

Introduction

Thank you for purchasing the ISA 220 Session Pack brought to you by the Focusrite team – Trevor, Peter, Martin, Helen, Raf, Tom, Mick, Phil, Chris, Micky, Pauline, Jo, Chris, Bryn, Giles, Rob and Simon.

The chaps at Focusrite are a jolly hard working bunch and take a great deal of pride in designing, building and delivering the best audio units around. We hope your new Focusrite unit lives up to that reputation, and that you enjoy many years of productive recording.

If you would like to tell us about your recording experiences then please email us at: sales@focusrite.com

The Focusrite Team

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Important Safety Instructions

Please read all of these instructions and save them for future reference. Follow all warnings and instructions marked on the unit.

- Do not obstruct air vents in the rear panel. Do not insert objects through any apertures.
- Do not use a damaged or frayed power cord.
- Unplug the unit before cleaning. Clean with a damp cloth only. Do not spill liquid on the unit.
- Unplug the unit and refer servicing to qualified service personnel under the following conditions:

If the power cord or plug is damaged; if liquid has entered the unit; if the unit has been dropped or the case damaged; if the unit does not operate normally or exhibits a distinct change in performance. Adjust only those controls that are covered by the operating instructions.

- Do not defeat the safety purpose of the polarised or grounding-type plug. A polarised plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wider blade or the third prong are provided for your safety. When the plug provided does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

**WARNING:
THIS UNIT MUST BE EARTHED BY THE POWER CORD.**

UNDER NO CIRCUMSTANCES SHOULD THE MAINS EARTH BE DISCONNECTED FROM THE MAINS LEAD

This unit is capable of operating over a range of mains voltages as marked on the rear panel. Ensure correct mains voltage setting and correct fuse before connecting mains supply. Do not change mains voltage settings while mains supply is connected. To avoid the risk of fire, replace the mains fuse only with the correct value fuse, as marked on the rear panel.

The internal power supply unit contains no user serviceable parts. Refer all servicing to a qualified service engineer, through the appropriate Focusrite dealer.

Power Connections

There is an IEC mains lead supplied with the unit, which should have the correct moulded plug for your country. The wiring colour code used is:

For units shipped to the USA, Canada, Taiwan and Japan:

Live - Black **Neutral** - White **Earth** - Green

For units shipped to any other country:

Live - Brown **Neutral** - Blue **Earth** - Green and Yellow

Signal Connections

(Optional A/D Card shown fitted)



XLR (Audio) Inputs and Outputs

All 3-pin XLR audio connectors (Output, Mic IP, Line IP, and EXT A/D IP) are wired as follows:

- Pin 1 Screen/Chassis
- Pin 2 Audio 0°
- Pin 3 Audio 180°

Inst. Hi Z IP, Comp Key IP, Int A/D Direct Input and Dynamic Link

1/4" jack wired as follows:

- Tip Audio 0°
- Ring Audio 180°
- Sleeve Screen/Chassis

Mic IP/Line IP/Inst. Hi Z IP

Any one of these inputs may be used as the main input to the ISA 220. Signals routed to these inputs are referred to as the 'internal' or 'Int' signal path.

Int A/D Direct Input

The 'Internal A/D Direct Input' is used to route an external signal directly to the A/D card via the Limiter. It is fed to the left channel of the A/D card and thus it replaces the 'Internal' signal feed to the A/D card (i.e. replaces whatever is connected to the mic, line or instrument input.)

Ext A/D IP

The External A/D input is used to route an external signal to the optional A/D card via the Limiter. The signal is fed to the 'spare' side of the A/D card (the right channel, i.e. the channel not being used by the internal signal) and so does not replace it. Using this input, two ISA 220 units can be used to create a stereo recording channel using only a single A/D card.

Output

This output is used as the main analogue internal signal output, and is fed by whatever is connected to the Mic IP, Line IP or Inst IP, after this signal has been routed through the EQ and dynamics modules.

Dynamic Link

You can connect two ISA 220 units (using a standard stereo jack to jack lead between the DYNAMIC LINK sockets) to allow the compressor sections to behave as a stereo pair of processors. When connected in this way the dynamics processors behave as if both units were receiving the same level of signal, with both units responding to the higher level of the two signal paths. The EQ channels can be matched visually or aurally to be used as a stereo pair if required.

Retrofitting the Optional A/D Card

The optional A/D card can be retrofitted to a standard ISA 220 at any time. The card can easily be fitted by the user – no engineering experience is required. Full fitting instructions for this option are included with the card.



Getting to know the ISA 220

Power

Applies power to the unit. Turn on the ISA 220 before powering up devices to which the outputs are connected.

Bypass

The processing modules can be globally switched out using the BYPASS switch, providing a direct route (except for the signal overload protection of the multi-band limiter, which remains in the circuit) from the main inputs or External input, to the A/D inputs. (This enables the unit to be used as a 24-bit, 96kHz stereo converter for final mastering or for analogue transfer to digital.)



Metering

VU Select

The VU meter can display input level or the compressor gain reduction. Press VU SELECT to toggle between the two sources as indicated by the corresponding LEDs. With 'Input' selected, 0VU corresponds to +4dBu. With 'Compressor' selected, the meter indicates the amount of gain reduction caused by compression, from 0VU (no compression) to -20VU (corresponding to 20dB of gain reduction).

Note: the VU meter is calibrated at operating temperature. An ISA 220 will typically take up to 30 minutes to reach operating temperature. Prior to this the meter may give slightly lower readings.

Digital Output Meters

Two 16-LED bar graph meters monitor the Internal signal and the External signal (whatever is connected to the "Ext A/D IP" XLR input) at a point after the Limiter but before the A/D input. The meters cover a wide range, with the O/L LED (see below) acting as an Overload indicator to warn of excessively high levels at the input of the A/D converters.

