



# MPE-1.1 Mono Parametric Equaliser

## Users Manual

## Welcome...

Thank you for choosing the Buzz Audio MPE1.1 Mono Parametric Equaliser. In this manual you will find important information regarding the use of the MPE and we suggest you do read it before using the unit to become familiar with all the controls.

If after unpacking the MPE you find any damage you should contact your dealer or supplier immediately for advice on what to do.

We also suggest you retain the original packaging at least during the warranty period in case you need to return the unit for service, however we are confident this will not be necessary!

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## 1] The Mains Input.

As a safety precaution your MPE maybe shipped without a mains fuse fitted. Before use, you must select the correct mains voltage for your local supply on the rear panel and fit the correct mains fuse type into the fuse draw for that voltage.

- **Setting the Voltage Selector...**

You will need a medium size flat blade screwdriver.

If your local mains voltage is 110V to 120V set the rear panel voltage selector to 110V.

If your local mains voltage is 220V to 240V set the rear panel voltage selector to 220V.

**POWERING UP THE MPE WITH THE WRONG VOLTAGE SETTING MAY CAUSE SEVERE INTERNAL DAMAGE!**

- **Selecting the Correct Fuse...**

In the supplied accessories bag you will find;

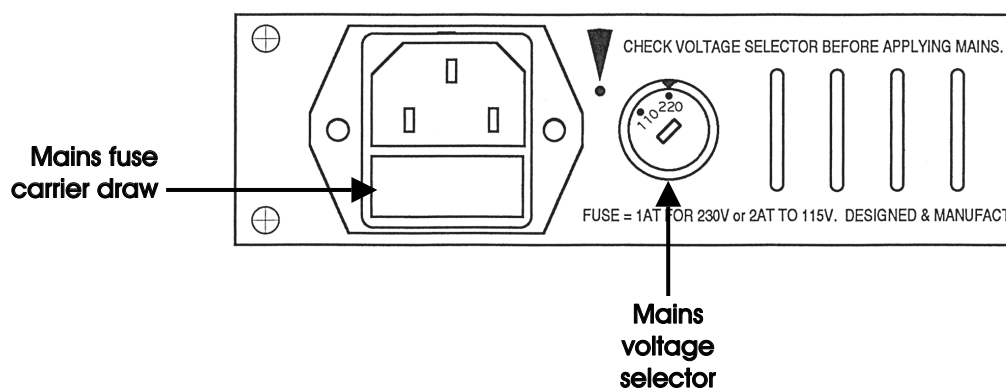
2x 1 Amp slow blow fuses, FIT for 220V to 240V.

2x 2 Amp slow blow fuses, FIT for 110V to 120V.

Slide out the fuse draw below the IEC power inlet using a small flat blade screwdriver and insert the appropriate fuse into the carrier clip. Note there is also a position in the carrier for a spare fuse (the square tube bit) and we suggest you store the second supplied appropriate fuse here.

- **Please Note...**

Fitting the wrong fuse may result in the fuse blowing on power up or inadequate protection. Fitting a fast blow type fuse may also result in the fuse blowing on power up. Your dealer may have already set all this up for you but it pays to check it before powering up the MPE.

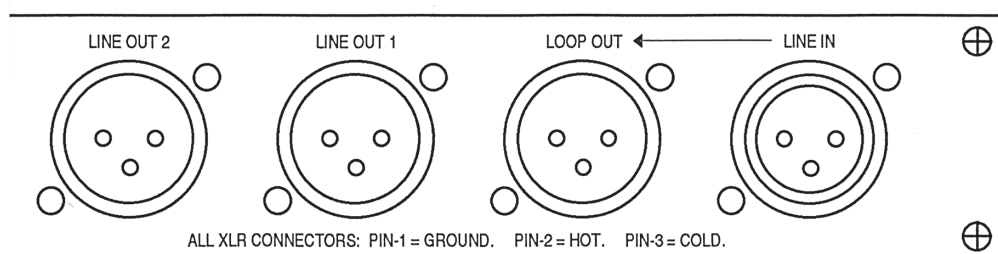


## 2] Connections...

All the audio input and output XLR connectors on the rear of the MPE are wired as follows;

- Pin 1 = Chassis Ground
- Pin 2 = Signal Hot (+)
- Pin 3 = Signal Cold (-)

All inputs and outputs are electronically balanced unless the transformer options have been installed, in which case some connections will be transformer balanced, see the Transformer Options section for more detail on how this works.



