

# 11 MHz Stabilized Sweep Generator

- 100  $\mu$ Hz to 11 MHz Range
- Crystal Stabilized to 0.09%
- Linear and Logarithmic Sweep
- LCD Display

## Crystal Stabilized Operation

Model 22 features frequency stabilized operation. Stabilization extends tight short-term specs (0.09% of range) to indefinite periods throughout the entire 100  $\mu$ Hz to 11 MHz range.

## LCD Display

Frequency is monitored by a 3½ digit LCD display. Display annunciators point to selected parameters

to show the instrument setup at a glance.

## Low-Frequency Waveform Synthesis

Waveforms below 1.1 kHz are synthesized digitally to provide additional features of up and down ramps.

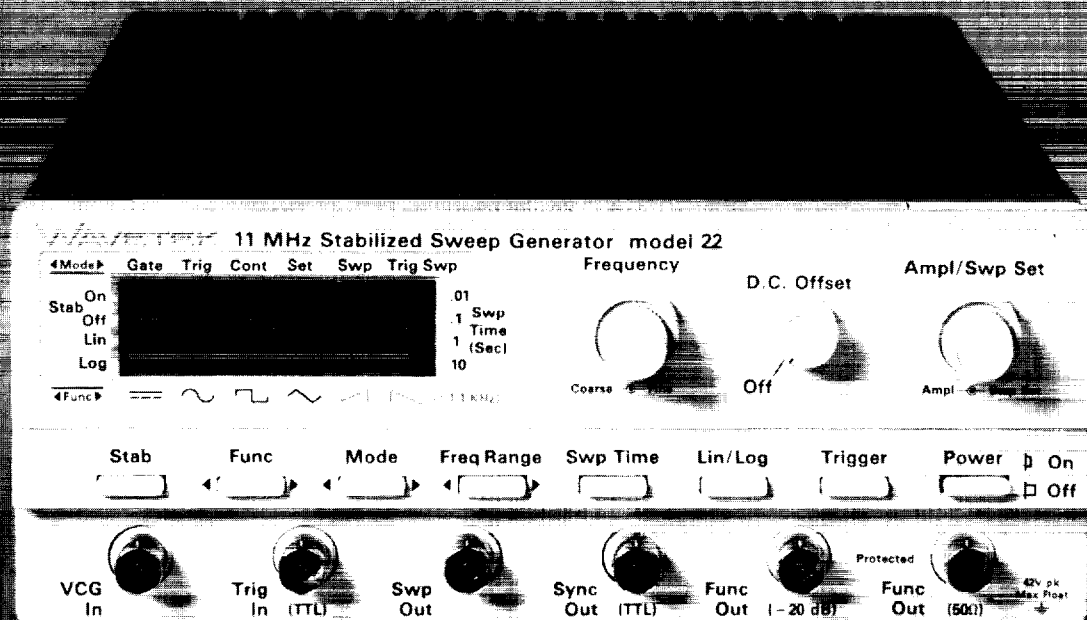
## Linear and Logarithmic Sweep

Model 22 offers linear and logarithmic sweep with selectable sweep

times of 0.01 to 10 seconds, and adjustable sweep width up to 1100:1.

## 20 Vp-p Amplitude

Output is 20V peak-to-peak (10 Vp-p into 50 $\Omega$ ) at the primary output. A second output is attenuated 20 dB with the respect to the first. Both outputs can be varied 20 dB, which gives a full 40 dB output range.



## MODEL 22

## FUNCTION GENERATORS

**VERSATILITY****Waveforms**

Sine  $\sim$ , triangle  $\nabla$ , square  $\square$  and dc; additionally, below 1100 Hz, ramp up  $\nearrow$  and ramp down  $\searrow$ .

**Operational Modes**

**Continuous:** Generator runs continuously at selected frequency.

**Triggered:** Generator is quiescent until triggered by external signal or manual trigger, then generates one complete waveform cycle at selected frequency.

**Gated:** Generator output is continuous for duration of external or manual trigger.

**Set:** Generator runs continuously at sweep stop frequency set by Sweep Set control. Sweep stop frequency is displayed.

**Sweep:** Generator frequency is swept from lower frequency limit set by Frequency control to upper frequency limit set by Sweep Set control in a continuously occurring low to high sweep. Sweep time and choice of linear or logarithmic sweep are selectable.

**Triggered Sweep:** Generator is quiescent until triggered, then produces a single low to high sweep at selected rate and width.

**Frequency Range**

100  $\mu$ Hz to 11 MHz in 9 overlapping decade ranges. Each range capable of 1100:1 frequency change.

**Frequency Control**

**Value:** Range is selected with front panel key; frequency within range is set with coarse and fine tune controls.

**VCG:** Up to 1100:1 frequency change with external 0 to  $\pm 5$ V signal applied to VCG input connector. Upper and lower frequencies limited to maximum and minimum of selected range. VCG input is disconnected when stabilizer is engaged.

Input Impedance: 5k $\Omega$ .

Slew Rate: 0.1 V/ $\mu$ s (max.).

