

# 50 MHz Function Generator

## MODEL 8550



- **Direct replacement to HP 8116A.**

- Four instruments in one: function generator, linear sweep generator, logarithmic sweep generator, and phase locked generator
- Auto calibration to typically 1% accuracy on all functions, 0.1% continuous frequency accuracy. Built-in self diagnostics
- Six popular output wave forms including Sine, Triangle, Symmetrical Square, Positive and Negative Square waves, and DC
- 30 storable, non-volatile, front panel set-ups

- High-resolution, high-accuracy digital settings. Parameters are set, either from the front panel or through the GPIB interface
- Control inputs for FM, VCO, and AM modulation
- Accurate sweep operation is digitally controlled with the provided X ramp (horizontal drive), and Z intensifier (marker) outputs
- Standard GPIB interface, complies with IEEE-488.2 specifications

Model 8550 is an extremely high performance programmable function generator. It provides a variety of signal waveforms to be used as test stimuli for a diversity of electronic devices. For improved immunity to RFI and EMI noise, the instrument is housed in an all-round metal case. The Model 8550 offers many features and functions, such as enhanced accuracy, eight different linear and logarithmic sweep modes, automatic phase lock loop, counted burst, and internal trigger generator. Besides its normal-continuous mode, Model 8550 offers a variety of interrupted and controlled modes. Output waveforms may be gated, triggered, or may generate a burst of pre-selected number of cycles. The generator also provides a number of externally controlled modes, including VCO, FM, AM, and PLL.

### Versatility

Taber generators are reliable and easy to operate. Rapid, repeatable testing is assured by the user programmed non-volatile memory. Extremely broad frequency and amplitude limits permit usefulness in a variety of complex

applications. Parameters are digitally set over exceptionally wide ranges:

- **Frequency** - from 10mHz to 50MHz
- **Amplitude** - from 10mV to 32V
- **Pulse Width** - from 10 ns to 999ms
- **Pulse Transitions** - from 5ns to 99.9ms
- **Sweep** - from 10mHz to 50MHz
- **Phase Lock Offset** - 180°

### Self-Calibration

Front panel calibration, even by inexperienced persons, has made maintenance and troubleshooting extremely easy. Output waveform parameters are compared to internal references and are stored together with correcting factors in special tables for later use. If the self-calibration routine fails to successfully complete, the generator produces a failure list that can be evaluated, anytime, either from the front panel or through GPIB reporting query. The self-calibration capability restores full accuracy potential - even at extreme temperatures (0-50 C).

### IEEE-488.2 Compatibility

The IEEE-488 standard greatly simplifies interconnection of programmable instrumentation. It clearly defines mechanical, electrical and protocol specifications.

The IEEE-488.2 standard, has significantly improved definition of data formats, status reporting, and error handling. This new standard goes further and defines a set of common commands and common queries for easy and goes further and defines a set of common commands and common queries for easy instrument interchangeability between instruments made by different manufacturers. Models 8550 and 8551 fully comply with IEEE-488.2.



**TABOR ELECTRONICS Ltd.**

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## Service and Support

Beyond providing precision Test & Measurement instruments, Tabor Electronics provides unparalleled service and support, and is continuously finding new ways to bring added value to its customers.

Our after-sales services are comprehensive. They include all types of repair and calibration, and a single point of contact that you can turn to whenever you need assistance. As part of our extensive support, we offer individualized, personal attention Help Desk, both online and offline, via e-mail, phone or fax.

Tabor Electronics maintains a complete repair and calibration lab as well as a standards laboratory in Israel and USA. Service is also available at regional authorized repair/calibration facilities.

Contact Tabor Electronics for the address of service facilities nearest you.

## Applications

For expert technical assistance with your specific needs and objectives, contact your local sales representative or our in-house applications engineers.

## Manuals, Drivers, and Software Support

Every instrument comes equipped with a dedicated manual, developer libraries, IVI drivers, and software. However, if your specific manual is lost or outdated, Tabor Electronics makes it possible to log-on to its Download Center and get the latest data "in a click".