O/L LED

This LED illuminates when the peak signal level reaches or exceeds +20dB, or when the peak signal level reaches 6dB below clipping. The signal is monitored at three points: after the input gain TRIM, after the EQ module and after the Dynamics module, since each module could cause clipping if incorrectly set up. Occasional short-duration peaks which may cause the LED to blink will not normally cause audible distortion, but if the LED is lit constantly, the level in the appropriate module should be reduced to prevent overloading.

Inst I/P

Instrument sources may either be connected via the rear panel 'Inst Hi Z IP', or via the front panel 'Inst I/P' jack.

Input Stage

Three input options are provided to give compatibility with microphone, line or instrument level sources.



Select

Pressing SELECT steps through each of the three inputs as indicated by the corresponding LEDs. When the Mic LED is lit, the Mic input is active etc.

Mic Input Gain

With the mic input selected, the user has access to the full gain range, from 0dB to +60dB, in 10dB steps. With the '30-60' switch off, 0dB to +30dB settings are accessible. With the '30-60' switch on (illuminated), +30dB to +60dB settings are accessible (yellow legend).

Line Input Gain

With the line input selected, the user has access to gain settings ranging from -20dB to +10dB (white legend). The '30-60' switch is inactive when the line input is selected.

Instrument Input Gain

With the instrument input selected, gain changes can be made using the trim control only (see below) which allows +10dB to +40dB of additional gain. This input is suitable for high impedance sources such as guitar or bass pickups (which may be connected directly without the need for an external DI box), or vintage synthesisers with high impedance outputs.

Trim

The Trim control provides additional variable gain of 0dB to +20dB (with mic or line inputs selected – white legend) or +10dB to +40dB (with instrument input selected – yellow legend).

+48V

This provides +48V phantom power for condenser mics when pressed. This switch does not affect the other inputs. If you are unsure whether your microphone requires phantom power, refer to its handbook, as it is possible to damage some microphones by providing phantom power.

Phase

Pressing PHASE inverts the phase of the selected input, to correct phase problems when using multiple microphones, or when incorrect wiring polarity has occurred.

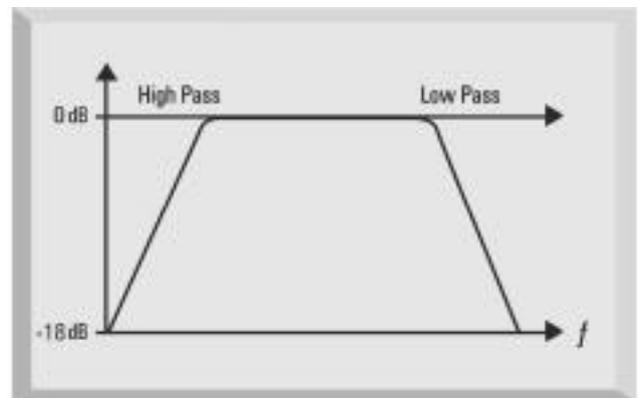
EQ Module

All EQ

Pressing ALL EQ activates all sections of the EQ module (including the Hi and Lo Pass Filters), placing the whole module in the audio path. (Also note that each section may also be switched out of circuit individually.) Toggling ALL EQ allows A/B comparison of EQ settings without having to use BYPASS, which switches both EQ and Dynamics modules in or out of the audio path.

Filter In

Press in to make the Hi and Lo Pass Filters active in the audio path. Both filters provide 18dB/octave rolloff, and since the filter frequencies overlap they may be configured as a very tight band-pass filter.



Low Pass Filter

A variable control sets a rolloff frequency from 400Hz to 22kHz.

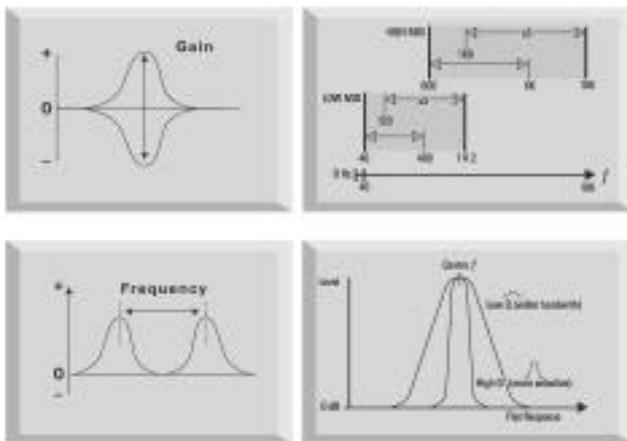
High Pass Filter

A variable control sets a rolloff frequency from 20Hz to 1k6Hz.



PARAMETRIC EQ

Two separate bands of parametric EQ are provided, each with continuously variable boost/cut with centre detent, sweep control with two ranges, and variable Q. The first band covers the range 40Hz to 400Hz (120Hz to 1kHz when x3 is pressed) and the second band covers 600Hz to 6kHz (1.8kHz to 18kHz when x3 is pressed).



