

2400AL Series

Microwave Synthesizer

Features

- Optimized for ATE
- WaveMaker Software
- Faster Programming Speed
- Low Phase Noise
- Fast Frequency Switching

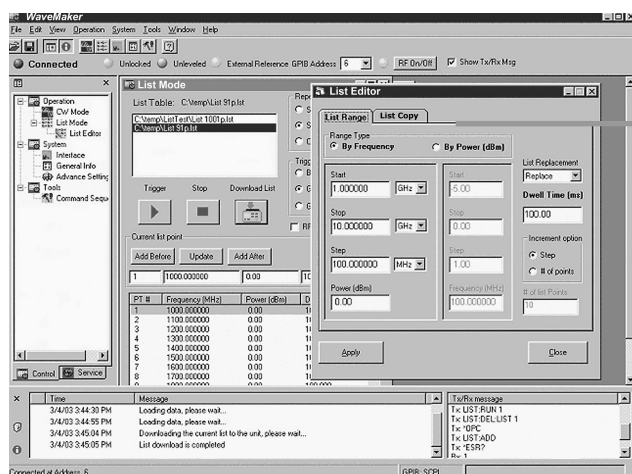
Models

Frequency Range

2408AL	10 MHz to 8 GHz
2420AL	10 MHz to 20 GHz
2440AL	10 MHz to 40 GHz

Available Options and Accessories

26	Step Attenuator
28	High Stability 10 MHz Reference
40	0.1 Hz Resolution
41	Add Front Panel Display



Optimized for ATE

The 2400AL model is optimized for your ATE environment offering the features you truly needed but always had a hard time getting. With the 2400AL, ATE integrators now have a system source specifically designed to match their unique performance needs. The 2400AL works seamlessly with other instruments. It includes hardware triggering and synchronization signals with programmable delay to allow coordination with other test products in your system. Emulating other industry-standard microwave synthesizers can be accommodated, making the 2400AL Series the ideal choice for upgrading older systems.

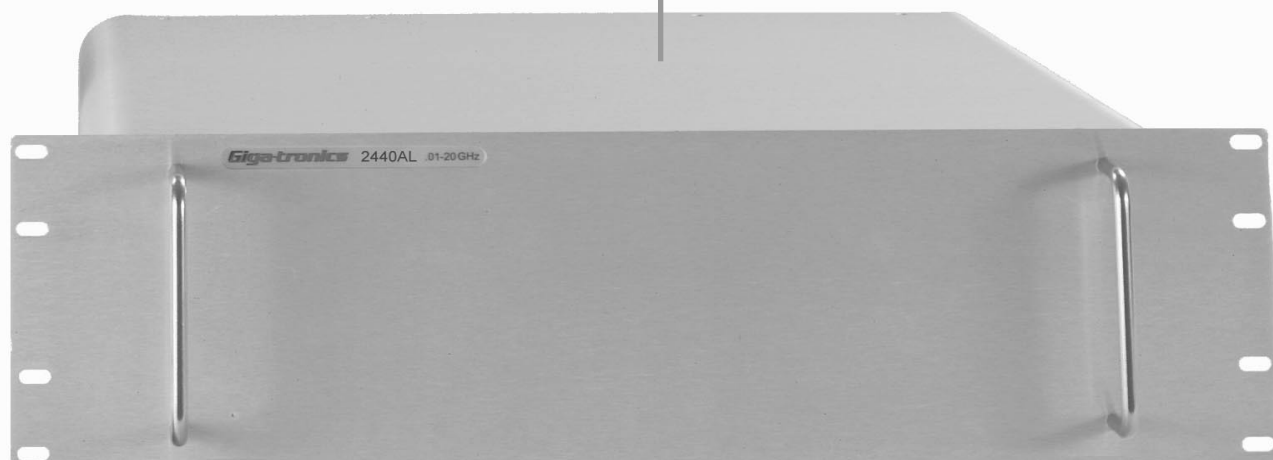
We recognize the special needs that you have in the ATE environment. That is why we think it is important to offer you the convenience of ordering exactly what you need at the right price. The 2400AL standard features include a 3U rack mountable microwave synthesizer with rack ears, rear RF-output, GPIB-interface, and a blank front panel-all for one competitive price.

