without an input attenuator pad! This is a unique feature that enables this input to double as an additional line input.

THE MAIN OUTPUT

The output stage is identical with that of the Portico™ 5012, using single-sided circuitry, driving a carefully configured output transformer that can deliver a full +25dBu from the balanced and ground-free secondary winding.

This maximum output level provides a large margin over and above the likely maximum requirement of any destination equipment to which the Portico™ 5032 may be connected. This is especially true when feeding digital equipment!

Freedom from the interference fields that are inevitably present in any control room is virtually guaranteed by the balanced, ground-free design used in the Portico™ modules. My original classic modules always used transformers, as do a number of other high quality vintage modules still in current use.

High quality transformer connectivity has been used for many years, enabling modular amplifier units to deliver the sonic performance for which they are famous.

Bear in mind that human ears are very sensitive and can perceive incredibly minute interference signals that are not part of the “desired” signal. If unbalanced connections are used, great care must be exercised to avoid ground loops and common signal paths. Reduced immunity from various forms of interference can be tolerated (sometimes) but usually results in a loss of that transparent musical resolution that we all love.

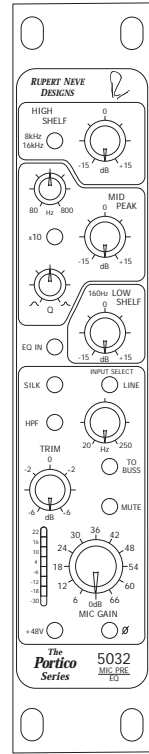
However, the output of any Portico™ transformer-coupled module may be used with one side grounded if necessary, for example to use with “Hi-Fi”, “consumer” or other unbalanced audio gear, without degrading the performance of such devices. Care must be exercised when using ancillary equipment to avoid overloading it.

THE BUSS OUTPUT

The Buss output is unbalanced and high impedance, and the BUSS connection is derived pre-mute. It is intended for use with future modules in the Portico™ range which will be equipped with a matching MIX or BUSS input.

The Portico™ 5032 BUSS output has dual, paralleled, TRS connectors that allow any number of Portico™ modules to be mixed to the BUSS input on any of these appropriate modules using a standard TRS patch cord.

When multiple Portico™ modules are configured in a console assembly, mixing busses will be available at many points (beyond the ones traditionally expected), providing enormous flexibility. More detailed descriptions with suggested block and system diagrams will be available in the future on the Rupert Neve Designs website at www.rupertneve.com.



DESIGN NOTES

In former years, before the introduction of solid state amplifiers, transformers were necessary to step up to the very high input impedance of tubes, and to provide a balanced input for the microphone line. An input impedance of 1,000 or 1,200 ohms became established for microphones having a source impedance of 150 or 200 ohms. Thus microphones were not heavily loaded. Condenser microphones worked off high voltage supplies on the studio floor which polarized the diaphragms and powered a built-in pre-amplifier.

More and more microphones were needed as “Pop” music gained ground and this led to the popular and efficient method of 48-volt “Phantom” powering that was built into the multi-channel recording Console – in place of numerous bulky supplies littering the studio, a miniature pre-amplifier now being fitted inside the microphone casing.

The 48-volt supply was fed to the microphone through balancing resistors so it was impossible for this voltage to actually reach the microphone, resulting in low polarizing volts and virtual starvation of the little pre-amp inside the microphone. Nevertheless amazingly good microphones were designed and made, becoming the familiar product we use today.

If a low value resistive load is connected to the output of an amplifier, that amplifier has to produce power in order to maintain a voltage across that load. Obviously if we want more voltage (output from the microphone) we need to provide a larger supply for the amplifier or settle for a lighter load.

A microphone is a voltage generator, not a power amplifier. Most microphones give their most accurate performance when they are not loaded by the input impedance of a traditional preamplifier.

If the microphone uses an electronic circuit (transformerless) output, a low value of load impedance will likely stress the little microphone pre-amplifier, causing slew rate and compression at high levels.

On the other hand, a high value of load impedance allows the microphone to “breathe” and give of its best, this being particularly advantageous with very high level percussive sounds.