- **LINE IN** – this is the audio input to the MPE and it can be used with an unbalanced source in which case pin 2 should carry the HOT (or +) signal and pin 1 and 3 should be tied to GROUND (or shield).
- **LOOP OUT** – this connector is hard wired to the LINE IN and carries the exact same signal. It is provided for ease of connectivity where the source may need to feed another device in daisy chain.
- **LINE OUT 1** – this connector is the audio output of the MPE and is electronically balanced even if the optional output transformer is fitted.
- **LINE OUT 2** – this connector carries the same signal as LINE OUT 1 unless the output transformer option is fitted, in which case it carries the MPE output via the transformer. The combination of the two output connectors gives the user some flexibility in which “sound” to use when the output transformer is fitted.
- **Please Note** – it is OK for the MPE electronically balanced output to feed an unbalanced load due to the use of a “transformer like” output stage which detects the loading on each output leg (pin 2 or 3) and adjusts the drive to that leg accordingly. If a short is detected on any leg, that leg is shut down.

### 3] Input Section...

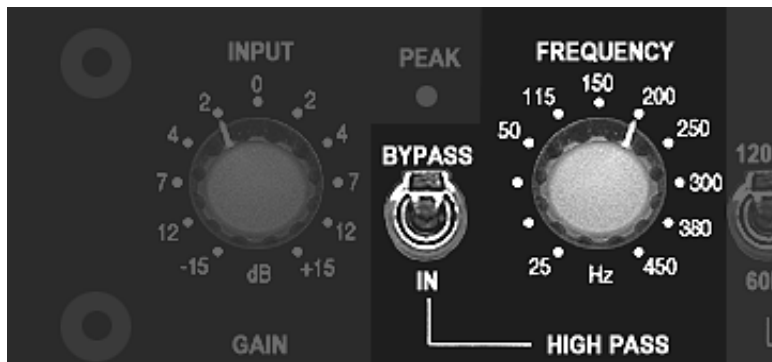


- **INPUT GAIN** - This control adjusts the **GAIN** of the MPE at the input stage and can be used to raise and lower the output level as required. It is useful to match the MPE output level to  $-10\text{dBv}$  devices. If you are applying large amounts of boost in the EQ then it can be used to lower the **INPUT GAIN** to prevent overload. Gain range is  $\pm 15\text{dB}$ , with  $0\text{dB}$  gain being the centre position.
- **PEAK LED** – This red LED is driven by a circuit that monitors signal levels throughout the MPE audio path and will light when a potential overload (or clipping) situation might occur. If the **PEAK LED** is flashing at you, reduce the **INPUT GAIN** to correct it.

#### **Designers Note**

The signal path through the equaliser sections of the MPE runs  $6\text{dB}$  lower than the input and output signal levels to ensure plenty of headroom. The **PEAK LED** will light when levels beyond  $+18\text{dBu}$  are detected in these circuits. Note that this corresponds to an output level of  $+24\text{dBu}$  ( $18\text{dB} + 6\text{dB}$ ). The MPE output stage is capable of  $+23.5\text{dBu}$  before clipping. Depending on what EQ control settings are dialled in, the **PEAK LED** in some cases may be indicating an actual output clip situation.

