

## G85793/H10579 Spacesaver Power Signal Generator

NFU 600



### Purpose:

The Spacesaver Power Signal Generator is ideal for all experiments in sound, driving loudspeakers and also the Vibration Generator with accessories for the study of resonance and standing waves.

### Output:

Sine, square, triangular and TTL waveforms.

Frequency range 0.1Hz to 110kHz in 6 decades.

Accuracy 5% above 10Hz

Power output up to 2.5W, i.e. 5V rms (7V peak) into a 10 ohm load

Frequency response d.c. to 110kHz,

Output impedance 1 ohm (high current loads) or 100 ohm.

### Ratings:

230V ac +/-10% 50Hz 100VA Class I

Fuse: T250mA time delay

Internal fuse: T2A time delay

Temperature range: 10 to 40°C

Humidity: 10 to 90% RH

Mass: 4.3kg

### EMC:

This equipment is Class A according to the EMC standard EN55011 and is intended for use in a non-domestic environment only. Interference from

nearby sources of RFI (radio frequency interference) may affect the output signals. Likewise, this equipment may affect other equipment: PCs, laptops, tablets and mobile phones may be affected.

### Warnings:

For your safety, this product should be used in accordance with these instructions, otherwise the protection provided may be impaired.

**Do not open or remove covers or panels.** Repairs and service may only be carried out by our repair agent, otherwise the warranty may be void.

Use only the 3-core mains cable supplied with the unit. If the mains cable is replaced, the rating of the replacement must be the same or better than the original.

The unit must be earthed at all times. The unit is earthed/grounded through the 3-core mains lead, so no additional earth connection is required.

Always position the generator so that it can be disconnected from the mains, if an emergency arises.

This unit is intended for use in DRY conditions. Avoid spillage of water and other liquids on to the unit. If spillage occurs, disconnect the mains supply.

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There is no specific requirement for insulation of external circuits as they cannot become hazardous live, as a result of connection to this unit. Limit the length of any connecting leads to 3 metres.

## Continuous use:

If the generator is used continuously at high currents, then we advise a maximum period of 60 minutes, followed by cooling for the same period. Similarly, if it is used at full load for 10 minutes, a cooling period of 10 minutes is advised.

## Features:

- Sine, square, triangular and TTL waveforms available
- Amplitude and frequency modulation
- Instrument amplifier for amplification of signal generator output or external input
- Continuously variable outputs: low impedance, and high impedance with  $\div 10$  and  $\div 100$  attenuation
- Built-in speaker with on/off control for audio frequencies
- Separate time-delay fuses protect the transformer primary and low impedance output
- Thermal trip protection for transformer

## Controls:



The smaller rotary control selects the decade range:  
0.1 to 1.1 Hz, 1 to 11 Hz,  
10 to 110Hz, 0.1 to 1.1kHz,  
1 to 11 kHz or 10 to 110kHz

The large control adjusts the output frequency from 1 to 11, to cover the selected decade range.

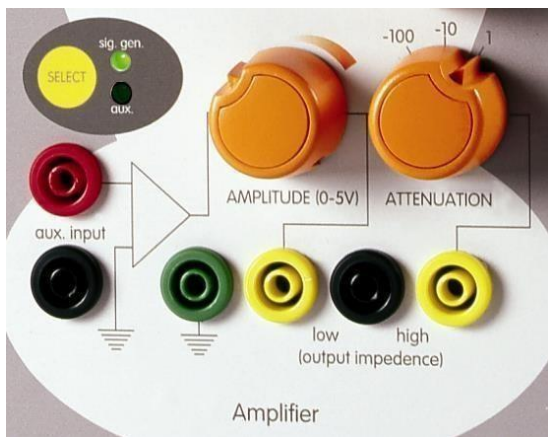
Pressing SPEAKER On/Off turns the internal speaker On and Off. It has a useful response from 100Hz to 3kHz. Default is Off.

The central SELECT button cycles through sine, triangle, TTL and square waveforms. Default is sine.

The SELECT button in the Modulation section selects amplitude or frequency modulation. Default is Off.

The two yellow sockets allow for the input of modulating signals, supplied by a crystal/ceramic microphone or a second signal generator.

