

# ***Instruction Manual***

*G.R.A.S. 12AX 4-Channel CCP Power Module  
with Gain*



## Revision History

Any feedback or questions about this document are welcome at [gras@gras.dk](mailto:gras@gras.dk).

Revision	Date	Description
1	9 June 2015	First publication
2	2 June 2016	Section about 19" rack mounting added

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## Introduction

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The G.R.A.S. 12AX is a 4-channel CCP power module with gain for powering of prepolarized microphone sets.

It is designed for use in a production environment, with a sturdy enclosure that offers protection against dirt, dust, and moisture.

It has 4 channels with 3 gain settings: 0 dB, 20 dB, and 40 dB. With these settings it is possible to adjust the signal level for best signal-to-noise performance.

Status information, including gain settings and error detection is via green and red LEDs on the front panel.

To avoid accidental change to the settings, these can only be changed if a cover at the top plate is removed and jumpers on the main board are moved.

12AX is delivered with a mains adapter that provides 15 V DC.

## Delivered Items

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Item	GRAS Number
4-Channel CCP Power Module with Gain	12AX
Power Supply (15 V DC)	-

## Principles of Operation

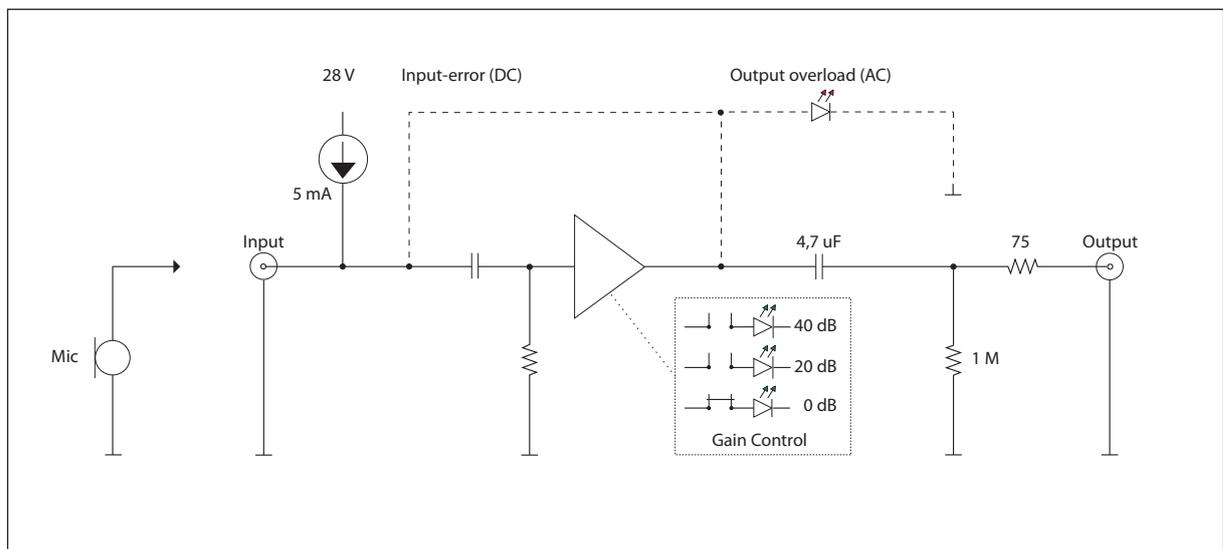


Fig. 1. Principles of operation.

### Signal Conditioning

Each channel provides a 5 mA current at 28 V DC compliance voltage for the microphone pre-amplifier. The gain can be set to either 0, 20, and 40 dB for best signal to noise ratio.

### Error Detection

12AX has DC-error detection at the input and overload detection at the output.

#### Input Error

The error detection at the input monitors the DC level. If it falls below 2.2 V or exceeds 24 V, the red overload led on the front panel will warn about it. This will happen if the input is shorted, the cable broken, or the preamplifier faulty.

#### Output Overload

The signal level is monitored at the output of the amplifier. If it exceeds 22 V AC<sup>P-P</sup>, the red overload LED on the front panel will warn about it. This warning indicates that the signal level exceeds what the 12AX can handle without clipping. The remedy will be to lower the gain, see "Setting the Gain" on page 7. If you experience overload with the gain set to 0 dB, the remedy is to lower the input signal by using a microphone with a lower sensitivity.

