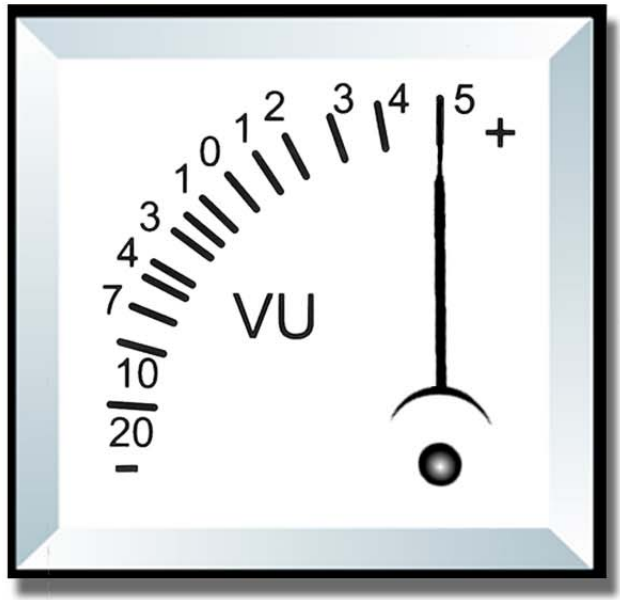
THERMIONIC CULTURE



The FAT BUSTARD 2

OPERATING MANUAL



WARNING

For your personal safety, please read this operating manual and warning thoroughly before using the equipment.

This unit must be installed in such a manner that operator access to the mains plug is maintained. Where the product is to be rack mounted, this may be achieved by having access to the disconnection device for the whole rack.

To reduce the risk of electric shock, it is essential that the unit is disconnected from the mains supply before removing the cover.

Please also note that the power supply capacitors within this unit can remain charged even after the mains supply has been disconnected. It is essential that these capacitors are discharged after the mains supply has been disconnected and the covers have been removed.

In the event that this unit has been dropped or has suffered an impact, an electrical safety test must be carried out before reconnection to the mains supply.

This equipment is not intended for use in explosion hazard environments. It must be used and stored in studio conditions, such that the ambient relative humidity does not exceed 80%, nor is the temperature to be allowed to drop to a level, which would cause dew point to be reached.

The Fat Bustard gets hot! Please ensure that adequate ventilation is provided and that the ventilation slots are not obstructed. When rack mounting this equipment, mount it at the top of the rack, or if there is equipment above it, leave an air gap of 1U (1.75”) for heat to escape. **Important - Please read Section 3.1.** A fan may be required to provide sufficient airflow. Failure to observe these precautions may result in damage occurring to the equipment above and/or to the Fat Bustard.

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1 Introduction

The Fat Bustard is a passive input summing mixer that has all valve summing and output stages. There are 12 input channels and 2 auxiliary inputs. Included in the output stage are facilities for stereo EQ, gain, distortion and also control of the stereo / mono balance over different frequencies. These features are all tried & tested and are felt to be useful and unique to what the Fat Bustard offers and what it can be used to achieve.

The Fat Bustard 2 differs from the original in that has a monitor control, switchable internal/external, otherwise it is identical to the original Fat Bustard.

The Fat Bustard owes its sound largely to the unusual choice of valves used. The summing / EQ amplifier uses 5965 valves, only used in audio applications by Fairchild before now. These excellent valves give smoothness and fatness to the sound. The output amplifier uses 6SN7GTB valves. These large output valves give a huge amount of headroom and a tough punchy character. The stereo width is controlled by a 12AU7 valve giving a wide spectrum to the sound.

All inputs are “semi-floating”. They are really unbalanced but have a small resistor to lift the input signals slightly above ground. This means that balanced DAWs can be connected without quality loss. The output is unbalanced, which is perfect for most users. A transformer balanced output is fitted to the TX version which gives virtually no quality loss but a little less LF noise in some situations.

However, for those with problems with this (eg. eliminating possible mains hum loops or just addiction to “balancing”), nice chunky Sowter transformers can be supplied to balance the outputs (& inputs). Check with your dealer as to cost.

2 Controls

2.1 Attitude

The Attitude control has the same effect as found in Thermionic Culture's Rooster. At low settings (1 is low, Max is high) the distortion is kept to a minimum and the frequency response of the unit is very flat. At higher settings the distortion increases and the frequency response changes, tending to become less linear at high frequencies.
At setting 1 on the attitude control the summing amplifier is working at unity(0dB) gain. As the Attitude control is increased the gain rises to +14dB at 6.

2.2 EQ section

The EQ section comprises a Bass lift, Top lift, Bass cut and Top cut.

The **Bass lift** and **Top lift** utilise Thermionic Culture's own **varislope** EQ curves where:-

The **Bass lift** curve starts to rise at 2kHz at low settings and at high settings the curve peaks at 50Hz.;

The **Top lift** curve starts to rise at 800Hz at low settings and then gives a peak at 10kHz at high settings.

