3400A Specification List

Display	Graph mode for visual verification of signal settings		
Capability	Standard waveforms	Sine, Square, Ramp, Triangle, Pulse, Noise, DC	
	Built-in arbitrary waveforms	Exponential Rise and Fall, Negative ramp, Sin(x)x, Cardiac	

WAVEFORM CHARACTERISTIC

	Frequency	1 μHz to 50MHz	
	Amplitude Flatness[1][2] (Relative to 1K)	0.1dB(<100KHz) 0.15dB(<5MHz) 0.3dB(<20MHz) 0.5dB(<50MHz)	
Sine	Harmonic distortion[2][3] (unit: dBc)	DC to 20 KHz -70(<1Vpp) -70(≥1Vpp) 20 KHz to 100 KHz -65(<1Vpp) -60(≥1Vpp) 100 KHz to 1 MHz -50 (< 1Vpp) -45 (≥1Vpp) 1 MHz to 20 MHz -40 (<1Vpp) -35 (≥1Vpp) 1 MHz to 50 MHz -35 (<1Vpp) -30 (≥1Vpp)	
	Total Harmonic distortion[2][3]	DC to 20 KHz, Output≥0.5Vpp THD+N≤0.06%	
	Spurious[2][4] (non-harmonic)	DC to1 MHz -70 dBc 1 MHz to 50 MHz -70 dBc + 6 dB/octave	
	Phase Noise (10K Offset)	-115/dBC/Hz, typical when f ≥1MHz, V≥0.1Vpp	
	Frequency	1 μHz to 25 MHz	
	Rise/Fall time	< 10 ns	
	Overshoot	< 2%	
Square	Variable Duty Cycle	20% to 80% (to 10 MHz) 40% to 60% (to 25 MHz)	
	Asymmetry	1% of period + 5 ns (@ 50% duty)	
	Jitter (RMS)	200 ps when f ≥ 1MHz, V ≥ 0.1Vpp	
Ramp, Triangle	Frequency	1 μHz to 200 KHz	
	Linearity	< 0.1% of peak output	
	Symmetry	0.0% ~ 100.0%	
	Frequency	500 μHz to 10 MHz	
	Pulse width	20 ns minimum 10 ns res. (period ≤ 10s)	
Pulse	Variable Edge Time	< 10 ns to 100 ns	
	Overshoot	< 2%	
	Jitter (RMS)	200 ps when f ≥ 50KHz, V ≥ 0.1Vpp	
Noise	Bandwidth	20 MHz typical	
	Frequency	1 μHz to 10 MHz	
	Length	2 to 256 K	
	Resolution	14 bits (including sign)	
	Sample Rate	125 MSa/s	
Arbitrary	Min Rise/Fall Time	30ns typical	
	Linearity	< 0.1% of peak output	
	Settling Time	< 250ns to 0.5% of final value	
	Jitter(RMS)	6ns +30ppm	
	Non-volatile Memory	4 waveforms × 256K Points	

[1] add 1/10th of output amplitude and offset spec per °C for operation outside the range of 18°C to 28°C
[2] Autorange enabled
[3] DC offset set to 0V
[4] spurious output at low amplitude is -75 dBm typical
[5] add 1 ppm/°C average for operation outside the range of 18°C to 28°C
[6] FSK uses trigger input (1 MHz maximum)
[7] Sine and square waveforms above 10 MHz are allowed only with an "infinite" burst count

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COMMON CHARACTERISTIC

Frequency	Resolution	1μHz	
Amplitude	Range	10mVpp to 10Vpp in 50Ω 20mVpp to 20Vpp in Hi-Z	
	Accuracy[1][2] (at 1kHz)	±1% of setting ± 1mVpp	
	Units	Vpp, Vrms, dBm	
	Resolution	4 digits	
DC Offset	Range (Peak AC +DC)	±5V in 50Ω ±10V in Hi-Z	
	Accuracy[1][2]	±2% of offset setting ±0.5% of amplitude setting ±2mv	
	Resolution	4 digits	
Main Output	Impedance	50 Ω typical	
	Isolation	42 Vpk maximum to earth	
	Protection	short-circuit protected; overload automatically disables main output	
Internal Frequency Reference	Accuracy[5]	±10ppm in 90 days ±20ppm in 1 year	
External Frequency reference	Standard /Option	Standard	
External Frequency Input	Lock Range	10 MHz ± 500 Hz	
	Level	100mVpp ~5Vpp	
	Impedance	1KΩ typical, AC coupled	
	Lock Time	< 2 Sec	
External Frequency Output	Frequency	10 MHz	
	Level	632mVpp (0dBm), typical	
	Impedance	50Ω typical, AC coupled	
Phase Offset	Range	-360° to +360°	
	Resolution	0.001°	
	Accuracy	8ns	

