

Obit.6User Guide Issue 1

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To the best of our endeavors, we believe the information contained in this user guide to be true and accurate but we do not assume responsibility for inaccuracies or omissions, and reserve the right to make any changes deemed necessary.

This product has been designed to comply with the applicable standards, regulations, and directives for the countries where the product is marketed.

NOTE: Changes or modifications to this mixer, or its associated power supply, could negatively impact compliance and the user's authority to operate it.

Designed and manufactured in the United Kingdom by:
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Limited Two-Year Manufacturer's Warranty

Union Audio warrants the product and accessories contained in the original packaging against defects in materials and workmanship when used in accordance with this user manual for a period of TWO (2) YEARS from the date of original purchase by the end-user purchaser ("Warranty Period").

Repair or replacement under the terms of the warranty does not provide right to extension or renewal of the warranty period. Repair or direct replacement of the product under the terms of this warranty may be fulfilled with functionally equivalent service exchange units.

This warranty is not transferable. This warranty will be the purchaser's sole and exclusive remedy and neither **Union Audio** nor any approved service centres shall be liable for any incidental or consequential damages or breach of any express or implied warranty of this product.

Conditions of Warranty

The equipment has not been subject to misuse either intended or accidental, neglect, or alteration other than approved by **Union Audio.** The warranty does not cover potentiometer wear and tear. Any necessary adjustment, alteration or repair has only been carried out by **Union Audio** or distributor or appointed service agent.

The defective unit is to be returned to the place of purchase, an authorised **Union Audio** distributor or agent with proof of purchase. Please discuss this with the distributor or the agent before shipping. Units returned should be packed in the original carton to avoid transit damage.

Check with your **Union Audio** distributor or agent for any additional warranty information which may apply. If further assistance is required please contact **support@unionaudio.co.uk**

Any changes or modifications to the equipment not approved by **Union Audio** could void the compliance of the product and therefore the users authority to operate it.



Safety Instructions

Please read and retain these instructions

- Only use the product for the purposes it is intended and heed all warnings.
- WARNING To prevent the risk of fire or electric shock do not use this mixer near water, or in locations where it is likely to be exposed to rain or
 moisture.
- Always ensure that liquids cannot get spilt over the mixer or its power supply, and keep all objects filled with liquids, such as vases, drinks glasses, etc. well away from the apparatus.
- Ensure adequate ventilation and ensure all ventilation openings are not blocked or restricted.
- Do not connect the output of amplifiers to this apparatus. Always use the correct, high quality cables to connect the mixer to audio sources and power amplifier inputs.
- Do not install the mixer or power supply near any heat sources such as radiators, stoves, amplifiers or other apparatus that generates heat.
- When fitted to a 19" rack ensure the unit has adequate ventilation and that equipment installed above or below does not generate significant amounts of heat or magnetic fields that may create hum. If necessary, install a rack mounted cooling fan to prevent excessive temperature build up within the rack.
- Do not place sharp or heavy objects onto the mixer or power supply as these could damage the controls or cosmetics. Avoid rough handling and
 protect both units from vibration. Retain the original packing in order to protect the unit during shipping or transit.
- Refer all servicing to qualified personnel. Servicing is required if liquids are split onto the mixer or its power supply, objects have fallen into the
 apparatus, the unit has been dropped, or does not function normally.



Safety Instructions

- Do not remove any covers, either on the mixer or the power supply.
- Install only in accordance with the manufacturer's instructions.
- The power supply must have a good safety ground connection. Do not tamper with or remove the safety ground in the power cord.
- Always use a power cord appropriate to your local mains supply, and ensure the power supply is correctly specified for the local mains voltage.
- Protect the power cord from being walked on, pinched, or stretched.
- Unplug the power supply and mixer during electrical storms.
- Do not leave the apparatus unattended for long periods when powered on.



CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN



ATTENTION: RISQUE DE CHOCS ELECTRIQUE - NE PAS OUVRIR

To prevent the risk of electrical shock do not open the mixer or power supply or remove any covers. no user serviceable parts inside. Refer servicing to qualified service personnel only. These symbols are internationally accepted symbols to warn of potential hazards with electrical products.



This symbol indicates that a dangerous voltage constituting a risk of electric shock is present within this unit.



This symbol indicates that there are important operating and maintenance instructions in the literature accompanying this product.

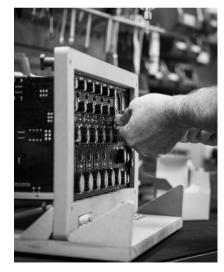
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About Orbit.6



The Obit.6 is an esoteric six-channel rack mounted rotary mixer, craftsmen engineered for the discerning audiophile DJ and vinyl lover. A fully discrete internal signal path, from Input to Mix-Out, with per-channel thermionic valve stages, Obit.6 presents a remarkable and distinctive listening experience. Sweet clear highs, warm forward mids, and extended, driving low end, Obit.6 breathes life into even modest setups while maximising the potential of high-end sound systems.

The input channels feature an auxiliary send control with pre or post fader routing, a channel level trim, an input selection switch, a variable High-Pass filter, an IP4 rated illuminated cue button, and a 10 LED VU meter.

Channels one to four have both RIAA and Line inputs, while Channel five and six are Line/Line, with the additional option of a Microphone input on Channel six.

All channels feature post-fade Direct Outputs for multi-track recording or external summing.

The six rotary channel faders feature a unique damping system providing a silky smooth, heavily weighted feel for the most precise of mix transitions, while the 33mm classically styled knobs are subtly backlit for easy identification in low light environments.

Obit.6 also features a fully discrete three-band asymmetric Isolator with +6dB of boost and -70dB of attenuation, providing a useful tool for dramatic musical contouring or for audio equalization adjustment.

The Master Mix control sets the mix output signal level, with the Booth monitor section featuring both level control and two-band equalization. The high powered Headphone Cue monitor system has both level control and an "Add Mix" function for ease of beat matching.

The mix buss is monitored pre Master Level by two easy to read custom analogue VU meters. The elegant white meter faces are printed using fluorescent inks and backlit by ultraviolet LEDs, creating a subtle blue/white glow for easy monitoring in low light. To warn of potential overload should the buss signal level exceed +3VU, the meter illumination automatically switches to bright red.

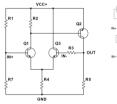
On the rear panel, the Input and Record Output connections are via gold plated RCA (Phono) connectors, while the channel Direct Outputs, Aux Send, Aux Return and Master Insert use TRS 1/4" Jack Sockets. Main Mix and Booth outputs feature high quality, metal bodied locking XLR connectors, while power to the mixer from the external linear PSU is via the Kycon "Snap and Lock" multi-pin connector system for added security.

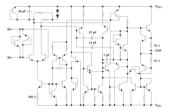
The striking looking front panel is precision machined from 6mm 5083 Aluminium tooling plate, glass bead blasted, anodised black and white silk-screened, while the rugged steel chassis is manufactured from 1.5mm Zintec, black texture powder-coated and white silk-screened.

Why Discrete?

A discrete circuit is one built from individual components, as opposed to an integrated circuit (IC) where all the components are etched onto a single wafer of silicon.

The basic building block of analogue electronics is the operational amplifier, or op-amp; a device with a differential input and a single output. Commercial op -amp ICs are complex, containing many transistors, resistors and capacitors to ensure stable, repeatable and consistent operation in a wide range of different circuit topologies, many of which will not be audio related. A typical mixer will contain dozens of these ICs that the audio signal will have to pass through on







its journey from input to output. And while the added complexity might ensure good measured performance, it doesn't necessarily translate into what sounds pleasing to the ear, as each component will have a tiny effect on the overall tonality.