Param EQ In

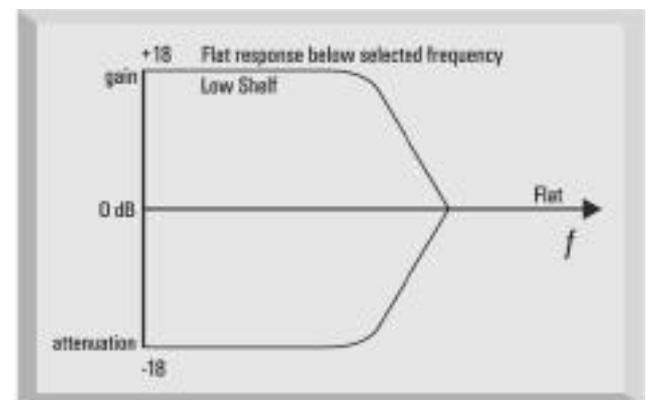
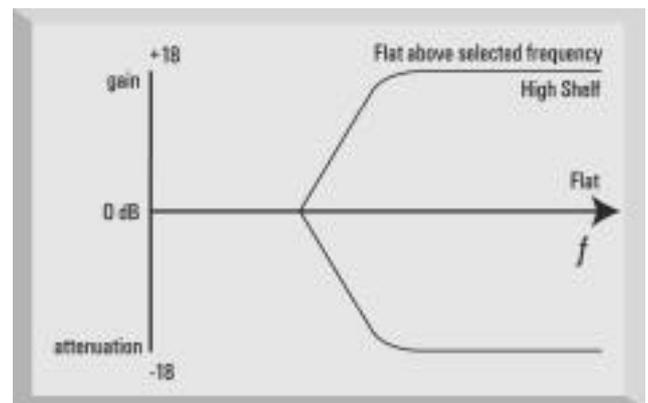
Press in to switch the Parametric EQ into the signal path.

X3

The Sweep controls have two ranges; the higher being selected when the x3 switch is pressed (frequencies shown in yellow on the panel).

SHELVING EQ

High and Low frequency shelving sections are available, each with continuously variable boost/cut with centre detent, and a four position rotary switch for selection of rolloff frequency.



Shelving EQ In

Press in to switch all the Shelving EQ into the signal path.

Compressor



Comp Pre EQ

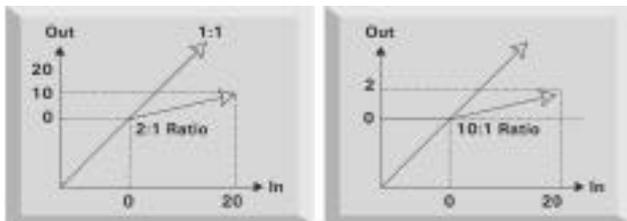
The COMP PRE EQ switch allows the compressor to be placed before the EQ in the signal path. With this switch disengaged, the compressor is placed after the EQ (default position).

Comp In

Press COMP IN to switch the compressor into the signal path. Note that the VU meter can be selected to display the compressor gain reduction (see Metering section).

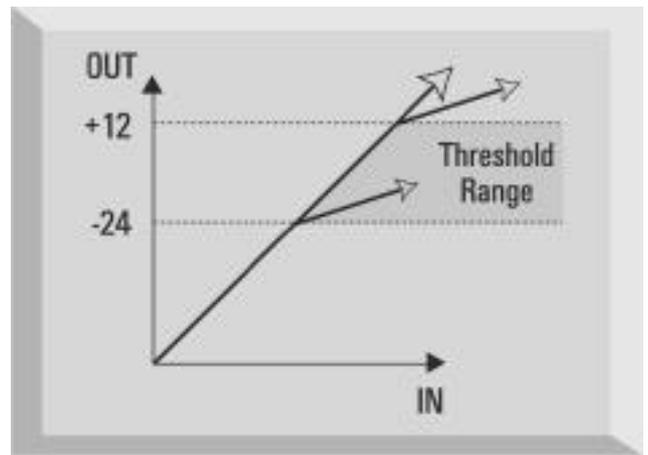
Ratio

The RATIO control determines the rate at which compression is applied to the signal with increasing input, and is the ratio of change in input level compared to change in output level. The control gives a range of 1.5 to 10. Higher Ratio settings will produce more noticeable compression, so for the least obtrusive result, the Ratio should be set at the minimum necessary for the application. For example, using low Threshold and low Ratio may produce a less noticeable effect than a high threshold and high ratio, even though the total amount of compression may be the same.



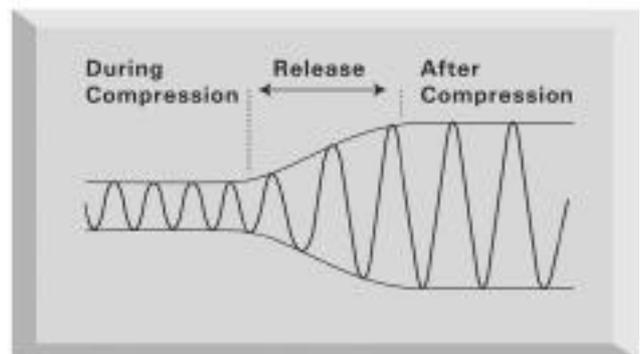
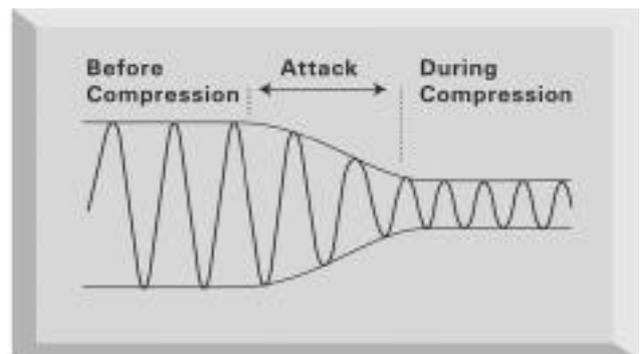
Threshold

THRESHOLD determines the level at which compression begins, with a range -28dB to +12dB. The lower the Threshold, the more the signal is compressed. Setting a higher Threshold allows quieter passages in the music or speech to remain unaffected; only passages that exceed the Threshold will be compressed.



