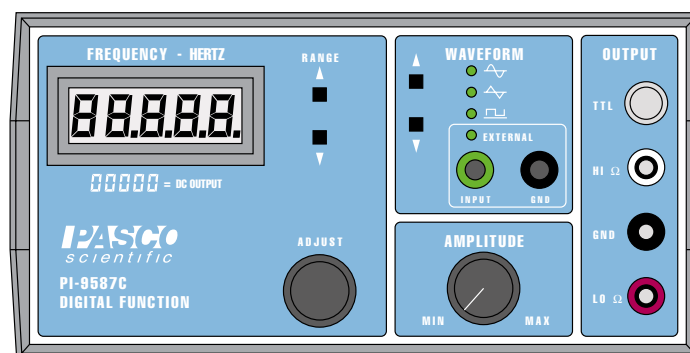


**Instruction Sheet
for the PASCO
Model PI-9587C**

Digital Function Generator/Amplifier



Introduction

The PASCO Model PI-9587C Digital Function Generator/Amplifier is designed specifically for use in the physics lab. The frequency is synthesized from a stable crystal oscillator which provides a frequency ranging from 0.001Hz to 99,999Hz over four ranges. The range buttons are used to select resolutions from 0.001Hz to 1Hz and D.C. output. Each range option gives five decades of range, except the fifth. The fifth selection (a display reading of 00000) provides a DC voltage whose level can be varied between 0 volts and +10 volts by adjusting the amplitude knob. The output voltage and liquid crystal display respond to changes in frequency within 2 milliseconds regardless of the frequency. The PI-9587C can synthesize sine, triangle and square waves and provides a TTL trigger signal for synchronizing oscilloscopes. The power amplifier drives two different impedance outputs: the LO Ω which can deliver 1 amp at 10 volts and the HI Ω (600 Ohm) which limits the current to under 17ma. The LO Ω output allows direct connection to high current loads such as speakers and mechanical drivers. The PI-9587C also has an external input to the power amplifier which can be selected instead of the synthesizer. This one compact unit provides all the functions necessary to do many experiments in acoustics and mechanical waves without a whole table full of additional equipment.

The sine and triangle waveform output amplitude can be adjusted from 0 volts to 20 volts peak-to-peak, and the square waveform output amplitude can be adjusted from 0 volts to +10 volts peak. The external input voltage can range from +5 volts to -5 volts, since the power amplifier has a voltage gain of 2, and the input is diode clamped to the supply rails for protection.

The frequency adjustment knob is an optical encoder which allows fine frequency changes equal to the selected resolution or larger changes of 10-times or 100-times the resolution depending on how fast the knob is turned. This feature helps span the frequency ranges quickly yet still providing fine adjustment capability. The knob turns continuously in either direction. The frequency adjustment knob has no effect when the DC output mode is selected.

To Operate the Function Generator

- ① Plug in the Function Generator power cord to the appropriate power source: 100, 110, 220 or 240 VAC, 50 or 60 Hz grounded outlet. See the back panel for identification of the appropriate power source.

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The lightning flash with arrowhead, within an equilateral triangle, is intended to alert the user of the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



CAUTION:
TO PREVENT THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER ON UNIT. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

- ② Using banana plug connectors or hookup wire, connect the output of the Function Generator to the circuit or device to which you want to apply the signal. Use the GND and LO Ω jacks for high current applications such as speakers or mechanical wave drivers; use the GND and HI Ω jacks for low current applications, such as most electronic circuits.
- ③ Turn the amplitude adjustment knob to the minimum position and turn the power switch (located on the back panel) on. The PI-9587C will power-up with the sine waveform selected, the frequency set to 1000.0Hz and the resolution set to 0.1Hz.
- ④ Select the desired waveform using the push-buttons in the WAVEFORM area of the Function Generator front panel.
- ⑤ Adjust the amplitude to the desired value by rotating the AMPLITUDE knob clockwise.
- ⑥ If you want to trigger an oscilloscope synchronously with the generator output, just connect the TTL output jack to the external trigger of the oscilloscope.

➔ **NOTE:** If at any time the Function Generator fails to come on, check the fuse in the power entry module located on the back panel. Replace only with a similarly rated fuse:

0.5A, 250 volt for 90 - 130 volt units;
0.315A, 250 volt for 180 - 260 volt units.

See the label on the back panel of the Function Generator for detailed fuse replacement information.

Specifications

Functions

Sine, triangle, and square waveform output and external input selections (one at a time).

Special Features

Large output power capability: Up to 1 amp, 10 W, and digital display of frequency.

Output Signal Specifications

Amplitude:

0 to 20 volts peak-to-peak for sine and triangle wave outputs.

0 to +10 volts peak for square wave output continuously variable.

D.C. Output

0-10 volts.

Frequency:

0.001Hz to 99,999Hz in 4 ranges, continuously adjustable in each range. Note that each range spans 5 decades. Accuracy is 0.01% \pm 1 digit in all ranges.

Frequency Range	Resolution
0.001Hz to 99.999Hz	0.001Hz
0.01Hz to 999.99Hz	0.01Hz
0.1Hz to 9,999.9Hz	0.1Hz
1Hz to 99,999Hz	1Hz

Quality:

Sine Wave: less than 2% Total Harmonic Distortion, load dependent.

Square Wave: Duty cycle: 50% \pm 5%;

Rise/Fall times less than 1.0 microsecond for a 10 volt swing, square wave driving a 100 Ω load.

Outputs:

Low impedance output: to drive loads up to 1 amp.

High impedance output: 600-Ohm output impedance to drive electronic circuits.

Trigger output: 0 to +5 volt square wave synchronous with signal output. Duty cycle 50% \pm 5%.