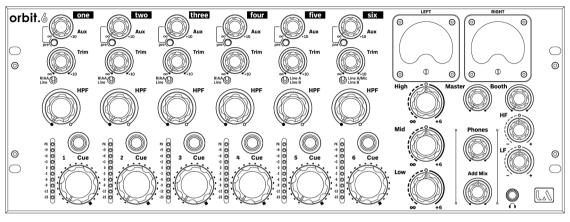
A purpose made discrete audio op-amp however, only needs sufficient complexity to perform its intended function, and can therefore be designed with far fewer components.

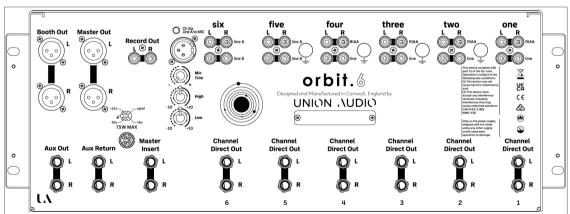
In addition, each of these components can be individually chosen for best audio performance, rather than being limited by what can be etched onto a single wafer of silicon.

The two schematics (above left) highlight the extremes in complexity between very a simple discrete op-amp and a typical commercial design. In reality the simple discrete op-amp, would have limited performance, though it can be made to work quite well.

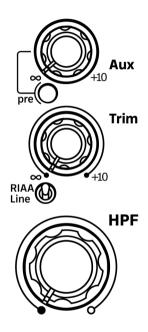
The heart of Orbit.6 is our own discrete op-amp, designed and manufactured inhouse. In terms of complexity it is halfway between the two extremes, but offers a similar measured performance to a commercial IC when used in typical audio applications.

Featuring matched transistor pairs, it offers wide bandwidth, high slew rate, low distortion and high output current, and plays a key role in defining the distinctive sound characteristic of the Orbit.6.





Input Channel Controls



Obit.6 has a total of six Input Channels, each with valve preamp stages and dual stereo inputs. Channels 1- 4 feature both Line and Phono (RIAA) Inputs, Channel 5 has dual Line Inputs (Line A and Line B), and Channel 6 accommodates Line A/Mic and Line B inputs. The Mic Input Select switch is located on the rear panel and overrides the Line A input source.

Aux — The Auxiliary Send controls the channel signal level sent to the Aux Output, primarily for use with external effects or audio processors.

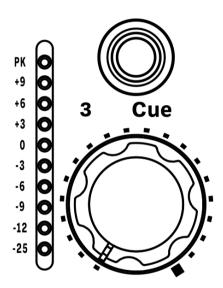
Pre — The Pre/Post button selects whether the Aux Send signal level is affected by the Channel Fader. When Pre is selected, the Aux Send level is not affected by the Channel Fader.

Trim — Controls the level of the input signal from fully OFF to a maximum gain of +10dBu. Use in conjunction with the Channel VU Meter to set the optimum signal level, with the average lighting the green OVU LED and the peaks just lighting the orange +3VU LED.

RIAA/Line select — (CH1-4) Switches between PHONO (RIAA) Input in the up position and LINE in the down position. The PHONO input has RIAA equalisation for use with all good quality moving magnet turntable cartridges

HPF — The channel High Pass Filter adjusts the low frequency cut-off of the channel signal, and features a two-pole response with a swept frequency range from 10Hz to 1.1kHz.

Input Channel Controls continued



Cue — The Cue button illuminates red when active, and routes the pre-fader channel signal to the headphone monitor for auditioning. The button has a toggle function and will turn on/ off with each press. Each channel cue is independent and will not be overridden when pressing other channel cue buttons.

Rotary Fader — The six channel faders provide smooth mix transitions between the different audio sources. They are not intended to be used to set the channel level being fed to the main Mix Buss - use the Channel Trim control for this.

