



s t u d i o  products

ISA & RED RANGES

The industry standard for signal processing



The legendary Forte recording console, still regarded by many as the most sonically impressive analogue console ever created.

## The last word in quality from the first name in audio

Mention the name "Focusrite" to anyone in the music recording industry and you are likely to observe immediate recognition and appreciation of the high sonic values that recording professionals attribute to our products. After all, they have become permanent fixtures in most of the top recording studios the world over, as well as finding pride of place in the personal studios of many leading engineers and producers.

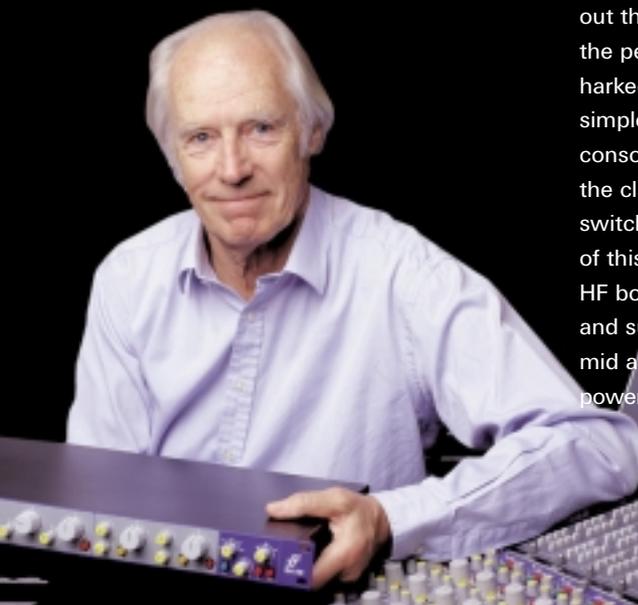
The Focusrite brand was established in 1985 and quickly became recognised as the source of the best outboard equalisers, compressors and microphone preamplifiers money could buy. Focusrite set the trend for the use of these outboard devices in the world's finest studios with the realisation that even the most technically sophisticated recording consoles lacked the sonic qualities of boutique outboard processors. The

design heritage was built around the ISA 110, a microphone preamplifier and equaliser module designed initially for the custom console at AIR Studios, London. This classic transformer-based design has been the cornerstone of all the classic Focusrite products.

The extended bandwidth and low distortion characteristics of the ISA and Red range created the ultimate Microphone interface and helped to bring out the best in both the microphone and the performer. The circuit implementation harked back to the Hi/Lo controls on the simple EQ sections of early solid state consoles, and no other EQ represented the classic EQ sound quite like this switched capacitor circuit. The signature of this EQ is the classic open sounding HF boost (bringing e.g. reverb tails to life), and surgical yet flexible parametric high mid and low mid, as well as thick powerful bass control from the LF section.

The ISA 110 was offered in racks of up to eight modules and was the foundation product for the new brand. More recently, the ISA 110 was re-released as a limited edition classic, and serial 001 was presented to Sir George Martin in recognition of our unique association with AIR studios. The ISA 110 was incorporated into the Focusrite Studio Console launched in 1990 to critical acclaim.

In 1993 the ISA 215 incorporating two ISA 110's in a 19" rack-mount package was introduced, and rapidly became the industry standard dual EQ. To partner the original ISA 110 in the 1980's, the ISA 130 compressor was designed, utilising a proprietary VCA designed by Trevor Stride (Trevor is still designing for Focusrite and is our technical "guru"). The design provided the signature Soft Knee compression for which Focusrite has become known, adding punch and power without distortion or colouration.



George Martin with the ISA110 re-issue. With the current ISA products, this mic pre and EQ circuit remains a timeless classic amongst the world's top producers and engineers.

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With this proprietary design, frequency response remains natural and controlled, even with large amounts of gain reduction applied. From the creation of these fundamental building blocks, and with new innovations from Trevor Stride and Focusrite's Director of Product Strategy, Robert Jenkins, Focusrite have gone on to create a whole host of analogue signal processing outboard to fulfil the demands of today's professional audio recording engineers.

We hope you find the information contained in this brochure useful, but the best way to really learn about our products is to audition them for yourself. Please contact your local Focusrite dealer for further information, and a hands-on demonstration.

A handwritten signature in white ink, reading 'Phil D'.

Phil Dudderidge, Chairman  
Focusrite Audio Engineering



# ISA 430 MKII: Producer Pack

The ISA 430 MKII represents the pinnacle of Focusrite’s analogue channel strip technology, bringing together all the classic designs in one comprehensive production tool. Augmented with additional features and flavours, alongside unmatched internal routing and connectivity, the ISA 430 MKII enables today’s recording professional to enjoy the unique sonic contribution of these heritage designs within one extremely versatile processor. Focusrite’s iconic status as the leading manufacturer of channel strips remains unrivalled.



- Classic Focusrite transformer-based Mic-pre with variable impedance and ‘Air’ feature
- Multi format Compressor; switch between Focusrite’s transparent VCA circuit and a vintage optical circuit
- Unmatched flexibility with an incredible variety of insert points and variable signal path arrangements
- Ability to function as 4 separate modular processors: mic pre, EQ, Dynamics and stereo ADC
- Precision VU metering of input level, Insert 1 or 2 Return level, Compressor gain reduction or Sidechain listen level (switched)
- Classic Focusrite EQ design; an expanded version of the original ISA 110
- Post mic pre output for the shortest possible signal path
- Proprietary Focusrite discrete Class A VCA Gate and Expander designs
- ‘Listen’ feature for precise control over compression, gating, expansion and de-essing
- De-esser design based on optical technology for lower distortion and transparency
- Soft Limiter to avoid critical digital overload
- Optional Stereo A/D – 24-bit 192 kHz Delta Sigma converter

The input section on the ISA 430 MKII features a large, professional-grade VU Meter with adjustable calibration, which can be selected to display any one of a number of multiple points in the signal chain. Additional visual monitoring is available through the inclusion of two LED bar graph meters, allowing the signals being fed to the input and output of the unit, or the ADC input levels to be viewed.

As with the ISA 428, the ISA 430 MKII has a variable impedance option on its classic transformer-based Mic-pre, ranging from 600 to 6800Ω (at 1kHz). This provides the engineer with increased control over the interaction between microphone and pre-amp, tailoring the response to suit his or her needs. Pressing the ‘Air’ switch further extends this principle, introducing an inductor circuit into the secondary of the transformer, which adds clarity and ‘spaciousness’ to the signal without the need for EQ.

The split configurable Inserts and changeable signal path order combine to

produce an unrivalled flexibility; herein lies the real benefit of the ISA 430 MKII as a ‘do-all’ processor for the most demanding of engineers. Both Inserts can be used to separate the individual sections of the channel strip. This means that if the post-mic output and ADC inputs are in use, the ISA 430MKII can function as four discrete processors simultaneously! (EQ and dynamics split mode; see diagram on page 6). Insert 2 can also be located post-dynamics should this be required, and for further adaptability, the dynamics can be shifted to a pre-EQ or post-sum position.

A significant development from the original ISA 430 can be found in the Compressor section, which now boasts a vintage opto circuit in addition to the original discrete Class A VCA design. Selecting the optical Compressor or Limiter results in a more coloured sound, as opposed to the extremely transparent VCA circuit. The ISA 430 MKII caters for the most varied of signals, containing an ‘Auto Release’ function (switch activated) that changes the

release time with each transient to suit the nature of the waveform. If the signal sounds excessively processed, a remedy lies in the Compressor ‘Blend’ feature, allowing the pre- and post-dynamics signals to be mixed. This can help restore a track’s natural dynamism without losing the desired effect of compression.

