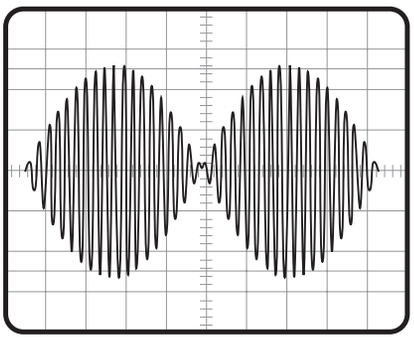
Model 395

continuous range from 1 mHz to 20 MHz. Triggered and manual sweep operations also can be performed. Seven sweep modes, with linear and logarithmic sweep spacing, a TTL level sweep marker, and a ramp output give you the flexibility you need. There's even a pen lift function for use with chart recorders.

Modulation Source. If you do communi-



cation or audio design and test, Model 395 offers internally generated amplitude modulation and frequency modulation, as well as externally controlled amplitude modulation in two modes.

Convenience and Versatility. Wavetek designed Model 395 for user convenience. The user screens are tailored to the particular jobs you want to perform, such as setting up a pulse generator or a noise function.

From any screen, you can access help screens that guide you in using the instrument's extensive capabilities. And you can store at least 10 instrument set-ups so you don't have to spend valuable time duplicating past effort.

Low cost of ownership is assured by the high reliability and ease of calibration of the Model 395. Calibration is performed with covers on in less than 15 minutes, under front panel or remote control.

Specifications

Specifications apply within the specified environmental conditions after a 20 minute warm-up.

Amplitude

Range: 10 mVp-p to 10 Vp-p into 50 Ω.
Resolution: 3.0 digits.
Accuracy: 25 ±10° C: ±(1% + 2 mVp-p).

Offset

Range: ±5 V into 50 Ω.
Resolution: 3 digits.
Accuracy: 25 ±10° C: ±(1% + 20 mV).

Standard Waveforms

Sine, square, triangle, pulse, pulse trains, DC, positive/negative ramp, positive/negative haversine, (sin x)/x, and five noise functions.

Frequency (Sine and Haversine)
Range: 1 µHz to 40 MHz.
Resolution: (Resolution limited by 1 µHz.).
≤ 20 MHz: 10 digits; ±30 ppm.
> 20 MHz: 4 digits; ±100 ppm.

Frequency (Square)
Range: 1 µHz to 50 MHz.
Resolution: 4 digits; ±100 ppm.

Frequency (Triangle)
Range: 1 µHz to 10 MHz.
Resolution:
≤ 100 kHz: 10 digits; ±30 ppm.
> 100 kHz: 4 digits; ±100 ppm.

Frequency (Ramp)
Range: 1 µHz to 2 MHz.
Resolution:
≤ 100 kHz: 10 digits; ±30 ppm.
> 100 kHz: 4 digits; ±100 ppm.

Frequency (Sin (x)/x)
Range: 1 µHz to 1 MHz
Resolution:
≤ 100 kHz: 10 digits; ±30 ppm
> 100 kHz: 4 digits; ±100 ppm

Waveform Quality
Square Transition Time: < 8 ns.
Square Aberrations: < (5% + 20 mV).
Sine Distortion:
< 100 kHz: 0.15% (-56 dBc).
< 5 MHz: No harmonic > -35 dBc.

Arbitrary Waveforms

Sampling Frequency
Range: 100 mS/s to 100 MS/s.
Resolution: 4 digits.
Accuracy: ±100 ppm.

Waveform Memory Size
64 k points; 256 k points optional.

Minimum Waveform Size: 10 points.
Vertical Resolution: 12 bits.
Output Filters (Selectable): 20 MHz Elliptic (8 pole), 40 MHz Elliptic (8 pole), 10 MHz Bessel (2 pole), no filter.
Waveform Sequencing: Up to 4 waveforms can be linked. Each waveform can have a repeat (loop) count of up to 65,535 or run continuously, conditional upon an external trigger event (repeat until event true). Additionally, a sequence of waveforms can be repeated up to 524,287 times or run continuously.

Pulse Waveforms

Up to 10 pulses may be independently programmed in a pulse pattern. Parameters that can be independently programmed for each pulse are rise time, fall time, width, delay, and amplitude.

For Periods ≤ 655 µs:
Range: 100 ns to 655 µs.
Resolution: 20 ns.
Accuracy: ±100 ppm.
Rise/Fall:
Fixed: 8 ns.
Variable: 50 ns to 500 µs.
Resolution: 8 ns.
Accuracy: ±0.1% ±5 ns
(< 8 ns for fixed rise/fall).
Delay:
Range: -600 to +600 µs.
Resolution: 10 ns.
Accuracy: ±0.1% ±5 ns.
Width:
Range: 10 ns to 655 µs.
Resolution: 10 ns.
Accuracy: ±0.1% ±5 ns.

For Periods > 655 µs:
Range: 655 µs to 10 s.
Resolution: 4 digits.
Accuracy: ±100 ppm.
Rise/Fall: 0.1% to 79% of period (or < 8 ns).
Delay: -99.9% to +99.9% of period.
Width: 0.002% to 99.9% of period.

Noise

White (Analog) Noise:
Uniform frequency distribution with programmable noise bandwidth.
Noise BW Range: 10 mHz to 10 MHz.
Sequence Length:
Standard: 2^n - 1, n = 6 to 16.
With Option 002: 2^n - 1, n = 6 to 17.