## Product Demonstrations

If your application requires that you evaluate an instrument before you purchase it, a hands-on demonstration can be arranged by contacting your local Tabor Electronics representative or the Sales Department at our Corporate Headquarters.

## Three-year Warranty

Every Tabor Electronics instrument comes with a three-year warranty. Each one has full test results, calibration certificate, and CD containing product's manual and complete software package. Our obligation under this warranty is to repair or replace any instrument or part thereof which, within three years after shipment, proves defective upon examination. To exercise this warranty, write or call your local Tabor representative, or contact Tabor Headquarters and you will be given prompt assistance and shipping instructions.

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# Specification 50 MHz Function Generator

## Model 8550



### WAVEFORMS

Sine, Haversine, Haver cosine,  
Triangle, Square, Positive  
Square, Negative Square, DC.

### FREQUENCY CHARACTERISTICS

**Range:** 10mHz to 50MHz.  
**Resolution:** 4 digits.

### ACCURACY

**Continuous:**  $\pm 3\%$  of reading, from 10mHz to 999.9mHz;  
 $\pm 0.1\%$  of reading,  
from 1Hz to 50MHz.

### VCO and

**Interrupted Modes:**  $\pm 3\%$  of reading, to 50MHz.  
**Jitter:**  $< 0.1\% \pm 50\text{ps}$ .

### WAVEFORM CHARACTERISTICS

#### SINEWAVE

**Total harmonic distortion:**  $< 1\%$  from 10mHz to 1MHz.  
**Harmonic signals below the carrier level:**

$> 40\text{dB}$ , 1MHz – 5MHz;  
 $> 30\text{dB}$ , 5MHz – 50MHz,  
 $< 12.0\text{Vp-p}$ ;  
 $> 23\text{dB}$ , 5MHz – 50MHz,  
 $> 12.0\text{Vp-p}$ .

**Flatness:**  $\pm 1\%$ , 10mHz to 999.9KHz;  
 $\pm 2\%$ , 1MHz to 9.999MHz;  
 $-15\%$ , 10MHz to 50MHz.

#### TRIANGLE

**Linearity:** Better than 99%, up to 5MHz  
(10% to 90% of amplitude).

#### SQUARE WAVE

**Rise/Fall time:**  $< 6\text{ns}$ , 10% to 90%  
of amplitude (5ns typical).  
**Aberration:** less than 3%.

#### SYNC PULSE

**Output level:** 0 to 1V, into 50 $\Omega$ ;  
0 to 2V, open circuit.  
**Rise/Fall time:**  $< 2\text{ns}$ , into 50 $\Omega$ .  
**Aberrations:** less than 5%.

### OUTPUT CHARACTERISTICS

**Stand-By Mode:** Output Normal or Disabled,  
selectable.  
**Impedance:** 50 $\Omega$ ,  $\pm 1\%$ .  
**Output Level:** 20.0mV to 32.0Vp-p,  
into open circuit;  
10.0mV to 16.0Vp-p, into 50 $\Omega$ .  
3 digits.  
**Resolution:** 3 digits.  
**Accuracy (1 KHz):**  $\pm 4\%$  of reading,  
from 10.0mV to 16.0V.  
**Output Protection:** Protected against continuous  
short to case ground.

### OFFSET

**Resolution:** 3 digits.  
**Range:** Offset and amplitude are  
independently selectable  
within widow levels of  
 $\pm 800\text{mV}$  and  $\pm 8\text{V}$ .  
**Accuracy:**  $\pm (.5\%$  of setting + 1%  
of amplitude  
+ .2mv),  $\pm 800\text{mV}$ ;  
 $\pm (1\%$  of setting + 1% of  
amplitude + 2mv)  $\pm 8\text{V}$ .

### DC CHARACTERISTICS

**Range:** Variable from -16V to + 16V,  
into open circuit;  
-8V to +8V, into 50 $\Omega$ .  
**Resolution:** 3 digits.  
**Accuracy:**  $\pm (1\%$  of reading + 100 $\mu\text{V}$ ).