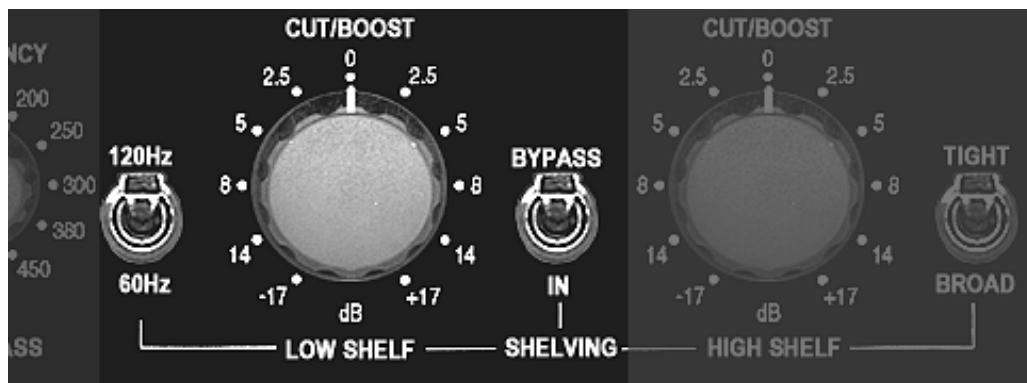
## 4] High Pass Filter Section...



High Pass Filters (HPF) are generally used to eliminate unwanted low frequency sounds from the audio signal. These sounds may be traffic rumble picked up in the recording or excessive low frequency energy in a vocal recording.

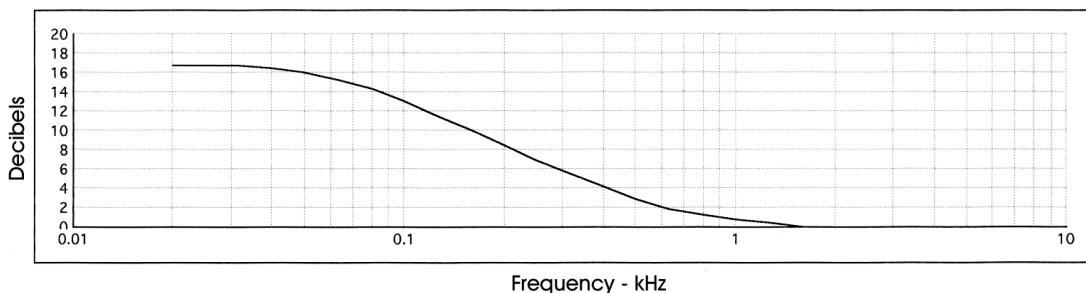
- **FREQUENCY** – this control sets the frequency in Hertz (Hz) at which signal level is attenuated by 3dB, sometimes referred to as the cut off frequency. Frequencies below the cut off point are then attenuated at the rate of 12dB per octave, where one octave equals half (or double) the frequency. For example, with the **FREQUENCY** control set to 200Hz, signal level will be -3dB at 200Hz, -12dB at 100Hz and -24dB at 50Hz and virtually non-existent at 25Hz!
- **BYPASS <> IN** – this switch either places the **HIGH PASS** section into the signal path or bypasses it entirely.

## 5] Low Shelf EQ Section...

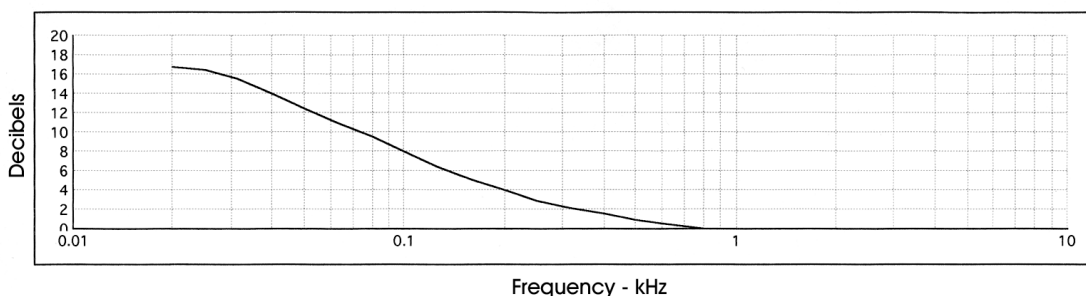


- **CUT/BOOST** – as the name suggests, this control varies the amount of attenuation or gain applied to the lower part of the audio spectrum and is calibrated in dB (decibels). A light detent in the centre of travel marks the 0dB point.
- **120Hz < > 60Hz** – selects the turnover frequency of the **LOW SHELF** control. The **60Hz** position will add real “sub” to the signal, whilst the **120Hz** position affects more of the upper bass frequencies as well. The graphs below show measured performance of the two settings with the **CUT/BOOST** control fully clockwise. This section utilises a real choke (inductor) as the reactive element which results in a much “tighter” sounding bass control than an electronically generated one (gyrator).
- **BYPASS < > IN** – this switch places the **LOW SHELF EQ** and **HIGH SHELF EQ** sections into the signal path or bypasses them entirely.