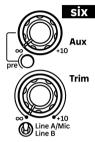
Each fader has a range from Off, (fully anti-clockwise) - to unity, (fully clockwise), with a progressive logarithmic law. There is no signal gain built into the channel fader, and for best dynamic range it should be operated fully clockwise on any channel feeding into the mix. The faders are heavily damped for precise level changes, and are also backlit red for easy navigation in low light conditions.

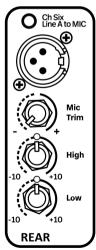
Channel Meter — Each channel has its own associated 10 bar LED meter.

The meter is peak reading and is scaled from –25VU to PK (+12VU). For optimal signal to noise ratio (SNR) with minimum distortion (THD) set the channel audio level so that the green 0VU LED is illuminated, and the signal peaks just lighting the orange +3VU LED. Adjustment is set using the Channel Trim (see page 10).

Avoid running the channel signal level too hot or too cold as it will have a detrimental effect on the overall audio fidelity. Especially running the signal level above +9VU will significantly increase distortion as it will force the valve stage to start soft clipping. Likewise avoid running the channel level with the red Peak LED illuminating.

Microphone Input





Mic Select – Channel Six can be routed to the microphone input (located on the rear panel) by switching the front panel toggle switch to "Line A/Mic" and by pressing the "Ch Six Line A to Mic" button on the rear panel.

The Microphone input is designed to work with any good quality dynamic microphone, such as the Shure SM58. By default, the microphone input isn't phantom powered, but this function can be activated by changing an internal jumper link - contact Union Audio or an authorised service agent for more details.

Rear Panel Controls

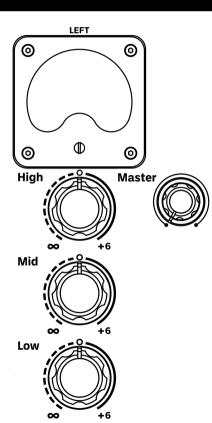
Ch Six Line A to Mic – Pressing in this button routes the Microphone Input to Channel Six Line A - NOTE that the LINE A RCA input on Channel Six will be deactivated.

MIC Input XLR - Balanced XLR Input. Pin1 = Ground, Pin 2 = + Hot, Pin 3 = - Cold

Mic Trim— Sets the gain of the pre-amplifier from +15dB to +55dB to suit the microphone used.

Mic EQ— Two-band equalizer to adjust the tonality of the microphone input or as an aid in limiting feedback.

Master Section



The Master sections sums the audio from the six Channels and controls the output signal level feeding the main sound system.

This section features a Master Output Level control, a three-Band Isolator EQ and a pair of Analogue VU Meters for monitoring the left and right mix buss signal levels.

Additional signal processing can be applied by making use of the Master Insert sockets located on the rear panel. These sockets break the mix signal path, enabling external audio processors to be "inserted" into the signal chain and on to the mixer outputs.

Master Level – The Master Output level is adjusted from fully off to +6dBu gain. For best signal to noise ratio (SNR) it is recommended operating the mixer with the knob pointer at "12 o-clock" or above. If this results in excessive volume then reduce the gain on the connected power amplifiers

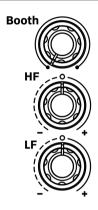
Isolator – The asymmetric Isolator offers full signal cut and +6dB of boost over three frequency bands, High, Mid, Low. Like an EQ the Isolator can be used for audio frequency correction, however, unlike an EQ the Isolator completely attenuates the signal when the knobs are fully anti-clockwise. With the knob pointers in the centre position the frequency response is flat.

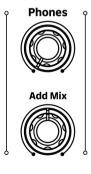
Output Meters— The large analogue VU Meters allow for easy monitoring of the left/ right main Mix Buss signal level. The signal level is monitored post-Isolator but pre-Master Level control. The meter response is the VU (Volume Unit) standard and displays the average signal level, unlike the channel LED meters which are peak reading. Both meters feature soft ultra violet illumination providing a cool blue/white glow for easy monitoring in low light conditions, without being overly bright or distracting.

