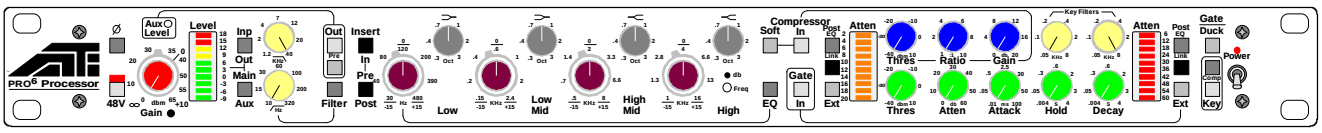
Audio Toys Inc.™

# PRO$^6$ Processor

## Multiple Mode Audio Processor




# Manual

# Contents

## Introduction:

ATI would like to congratulate you on this **PRO6** purchase. ATI realizes the importance of any equipment purchase and would like to assure you that strong product support has always been a commitment of ATI.

## The History:

The **PRO6** was developed in response to the wide scale acceptance of the ATI Paragon as the reference standard in sound reinforcement consoles. Possibly the most innovative feature of the console is the input processor module. A number of live and studio sound engineers are responsible for the development of the **PRO6**. The sonic quality of the high voltage mic pre-amp coupled with the responsive equalizer and high quality VCA make the **PRO6** a perfect device for the mixing engineer who needs all the tools in one chassis. Additional versatility was added to allow the external keying of the gate/ducker and compressor. Inter-unit linking was added to provide stereo coupling. This document will outline the basic blocks of the **PRO6** and show some unique ways in which this device could be used on your next project.

## Overview:

There are six audio blocks that make up the **PRO6**. These are: High Voltage Microphone Preamplifier, 24dB per octave High and Low pass filters, Four Band Fully Parametric Equalizer (with shelving on each band), ATI's patented Compressor Circuitry, and Fully Parametric Noise Gate and Audio Ducker (with key filters).

External key audio inputs appear on the rear panel for the compressor and gate / ducker. In addition to the Main output an Auxiliary audio output is provided that can be switched either post mic amp, pre VCA or post VCA . Comprehensive signal meter selection allows the level meter to display either Input level, Main output or Auxiliary output. The compressor and gate / ducker have individual signal attenuation meters. External devices can be inserted and this point is switched into circuit via the in/out switch. The insert point can be positioned pre/post the equalizer.

On the Rear panel there are ground lift switches for the Main input, Main outputs and for the External audio key inputs and Insert point. Four Inter-link jacks allow multiple **PRO6** to be linked together for dynamics control. All inputs and outputs are fully balanced. AC input can either be 117VAC or 240VAC and has an operating range from minus 15% to plus 10% of nominal.

## Signal Flow

The proprietary ATI microphone preamplifier will accept signal levels from 0dB to minus 65dB. This preamplifier has 48+ve and 48-ve power rails and produces very low THD even at high input levels or gain. **See Input / Filter.** The output of the Mic preamp feeds the high and low pass filters and can feed the Auxiliary output via the Aux. output select switching. **See Auxiliary Output.** The Input gain control has 31 position detents for easily resetable gain. Following the main gain stage there is a phase reverse switch. The **PRO$^6$** is pin 2 hot. The Input signal level can be displayed on the level meter. **See Level Meter.** After the filter section the signal can either go directly to the equalizer or to the insert send / return point. Normal setting is insert point pre equalizer. **See Equalizer / Insert.** Internal control signals for the Gate and the Compressor can be taken off directly prior or immediately after the equalizer circuit. These signals are selected by the Ext and Pre / Post or Link switches for the Gate and the Compressor. The main gain cell ( VCA ) is controlled by the parameters set by the Gate and Compressor controls. **See Gate and Compressor sections.** The main output will have the final processed signal or the Gate or Compressor control input signal. If the Key switch is depressed either the Gate or the Compressor audio signal can be monitored via the main output. **See Key / Power.**

**For a better understanding of the signal flow always refer to the Block Diagram found on page 2.1.**

**NOTE: There are a great many switches on the PRO$^6$. In the event that it is not obvious what and in which position a switch functions, please read the appropriate description carefully. Because of switch to switch proximity,** *some function labels are above a switch and other cases labels are below***.**

## Specifications

**Frequency Response:**
+0/-1 dB, 10Hz-100kHz
(or as defined by HP/LP filters)

**Gain Structure:**
20dB headroom throughout
THD+N 0.008%, 20Hz-20kHz, at +4dBm
Clipping Level- All Stages: +24dBm
Total Voltage Gain: 80 dB at Aux Out

**Hum and Noise:** (20kHz Bandwidth)
-132 dBm E.I.N. (shorted input)
-129 dBm E.I.N. (150 ohm source)
-90 dBm residual output noise

**Input Preamp/Trim Control:**
Proprietary High Voltage Preamp
Adjustable Gain 0-65dB, single control
(no pad required)
31 Detented 1.5 dB steps on level control
Constant Input Impedance: 4K ohms
RFI filter, 2 pole Bessel, 500kHz
Better than 0.008% THD+N at +60dB gain
CMR >80 dB, no trimming required
RMS level display- 30 dB range
Phantom Power +48 volts

**High/Low Pass Filters:**
10Hz-320Hz HPF
1.2kHz-40kHz LPF
4th order, 24dB/Octave Modified Bessel

**Equalizer:**
4 Band Parametric, all Peak/Shelf type
LF: 30Hz-480Hz LM: 150Hz-2.4kHz
HM: 500Hz-8kHz HF: 1KHz-16kHz
Infinite Headroom in filter stages
True Linear dB scale for cut/boost
Ultra Low Noise/Low Distortion
Maximum cut/boost +/- 15 dB
Variable Q from 0.3 to 3 Octaves

**Compressor/Limiter:**
Key Listen
RMS Level Detection
Hard/Soft Knee selection
Threshold: -40dBm to +10dBm
Ratio: 1:1 to 10:1
Gain: 0 dB to +20 dB
Gain Reduction Display, 20 dB range

**Noise Gate/ Ducker:**
Key Filters: HP/LP 24dB/Oct.,50Hz to 8kHz
Key Listen
Threshold: -40dBm to +10dBm
Attenuation Depth: 0 to 60 dB
Attack Time: 10uS to 100mS
Hold Time: 4mS to 4S
Decay Time: 4mS to 4S
Gain Reduction Display- 60 dB range

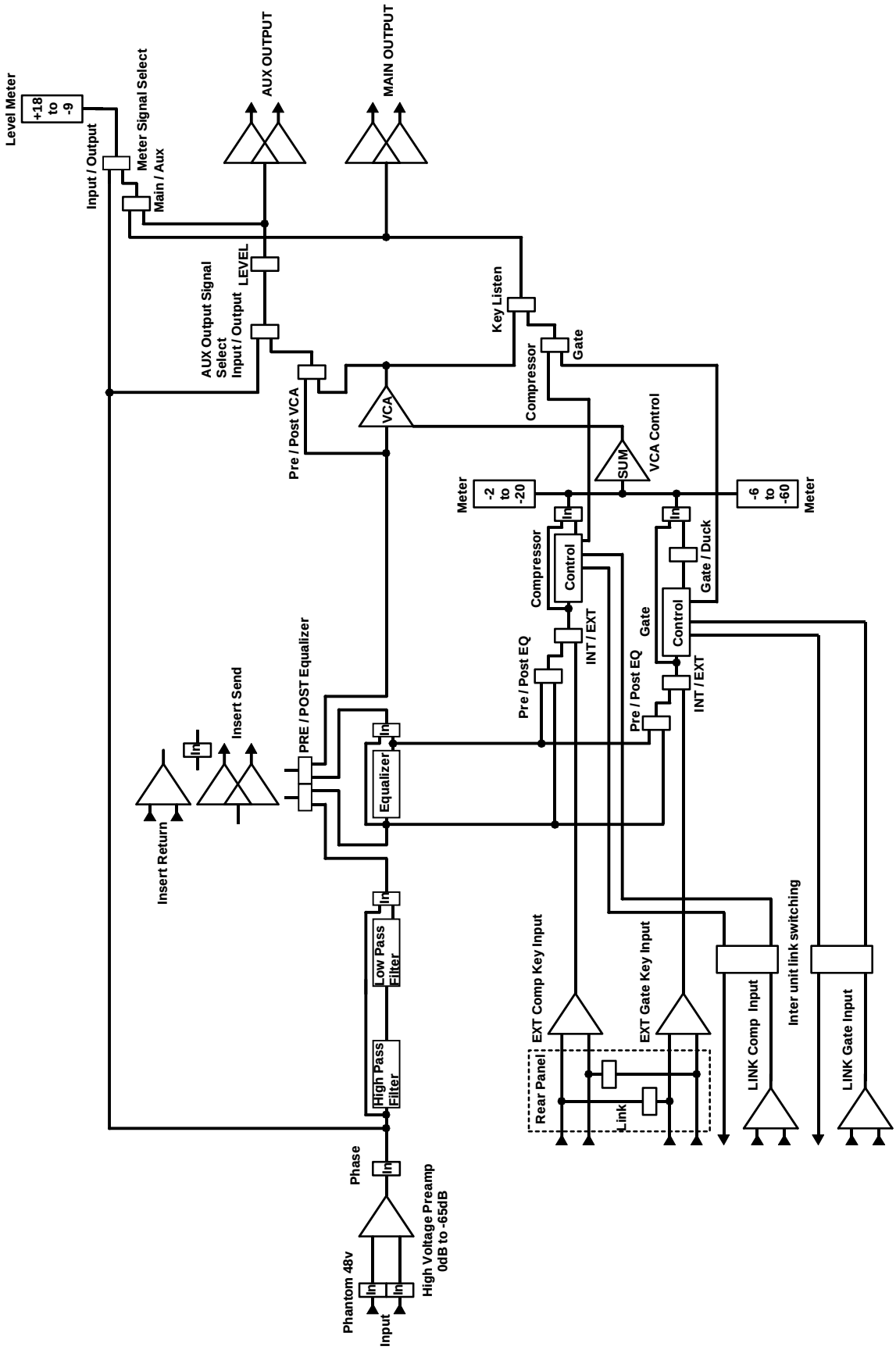
**General / Physical**

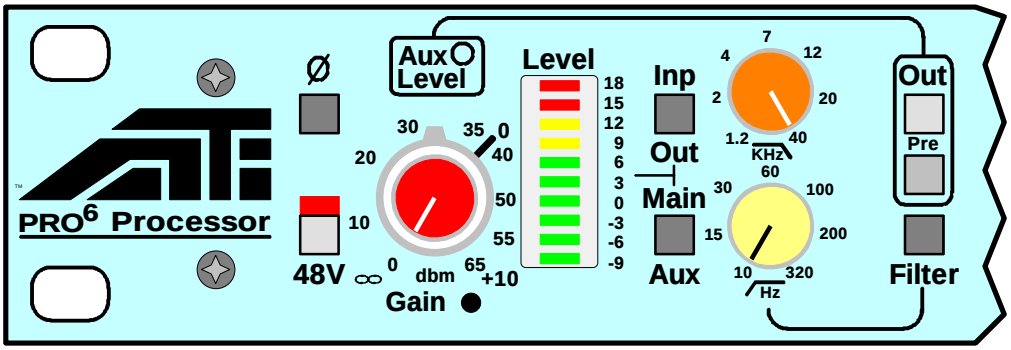
**Connectors:**
Input and Output: XL-type 3 pin (pin 2 High)
Link, Insert and Ext. Key: 1/4 in.
(63mm)phone jacks
AC Input: RF Filtered, Fused, Voltage Select
AC Line cord: IEC type, Detachable