### TRIGGERING CHARACTERISTICS

#### TRIGGER INPUT

**Connector:** Via TRIG/REF BNC.  
**Impedance:** 10K $\Omega$ ,  $\pm 5\%$ .  
**Sensitivity:** 500mVp-p.  
**Maximum Input Voltage:**  $\pm 20\text{V}$   
**Minimum Pulse Width:** 20ns.  
**Slope:** Positive-going leading edge.  
**Source:** Manual (front panel push-  
button), internal or external  
stimulate.

### MODES

**Normal:** Continuous wave form  
is generated.  
**Triggered:** Each input cycle generates  
a single output cycle.

**Gated:** External signal enables  
generator. First output cycle  
synchronous with active slope  
of triggering signal.  
Last cycle of output wave form  
always completed.  
**Burst:** Preset number of cycles  
(1-4000) stimulated by an  
internal, external, or manual  
trigger.

### TRIGGER STIMULATION FREQUENCY

**External:** To 50MHz;  
**Internal:** from 20 $\mu\text{s}$  to 999s;  
**Manual:** Simulates an external trigger  
signal.  
**Start Phase offset:** Adjustable, from -90° to +90°,  
to 500.0KHz; proportionally  
reduced from 500.1KHz  
to 50.00MHz.  
**Accuracy:**  $\pm 3^\circ$ , to 500.0KHz  
**Trigger level:** variable, -10.0V to +10.0V.

### LOGARITHMIC SWEEP CHARACTERISTICS

**Modes:** Auto, Manual, Triggered,  
Gated and Bursted sweep.  
Output frequency repeatedly  
changes from sweep start to  
sweep stop settings.  
Available sweep directions  
are: up, down, up-down  
and down-up.  
**Width:** 10 decades maximum.  
**Rate per Decade:** continuously adjustable from  
10ms to 999s, NOMINAL,  
per decade.  
**Steps per decade:** Depends on sweep time  
and range. Automatically ad-  
justed for maximum steps  
per sweep time.  
Maximum steps are 200;  
Minimum steps are 50.  
**Sweep Output:** 1V/decade, below 5 decades;  
.5V/decade, above 5 decades.  
**Marker Output:** +5V with no marker;  
drops to 0V, NOMINAL, when  
marker frequency is reached  
and remains at this level until  
end of sweep.  
**Sweep Stop Resolution:** Same as frequency resolution.

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### LINEAR SWEEP CHARACTERISTICS

<b>Modes:</b>	Same as in logarithmic sweep.
<b>Sweep Width:</b>	3 decades maximum.
<b>Sweep Time:</b>	continuously adjustable from 10ms to 999s, NOMINAL.
<b>Sweep Out:</b>	0 to +5V, $\pm 5\%$ .
<b>Sweep Steps:</b>	Depends on sweep time and range. Automatically adjusted by the instrument to get the maximum steps per sweep time. Maximum steps are 1000; Minimum steps are 2.
<b>Marker Output:</b>	Same as in logarithmic sweep
<b>Sweep Stop Resolution:</b>	Same as frequency resolution.

### CONTROL CHARACTERISTICS

<b>Modes:</b>	VCO, FM, AM.
<b>Input:</b>	Via front panel CONTROL INPUT BNC connector.
<b>Input Impedance:</b>	10K $\Omega$ , $\pm 5\%$ .
<b>Maximum Input Voltage:</b>	$\pm 10V$ .

### VCO (FM) CHARACTERISTICS

<b>Sensitivity:</b>	0V to -4.7V, $\pm 20\%$ produces 1/1000 frequency change from main frequency, when main frequency is set to 9999 counts.
<b>FM Sensitivity:</b>	0V to 0.5V $\pm 70mV$ , modulates to 1% deviation from center frequency.
<b>Modulation Bandwidth:</b>	DC to 50KHz.