The ISA 430 MKII features the same classic Focusrite EQ as the original ISA 110, but with two extra frequency values for both the high and low shelving, and with the added benefit of being able to insert the EQ into the sidechain of the Compressor and Gate sections. This allows for fully frequency-conscious compression, gating and expansion, making the ISA 430 MKII the most powerful dynamics processor yet developed.

The Gate section uses the Focusrite Class A VCA as the control element to remove the effect of unwanted interference and high levels of wide-band system noise build-up.



## ISA 430 MKII SPECIFICATIONS

<b>Line</b>	<b>Gain Range:</b> +10dB to +40dB continuously variable	<b>Slope:</b>	Soft knee in Comp mode, Hard knee in Lim mode
	<b>Input Impedance:</b> >1MΩ	<b>Attack:</b>	Fixed
<b>Mic</b>	<b>Gain Range:</b> 0 to +60dB in 10dB steps	<b>Release:</b>	Fixed
	<b>Input Impedance:</b> Variable as follows: 600Ω, 1400Ω, 2400Ω, 6800Ω	<b>Gate</b>	
<b>EIN:</b>	-128dB with 150Ω terminating impedance at 60dB of gain	<b>Threshold Range:</b>	-40dB to +10dB
<b>Noise:</b>	-97dBu	<b>Gate Range:</b>	0 to -80dB
<b>THD:</b>	0.001% with -20dBu 1kHz input and 20Hz-22kHz bandpass filter	<b>Attack:</b>	switched fast or slow
		<b>Release:</b>	100mS to 5S
		<b>Hold:</b>	20mS to 4S
		<b>Expander Ratio:</b>	0 to 5:1
<hr/>			
<b>Compressor (VCA mode)</b>			
<b>Threshold Range:</b>	-28dB to +12dB	<b>De-Esser</b>	
<b>Ratio:</b>	1.5:1 to 10:1	<b>Threshold Range:</b>	22dB
<b>Slope:</b>	Soft knee	<b>Frequency Range:</b>	2K2 to 9K2
<b>Attack:</b>	100μS to 100mS	<b>Ratio at centre</b>	
<b>Release:</b>	100mS to 7S, variable or auto (program dependent)	<b>Frequency:</b>	2:1
<hr/>			
<b>Compressor (Vintage Opto mode)</b>			
<b>Threshold Range:</b>	-28dB to +12dB	<b>Limiting Threshold</b>	
<b>Ratio:</b>	1.5:1 to 5:1 in Comp mode 5:1 to 20:1 in Lim mode	<b>Range:</b>	20dBu
		<b>Ratio:</b>	infinite (Brick Wall)
		<b>Attack:</b>	Frequency dependent

Switching this section to expand mode causes the Gate to function as an Expander. Instead of cutting off any signal below the threshold, an expander proportionately decreases it. This provides a more natural sound when reducing noise from non-percussive sources (especially vocals). 'Hysteresis' increases the level-difference between the gate switching on and switching off, and prevents the gate oscillating ('chattering') with particular combinations of input signal and threshold settings. This function is particularly useful when gating a signal with a very long decay time and large amounts of level modulation (for example a Grand Piano).

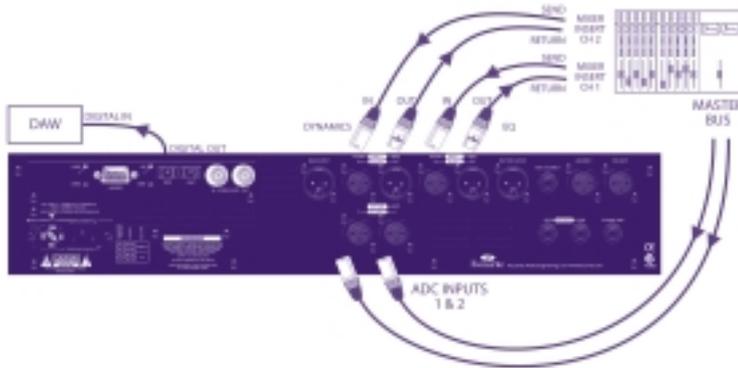
The ISA 430 MKII's De-esser is based on a low-distortion optical technology design, allowing transparent removal of excessive sibilance from a vocal performance. The circuit uses phase cancellation to create a smoother and less intrusive de-esser than traditional compression-based designs.

All four dynamic processors; the compressor, gate, expander and de-esser, feature Focusrite's unique 'Listen' feature. Selecting 'Listen', inverts the operation of the processor, so only the chosen frequencies that are being affected can be heard, rather than straining to hear the overall effect in a complex signal.

The sensitively designed soft Limiter, also present in the ISA 428, can be made to act on both the analogue output and the inputs to the optional ADC. The gradual changes in ratio leading up to 0dBFS produce a gentler limiting effect whilst still preventing a level overload.

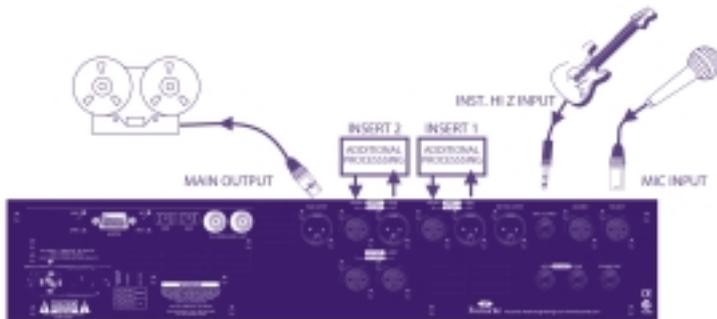
The optional stereo A/D card provides the ISA 430 MKII with 24-bit 192kHz capabilities and employs the same converters as those featured in the TEC award nominated ISA 428. (For more information, see the ADC details overleaf.)





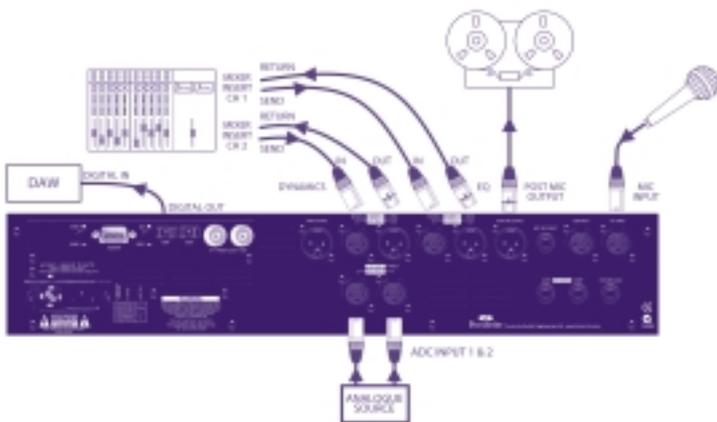
## Split 'mixdown mode'

This example shows how to use the ISA 430 MKII in split mode as a mixdown tool. The unit has been switched to both 'EQ split' and 'Dyn split', and connected to two channel inserts of a mixing console. One is used to EQ, the other as a dynamics processor. The stereo mix is then converted using the ISA 430 MKII's ADC and soft Limiter for high quality digital mastering.