If the microphone has an inductive source (such as would be the case if it has a transformer output) a low value of load impedance causes the high frequencies to roll off due to leakage inductance in the transformer in addition to the above amplifier distortion (This can be an advantage with some microphones!).

For this reason I have provided a high value of input impedance that will load microphones to the smallest possible extent and makes the best possible use of that limited “Phantom” 48-volts supply.

SIGNAL ROUTING

Separate MIC and LINE inputs are available on the 5032 rear panel. Connections can be made to both inputs simultaneously and the desired source signal is selected using the INPUT SELECT button on the 5032 front panel.

1. When the INPUT SELECT push button is UP, (i.e. MIC) the XLRF MIC input connector is routed to the microphone pre-amplifier circuit.
2. When the INPUT SELECT push button is DOWN, (i.e. LINE) the XLRF LINE input connector is routed to the Line Input transformer.
3. When the HPF (High Pass Filter) push button is DOWN, the variable frequency High Pass Filter is inserted into the signal path regardless of the INPUT SELECT push button.
4. When the EQ IN push button is DOWN, the Equalizer is inserted into the signal path.
5. When the SILK push button is DOWN, the SILK feature is inserted into the signal path.
6. When the PHASE (Ø) push button is DOWN the phase of the signal is inverted.

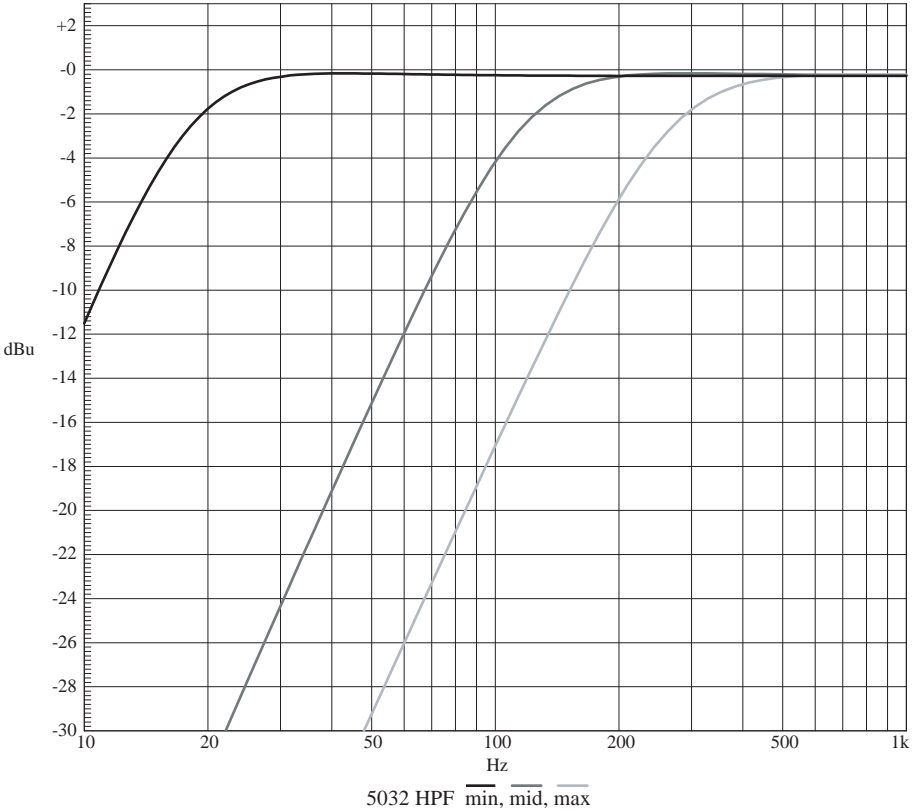
MAIN CONTROLS

MIC GAIN	A 12-way precision rotary switch covering from 0 to 66 dB in 6 dB steps. Selecting the right gain optimizes Noise and Headroom.
TRIM	Provides further gain adjustment, continuously over a range of +/- 6 dB.
+48V	Push button makes phantom power available at the microphone input.
Ø	Push button inverts the phase of the signal path.
MUTE	Silences the main output.
SILK	Much could be written about this feature, but suffice to say that it gives a subtle option to enhance sound quality in the direction of vintage modules. The SILK button reduces negative feedback and adjusts the frequency spectrum to provide a very sweet and musical performance. We suggest you try it and make your own judgment.
TO BUSS	Provides a resistive feed to the Portico™ Buss mix system as described earlier.
EQ IN	As stated in (4.) above, the EQ IN push button determines whether the Equalizer is inserted into the signal path.

