ISA Two

Two channel classic transformer mic pre

Version 2.0

User Guide

Focusrite®

focusrite.com

Table of Contents

About this User Guide

This user guide applies to the ISA Two mic pre.

It provides information about installing and using the unit and how it can be connected to your system.

Should this User Guide not provide the information you need, then please consult focusritepro.zendesk.com, which contains a comprehensive collection of common technical support queries.

Box Contents

- ISA Two
- AC power lead
- Safety information cut sheet

Introduction

Thank you for purchasing the Focusrite ISA Two.

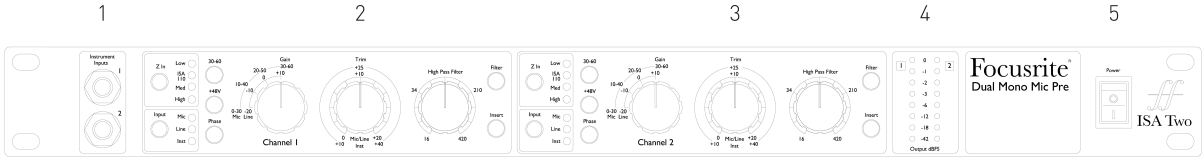
The ISA Two provides two of Focusrite's prestigious transformer-based microphone preamps and can be used to record microphone, line-level or instrument sources. Microphones and line-level sources are connected via the rear panel, whilst instrument inputs can be plugged directly into the front panel jack sockets.

The front panel also features gain, adjustable filter frequency and other settings such as phantom power, phase and input impedance for both inputs. Peak level LED metering in dBFS is provided for each channel to indicate when the output is reaching the digital clipping point; a meter calibration control is provided on the rear panel.

First introduced in 1985, the ISA microphone preamp is renowned for outstanding transparency and subtle warmth contributed by transformer core saturation. The variable impedance circuit allows ISA users to match the preamp with a wide range of microphones.

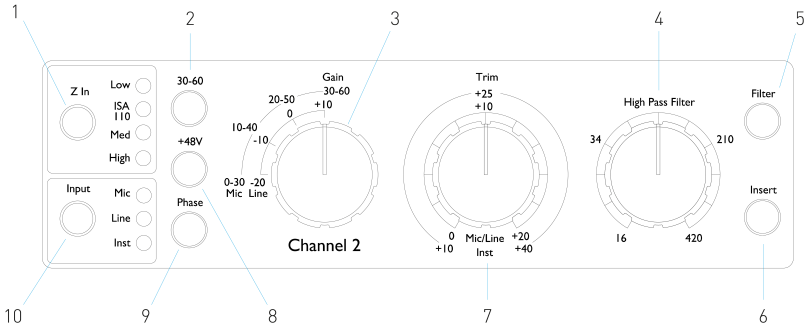
Controls and Features

Front Panel



1. Instrument Inputs
2. Channel 1
3. Channel 2
4. LED meters
5. Power switch

Channel Controls



1. Mic input impedance (**Z In**) selection
2. Selects the high (**30-60** dB) mic gain range on the Gain switch
3. 10 dB stepped Mic/ Line **Gain** switch Mic: 0-30 / 30-60 Line: -20 +10
4. Filter roll-off frequency pot
5. Applies the variable-frequency high-pass **Filter** to the selected input
6. Switches the external **Insert** return into the channel path
7. Input **Trim** pot Mic/Line: 0 +20 dB Instrument: +10 +40 dB
8. Applies **+48V** phantom power to the mic input XLR
9. Inverts polarity (**Phase**) of the selected input
10. **Input** source selection

Input Selection

The **Input** button selects the input source for the main channel path: Mic/Line/Instrument.

Phase

Pressing **Phase** inverts the polarity of the selected input. This can be useful when multiple mics are used in close proximity (ie., on a drum kit).

Mic Input Gain

The **Gain** switch adjusts the mic gain in 10 dB steps. Its range is either 0–30 dB or 30–60 dB when the **30–60** switch is pressed. An additional 0–20 dB of continuous gain adjustment is available using the **Trim** control.

Caution

To avoid an excessive jump in level, It is recommended that the stepped Gain switch is turned to minimum before pressing the 30-60 switch.

Before starting a recording, set the Trim control to near its centre position. This will allow for some gradual gain adjustment up or down without the use of the stepped control.

+48V

Pressing the **+48V** button applies phantom power to the Mic input XLR. This switch does not affect the Line or Instrument inputs.