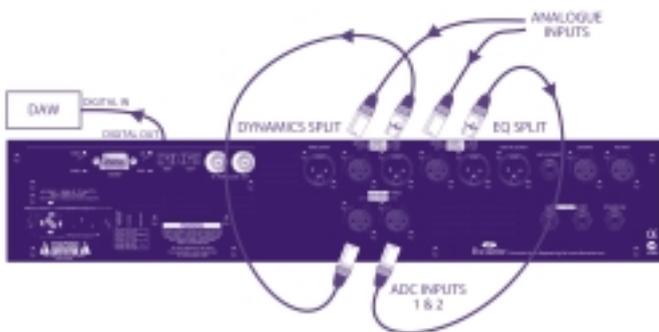
## Record channel

This example shows the ISA 430 MKII being used for mic or guitar recording. The Insert points may be used to add external processing 'in-line' if required.



## Using the ISA 430 MKII as four discrete units

This example shows how to use the ISA 430 MKII as four individual processing units. This unit is switched to 'EQ split' AND 'Dyn split', and ADC Inputs 1 & 2 are switched on. The unit is simultaneously allowing equalisation, plus separate dynamics processing of audio. At the same time, it is permitting two channels of A/D conversion into a DAW, as well as allowing super clean microphone recording!



## Split + digital record mode

This example shows an analogue input connected to Insert Return 1 and then routed, via EQ modules, to Insert Send 1, which then feeds ADC Input 1. A second analogue input is connected to Insert Return 2 and then routed, via the dynamics module, to Insert Send 2, which then feeds ADC Input 2. This allows two separate sources to be processed and recorded via the digital output.



## A-D Conversion

Just paying for the PCB and circuitry, without any additional casing and metalwork, affords a considerable reduction in cost whilst maintaining an extremely high level of sonic clarity. However, the benefits from installing Focusrite's optional ADC extend far beyond the obvious financial advantages and space saving issues. As most converters use the same chips, it is the quality of the surrounding analogue circuitry that makes the difference. This is the reason why the ISA ADC is unrivalled in terms of both price and performance.

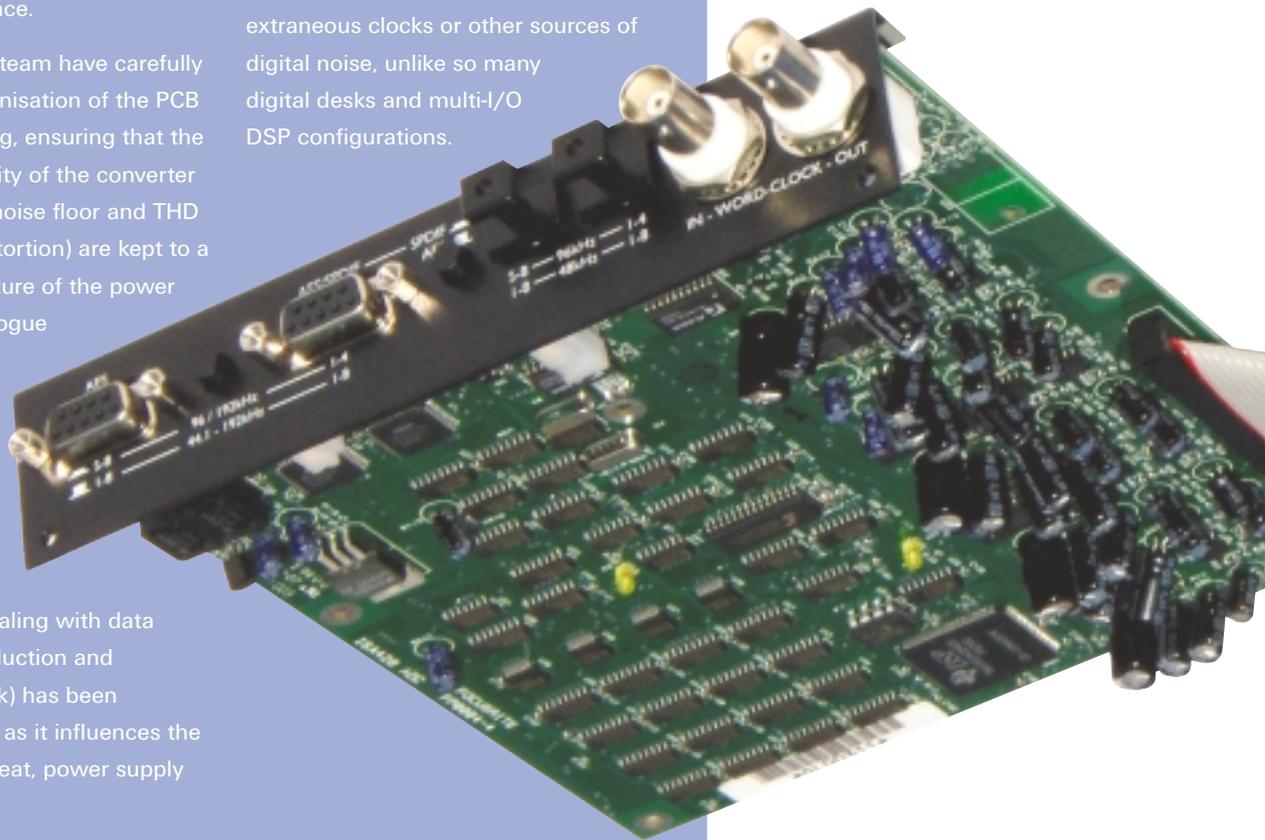
Focusrite's R and D team have carefully considered the organisation of the PCB layout and grounding, ensuring that the S/N ratio and linearity of the converter are optimised. The noise floor and THD (Total Harmonic Distortion) are kept to a minimum by the nature of the power supply and the analogue input design, with analogue filtering positively effecting the sound of the digital noise. In addition, the supporting circuitry around the ADC (dealing with data transmission, bit reduction and incoming word clock) has been carefully structured, as it influences the converter through heat, power supply and data jitter.

One of the most important aspects of the ADC is the clock design, as this determines the linearity of the digital output. All Focusrite ADCs are designed to have incredibly low jitter figures (44.1kHz-192kHz < 20 psec) which significantly improve the quality of the sound.

With the converters housed within the analogue units, the signal path is kept as short as possible, having no unnecessary analogue connections to the inputs of recording equipment. In addition, Focusrite units do not contain extraneous clocks or other sources of digital noise, unlike so many digital desks and multi-I/O DSP configurations.

*"It is always easy to jump to the conclusion that onboard ADC cards offered on analogue outboard are cut price in features and performance, but this simply isn't the case here. Not only can I not imagine a digital scenario that this unit would not easily interface to, but the quality of the conversion is extremely good, and at least the equal of any unit out there that retails for the same money for just a converter alone."*

Jon Thornton, ISA 428 review, Resolution, September 2003



Think of the ISA 428 “Pre Pack” as a new ‘Old Master’; a unique blend of classic vintage analogue mic pre’s with state-of-the-art 192kHz digital technology means that it’s now possible to record using the best of past, present and future audio designs.