For lowest distortion and best dynamic range, operate the mixer with the meters reading between –5VU and 0VU, with signal peaks no higher than +1VU. If the mix buss signal level goes above +3VU the meter illumination will flash bright red as a warning.

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Booth and Headphones





The Booth Output provides for independent local monitoring of the Main Mix buss and is not affected by the Main Mix Level control. It features a two-band EQ and a level control.

The headphone output is used for previewing the pre-fader signal level feeding the input channels, and is active when any Cue button is pressed (see page 11). The headphone output also features an "Add-Mix" control.

Booth Level – Adjusts the signal level of the Booth Outputs from off to +6dBu when rotated fully clockwise. For best signal to noise ratio (SNR), set the level with the pointer at or above the 12 o'clock position.

Booth EQ – A two-band shelving EQ offering +/-6dB boost/cut at 100Hz and 5kHz.

Phones Level— Adjusts the level of the headphone output. The Orbit.6 is fitted with a powerful high-quality headphone amplifier optimised for use with headphones having an impedance between 33ohms to 170ohms. Headphones with impedances above or below the recommended impedance should be avoided, and in particular headphones with impedances below 33ohms could cause damage to the circuitry.



WARNING! Avoid operating the mixer with headphones at high volume or for extended periods of time as this can contribute to severe hearing loss!

Add Mix – The Add Mix control sets the level of the main mix summed with the Cue Mix. When the knob is fully anti-clockwise, only the channel Cue signal will be heard in the headphones. Turning the Add Mix knob clockwise increasingly adds the mix signal to the headphones allowing the operator to audition how the Cued channel signal will sound in the mix before the Channel fader is raised.

Rear Panel Input Connections

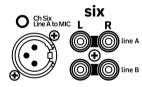


Channels 1-4 – The top row of RCA (Phono) connectors are designed for use with turntable magnetic cartridges and incorporate RIAA (Record Industry Association of America) equalisation. Do not connect line-level sources to these inputs as it could cause damage to the sensitive circuitry.



The lower row of RCA connectors are for Line level signals within the range of +26dBu to -10dBu.

Channel 5 – Channel five has line-level inputs for both A and B.



Channel 6 – Channel six has line-level inputs for both A and B, but additionally Input A can be switched to the Mic Channel (see page 12).

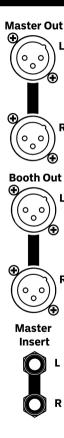


Channel Direct Out – The channel direct output jack sockets carry the post-fade signal for each of the six channels . These can be connected to a multi-track recorder or DAW (Digital Audio Workstation) enabling each channel to be recorded separately.

Mixer Output Connections

NOTE Both the Master and Booth Outputs have automuting to prevent clicks and thumps in any connected PA when powering the mixer on or off.

Power On muting lasts approximately 12 seconds, Power Off muting is instantaneous.



Orbit 6's Master and Booth Output XLR connectors are located on the left-hand side of the rear panel. There is also a pair of Mix Insert patch points for connection to external audio processors (compressors. limiters, graphic EQ etc).

Master Out — The Master Output XLRs are electronically balanced, with Pin 2 hot (positive phase), Pin 3 cold (negative phase), and Pin 1 ground. When the Master Level control is fully clockwise, with the Meters reading —4VU the output level is approximately +6dBu.



Important please read!

The Master Out XLRs must only be used on equipment fitted with fully balanced inputs. Never unbalance these outputs by connecting Pin 3 to ground, or use an XLR to RCA type adaptor. For unbalanced operation connect only to Pin 2 and Ground and leave Pin 3 floating.

Booth Out – The Booth Output XLRs are electronically "EBOS" balanced, with Pin 2 hot (positive phase), Pin 3 cold (negative phase), and Pin 1 Ground. When the Master Level control is fully clockwise, with the Meters reading –4VU the output level is approximately +6dBu. These XLR outputs can be used balanced or unbalanced by connecting Pin 3 to Ground.