**Amplitude Range**

20 dB range up to 20 Vp-p (10 Vp-p into 50 $\Omega$ ) at Func Out (50 $\Omega$ ). Additional output attenuated 20 dB with respect to Func Out (50 $\Omega$ ) for total amplitude range of 40 dB.

**DC Offset and DC Output**

Variable up to  $\pm 10$ V maximum ( $\pm 5$ V into 50 $\Omega$ ). Calibrated zero offset position. Signal peak plus offset limited to  $\pm 10$ V ( $\pm 5$ V into 50 $\Omega$ ).

**Outputs**

**Func Out (50 $\Omega$ ):** Main waveform output.

**Func Out ( $-20$  dB):** Output attenuated 20 dB with respect to main output.

**Sync Out:** TTL pulse (50% duty cycle) at generator frequency. Will drive 10 LS TTL loads.

**Sweep Out:** Voltage proportional to instantaneous generator frequency.

**Inputs**

**VCG In:** BNC input for voltage control of generator in nonstabilized modes.

**Trig In:** BNC input accepts TTL compatible signal to trigger or gate the generator. Generator triggers on positive edge of input or gates on for duration of high level input. External signal pulse width is 50 ns minimum with a maximum repetition rate of 5 MHz.

**Stabilizer**

When stabilizer is selected, generator frequency is stabilized at displayed frequency to a crystal-controlled reference. Stabilizer improves long term frequency stability for all durations to be equal to the 10 minute short term value.

**Display**

1100 count LCD frequency display with frequency ranging units (mHz, Hz, kHz and MHz) and decimal point. Annunciators indicate selection of modes and functions.

**Sweep Generator**

**Sweep Mode:** Linear or logarithmic, up to 3 decades.

**Sweep Time:** Selectable 0.01, 0.1, 1.0 and 10 seconds.

**Sweep Width:** Up to 1100:1 linear or logarithmic.

**Sweep Output:** Voltage proportional to instantaneous generator frequency. Source Impedance: 600 $\Omega$  for driving horizontal axis of oscilloscope or recording equipment. Voltage of 0 to +5V (open circuit) for frequency change from bottom to top of selected range.

**FREQUENCY PRECISION****Frequency Display Accuracy**

$\pm 1$  count of 1100 counts, which is 0.09% of range. Stabilizer maintains same reading indefinitely.

**Time Symmetry**

**Square Waveform Variation From 100 to 1100 Counts On Display:**

To 1100.00 Hz (Bottom 5)  $< \pm 0.1\%$ .

To 110.00 kHz:  $< \pm 1\%$ .

To 11.00 MHz:  $< \pm 5\%$ .

**AMPLITUDE PRECISION****Sine Variation with Frequency**

Referenced to 1 kHz.

**To 110.0 kHz Range:**  $< \pm 0.2$  dB.

**To 11.00 MHz:**  $< \pm 1.5$  dB.

**WAVEFORM CHARACTERISTICS****Sine Distortion**

**1.00 to 11.00 kHz Range:**  $< 0.5\%$  THD.

**10.0 to 110.0 kHz Range:**  $< 1\%$  THD.

**0.100 to 1.1 MHz Range:**  $< -40$  dBc.

**1.0 to 11.0 MHz Range:**  $< -28$  dBc.

**Triangle Linearity**

To 110 kHz:  $> 99\%$ .

**Square Wave Rise and Fall Times**

$< 22$  ns at Function Out with 10 Vp-p into 50 $\Omega$ .

**Square Wave Total Aberrations**

Each peak  $< 5\%$  of peak-to-peak amplitude.

**Stability**

**Amplitude, Frequency (Nonstabilized) and DC Offset After 30 Minutes Warm-up:**

$\pm 0.10\%$  of range for 10 minutes.

$\pm 0.50\%$  of range for 24 hours.

**Frequency (Stabilized):**

$\pm 0.9\%$  of range for  $\geq 10$  minutes, 0 to 50 $^{\circ}$ C.

**GENERAL****Output Protection**

Function outputs are protected against a short circuit to any voltage between  $\pm 10$  Vdc and have internal fused protection (both output and common conductors) against accidental application of up to 250 Vac or 350 Vdc.

**Environment**

**Temperature Range:** 23 $^{\circ}$   $\pm 5^{\circ}$ C for specified operation, operates 0 $^{\circ}$  to +50 $^{\circ}$ C,  $-20^{\circ}$  to +75 $^{\circ}$ C for storage.

**Warm-up Time:** 20 minutes for specified operation.

**Altitude:** Sea level to 10,000 ft for operation. Sea level to 40,000 ft for storage.

**Relative Humidity:** 95% at 25 $^{\circ}$ C at sea level (noncondensing).

**Dimensions**

211 mm (8.3 in.) wide; 85 mm (3.4 in.) high; 305 mm (12 in.) deep.

**Weight**

3.4 kg (7.5 lb) net; 4.5 kg (10 lb) shipping.

**Power**

90 to 128, 180 to 256V, 48 to 66 Hz,  $< 35$  VA.

*NOTE: All specifications apply for display between 100 and 1100 frequency counts; amplitude at 10 Vp-p into 50 $\Omega$ .*

**FACTORY/FOB**

San Diego, CA

**PRICE**

Model 22

\$1295