- Four classic designed transformer-based pre amps. ○ Eight line inputs ○ 4 Front Panel Instrument Inputs – no separate DI box required.
- 8 Channels of optional cutting-edge 192kHz A/D conversion ○ Custom global ADC soft limiter ○ Switchable Impedance for unparalleled mic matching or extended microphone creativity (includes ‘Vintage ISA110’ setting for the original Focusrite settings.)
- Analogue insert points on every channel. ○ Focusrite vintage variable High Pass Filters on every channel ○ New moving coil peak meters and full 8 channel metering

Four classic transformer-based mic pre amps with switchable impedance and direct instrument inputs form the heart of this unit. These, alongside a custom ‘Soft Clip Limiter’ circuit and an optional eight channel 192kHz ADC, provide the perfect path into any Digital Audio Workstation.

The ISA428 also functions as the perfect input expander for mixing consoles, featuring the four microphone pre amps, four instrument inputs, and 8 line inputs. Any combination of 8 of these inputs can be routed discretely to the 8-channel ADC option. The ISA428 is also ideal for more traditional stand-alone pre amp roles in broadcast, post-production, live sound and installations.

The original design transformer-based pre amps featured in the ISA428 Pre Pack are the very same originals to be found in the Focusrite consoles and classic early ISA110s. The benefits of this classic pre-amp topology include superb common-mode rejection, an excellent overload margin, and, courtesy of the shared gain structure, (20dB from the hand-wound transformer and up to 40dB from the amplifier,) an extremely low noise floor and super-wide bandwidth. This pre-amp design is the cornerstone of Focusrite’s signature ‘warm-yet-transparent’ sound and is a standard point of reference for many of the industry’s most discerning audio professionals.

The input stage now also provides enhanced control and creativity, by allowing the user to switch between four carefully selected input impedance settings. The original ISA110 setting is supplemented by three further impedance settings, to either perfectly match the pre-amp with any microphone, (and so maximise level,) or to use different settings creatively to interactively shape the sound of your chosen classic mic.

Switchable insert points are also featured on every channel, allowing routing (between pre amp and output) to additional external processing if desired.

Focusrite’s new Soft Limiter is a custom optical design, which both protects the ADC by preventing ‘digital overload’, and also eliminates the unpleasant distortion that standard limiter circuits often generate.\* \*

Full output metering for all 8 channels is provided as standard by 6-segment LEDs on the ISA428’s front fascia, whilst input levels can be tracked using the new ‘moving coil’ peak meters, designed to catch even the fastest and most elusive of transients.

A brand new optional 8 channel, 24 bit 192kHz ADC embodies cutting-edge conversion technology, encompassed within pristine Focusrite circuitry, providing eight channels of the highest quality conversion at frequency

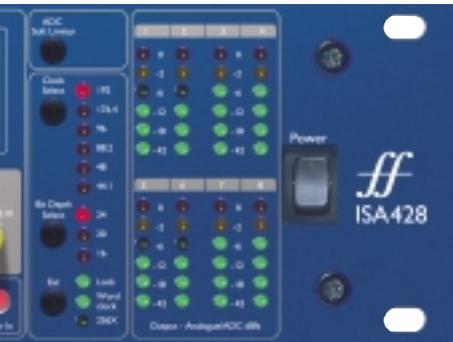
rates of up to 192kHz. (Running at 96kHz provides 16 simultaneous digital outputs alongside the four main analogue outputs.) Digital output formats include 8 channel single/dual wire AES/EBU, 8 channel SPDIF and single/dual port 8-channel ADAT lightpipe, all available on a single ADC card.

Two ISA428s can be used with a single ADC, utilising the four extra line input channels on the rear of the unit containing the optional ADC. This allows expansion from a 4-pre amp system to an 8-pre amp system – hence why we named the product “Four t(w)o Eight!”

Revering the past, embracing the future; combining classic pre amp technology, innovative custom Focusrite input – and limiter – circuits, and the very best in A/D conversion technology, the ISA 428 Pre Pack raises the bar for multi-channel recording solutions.

*“As a stand alone mic pre amp, this unit is very capable indeed, but with the optional converter card installed it makes a very competent and cost effective eight-channel (four mic, four line) front end for a DAW or digital recorder.”*

Hugh Robjohns, Sound On Sound, May 2003



## ISA 428 SPECIFICATIONS

### Inputs

#### GAIN RANGE

- Line** = +/- 18dB
- Mic** = 0 to 60dB (both in 6dB steps)
- Inst** = +10 to +40 dB variable

#### INPUT IMPEDANCE

- Line** = 10K $\Omega$
- Mic** = Variable - 600 $\Omega$ , 2K4 $\Omega$ , 6K8 $\Omega$  and original ISA110 settings
- Inst** = >1M $\Omega$

#### NOISE

- Line** = -96dB
- Mic** = -128dB (EIN with 150 $\Omega$  input resistance at 60dB of gain)

#### THD

- Line** = 0.003% with 0dBu, 1kHz input and 20Hz to 22kHz band pass filter
- Mic** = 0.003%

### Analogue Input and Output connectors (balanced)

- Inst inputs** 1/4 inch Jack (unbalanced)
- Mic inputs** XLR (balanced)
- Line** TRS Jack (balanced)
- Insert Sends and Returns** TRS Jack (balanced)
- Additional ADC inputs** XLR (balanced)
- Analogue Outputs** 4 x XLR (balanced)

### 192KHZ A/D SPECIFICATIONS

- AES/EBU and S/PDIF** Dual 9 pin D-types - 8 channel
- ADAT Lightpipe (max .96kHz)** Optical - 8channel
- Bit depths** 16, 20 or 24 bit
- Frequency options** 44.1, 48, 88.2, 96, 176.4 & 192kHz
- Clock options** Standard or '256 x'
- SNR** 120dB A weighted
- 0dBfs** +22dBu
- Dithering** Adaptive



## 192 kHz A/D conversion and the Soft Limiter.

Focusrite's new ADC converter is the company's first 192kHz design, (it's also amongst the world's first multi-channel 192kHz audio input devices.) As ever, Focusrite's bespoke A/D designs have been crafted in order to maximise the specifications achievable with any given converter chip-set. The ISA428's ADC offers extremely low distortion, (compare our figures with any of the A/D 'heavyweight' brand names in the market...) and ultra-high signal/noise ratio specifications (better than 120dB "A-weighted", comparable with e.g. Digidesign's Pro Tools HD™.)

All the advantages of integral A/D conversion within the main analogue unit's chassis apply;

the shortest possible record path is achieved, all unnecessary external analogue connections are dispensed with, and a quiet and controlled operating environment for the conversion process is ensured. There are no extraneous clocks or sources of digital noise, (as are all too often found in multi I/O DSP environments, digital mixers etc) so there is no loss of accuracy nor clarity. The result is simply detailed, crystal clear, beautiful audio conversion.