Modulation

Modulation Type	AM, FM, PM, FSK, PWM, Sweep and Burst		
AM	Carrier	Sine, Square, Ramp, Arb	
	Source	Internal / external	
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb	
	Frequency (Internal)	2mHz to 20KHz	
	Depth	0.0% ~ 120.0%	
FM	Carrier	Sine, Square, Ramp, Arb	
	Source	Internal / external	
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb	
	Frequency (Internal)	2mHz to 20KHz	
	Deviation	DC ~ 25MHz	
PM	Carrier	Sine, Square, Ramp, Arb	
	Source	Internal / external	
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb	
	Frequency (Internal)	2mHz to 20KHz	
	Deviation	0.0° to 360°	
PWM	Carrier	Pulse	
	Source	Internal / external	
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb	
	Frequency (Internal)	2mHz to 20KHz	
	Deviation	0% ~ 100% of pulse width	
FSK	Carrier	Sine, Square, Ramp, Arb	
	Source	Internal / external	
	Internal Modulation	50% duty square	
	Frequency (Internal)	2mHz to 20KHz	
External Modulation Input[6]	Voltage Range	±5V full scale	
	Input Resistance	8.7KΩ typical	
	Bandwidth	DC to 20KHz	
SWEEP	Waveforms	Sine, Square, Ramp, Arb	
	Type	Linear or logarithmic	
	Direction	up or down	
	Sweep Time	1 ms ~ 500 Sec	
	Trigger	Internal, External or Manual	
	Marker	falling edge of sync signal (programmable frequency)	
BURST[7]	Waveforms	Sine, Square, Ramp, Triangle, Noise, Arb	
	Type	Counted, Infinite	
	Start/Stop Phase	-360° to +360°	
	Internal Period	1μS ~ 500Sec	
	Gated Source	External trigger	
	Trigger Source	Internal , External or Manual	
Trigger Input	Level	TTL compatible	
	Slope	Rising or Falling (Selectable)	
	Pulse width	> 100 ns	
	Impedance	> 10KΩ, DC coupled	
	Latency	< 500 ns	
Trigger Output	Level	TTL compatible into ≥ 1 kΩ	
	Pulse width	> 400 ns	
	Output Impedance	50 Ω typical	
	Maximum rate	1MHz	
	Fan-out	≤ 4 Protest G5100As	

Pattern Mode CHARACTERISTIC

Clock	Maximum rate	50MHz
Output	Level	TTL compatible into ≥ 2 kΩ
	Output Impedance	110 Ω typical
Pattern	Length	2 to 256 K

General

Power Supply	CAT II 110 - 240V AC ±10%	Dimensions	107 (H) x 224 (W) x 380 (D) mm
Power Cord Freq.	50Hz to 60Hz	Weight	4.08 Kg
Power Consumption	50VA max	Safety Designed to	IEC61010-1,EN61010-1,UL61010-1
Operating Environment	0°C to 50°C	EMC Tested to	EN61326, IEC61000-3, IEC61000-4
Storage Temperature	-38°C to 70°C	Warm-up Time	1 hour
Interface	Standard: USB, LAN. (Optional) GPIB	Warranty	1 Year
Language	SCPI-1993, IEEE-488.2	Accessory	M3500-opt04 GPIB Card

Area Agency Information:

ARRAY
3400A

50 MHz Function / Arbitrary Waveform Generator

Features:

- 50 MHz Sine, 25 MHz Square & 10 MHz Arbitrary Waveforms
- 1 μHz Frequency Resolution
- 14-bit, 125 MSa/s, 256 K-point Arbitrary Waveform
- Pulse, Ramp, Triangle, Noise & DC Waveforms
- Linear & Logarithmic Sweeps & Burst Operation
- AM, FM, PM (PSK), FSK & PWM Modulation Types
- Amplitude Range, 20 mVpp to 20 Vpp into Open Circuit
- Remote Control via USB, LAN or Opt. GPIB
- Graph Mode for Visual Verification of Signal Settings
- 16-bit Data Output via Pattern Out
- Free Waveform Editor Software

Pattern Out

Great Time Base

3400A, 50MHz Function/Arbitrary Waveform Generator

※Note: Specifications are subject to change without notice due to design improvements.