HPF

A 12 dB/octave high pass filter providing continuously variable Low Frequency attenuation between 20 Hz and 250 Hz. The high pass filter is a valuable aid in any signal chain but particularly so in a microphone preamplifier. Signals within this band can be attenuated, leaving higher frequencies unaffected. Helps get rid of building rumble, air handling motor hum etc.

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LINE INPUT

The line input is a 10,000 ohms (bridging) floating and balanced transformer design that provides uncompromising isolation and protection against ground currents and other unwanted interference. This makes a significant contribution to the purity and sonic quality of the music signal.

Unlike traditional transformers, the frequency response and distortion are independent of the source impedance of the preceding equipment.

Full low frequency distortion performance is maintained even with input levels higher than +20 dBu.

THE EQUALIZER

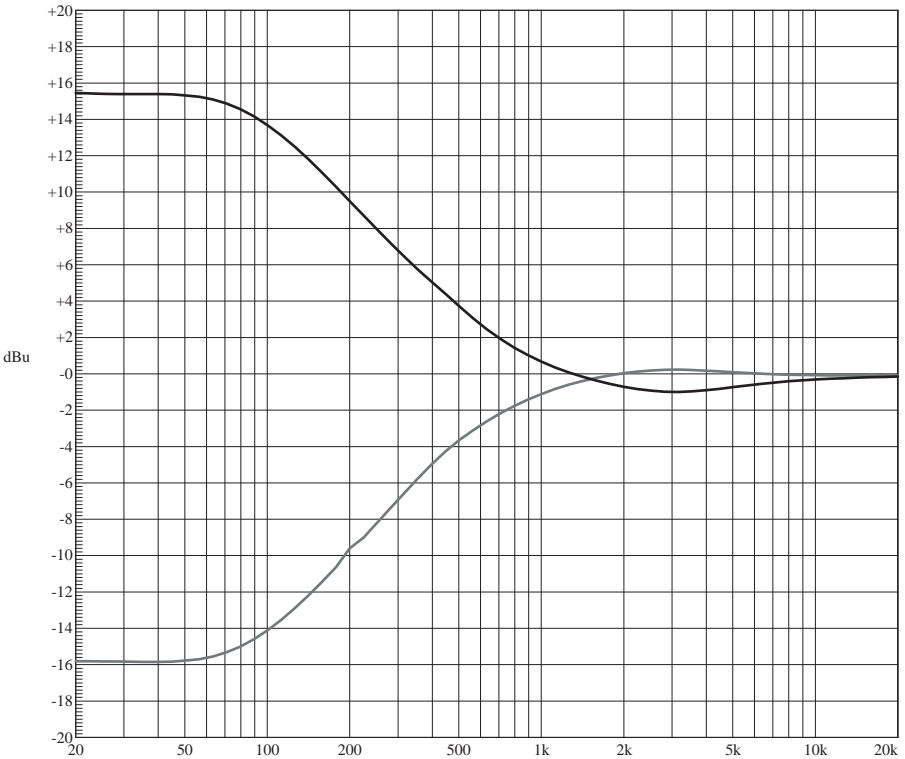
The subtleties of audio circuit design as relating to sonic performance are becoming more clearly understood by designers and professional users. For example, it is evident that frequencies above 20 kHz and incredibly small distortion and non-harmonic artifacts, affect the way that humans perceive sound. Specifications and measurements do not fully disclose these sonic qualities that are important to sound engineers and musicians. There is no substitute for hours of patient listening and experimental bench work that results in the sweet and silky sound of my classic designs.

LOW SHELF and HIGH SHELF

The Portico™ 5032 Equalizer makes use of both a High Frequency and Low Frequency shelving characteristic that provide steeply rising or falling curve shapes. Such curves, when used aggressively, enable second and even third harmonics to be varied in relation to a fundamental, allowing the natural sound of a musical instrument to be varied. Used less aggressively, bands of frequencies above or below the “turnover” frequency can be adjusted to desired levels.

