

# **T L Audio**

## **INDIGO SERIES**

*User Manual*

### **EQ-2011 VALVE EQUALISER**

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## INTRODUCTION

The T L Audio Indigo Series combines classic valve techniques with low noise solid state circuitry to produce audio processing units offering very high quality signal paths with comprehensive control facilities and the unique valve sound.

The EQ-2011 is a two channel valve equaliser. Four bands of EQ are provided on each channel, each with a switched frequency selection to cover the full audio bandwidth.

The block diagram of one channel of the unit is shown in fig.1. It has three input sources - a balanced line level input via an XLR connector, an unbalanced line level input via a jack socket, and an instrument input also on an unbalanced jack socket but located on the front panel where it provides a convenient means of patching a guitar or keyboard directly into the equaliser. All three inputs may be used simultaneously. The gain of the input stages is controlled by a centre-detented control, calibrated for 0dB nominal gain from the line input sources at the centre and providing +/-20dB of variation. The instrument input has a sensitivity switch associated with it, to match the gain to a low level pickup (e.g. a passive guitar or microphone) or a higher output source such as a keyboard or active guitar, followed by the 40dB variation of the input gain control.

After the input stage, the signal is fed to the four valve stages, which are arranged as a pre-amplifier stage, a combined LF/HF shelving stage and two separate peaking mid bands. The valve equaliser stages use the established TL Audio circuitry which offers a wide dynamic range and frequency response, low noise, low distortion and broad control range.

A variable intensity peak LED monitors the output of the valve stages, providing an indication of the amount of drive and headroom available.

The signal chain is completed by an EQ-in switch plus balanced and unbalanced output driver stages.

Please read this manual fully before installing or operating the Equaliser.

## **PRECAUTIONS**

The T L Audio EQ-2011 Valve Equaliser requires very little installation, but like all electrical equipment, care must be taken to ensure reliable, safe operation. The following points should always be observed:

- All mains wiring should be installed and checked by a qualified electrician,
- Ensure the correct operating voltage is selected on the rear panel before connecting to the mains supply,
- Never operate the unit with any cover removed,
- Do not expose to rain or moisture, as this may present an electric shock hazard,
- Replace the fuse with the correct type and rating only.

**Warning: This equipment must be earthed.**

## INSTALLATION

### AC Mains Supply.

The unit is fitted with an internationally approved 3 pin IEC connector. A mating socket with power cord is provided with the unit, wired as follows:

Brown: Live.

Blue: Neutral.

Green/Yellow: Earth (Ground).

All mains wiring should be performed by a qualified electrician with all power switched off, and the earth connection must be used.

Before connecting the unit to the supply, check that the voltage selector switch on the rear panel is correctly set. The unit may be set for 115V (accepting voltages in the range 110V to 120V, 60Hz AC), or to 230V (for voltages in the range 220V to 240V, 50Hz AC). Adjustment to the operating voltage should be made by sliding the selector switch left or right with a small screwdriver until the desired voltage is displayed. The mains fuse required is 20mm anti-surge, 1AT rated at 250V. If it ever necessary to replace the fuse, only the same type and rating must be used. The power consumption of the equipment is 30VA.

**Warning:** attempted operation on the wrong voltage setting, or with an incorrect fuse, will invalidate the warranty.

### Audio Operating Level.

The equaliser is equipped with inputs and outputs suitable for connection to a wide variety of other audio equipment. Generally, the balanced XLR connections will be required for interfacing to other professional equipment, where the operating level (line-up level or nominal level) will be +4dBu, or about 1.2V rms. The unbalanced jack connectors are generally intended for interfacing to semi-professional equipment and have an operating level of -10dBu, or about 225mV rms.

The equaliser may be used to change between operating levels, for example by connecting the unbalanced output of a semi-pro mixing console to the equaliser's unbalanced input, and taking the balanced output of the equaliser to the balanced input of a tape machine at +4dBu. All inputs and outputs of the equaliser may be used simultaneously if required. Balanced interconnection is always preferable to obtain the best headroom and noise rejection, but can only be used if the other equipment in the chain, e.g. the mixing console, also has provision for balanced connections.