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Easy-to-use Functions

Users can easily use the following functions.

- Internal modulations of AM, FM, PM (PSK), FSK & PWM for waveform adjustment.
- Built-in linear and logarithmic sweeps from 1 ms to 500 s.
- The burst mode with selectable numbers of cycles per period of time.
- The remote control via USB, LAN or Opt. GPIB interface.
- The programmability by SCPI commands under the remote control connection.
- Precise phase adjustments and calibrations acceptable from the front panel or via a PC.

Friendly Operation

The 3400A's front-panel operation is simple and user friendly. Users can enter all functions with a single key or two, and use knob or numeric keypad to adjust frequency, amplitude, offset and other parameters. can directly input voltage values in Vpp, Vrms, dBm or high & low levels, as well as Hertz (Hz) or second values in Timing.

Data Transmission via Pattern Out

The WavePatt software adheres to the waveform editor. It allows users creating and storing 16-bit data in the 3400A's nonvolatile or volatile memory. Then, according to application purposes users can transmit data via Pattern Out, located in rear panel.
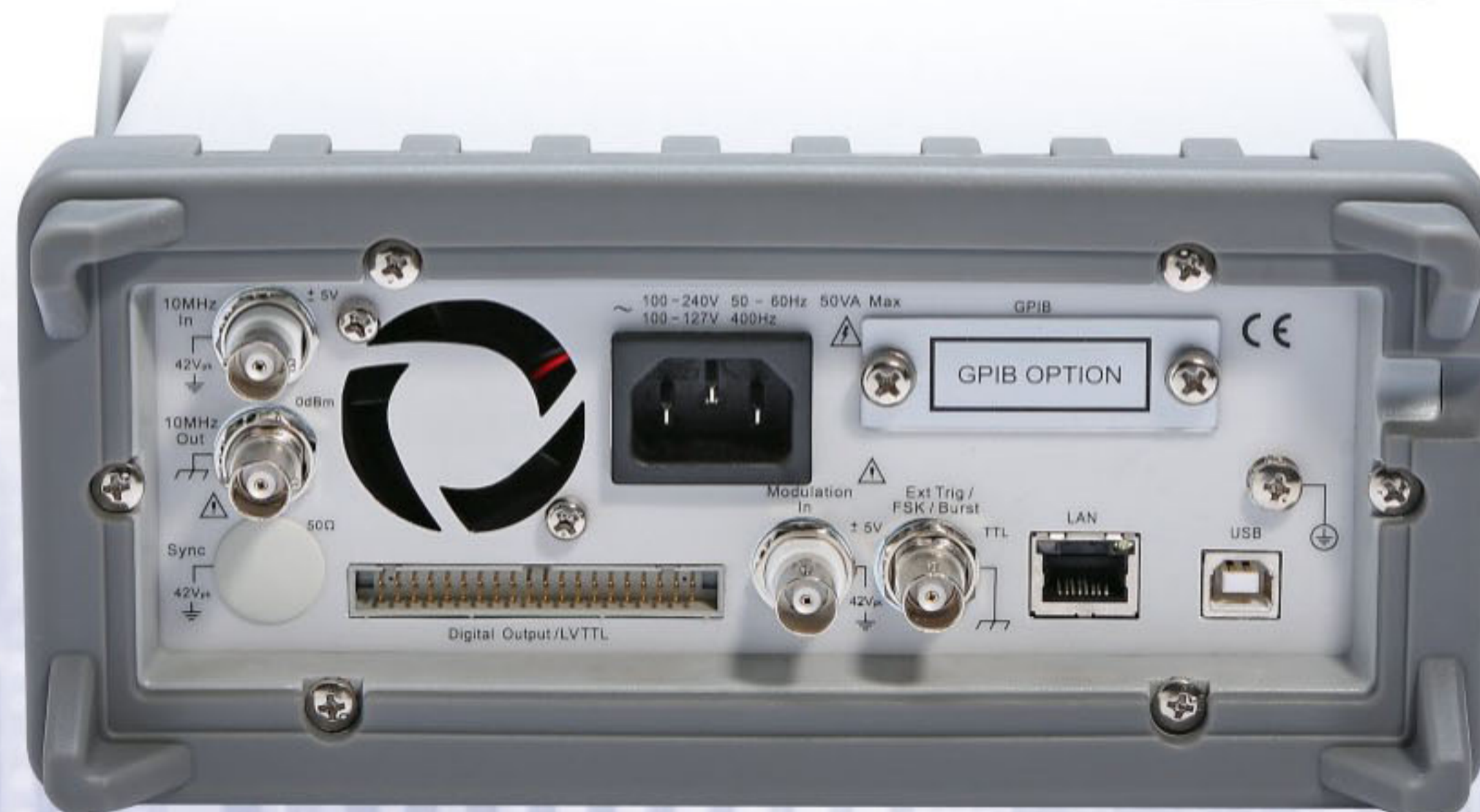
Great Functions and Waveforms