If you are unsure whether your microphone requires phantom power please refer to its handbook. Certain microphones (most notably ribbon and unbalanced mics) could be damaged by applying phantom power.

Line Input Gain

The **Gain** switch adjusts the gain between -20 dB and +10 dB in 10 dB steps. Continuous gain adjustment of up to 20 dB can be added using the **Trim** control.

Instrument Input

The Instrument input is via a standard 1/4” mono jack (**DI**) on the front panel. The level is set using the **Trim** control and is continuously adjustable from +10 dB to +40 dB.

Z in (Input Impedance)

With the Mic input selected, pressing the **Z In** button steps through the four transformer preamp input impedance options. The values are shown in the table.

Table 1. Mic Impedance

Low	600Ω
ISA 110	1.4kΩ
Med	2.4kΩ
High	6.8kΩ

Tip

For information on impedance selection see Preamp Input Impedance [10].

The Line input impedance is fixed at 10 kΩ and is not affected by the Z In switch.

Filter

Pressing the Filter button inserts the 18 dB/octave high-pass filter into the channel path; it is applied to whichever input is selected. The High Pass Filter control allows the roll-off frequency to be set within the 16 Hz to 420 Hz range.

Tip

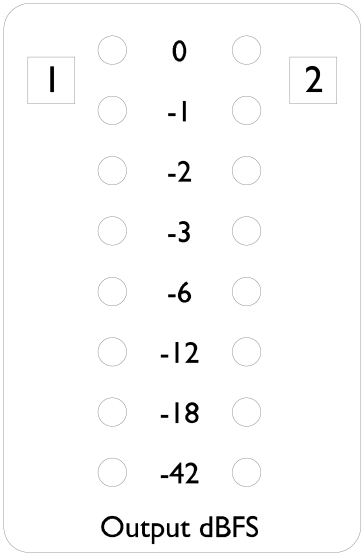
The filter is useful for removing any unwanted low frequencies, eg., rumble transmitted through floor-mounted mic stands, etc.

Insert

Pressing **Insert** places the Insert Return signal into the channel path before the Output connector, allowing the inclusion of external effects units.

The Insert Send is always available and is post the input Gain and Filter & Phase controls.

Channel Meters



The LED meters indicate the level at the channel output connectors. The scale is in dBFS, ie., the level in dB, relative to maximum output (reached when the '0' LED illuminates).

The default calibration is for '0' to indicate a signal level of 22 dBu

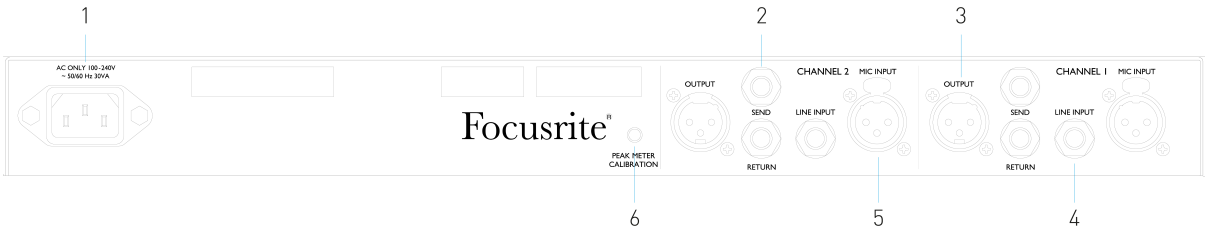
Meter Calibration

The level at which the '0' LED illuminates can be adjusted using the **Peak Meter Calibration** pot on the rear panel. The default setting of 0 dBFS = 22 dBu occurs when the knob is in its central, detent position.

PEAK METER
CALIBRATION

Rotating the pot sets the value between 0 dBFS = 16 dBu (fully anticlockwise) and 0 dBFS = 24 dBu (fully clockwise).

Rear Panel



1. Mains inlet
2. Insert Send and Return
3. Channel Output
4. Line input
5. Mic input
6. Meter calibration trim pot

AC Mains Inlet

Standard IEC receptacle for AC mains. ISA Two features a ‘Universal’ PSU, enabling it to operate on any supply voltage between 100 and 240 V AC

Channel Mic Inputs

On latching XLR-3 female connectors, with switchable phantom power per channel.

Channel Line Inputs

On balanced 1/4” TRS jack sockets.

Channel Outputs

On XLR-3 male connectors.

