VXIbus 50 MS/s Arbitrary Waveform Synthesizers

- *Up to 50 MS/s Sampling with 12 Bit Resolution*
- *Up to 512k Horizontal Points*
- *Versatile Intermodule Triggering, Summing, and Phase Control*
- *Up to 450 User-Defined Waveforms*
- *Waveform Linking and Looping of Up to 4,096 Segments (1396 only)*
- *16 Bit Digital Output (1396 only)*
- *Floating output (1385 only)*
- *Frequency Sweep and Hopping*
- *SCPI-Compatible Command Language*
- *MATE/CIIL Option (1395 only)*
- *Single-Slot, C-Size VXIbus Message-Based Device*

Wavetek models 1396, 1395 and 1385 are ideal for applications requiring standard function generator or arbitrary waveform capability. Model 1395 is the basic model. Model 1396 adds advanced waveform sequencing capability of up to 4,096 waveform segments for complex waveform generation. It also provides a 16 bit digital output. Model 1385 has advanced waveform sequencing as well as a floating main output.

Standard sine waves are available to 20 MHz and square waves to 25 MHz. Arbitrary waveforms with 12 bit vertical resolution may be generated at sampling frequencies up to 50 MS/s.

For multichannel applications, multiple units may be phase locked with programmable phase offsets. Waveforms from multiple modules may be summed using the VXI backplane sumbus (1395 and 1396 only). Versatile intermodule triggering capabilities are provided.

In addition to built-in frequency sweep capability, a frequency list function can be used for custom sweeping or frequency hopping applications.

To simplify programming and help reduce programming time, all three models support dynamic configuration, are message based, SCPI compatible and are provided with VXIplug&play drivers.

Specifications

Standard Waveforms

Sine, square, triangle, ramp, haversine, random, (sine x)/x, and DC.

Frequency

Range:
Sine and haversine: 1 mHz to 20 MHz.
Square: 1 mHz to 25 MHz.
All others: 1 mHz to 2 MHz.
Resolution: 8 digits limited by 1 mHz (5 digits above 20 MHz and in noncontinuous modes).
Accuracy: Same as VXI CLK10 backplane signal (±0.01% typical).

Waveform Quality

Sine Distortion (Elliptic filter selected):

Freq	Ampl	Harmonic Level
< 100 kHz	10 Vp-p	< -60 dBc
< 100 kHz	> 10 Vp-p	< -55 dBc
< 5 MHz	10 Vp-p	< -45 dBc
< 5 MHz	> 10 Vp-p	< -40 dBc
20 MHz	10 Vp-p	< -35 dBc
20 MHz	> 10 Vp-p	< -28 dBc

Square Transition Time: < 9.5 ns.
Square Aberrations: < 5% + 20 mV.
Square Wave Duty Cycle Control (1396 and 1385)
Range: 0 to 100%.
Resolution: 3½ digits.
Triangle Wave Symmetry Control (1396 and 1385)
Range: 0 to 100%.
Resolution: 3½ digits.

Arbitrary Waveforms

Sampling Frequency:
Range: 0.1251 S/s to 50 MS/s.
Resolution: 5 digits limited by 100 µS/s.
Accuracy: Same as VXI CLK10 (±0.01% typical).
Horizontal Resolution: 1396 and 1385:
128k (512k optional)
1395: 32k (128k/512k optional)
Vertical Resolution: 12 bits.
Waveform Filters: 20 MHz, 4-pole Bessel and 20 MHz, 7-pole, 6-zero elliptic.

Amplitude

Range (1396 and 1395): 15 mV to 15 Vp-p into 50Ω (30 mV to 30 Vp-p into > 10 kΩ).
Range (1385):15 mv to 11 Vpp into 50Ω (30 mV to 22 Vpp into > 10kΩ).
Resolution: 3.5 digits.
Accuracy: ±(1% of setting).

Models 1396, 1395 and 1385

Offset
Range (1396 and 1395): -7.5 to +7.5 V into 50Ω (-15 V to +15 V into > 10 kΩ). Peak amplitude + absolute offset must be ≤ 7.5 V into 50Ω.
Range (1385): -5.5V to +5.5V into 50Ω (-11V to +11V into > 10kΩ). Peak amplitude + absolute offset must be ≤5.5V into 50Ω.
Resolution: 3.5 digits.
Accuracy: ±(1% of setting).