Please note that 12AX's overload detection is a warning of (electrical) signal clipping in 12AX's electronics. It does not detect if the microphone is overloaded by the acoustical signal it measures.

12AX can handle long cables without significant degradation of the frequency performance.

## Controls and Connections

### The Front Panel

12AX has 4 LED status indicators for each channel. Green LEDs indicate the chosen gain setting. A red LED indicates DC-error or overload. The overload detector measures the voltage swing at the output and will be triggered if the signal exceeds  $22 V^{P-P}$ . If a DC error occurs at the input, i.e. a short, a broken cable or faulty preamplifier, the red LED will also warn of this. The power switch is also located on the front panel.

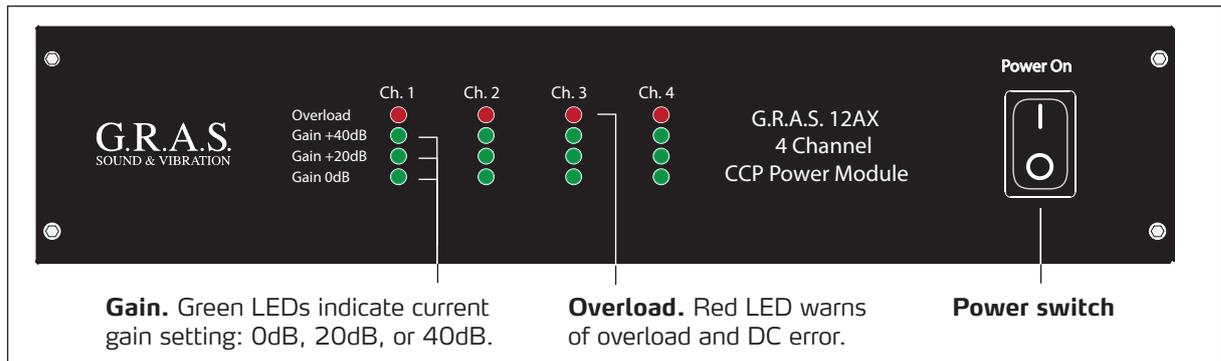


Fig. 2. The front panel with power switch and LEDs for indication of gain and overload.

### The Rear Panel

The rear panel has a socket for power supply and 8 BNC sockets, 4 for input and 4 for output. It requires a DC supply of 9 to 18 V DC. The included power adapter supplies 15 V DC, 500 mA.