**Dimensions:**
1U, 1 3/4 x 19 in. (44mm x 483mm)
11 in. depth behind front panel (280mm)

**Weight:** 7 Lbs. (3.2kg)

**Electrical Requirements:**
100-120/220-240 V AC, 50-60 Hz, <60 watts


Level Meter
+18
to
-9
Input / Output
Meter Signal Select
Main / Aux
AUX OUTPUT
MAIN OUTPUT
AUX Output Signal
Select
Input / Output
LEVEL
Key Listen
Gate
Compressor
Pre / Post VCA
VCA
SUM
VCA Control
Meter
-2
to
-20
-6
to
-60
Meter
In
Compressor
Control
Gate / Duck
Gate
Control
Pre / Post EQ
INT / EXT
Pre / Post EQ
INT / EXT
Insert Send
PRE / POST Equalizer
In
Equalizer
Insert Return
In
Low Pass
Filter
High Pass
Filter
EXT Comp Key Input
EXT Gate Key Input
Inter unit link switching
Rear Panel
Link
LINK Comp Input
LINK Gate Input
Phase
In
High Voltage Preamp
0dB to -65dB
Phantom 48v
In
In
Input




## Phase ( Ø )

Phase invert switch is provided and when in the down position will invert the phase / polarity of the input signal.

NOTE: Normal operation is Pin 2 Hot (+ve)

## Phantom Power ( 48V )

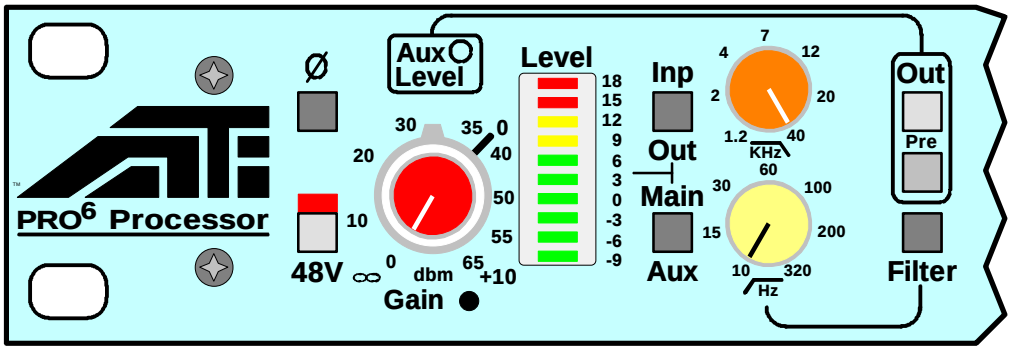
When this switch is in the down position 48 Volts is placed on pin 2 and pin 3 of the input XLR. **Note: If 48V phantom is being used from this unit the input ground lift switch on the rear panel MUST be in the grounded position ( down ) to provide a ground return path for the phantom voltage.** A red LED located the 48V switch will illuminate when 48V is ON.

## Input Level ( Gain )

The inner knob of this dual concentric control is the Input Gain set potentiometer. The gain of the preamplifier can be adjusted from 0dB ( unity ) to maximum gain of 65dB. The control has 31 detents. The maximum input signal is +24dB.

## Level Meter

The ten segment tri-color LED can display any one of three signals. Input, Auxiliary Output or Main Output. The Inp / Out switch selects the Input signal, in the Inp (up) position, or when depressed either of the output signals. When Out is selected the Main / Aux switch is used to select the Main Output signal (up) or the Aux Output signal (down). The Meter will display signals from -9dB to +18dB and is peak reading.

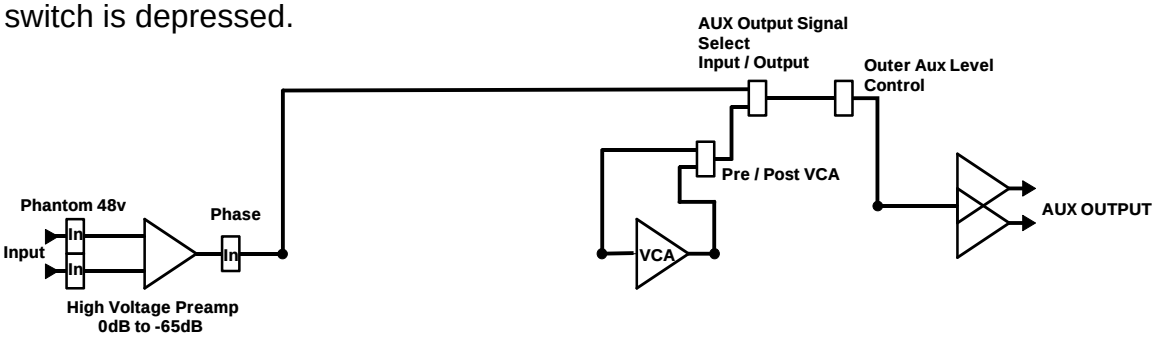



## High and Low Pass Filters

High and Low pass filters are in circuit when the in / out switch labeled Filter is depressed. Both filters have 24dB per octave slopes. The High Pass filter is adjustable from 10Hz up to 320Hz. The Low pass filter is adjustable from 40KHz down to 1.2KHz.

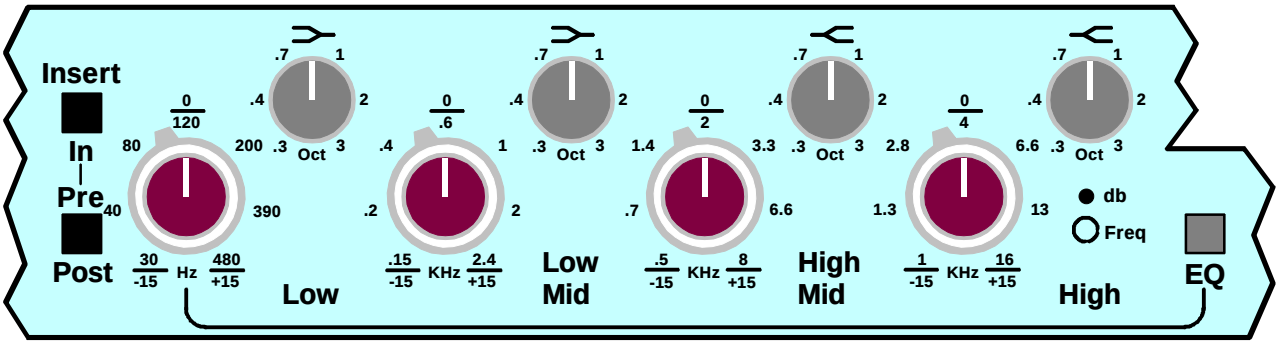
## Auxiliary Output

The outer control around the Input Gain set control is the Auxiliary Output Fader and has a maximum gain of +10dB. The Auxiliary output is balanced. Auxiliary output signal can be one of the following: Input signal ( pre filter ) or Pre or Post VCA. To select the Input signal the OUT switch needs to be in the up position. When this switch is depressed the signal pre or post VCA is determined by the switch directly under the OUT switch. Pre VCA signal is selected when this switch is depressed.




## Main Output

The Main output is balanced and the main output signal is post all processing. See Key Listen.




## Insert

A fully balanced insert point is provided. The send and return connectors are TRS with Tip being in phase. Nominal input and output level of the insert point is 0dB. There are two signal insertion points that can be used. In the up position the Pre / Post switch selects the insert point to be PRE Equalizer. In the depressed position the insert point will be POST equalizer. In both cases the Insert IN switch will select the insert return signal to the audio path. The insert send is always active.

## Equalizer

Four bands of fully parametric equalization with shelving have the following characteristics:

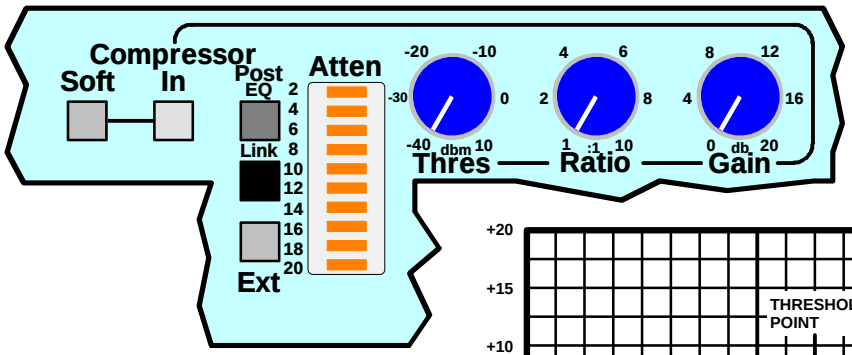
The Inner control of the dual concentric has a center detent and will lift or cut the selected frequency by 15dB.