The 3400A can create stable, precision , clean and low distortion sine waves by DDS (Direct Digital Synthesis) Technology. With fast rise and fall times up to 25 MHz of square waves and linear ramp waves up to 200KHz, the 3400A also can reach users' demand on waveforms.

Pulse Generation

The 3400A can generate variable-edge-time pulses up to 10MHz. With variable period, pulse width and amplitude the 3400A is perfectly suited to wide applications requiring a flexible pulse signal.

Custom Waveform Generation

The 3400A can generate complex custom waveforms. With 14-bit resolution, and 125 MSa/s sampling rate, the 3400A offers users to flexibly create waveforms. It also allows users to store up to 5 waveforms, 4 (4 x 256K Points) in nonvolatile memory and 1 in volatile memory.

In addition, the 3400A's Waveform Editor Software can ease users to create, edit and download complex waveforms. In addition, by the software users can get waveforms from Agilent Oscilloscope MSO 8104.
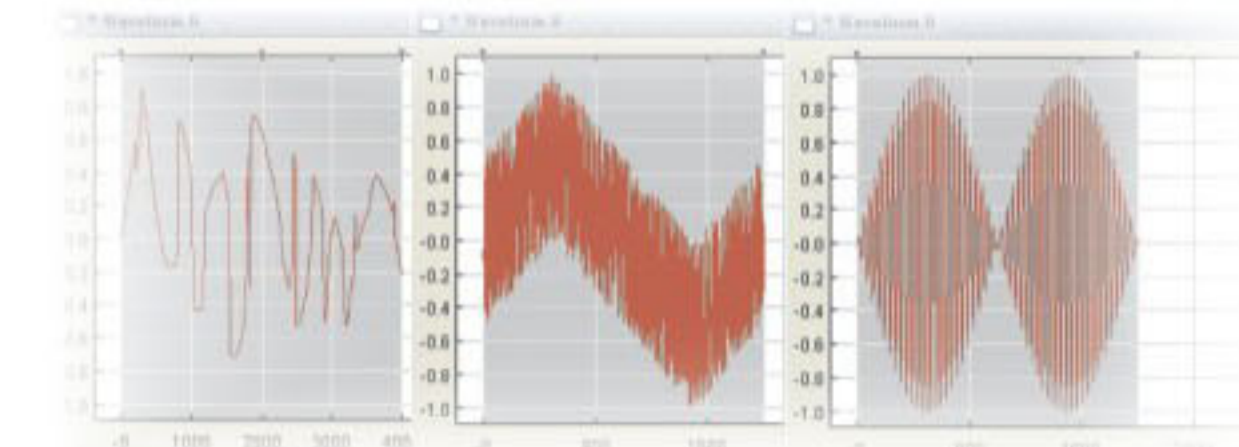
Support External Frequency Synchronization

The 3400A's external frequency reference allows users synchronizing an external 10 MHz clock to another 3400A or to any other unit which can support 10-MHz-frequency-input function.