### Audio Inputs.

Each channel has a female, 3 pin XLR connector, suitable for balanced or unbalanced line sources at a nominal level of +4dBu. The mating connector should be appropriately wired as follows for balanced or unbalanced operation:

Balanced inputs:

- Pin 1 = Ground (screen).
- Pin 2 = Signal Phase (also known as “+” or “hot”).
- Pin 3 = Signal Non-Phase (“-” or “cold”).

Unbalanced inputs:

- Pin 1 = Ground (screen)
- Pin 2 = Signal Phase (“+” or “hot”).
- Pin 3 = Signal Ground

When using unbalanced signals, the signal ground may be obtained by linking pins 1 and 3 in the mating XLR connector. If this connection is not made, a loss in level may result.

### **Unbalanced Line Inputs.**

An unbalanced line level input at a nominal level of -10dBu is also provided for each channel, on a 0.25” mono jack socket. The mating plugs should be wired as follows:

- Tip = Signal Phase (“+” or “hot”).
- Screen = Ground.

### **Auxiliary Inputs.**

A 2 pin (mono) jack plug is required, which should be wired as follows:

- Tip = Signal Phase (“+” or “hot”).
- Screen = Ground.

The auxiliary input is suitable for direct connection of instruments including guitars and keyboards. Good quality screened cable should be used, particularly for microphone or low level sources, to prevent hum or noise pickup.

### **Balanced Outputs.**

The output is via a balanced, 3 pin male XLR connector. The mating connector should be wired as follows:

- Pin 1 = Ground (screen),
- Pin 2 = Signal Phase (“+” or “hot”),
- Pin 3 = Signal Non-Phase (“-” or “cold”).

### **Unbalanced Outputs.**

An unbalanced line output is provided for each channel, on a 0.25” mono jack socket.

- Tip = Signal Phase (“+” or “hot”).
- Screen = Ground.

### **Ventilation.**

The unit generates a small amount of heat internally. This heat should be allowed to dissipate by convection through the grills in the side panels and top cover, which must not be obstructed. Do not locate the unit where it will be subject to external heating, for example in the hot air flow from a power amplifier, or on a radiator.

The equaliser may be free standing, or mounted in a standard 19” rack.

### **Rear Panel.**

The rear panel connectors are identified in fig.3. Make sure that all settings, mains and audio connections have been made as described above before attempting to operate the equipment.

## **OPERATION.**

### **Front Panel.**

The front panel controls are identified in fig.2.

### **Input Gain.**

The input gain of the equaliser may be varied over a range of +/-20dB, which combined with the different sensitivity inputs, provides adequate and precise control of signal level. Generally, enough gain should be applied to make the peak LED glow on the louder sections of music, without causing the LED to illuminate brightly for an extended time. This will provide the optimum signal to noise ratio whilst allowing plenty of headroom for boost in the equaliser.

The front panel auxiliary input sockets may be switched between high level signals ("LO GAIN", suitable for active guitars and keyboards) and low level signals ("HI GAIN", suitable for microphones, pick ups or passive guitars), and are also controlled by the input gain control.

### **Peak LED.**

The peak LED indicates the drive level within the valve stages that form the equaliser. The EQ-2011 is a precise, low distortion instrument which is capable of a high operating level without a significant increase in distortion, but the valve character will become more noticeable as the level is increased to illuminate the peak LED fully.

The LED will start to glow at a level of +6dBu referred to the balanced output, and be fully illuminated at +16dBu, where there is still 10dB of output headroom remaining.

### **LF Band.**

The LF (Low Frequency) band of the equaliser has a shelving characteristic - i.e. it extends from the selected frequency to the extreme low frequency limit of the equaliser's response.

The corner frequency of the LF band is selected by a push button to 120Hz or 80Hz, and the cut or boost is controlled by a continuously variable, centre-detented rotary knob. At the selected corner frequency, up to 12dB of cut and boost are available. Typical response curves are shown in the specification section of this manual.

### **LM Band.**

The LM (Low-Mid Frequency) band has a peaking characteristic - i.e. it boosts or cuts a section of the audio spectrum around its selected centre frequency only.

A four position rotary switch is used to select the centre frequency to 250Hz, 500Hz, 1KHz or 2K2Hz. The mid bands possess a low Q, wide bandwidth, response which results in effective equalisation without harshness, and this means that there is a good degree of overlap between the frequency options.