Focusrite's revolutionary custom Soft Limiter provides worry-free, musical A/D conversion, handling even the hottest analogue signals with style and grace. It brings warmth to the

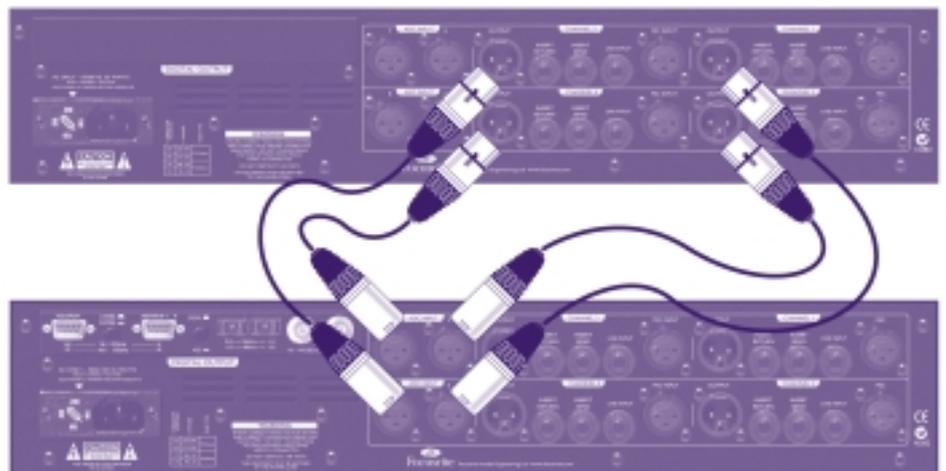
conversion process whilst eliminating the undesirable artefacts caused by digital clipping. Rather than simply protecting the A/D in a brick-wall fashion, the Soft Limiter tailors the last 6dB dynamic range of the A/D converter to cater for the last 12dB of analogue headroom. This ensures the A/D converter never overloads at any point during the analogue performance. Unlike conventional limiters, it provides an absolute limit without destroying the audio integrity of the source signal.



## 8 channel systems

8 channels of A/D conversion are fed from the outputs of channels 1 to 4 (Mic/Line/Inst channels) with channels 5 to 8 fed from the 4 additional external line inputs on the rear panel. This allows a single ISA428 unit to act as an 8-channel digital input expansion unit (mic inputs + line inputs) to any DAW. Alternatively, (see diagram right) two ISA428 units with a single A/D option can be used to create an 8-channel mic pre to A/D system.

Simply feed the analogue outputs of the second unit into inputs 5-8 of the ADC-equipped unit.





## ISA 220: Session Pack

The ISA 220 Session Pack provides all the audio precision tools required to infuse your session with Focusrite's renowned sonic performance. It features many of the original circuits of the flagship ISA 430 MKII Producer Pack, and also includes some new facilities of its own. It also features the same digital output option as the original ISA 430, providing you with a high quality digital route direct from the ISA 220 into your digital recording system.



- Classic Focusrite transformer-based Mic pre
- New Focusrite EQ featuring elements of the original ISA 110 EQ circuit
- Hi and Lo pass filters
- Precision VU metering of input level or compressor gain reduction (switched)
- Proprietary Focusrite discrete Class A VCA Compressor design for better distortion and noise figures
- Order of compressor and EQ modules in the signal path can be switched from the front panel
- New Blend feature allows uncompressed dynamics to be merged with the compressed signal path
- De-esser design based on optical technology for lower distortion and transparency
- De-esser listen for independent monitoring of isolated sibilant signals
- Frequency-adaptive limiter to prevent critical digital overloads
- Optional Stereo A/D – 24 bit 96 KHz Delta Sigma converter running at 128KHz over-sampling – Dithers down to 20 or 16 bit

The ISA 220's input stage features a precise VU meter, switchable to allow the user to monitor either input level or compressor gain reduction. Situated above the VU meter is a 32 LED digital meter for monitoring both the 'internal' input and the rear panel 'external' input (the latter routes directly to the second channel of the optional high quality stereo A/D card). A global bypass switch is located to the right of the digital meter to allow for instant A/B comparisons.

Mic, Line and Instrument inputs allow interfacing to any input device, and are all transformer-based, the cornerstone of the focusrite signature sound clear yet warm, with incredibly low noise figures and a THD below 0.001% on the mic input! Switching between these input options is available on the front fascia with LED's indicating the active input.

The Mic Pre is the classic Focusrite transformer-based design as featured in the ISA 110 with illuminated switches for phantom power and phase reverse, all immediately available on the front fascia.

Further front panel switchable controls allow control over the Digital output option and in/out selection for each of the processors. An instrument jack is provided on the front panel for quick 'plug and play' access.

The EQ featured on the ISA 220 is similar to the ISA 430 MK II and ISA 110, except that the Shelving EQ features four frequency selections rather than six or eight. Whether fattening-up bass, foregrounding or trimming middle, or adding airy top, this EQ can handle anything.

Next to the Compressor section (which utilises the same compressor circuit as the ISA 430 MK II) the ISA 220 features a 'Compressor Pre EQ' switch. This allows the user to place the Compressor either pre or post-EQ. A new feature in the compressor section alongside the auto release is the Blend control, a unique ISA feature, allowing smoother compression at more extreme settings. When switched in, 'Blend' allows you to mix the uncompressed signal with the compressed, thus retaining the power of the dynamics from the original source.

The ISA 220 also includes the same De-esser as the ISA 430 MK II, based on a low distortion optical technology design, letting you transparently remove excessive sibilance from a vocal performance. The output section of the ISA 220 features the same frequency adaptive limiter as the ISA 430 MK II, a design which uses three separate stages of optical-based circuits, each of which has different limiting properties to give true distortion-free limiting.

Fast limiters tend to have problems dealing with complex signals that contain sustained low and mid frequency information and thus "chop holes" in the audio when HF transients trigger the limiting. To overcome this, the ISA 220's frequency adaptive limiter has three frequency bands with different attack times as follows: LF slow, MF quick and HF ultra-quick, the latter designed to catch fast transients. The Limit-in 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.

*"When you unpack any box with the Focusrite logo on its side you know you are in for a treat, and the ISA220 proved the rule once again. This is a well-thought-out professional product which will enhance any recording session or facility."*

Hugh Robjohns SOS review March 2002



*"If you're looking for an all-in-one input channel that can also be put to work EQing, compressing and de-essing signals during mixdown, the Session Pack should top your list. The unit sounds great, is flexible and covers everything you might need to get signal in to your recorder, whether analogue or digital."*

Mitch Gallagher, EQ, June 2003

Finally, a variable control adjusts the module output level between -60dB and +6dB ensuring optimum output levels.

The optional A/D card can be purchased with the unit, or retrofitted at a later date. At the heart of the A/D card is a high quality 24bit 96KHz Delta Sigma converter running at 128KHz over-sampling for maximum conversion performance. Focusrite proprietary designs are used for all internal clocking and phase lock loop circuits to guarantee the absolute minimum jitter possible, whether free-running or locked to wordclock.

### ISA 220 SPECIFICATIONS

#### Inst. Hi Z I/P

**Noise:** -96dBu  
**THD:** 0.003% with 0dBu

#### Mic

**Noise:** 123dB EIN with 150Ω input resistance at 60dB of gain  
**THD:** 0.0008%

#### Compressor

**Threshold Range:** -28dB to +12dB  
**Ratio:** 1.5:1 to 10:1  
**Slope:** Soft knee  
**Attack:** 500μS to 25mS  
**Release:** 100mS to 4S, variable or auto (program dependent)