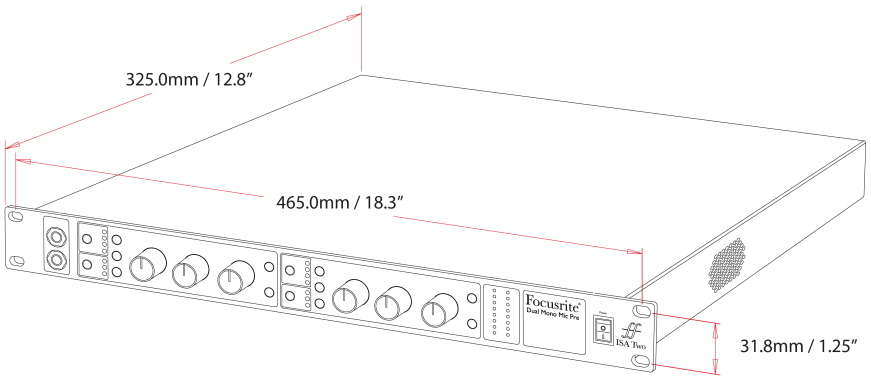
Channel Insert Sends and Returns

Balanced 1/4” TRS Jack sockets for Insert Send and Return. The insert can be added to the channel path by pressing the front panel **Insert** switch

Meter Calibration Pot

Adjusts the level at which the channel meter ‘0’ LED illuminates. See page Meter Calibration [6].

Physical Characteristics



ISA Two dimensions are illustrated in the diagram above.

ISA Two requires 1U of vertical rack space. Allow an additional 75mm of rack depth behind the unit to allow for cables.

ISA Two weighs 3.7 kg / 8.12 lbs and for installations in a fixed environment (eg., a studio rack), the front-panel rack mountings* will provide adequate support. However, if the unit is to be used in a mobile situation (eg., flight-cased for touring, etc.), it is recommended that side support rails or shelves are used within the rack.

Important
*Always use M6 bolts and cage nuts specifically designed for 19" equipment racks. An Internet search using the phrase "M6 cage nuts" will reveal suitable components.

Cooling vents are provided at each side; ensure that when mounted in a rack these vents are not obstructed. Do not mount the unit immediately above any other equipment which generates significant heat, for example, a power amplifier.

Note
The maximum operating environmental temperature is 40°C / 104°F.

Power Requirements

ISA Two is mains-powered. It incorporates 'Universal' power supplies which can operate on any AC mains voltage from 100 V to 240 V. The AC connections are made via standard 3-pin IEC connectors on the rear panel.

A mating IEC cable is supplied with each unit – this should be terminated with a mains plug of the correct type for your country.

The AC power consumption of the ISA Two is 35 W.

Note
There are no fuses in ISA Two or other user-replaceable components of any type. Please refer all servicing issues to the Customer Support Team (see Customer Support and Unit Servicing [15]).

Appendices

Connector Pinouts

Mic Input

Connector: XLR-3 female

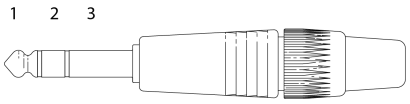
Pin	Signal
1	Screen
2	Hot (+ve)
3	Cold (-ve)

Output

Connector: XLR-3 male

Line Input / Insert Send / Return

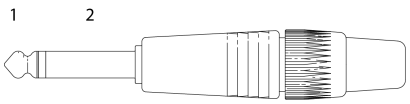
Connector: Balanced (TRS) 1/4” Jack socket



Pin	Signal
1 - Tip	Hot (+ve)
2 - Ring	Cold (-ve)
3 - Sleeve	Ground

Insturment Input

Connector: Unbalanced (TS) 1/4” Jack socket



Pin	Signal
1 - Tip	Hot (+ve)
2 - Sleeve	Ground

Preamp Input Impedance

A major element of the sound of a mic pre is related to the interaction between the specific microphone being used and the type of mic preamp interface technology it is connected to. The main area in which this interaction has an effect is the level and frequency response of the microphone, as follows:

Level

Professional microphones tend to have low output impedances and so more level can be achieved by selecting the higher impedance positions of the ISA Two mic preamp.

Frequency response

Microphones with defined presence peaks and tailored frequency responses can be further enhanced by choosing lower impedance settings. Choosing higher input impedance values will tend to emphasise the high-frequency response of the microphone connected, allowing you to get improved ambient information and high-end clarity – even from average-performance microphones. Various microphone/ISA Two preamp impedance combinations can be tried to achieve the desired amount of colouration for the instrument or voice being recorded. To understand how to use the impedance selection creatively, it may be useful to read the following section on how the microphone output impedance and the mic preamp input impedance interact.