The **Bass cut** is a stepped switch control. Positions 1 to 3 give a 6dB / octave High pass filter rising in frequency as the control is increased. Then positions 4 to 6 give a shelving filter that begins to act higher in frequency as the control is increased. This is intended to be used with the Bass lift control, much like classic passive valve EQ designs whereby a bass cut that acts slightly higher than the bass lift will give a mid cut, then a bass lift.

The Top cut is also a stepped switch control. It acts in the same way as the Bass cut control. Positions 1 to 3 give a 6dB / octave low pass filter that decreases in frequency as the control is increased. Positions 4 to 6 give a shelving/cut filter that deepens the more the control is increased.

2.3 Stereo Width Section

This section of the Fat Bustard is concerned with adjusting and tailoring the width of stereo with respect to frequency. Some features here are very similar to those found in Elliptical equalisers, most often found in mastering applications. Specifically vinyl mastering and cutting.

2.4 Stereo Spread

This control can increase the apparent width of stereo at full bandwidth, or frequencies above a selected point ascertained by the Bandwidth control. As the Spread control is increased the stereo width increases from normal to very exaggerated.
There is an On/Off switch located next to the Spread control. This takes the Spread in and out of circuit.

2.5 Bandwidth

This control is a stepped switch. At the bottom position the spread can be increased across all frequencies. Then the next positions give a high pass filter function to the spread at frequencies 100Hz, 250Hz, and 3kHz respectively. This effectively means that at maximum (3kHz) the spread affects higher frequencies only.

2.6 Bass to centre

This control is a switched step control. At the bottom position (Full) the stereo is unaffected. At the next position up frequencies below 100Hz are made Mono whilst frequencies above are stereo. At the next position

frequencies below 200Hz are made Mono. At the last position all frequencies are Mono.

2.7 Balance

This control allows a fine control over the left / right balance of the Fat Bustard. This can be very useful in correcting any discrepancies of outboard equipment that may be slightly misaligned with respect to the level of the left and right hand signals.

2.8 Output Level

This control is a rotary switch that governs the final output level of the Fat Bustard. The switch is a high quality Elma switch and gives a smooth precise result.

2.9 Monitor

This controls the level to the monitor output, which is 8 dB lower than the main output. It is switchable (INT/EXT) between the Fat Bustard output and an external input, and it is intended that this can be used to compare the original signal to the playback from the equipment used for the final master. This is especially useful if a compressor (eg. a Phoenix) is inserted after The Fat Bustard.

There is a pre-set adjuster near the External Input jacks which determines the level of signal from the External Inputs. This should ideally be set up with a tone so that INT = EXT in level with any inserted equipment in bypass. It requires an “electrical” type flat-bladed screwdriver.

3 Installation Hints

3.1 Installation

The Fat Bustard is designed for 19" rack mounting and, to repeat the warning on page 1, **must** have adequate ventilation.

It is important when rack mounting the Fat Bustard, that it is installed at the top of the rack, or if that's not convenient then leave at least 1U gap above it as the 6SN7GTB output valves do get quite hot and **any equipment mounted directly above could be damaged by the heat unless an adequate gap is left. It is inadvisable to mount the unit with it's front panel horizontal for instance flat in a desk. Heat rising from valves can cause front panel components to go out of tolerance. Also the useful life of valves may be shortened. Thermionic Culture's warranty will be invalidated unless common sense is used regarding ventilation when installing this product.**

3.2 Power

The unit can operate from mains supplies of 220-240V AC or 110-120V AC, 50/60Hz. Check that the voltage selector at the back near the power inlet is set to the correct voltage setting.

3.3 Inputs

All inputs are unbalanced but 'floating' slightly above ground due to a small resistor. This is connected between pins 3 & 1 of XLR sockets and between ring and sleeve of the EXT input jacks. This is to prevent the shorting to ground of one side of a low impedance electronically balanced source with consequent loss of quality.

3.4 Outputs

Outputs are unbalanced with XLR main outputs having pins 1&3 shorted. The ring and sleeve on the monitor out jacks are also shorted.

3.5 Audio Connections

Use standard balanced cables to connect to all audio equipment, whether balanced or unbalanced. For XLRs pins 2 & 3 are signal with pin 2 'hot'. Pin 1 is ground. On jacks, these are standard 0.25” stereo types with the tip 'hot'. Unbalanced jacks can also be used.

3.6 Tips

To minimise the possibility of hum loops, quality loss, or pick up of unwanted signals, keep cables as short as reasonably possible. This applies especially to the monitor outputs which come out at relatively low level and higher impedance. The power connections to the Fat Bustard and other equipment connected to it should all come from the same mains distribution point.