#### De-Esser

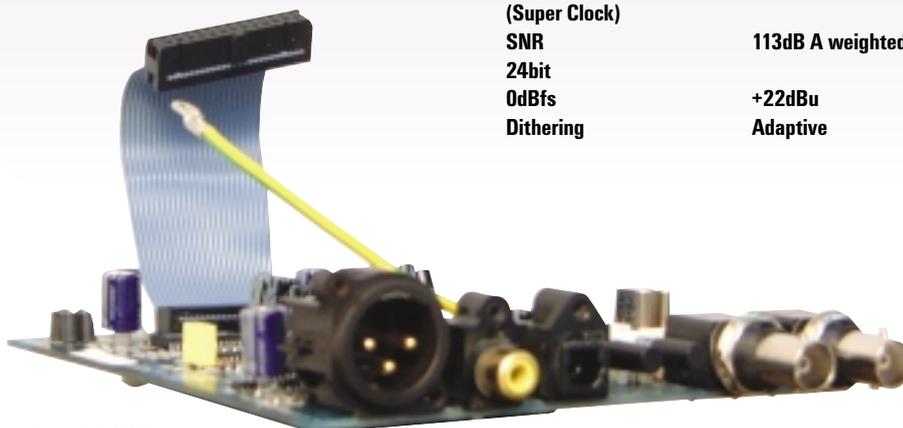
**Threshold Range:** 22dB  
**Frequency Range:** 2K2 to 9K2  
**Ratio at Centre Frequency:** 2:1

#### Limiter

**Threshold Range:** 20dBu  
**Ratio:** infinite (Brick Wall)  
**Attack:** Frequency dependent

#### 96KHZ A/D SPECIFICATIONS

**AES/EBU:** XLR  
**S/PDIF:** RCA Phono  
**ADAT Lightpipe:** Optical  
**Bit depths:** 16, 20 or 24 bit  
**Frequency options:** 44.1, 48, 88.2 & 96kHz,  
**Clock options (Super Clock):** Standard or '256 x'  
**SNR:** 113dB A weighted @ 24bit  
**OdBfs:** +22dBu  
**Dithering:** Adaptive



The ISA 220's optional A/D is stereo and allows for inputs from internal (post-processing) and external sources simultaneously giving a clean, protected, high-quality path to stereo digital media.

Thus, with the Stereo A/D card installed, the ISA 220 can be used as a high quality mono/stereo tracking converter, or at mix

down as a stereo converter channel for routing complete mixes to digital media.

Two ISA 220 Session Packs can take full advantage of the one A/D converter, with one ISA 220 acting as the master and the other as the slave.



## Red 1: Quad Mic Pre

Using the same circuit topology as the original ISA mic pre designs, the Red 1 and 8 offer respectively, four and two channels of ultra-high quality Focusrite microphone amplification. Used with high quality ribbon, valve and condenser mics, the Red 1 and Red 8 obtain outstanding results with any sound source, but especially voice, piano and string instruments.



- Classic Focusrite Mic Pre transformer-based design
- Phase reverse and phantom power
- VU output level meter
- Scribble disc
- Stepped gain potentiometers

With four mic pre-amps in a single unit, the Red 1 is ideal for those looking for improved audio performance, as a compact 'way in' to digital recording systems, or for location multi-mic recordings. Each channel offers custom-wound Focusrite input transformers, switchable phantom power, phase reverse, an easily-read illuminated VU meter, and a handy scribble disc for denoting channels. Mic gain is switched in 6dB steps over a 66dB range, for accurate, precise channel matching and recall. The Red 8, with a perfectly matched pair of mic amps, offers identical channel controls to the Red 1, and is especially suited to demanding mono or stereo recording work, such as location classical recording with digital recording media.

The many benefits of the unique Focusrite mic amp topology include superb common-mode rejection, a good overload margin and, with its shared gain structure, (20dB from transformer and up to 40dB from the amplifier) a very low noise floor with the signature wide bandwidth (10Hz to

200KHz). It also maintains this level of performance with a very wide range of impedance across the inputs. In practice, this makes it what one reviewer called, "perhaps the most revealing yet forgiving mic pre-amp in history."

The output stages of both the Red 1 and Red 8, with their custom transformers, will easily drive very long cable runs – up to several kilometers – without significant loss of quality, making them ideal for remote recordings.

*"Performance-wise, Red 1 is excellent, having a noticeably broad frequency response with well-defined low end and an open high end; mid frequencies sound both open and well-focused."*

Patrick Stapely - Studio Sound

*"Versatile yet straightforward operation means the Red 1 can be relied upon at all times to produce the required quality of signal to tape."*

Steve Power - Producer for Robbie Williams

### RED 1 & RED 8 SPECIFICATIONS

Mic input gain	-6dB to +60dB in 6dB steps
Mic Input Impedance	1200Ω ±15%, balanced and floating
Frequency Response	10Hz to 140kHz (-3dB points), ±0.1dB within passband
Noise (EIN)	-127dBu (input loaded 200Ω) @ 60dB gain
Distortion	0.15% (-20dBu @ 20Hz) 0.06% (-20dBu @ 40Hz) 0.003% (-20dBu @ 1kHz) 0.005% (-20dBu @ 10kHz)
Output	+24dBm into 600Ω +26dBm into 10kΩ, balanced and floating



## The Focusrite Red Range

The Focusrite Red Range is hand-made, crafted to the highest standards. All the Red Processors are manufactured solely in the UK using machine-tooled, half-inch thick claret red anodised aluminium. The chassis features recessed section grooves and styling motifs, (sculpted with diamond-tip cutters,) porthole windows, anoprinted silver control text, and firm-response illuminated switches.

All potentiometers are manufactured to Focusrite's own specification by French company 'Sfernice', and are made from conductive plastic which gives more sensitivity and no mechanical resistance (easy to make very fine adjustments).

All Red products feature sealed relays, (gold-plated silver in an inert gas,) situated in the middle of the circuits in which they switch. The precious metals mean that all contacts are low resistance, and the gas prevents any kind of corrosion of the surface of the contacts, meaning the most perfect audio switching device ever designed - utterly passive, zero distortion caused and no FET's required.

Red Range processors with mic pre's feature solid-state-amplified audio transformers, which help to give the characteristic "warm, organic sound" loved by studios world-wide. Transformers are the only way of giving a truly floating and earth-free

system, because there's no galvanic connection between the input and output circuitry.

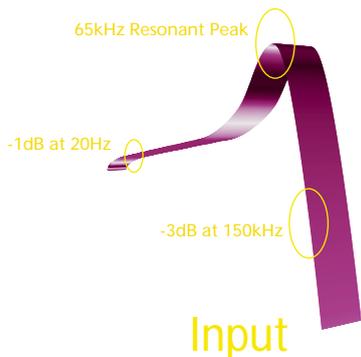
Transformers are not new in audio; they were there at the outset, but whilst others were trying to design them out to cut costs, Focusrite went after the best transformer possible, a philosophy which resulted in the transformers you find in the Red series today.

Low frequency second order distortion created by transformer saturation provides the character that many perceive as 'warmth'. Meanwhile, a high frequency emphasis generated by the reactance of the coil resonance with the terminating impedance of the microphone or receiving device, provides the engineer with open, spacious high frequencies.

The Red Range mic transformer in particular gets its legendary "transparent yet warm" label from this process, an apparent contradiction in terms, yet a genuine characteristic - audition a unit and hear for yourself.

*"The Focusrite Red Range is a reviewer's dream come true."*

Dave Foister, Studio Sound



The Legendary ISA Mic Pre sound is shaped by its unique profile, with its extended frequency range and 65kHz resonance, developed by ear rather than at the test bench.

