



# FG-3000 Series

# DDS Function Generator

## User Manual

Rev. 1.0



# TEST INSTRUMENT SAFETY GUIDELINES

## WARNING

*An electrical shock of over 10 milliamps of current to pass through the heart will stop most human heartbeats. Voltage as low as 35 volts dc or ac rms should be considered dangerous and hazardous since it can produce a lethal current under certain conditions. Be sure to observe following safety precautions:*

1. Do not expose high voltage needlessly in the equipment under test. Remove housings and covers only when necessary. Turn off equipment while making test connections in high-voltage circuits. Discharge high-voltage capacitors after removing power.
2. If possible, familiarize yourself with the equipment being tested and the location of its high voltage points. However, remember that high voltage may appear at unexpected points in defective equipment.
3. Use an insulated floor material or a large, insulated floor mat to stand on, and an insulated work surface on which to place equipment; make certain such surfaces are not damp or wet.
4. When using a probe, touch only the insulated portion. Never touch the exposed tip portion.
5. When testing ac powered equipment, remember that ac line voltage is usually present on some power input circuits such as the on-off switch, fuses, power transformer, etc. any time the equipment is connected to an ac outlet, even if the equipment is turned off.

# Limited One-Year Warranty

GME Technology warrants to the original purchaser that this product and the component parts thereof, will be free from defects in workmanship and materials for a period of one years from the data of purchase. GME Technology will, without charge, repair or replace, at its' option, defective product or component parts. Returned product must be accompanied by proof of the purchase date in the form a sales invoice or receipt.

## Term and Conditions

- The warranty period is based upon the invoice date of the original purchase by the end-user.
- Warranty only applies to defects in materials and/or workmanship, which occur during normal use.
- Warranty does not apply to those products that are damaged due to misuse, abuse, negligence or modification.
- Warranty does not extend to any damage that occurs in shipment or due to natural phenomenon (i.e. lightning or line surges).
- Warranty will be voided if the original serial number on the product is removed by accident or intentionally

This warranty gives you specific rights and you may have other rights, which vary from state-to-state.

## Service & Repair

The following are procedure for returning a GME product for servicing and repair. Turn around time for repair is normally within five (5) working days excluding shipping time.

### **RMA Procedure**

**Before sending your GME product in for service, be sure to contact GME Technology first to obtain a RMA number.** If your product is still under warranty, please send in the product along with a copy of the invoice or receipt showing the date when the product was purchased. If the warranty has already expired, please ask for the repair cost when you contact GME Technology for the RMA number and include a check or money order for the repair cost when you send in the product.

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## INTRODUCTION

Thank you for purchasing the FG-3000 series DDS Function Generator.

Based on the latest advances in DDS (Direct Digital Synthesis) technology, the FG-3000 series are portable high precision sine, square, and triangle waveform function generator. The FG-3000 series utilize microprocessor control that delivers clean and accurate waveforms up to 20MHz with 12V peak-to-peak amplitude and DC offset variable up to  $\pm 5V$  in a portable hand-held unit.

The frequency output of the FG-3000 series can be set at 0.2Hz step resolution up to 20MHz. The easy to use interface features a numerical keypad that allows simple and accurate frequency setting while the 8-digit LCD displays the frequency value. Internal built-in flash memory allows store/recall of up to 50 frequency values for various waveforms.

There are two BNC connectors for separate adjustable 12Vp-p sine/triangle/square wave output and fixed 5V square wave output. The instruments can be power from the included 11V AC.