WaveMaker Software

The 2400AL includes the new WaveMaker software package, designed to integrate seamlessly with your other instruments and reduce system integration times. WaveMaker comes equipped with a full-featured plug-and-play driver and soft front panels to provide ATE system integrators everything they need to get up and running fast. A comprehensive LIST mode, Command-Line interpreter with script and loop capability, and Auto-Programming capability, are just a few of the features that test system programmers will appreciate when developing and debugging Test Program Sets.

Faster Programming Speed

The 2400AL Series integrated with the WaveMaker is designed to simplify testing, making lengthy and repetitive tasks, such as list downloading, faster and more efficient. Using any laptop or desktop PC, engineers can download more than 2,000 list points in seconds right from the click of the mouse. Operating under the familiar Windows 2000 or Windows XP operating systems, the 2400AL can be linked to a variety of other common applications development environments, including Visual Basic, Visual C++, and NI LabWindows.



2400AL Series

Technical Specifications- Preliminary

All specifications apply over a 0°C to +55°C range after 30 minutes of warm-up time unless otherwise stated.

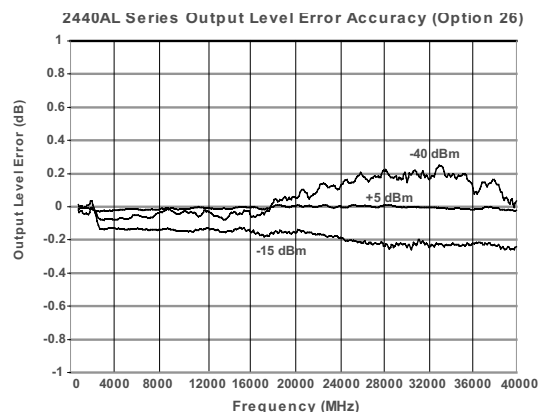
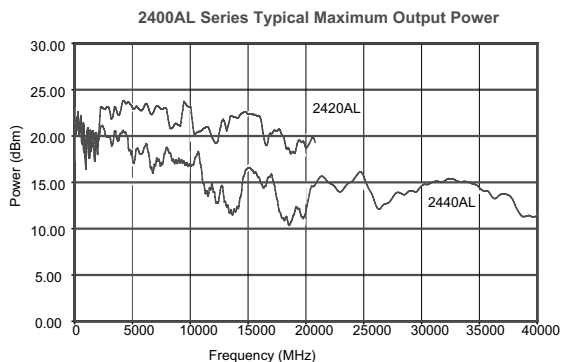
Frequency

Accuracy:	Same as time-base
Resolution:	1 KHz 0.1 Hz (Option 40)
Primary Time Base	100 MHz
Aging Rate	$< 1 \times 10^{-6}/\text{day}$
Temperature Stability	$< \pm 2 \times 10^{-6}/^{\circ}\text{C}$
100 MHz Reference Output	$> -4 \text{ dBm}$ into 50 Ω
10 MHz Reference Output	TTL level into 50 Ω
External Reference Input	10 MHz or 100 MHz $\pm 1 \text{ ppm}$ $> -5 \text{ dBm}$ into 50 Ω
Secondary Time-Base (Option 28)	10 MHz
Aging Rate	$< 5 \times 10^{-10}/\text{day}$
Temperature Stability	$< \pm 5 \times 10^{-10}/^{\circ}\text{C}$

Output Power

Maximum Levelled ^{1,2} (dBm)	.01 – 8 GHz	8 – 20 GHz	20 – 40 GHz
20 GHz Model	+16	+15	—
40 GHz Model	+10	+9	+9
Minimum Settable	-20 dBm -110 dBm (Option 26)		
Power Offset	0 to 10 dB		
Resolution	.01 dB		
Accuracy ³ (dB)	$> 10 \text{ dBm}$	$> -20 \text{ dBm}$	$> -110 \text{ dBm}$
.01 - 20 GHz	± 1.0	± 0.8	± 1.3
20 - 40 GHz	± 1.2	± 1.0	± 1.5
Temperature Stability	0.025 dB/°C		
Source Match (typical)	$< 2.0:1$		