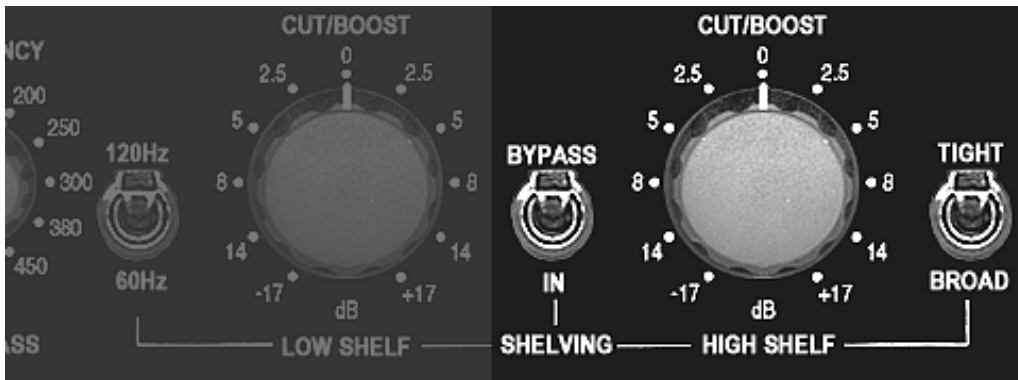
Low Frequency Shelf in 120Hz Mode



Low Frequency Shelf in 60Hz Mode

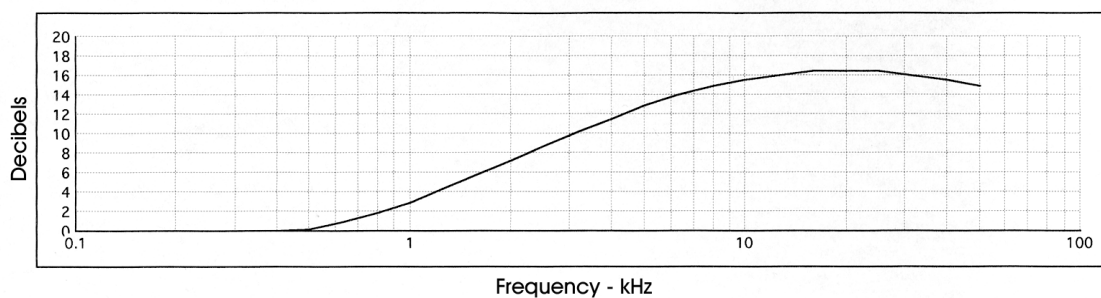


## 6] High Shelf EQ Section...

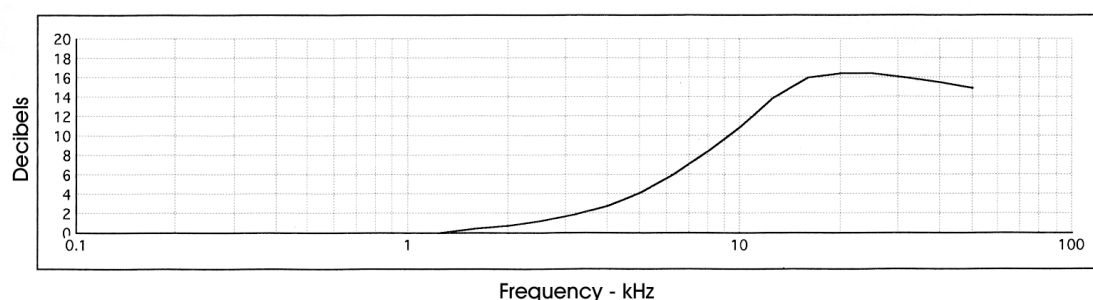


- **CUT/BOOST** – as in the **LOW SHELF** section, this varies the attenuation or gain of the upper part of the audio spectrum.
- **TIGHT < > BROAD** – selects the type of shelving curve. The **BROAD** position is very similar to the type of treble control you will find on a stereo hifi amplifier. The **TIGHT** position allows for the control of very high frequencies without less effect to the upper mid frequencies compared to the **BROAD** setting. The graphs below show the measured response curves of the two settings with the **CUT/BOOST** control fully clockwise (max boost). Note that the **TIGHT** position could also be used as a Low Pass Filter if desired.
- **BYPASS < > IN** – this switch places the **LOW SHELF EQ** and **HIGH SHELF EQ** sections into the signal path or bypasses them entirely.

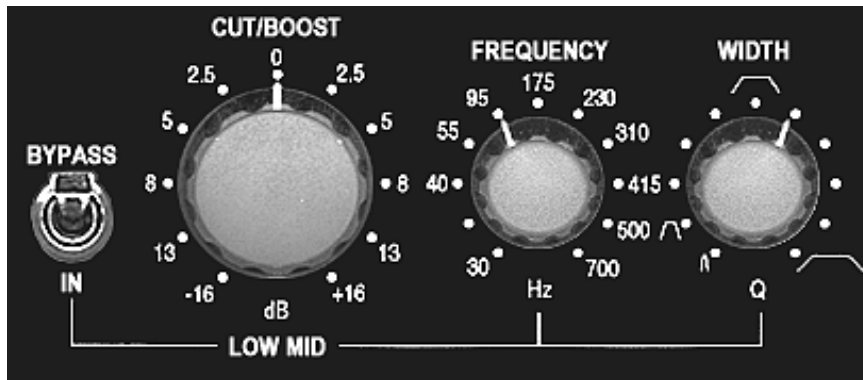
High Frequency Shelf in Broad Mode