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Rotary control adjust the amplitude or loudness of the output. AMPLITUDE (0-5V) controls the overall output level.

The low impedance sockets, black and left yellow, give 0 to 5V loudspeaker or vibration generator.

The high impedance sockets, black and right yellow, give the same voltage range, but at low power, suitable for input to oscilloscopes.

The black socket is NOT a true earth as the output is fully floating. Connecting the black socket to the green socket makes the output signal change relative to true earth (0V).

ATTENUATION reduces the high impedance output signal ONLY, by a factor of 10 or 100. This gives controllable signals in the range 0 to 0.5V or 0 to 0.05V (50mV). These attenuated signals are suitable for input to electronic amplifier circuits.

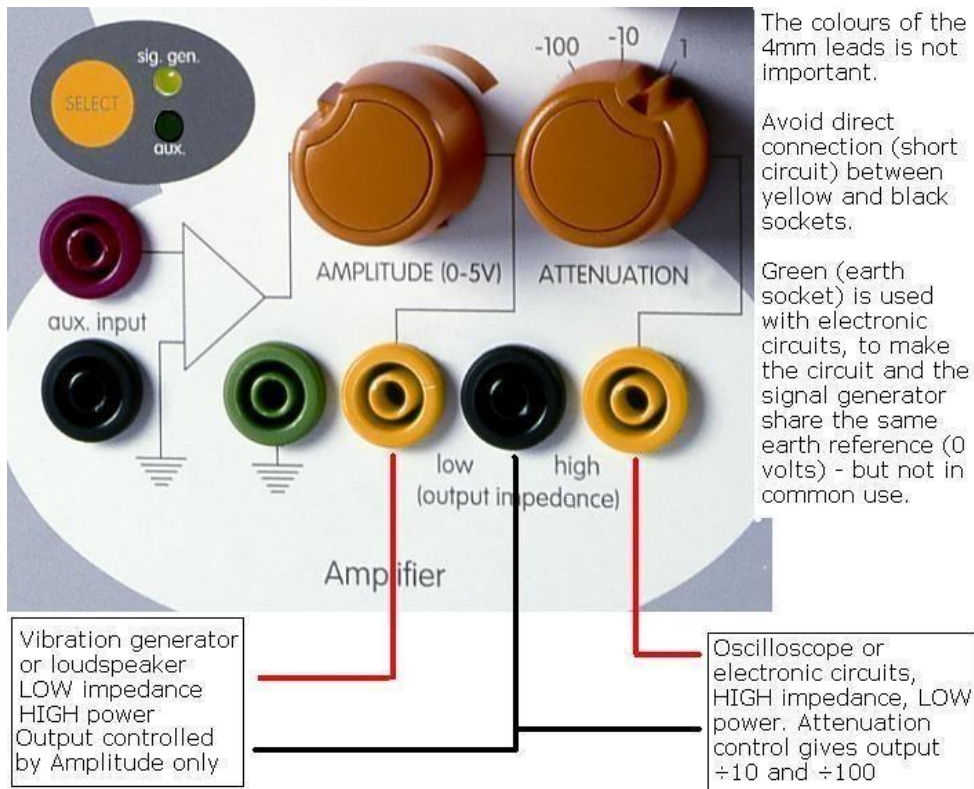
The red and black sockets provide for a microphone input to the amplifier section of the signal generator. The SELECT button turns off the signal generator and the LED indicates "aux." A crystal/ceramic microphone is recommended, with an output in the range 50 to 500mV. "Professional" microphones have much lower outputs and are not suitable.

The black socket is NOT a true earth, but the screen conductor of the microphone should be connected to it, to reduce interference from stray pickup.



## Quick guide to the output controls and sockets:

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### Modulation:

**Amplitude** modulation (am) varies the loudness of the generator output.

A signal of  $\pm 160\text{mV}$  gives 100% modulation, i.e. the loudness will vary from 100% to 0% in response to the input signal.

This is best observed by connecting an oscilloscope to the high impedance output.

Setting the signal generator to around 10kHz, and applying a modulation signal of between 50 and 500Hz will show the effect well. The internal speaker will make the combined sound audible.

Applying a modulation frequency closer to the main or “carrier” frequency will produce some strange and interesting effects which might find use in electronic music.