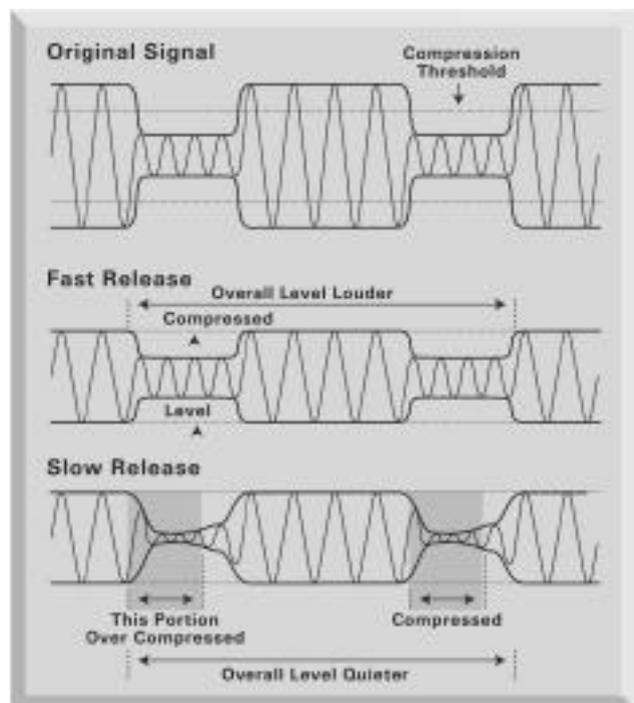
Attack

ATTACK determines how quickly compression is applied once the level of the source signal has risen above the Threshold. When turned anticlockwise the response is very fast, which tends to make the compressor react to the peak levels of the signal. This is sometimes desirable, but can cause unwanted "pumping" of steadier low level components of the signal by short transients. A slower attack will cause the compressor to ignore short transients and respond more to the average loudness of the signal; however this may seem to increase the relative volume of the transients.



Release

RELEASE determines how quickly compression is removed once the level of the source signal has fallen below the Threshold. When in the anticlockwise position, the compression releases very quickly, which may be appropriate on rapidly varying signals to avoid compressing the beats that follow, but can result in excessive distortion on more sustained material. Clockwise rotation increases the release time, giving a smoother effect, but which at the same time may result in transients causing audible "pumping".



Auto Release

The AUTO RELEASE switch makes the release time automatic, substituting an adaptive attack/release circuit, which essentially varies the release rate to suit the dynamics of the signal. This enables the use of fast attack times without any "pumping" type artefacts, especially effective on complex programme material.

The release rate is probably the most important variable when recording rock music, since it controls loudness. Loudness is determined by the maintenance of high mean levels: compression increases the proportion of high-level signal content, and as the diagram shows, the faster the unit releases, the more low-level signal is brought to a higher level. Therefore, the faster the release rate, the higher the perceived loudness of the recording.

Blend

This switch, when engaged, mixes the compressed and uncompressed signals, allowing more of the dynamics of the original source to be maintained. This simple operation simulates the common producer's practice of mixing compressed and uncompressed signals on two separate channels of a mixing console.

The unique 'blend' switch on the ISA 220 recombines the direct unprocessed signal with the post-compression signal at the gain make-up stage. The direct (uncompressed) signal is lowered by 6dB to compensate for possible overload. As the make-up gain is raised, quieter sections of the compressed audio signal increase in value, while transients pass without being processed. The result is that the required reduction in the dynamic range of the signal is achieved without an overly 'squashed' sound being audible. Note: when used pre-EQ (COMP PRE EQ switch illuminated) it may be possible to overload the EQ circuit when using 'blend.' Hence best results will be obtained with a post-EQ setting (COMP PRE EQ switch not illuminated.)

Make Up

Compression results in an overall reduction in level. The MAKE UP control allows you to restore the signal volume back to the original level. The gain reduction meter is useful for determining how much make up gain needs to be applied.

De-esser

The DE-ESSER is based on optical technology, letting you remove excessive sibilance from a vocal performance (if "ess" sounds are over-emphasised).



De-Ess In

Press in to activate the de-esser.

Threshold

THRESHOLD determines how much de-essing is being applied to the selected frequency. The lower the threshold (control anticlockwise), the more de-essing is applied.

Freq

This control selects a frequency to remove between 2kHz and 9kHz.

De-Ess Listen

Press to allow isolated monitoring of only those signals which will trigger activation of the de-esser, rather than hearing the overall effect in a complex signal. When the de-esser has been set up as desired the switch should be released.

Active LED

This LED illuminates when the de-esser is active at the chosen frequency, and shines more brightly with increasing level reduction.

Setting up the de-esser

Press DE-ESS LISTEN with THRESHOLD at maximum and slowly reduce until the selected frequency begins to trigger the de-esser. Vary the frequency control to find the exact area of the signal that you wish to remove. Once located, switch off DE-ESS LISTEN and adjust THRESHOLD for the amount of reduction required. No further adjustment of FREQUENCY should be required, as the hot spot will have been precisely found using DE-ESS LISTEN.

Limiter

Limit In

Press to activate the multi-band limiter. Three separate fixed frequency bands with different limiting properties give true distortion-free limiting.

Active LED

This LED illuminates when the Limiter is active. An upper threshold is fixed at +20dBu to prevent overload of the internal (or an external) A/D converter.

Output

A variable control adjusts the ISA 220's output level between -60dB and +6dB.

Stereo A/D

The ISA 220 can be used as a high quality stereo A/D converter for final mastering, or for analogue transfer to digital, with the addition of the optional ISA 220 digital output board. The external input, and the line input (when BYPASS is pressed) are both fed to the A/D inputs, via the limiter, giving a clean, protected, high quality path to digital. Digital formats available on the A/D card are AES/EBU, S/PDIF and 2 channel optical format.