High Frequency Shelf in Tight Mode



## 7] Low Mid EQ Section...

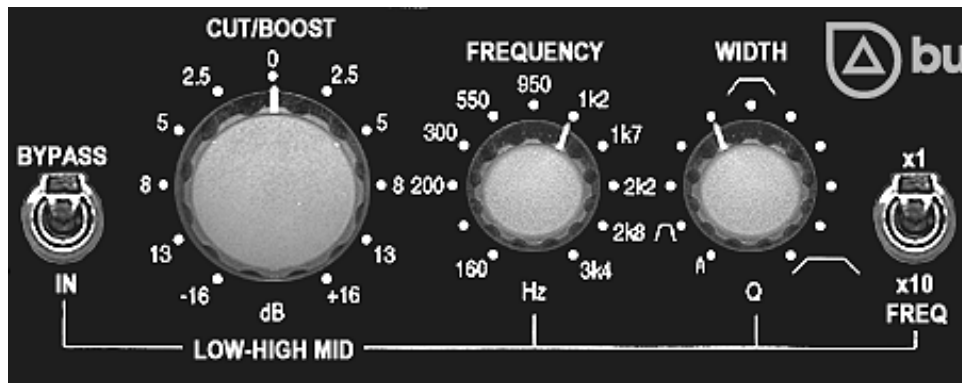


- **CUT/BOOST** – similar to the Shelving sections, this control varies the attenuation or gain of the signal centred around the frequency set by the **FREQUENCY** control.
- **FREQUENCY** – the Mid Band EQ sections are Band Pass (**BOOST**) or Band Reject (**CUT**) filters. The **FREQUENCY** control defines the “centre” frequency at which the Pass or Reject Band is centred. The **WIDTH** control is used to define the “bandwidth” of the Pass or Reject Band. **LOW MID** has a centre frequency range of 30Hz to 700Hz.
- **WIDTH** – sometimes referred to as “**Q**”, this control varies the bandwidth of the reject/pass band (**CUT/BOOST**) at the selected frequency (see **FREQ** below). Fully clockwise, the bandwidth is approx 1.7 octaves (wide). Fully counter clockwise, the bandwidth is approx 0.25 octaves (narrow). This is equivalent to a **Q** of 0.6 and 4.0 respectively. See the next page for graphs.
- **BYPASS <> IN** – this switch places the **LOW MID** section into the signal path or bypasses it entirely.

