THERMIONIC CULTURE

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.

Please ensure that adequate ventilation is provided and that the ventilation slots are not obstructed. When rack mounting this equipment, a fan may be required to provide sufficient airflow.

It is not advisable to operate this equipment if all valves are not in place and working, as voltages will rise, and components may overheat and fail.

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1 Introduction

The Earlybird 2.3 is a two channel all valve pre-amp employing a balanced push-pull circuit, which as far as we know, is unique in this application. The use of this type of circuit gives very low noise and plenty of headroom with minimal distortion. These factors coupled with a switchable input impedance will mean the user can get a very natural interpretation of whatever sound the microphone is picking up, whether the mic is valve, ribbon, moving coil or FET.

After much dedicated development work in conjunction with Brian Sowter, we have arrived at the pinnacle of audio transformer design. Both the input and output transformers have been optimized for use in our unique circuit. This results in more headroom and lower distortion especially at low frequencies.

The Earlybird 2.3 need not stand idle once the mixing process has begun. The line input facility means that the sonic characteristics and EQ facilities of the Earlybird 2.3 can be fully utilised on any mono or stereo signals that the user feels may benefit from such enhancement. With this in mind the Pullet acts as a perfect companion for precision mid range EQ.

We believe that the Earlybird 2.3 is not only the finest mic-amp available for today's recording environment but combined with its EQ and Pullet compatibility, the most versatile.

2 Controls

2.1 Function

This control selects the basic operating mode of the Earlybird. The pre-amp can be aligned to operate as:

300Ω:- A mic-amp with an input impedance of 300Ω

1200Ω:- A mic-amp with an input impedance of 1200Ω

PAD:- A mic-amp with an 18dB attenuating pad in front of its transformer.

LINE:- A pre-amp that accepts line level signals

PULLET:- A pre-amp that provides the make-up gain for the passive EQ network provided by the Pullet in order to bring the signal back up to line level.

2.2 Gain

This control selects the gain setting that the Earlybird is operating at. The Gain is varied in four steps of 8dB. i.e. 32dB to 60dB (mic), -8dB to 16dB (line).

2.3 Bass cut

The response is flat when this switch is fully anti-clockwise. It acts as a HPF at 40Hz with a 12dB/octave slope, a little gentler at 100Hz and is a shelving filter at 800 Hz.

2.4 Active lift

The three bands of active lift work in the negative feedback loop. They are most effective at the first two gain settings (36/-8 to 44/0), then less effective at 52/8 and almost out at maximum gain (60/16) as feedback is reduced in the circuit to increase gain.

2.4.1 Top

This control uses our award-winning *'Varislope'* lift circuit where the lift is a nearly flat "shelf" at low settings and as the control is advanced it accentuates the higher frequencies, resulting in a peak of 20dB at 10kHz (with gain set at 36 or 44dB).

2.4.2 Mid

A very broad lift peaking at either 800Hz or 2.5kHz depending on the position of the Mid lift frequency selector switch. The maximum lift available is 15dB.

2.4.3 Bass

Another *'Varislope'* curve, where the lift starts off quite high (2kHz) and the lower frequencies gradually rise as the control is advanced, giving a peak of 17dB at 50 Hz when turned to maximum.

2.5 +48V

This switch will apply phantom power to the mic-in sockets when in the down position.

2.6 Phase reverse

These switches will invert the phase of the signal in the corresponding channel when in the down position.

2.7 Output trim

These controls are reverse linear attenuators, operating after all of the electronics. The full output of the electronics is sent to the output plugs when the controls are set to maximum. These controls can be used as a ‘fine’ level adjustment or an output attenuator so that the unit can be run ‘hot’ in order to get some distortion without overloading the next piece of equipment in the chain.

3 Metering

The meters are a VU type, however they do have a compressed scale above 0VU. This feature has been applied to the meters because a mic-amp will naturally have un-compressed signals passed through it. A signal like this, on a normal VU scale, will tend to look as if there is either too little level, or so much level that it is ‘off the scale’. As the Earlybird has such a lot of headroom available before distortion becomes a problem, we wanted the VU scale to be useful when running the mic-amp ‘hot’. In this way the meters can still display what is going on without simply hitting the end stops at high level.

The Meters are aligned to measure the output of the electronics (less 2dB) before the output trim controls. The meters closely match the output of the unit after the output trim when the controls are set to 8.5. When the controls are at maximum add 2dB to the VU reading. When the output controls are set below 8.5 the output of the unit will be lower than is shown on the VU meter.

4 Connections

There is a row of input and output sockets on the back of the Earlybird, which allow it to be left permanently connected for it's various configurations.

4.1 Mic input

These XLR sockets are for connecting microphones to the Earlybird. The 48-volt phantom power supply will applied to these sockets only. The Mic settings on the Function switch will all select these inputs.