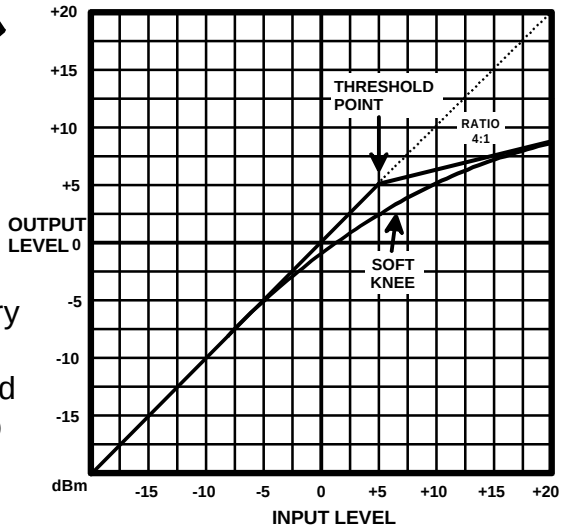
The Outer control of the dual concentric selects the frequency for each equalizer band. The four bands cover the following frequencies:

LOW 30Hz to 480Hz
LOW MID 150Hz to 2.4KHz
HIGH MID 500Hz to 8KHz
HIGH 1KHz to 16KHz

The small single control determines the Bandwidth or Q of each individual equalizer band. This control has a push / push latching switch which determines whether the particular band is shelf type or peak / dipping. When the control is depressed (latched) the band will be peak / dipping and the bandwidth can be varied from .3 Octaves to 3 Octaves. When the control is UP the band is a shelving type and the bandwidth control is disabled.

The Equalizer is in circuit when the EQ switch is depressed.




## Compressor

The Compressor control circuitry is independent of the Gate control circuitry and has a number of control signal sources. The IN switch when depressed will feed Compressor control voltage to the VCA.

## Threshold Control ( Thres )

The Threshold Control sets the signal level above which compression will occur and can be adjusted for signal levels from -40dBm to +10dBm.

## Ratio Control ( Ratio )

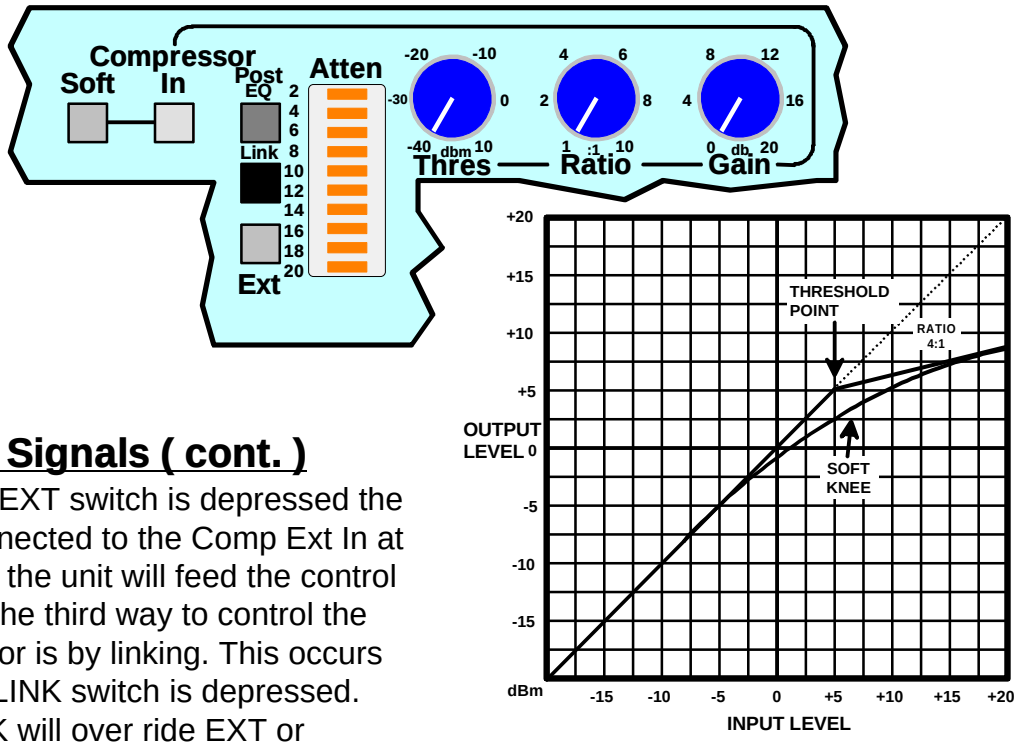
This control varies the compression ratio from 1:1 to 10:1. Compression occurs at ratios of 1:1 to 4:1, and limiting at ratios from 4:1 to 10:1.

## Gain Control ( Gain )

In the full clockwise position, this control adds 20dB of additional gain to compensate for compression level loss. The control is continuously variable from 0 to 20 dB.

## Control Signals

Normal signal feed to the control circuitry is PRE equalizer. However if the POST EQ switch is depressed the control signal will be POST equalizer and is PRE the main signal equalizer IN / OUT switch. Therfore if the E.Q. is not required in the main audio path it is possible to use the post E.Q. signal to feed the compressor control circuitry with the result being frequency dependent compression. See Key section on page 7.0.




## Control Signals ( cont. )

When the EXT switch is depressed the signal connected to the Comp Ext In at the rear of the unit will feed the control circuitry. The third way to control the Compressor is by linking. This occurs when the LINK switch is depressed. Note: LINK will over ride EXT or NORMAL control signals. This LINK facility is provided to allow units to be configured as master and slave(s). The control voltage from the master unit Link OUT jack is fed into the slave at the Comp Inter-unit DC Link IN socket on the rear of the unit. **This is a DC control port only.** ANY changes made to Threshold and Ratio are passed on to the slave unit. Compressor make up Gain is **not** effected and can be adjusted independently on the master and slave units.

## Soft Knee ( Soft )

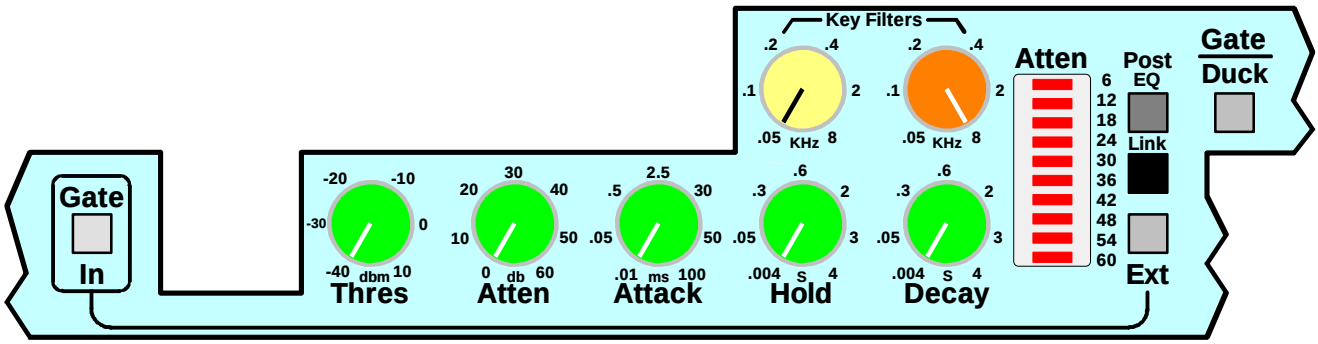
The compressor Soft Knee is selected in the depressed position and provides a gradual transition across the threshold into compression. In the up position, a hard transition occurs at the threshold going into compression.

## Gain Reduction Display ( Atten )

The orange 10 segment display indicates the amount of signal attenuation produced by compressor action. The display is calibrated in 2dB steps from -2dB through -20dB attenuation.

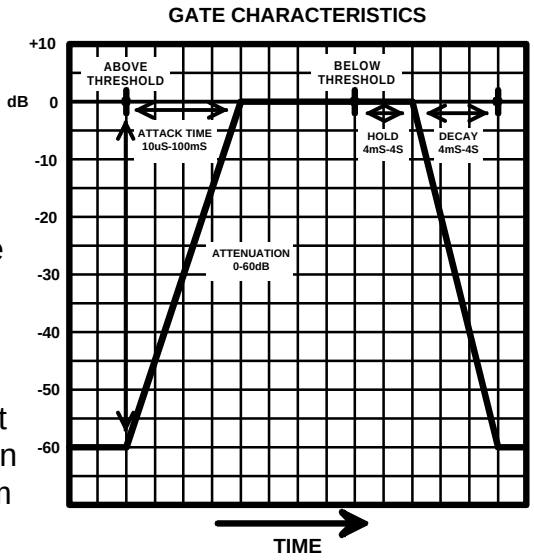
## Compressor Key Signal Listen

See section on Key Listen (p7.0).




## Gate / Ducker

The Gate / Ducker control circuitry is independent of the Compressor control circuitry and has a number of control signal sources. The IN switch, when depressed, will feed Gate control voltage to the VCA.




## Threshold ( Thres)

This rotary control sets the signal level at which the gate will open or close, and can be adjusted for signal levels from -40dBm to +10dBm.

## Attenuation Depth Control ( Atten )

The amount of attenuation applied when the gate is closed is adjusted with this control. Attenuation can be set from 0dB to 60dB.

## Attack Time Control ( Attack )

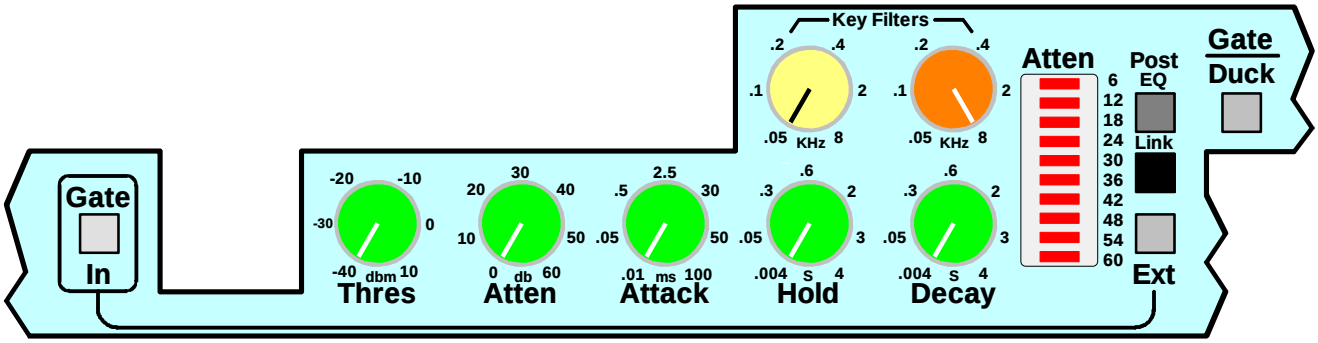
The Attack Time Control sets the rise time of the noise gate and is adjustable from 10uS to 100mS. The slope of the attack is dB linear.