Master Insert – The Master Inserts are fitted with 1/4" TRS Jacks and follow the standard convention of Tip = Send, Ring = Return, and Sleeve the common Ground. The connector's normalising contacts by-pass the insert when nothing is plugged in. Any External Processor should have a nominal operating level between –2dBu to +18dBu. Be aware that any external equipment plugged into these sockets will have an impact on audio fidelity, and we strongly recommend using only studio grade equipment.

Record and Auxiliary

Record Out L + R

Record Out – The Record Output is via an RCA connector with a nominal level of 316mV, -10dBV (-8dBu) and is compatible with most 2-track recorders. The Record output is taken post Insert and will be affected by the Isolator EQ but not by the Master Level control.

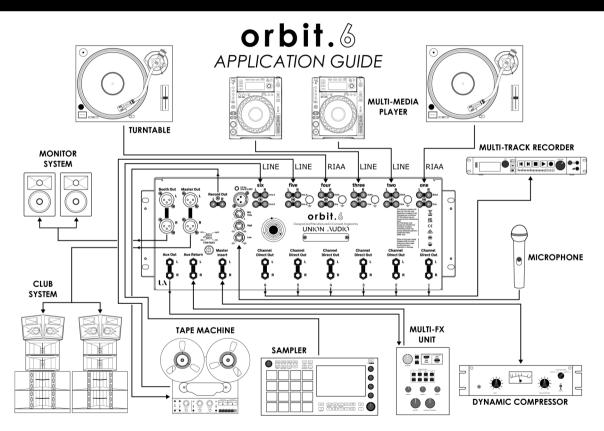
Aux Out

Auxiliary Out – The Auxiliary Output is via a pair of balanced 1/4" TRS Jack sockets following the standard convention of Tip Hot, Ring Cold, and Sleeve Ground. The nominal output level is 0dBu.

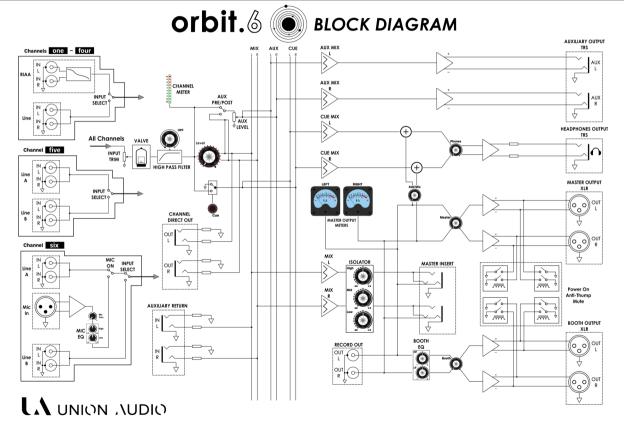


Auxiliary Return – The Auxiliary Return is via a pair of unbalanced 1/4" TRS Jack sockets following the standard convention of Tip Hot, Ring Signal Ground, and Sleeve Chassis Ground. The nominal input level is 0dBu

Application Diagram



Block Diagram



Specifications

Distortion plus Noise (THD+N) un-weighted

0dBu, 20Hz to 20kHz, Line In to Mix Out +4dBu 0.008%

Frequency Response

Line in to Mix Out +/-1dB 10Hz to 120kHz

RIAA Accuracy +/-0.2dB 20Hz to 20kHz

Shutoff and Crosstalk

Fader Shutoff > -85dB

L/R Crosstalk Line in to Mix Out 1kHz <-80dB

Noise 22Hz to 22kHz Un-Weighted

Residual Mix Output noise <-102dBu

Line In to Mix Out Unity <-89dBu

Maximum Output Level Mix Out 0.5% THD +26dBu

Dynamic Range 115dB

EQ and Filter Frequency

Channel High-Pass Filter Fully Clockwise -3dB/1100Hz

Isolator Crossover Frequencies 320Hz and 3800Hz

Booth EQ -3dB/100Hz and 5000Hz

Dimensions

Mixer

Front Panel 482.5mm x 176mm (4U 19" Rack Mount)

