



MODEL 311B

20 MHz FUNCTION GENERATOR

- * 20MHz Frequency Range
- * Trigger and Gate Modes
- * Sweep Capabilities
- * Variable Symmetry
- * AM and FM
- * Frequency Counter



The Perfect General Purpose Function Generator

Choice of Capabilities

The MODEL 311B is a 20MHz generator, which combines sine, triangle, square and DC capabilities in one small unit. All these waveforms are available over a very broad frequency and amplitude range with a choice of sweep and modulation modes. Any waveform can be continuous, triggered or gated with an external or manual trigger.

Variable symmetry from 10% to 90% offers the possibility to generate ramps and pulse waveforms.

Easy Operation

The MODEL 311B has been designed to provide a wide range of capabilities with an easy way to operate them. The unit uses a small and compact metal enclosure, the best choice for any application.

Variable Amplitude and Offset

The MODEL 311B separate amplitude and offset controls allow you to superimpose a DC component on the AC output waveform.

The output level can be continuously adjusted over a 20dB range and attenuated by 20dB or 40dB fixed attenuators.

Sweep Capabilities

The sweep mode can be internally or externally controlled. Sweep start and stop frequencies are independently adjustable and the sweep rate can be set from 20mS to 10S.

Modulation

The output waveform can be amplitude or frequency modulated by an internal (1KHz) or external signal.

The modulation level is adjustable 0% to 100%.

Frequency Counter

A built-in digital counter that display the instrument frequency allows precise settings. An additional converter enables the reading of very low frequencies with high resolution. This 6 digits autoranging counter can be used to measure external signals.

Performance and reliability

The MODEL 311B high performance has been achieved by using advanced LSI and logic circuits and by designing all main functions into custom IC. Using quality components far away from maximum ratings, minimizing the component count and using special protection circuits for the output amplifier stage are the main reasons for the instrument increased reliability.

MODEL 311B SPECIFICATIONS

WAVEFORMS

Sine, square, triangle and DC.

OPERATING MODES

Continuous - Output continuous at selected frequency.

Triggered - Output quiescent until triggered by an external or manual trigger, then one cycle is generated at selected frequency.

Gated - Same as triggered mode except waveform is executed for the duration of the gate signal. The last cycle started is completed.

Symmetry - Waveform symmetry continuously adjustable from 10% to 90%, up to 1MHz.

Sweep - The output waveform can be linear internally swept over 100:1 range. The sweep start and stop frequencies can be independently adjusted and the sweep rate can be set from 20mS to 10S.

Modulation - The output can be AM and FM modulated by an internal or external signal. The internal modulation is a 1KHz sinewave.

FREQUENCY CHARACTERISTICS

Range: 0.01Hz to 20MHz in 8 overlapping ranges. Each range capable of over 100:1 frequency change.

Control: The range is selected by up and down keys; frequency within the range is set with coarse and fine controls.

Display: Up to 5 digits (20000 counts) with large and bright LED's, range units (MHz, KHz, Hz and mHz) and decimal point. Display accuracy is 0.01% of reading ± 1 LSB from 100Hz to 20MHz and 2% from 0.01Hz to 99Hz.

OUTPUT CHARACTERISTICS

Amplitude Range: Up to 10Vp-p into 50 ohms (20Vp-p into open circuit).

Amplitude Control: >20dB continuously variable.

Amplitude Attenuator: Two independent 20dB and 40dB attenuators with a total of 60dB attenuation and with $\pm 2\%$ accuracy.

Amplitude Flatness: ± 0.5 dB to 1MHz, ± 3 dB to 15MHz.

Offset Range: Variable up to ± 10 V (± 5 V into 50 ohms). Absolute peak amplitude plus offset limited to ± 10 V (± 5 V into 50 ohms).

Output Impedance: 50 ohms.

Output Protection: The generator main output is non-destructively protected against short circuit to ground or to any voltage practically available in electronics laboratories.

WAVEFORM CHARACTERISTICS

Sine Distortion:

< 0.5% THD, 10Hz to 100KHz.

≤ 25 dBc above 100KHz.

Triangle Linearity: > 98% to 100KHz.

Square Transition Times: <20ns, 10% to 90% at full output amplitude terminated into 50 ohms.

Square Aberrations: <5% of p-p amplitude ± 50 mV.

INPUTS AND OUTPUTS

Trigger In: TTL compatible. External signal width is 50ns minimum with a maximum rate of 10 MHz.

Sync Out: TTL levels square wave with a 50 ohms impedance. Can drive a minimum of 20 TTL loads.

Sweep In-Out: 0-5V input for a up to 100:1 frequency change. In the sweep mode, the sweep voltage is available at this output. The output impedance is 600 ohms and the input is 10 Kohms.

Mod In-Out: The internal 1KHz sinewave is available for external synchronization. The signal amplitude is 2V p-p and 600 ohms output impedance. In EXT modulation mode, a signal applied to this input will modulate the output signal. A 2V p-p signal is required for a 100% AM modulation. The input impedance is 10 Kohms.

COUNTER CHARACTERISTICS

Range: 5Hz to 50MHz, (typical over 70MHz).

Resolution: Autoranging, up to 6 digits.

Accuracy: ± 1 digit ± 20 ppm.

Sensitivity: 30mV RMS.

GENERAL

Power Requirements: 93-128V AC, 185-256V AC switch selectable, 48-66 Hz, 25VA Max.

Dimensions: Height 8.9 cm (3.5 in).

Width 22 cm (8.4in).

Length 31 cm (12 in).

Weight: Aprox. 3 Kg (net).

Operating Temperature: 0°C to +50°C.

Storage Temperature: -20°C + 60°C.

CE Labeled

NOTES

Specifications apply for instrument operating at $25 \pm 5^\circ\text{C}$ ambient temperature and after 30 minutes warm-up period, for a frequency display between 100 and 2000 counts at full amplitude and terminated into 50 ohms.

Specifications are verified according to the performance check procedures in the technical manual.

Specification not verified in the manual are either explanatory notes or general performance characteristics only.

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