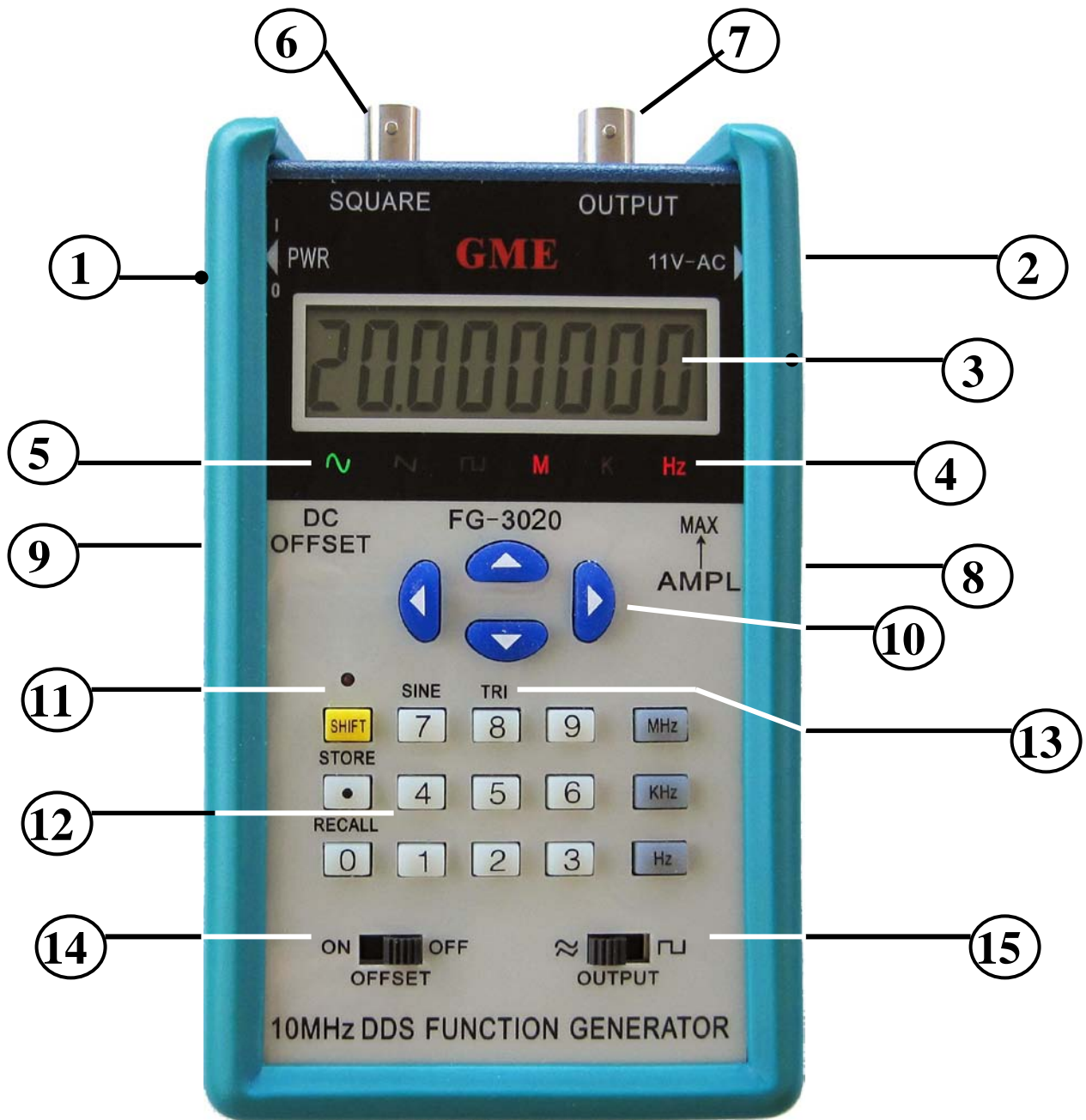
## ITEM CHECKLIST

- ✓ FG-3000 series DDS function generator
- ✓ One 11V AC power adapter
- ✓ One protective rubber boot
- ✓ One User's Manual

## FEATURES

- ◆ Up to 20MHz output frequency and 12V peak-to-peak amplitude
- ◆ DDS technology with microprocessor control for clean and accurate waveform
- ◆ Multiple output waveforms include sine, triangle, and square wave
- ◆ Numerical keypad for simple and accurate frequency setting up to 0.2Hz step
- ◆ 8-digit LCD frequency display
- ◆ Two BNC outputs for simultaneous fixed 5V square waveform and adjustable 12V sine/triangle /square waveform output
- ◆ Built-in flash memory for store/recall of up to 50 setup parameters
- ◆ AC adaptor power source operation
- ◆ Ideal for on-the-bench and in-the-field testing
- ◆ Easy to use, lightweight, and portable

## UNDERSTANDING THE INTERFACE



## FRONT PANEL

### 1. **Power ON/OFF Switch**

This Power ON/OFF switch is on the left side of the unit. Slide the switch upward to turn the unit on and downward to turn the unit off.

### 2. **11V AC Adaptor Input**

Plug in a 11V 300mA 5.5mm x 2.1mm AC adaptor to power the FG-3000 series function generator.

### 3. **Frequency LCD Display**

This 8-Digit LCD display shows input/output frequency value information.

#### **4. Frequency Unit Display**

These indicators will light to show the unit for the frequency value currently displayed on the 8-Digit LCD screen (i.e. MHz, KHz, Hz).

#### **5. Output Waveform Type Display**

These indicators will light to shows the type of waveform being on OUTPUT *BNC connector* (i.e. sine wave, triangle wave or square wave). *NOTE: The fixed 5V p-p square wave is always being output on the SQUARE BNC output connector.*

#### **6. SQUARE BNC output connector**

Outputs the fixed 5V p-p square waveform of selected frequency.

#### **7. OUTPUT BNC output connector**

Outputs either sine, triangle or square waveform of selected frequency depending on the output waveform type selected.

#### **8. Amplitude Control Knob for Sine/Triangle/Square Waveform**

The amplitude control knob is on the right side of the unit and is used to adjust the level of the sine/triangle/square waveform output.

#### **9. DC Offset Control Knob**

The offset control knob is on the left side of the unit and is used to adjust the level of the DC offset on the OUTPUT BNC connector.

#### **10. Modify Keys**

Use the left/right modify keys to select the desire digit on the LCD display to modify; use the up/down modify keys to increment/decrement the value of the selected digit.

#### **11. SHIFT Key Status LED**

Press the SHIFT key to turn this LED ON/OFF. When this LED is on, the secondary function of some keys on the keypad is activated.

#### **12. Input Keypad**

Use to key in desire frequency value and the frequency unit (i.e. MHz, KHz, and Hz).