Output Power and Level Accuracy for the 2400AL Series



Spectral Purity

Harmonics ⁴	Power out = +6 dBm
.01 – 2 GHz ⁵	-50 dBc
2 – 20 GHz	-55 dBc
20 – 40 GHz	-30 dBc
Sub-Harmonics	Power out = +10 dBm
.01 – 8 GHz	None
8 – 20 GHz	-60 dBc
20 – 40 GHz	-50 dBc
Spurious ⁶	Offsets $> 300 \text{ Hz}$
.01 – 16 GHz	-60 dBc
16 – 32 GHz	-55 dBc
32 – 40 GHz	-50 dBc
Residual FM (typical)	50 Hz – 15 KHz Bandwidth
.01 – 16 GHz	$< 40 \text{ Hz}$
16 – 32 GHz	$< 80 \text{ Hz}$
32 – 40 GHz	$< 120 \text{ Hz}$
AM Noise (typical)	Offsets $> 5 \text{ MHz}$
.01 – 2 GHz	-130 dBm/Hz
2 – 20 GHz	-145 dBm/Hz
20 – 40 GHz	-140 dBm/Hz

SSB Phase Noise

Frequency (GHz)		Offset from Carrier (dBc/Hz)			
	100 Hz	1 KHz	10 KHz	100 KHz	
2	-91	-105	-106	-117	
10	-79	-95	-96	-105	
18	-72	-89	-90	-99	
40	-66	-83	-84	-93	

List Mode (Requires WaveMaker Software)

Number of List Points:	> 4000
Phase Settling Time ⁷ :	$< 400 \text{ } \mu\text{sec}$
Amplitude Settling Time ⁸ :	$< 200 \text{ } \mu\text{sec}$
Step Time:	150 μsec - 1 sec (1 μsec resolution)
Sync Out Delay ^{9,10} :	50 μsec - 10 msec (1 μsec resolution)
Trigger Modes:	EXT, GPIB GET, Software
Sweep Modes:	Continuous, Single Step, & Single Sweep

WaveMaker Requirements:

20 MB Disk Space
Windows NT 5.0, Windows 2000,
Windows XP
16 MB RAM or greater recommended

Remote Programming

Hardware Interface:	RS-232, USB, IEEE 488.2
Language:	SCPI
Emulation Mode:	GT-12000A
Command Execution Time:	$< 15 \text{ msec}$

Physical

Environmental:	MIL-PRF 28800F, Class 3
Safety:	EN61010
Weight:	$< 13.6 \text{ kg}$ ($< 30 \text{ lbs}$)
Emissions:	EN 61326
Dimensions:	3 U (5.25 inches) (5.25 in H x 16.75 in W x 21 in D)

Inputs and Outputs

RF Output	V/GHz Output
External Reference Input	Trigger Input
100 MHz REF Output	Sync Output
10 MHz REF Output	
Lock/Level Output	

¹Specifications applies over the 0 to 35°C range and degrades $< 2.0 \text{ dB}$ from 35 to 55°C.
²Step attenuator (opt 26) reduces power by 1.5 dB to 20 GHz and 2.0 dB above 20 GHz.
³Specifications applies over the 15 to 35°C range and degrades $< 0.5 \text{ dB}$ outside that range.
⁴Specifications for harmonics above instrument frequency range are typical.
⁵Specification is -30 dBc below 100 MHz.
⁶Specification is -45 dBc typical for offsets $< 300 \text{ Hz}$.
⁷Time for phase to settle within 0.1 radian of final value after a frequency switch.
⁸Time for amplitude to settle within 0.1 db of final value after an amplitude switch.
⁹Delay is specified from edge of trigger pulse.
¹⁰Delay accuracy is $\pm 200 \text{ nsec}$.

Data subject to change without notice.

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