Depth 170mm (6 7/10 ")

Weight 6.35kg (14lb)

<u>PSU</u>

Top Panel 200mm x 200mm (7 7/8" x 7 7/8)

Depth 52mm (2")

Weight 2.2kg (5lb)

Packed Dimensions

Size L x W x H 62cm x 31cm x 38cm (24.5"x 12.2" x 15")

Weight 12.35kg (27lb)

Headphone Amplifier

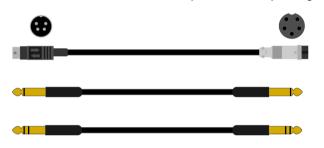
Maximum output level 1W RMS into 40ohms

Valves

Six High Quality ECC82 (12AU7) Dual Triodes

Cable Types

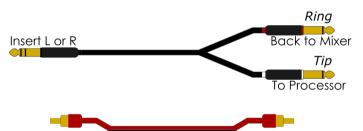
For best performance always use high-quality audio cables and interconnects.



Proprietary Power Supply DC Cable supplied with the Mixer. Do not use any other type

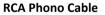
Unbalanced TR Cable

Balanced TRS Cable



Insert (Send + Return) Cable

Tip = Send (Connect to External Processor Input)
Ring = Return Connect to External Processor Output)
Sleeve = Common Ground



Black = Left Channel Red = Right Channel



Pin 1- Ground Pin 2- Hot(+)

Pin 3- Cold(-)

Europa Power Supply





Orbit.6 is powered by the external Hybrid Linear power supply unit (PSU) "Europa". Each Europa PSU is factory configured for the specific mains voltage for the location where it is used, and is available in three versions; 100VAC (JAPAN ONLY), 115VAC, and 230VAC. Please ensure you specify the correct mains voltage when placing your order for the Orbit.6

Europa has three outputs, +16V and -16V providing power for the mixer's analogue audio circuitry, and +12V to power the valve heater elements.

The two analogue rails are fully linear and are derived via a high quality toroidal transformer, bridge rectifier, smoothing, and dual discrete regulators. These analogue power rails are extremely quiet with a typical wide-band output noise level of <-85dBu at the rated output of 1 amp.

The analogue power rails are fully protected against short circuit and overvoltage, and each rail has its own visual status indicator; Green for good, flashing Amber for overheat warning, or flashing Red in the event of a shutdown.

The 12 volts for the valve heaters is derived from a compact switched mode power supply module, ensuring high efficiency and maximum reliability.



<u>WARNING</u> - To prevent the risk of fire or electric shock do not operate the Europa PSU near water or in locations where it is likely to be exposed to rain or moisture.

Always ensure the Europa has adequate ventilation, and if operated in high ambient temperatures consider additional measure to aid cooling, such as a small desktop fan.

Connecting Europa to Orbit.6





Make sure the flat face is facing left when plugging into the socket on the rear panel of the Orbit.6



ALWAYS ENSURE THE EUROPA POWER SUPPLY IS TURNED OFF BEFORE CONNECTING THE DC POWER CABLE TO THE ORBIT.6 MIXER

The supplied DC lead is securely attached to the Europa by a threaded screw ring, and to the Orbit.6 by a 4 pin KYCON locking system. To connect the lead, line up the keyway on the chrome 5 Pin socket with the plug on the Europa, push fully in and tighten the locking ring. Line up the pins on the Kycon plug with the socket on the rear panel of the Orbit.6, the flat face of the outer sleeve should be facing left, then push the connector fully in until it locks. To release the Kycon connector, pull back the spring-loaded outer sleeve until the plug withdraws from the socket. Never pull on the cable to release the connector as this could cause damage to the cable or connector system.