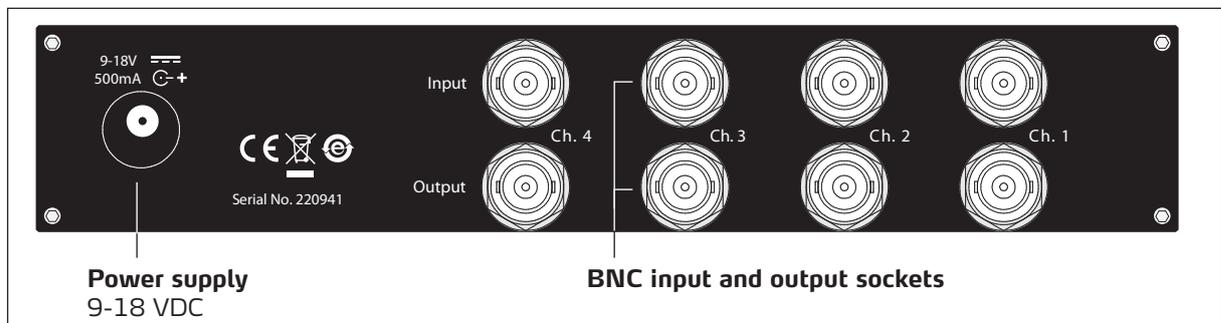


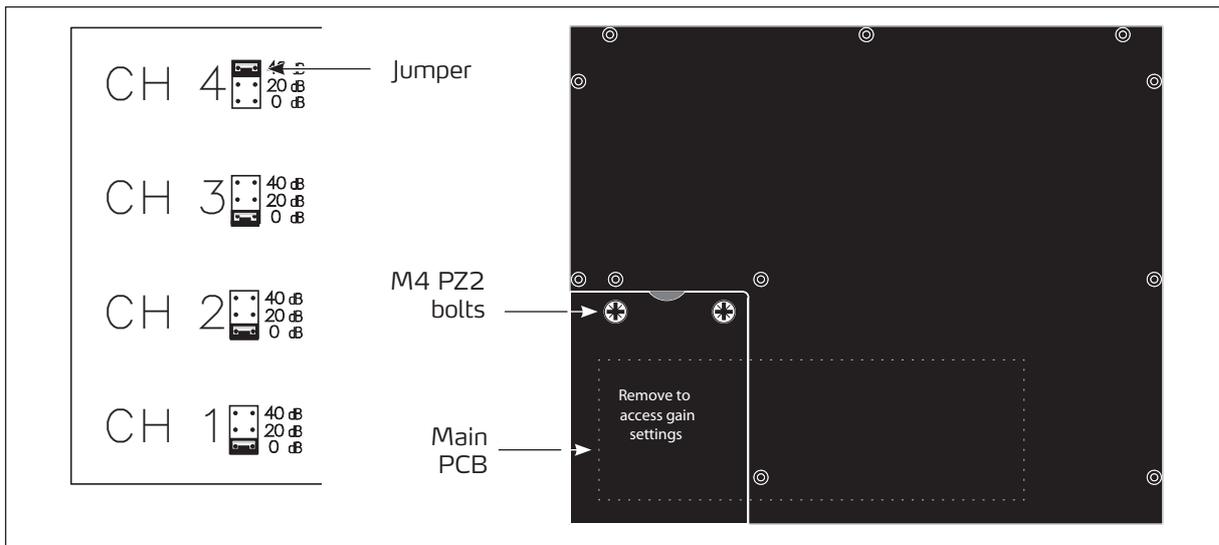
Fig. 3. Rear panel with sockets for power, input, and output.

## Operation

12AX is designed for unattended use and does not require any user input during operation. However, you may want to adjust the gain setting to avoid overload and obtain the best signal to noise ratio.

### Setting the Gain

The gain is selected by means of jumpers accessible by removing a cover on the top plate.



**Fig. 4.** The jumpers for setting the gain (left) and the removable cover (right).

The factory default gain setting is 0 dB. If you need to change the gain, proceed as follows:

1. Power off the 12AX.

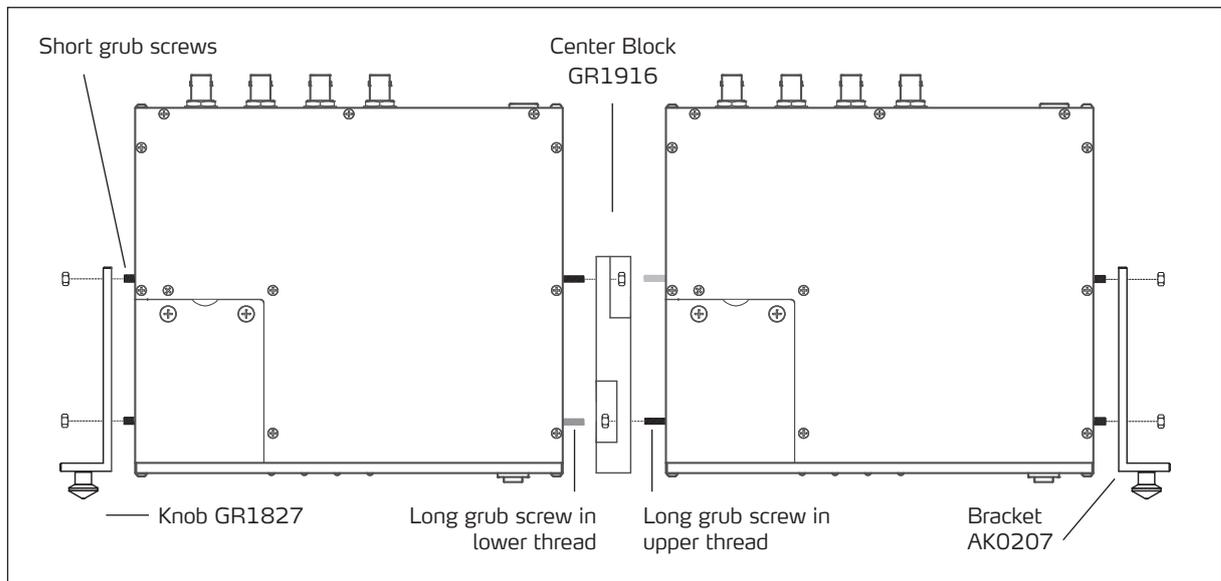
**Caution.** To avoid damage to the electronics, the 12AX must be switched off when the gain settings are changed.