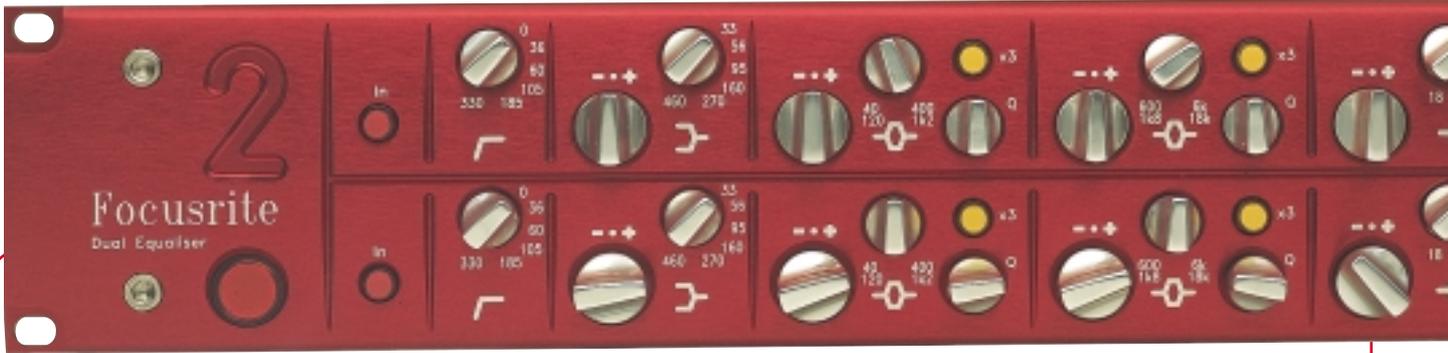


- Classic Focusrite Mic Pre transformer-based design
- Phase reverse and phantom power
- VU output level meter
- Scribble disc
- Stepped gain potentiometers



# Red 2: Dual Equaliser

Focusrite Equalisation has a unique design heritage and is renowned for the ease with which outstanding, warm, musical results can be obtained. The Red 2 offers two comprehensive channels of Focusrite EQ with transformer-balanced line level inputs and outputs



- Two channels of classic Focusrite EQ
- In/out switching and x3 switching on mid bands
- High and Low fully parametric mid bands
- Discrete High and Low pass filters
- Switched High and Low shelving bands
- Total isolation between bands

These transformer-balanced inputs and outputs provide superb isolation, and this classic approach to interfacing contributes to the warm sonic signature of the Focusrite EQ. In fact many owners run their signal paths through the Red 2 to obtain this warmth whether or not they are applying the filters or equalisation.

Derived from the classic ISA 110, the Red 2 equaliser offers switched-frequency high and low-pass filters, switched frequency shelving bands for low and high frequencies, and two fully parametric mid bands with frequency sweep and Q controls.

The shelving high and low bands offer up to 18dB cut and boost from 3.3–18kHz and 33–460Hz respectively, with a constant filter curve shape – unaltered by frequency selection – for smooth, predictable results.

The two fully-parametric, mid bands have considerable overlap in available frequency selection. The low-mid band is sweepable from 40-400Hz or (x3) 120Hz–1.2kHz. The high mid band is sweepable from

600Hz-6kHz or (x3) 1.8kHz-18kHz. The bandwidth (or Q) is continuously variable from 0.3 to 1, allowing a broad or very fine “peaking” or “dipping” curve to be obtained with up to 18db of gain or attenuation.

The high and low-pass filters provide 12db per octave attenuation and are switchable in steps between 36Hz – 330Hz and 5.6kHz–22kHz respectively. They are indispensable for cleaning up signals corrupted by noise at either end of the spectrum.

*“You need sweet sounding EQ which the Red 2 has. I use it frequently to brighten or refine vocal sounds in the mix.”*

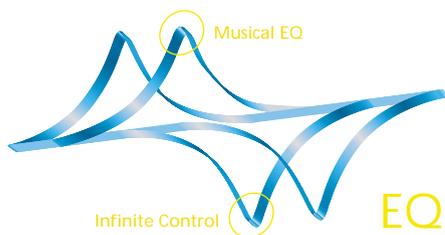
Steve Power – Producer for Robbie Williams and other artists

*“...offers exemplary quality. Red 2 gave excellent, fast results on a wide range of programme material, with minimum fuss. Whether fattening-up bass, hardening or softening middle, or adding airy top, it was quick and intuitive to use.”*

Patrick Stapely, Studio Sound

### RED 2 SPECIFICATIONS

<b>Input Gain</b>	-12dBu to +12dBu, continuously variable
<b>Input impedance</b>	10kΩ ±15%, 20Hz to 20kHz
<b>Balance</b>	>60dB
<b>Frequency response</b>	5Hz to 200kHz (-3dB points) ±0.1dB within passband
<b>Noise</b>	Better than -98dB below +4dBu
<b>Distortion</b>	0.016% (-20dBu @20Hz) 0.02% (-10dBu @20Hz) 0.03% (0dBu @20Hz) 0.0025% (0dBu @10kHz)
<b>Output</b>	+26dBm with 600Ω output load, balanced and floating



## Why is Focusrite EQ so special?

The Focusrite design for the original ISA110 EQ was commissioned as a custom rack for Air Montserrat, and later at George Martin's personal request, for the custom Neve at Air London, (these units are still working at Air Lyndhurst today.) But what makes the Focusrite EQ so special?

The design, like most great designs, is relatively simple; a classic six band EQ, with shelving high and low bands, parametric low mid and high mid bands, and low and high pass filters. The HF and LF shelving EQ's are unique – they are an implementation of the legendary Baxandall circuit designed in the 1950's. The EQ is inherently expensive to build as a circuit; most typical shelving filters are variable resistance, fixed capacitance, but the design featured instead variable resistance for gain and variable capacitance for frequency. The positive benefit of this high-end design is that there is no interrelation between EQ bands, (making a change to one band has zero effect on another band,) and that the EQ is virtually noiseless.

The HF and LF EQ features switched capacitor circuits, rather than a variable resistor circuit. (The shape of the shelving filter in the case of a variable resistor circuit varies according to the frequency, thus shelving response is not pure, it's shallow at one point, steep at another.) With the ISA 110, this switched capacitor circuit means the Q is constant, and the EQ slope is constant, meaning accurate, predictable, beautiful results.

The high-mid and low-mid EQ bands are fully parametric, and are a full

implementation of the state variable circuit configuration – separate amplifiers for the Q, and for low-mid/high-mid gain. The usual cheap way to simulate this is to implement a compromise – a gyrator mid-band peaking circuit – but cutting corners in this way invariably means a poor imitation of the real thing. The Focusrite way has, from the beginning, been to choose the solution that sounded best then minimise cost through elegant design. This has carried right through from the 1st ISA 110 modules to the current Focusrite core technologies; EQ, Mic pre amps and Compression.

*“Throughout its history, the basic philosophy of Focusrite has remained constant... to provide uniquely styled audio products, engineered using the highest quality circuits – a philosophy we have held true to this day.”*

**Phil Dudderidge, Chairman,  
Focusrite Audio Engineering**



# Red 3: Dual Compressor / Limiter



The Red 3 employs an unusual and original single-VCA design to achieve high quality and truly independent compression and limiting, without the compromise and unnecessary processing involved in traditional designs. The success of the design is attested to by the Red 3's TEC award for Outstanding Technical Achievement in the Signal Processing Technology category



- Stereo switch for true stereo operation from a single set of controls
- Key inputs with illuminated push-button selection
- Illuminated push-button switches for compressor/limiter in/out on each channel
- Precision VU metering of signal level or gain change (switched)
- Can operate as a discrete channel unit

The VCA used is a proprietary Focusrite design, fully discrete and balanced, offering superb low noise and distortion, and excellent common-mode rejection. In order to separate compression and limiting, the side-chain electronics contain three VCAs in series to generate compression and limiting control voltages which drive the main VCA. The result is true compression followed by limiting, rather than the more common characteristic of compression that turns into limiting. The side-chain electronics are class A, ensuring superb transient response. Both compression and limiting therefore, offer true peak response, not averaging RMS response.