The converter settings accessible on the front panel are as follows:

Clock Select

Selectable between 44.1kHz, 48kHz, 88.2kHz and 96kHz.

Bit Rate Select

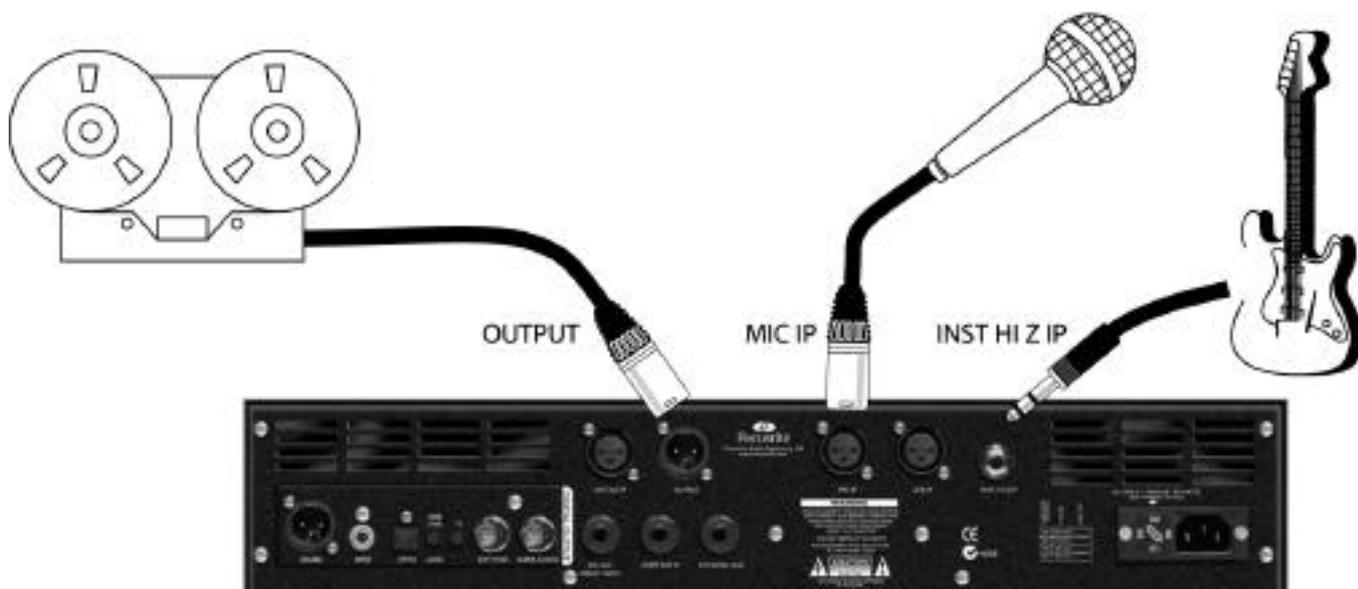
Selectable between 24, 20 and 16 bits.

Ext Select

Selecting EXT allows the ISA 220 to be slaved to an external wordclock source. Selecting EXT S/C allows the ISA 220 to be slaved to an external Digidesign Superclock source.

Applications

Record Channel



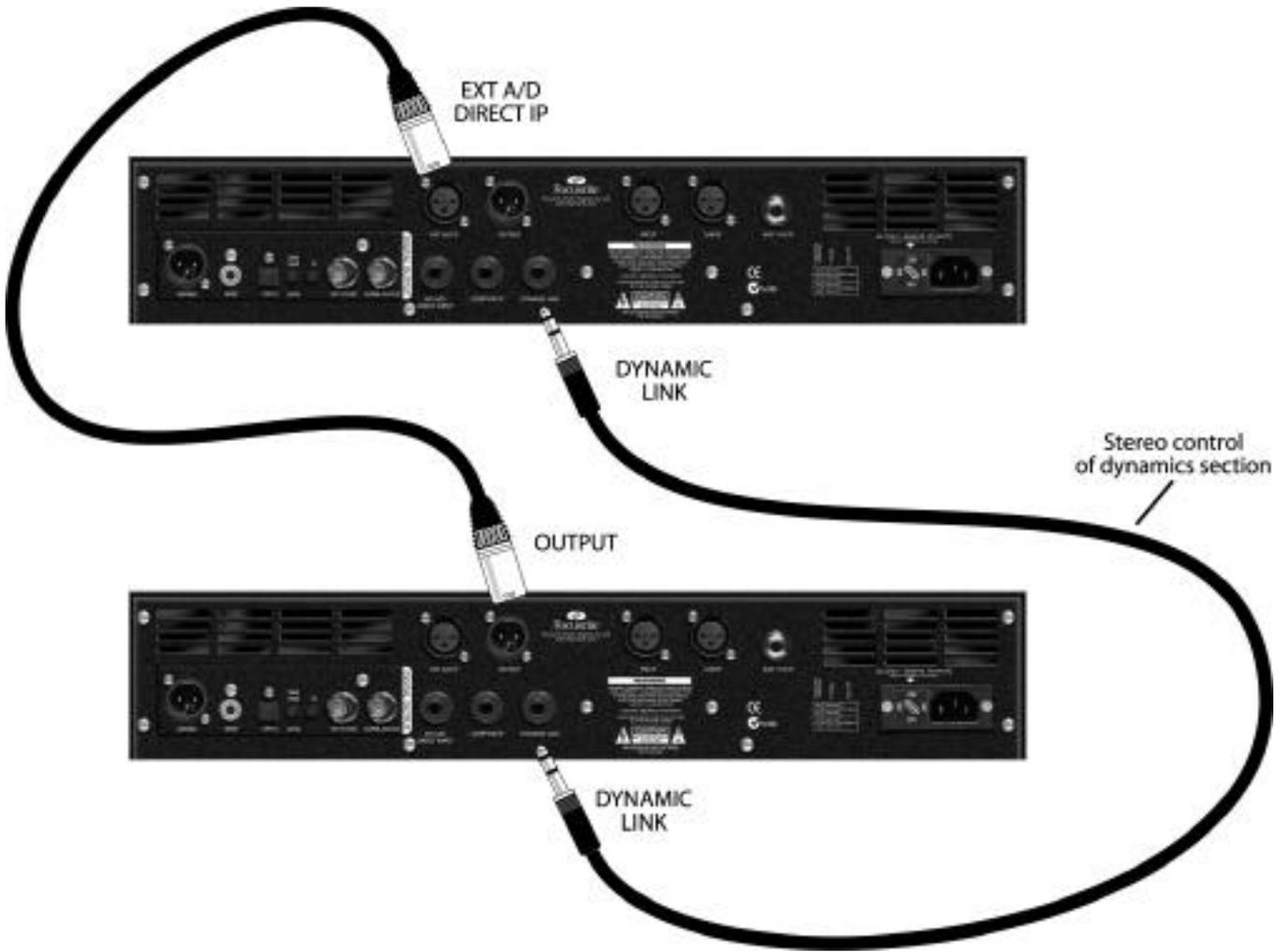
This example shows the ISA 220 being used for mic or guitar recording.