The amount of cut or boost is again controlled by a continuously variable, centre-detented rotary knob, with up to 12dB of cut and boost available at the centre frequencies. Response curves for the mid bands are also shown in the specification section of this manual.

### **HM Band.**

The HM (High-Mid Frequency) band is similar in operation to the LM band, except that the centre frequencies are obviously higher, and concentrated in the critical upper vocal region of the spectrum. The available frequencies are 1K5Hz, 2K2Hz, 3K6Hz and 5KHz.

### **HF Band.**

The HF (High Frequency) band has a shelving characteristic, complimenting the LF band. Corner frequency selection is by push switch to 8KHz or 12KHz.

### **Bypass.**

The Equaliser In switch allows the processing to be bypassed for comparison of the equalised and original, unprocessed signal.

The valve stages of the 2011 are all associated with the equaliser section - see the block diagram - resulting in a clean (non-valve) sound when the EQ is bypassed. It is also possible to add valve warmth without EQ by setting the cut and boost controls flat (i.e. at their centre-detent positions), but leaving the EQ in circuit.

## SPECIFICATIONS

### Balanced Line Input:

Electronically balanced, unbalanced compatible, with input impedance greater than 5Kohm.  
Gain range -20dB to +20dB.  
Nominal input level +4dBu.  
Maximum input level +26dBu.  
3 pin female XLR connector.

### Unbalanced Input:

Input impedance greater than 5Kohm.  
Gain range -20dB to +20dB.  
Nominal input level -10dBu.  
Maximum input level +12dBu.  
2 pole 0.25" jack socket.

### Auxiliary Input:

Switchable for high or low gain, plus 40dB gain variation.  
Maximum input level +18dBu.  
2 pole 0.25" jack socket.

### LF Band:

+/-12dB at 80Hz or 120Hz.  
Shelving response.

### LM Band:

+/-12dB at 250Hz, 500Hz, 1KHz or 2K2Hz.  
Peaking response, Q = 0.5.

### HM Band:

+/-12dB at 1K5Hz, 2K2Hz, 3K6Hz or 5KHz..  
Peaking response, Q = 0.5.

**HF Band:**

+/-12dB at 8KHz or 12KHz.  
Shelving response.

**Balanced Outputs:**

Electronically balanced, unbalanced compatible.  
Nominal level +4dBu.  
Output impedance 47 ohms.  
Maximum level +26dBu.  
3 pin male XLR connector.

**Unbalanced Outputs:**

Output impedance 47 ohms.  
Nominal level -10dBu.  
Maximum level +18dBu into 10Kohms.  
2 pole 0.25" jack socket.

**Frequency Response:**

10Hz to 40KHz, +0, -1dB.

**Noise:** -80dBu (22Hz - 22KHz).

**Distortion:**

0.05%, 10Hz to 40KHz at 0dBu with EQ in and flat.

**Dynamic Range:**

106dB.

**Power Requirements:**

Rear panel selectable for 220-240V 50Hz or 110-120V 60Hz operation.  
Rear panel fuse 20mm, 1AT, 250V.  
Power consumption 30VA typical.

Detachable 3 pin IEC connector, mating connector and cable supplied.  
Front panel On/Off switch with green LED.

**Dimensions:**

19" rack mounting, 1U high.  
483mm wide x 44mm high x 250mm deep.

**Weight:** 4Kg.

The above specifications are subject to change without notice.

**SERVICE**

Should the equaliser require service, it must be taken or posted to an authorised dealer. Please retain the original packing for possible future use, and ensure the unit is suitably protected during transit. The manufacturer cannot accept responsibility for damage caused during transportation.

The equaliser is supported by a limited warranty for a period of one year from the date of purchase. During this period, any faults due to defective materials or workmanship will be repaired free of charge. The warranty excludes damage caused by deliberate or accidental misuse, operation on the incorrect mains voltage, or without the correct type and value of fuse fitted. It is the user's responsibility to ensure fitness for purpose in any particular application. The warranty is limited to the original purchase price of the equipment, and excludes any consequential damage or loss.

Please retain proof of purchase, and record the following details:

Serial Number.....

Date purchased.....

Dealer.....