## Hold Time Control ( Hold )

This control establishes the amount of time the gate remains open ( after the signal level drops below the threshold set point ) before triggering the decay circuit. Hold time is adjustable from 4mS to 4S.

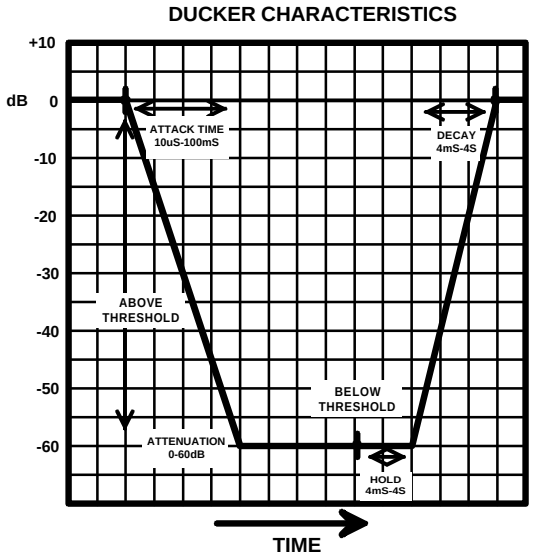
## Decay Time Control ( Decay )

The Decay control determines the fall time for the gate to reach full attenuation once the time period set by Hold has elapsed. Decay is adjustable from 4mS to 4S. The slope of the decay function is dB linear.




## Key Filters

The two filters are configured as a low pass and high pass. Each have a sweep range of 50Hz to 8khz. The gate control signal that feeds the Gate / Ducker control circuitry can be band pass filtered by use of these controls.




## Control Signals

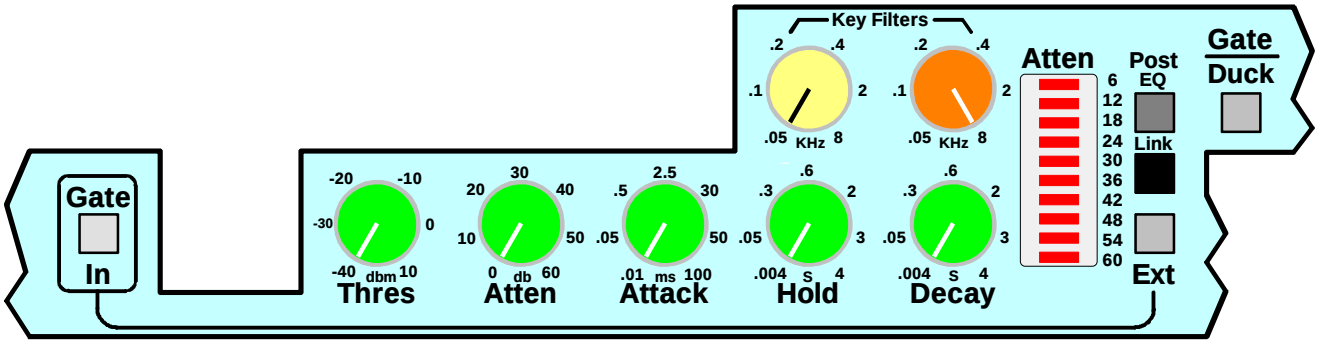
Normal signal feed to the control filters is PRE equalizer. However if the POST EQ switch is depressed the control signal will be directly POST equalizer. When the EXT switch is depressed the signal connected to the Gate Ext In at the rear of the unit will feed the control signal filters. The third way to control the Gate / Ducker is by linking. This occurs when the LINK switch is depressed. Note: LINK will over ride EXT or NORMAL control signals. This LINK facility is provided to allow two units to be configured as master and slave. The control voltage from the master unit is fed into the slave at the Gate DC Link In socket on the rear of the unit. ANY changes made to Threshold, Attenuation, Attack, Hold and Decay also control the slave unit.

## Gate / Duck

As shown by the graph on this page the Duck function is opposite to that of Gating. In the Duck mode with the EXT switch depressed the main signal will be attenuated ( Atten control ) when the EXT audio signal goes above the desired threshold ( Thres ). All other controls adjust their particular parameters. Ducking occurs when the Gate / Duck switch is depressed.

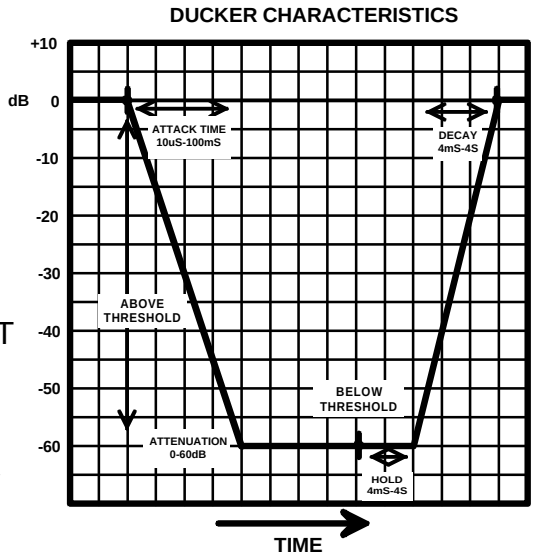
## Attenuation Display ( Atten )

The red 10 segment display indicates the amount of signal attenuation produced by the action of the gate controls. Indication is -6dB to 60dB in 6 dB steps.




## Gate / Duck

As shown by the graph on this page the Duck function is opposite to that of Gating. Typically the Ducker would be used with the EXT IN key input selected. In the Duck mode with the EXT switch depressed the main audio signal will be attenuated ( Atten control ) when the EXT audio signal goes **above** the desired threshold ( Thres ). All other controls adjust their particular parameters. The Ducking function occurs when the Gate / Duck switch is depressed.

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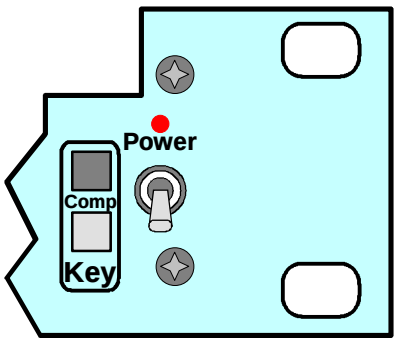
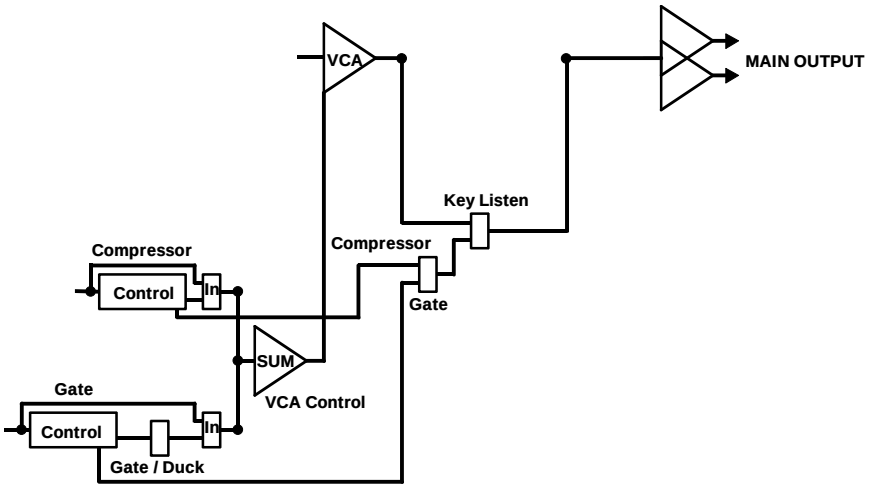


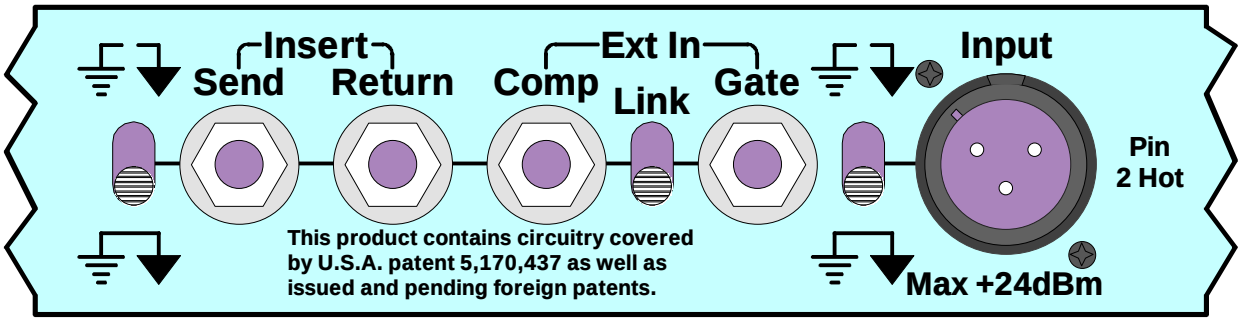

## Key Listen ( Key )

In the normal position (up) the processed or main audio signal will be present at the Main output XLR. If the switch is depressed either the Compressor control signal or the Gate control signal post Key Filters will be present at the Main output XLR. The switch directly above the Key switch determines this. This switch in the normal (up) position will select the Gate control signal and when depressed the Compressor audio control signal.




## Power

The main power switch for AC input.
When switching this unit to operate on either 120Vac input or 240Vac always check the fuse value. The fuse plug contains a spare fuse. For 120Vac 500mA slow blow and for 240Vac 250mA slow blow.




## Input XLR

Main input XLR will accept a maximum signal level of +24dB. Pin 2 is in phase. The switch to the left of the XLR when in the up position will remove the unit ground from pin 1 of the XLR.