Once both devices are connected, and the power supply is plugged into the mains, use the switch on Europa to power up Orbit 6. It is normal on initial power-up for the channel meters to flicker and the VU meters to kick. Orbit.6 has built in output muting on the Master and Booth outputs to prevent clicks and thumps through any connected speakers. The output muting will last approximately 12 seconds to allow the power rails to stabilise before un-muting.

It is a good idea to leave the mixer to warm up for 5 minutes before use to ensure the best performance from the valves.

Care of the Mixer



When fitting the mixer into a 19" rack unit, always use protective nylon washes under the securing screws to avoid damaging the anodised aluminium faceplate, and do not overtighten.

If liquid is accidentally spilt onto the mixer, turn off the power supply immediately, and if possible turn the unit upside-down to minimise ingress. Clean off the spill with a damp cloth, and dry thoroughly before powering back on. If afterwards the mixer fails to function properly or is excessively noisy, contact Union Audio technical support, or an appointed service agent to have the unit inspected at the earliest opportunity.

When not in use, cover the mixer with a dedicated protective screen or dust sheet, and avoid siting the unit where it will be in direct sunlight for any length of time. Clean stains or spills with a soft damp cloth and dry carefully with a soft cotton cloth. Never use harsh abrasive or solvent based cleaning products.

Turn off the mixer when not in use to minimise power consumption, and consider additional cooling (such as a directing a desktop fan at the mixer and power supply) when operating in high ambient temperatures.

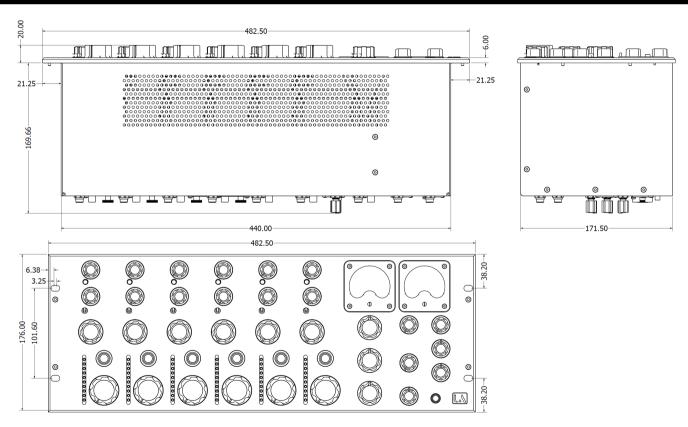
Only ever store the unit in a dry environment as dampness and high humidity will shorten the life of the potentiometers and could promote internal corrosion.



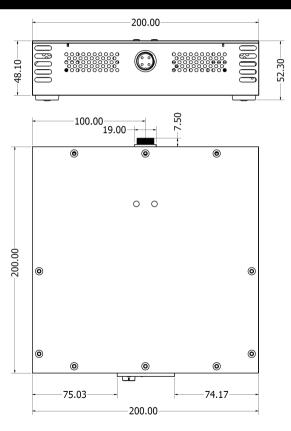
Important Notice regarding the VU Meters:

The needles in the meters are highly sensitive to electrostatic charges. This can cause the needle to initially stick when first powered on or lag behind the other meter. The static charge will normally dissipate after a few seconds, but take extra care when polishing or cleaning the mixer, and be sure to use a soft cotton or anti-static cloth with a specialist anti-static spray to avoid inducing a charge on the meter. Take care when wiping the meter windows as they can be easily scratched.

Mixer Dimensions



Europa PSU Dimensions



Service Record and Notes				
Service Date		Carried out by		Signature
Service Date	I	Carried out by	I	Signature
Service Date		Carried out by		Signature
Service Date	I	Carried out by		Signature

Notes

