

12AU 1-Channel Power Module with Signal Conditioning and Power Amplifier

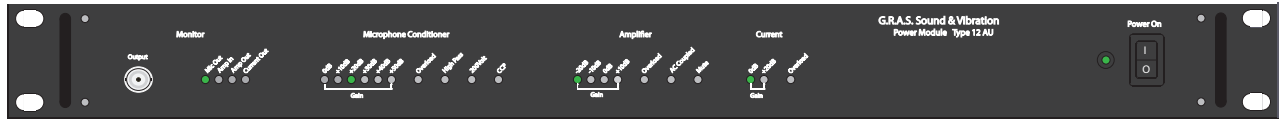


Fig. 1. The 12AU 1-Channel Power Module with Signal Conditioning and Power Amplifier

The G.R.A.S. 12AU is a supply and conditioning amplifier for simultaneously powering a preamplifier for a condenser microphone and an amplifier for a loudspeaker.

It is ideally suited for automated production line testing of micro speakers and mobile devices with built-in speaker.

The inherent noise is very low, and by design it avoids system-generated noise, for example from ground loops. In a measurement setup, it controls the paths of (a) the signal sent out to the loudspeaker and (b) the resulting acoustic signal picked up by a condenser microphone fitted to the preamplifier.

It is remotely controlled via its USB interface and, for this purpose, is delivered with a control program for Microsoft Windows®.

Features

- Single channel conditioning amplifier suited for both CCP and 200 V LEMO preamplifiers
- Very low inherent noise
- The speaker input and the analogue outputs are floating with respect to common ground to avoid system-generated noise
- Speaker amplifier with measurement of loudspeaker impedance without disturbing the speaker
- Fulfils EMC requirements according to EU regulations

- Full remote control via USB interface
- Gain settings:
 - Microphone conditioner: 0 to 50 dB in 10 dB steps
 - Speaker amplifier: -20 dB to +10 dB in 10 dB steps
 - Current output: 0 dB and +20 dB
- Filters:
 - Microphone amplifier: 1 Hz or 20 Hz
 - Speaker amplifier: DC or AC coupling (10 Hz)
- Comprehensive status and overload indication
- Rack mountable in 19" rack.

Applications

It is designed for automated production line testing of key loudspeaker parameters, such as frequency response, rub and buzz, THD, and impedance.

The 12AU's design makes it ideally suited for test of portable devices with built-in loudspeaker such as mobile phones, hearing aids, tablets, and GPS devices.

Electroacoustic tests of:

- Telephones
- Hearing aids
- Loudspeakers
- Portable devices, for example tablets, GPS, etc.

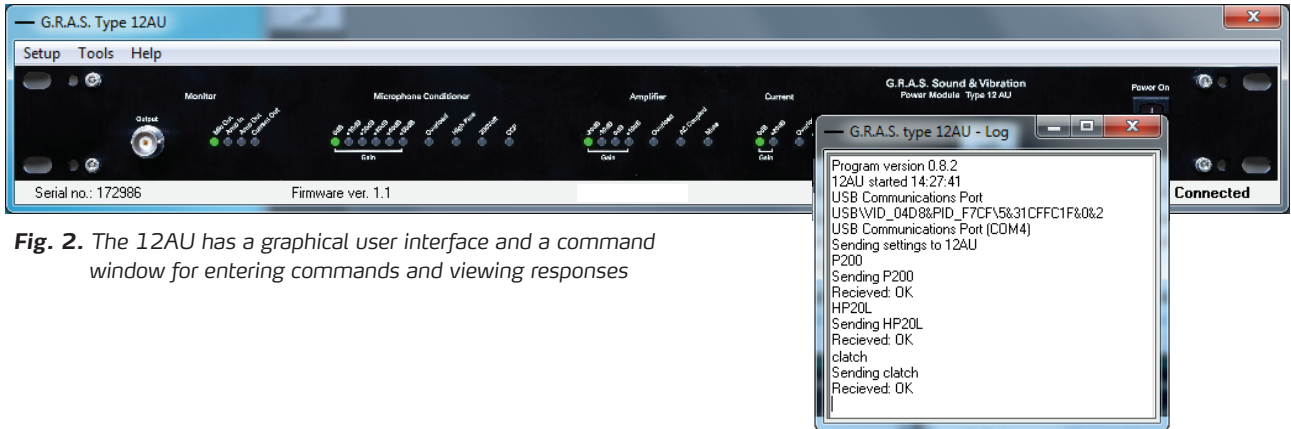


Fig. 2. The 12AU has a graphical user interface and a command window for entering commands and viewing responses

Measurement Control with 12AU

In a complex measurement setup, it is often difficult to avoid system generated noise. Also, it can be tedious to correctly set up all the parameters of the measurement chain with respect to sensitivity, gain, filtering and overload handling.

With the 12AU, you can control the loudspeaker amplifier and microphone conditioner simultaneously.

The 12AU is remote-controlled via its USB interface and a control program for Windows. You can operate the 12AU using a graphical user interface or by entering commands as shown in Fig. 2 above. Multiple 12AUs can be controlled from the same PC.

These features make the 12AU ideal for automated production line testing.