**Note: If 48V phantom is being used from this unit the switch must be in the down position.**

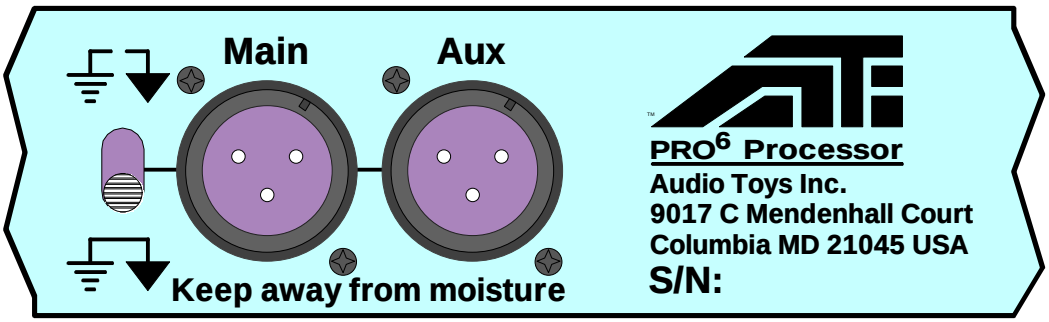
## External Input ( Ext In )

The external in jacks are provided for the external audio control of the Gate and Compressor. Both jacks are balanced, will accept signals of +24dB, and are TRS tip hot. Used in conjunction with the Compressor Ext and / or Gate Ext switches on the front panel the applied signal will feed the corresponding control circuitry. The signals can be independent or with the Link switch in the up position will be cross connected. The Link switch shorts the Compressor and Gate External In jacks together. Ground lift for these inputs is to the left of the Insert Send jack.

**Note: Do not connect signals from different sources to the Ext Compressor jack and Ext Gate jack with the Link switch in the up position.**

## Insert Points ( Insert )

The insert send and insert return are balanced TRS jacks. The insert send is always active. The signal at the insert send is determined by the PRE / POST EQ switch on the front panel. The insert return is accepted when the INS switch on the front panel is depressed. Max. input / output level is +24dB. As mentioned above, the ground lift switch for the External Audio Control Inputs and for the Insert Point jacks is to the left of the insert send jack. In the up position the unit ground is removed from the shield connection of the jacks.

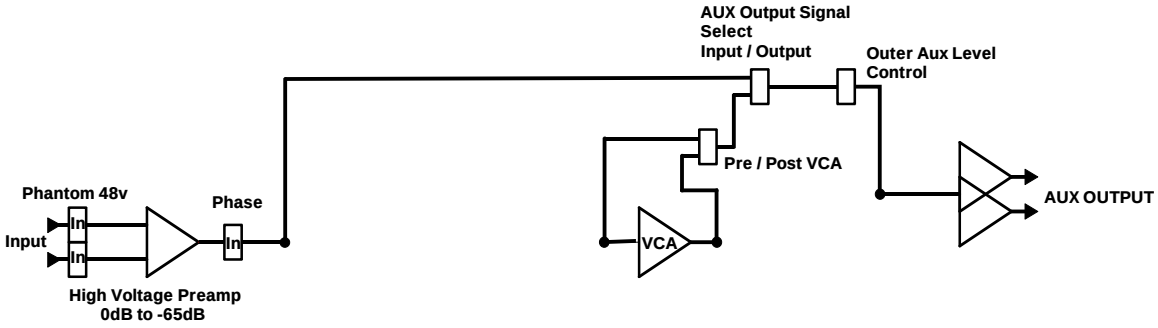



## Main Output ( Main )

The Main output is balanced and the main output signal is post all processing. **See Key Listen**. Maximum output is +24dB pin 2 +ve (in phase).

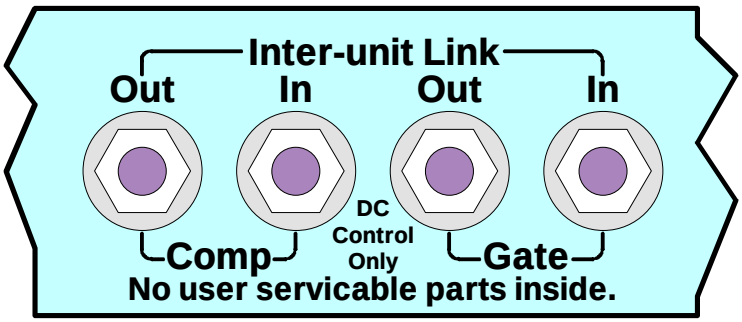
## Auxiliary Output

The outer control around the Input Gain set control is the Auxiliary Output Fader and has a maximum gain of +10dB. The Auxiliary output is balanced. Auxiliary output signal can be one of the following: Input signal ( pre filter ) or Pre or Post VCA. To select the Input signal the OUT switch needs to be in the up position. When this switch is depressed the signal pre or post VCA is determined by the switch directly under the OUT switch. Pre VCA signal is selected when this switch is depressed.




## Output Ground Lift

The Main and Auxiliary Outputs have a ground lift switch which, in the up position will remove the unit ground from the pin 1 of both output XLR's.

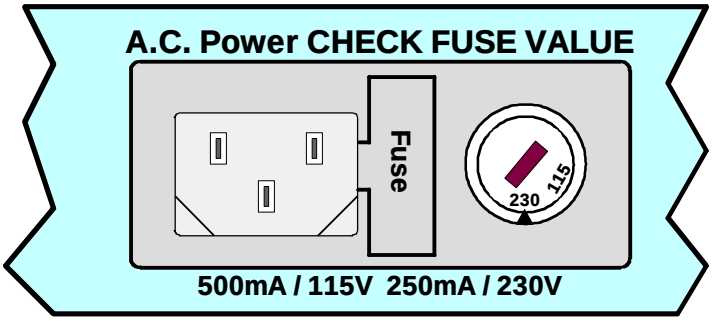



## Inter-unit Link

There are four jacks provided for the inter linking of **PRO$^6$** units. Used in conjunction with the LINK switch on the front panel the DC voltages presented at the IN sockets will be fed to the relative control circuitry. The Compressor / Gate link circuitry is independent of one another and **accept DC control voltages only.**

With a DC link voltage connected to the Gate Link In socket and the link accept switch on the front panel depressed the link DC voltage being applied will control the Gate parameters and appear on the Gate Link Out socket. The same is true for the Compressor DC control. **See Gate and Compressor Control Signals.**

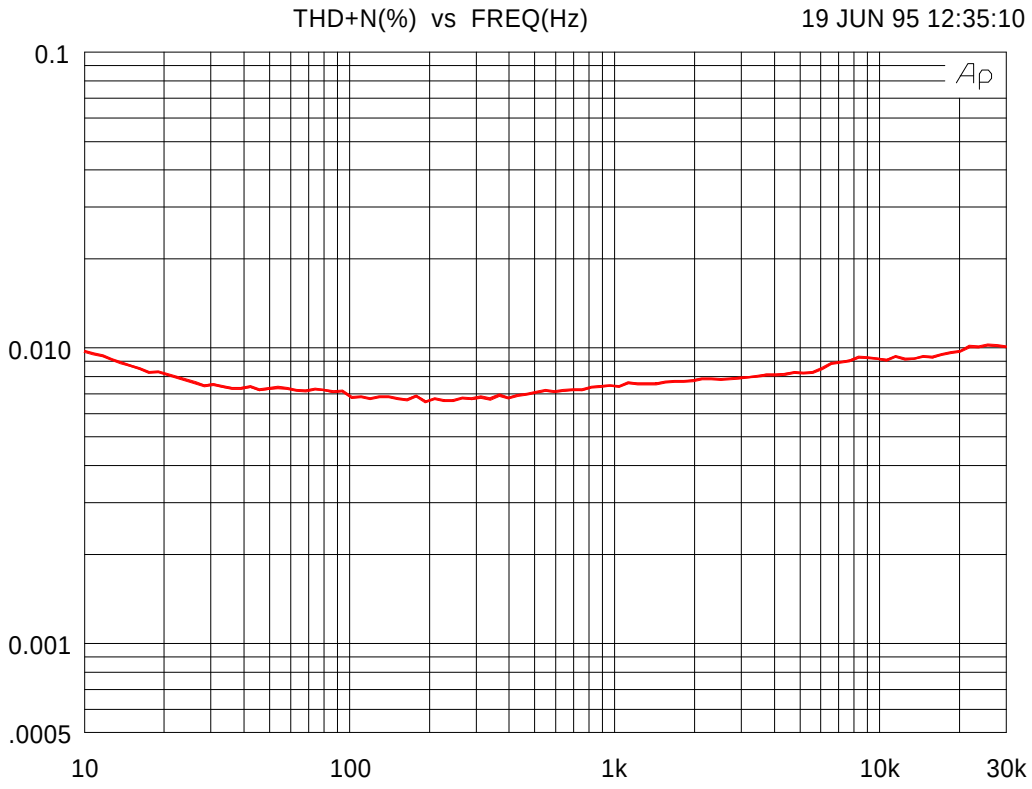
**Note: Link Inputs are balanced and should be connected using balanced TRS jack to jack leads.**



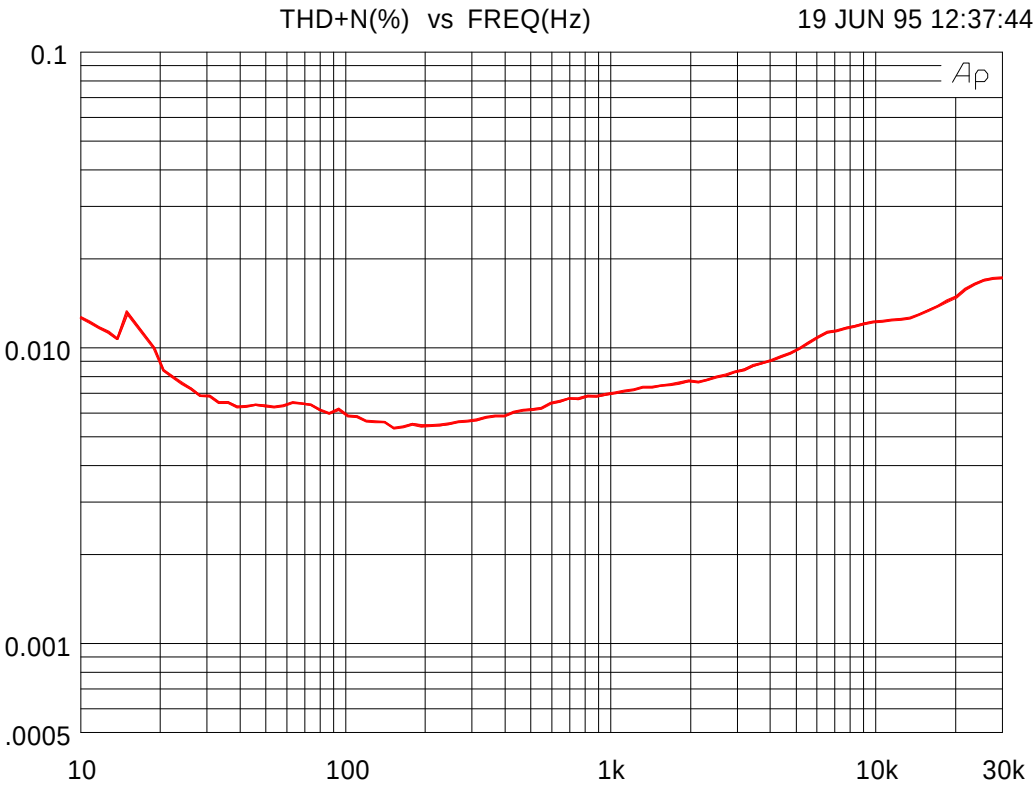

## AC Input

IEC mains input socket includes the fuse socket and voltage tap switch. Mains input voltage is set for nominal 120VAC{115} ( 500mA ) or 240VAC{230} (250 mA ). **When changing AC input voltage check the fuse value** that is in place. Both fuse values are supplied and the spare fuse is stored in the removable fuse “plug” body.