Stereo A/D Converter



The optional A/D card is a stereo device which can convert two channels simultaneously. Stereo or dual mono conversion can be accessed by connecting the two audio signals to the EXT A/D IP and INT A/D DIRECT inputs (directly accessing the A/D inputs via the limiter and digital meters). The INT input of the A/D can alternatively be connected in the normal way via the mic, line or instrument input, if additional mono processing (EQ and Dynamics) is required on the signal, or if dual mono signals are being processed by a pair of ISA 220s and converted simultaneously.

Stereo ISA 220 Units



It is possible to send audio from an ISA 220 to an A/D card in a second ISA 220 via the EXT A/D input. This configuration creates a stereo/dual mono record channel with only one A/D Card.

Stereo control of Dynamics section

The example above also shows how to link two ISA 220s together, allowing them to be used as a stereo/dual mono record channel. The stereo channel can then be routed to a single optional ISA 220 Digital Output Board allowing A/D conversion of the stereo signal.

FAQs

1. Who is the main 'target audience' for the ISA 220?

The ISA 220 was designed primarily for use in high end and project recording studios, audio/video post-production and voice over facilities etc. Owing to its combination of a mic pre and a comprehensive range of processing types, it can be used both for tracking, and as a mix-down tool.

2. What are the main features?

- Many types of class A dynamic and EQ processing in one box
- Focusrite-quality audio throughout, e.g. huge bandwidth: 10Hz-150KHz
- Focusrite professional Mic Pre (dual-gain transformer-based)
- Upgraded version of the original ISA 130 Class A Focusrite VCA Compressor
- Focusrite 4-band parametric EQ derived from the original Focusrite circuit designs
- New opto de-esser utilising phase-cancellation de-ess technology
- New opto multi-band limiter
- Can be used for tracking, mix-down, or as a stereo A/D converter
- Optional 24 bit/96 kHz digital output board

3. Is the EQ based on the original Focusrite designs?

Yes, the ISA 220's EQ uses the same EQ curves as those used in the original Focusrite console, (but with 4-way instead of 6-way shelving selections.)

4. Is the ISA 220 a Class A device? Why is that important?

Yes, the ISA 220 is a Class A device. Class A is a type of amplifier design in which you have a standing DC current running through your amplifier circuits all the time. As signal arrives, a Class A device varies what is taken from that standing DC current, rather than switching between supplying a positive current for one half of the waveform and a negative current for the other half. This results in the ability to represent audio in a linear (distortion free) manner all the way through the circuit. Cheaper processors use IC amplifiers which run close to Class B and don't have the same standing DC current, which means the transistors inside the chips switching off and on, inevitably resulting in less linear performance.

5. What if I want my dynamics processing to occur pre-EQ?

No problem. The EQ and dynamics sections can be switched so that the dynamics processing precedes the EQ section, (a single push of the 'Pre-EQ' button on the front panel.)

6. Is there any way to configure the ISA 220 as a stereo unit?

Yes. Although a single ISA 220 can act only as a mono unit, it's possible to link 2 ISA 220s together, using the 'dynamic link' socket on the rear panel. Using a single stereo TRS jack cable, this allows stereo operation of the compressor, plus dual mono EQ. You can also use a single ISA 220 as a stereo A/D converter, (see questions below for a full explanation.)

7. How do I control which ISA 220 will be the controller and which will be the slave when using two together for stereo compression?

Whichever ISA 220 is generating the greater control voltage will be the controller- So, set one of the ISA 220 compressors to minimum ratio, maximum threshold, and the other compressor will then always be the 'controller,' with any changes made on the controller's knobs affecting both channels in the same way.

8. Does the ISA 220 have the same kind of spectacular bandwidth that has given the Red Range its reputation for 'open-ended' sound?

Yes. The bandwidth of the ISA 220 extends from 10Hz to 150kHz!

9. Can I use all the different sections of the ISA 220 at once?

Yes. If you want to use the mic pre, hi- and lo- pass filters, parametric and shelving EQ, compressor, de-esser, limiter and digital output all at the same time, as one huge 'super channel,' you can. You can also take any section out of the signal path independently with a single button push.

