Table 1-1. Specifications.

MODEL 3310A/B
PERFORMANCE CHARACTERISTICS

Frequency range: 0.0005 Hz to 5 MHz in decade ranges.

Sine wave frequency response: reference, 1 kHz at full output into 50 ohms.
0.0005 Hz to 50 kHz: ± 1%
50 kHz to 5 MHz: ± 4%

Dial accuracy:
0.0005 Hz to 500 kHz, all functions: ±(1% of setting + 1% of full scale).
500 kHz to 5 MHz, sine, square, triangle: ±(3% of setting + 3% of full scale).
500 kHz to 5 MHz, pulse and ramp: ±(10% of setting + 1% of full scale).

Sine wave distortion (below fundamental at full output):
10 Hz to 50 kHz (on 1 K range): greater than 46 dB (0.5%)
50 kHz to 500 kHz: greater than 40 dB (1%)
500 kHz to 5 MHz: greater than 30 dB (3%)

Triangle symmetry:
0.0005 Hz to 20 Hz: less than 1%
20 Hz to 50 kHz: less than 0.5%

Square wave and pulse response:
less than 30 ns rise and fall times at full output.
less than 35 ns rise and fall times at less than full output.
less than 5% total aberration.

Sync output response:
less than 20 ns rise and fall times.

External Frequency Control

Input requirements:

0 to + 10V ± 1 V for 50:1 increase.
0 to - 10 V ± 1 V for 50:1 decrease.
An ac voltage will FM the frequency about a dial setting within the limits (1 > f < 50) X range knob setting.

CAUTION

Do not apply greater than ± 10 V to either external gate or external trigger input.

3310B (only)

The specifications for the 3310B are identical to those of the Model 3310A except as follows:

NOTE

These specifications apply to the X.0001 through X 1 K ranges only.

External Gate Sensitivity (DC coupled):
Will cause the 3310B to free run when the gate input is held at between + 1 V and + 10 V, or will trigger a single cycle on a positive waveform ⩾1 V but ⩽10 V. To generate a single cycle the period of triggering waveform must be greater than the period of the 3310B output while the duty cycle is less than that of the 3310B output. When the gate signal goes to 0, the 3310A output will stop in the same phase it started.

External Trigger Sensitivity (AC coupled):
Requires a positive going square wave or pulse from 1.4 V p-p to 10 V p-p of lower frequency than that set on the 3310B. (The triggering signal can be dc offset, but its peak amplitude, including dc offset, must not exceed ± 10 V; i.e., [V ac peak + V dc] [⩽10 V peak). Rise time of pulse: < 0.5 μs. Maximum gating rate: 50 kHz.

OUTPUT CHARACTERISTICS

Maximum HIGH outputs
greater than 30 V p-p open circuit.
greater than 15 V p-p into 50 ohms (except pulses greater than 2 MHz).

Maximum HIGH output (pulses greater than 2 MHz):
greater than 24 V p-p open circuit.
greater than 12 V p-p into 50 ohms.

Minimum LOW output:
less than 30 mV p-p open circuit.
less than 15 mV p-p into 50 ohms.

OUTPUT LEVEL control: range greater than 30 dB. HIGH and LOW outputs overlap for a total range of greater than 60 dB; LOW output is 30 dB down from HIGH output.

SYNC output amplitude:
greater than 4 V p-p open circuit.
greater than 2 V p-p into 50 ohms.

Table 1-2. General Information (3310A/B).

Frequency Range: 0005 Hz to 50 kHz (3310B only)

LOW output: 30 dB below HIGH output for any amplitude setting, when LOW and HIGH are equally terminated.

External Frequency Control

Range: 50:1 on any range.

Input requirement: with dial set to low end mark, 0 to + 10 V ± 1 V will linearly increase frequency 50:1. With dial set at 50, 0 to - 10 V ± 1 V will linearly decrease frequency 50:1. An ac voltage will FM the frequency about a dial setting within the limits (1 < f < 50) x range setting.

Sensitivity: 100 mV/minor division (of the frequency dial on any range).

Linearity: ratio of output frequency to input voltage ($\Delta V/\Delta F$) will remain constant within 0.5%.

Input impedance: 10 kΩ.

Sine Wave Distortion (below fundamental):
0.0005 Hz to 10 Hz: greater than 40 dB (1%)

Triangle and Ramp Linearity:
0.0005 Hz to 50 kHz: less than 1%.

DC Offset

Amplitude: ± 10 V open circuit, ± 5 V into 50 ohms, continuously adjustable.

NOTE: maximum (V acp + V dc) is ± 15 V open circuit, ± 7.5 V into 50 ohms.

Input impedance (3310B only):
External Trigger: 390 pF in series with 500 ohms
External Gate: 500 ohms

Modes of Operation (3310B only):

Single Cycle: EXT TRIGGER (ac coupled) requires a potitive-going square wave or pulse from 1 V p-p to 10 V p-p of lower frequency than that set on the 3310B; the triggering signal can be dc offset, but (V ac peak + V dc) ⩽ ± 10 V. EXT GATE (dc coupled) will trigger a single cycle on any positive waveform ⩾1 V but ⩽10 V which has a period greater than the period of the 3310B output, and a duty cycle less than the period of the 3310B output. The gate signal cannot exceed 10 V. Applies to X.0001 thru X1K ranges only.
NOTE: single negative pulses cannot be produced.

Multiple cycle: MANUAL TRIGGER will cause the 3310B to free run when depressed. When the trigger button is released, the waveform will stop on the same phase as it started. EXT GATE will cause the 3310B to free run when the gate is held at between + 1 and + 10 V. When the gate signal goes to zero, the 3310B will stop on the same phase as it started. For accurate gating, a square wave or square pulse is recommended. Applies to X.0001 thru X1K ranges only.

Start–stop phase: the start–stop phase can be adjusted over a range of approximately ± 90° using the front panel control.

Manual Trigger: Causes the 3310B to free run when depressed. When the trigger button is released, the waveform will stop in the same phase it started.

Waveforms: sine, square, triangle, positive pulse, negative pulse, positive ramp, and negative ramp. Pulses and ramps have 15% or 85% duty cycle, SYNC waveform is a square wave for symmetrical functions, pulse for pulse and ramp functions.

Power requirements: 115 V or 230 V ± 10%, 48 Hz to 440 Hz, less than 20 VA.

Operating temperature: 0 to 55° C.

Accessories available:
Combining case: -hp- 1051A
Rack adapter: -hp- 5060-0797
Filler strip: -hp- 5060-0105