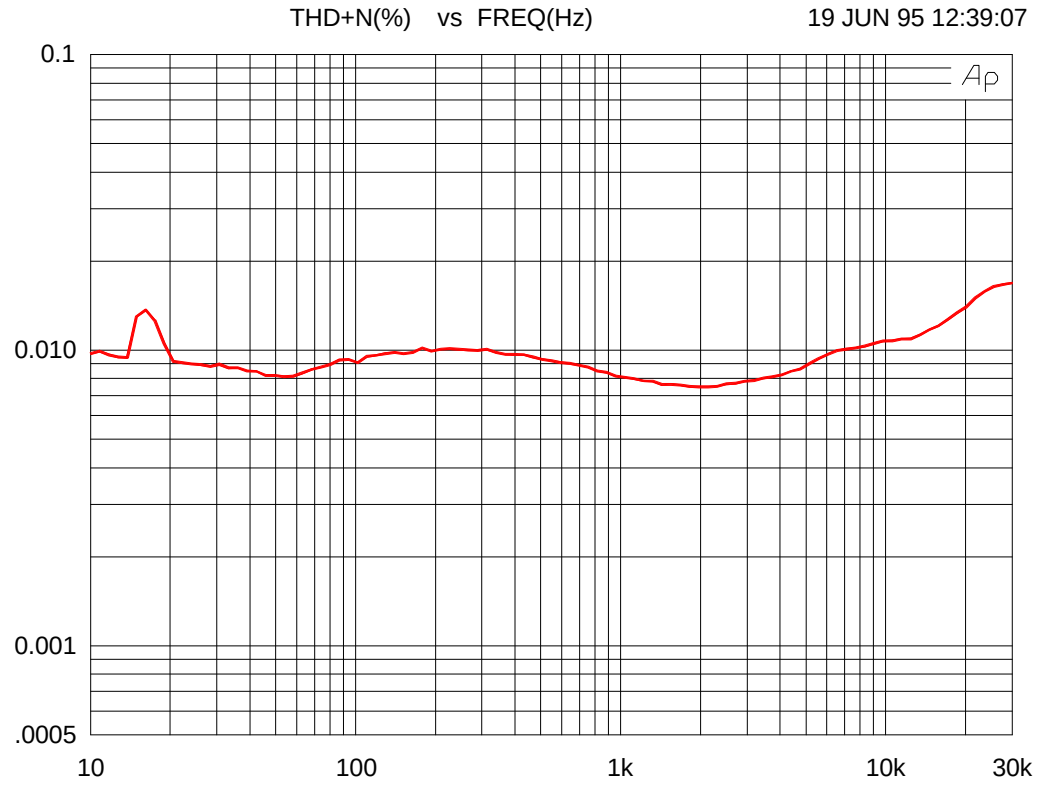
***Note: Do not operate this equipment with the main AC ground connection lifted. Use the ground lift switches if loop problems occur and recheck wiring design.***