### Designers Note

The actual filter utilised in the MPE Mid Band EQ design is based on a circuit topology called the Constant Amplitude Phase Shift network (CAPS). Back in the early 1980's, the CAPS network was suggested as an improvement over the more common State Variable Filter by well know UK audio designer Mr Steve Dove. I have always been intrigued by this topology and have pleasure in presenting it here within the MPE.

## 8] Low-High Mid EQ Section...

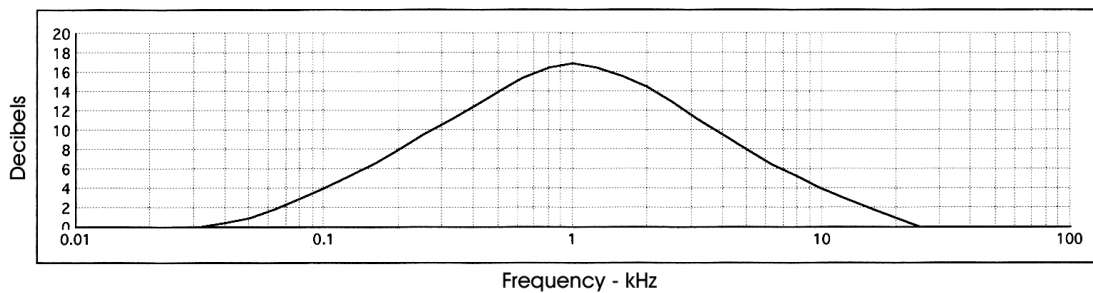


The **LOW-HIGH MID** EQ section is identical in operation to the **LOW MID** section apart from the available **FREQUENCY** range.

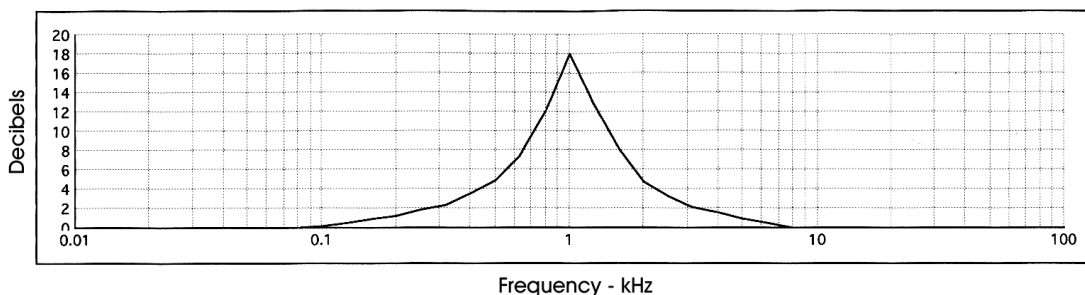
- **x1 <> x10** – this switch multiplies the range of the **FREQUENCY** control by a factor of 1 or 10. The **LOW-HIGH MID** has a range of 160Hz to 3.4kHz in x1 mode or 1600Hz to 34kHz in x10 mode.

The graphs below show the measured performance of the Low-High Mid Band **WIDTH** control at the two extremes, centred at a frequency of 1kHz with **CUT/BOOST** fully clockwise. The Low Mid has a similar response.

**BW Control in Wide Position (CW)**



**BW Control in Narrow Position (CCW)**



## 9] Bypass and Power...



- **TX IN <> ALL BYPASS <> DC IN** – this switch is used to bypass the entire MPE circuitry – but with a twist. In the middle position (**ALL BYPASS**), the MPE input is connected directly to the output via a relay – full bypass including the **INPUT GAIN** control. In the up or down position the MPE is engaged. If the input transformer option is installed, the up position (**TX IN**) of this switch engages the EQ circuitry via the transformer with the down position (**DC IN**) bypassing the transformer and feeding the input directly coupled. If the input transformer option is not installed, the up position is the same as the down position. Hopefully all that makes sense to you!
- **POWER <> ON** – turns the MPE mains power **ON** and **OFF** and a yellow indicator light directly above shows you when the unit is powered.