**Frequency** modulation varies the frequency of the generator output.

When “fm” is selected, the frequency output is locked at approximately 6 in whichever decade is selected. A modulation signal of  $\pm 5\text{V}$  will then swing the frequency through the full decade from 1 to 11. Smaller signals will give smaller swings.

Connecting an oscilloscope will show the frequency variation best, if the modulating signal is at a similar frequency to the main or “carrier”.

Both types of modulation provide examples of how a signal can be superimposed on a carrier frequency, which is the basis of am and fm radio transmissions.

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## Mains lead and fuse replacement

The mains cable stows on the back of the unit with a wind and clip feature. The mains cable retainer can be removed to allow the cable to be stored separately. Simply remove the screw and retainer from the base of the unit. The IEC cable is now detachable. In the unlikely event of the fuse blowing, the retainer and mains cable must be removed to gain access to the fuse carrier.

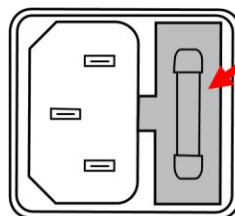
There is also an internal fuse, rated at T2A, which protect the low impedance (high power) output.

If the internal fuse blows, there will be no low impedance output, but the high impedance output will continue to work. Disconnect the instrument from the mains. Remove three screws from the plastic base and detach it. The circuit board is fixed to the front panel and the fuseholder is before half way down. It is a rectangular block, with a clip that can be removed using a fingernail to release the fuse. The replacement fuse (T2A) clicks into the holder with the clip.



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The carrier can be removed with a fingernail or tip of a screwdriver. A spare fuse is provided in carrier.

Replacement fuses must be 20mm cartridge time-delay fuses, of the correct rating: T250mA

The front panel membrane conceals and protects switches and LEDs. It may be wiped clean using a damp cloth. Be sure to disconnect the unit from the mains before cleaning, and do not use any abrasive cleaners or organic solvents.

## Periodic testing:

Check the mains lead and plugs at both ends for any damage.

Periodically check the earth bonding and insulation, by performing a Portable Appliance Test (PAT). Most schools and local authorities have a regular schedule for such testing.

Check that the fuse in the mains plug (5A recommended) and the two fuses (active and spare) in the IEC socket on the back panel are all of the correct rating.

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**Warranty, repairs and spare parts:**

The signal generator is guaranteed for a period of one year from the date of delivery to the customer. This warranty does not apply to defects resulting from the action of a user such as misuse, improper wiring, any operations outside of its specification, improper maintenance or repair, or unauthorized modification.

Our liability is limited to repair or replacement of the product. Any failure during the warranty period should be referred to Customer Services.

In the event of a fault, apart from replacing the instrument fuse in the IEC socket, the signal generator should be referred to the Philip Harris recommended repair agent.

Please contact Customer Services or [techsupport@philipharris.co.uk](mailto:techsupport@philipharris.co.uk) for advice

**Instructions for authorized service technicians:**

Ensure that any replaceable mains cord is of the correct rating.

Ensure that all earth conductors and protective earth bonding is maintained after service work.

Please refer to the detailed service procedures, safe servicing and continued safety - contact [techsupport@philipharris.co.uk](mailto:techsupport@philipharris.co.uk) for advice.

For any manufacturer specific parts please refer to our recommended repairer.

Please refer to product specific risks that may affect service personnel, the protective measures and verification of the safe state after repair.

**Disposal of Waste Electrical and Electronic Equipment (WEEE)****Do not dispose of this product with household waste**

- For the proper treatment, recovery and recycling please take this product to an appropriate collection point.
- If you are unsure where this is, contact your Local Authority.
- By disposing of this product correctly you will be providing positive help to the environment.

**Supplier details:**

Philip Harris Education, 2 Gregory Street, Hyde, Cheshire, SK14 4RH  
Orders and Information Tel: 0845 120 4521  
Fax: 0800 138 8881

Repairs Tel: 0845 120 3211

E-mail: [techsupport@philipharris.co.uk](mailto:techsupport@philipharris.co.uk)

Website: [www.philipharris.co.uk](http://www.philipharris.co.uk)

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