Operating Modes
Continuous, sweep, triggered, gated, linked sequence, and frequency list.
Triggered: One to 1,048,576 cycles on trigger input (limited to 10 MHz).
Gated: Waveform cycle started on trigger high, completed after low.
Linked Sequence (1396 and 1385): Linking, looping, and advancing of up to 4,096 waveform segments. Allows creation of long and complex waveform sequences.
Linked Sequence (1395): Linking, looping and advancing of up to 4 wave form segments.
Frequency List: Up to 1024 programmable frequencies. Can be output phase continuously on trigger command. (Maximum rate 2 kHz).

Frequency Sweep:
Range: 1 mHz to 20 mHz.
Time: 30 ms to 1000 sec.
Modes: Continuous or triggered up, down, or up/down, and triggered sweep and hold.
Spacing: Linear or logarithmic.

Triggering:
Sources: External, internal, TTLTRG0-7, adjacent modules via local bus and word serial command.
Internal Trigger Frequency Range: 10 µHz to 5 MHz.

Modulation
AM & SCM.
Range: 0 to 100% on external voltage.
Bandwidth: DC to 500 kHz.

Multimodule Summing (1395 and 1396)
Input from the VXI SUMBUS may be summed with the output, or the programmed output may be sent to the SUMBUS.

Multimodule Phase Control
Adjacent modules may be phase synchronized on standard waveforms.
Phase Resolution: 0.1°.
Phase Accuracy: ±(0.05° + 5 ns).

Outputs
Main Out (50Ω): Main waveform output, programmable on/off. 1385 output floats ±10V.
Sync/Horizontal Sweep (600Ω): TTL level synchronous with main output waveform, or a 0 to 10 V ramp proportional to sweep frequency.
Position Out (50Ω): TTL-level marker, selectable for each waveform point.
Clock Out (50Ω): TTL level, sampling frequency clock output.
Digital Output (Model 1396): 16 bit differential ECL updated at up to 50 MHz.
Aux Analog Output (Model 1396,50Ω): ±1.0 V output updated for each segment in a sequence.

Inputs
Clock In (2 kΩ): TTL level, selectable as main waveform clock.
Trig In (2 kΩ): TTL level, triggered on rising or falling edge.
AM In (10 kΩ): Used for AM and SCM input.

VXI Interface
Device Class: DC, Message-based, SCPI compatible.
TTLTRG0-7: Programmable as trigger input, output, position out, burst- or loop-complete, or sequence start/advance input.
ECLTRG0-1: Programmable as clock input or output.
SUMBUS (1396 and 1395): Full driver and receiver support. Accuracy ±5% typical.
A24 Shared Memory: Supports high-speed waveform transfers, and fast frequency updates.

General
Operating Temperature: 0° to 50° C; 25° ±10° C for specified operation.
Dimensions: Single-slot, C-size VXI module.
Weight: < 1.8 kg (3.9 lb).
Power: < 35 Watts.

Ordering Information
Model 1396: VXIbus 50 MS/s Arbitrary Waveform Synthesizer with advanced sequencing and 16-bit digital output and VXIplug&play Driver.
Option 001: 512k Extended Waveform memory.

Model 1395: VXIbus 50 MS/s Arbitrary Waveform Synthesizer and VXIplug & play Driver.
Option 001: 128k Extended Waveform memory.
Option 002: 512k Extended Waveform memory.

Model 1385: VXIbus 50 MS/s Arbitrary Waveform synthesizer with advanced sequencing floating main output and VXIplug&play Driver.
Option 001: 512k Extended Waveform memory.

Model 1395 MATE: MATE Compatible VXIbus 50 MS/s Arbitrary Waveform Synthesizer (conforms to CIIL Standard 2806763 Rev. C).
Option 001: 128k Extended Waveform memory.
Option 002: 512k Extended Waveform memory.

1396, 1395, 1385 Comparison Chart

	1396	*1395*	*1385*
Maximum Amplitude into 50 ohms	15 Vpp	15 Vpp	11 Vpp
Waveform Memory	128k (512k opt.)	32k (128k/512k opt.)	128k (512k opt.)
Maximum Sequencing Segments	4,096	4	4,096
16 Bit Digital Output	yes	no	no
Floating Output	no	no	yes
Sine/Square Symmetry Control	yes	no	yes