10. What is the 'blend' feature in the compressor section?

The blend feature allows the user to mix uncompressed elements of the original source signal together with the post-compression signal. The result achieves the required gain reduction without making the audio sound 'over-squashed.'

11. Which sections are VCA-driven, and which use optical technology?

The Compressor uses a VCA, the De-esser and Limiter use optical technology.

12. Can I use the ISA 220 as a 24/96 stereo A/D converter?

Yes, the external A/D input, in combination with either the INT A/D direct I/P, or the mic or line inputs (bypass on,) can be used as a stereo feed to the optional A/D converter. All inputs also pass through the three-band limiter before reaching the A/D, preventing digital clipping.

13. Are the ISA 220's mic and line inputs transformer-based?

Yes, the ISA 220 comes as standard with mic and line input transformers, so you are guaranteed the classic 'warm yet transparent' Focusrite signature sound loved the world over. There's also a MU-metal shielded power transformer (to prevent hum.)

14. What about metering?

The main input meter can display input level or compressor gain change. Additionally, there are 16-LED peak-reading output meters for internal and external signal levels, which measure the output(s) at a point just after the limiter. You also have an independent overload LED that is fed from 3 different points in the circuit, to warn of overload at the input stage, in the EQ processor, or in the dynamic processors. There are also status LED's for clock select, bit rate select, external sync, and meter select.

15. The limiter is described as 'frequency adaptive.' What does that mean?

It's a kind of multi-band limiter. Our 3-band "adaptive attack" limiter has different limiting properties for each of the three frequency bands, giving true distortion-free limiting. Basically the HF content requires a faster response from the limiter than the mid or LF, the mid is different from either HF or LF and so on, so the limiter's slope is designed to be different for each of the three bands. It's genuinely multi-band, as each of the 3 frequency bands is split, and then sent through different, discrete circuitry. Thus a large increase in LF will not cause any change in the limiting of the HF band for example, so the limiter is simple, effective and musical.

16. How does the de-esser work?

The de-esser uses Focusrite's proprietary phase invert technology. Once the user has selected the frequency at which the de-ess is to occur, the ISA 220 generates a 180° out-of-phase signal at that frequency which cancels the specific frequency selected at the moment it occurs, without having a negative effect on other related frequencies.

17. When I travel internationally can I take my ISA 220 with me?

No problem. The power supply is a multi-tap design, so all you need to do is turn the fuse holder around (and, if necessary, change the fuse) to change the voltage to match whichever country you are in.

18. Is there an optional digital output card?

Yes. The card offers a stereo A/D converter, with 24/96 spec (selectable options from front panel buttons.) The single card fits into the main ISA 220. The card includes a Wordclock input and, uniquely in the processing world, a Digidesign Pro Tools™ Superclock direct connection via an additional BNC connector, so that the unit can be slaved to an external master clock. It allows 16, 20 or 24 bit operation at 44.1, 48, 88.2 and 96 kHz sample rates. Digital audio formats supported are S/PDIF (on single RCA connector), AES-EBU (on single XLR connector) and optical. The card can be ordered as part of a 'digital-ready' ISA 220 when the main unit is purchased, or can be retrofitted later. So if you want to take the output of the ISA 220 to a digital system which doesn't support 24bit 96 kHz, no problem; you can select any of the range of different clocks and bit rates as well as choosing to use an external clock source, from the front panel.

19. Why is a Superclock input important?

If a customer has a Pro Tools TDM system and wants to lock it to an external analogue multi-track (s)he needs a USD, (Universal Slave Driver, Digidesign's premier sync box.) This box looks at the speed of incoming timecode and then varies the Superclock frequency up and down to match. Therefore, because the Superclock is basically 256 x the speed of wordclock, the playback or record speed of Pro Tools is matched (very accurately) to the machine's speed and any attached Digidesign Audio interfaces will also be adjusted.

If the customer now wants to record off the multitrack into Pro Tools via an ISA box, they have a problem if they don't have a Superclock input, because the ISA would be running off its own internal crystal, and not looking at the speed information being calculated by the USD. It would be running at precisely 44.1 or 48k with a very high stability, however the analogue deck would be 'wowing and fluttering' all over the show. Therefore by providing a Superclock input, you can use the USD to clock the ISA module, and therefore lock the ISA up to anything you are locking Pro Tools up to.

Also any TDM Pro Tools equipped with a USD can be switched into varispeed mode. Using Pro Tools' Session Setup window, a slider allows the overall speed of Pro Tools to be moved up or down. This is achieved by telling the USD to adjust its internal clock and therefore its Superclock output. This varied Superclock output then feeds any Digidesign interface as above. So if a customer wants to use an ISA 220, but at the same time use varispeed in Pro Tools, they need a Superclock input.

20. Is there an optional digital input card?

No, because all the processing in the ISA 220 is entirely analogue - so even if there were a digital input, the digital signal would have to be immediately pass through a D/A converter to allow processing!

21. Does the card include dithering?

Yes, the word length of a 24 bit input can truncated down to 20 or 16 bits and then dithered prior to digital output.

22. Why are the Int A/D and Ext A/D inputs fed to the digital output card via the Limiter?

The input to the A/D converter must not exceed 0dBFS in order to prevent digital clipping. The limiter therefore comes after the A/D converter inputs so that the user is protected from digital clipping.

23. Can I lock directly to Pro Tools from the digital output of the ISA 220?

Yes, the digital output board is designed so that it can synchronise to external wordclock signals, or to Digidesign's Superclock.