For Line Inputs, Outputs and Monitor return, use standard twin screened cable, 10m is fine. The Monitor Out is at higher impedance so keep to 5m or less, or use low loss single screened cable.

Any queries please contact Thermionic Culture Ltd. Our technical dept. will be pleased to help.

4 Operational Hints

Try increasing the Attitude control for more aggression, punch, warmth in the sound of a mix.

Bass drums, snare drums and vocals can all benefit from being sent to a mono channel with pan turned off for more level. This allows them to be high in the mix without running preceding outboard equipment unnecessarily "hot".

Try using the bass cut shelving positions together with the bass lift for that classic Pultec style equalisation trick.

A harsh sounding mix can be enhanced by using the stereo spread control at a frequency above the Full setting on the bandwidth control. In effect the harsh upper frequencies of the mono part of the mix will be softened and the stereo part of the mix will sound more open. Also try adding treble to the mix and the effect on a modern band will be to make it more 'Sixties' due to the 'soft' sound of our 'varislope' valve eq. design.

Don't be afraid to use the top and bottom lift EQ. There is no extra circuitry in the signal path, so no degradation of the signal occurs.

Drums can be made more solid by using the bass to centre control, the low end will sound more focused and feel heavier.

The output valves will handle huge amounts of headroom, so don't be afraid to run the Fat Bustard hot. The needles in the meters won't bend if you go too far, believe me I've tried!!

This unit makes a great sidecar desk when mixing, if you have the luxury, maybe put your drums through it. Or think of it as a second mix buss.

It is advisable to mute any channels (or aux) when not in use, to minimise noise and crosstalk.

5 Inputs & Outputs

The 12 inputs can be connected by the 12 labelled XLR sockets on the back of the unit.

As the front panel indicates, 8 of these inputs are pairs of stereo inputs and 4 are mono inputs.

The stereo inputs (channels 1 to 8) have a stereo rotary fader and a channel on/off switch.

The mono inputs (channels 9 to 12) have a mono rotary fader, pan pot and channel on/off switch. There is also a Mono/Pan switch for each mono channel. Set to ‘Pan’, the channel can be panned left to right with the pan pot. Set to ‘Mono’, the channel won’t be affected by the pan pot and will go to stereo centre. The channel will also gain about 3dB of gain.

The 2 auxiliary inputs are extra inputs without level controls. There are 2 XLR sockets on the back of the unit that are used to connect the auxiliary inputs. The inputs will normally be configured as Aux 1 to stereo left and Aux 2 to stereo right. The Aux to centre switch sends both Aux inputs to stereo centre (mono).

XLR inputs and outputs are wired Pin 2 Hot, pin 3 Floating/Ground and pin 1 Ground. Monitors are unbalanced jacks with Tip Hot and Ring +Sleeve Ground.

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6 Servicing & Maintenance

The unit comes with a 12 month warranty covering all parts, including valves. It is essential that it is returned to our factory or to the dealer from which it was purchased for repairs to be carried out otherwise the warranty is invalidated. There is, however, one important exception to this rule:

6.1 Valves

It is quite safe for the user to change the valves, but **the unit must not be operated without all valves plugged in**. If a fault occurs, it may be a valve, so **unplug the mains** and remove the top cover.

The two input valves are nearest the front panel and there is one for each channel. Similarly, the two output valves are at the rear (the large hot ones!).

You can swap the valves from side to side to isolate a fault, in fact we recommend that you swap the two 5965 valves after about 18 months to prolong their life.

Valve complement (spares are available from Thermionic Culture Ltd.):

Input - 2 x 5965;
Output - 2 x 6SN7GTB
Stereo spread 1 x 12AY7

6.2 Operating voltage / Fuse

The Fat Bustard is switch selectable to operate from either 230V or 115V 50/60Hz AC mains supply.