2. Unscrew the two M4 bolts securing the removable cover.
3. Remove the cover.
4. Place the jumpers at the appropriate dB setting.
5. Reinstall the cover.

## Rack Mounting

A 12AX is a little less wide than half a 19" rack. With the RA0321 Rack Mounting Kit, two 12AX can be mounted side by side in a 19" rack.

### Mounting the Brackets for 19" Rack Mounting



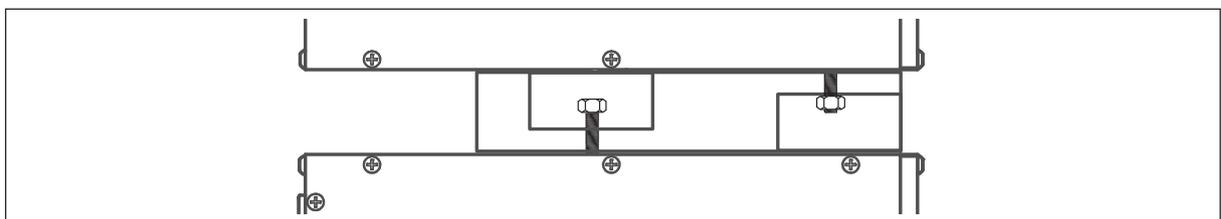
**Fig. 5.** The fittings for rack mounting. The long grub screws for use in the lower threads are shown dimmed.

### Mounting the Center Block

You must first connect the two 12AX to allow them to be mounted as if they were one piece of 19" equipment.

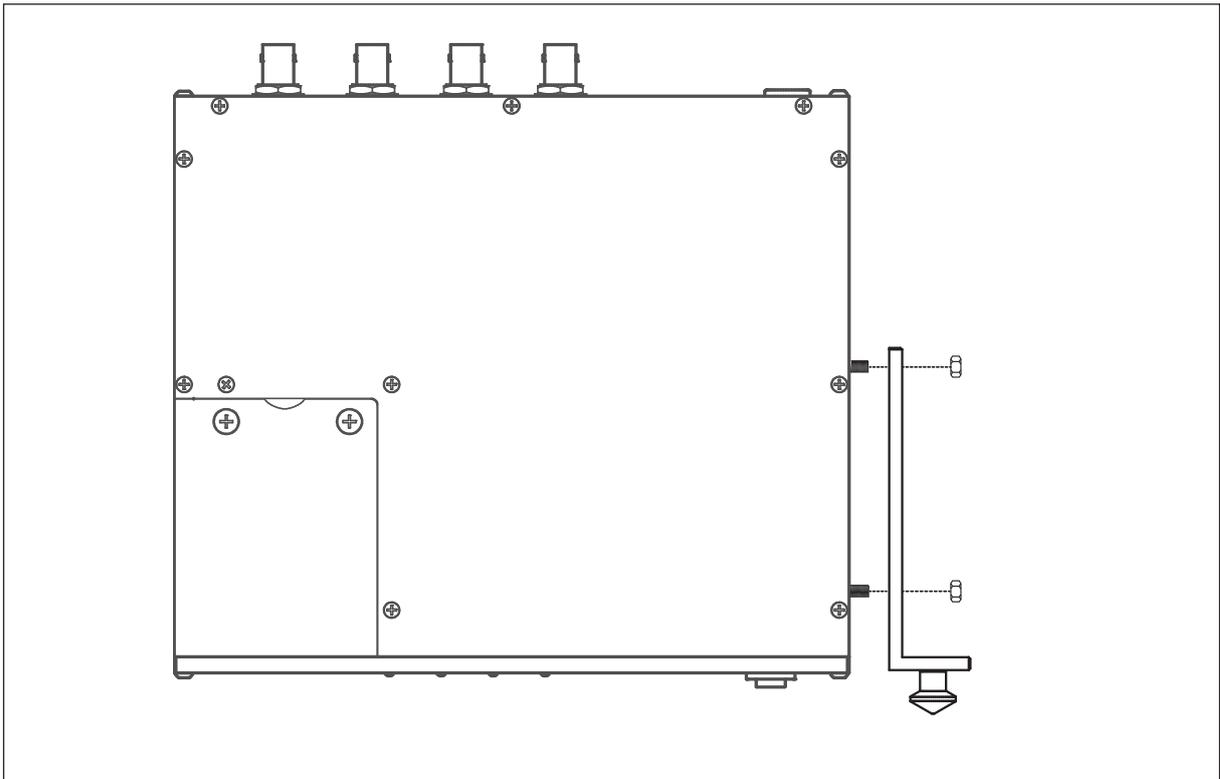
1. Mount two grub screws onto each of the two inward-facing side plates, as deep as they will go. Please note how two screws use the upper thread, the other two the lower thread, as shown in Fig. 5. The grub screws in the lower thread are shown dimmed.
2. Mount the center block onto one 12AX and secure it with two nuts.
3. Slide the other 12AX with its two grub screws onto the block and secure it with the two remaining nuts.