Note
Impedance Setting – Quick Guide

In general, the following selections will yield the following results:

High mic preamp impedance settings:

- Generate more overall level
- Tend to make low- and mid-frequency responses of the microphone flatter
- Improve the high-frequency response of the microphone.

Low preamp impedance settings:

- Reduce the microphone output level
- Tend to emphasise the low- and mid-frequency presence peaks and resonant points of the microphone.

Switchable Impedance - In-Depth Explanation

Dynamic Moving Coil and Condenser Microphones

Almost all professional dynamic and condenser microphones are designed to have a relatively low nominal output impedance of between 150 Ω and 300 Ω when measured at 1 kHz. Microphones are designed to have such low output impedance because of the following advantages result:

- They are less susceptible to noise pickup
- They can drive long cables without high-frequency roll-off due to cable capacitance

The side-effect of having such low output impedance is that the mic preamp input impedance has a major effect on the output level of the microphone. Low preamp impedance loads down the microphone output voltage and emphasizes any frequency-related variation in microphone output impedance. Matching the mic preamp resistance to the microphone output impedance (eg., making a preamp input impedance 200 Ω to match a 200 Ω microphone) still reduces the microphone output and signal-to-noise ratio by 6 dB, which is undesirable.

To minimise microphone loading, and to maximise signal-to-noise ratio, preamps have traditionally been designed to have an input impedance about ten times greater than the average microphone, around 1.2 kΩ to

2 kΩ. (The original ISA 110 preamp design followed this convention and has an input impedance of 1.4 kΩ at 1 kHz.) Input impedance settings greater than 2 kΩ tend to make the frequency-related variations of microphone outputs less significant than at low impedance settings. Therefore high input impedance settings yield a microphone performance that is flatter in the low and mid-frequency areas and boosted in the high-frequency area when compared to low-impedance settings.

Ribbon Microphones

The impedance of a ribbon microphone is worthy of special mention, as this type of microphone is affected enormously by preamp impedance.

The ribbon impedance within this type of microphone is very low, around 0.2 Ω, and requires an output transformer to convert the low voltage it generates into a signal capable of being amplified by a preamp. The transformer uses a ratio of around 1:30 (primary:secondary) to increase the ribbon voltage to a useful level. This transformer ratio has the effect of increasing the output impedance of the mic to around 200 Ω at 1 kHz.

The transformer impedance, however, is very dependent upon frequency – it can almost double at some frequencies (known as the resonance point) and tends to roll off to very small values at low and high frequencies. Therefore, in common with dynamic and condenser microphones, the mic preamp input impedance has a significant effect on the signal level and frequency response of the ribbon microphone output transformer, and the associated ‘sound quality’ of the microphone. It is recommended that a mic preamp connected to a ribbon microphone should have an input impedance of at least 5 times the nominal microphone impedance.

For a ribbon microphone impedance of 30 Ω to 120 Ω, the input impedance of 600 Ω (Low) will work fine. For 120 Ω to 200 Ω ribbon microphones, the input impedance setting of 1.4 kΩ (ISA 110) is recommended.

Pro Tools interfacing

Figure 1. Analogue out to Pro Tools | HD

Performance and Specifications

Microphone Inputs	
All measurements were taken at minimum gain, Z In: medium unless otherwise stated. Measurements taken at the analogue outputs	
Gain Range	0 to 30 dB or 30 to 60 dB (with '30-60' switch enabled), in 10 dB steps, plus 0 to 20 dB of continuous trim
Maximum Input Level	+7 dBu
Input Impedance	Transformer balanced, Low: 600 Ω, ISA 110: 1.4 kΩ, Medium: 2.4 kΩ, High: 6.8 kΩ
Signal-to-Noise Ratio	122 dB 'A'-Weighted (typical), maximum gain
Frequency Response	20 Hz – 20 kHz ± 0.2 dB | 10 Hz – 110 kHz ± 1.5 dB
THD+N	-92 dB (0.0025%) @ -1 dBr
High-Pass Filter	18 dB/octave, switchable, variable frequency: 16 – 420Hz
Noise EIN (A-Weighted)	<-123 dBu maximum gain
Common Mode Rejection Ratio	-93 dB @ 1kHz