Frequency Meter:

5-digit LCD.

Output Connections:

Banana jacks/binding posts for HI Ω , LO Ω , and ground.

BNC for TTL.

Power Requirements

90 - 130 VAC, 47 - 63Hz (PI-9587C) - use 0.5 amp, 250 volt type T fuse.

180 - 260 VAC, 47 - 63Hz (PI-9587C-220) - use 0.315 amp, 250 volt type T fuse.

60 watts maximum

Some Suggested Uses

In addition to the usual uses of a function generator, such as providing sine wave signals for electronics laboratories, the PI-9587C Digital Function Generator/Amplifier is particularly suited for experiments in waves and acoustics. You can drive a speaker - or several speakers - directly from the LO Ω output jack and accurately set the frequency to any level in the acoustic range or beyond. This makes it particularly

convenient for experiments such as measuring the speed of sound, observing the interference and diffraction of sound waves and investigating acoustic resonance in a cavity.

The PI-9587C Digital Function Generator/Amplifier can be used with the PASCO Model WA-9612 Resonance Tube Apparatus to investigate resonant modes and the speed of sound in a closed or open tube. With the PASCO Model WA-9611 Sonometer and WA-9613 Driver/Detector Coils, resonant frequencies and harmonics and the location of nodes and antinodes in a string can be measured.

The built-in amplifier also makes it an ideal device for driving mechanical wave experiments. With a mechanical driver, such as PASCO Model WA-9753 Wave Driver II, a variety of experiments can be conducted. With the PASCO Model SF-9297 Coupled Harmonic Oscillators, coupled harmonic motion can be effectively demonstrated on an air track. Experiments with the motion of waves in two dimensions using sand on thin metal plates can be conducted with the PASCO Model WA-9607 Chladni Plate Kit. Connect a wave motion apparatus, such as PASCO Model SE-9600 Complete Wave Motion Demonstrator or SE-9604 Longitudinal Wave Demonstrator, to a mechanical drive and the Digital Function Generator/Amplifier and measure basic properties of transverse and longitudinal waves. With the PASCO Model WA-9753 Wave Driver II, you can perform experiments such as the one illustrated in Figure 1, in which you can vary the drive frequency and examine the resonance modes in the vibrating wave cord. Please see the current PASCO catalog for more information about equipment for use with the PI-9587C Digital Function Generator/Amplifier.

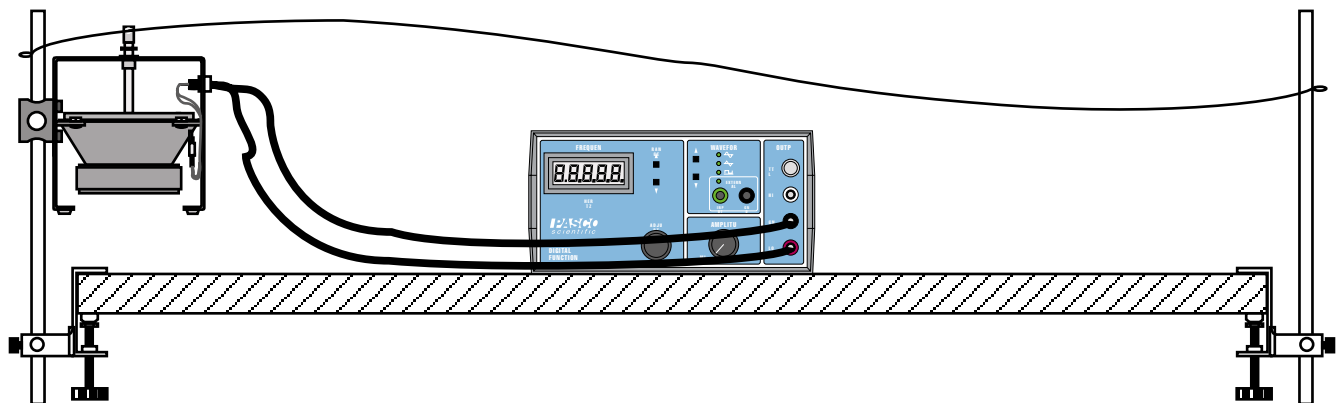


Figure 1 Equipment Setup with the WA-9753

Limited Warranty

PASCO scientific warrants this product to be free from defects in materials and workmanship for a period of one year from the date of shipment to the customer. PASCO will repair or replace, at its option, any part of the product which is deemed to be defective in material or workmanship. This warranty does not cover damage to the product caused by abuse or improper use. Determination of whether a product failure is the result of a manufacturing defect or improper use by the customer shall be made solely by PASCO scientific. Responsibility for the return of equipment for warranty repair belongs to the customer. Equipment must be properly packed to prevent damage and shipped postage or freight prepaid. (Damage caused by improper packing of the equipment for return shipment will not be covered by the warranty.) Shipping costs for returning the equipment, after repair, will be paid by PASCO scientific.

Equipment Return

Should this product have to be returned to PASCO scientific, for whatever reason, notify PASCO scientific by letter or telephone BEFORE returning the product. Upon notification, the return authorization and shipping instructions will be promptly issued.

◆ **NOTE: NO EQUIPMENT WILL BE ACCEPTED FOR RETURN WITHOUT AN AUTHORIZATION.**

When returning equipment for repair, the unit must be packed properly. Carriers will not accept responsibility for damage caused by improper packing. To be certain the unit will not be damaged in shipment, observe the following rules:

- ① The carton must be strong enough for the item shipped.
- ② Make certain there is at least two inches of packing material between any point on the apparatus and the inside walls of the carton.
- ③ Make certain that packing material cannot shift in the box, or become compressed, thus letting the instrument come in contact with the edge of the box.