24. Why is 24 bit 96 kHz specification important?

An A/D converter works by sampling the audio waveform at regular points in time, and then quantising those values into a binary number, which relates to the number of bits specified. The quantised signal must then be passed through a D/A converter before it becomes audible. In simple terms, the D/A essentially 'joins the dots' plotted by the A/D converter when the signal was first converted to digital. The number of dots to join, combined with how little those dots have been moved, determines how accurate the final signal will be compared to the original. The greater the sample rate and bit rate, the more accurate the whole digital process is. So 24 bit/96 kHz performance will ensure more accurate digital transfer of your audio information compared to the old 16 bit/44.1 kHz standards. (You can still use these standards for compatibility reasons if you need to, as the ISA 220 also allows 16 bit/44.1 kHz operation.)

25. Can I retrofit a digital board to an analogue ISA 220 at a later date?

Yes, and you can do it yourself - it can easily be retro-fitted by the customer without any soldering etc, just a few screws to undo, and one clip-connector to join to the main PCB.

26. How would you use the 'Int A/D direct' and 'Ext A/D direct' inputs on the rear panel?

The 'Internal A/D Direct' input is used to route a signal directly to the A/D card via the Limiter. It replaces the 'Internal' signal feed to the A/D card, (i.e. whatever is connected to the mic, line or instrument input.) The External A/D Direct' input is also used to route a signal to the optional A/D board card via the Limiter. The signal is fed to the 'spare' side of the A/D card not being used by the internal signal, and so does not replace it.

27. What are the differences between the ISA 430 and the ISA 220?

The ISA 430 includes an Expander/gate section with sidechain access, sidechain monitoring, and external keying, and an Insert point which can be post mic pre/pre EQ, post EQ/pre-compressor, or post compressor/pre-limiter. The ISA 430's EQ is the original Focusrite EQ with 6 frequency selections for shelving EQ, and frequency-conscious compression and gating (EQ feeding the sidechain of the compressor or gate) is possible. The ISA 430's Split function allows it to be used as two separate channels for discrete EQ and compression simultaneously. The ISA 430 features both input AND output transformers (however, note that the ISA 220's input transformer also applies to the line input, whereas the ISA 430 transformer is for the mic input only.) There's also a Post mic pre output on the rear panel, and the ISA 430's Instrument input has 10dB more range (0-40dB on the ISA 430,) but the ISA 430 lacks the ISA 220's blend function.

Specifications

Signal Connections

Mic IP

Connector: XLR
 Signal: Balanced (Transformer)
 Operating Level: +4dBu
 Maximum IP Level: +26dBu
 Gain Range: 0dB to +60dB in 10dB steps
 Input Impedance: 1K Ω
 Noise: 128dB EIN with 150W input resistance at 60dB of gain
 THD: 0.0008%

Line IP

Connector: XLR
 Signal: Balanced (Transformer)
 Operating Level: +4dBu
 Maximum IP Level: +26dBu
 Gain Range: -20dB to +10 dB in 10dB steps
 Input Impedance: 10K Ω
 Noise: -96dBu
 THD: 0.003% with 0dBu 1kHz input and 20Hz-22kHz bandpass filter

Inst IP (front and rear panel)

Connector: Mono Jack
 Signal: Unbalanced (from any high impedance source such as guitar or bass pickups)
 Operating Level: -10dBu
 Maximum IP Level: +10dBu
 Gain Range: +10 to +40dB
 Input Impedance: >1M Ω

Output

Connector: XLR
 Signal: Balanced
 Operating Level: +4dBu
 Maximum O/P Level: +26dBu

Ext A/D IP

Connector: XLR/Jack
 Signal: Balanced
 Operating Level: +4dBu
 Maximum IP Level: +22dBu=0dBFS

Int A/D Direct Input

Connector: TRS (Stereo) Jack
 Signal: Balanced
 Operating Level: +4dBu
 Maximum IP Level: +22dBu=0dBFS
 Inserting a jack breaks the connection of the A/D input from the internal signal path (fed by whatever is connected to the mic, line or instrument inputs) and routes the signal from the jack directly to the left channel of the A/D converter (via the meter and limiter).

Comp Key IP

Connector: TRS (Stereo) Jack
 Signal: Balanced
 Operating Level: +4dBu
 Maximum IP Level: +26dBu
 Drives the sidechain of the compressor.

Dynamic Link

Connector: TRS (Stereo) Jack
 Links two ISA 220 units, allowing control of the dynamics sections of each from one unit, giving true stereo dynamics control.

Compressor

Threshold Range: -28dB to +12dB
 Ratio: 1.5:1 to 10:1
 Slope: Soft knee
 Attack: 500 μ s to 25ms
 Release: 100ms to 7s, variable or auto (program dependent)

Limiter

Threshold Range: 22dBu
 Ratio: (infinite/brick wall)
 Attack: Fast

De-Esser

Threshold Range: 22dBu
 Frequency Range: 2K2 to 9K2
 Ratio at Centre Frequency: 2:1

Weight

7 kg

Dimensions

484 x 250 x 88 mm
 (2U rackmount)

Warranty

All Focusrite products are covered by a warranty against manufacturing defects in material or craftsmanship for a period of one year from the date of purchase. Focusrite in the UK, or its authorised distributor worldwide will do their best to ensure that any fault is remedied as quickly as possible. This warranty is in addition to your statutory rights.

This warranty does not cover any of the following:

Carriage to and from the dealer or factory for inspection or repair.

Labour charge if repaired other than by the distributor in the country of purchase or Focusrite in the UK.

Consequential loss or damage, direct or indirect, of any kind, however caused.

Any damage or faults caused by abuse, negligence, improper operation, storage or maintenance.

If a product is faulty, please first contact the dealer from which the product was purchased. If the product is to be shipped back, please ensure that it is packed correctly, preferably in the original packing materials. We will do our best to remedy the fault as quickly as possible.

Please help us to serve you better by completing and returning the Warranty Registration Card, or registering online at <http://www.focusrite.com>. Thank you.

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