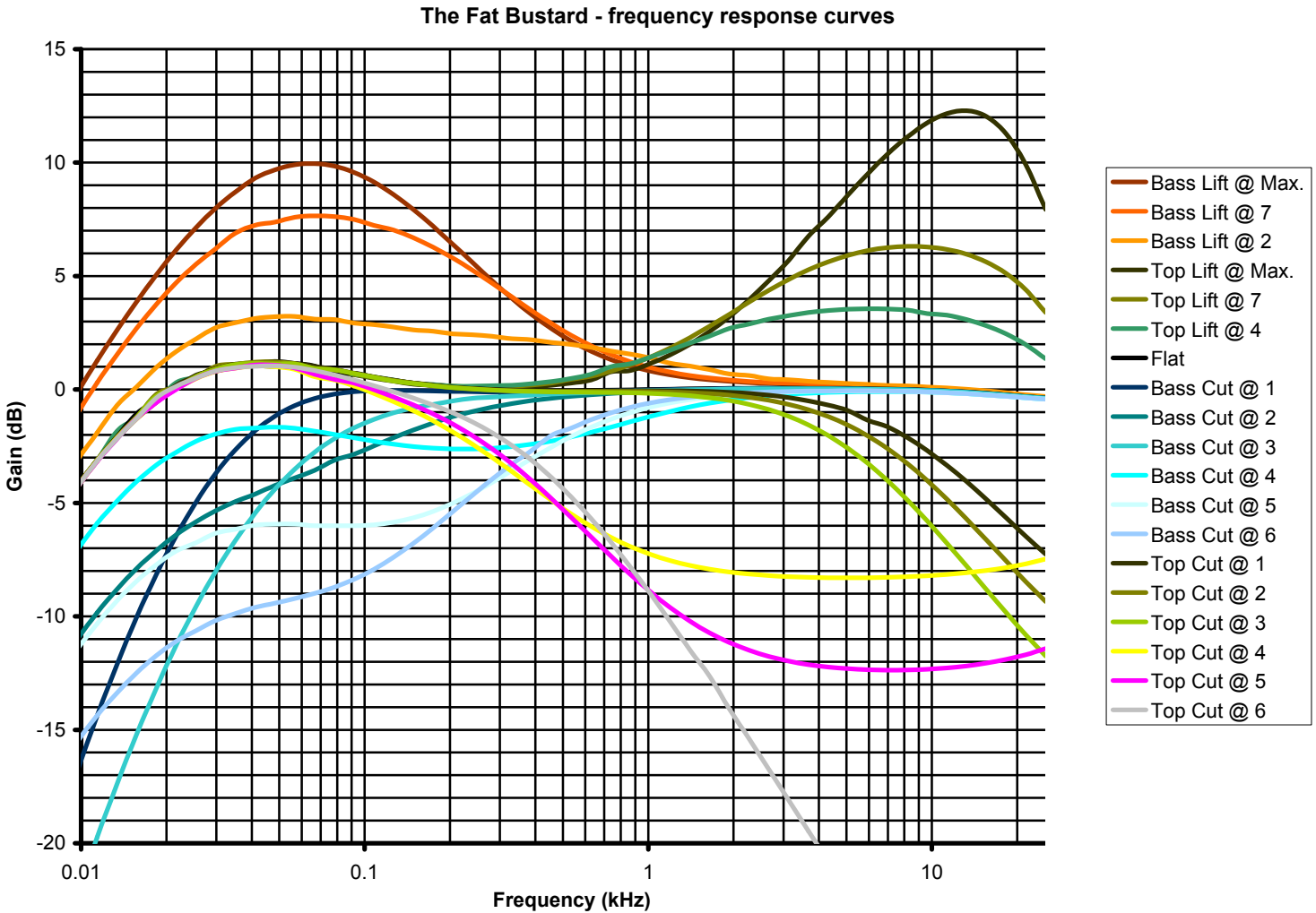
NOTE: Mains fuses may be replaced in accordance with the following table:

Operating Voltage	Fuse Rating
115V	T2.5A 20mm type
230V	T1.25A 20mm type

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7 Specification

Input impedance:	10kΩ (dependent upon channel and setting), "semi floating"
Output impedance:	600Ω unbalanced
Monitor:	5kΩ unbalanced
Gain (ch. 1-8):	0 at Attitude 1, +11dB at max attitude
Maximum Output level:	+25dBU
Distortion:	(at Attitude 1) 0.015% +8dBm output (at Attitude 3) 0.25% (at max. attitude) ≥1% (dependent on how hard valves are driven)
Signal to noise: (30kHz filter)	at least 100dB below MOL at Att.1
Freq. response (±1dB):	16Hz to 40kHz (at Attitude 1)
Max bass lift	+10dB @ 50Hz
Max top lift:	+12db @ 12kHz
Phase shift (10kHz): with EQ flat	(at Att.1), 7% (25°) (at Att. 4), 10% (36°)
Crosstalk: (average at Att. 1 & 2)	59dB @ 1kHz, 44dB @ 10kHz. Crosstalk will increase at high attitude settings and when stereo spread and/or bass to centre controls are used.


The Fat Bustard - frequency response curves
15
10
5
0
-5
-10
-15
-20
Gain (dB)
0.01
0.1
1
10
Frequency (kHz)
Bass Lift @ Max.
Bass Lift @ 7
Bass Lift @ 2
Top Lift @ Max.
Top Lift @ 7
Top Lift @ 4
Flat
Bass Cut @ 1
Bass Cut @ 2
Bass Cut @ 3
Bass Cut @ 4
Bass Cut @ 5
Bass Cut @ 6
Top Cut @ 1
Top Cut @ 2
Top Cut @ 3
Top Cut @ 4
Top Cut @ 5
Top Cut @ 6

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