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Series 2: New AES Interface Control

The new AES interface card additionally allows the unit to accept a digital input at any sample rate up to and including 96kHz. Please bear in mind the following points when using this card:

The sample rate converter (SRC) does not have to be used and we would recommend choosing the digital input option without SRC if your AES stream is already at 48kHz. Using the SRC introduces an additional processing delay through the unit in the order of 1.75mS, as explained by the table below.

Configuration	ADC Delay	S.R.Converter	DSP	DAC	Total
Analogue - Analogue	0.81mS	-	0.52mS	0.85mS	2.18mS
Analogue – Digital	0.81mS	-	0.52mS	-	1.33mS
Digital – Analogue	-	-	0.52mS	0.85mS	1.37mS
Digital – Digital	-	-	0.52mS	-	0.52mS
Digital & SRC - Analogue	-	1.75mS	0.52mS	0.85mS	3.12mS
Digital & SRC – Digital	-	1.75mS	0.52mS	-	2.27mS

Please note all figures above refer to an input sample rate of 48kHz and a (fixed) output sample rate of 48kHz. The major contributing factor that will change using a different input sample rate will be the delay through the SRC, according to the formula:
Delay = $41/fs_{in} + 43/fs_{out}$ so 48kHz rate in and out gives 41/48000 + 43/48000 = 1.75mS

If the incoming AES stream is at a rate less than 48kHz (down to a minimum of 32kHz), the unit will work in both SRC and non-SRC modes, but with one notable difference. In SRC mode, the incoming data will be converted to a 48kHz rate – the standard processing rate of the unit. In non-SRC mode, the incoming data rate sets the processing speed of the processing directly.

This is the rate at which all the internal processing is calculated against and all filter frequencies, time delays and time constants are referenced. If the SRC is NOT used, the incoming data rate becomes the reference for all calculations, with the result that all timings will be shifted by an amount equal to the difference between 48kHz and the incoming rate. This is NOT reflected on the display of the unit, hence the need to highlight this condition. What this means is best explained by a few examples.

If a filter is set to 1kHz (assuming a standard 48kHz rate) and the digital input is changed to 44.1kHz (consumer rate – as might be generated by a CD player), the centre frequency of the filter will shift by a factor of 44.1 / 48 or 0.918, so the filter would actually be centred at 918Hz. Whilst this isn't that crucial for standard EQ, it will also move the crossover points, so a 10k high pass will now be set to 9k18 which may compromise the protection of drivers.

The timings of delay setting will also be affected by the same factor. So, a delay setting of 100mS will now become longer by a factor of 48 / 44.1 or 1.088, so 108.8mS. Short delays used for driver alignment will be unlikely to be affected unduly, as they are only in the order of tens of millimetres, but stack alignment delays, and delays used for effects (in the order of several hundred milliseconds) may show up perceptible differences.

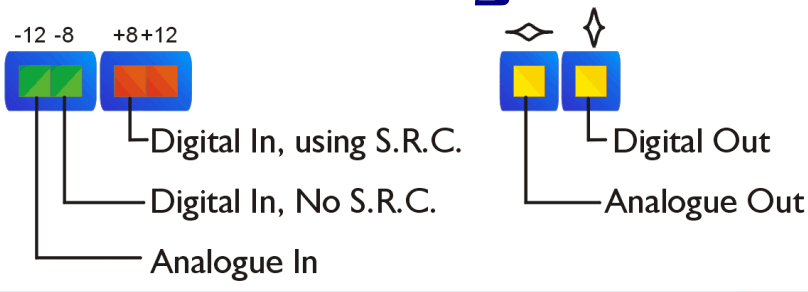
Time constants will similarly be slowed down by a factor of 1.088. This will affect the attack and release times of the limiters (in the case of crossovers) and all dynamics processing (in the case of SiDD). The change to limiter operation is unlikely to have any adverse affects, but in the case of compression or gate settings, the difference might be noticeable.

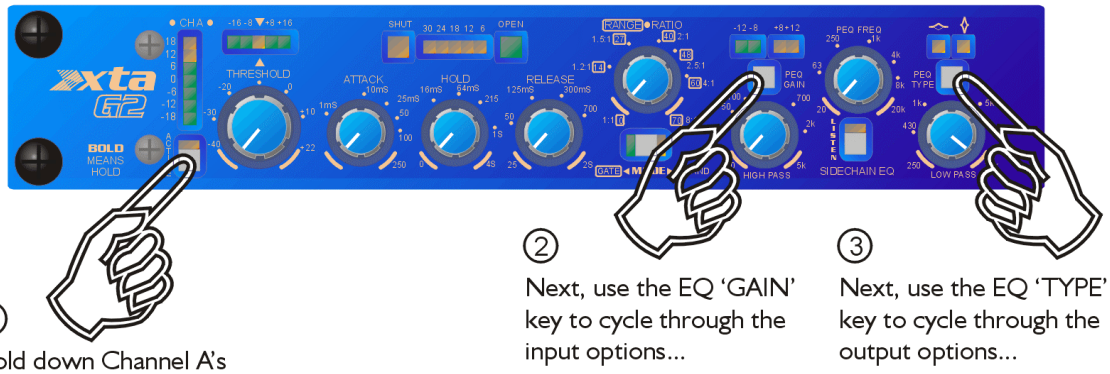
Any sample rates ABOVE 48kHz MUST use the SRC option or the unit will not lock, and will remain muted. The output sample rate from the digital outputs will always be 48kHz if the SRC mode is chosen, and will always be the same as the input rate if the SRC is not used.