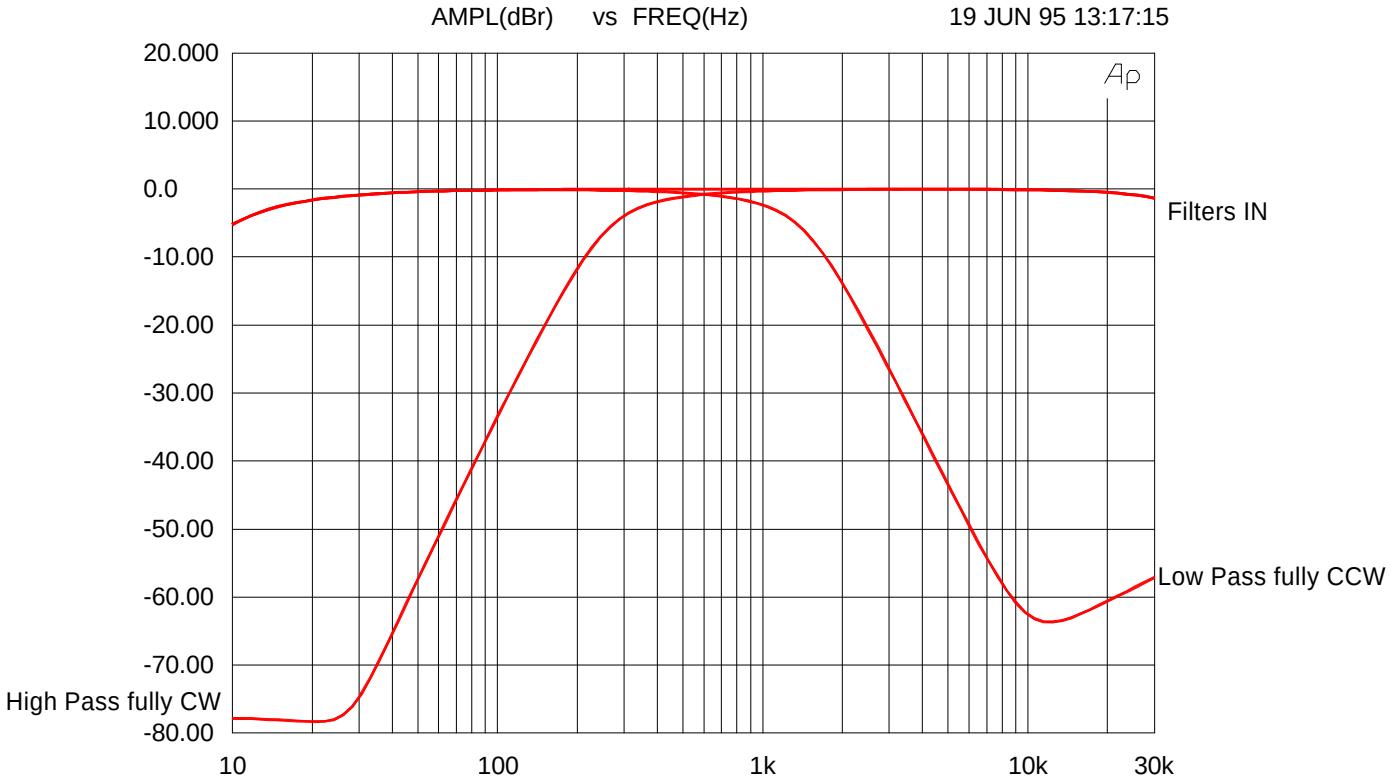

0dB input / Auxilary Output at 0dB, Equalizer IN, Signal selected post VCA



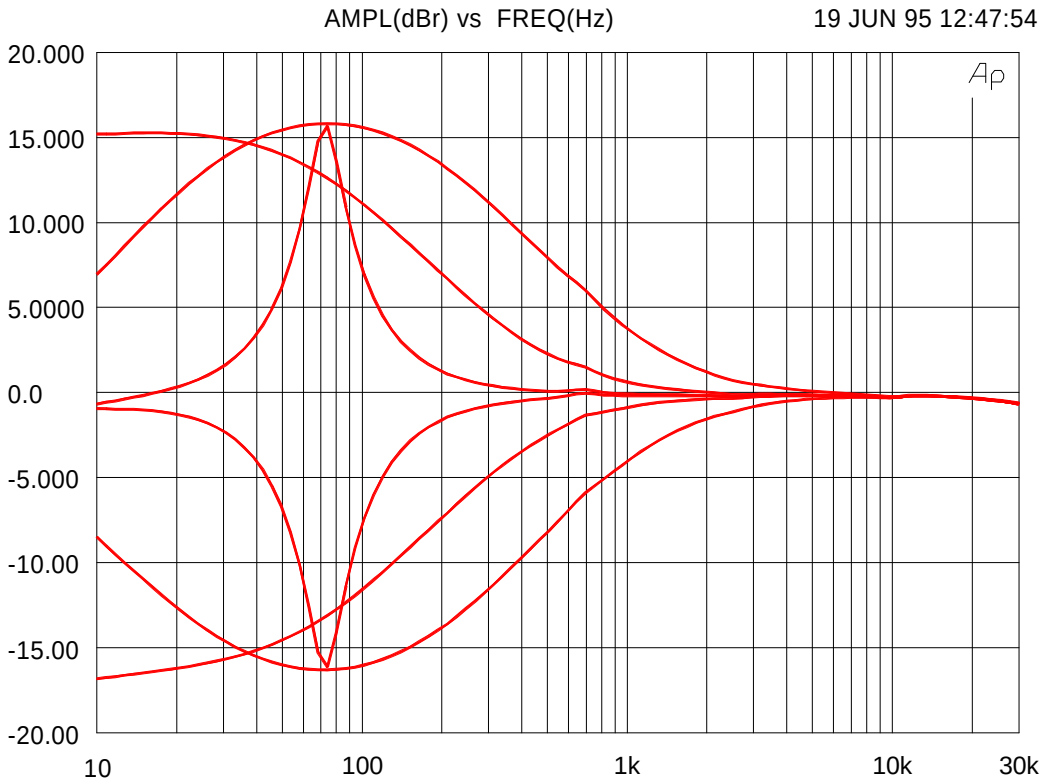

+10dB input / Auxilary Output at +10dB, Equalizer IN, Signal selected post VCA



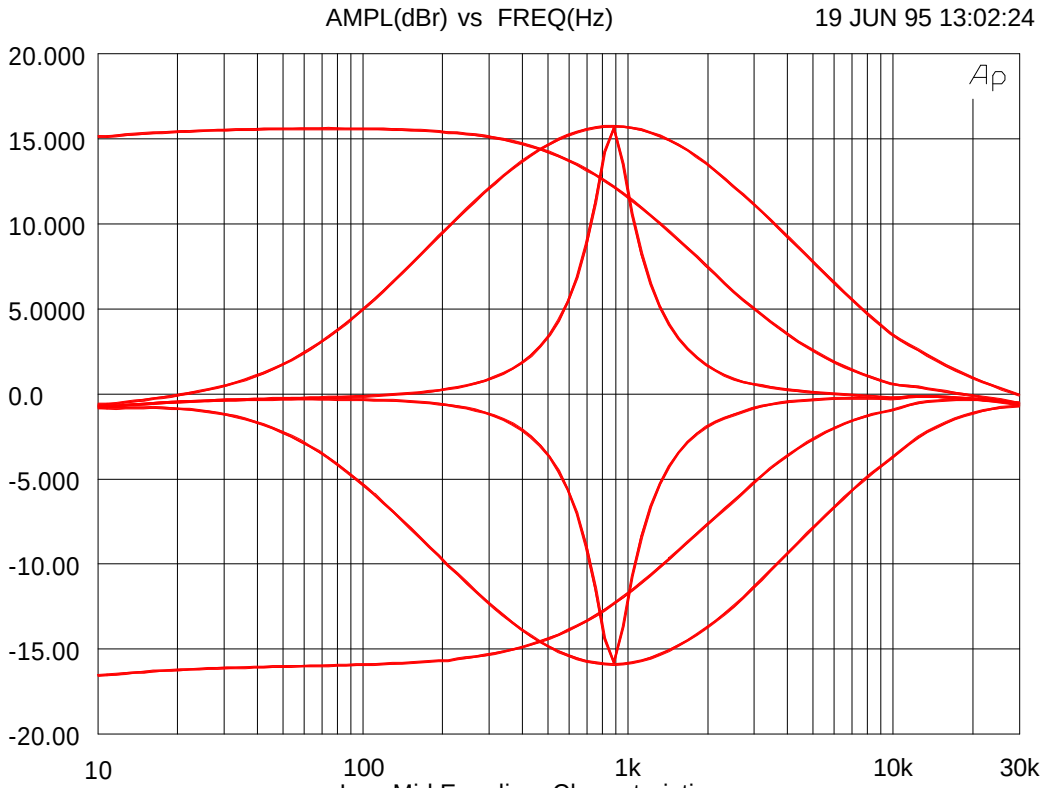

+10dB input / Auxilary Output at +20dB, Equalizer IN, Signal selected post VCA



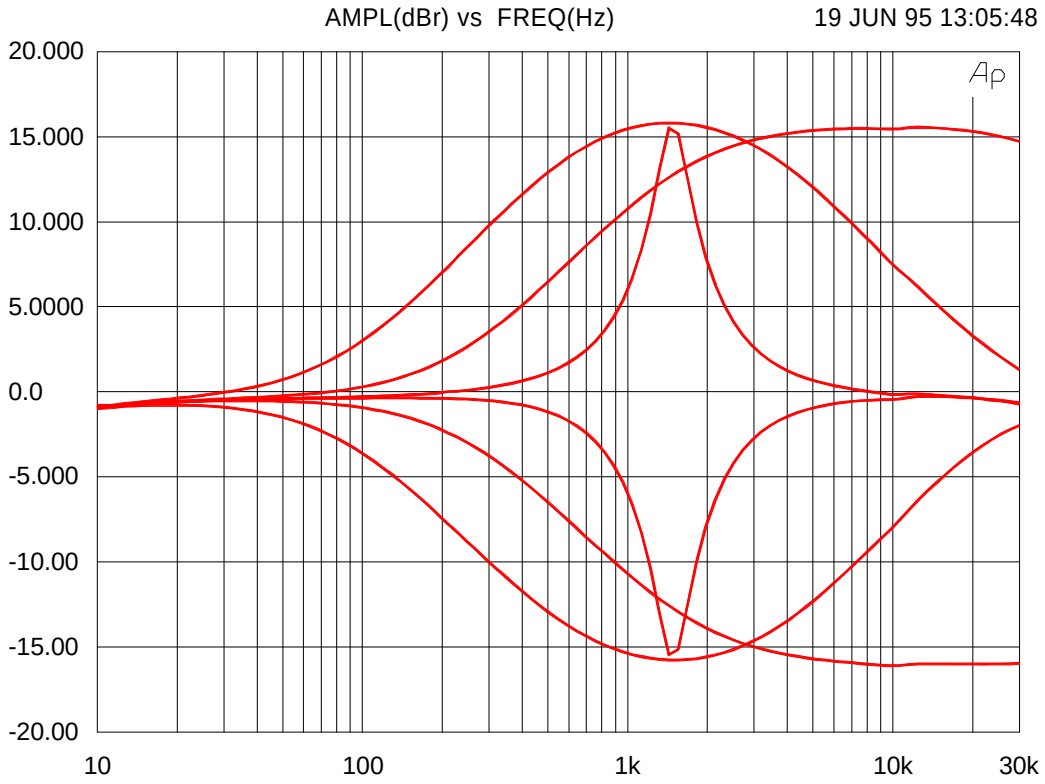

Reference 0dBr via filter circuit / Auxilary Output, Signal selected post VCA



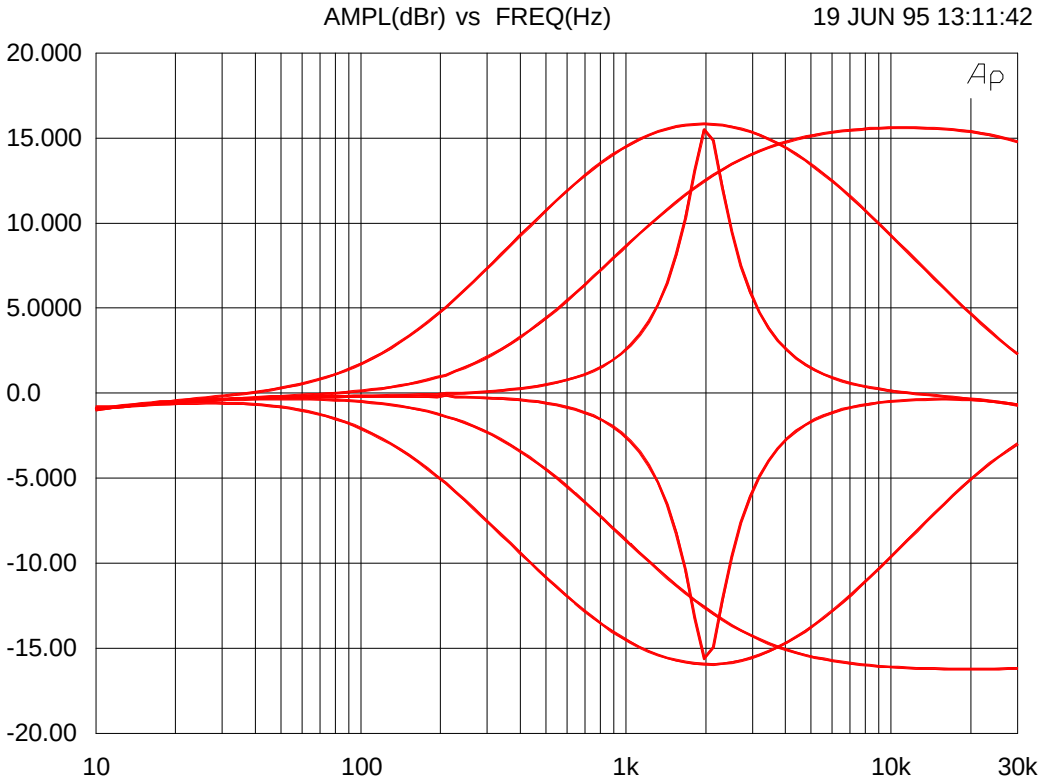

Low Frequency Equalizer Characteristics



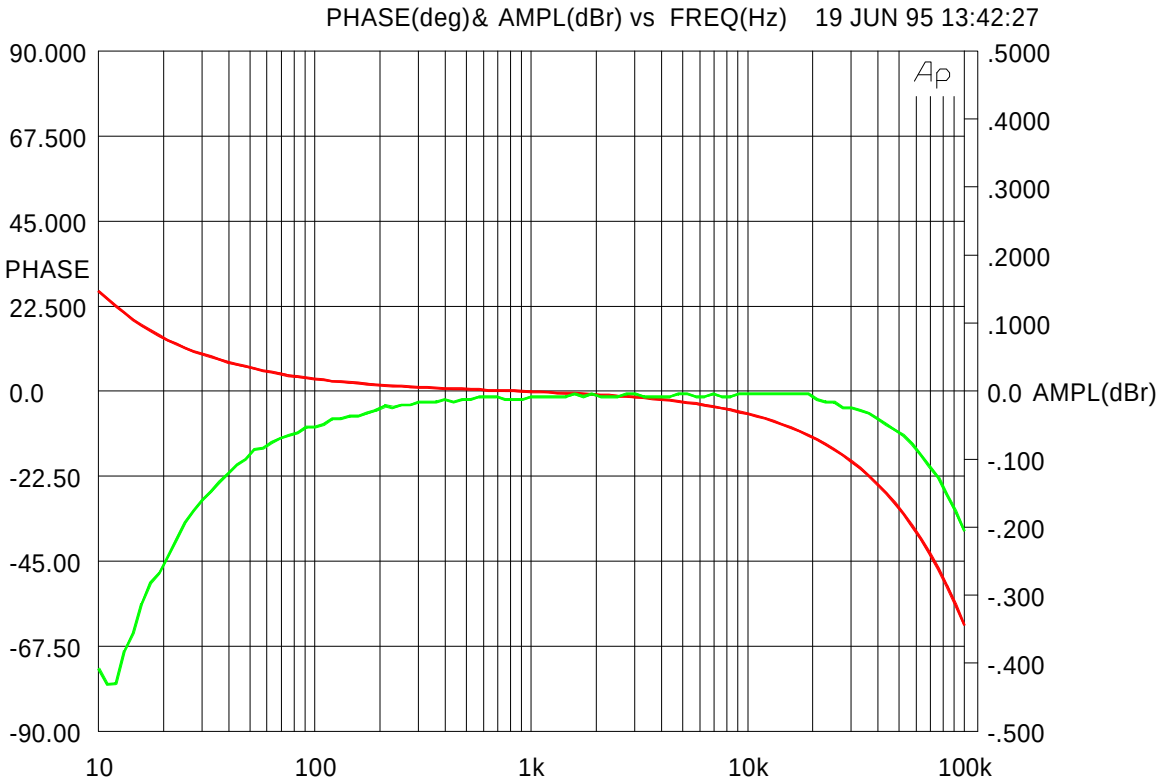

Low Mid Equalizer Characteristics



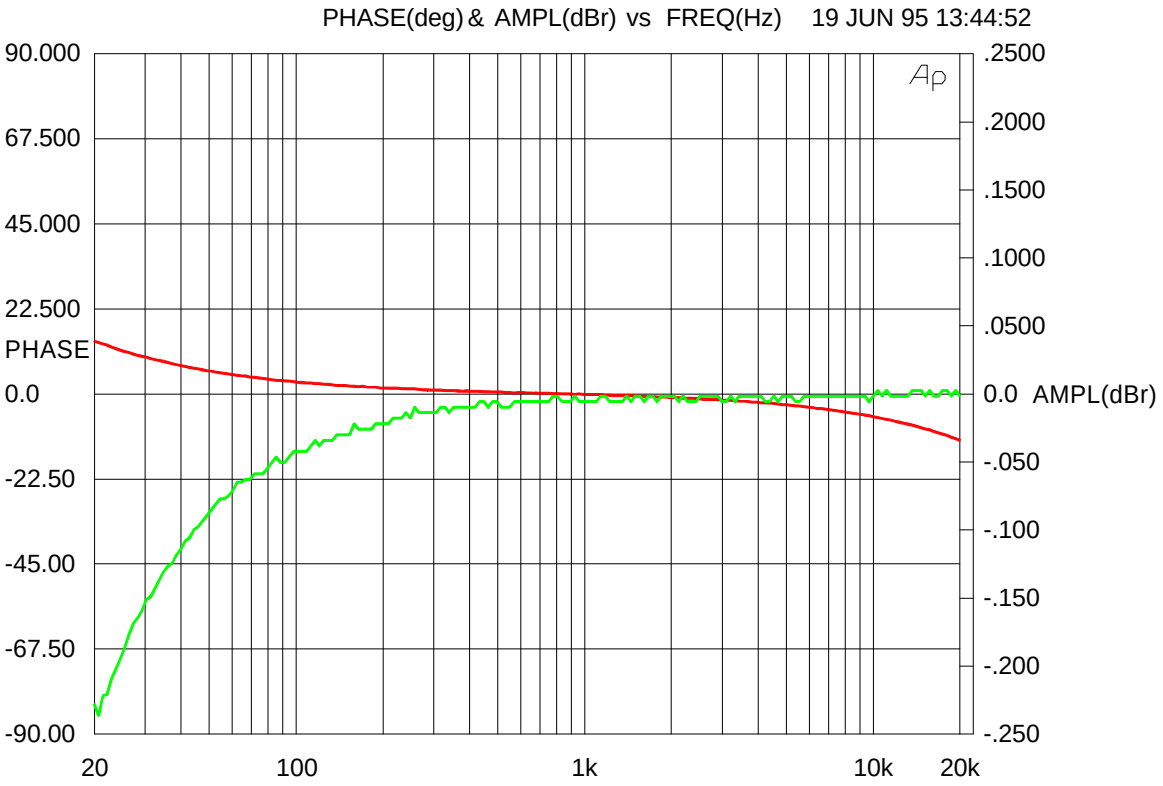

High Mid Equalizer Characteristics



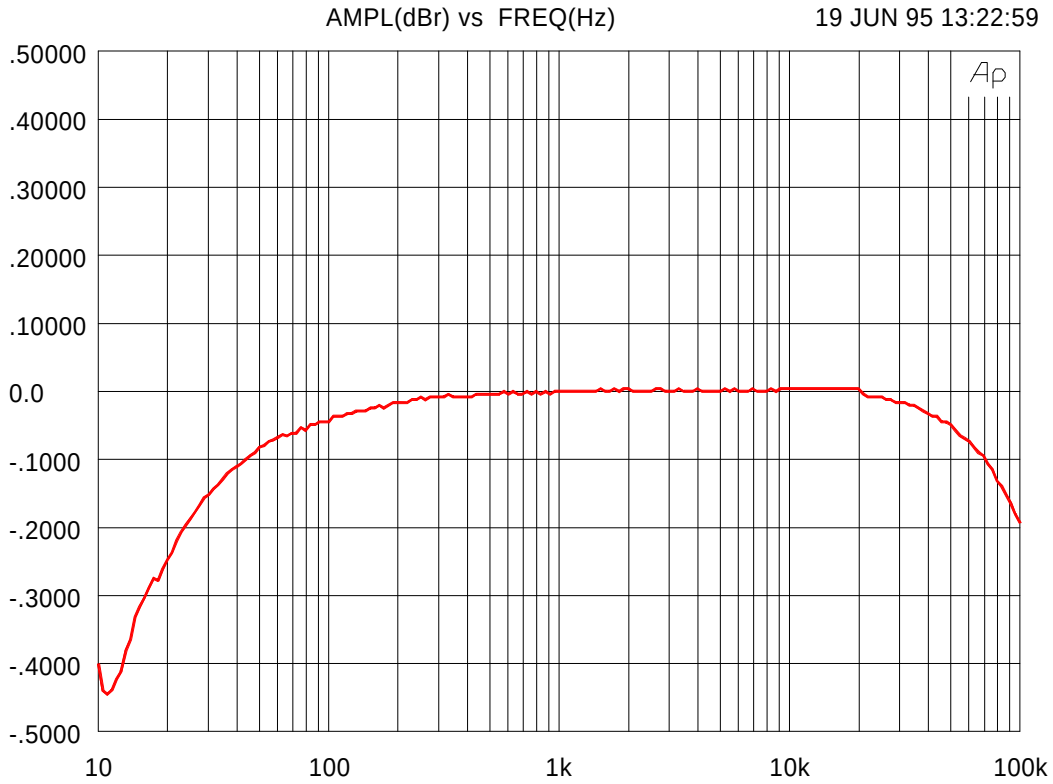

High Frequency Equalizer Characteristics



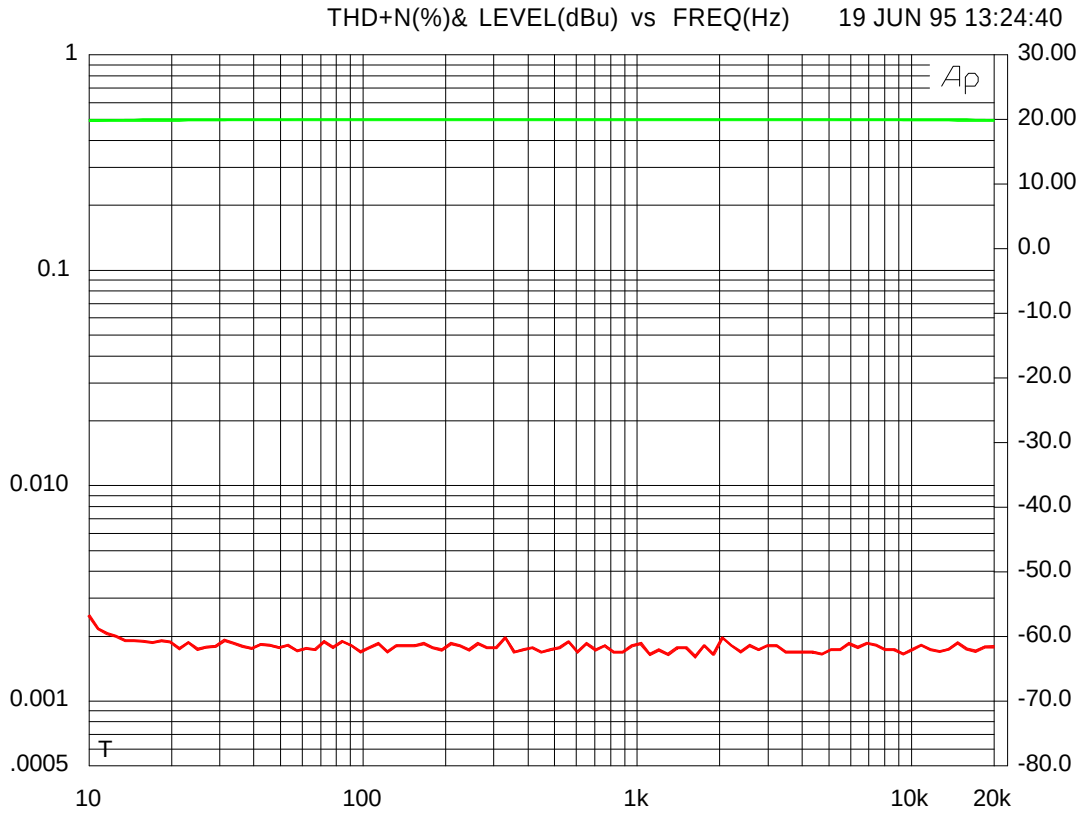

Main Output via E.Q. / VCA extended frequency range




Main Output via E.Q. / VCA




Frequency Response 10Hz to 100KHz




Aux Output pre VCA

# PRO$^6$ Processor

Record the serial number of your PRO$^6$ in the space below for your records. Should you ever need to contact the factory about this equipment, please have this number handy.

serial no. found on rear panel _____

## ATI LIMITED WARRANTY

This product is warranted by Audio Toys, Inc. against defects for 1 year from date of purchase. Within this period, ATI will, at its option, repair the defective product at no cost to you for parts and labor, or replace the defective product with new or remanufactured functionally equivalent product of equal value.

To obtain warranty service, the defective product should be returned to ATI at:

9017-C Mendenhall Court
Columbia, MD 21045
Tel: 410-381-7879 Fax: 410-381-5025

Warranty does not cover transportation costs, nor does it cover product which has been subjected, in our opinion, to misuse, abuse or accidental damage.

Except as herein provided, ATI makes no warranties, express or implied, including warranties of merchantability or fitness for a particular purpose. Some states do not permit limitation or exclusion of implied warranties; therefore this limitation(s) or exclusion(s) may not apply to purchaser.

This waranty gives you specific legal rights and you may also have other rights which vary from state to state.

All of us at ATI would like to assure you that no animals were harmed or mistreated in the design or testing of this product. No whales harpooned, no dolphons netted, no mice dissected, no dogs shampooed. We try to treat the earth like we treat our products, with love and care. We would be grateful if you would do the same. Recycle and reuse !

ATI