#### **13. Secondary Key Function**

Shows the secondary functions of some keys on the keypad; the secondary function is activated by first pressing the SHIFT key follow by the function key.

#### **14. Offset Switch**

Sliding the switch to turn the DC Offset on or off.

#### **15. Output Switch**

Sliding the switch to select the output waveform on the OUTPUT BNC connector.

# OPERATION

## **CAUTION:**

**The FG-3000 function generator outputs should never be connected to a signal injection point. Excessive voltage applied to the function generator output can cause internal damage to the function generator.**

## **I. Setting Up The Instrument**

1. Connect the FG-3000 function generator to the main supply with the included 11V AC adaptor.
2. Sliding the power switch to turn on the function generator.
3. The LCD display will turn on to show the current output frequency value. The respective Frequency Unit Display LED (i.e. MHz, KHz, and Hz) and Output Waveform Type LED (sine / triangle/ square wave) will also light to indicate the current signal output waveform status.

## **II. Frequency Setting**

1. With the FG-3000 function generator power up, use the front panel keypad to key in the desire output frequency value.

*NOTE: If the key in frequency is higher than the maximum allowed frequency, the function generator will automatically set the output frequency to the maximum allowed frequency.*

\* Example: Key sequence for setting the output frequency to 102.1 KHz



2. The 8-digit LCD will display the value of the key pressed. The output frequency will only change after one of the three frequency unit keys (i.e. “MHz”, “KHz”, and “Hz”) is pressed at the end of frequency input sequence.
3. The “modify keys” can be used to change current frequency output.
  - i. Use the left/right modify key to select the desire digit on the LCD display; selected digit will flash to indicate it is being selected.
  - ii. Once a digit has been selected to be modify, use the up/down modify keys to increment/decrement the value on this digit
  - iii. Pressing the “SHIFT” key to finish modify.

\* Example: Key sequence for changing the output frequency from 102.1000 KHz to 105.1000 KHz



**TIPS:** While keying in the desire frequency value using the keypad, pressing the “SHIFT” key will cancel all the keys pressed, allowing the input process to start over. This feature is useful for correcting any mistake made during the key in process

## **III. Waveform Type and Amplitude Setting**



1. Sliding the for select the sine/ triangle waveform or sliding the **Output switch** to right side for select the square waveform on the OUTPUT BNC connector. The corresponding waveform LED will light.
2. Output waveform type can be set by pressing the “SHIFT” key (the SHIFT key LED will light) follow by either “7/SINE” (for sine wave) or “8/TRI” (for triangle wave) key on the keypad. The corresponding waveform LED will light.

*NOTE: The square waveform of selected frequency is always being output on the square wave BNC output connector. Changing the output waveform will only affect the output on the “OUTPUT” BNC connector.*

\* Example: Change the output waveform to sine wave if the “Output switch” on left side.



3. Adjust the waveform output level on “OUTPUT” BNC connector with the amplitude control knob on the right side of the unit.
4. Adjust the waveform output DC offset on “OUTPUT” BNC connector with the DC offset control knob on the left side of the unit.

#### IV. STORE/RECALL Memory Setting

The FG-3000 series can store/recall up to 50 setup parameters (both frequency value and waveform type) with its built-in nonvolatile memory.

##### STORE

1. To store the current frequency value and waveform type, press the “SHIFT” key follow by the “./STORE” key.
2. Key in the memory number from “00” to “49”. This will store the frequency value and waveform type into this memory number.

\* Example: Store current frequency value and waveform type into memory “02”



##### RECALL

1. To recall a stored frequency value and waveform type from memory, press the “SHIFT” key follow by the “0/RECALL” key.
2. Key in the memory number from “00” to “49” to recall the frequency value and waveform type stored in this memory number.

\* Example: Recall frequency value and waveform type previously stored in memory “02”



# Specifications

MODEL	FG-3005	FG-3010	FG-3015	FG-3020
Output Function		Sine, Square, Triangle		
Frequency Range (For Sine, Square) (For Triangle)	0.2 Hz - 5 MHz 0.2 Hz - 2 MHz	0.2 Hz - 10 MHz 0.2 Hz - 2 MHz	0.2 Hz - 15 MHz 0.2 Hz - 2 MHz	0.2 Hz - 20 MHz 0.2 Hz - 2 MHz
Frequency Resolution (Under 10MHz) (Above 10MHz)	0.2 Hz 1 Hz			
Crystal Accuracy	+/- 30ppm			
Output Amplitude OUTPUT BNC Connector SQUARE BNC Connector	Adjustable 12V peak-to-peak (no load) Fixed 5V peak-to-peak (no load)			
Impedance	50 ohm +/- 5%			
DC Offset	±5V			
Display	8-digit LCD Display			
Store/Recall Memory Size	Store/Recall 50 setup parameters on built-in nonvolatile memory			
Power Source	11v AC adaptor (300mA, 5.5mm x 2.1mm)			
Operating Temperature	-10 deg ~ 70 deg			
Dimension	5.7"(H) x 3.8"(W) x 1.5"(D) (144x96x38mm)			
Weight	Approx. 1lb (0.5 kg)			