A typical Measurement Setup

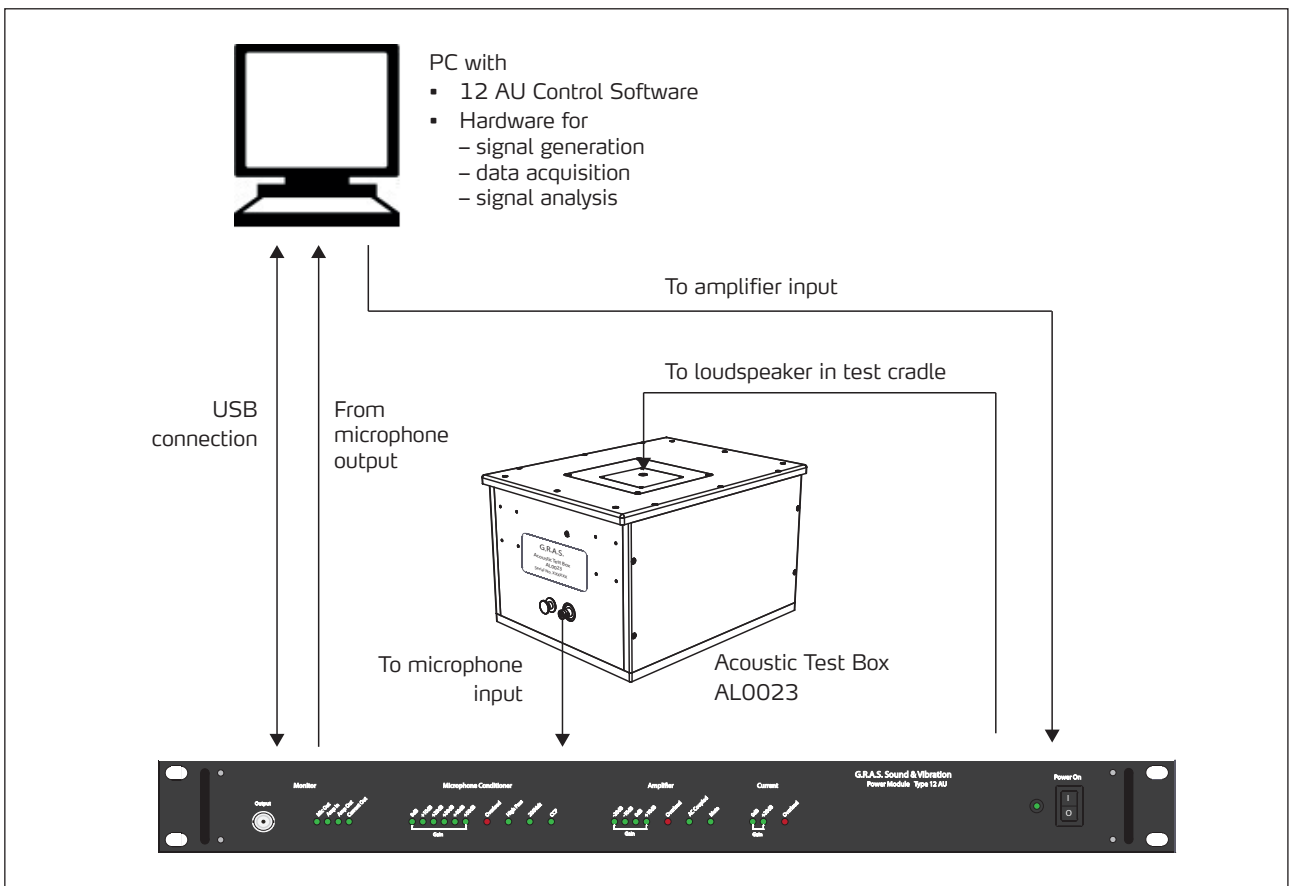


Fig. 3. A set-up for production test of a loudspeaker with the Acoustic Test Box AL0023

Technical Specifications

All outputs except the speaker amplifier output have fixed 100 kHz (3 dB) low pass filters to minimize the need for anti-aliasing filtering in the following analyzing equipment.

There is no phase shift between microphone input and output due to prepolarized or externally polarized microphones. It is designed without relays.

Microphone section

Input for externally polarized microphone	7 pin LEMO 1B series
Input impedance	100 k Ω
LEMO preamplifier supply	± 15 V
Input for prepolarized microphone	BNC
CCP preamplifier supply	4 mA
Polarization voltage (remote controlled)	200 V / 0 V
Output	BNC floating (2 k Ω //100 nF to power ground)
Output impedance	100 Ω
Gain	0 - 50 dB in 10 dB steps (± 0.2 dB) (remote controlled)
Bandwidth (-3dB)	1 Hz to 100 kHz
Noise floor (relative to input) Input shorted (≥ 20 dB gain) Input loaded with 20 pF dummy mic.	<1.5 μ Vrms (20 Hz – 20 kHz) <5 μ Vrms (20 Hz – 20 kHz)
High pass filter (remote controlled) 1.order Butterworth 3. order	1 Hz 20 Hz
Overload detection	LED indicators (remote controlled)

Speaker amplifier section

Amplifier Input connector	BNC floating (10 k Ω //100 nF to power ground)
Input impedance	10 k Ω
Amplifier output connector	2 pin LEMO 1S series
Current output connector (remote controlled)	BNC floating (2 k Ω /100 nF to power ground)
Gain (remote controlled)	-20 dB to +10 dB in 10 dB steps (± 0.2 dB)
Bandwidth (-3dB) (remote controlled AC or DC coupling)	DC coupled: DC – 80 kHz AC coupled: 10 Hz – 80 kHz
Phase shift (input to output)	$\leq \pm 1^\circ$ (DC to 20 kHz)
Max output voltage	± 14 V
Max output current	1.4 A

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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 12AU is delivered with a 2-year warranty.

The warranty does not cover products that are damaged due to negligent use, an incorrect power supply, or an incorrect connection to the equipment.

For more information, contact your G.R.A.S. representative.

Service and Repair

All repairs are made at G.R.A.S. International Support Center located in Denmark. Our Support Center is equipped with the latest test equipment and staffed with dedicated and highly skilled engineers. Upon request, we make cost estimates based on fixed repair categories.