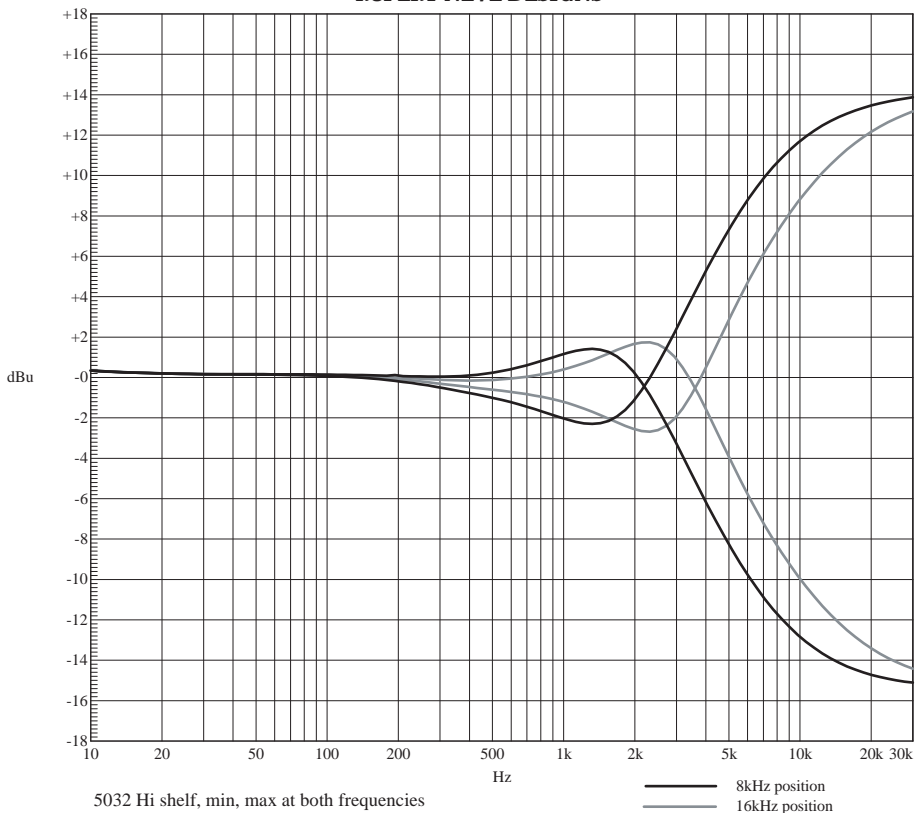
These sections each provide EQ curves that approximate to 6 dB/Octave with a boost or cut of up to 15 dB and a true “Flat” response at the center of the control track. Frequencies chosen for these “turnover” points are the result of critical listening and follow traditional equalizer patterns.

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5032 - 160 Hz Low Shelf min and max

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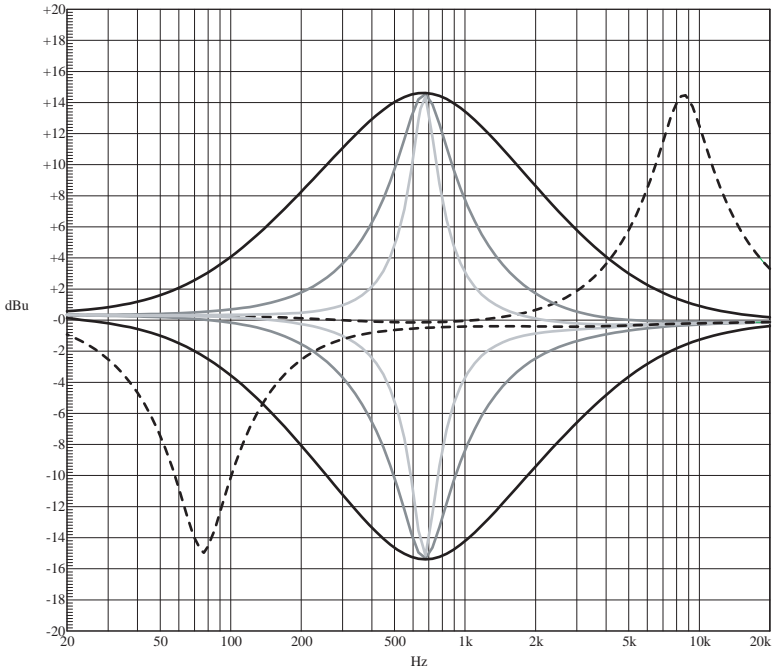