### AM CHARACTERISTICS

<b>Modulation Input:</b>	DC coupled.
<b>Modulation Bandwidth:</b>	DC to 1 MHz.
<b>Modulation Range:</b>	200%; reduced to 70% at 1 MHz.
<b>Sensitivity:</b>	0V to 5Vp-p produces 100% modulations; 0V to 10Vp-p produces suppressed carrier amplitude modulation (SCAM).
<b>Envelop Distortion:</b>	< 1 % for modulation depth < 90%, carrier frequency < 1 MHz, and modulation frequency < 50KHz.

### PHASE LOCK CHARACTERISTICS

<b>Reference Input:</b>	Via TRIG/REF BNC.
<b>Impedance:</b>	10K $\Omega$ , $\pm 5\%$ .
<b>Sensitivity:</b>	500mVp-p.
<b>Max Input Voltage:</b>	$\pm 20V$ (dc + Peak ac).
<b>Minimum Pulse Width:</b>	10ns.
<b>Operation:</b>	Output locks automatically to the frequency and phase of the external signal.
<b>Locking Range:</b>	10Hz to over 60MHz.

### PHASE OFFSET

<b>Range:</b>	Continuously adjustable from -180° to +180°, 10Hz to 19.99MHz.
<b>Resolution:</b>	1°
<b>Accuracy:</b>	$\pm 3^\circ$ , 10Hz to 100KHz.

### GPIB INTERFACE

<b>Interface Functions:</b>	Complies with IEEE488.2, including common commands and queries.
<b>Programmable Controls:</b>	All front panel controls except POWER switch.
<b>Subsets:</b>	SH1, AH1, T6, TE0, I4, LE0, SR1, RL1, PP2, DC1, DT1, CO.
<b>Program Message Format:</b>	Program Message Header, Program Data (floating point and / or suffix program data), Program Message Terminator. Characters lower or uppercase.

<b>Response Message Format:</b>	Variable length response format consisting of Response Header, Response Data (NR1, NR2, or NR3 format), and Response Message Terminator.
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<b>Common Commands and Queries:</b>	*CAL?, *CLS, *ESE, *ESE?, *ESR, *IDN?, *OPC, *OPC?, *RCL, *RST, *SAV, *SRE, *SRE?, *STB, *TRG, *TST?, *WAI.
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<b>Status Reporting:</b>	*ESR?, *STB?, and RQS read by Serial Poll.
<b>String Termination:</b>	Selectable NL, END (EOI) or combination of both.

**Address Selection:** Front panel programming. Address stored in a non-volatile memory.

### GENERAL

<b>Display:</b>	4 digits, 7 segment LED's 0.5".
<b>Power:</b>	115/230Vac, 50 or 60Hz, 50VA max.
<b>Stored Set-ups:</b>	30 complete sets of front panel set-ups. Storage guaranteed for 3 years.
<b>Operating Temperature:</b>	0 to 40°C, ambient.
<b>Specified Accuracy:</b>	+ 25°C, $\pm 5^\circ C$ .
<b>Storage Temperature:</b>	-40°C to + 70°C.
<b>Dimensions:</b>	3.5" x 8.3" x 15.4" (HxWxL).
<b>Rack Mount Dimensions:</b>	3.5" x 19" (HxW).
<b>Weight:</b>	Approximately 12Lbs.
<b>EMC:</b>	CE marked
<b>Reliability:</b>	MTBF per MIL-HDBK-217E, 25°C, Ground Benign
<b>Safety:</b>	Designed to meet IEC 1010-1, UL 3111-1, CSA 22.2 #1010
<b>Workmanship Standards:</b>	Conform to IPC-A-610D
<b>Supplied Accessories:</b>	Power Cord, CD containing Operating Manual and developer libraries.
<b>Warranty:</b>	3 years standard

### ORDERING INFORMATION

<b>MODEL</b>	<b>8550</b>
50MHz Function Generator	

### ACCESSORIES

<b>S-Rack mount</b>	19" Single Rack Mounting Kit
<b>D-Rack mount</b>	19" Dual Rack Mounting Kit
<b>Case Kit:</b>	Professional Carrying Bag

**Note:** Options and Accessories must be specified at the time of your purchase.



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