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Digital Noise:
Digital noise provides a random 0,1 pattern with programmable sequence length.
Clock Range: 10 mHz to 100 MHz.
Sequence Length:
Standard: $2^n - 1$, n = 6 to 16.
With Option 002: $2^n - 1$, n = 6 to 17.

Comb:
Uniformly distributed frequency spectra within a well-defined frequency band.
Start/Stop Range: 1 Hz to 10 MHz.
Number of Lobes: 3 to 256.

Signal-Plus-Noise, Signal-Plus-Comb:
Adds analog noise or comb to any standard or arbitrary waveform with precise, controlled noise-to-signal ratio.
N/S Ratio: 1% to 99% Vp-p.
Resolution: 1%.

Operational Modes

Continuous: The selected waveform is output continuously at the programmed frequency.
Gated: The selected waveform is output continuously at the programmed frequency while the selected trigger signal is true.
Triggered: Upon transition of the selected trigger from false to true, the number of cycles specified by the count is output at the specified frequency. Burst count is programmable from 1 to 1,048,575. (One to 524,287 for waveform sequence operation.)
Sweep: Frequency sweep.

Triggering

Trigger Sources: 4 trigger sources: External TRIG IN BNC, internal trigger generator, front panel manual trigger key, and remote trigger command.
Trigger Level: The trigger level at the TRIG IN BNC is programmable.
Range: -10 V to +10 V.
Trigger Slope: Positive or negative.
Internal Trigger Source
Range: 200 ns to 1000 s.
Resolution: 100 ns limited by 6 digits.

Sync Output

Sync output can be selected from among the following 7 sources: waveform sync, trigger signal, burst done, loop done, sweep marker, position marker, pen lift.

Modulation

For both standard and arbitrary waveforms.

Internal Frequency Modulation

Carrier Signal
Source: Sine Wave
Center Frequency Range: 0.01 Hz to 40 MHz
Deviation Frequency Range: 0.01 Hz to 40 MHz.
Note: Center frequency plus deviation frequency must be ≤ 40 MHz.
Modulating Signal
Source: Any waveform except noise, AM, FM, or pulse.
Modulation Frequency Range: 0.01 Hz to 40 MHz.

Internal Amplitude Modulation

Modes
AM: 0 to 200% modulation
SCM: 200% modulation
Carrier Signal
Source: Sine wave
Carrier Frequency Range: 0.01 Hz to 40 MHz
Modulating Signal
Source: Any waveform except noise, AM, FM, or pulse.
Modulation Frequency Range: 0.01 Hz to 40 MHz.

External Amplitude Modulation

Normal AM: 0 to 100% modulation.
Suppressed Carrier Modulation (SCM): ±100% modulation.

Signal Summing

External signals can be summed directly to the Model 395 output through the SUM IN BNC.

Sweep

Standard and arbitrary waveforms can be swept.
Sweep Start/Stop
Range: 1 mHz to 20 MHz.
Resolution: 4 digits limited by 1 mHz.
Sweep Time
Range: 30 ms to 1000 s.
Resolution: 1 ms.
Sweep Types:
Sweep off, continuous, continuous with reverse, triggered, triggered with reverse, triggered with hold, triggered with hold and reverse, and manual.
Sweep Spacing:
Linear and logarithmic.

Outputs

Reference Output (50 Ω):
TTL level into open circuit; > 1.2 Vp-p .
Main Output (50 Ω):
Output may be selected on or off.
A**M Input (2.5 kΩ):** ±2.5 V.
Sweep Output (1 kΩ): 0 to 10 V ramp proportional to completion of sweep.
Sync Output (50 Ω)
Low Level: < 0.4 V into 50 Ω.
High Level: > 2.0 V into 50 Ω.
Rise/Fall Time: < 7 ns.

Inputs

Trigger Input (2 kΩ)
Level: ±10 V (programmable).
Maximum Frequency: 10 MHz.
Sum Input (600 Ω)
Level: ±5 Vp-p max.
Bandwidth: > 30 MHz.
Protection: Over-voltage to ±10 V.
Reference Input (5 kΩ)
Level: 1 Vp-p minimum, 10 Vp-p maximum; 50 Vdc maximum.
Frequency: 10 MHz ±5%.

General

Remote Operation
RS-232 interface is standard. IEEE-488.2 (SCPI compatible) GPIB interface is optional.
Environment
Designed to MIL-T-28800C Class 5.
Temperature Range: Operates from 0° to +50°C: -20° to +70°C for storage.
Dimensions: 35.6 cm (14.00 in) wide, 13.3 cm (5.22 in) high, and 39.4 cm (15.5 in) deep.
Weight: Approximately 7.7 kg (17 lb) net; 10.0 kg (22 lb) shipping.
Power: 90 to 132, 198 to 252 volts rms; 48 to 440 Hz; 1 phase; < 80 VA.

Ordering Information

Model 395: 100 MHz synthesized Arbitrary Waveform Generator with serial cable and Quick Start Demo Disk.
Option 001: IEEE-488 Interface/Direct DSO Waveform Transfer
Option 002: 256k Extended Memory
Option 004: Rack Mount Kit
Model 485: WaveForm DSP, Windows-based software for creating and editing complex wave forms.