Input Sample Rate	S.R.C.?	Output Sample Rate	Comments
32kHz	NO	32kHz	Filter frequencies shift DOWN by 33% Delays and time constants are 33% LONGER
32kHz	YES	48kHz	All filter frequencies and time constants are as displayed on screen.
44.1	NO	44.1kHz	Filter frequencies shift DOWN by 8% Delays and time constants are 8% LONGER
44.1	YES	48kHz	All filter frequencies and time constants are as displayed on screen.
48kHz	NO	48kHz	Optimal use of the digital input
48kHz	YES	48kHz	Sample rate converter can be use, but will introduce additional processing delay (~1.5mS)
88.1kHz	YES	48kHz	SRC MUST be used, all filters and times are as displayed on the screen
96kHz	YES	48kHz	SRC MUST be used, all filters and times are as displayed on the screen

Choosing the various options is achieved by selecting the AES option at power-up on ***Series 2*** products. The various methods relating to each unit are given overleaf.

C2 AES Configuration





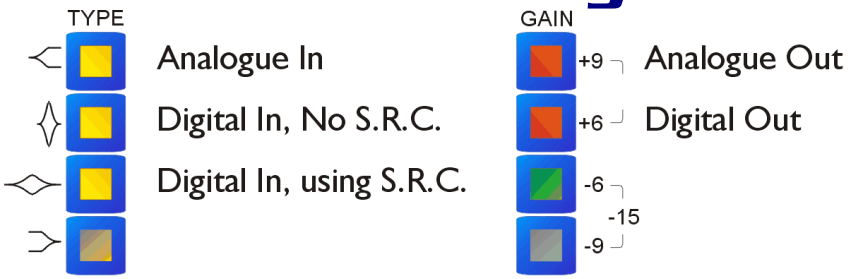
① Hold down Channel A's 'ACTIVE' key and switch the power ON.

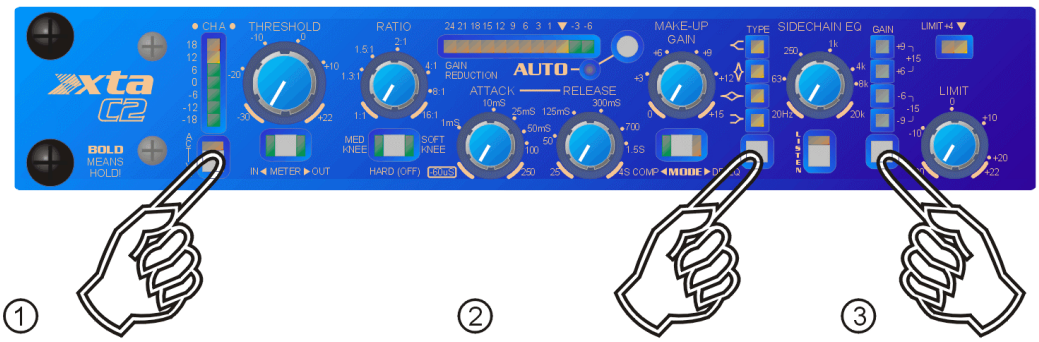
② Next, use the EQ 'GAIN' key to cycle through the input options...

③ Next, use the EQ 'TYPE' key to cycle through the output options...

④ Press ANY KEY to exit with current options selected.

G2 AES Configuration





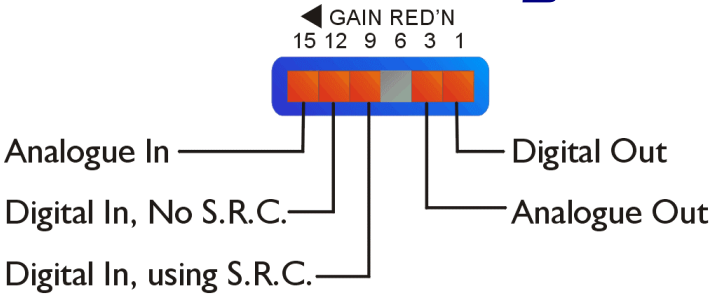
① Hold down Channel A's 'ACTIVE' key and switch the power ON.

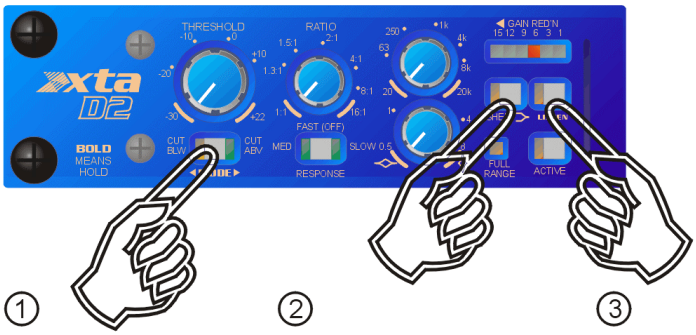
② Next, use the EQ 'TYPE' key to cycle through the input options...

③ Next, use the EQ 'TYPE' key to cycle through the output options...

④ Press ANY KEY to exit with current options selected.

D2 AES Configuration





① Hold down Band 1's 'MODE' key and switch the power ON.

② Next, use the EQ 'SHELF' key to cycle through the input options...

③ Next, use the EQ 'LISTEN' key to cycle through the output options...

④ Press ANY KEY to exit with current options selected.

E2 AES Configuration

① Hold down 'MASTER EQ' in/out key and switch the power ON.

② Next, use the High Pass 'SLOPE' key to cycle through the input options...

③ Next, use the Band 2 'RANGE' key to cycle through the output options...

④ Press ANY KEY to exit with current options selected.