These sections each provide EQ curves that approximate to 6 dB/Octave with a boost or cut of up to 15 dB and a true “Flat” response at the center of the control track. Frequencies chosen for these “turnover” points are the result of critical listening and follow traditional equalizer patterns.

PEAK EQ (MID-BAND)

This section provides a very wide range of frequencies in two bands with a powerful “Q” or bandwidth control. The range of boost or cut is +/-15 dB with a true “Flat” response at the center of the control track. The steepness of the actual curve slopes can exceed 6 dB/Octave which results in a powerful “chisel” type of tool. The “Q” control offers completely variable bandwidth, from very narrow to super wide, having a range of “Q” = 0.6 to “Q” = 3.0.

The “base” band covers 80 Hz to 800 Hz, which is important when dealing with the body of a spectrum or for thinning a muddy acoustic environment. A “x10” button multiplies the frequency of the base band by x10 (i.e. it provides continuity from 800 Hz to 8.0 kHz).

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5032 Mid EQ: 80Hz- 8kHz range, min, mid, max Q's

METER

An eight segment LED bar-graph meter is fitted for each channel, calibrated in dBu as follows:

- 30 dBu, - 18dBu, - 12dBu, -6dBu,
+4 dBu, + 10dBu, + 16dBu, +22dBu

With reference to the balanced output signal level.

The input level can be determined by reading the Meter indication, then subtracting the Gain settings of the Sensitivity switch and the Trim control. For example, if the meter is reading + 10 dBu, with the Trim control at, say, +2 and the main Gain switch is at 42, the level of the input signal is $10 - 42 - 2 = -34$ dBu.

Frequency Response:

Main Output, no load,

-0.2 dB @ 10 Hz

-3 dB @ 160 kHz

Noise:Measured at Main Output, unweighted, 22Hz-22kHz,
Terminated 150 Ohms.

With gain at unity better than -100 dBu

With gain at 66 dB better than -62 dBu

Equivalent Input Noise better than -128 dBu

High Pass Filters:

Continuously variable swept frequency from 20 Hz to 250 Hz.

Slope: 12 dB/Octave

Gain:

Unity to +66dB in 6 dB steps,

Trim continuously adjustable from -6dB to +6dB

Buss Output:Output is designed to feed a Buss-mix Amplifier (ie. Buss inputs on 5043) at the
internal system level of -2.5 dBu.**Maximum Output Level:**

Maximum output from 20 Hz to 40 kHz is +25 dBu.

Mute:

Mutes Main Output only.

Total Harmonic Distortion and Noise:

@ 1kHz, +20 dBu output:

Main Output: Better than 0.001%

@ 20Hz, +20 dBu output:

Main Output: Better than 0.002%

Silk Engaged: Better than 0.2% Second harmonic

Equalization:**Low Shelving EQ:**

+/- 15dB boost or cut. Corner frequency 160Hz

High Shelving EQ:

+/- 15dB boost or cut. Corner frequency 8kHz 16kHz switch selectable

Mid Peak EQ:+/- 15dB boost or cut. Continuously variable frequency, 80 to 800Hz or
800Hz to 8000Hz switchable**Phantom Power:**

+48 Volts DC +/- 1%

Power requirements:

Voltage range: 9 to 18 Volts DC

Current consumption:

@ 9VDC Current is 910 mA typical: Power = 11.7W

@ 12VDC Current is 670 mA typical: Power = 12.0 watts

@ 15VDC Current is 530 mA typical: Power = 12.0 watts

@ 18VDC Current is 450 mA typical: Power = 11.7 watts

Connector: 5.5mm X 2.1mm DC jack, Center Positive

BLOCK DIAGRAM