4.2 Line input

These XLR sockets are to be used when connecting a line level signal to the Earlybird. The Line setting on the Function switch will select these inputs.

4.3 Pullet

These XLR sockets should be used when connecting the Pullet to the Earlybird. The leads between the Pullet and these sockets should be as short as possible in order to avoid picking up any extraneous noise due to the low signal levels at this point.

Thermionic Culture can supply leads of the correct length if required.

4.4 Output

These XLR plugs are the signal output points for the Earlybird.

5 Operational suggestions

5.1 Impedance

The Earlybird has a switchable input impedance for its mic-amp inputs. This control has a large effect on the tone obtained from whatever microphone is being used. Technically 1200Ω is a good impedance for Neumann FET mics whilst 300Ω is a good impedance for ribbon mics such as the Coles 4038. However we have found that the impedance control can be used as a creative tonal adjustment.

Using a Neumann U87 with the 1200Ω setting the mic will sound very open with an extended top end presented to the listener. If the 300Ω setting is used with the same mic, the gain will increase slightly but the top frequencies will become slightly degraded and lower in level. To the ear the sound seems to become slightly more aggressive with a mid range punch to it. This kind of thing can make all the difference when recording things like vocals. For example a gentle vocal will sound big and open on the 1200Ω setting, whereas a rock vocal will punch through the mix when using the 300Ω setting.

Ribbon mics may well come into their own when using the Earlybird with the 300Ω setting. The gain, top frequency response, noise and distortion will all be optimum in this case and the ribbon mic can be used in situations that were not possible before, or they may simply sound better than before.

5.2 PAD

The PAD control on the Earlybird should be used when very high levels are coming from the mic being used. For example a valve mic that is near to a guitar amp or drum kit will give out a high output level. Using

the PAD will stop distortion in the input transformers of the Earlybird mic amp.

5.3 Pullet

Setting the Function control to Pullet will configure the Earlybird to take its input signal from the Pullet sockets on the back of the unit. This means that a line level signal can be fed into the Pullet and then into the Earlybird. The gain of the Earlybird should be set to 44/0 to give unity gain but it may be necessary to reduce the gain if a large amount of mid boost is used on the Pullet and the Active lift is being used too. This is totally dependent on the preference of the user as a bit of distortion may be what is needed. It's worth noting again that the leads connecting the Pullet to the Earlybird should be as short as possible to avoid any extraneous noise pick-up. Some 1-metre long leads can be obtained from Thermionic Culture if needed.

5.4 EQ

The EQ section of the Earlybird is designed to be useful in many situations:

The EQ can be used when the Earlybird is configured as a mic-amp and provide some extremely useful frequency lifting when recording from a large variety of sources. The beauty of this EQ is that there is no harm done at all to the signal by switching the EQ section, set flat, into circuit. This is because the EQ works on the feedback of the circuit, so the actual signal does not pass through any more components than before. In fact, any additional distortion is negligible until a large amount of EQ is applied. This allows the user to add EQ to the signal in a very purist manner. In reality there are many situations in which a bit of EQ added to a mic signal is necessary. Eg. Adding top to a close mic'd snare or bottom end to a 'one mic' drum sound.

If the Earlybird is configured as a line amp then it can be a very useful valve EQ. We have had very positive feedback from users who like to EQ their electric guitars with the Earlybird mid range on mix down.

There is no mid cut control but a little mid cut at 700-800Hz can be achieved by setting Bass Cut to 800Hz and Bass Lift to near max.

When using the Pullet, the EQ of the Earlybird provides the necessary bass end control. The active top and mid sections can also be used, in combination with the facilities and sound of the passive Pullet EQ. The sonic characteristics of both types of EQ together give endless possibilities.