The use of such a high quality audio VCA as the only element between input and output means a very short signal path, and an ability to retain a natural, unobtrusive sound even when significant compression is being applied.

Each channel has clear and identical controls, for compressor ratio, threshold, make-up gain, attack and release, and limiter threshold. A program-dependent auto-release mode is available, and the VU meters can be switched to show levels in two ranges, or gain change. In stereo mode the lower set takes control of both channels.

*"...possibly the cleanest, quietest, most unobtrusive compressor I have ever used..."*

Dave Foister, Studio Sound.

*"...the Focusrite Red 3. I always put finished, stereo mixes through the Focusrite. It pulls the mix together a bit. I call that 'kissing the Focusrite'".*

Tom Lord-Alge; Recording/Mixing Engineer - derived from an interview in Sound on Sound.

### RED 3 SPECIFICATIONS

Input sensitivity	+4dBu
Input Impedance	10kΩ ±15% (20Hz to 20kHz)
Balance	>60dB
Frequency response	5Hz to 200kHz (-3dB points)
Noise	Better than -80dB below +4dBu output level
Distortion	0.02% with input at 0dBu at 1kHz 0.006% (+10dBu @ 1kHz) 0.004% (+20dBu @ 1kHz)
Output	+24dBm with output loaded 600Ω, balanced and floating

# Every mic-pre and compressor in history; nailed.



The Liquid Channel is a revolutionary professional channel strip that precisely replicates any classic mic-pre and compressor. Combining radical new analogue pre-amp technology with dynamic convolution techniques. The Liquid Channel fuses cutting-edge analogue design with lightning fast SHARC DSP. Augmented by fully digital controls and optional remote software, The Liquid Channel provides the ultimate fluid vintage collection.

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Ask for The Liquid Channel's dedicated brochure, or for the latest reviews and up-to-date product details, check out [www.fliquid.com](http://www.fliquid.com)

Disclaimer: The impulse responses in The Liquid Channel are the true impulse responses of the original equipment replicated. All manufacturer, product and trade names referred to or implied in this document are the properties of their respective owners. Focusrite neither expresses nor implies any functional similarity to products developed and marketed by other manufacturers, nor does Focusrite express or imply any endorsement by these other manufacturers of Focusrite or vice versa.



# Red 7: Mic Pre & Dynamics



Combining the Focusrite transformer-based mic pre with a compressor, limiter and de-esser/exciter, the Red 7 is a superb, single-channel dynamics processor, ideal for high quality recording, notably voice-overs and other vocal applications



- Line input balance control
- Scribble disk
- Classic Focusrite mic pre, compressor, de-esser and exciter designs
- Illuminated push-button switches for compressor in/out, de-esser/exciter in/out and high pass filter in/out
- Precision VU metering of signal level or gain change (switched)

The Red 7 employs the same superb mic pre-amp as the Red 1 and Red 8, with a dual-range mic gain pot that allows precise control across the full range of the device. Phantom power and phase reverse are also provided. The Line input is electronically balanced, with continuously variable gain. A high quality output fader offers +6dB gain to infinite attenuation, essential for direct recordings, or for accurate level matching after EQ and dynamics.

Added to this mic pre is a full dynamics section, optimised for vocals. With its superb signal path, outstanding ease of use, and an integrated all-in-one design, it is a powerful tool for voice recording in all situations from music studios to post-production. The compressor design is taken straight from the Red 3, and as on that

unit, is characterised by low noise and distortion even with heavy processing. Relatively heavy compression can be applied whilst retaining a transparent natural sound. Ratio, gain make-up, threshold, attack and release are all continuously variable, and a program dependent auto-release mode can be switched in. A swept high-pass filter allows effective treatment of problems such as rumble, bass lift and proximity effect.

The de-esser/exciter stage can be switched to provide frequency-selective compression (de-essing) or excitation. The amount and centre frequency of the processor are continuously variable, and as all the unit's dynamics still use the Focusrite single-VCA

technique, unwanted colouration of the sound is kept to an absolute minimum. A clear VU meter shows level after the pre-amp gain control, or displays compressor gain change.

### RED 7 SPECIFICATIONS

<b>Mic Input Gain</b>	-6dB to +60dB in two variable ranges
<b>Mic Input Impedance</b>	1200Ω ±15%, balanced and floating
<b>Line Input Gain</b>	-12dB to +12dB
<b>Line Input Impedance</b>	10kΩ ±15%, electronically balanced
<b>Input balance</b>	>60dB to 15kHz on both inputs
<b>Frequency Response</b>	10Hz to 140kHz (-3dB points), ±0.1dB within passband
<b>Noise</b>	Better than -80dB below +4dBu output level, dynamics in
<b>Distortion</b>	0.006% (+10dBu @ 1kHz)
<b>Output</b>	+24dBm into 600Ω +26dBm into 10kΩ, balanced and floating

*"The Sound dept of PINEWOOD STUDIOS Ltd has been using the Focusrite Red 7 for many years; we have 7 in total. The two main areas of use are the Mic pre-amp and de-esser. For these purposes they do the job extremely well and we have found them to be very reliable."*

Martin Powlesland, Technical Manager  
Pinewood Studios Ltd





EQ Magazine Blue Ribbon Award 2002  
ISA 220 Session Pack



Computer Music Ultimate Buy Award  
Platinum TrakMaster



Future Music Best Buy Award  
Platinum Penta



Future Music Platinum Award  
Platinum Penta



Future Music Platinum Award  
Platinum TrakMaster



Future Music Best Outboard 2002  
Platinum Penta



Mix Foundation TEC Award Nomination 2001  
ISA 430 Producer Pack



Mix Foundation TEC Award Nomination 2001  
Platinum MixMaster



Mix Foundation TEC Award 1995  
Red 3 Compressor



Mix Foundation TEC Award 1996  
Red 7 Mic Pre/Dynamics



Mix Foundation TEC Award 1997  
Green 1 Dual Mic Pre



Electronic Musician Editor's Choice 1998  
Voice Processor  
Green 3 Voicebox



Dutch Future Music Magazine Platinum Award 1998  
Platinum Tone Factory



Studio Sound SSAIRA Award 1999  
Best Combined Outboard Device  
Platinum VoiceMaster



Mix Foundation TEC Award Nomination 1999  
Platinum VoiceMaster



Electronic Musician Editor's Choice 2000  
Voice Processor/Channel Strip  
Platinum VoiceMaster



Studio Sound SSAIRA AWARDS 2000  
Winner - Best EQ  
ISA 430 Producer Pack



Studio Sound SSAIRA AWARDS 2000  
Nominee for  
Best Combined Outboard  
ISA 430 Producer Pack



Best Pre-amplifier  
Noiz.gr 2002 Award  
RED 8 Dual Mic Pre



Future Music Best Outboard 2002  
Platinum VoiceMaster PRO



Pro Audio Review PAR Excellence Award 2002  
Platinum VoiceMaster PRO



Mix Foundation TEC Award Nomination 2003  
ISA 428 Pre Pack



[www.focusrite.com](http://www.focusrite.com)

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