## 10] Transformer Options...

As mentioned early in this manual, the MPE can be fitted or retro-fitted with input and output transformers. The available output transformer option is a Sowter Type 8403X. At the time of printing this manual, the only input transformer option is the Sowter 3575C but we will make available a variety of input transformer options in the near future. Please visit our web site [www.buzzaudio.com](http://www.buzzaudio.com) for more information and updates.

Retro-fitting the output transformer requires some soldering on the output connectors. The input transformers can be installed with simple hand tools, no soldering required. Instructions for fitting the transformers are supplied with the kit or can be downloaded from our web site.

## 11] Equaliser Glossary...

**Bandwidth** – is the difference between the upper and lower points where the filter response falls to 3dB below its peak value on the way out of the pass band.

**Centre Frequency** – the centre frequency of the pass band of any type of filter or combination of filters is the geometric mean of the lowest and highest frequency of the pass band.

**Equaliser** – a device consisting of reactive elements that may be connected into an electrical circuit for the purpose of altering the frequency characteristics of that circuit either up or down.

**Filter** – a device or network that favours certain frequencies at the expense of others. Filters can either pass or reject bands of frequencies (band pass or band reject) or can pass only high frequencies or low frequencies (high pass or low pass).

**Frequency** – indication of how many cycles of a repetitive waveform occur in 1 second. A waveform that has a repetition cycle of once per second has a frequency of 1Hz (Hertz).

**Inductor** – a reactive component that presents an increasing impedance with increasing frequency, often referred to as a “choke”, and usually constructed with a coil of wire on a metal or air filled former.

**Octave** – doubling or halving of a given frequency (or pitch). When a frequency is transposed up by one octave, its frequency is doubled.

## 12] Specifications...

### Frequency Response

All EQ sections BYPASSED ..... 3Hz to 200kHz (-3dB)

All EQ sections IN, no CUT/BOOST, HPF fully CCW..... 25Hz to 180kHz (-3dB)

### Total Harmonic Distortion

All EQ sections IN ..... 100Hz=0.0035% 1kHz=0.0035% 10kHz=0.0065%

### Noise (measured A weighted, 150R source Z, ref to 0dBu=0.775mV RMS)

All EQ sections BYPASSED ..... -95dBu

All EQ sections IN, no CUT/BOOST..... -88dBu

**Maximum Input and Output Level** ..... +23.5dBu

### General

Power requirements..... 115V/230V selectable on rear panel

Dimensions ..... 1U rack mount, 250mm deep

Weight ..... 6kg

## 13] Warranty/Service Information...

We are confident that you will receive many years of trouble free operation from your unit. If however you experience any technical problem with your MPE1.1, contact your dealer or Buzz Audio for recommendations on what to do. The modular nature of the MPE construction means most electronic faults can be easily repaired by swapping the circuit board.

For on line support visit our web site; [www.buzzaudio.com](http://www.buzzaudio.com)

Buzz Audio, 77 Kent Tce, PO Box 6677, Te Aro, Wellington, New Zealand.

Voice/Fax 64+4+385-2478.

Email; [support@buzzaudio.co.nz](mailto:support@buzzaudio.co.nz)

- **Disclaimer**

Buzz Audio is not liable for any damage to microphones, amplifiers, consoles, speakers or any other equipment and/or electric shock to humans that is caused by negligence or improper installation and/or use of the MPE1.1 Mono Parametric Equaliser.

- **Product Warranty**

Buzz Audio guarantees the MPE1.1 Mono Parametric Equaliser to be free of defective materials and/or workmanship for a period of 2 years from the date of sale, and will replace defective parts and repair malfunctioning products under this warranty when the defect occurs under normal installation and use – provided the unit is returned to our factory (or duly authorised service centre) via prepaid transportation with a copy of the proof of purchase, ie, sales receipt. This warranty provides that examination of the returned product must indicate, in our judgement, a manufacturing defect. This warranty does not extend to any product that has been subjected to misuse, neglect, accident, improper installation, or where the date code has been removed or defaced.