5.5 Mono mic-amp with Pullet EQ

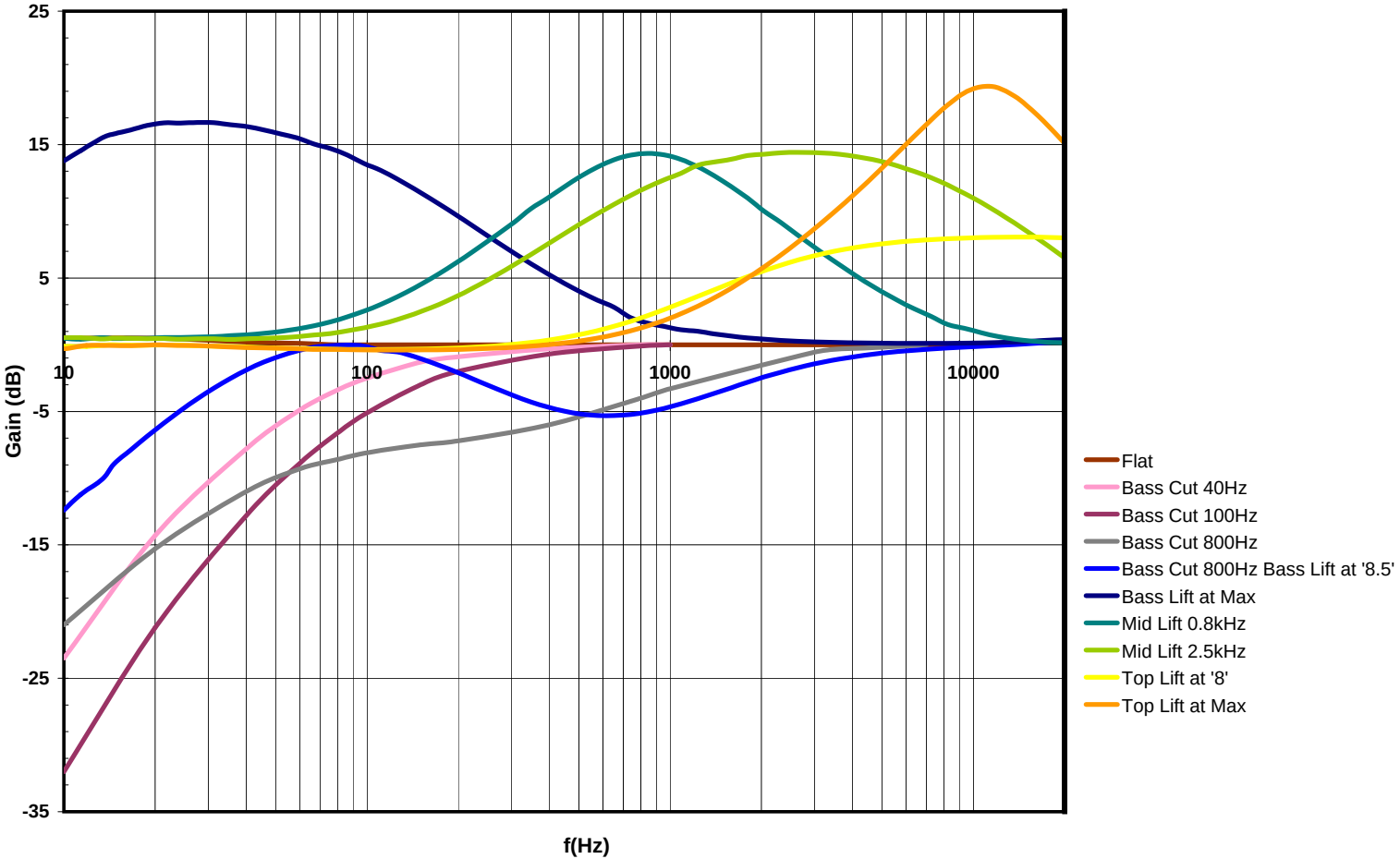
The Earlybird can also be used in mono with the Pullet, as a mic amp with fully implemented EQ. This can be achieved by using ***E.B. CH1*** as the mic-amp then taking the signal from ***E.B. CH1 OUT***, into ***Pullet CH1 IN***, from ***Pullet CH1 OUT*** into ***E.B. CH2 Pullet IN***. This arrangement makes the Earlybird / Pullet combination a very versatile one.

6 Specification

Included are the figures for noise, distortion and EQ. They are all measured with the Earlybird set up for 44dB mic gain / 0 dB line gain and a 10kΩ load.

Input impedance	
Mic	300Ω or 1200Ω, switchable, balanced
Pad	1.8kΩ
Line	12.7kΩ
Pullet	1.2kΩ
Output impedance	<300Ω
Maximum gain	62dB
Maximum output level (MOL)	+33dBm (36V RMS)
Distortion (THD) @	
1kHz	0.005%
100Hz	0.01%
Frequency response	
±0.5dB	11Hz to 26kHz
±1dB	8Hz to 65kHz
Total noise, unweighted, 30kHz filter	114dB below MOL
EQ, active controls @ max:	
Bass	+17dB@50Hz
Mid	+15dB@800Hz & 2.5kHz
Top	+20dB@10kHz
Phase shift	
HF	16° (4.5%) @10kHz
LF	0 within audible range
Gain settings (dB)	
Mic	36, 44, 52 & 60dB
Line	-8, 0, 8 & 16dB
High pass filter (Hz)	0, 40, 100 & 800Hz
Output trim	-18dB to 0dB reverse linear attenuator
Input and output connectors	8x3 pin XLRs, wired balanced
Valve complement	2x12AX7LPS/ECC83/7025, 2x12AU7/ECC82/6189
Pilot light bulb	12V/3W
Fuses	115V: T1.25A 230V: T0.63A
Dimensions	H-89mm x W-483mm x D-315mm
Weight	6.2kg

Earlybird 2.3 Frequency response curves



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