Line Inputs	
All measurements were taken at minimum gain, Z In: Low, unless otherwise stated, RS = 50 Ω. Measurements taken at the analogue outputs	
Gain Range	-20 to +10 dB in 10 dB steps, plus 0 to 20 dB continuous trim
Maximum Input Level	+25 dBu
Input Impedance	Electronically balanced 10 kΩ
Signal-to-Noise Ratio	122 dB 'A'-Weighted (typical), maximum gain
Frequency Response	20 Hz – 20 kHz ± 0.1 dB | 10 Hz – 122 kHz ± 3 dB unity gain
THD+N	-91 dB (0.0028%) @ -1 dBr
High-Pass Filter	18 dB/octave, switchable, variable frequency: 16 – 420Hz
Common Mode Rejection Ratio	-65 dB @ 1 kHz

Instrument Inputs	
All measurements were taken at minimum gain, Z In: Low, unless otherwise stated, RS = 600 Ω. Measurements taken at the analogue outputs	
Gain Range	+10 to +40 dB continuous, using Trim pot
Maximum Input Level	+18 dBu
Input Impedance	>2 MΩ
Signal-to-Noise Ratio	100 dB 'A'-Weighted
Frequency Response	20 Hz – 20 kHz ±0.1 dB | 10 Hz – 110 kHz ± 1.2 dB
THD+N	-83 dB (0.0071%) @ -1 dBFS
High-Pass Filter	18 dB/octave, switchable, variable frequency: 16 – 420Hz

Output Level	
Maximum output level	+24 dBu

Connectivity	
Front panel	
Instrument inputs	2 x 1/4" mono jack
Rear Panel	
Microphone inputs	2 x XLR-3 female
Line level inputs	2 x 1/4" balanced jack
Insert sends	2 x 1/4" balanced jack
Insert returns	2 x 1/4" balanced jack
Outputs	2 x XLR-3 male

Crosstalk	
All measurements were taken at minimum gain, Z In: Medium	
Microphone Inputs	-60 dB, 20 Hz – 20 kHz
Line Inputs	-80 dB, 20 Hz – 20 kHz
Instrument Inputs	-80 dB, 20 Hz – 20 kHz

Dimensions	
Height	88mm / 3.46”
Width	482mm / 18.98”
Depth	325mm / 12.8”

Weight	
Weight	3.7 kg / 8.12 lbs

Power	
PSU	1 x Internal, 100 – 240 V, 50 / 60 Hz
Consumption	35 W

Environmental	
Operating Temperature	40°C / 104°F Maximum ambient operating temperature

Notices

Focusrite Warranty and Service

All Focusrite products are built to the highest standards and should provide reliable performance for many years, subject to reasonable care, use, transportation and storage.

Many of the products returned under warranty are found not to exhibit any fault. To avoid unnecessary inconvenience to you in terms of returning the product please contact Focusrite support.

If a Manufacturing Defect becomes evident in a product within 36 months from the date of the original purchase, Focusrite will ensure that the product is repaired or replaced free of charge.

A Manufacturing Defect is defined as a defect in the performance of the product as described and published by Focusrite. A Manufacturing Defect does not include damage caused by post-purchase transportation, storage or careless handling, nor damage caused by misuse.

Whilst this warranty is provided by Focusrite the warranty obligations are fulfilled by the distributor responsible for the country in which you purchased the product.

In the event that you need to contact the distributor regarding a warranty issue, or an out-of-warranty chargeable repair, please visit: focusrite.com/distributors

The distributor will then advise you of the appropriate procedure for resolving the warranty issue. In every case, it will be necessary to provide a copy of the original invoice or store receipt to the distributor. If you cannot provide proof of purchase directly, then you should contact the reseller from whom you purchased the product and attempt to obtain proof of purchase from them.

Please do note that if you purchase a Focusrite product outside your country of residence or business you will not be entitled to ask your local Focusrite distributor to honour this limited warranty, although you may request an out-of-warranty chargeable repair.

This limited warranty is offered solely to products purchased from an Authorised Focusrite Reseller (defined as a reseller who has purchased the product directly from Focusrite Audio Engineering Limited in the UK, or one of its Authorised Distributors outside the UK). This Warranty is in addition to your statutory rights in the country of purchase.

Registering Your Product

To access optional bundled software, please register your product at: focusrite.com/register

Customer Support and Unit Servicing

You can contact our Customer Support team:

Email: focusriteprosupport@focusrite.com

Phone (UK): +44 (0)1494 836 384

Phone (USA): +1 (310) 450 8494

Troubleshooting

If you are experiencing problems with your ISA Two, we recommend you visit our Support Help Centre at: focusritepro.zendesk.com