Threading these last two nuts requires the use of pliers and a flat screwdriver.



**Fig. 6.** Threading a nut.

## Mounting the Brackets



**Fig. 7.** Mounting a bracket.

Each of the two brackets are mounted onto 12AX with four grub screws and nuts.

1. Mount four short grub screws in the threads on both the outer side faces and tighten.
2. Slide the bracket over the screws.
3. Fasten the four nuts.

## Technical Specifications

Frequency response		
+1/-3 dB, 1 MΩ load, gain 0 dB	Hz	1 to 300 k
+1/-3 dB, 1 MΩ load, gain +20 dB	Hz	1 to 200 k
+1/-3 dB, 1 MΩ load, gain +40 dB	Hz	1 to 70 k
Noise		
20 to 20 kHz, gain 0 dB	μV rms	1.5
20 to 20 kHz, gain +20 dB	μV rms	15
20 to 20 kHz, gain +40 dB	μV rms	150
Gain	dB	0, 20, 40
Input channels		4 BNC
Output channels		4 BNC
Output impedance	Ω	75
CCP preamplifier supply	mA	5
CCP open loop voltage	V	24-28
Input DC error detection levels	V DC	<2.5 and >24
Output AC overload detection level	V AC <sup>P-P</sup>	22
Power Supply	V DC	15
Power consumption, at 15 V DC, typical	mA	150

## Dimensions and Weight

Width	mm	207
Height	mm	42.7
Depth	mm	176
Weight	kg / oz	1.1 / 38.8

## Ordering Information

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Refer to [www.gras.dk/12AX.html](http://www.gras.dk/12AX.html)

## Warranty, Service and Repair

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### Warranty

All G.R.A.S. products are made of high-quality materials that will ensure life-long stability and robustness. The 12AX is delivered with a 2-year warranty.

The warranty does not cover products that are damaged due to negligent use.

### Service and Repairs

All repairs are made at G.R.A.S. International Support Center located in Denmark. Our Support Center is equipped with the newest test equipment and staffed with dedicated and highly skilled engineers. Upon request, we make cost estimates based on fixed repair categories. If a product covered by warranty is sent for service, it is repaired free of charge, unless the damage is the result of negligent use or other violations of the warranty. All repairs are delivered with a service report, as well as an updated calibration chart.

Manufactured to conform with:

CE marking directive:  
93/68/EEC



WEEE directive:  
2002/96/EC



RoHS directive:  
2002/95/EC



G.R.A.S. Sound & Vibration continually strives to improve the quality of our products for our customers; therefore, the specifications and accessories are subject to change.