

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Keysight / Agilent E6432A* at our website: ***Click HERE***

Agilent E6432A
VXI Microwave Synthesizer

Product Overview

High-performance microwave capability in a VXI module

- 10 MHz to 20 GHz
- –90 dBm to +20 dBm
- < 350 µs frequency switching time
- 1 Hz frequency resolution
- AM, FM and pulse modulation
- Optional I/Q modulation and IF upconversion

The Agilent E6432A VXI microwave synthesizer is designed to help you meet your measurement challenges in advanced microwave applications that require high-performance, microwave-frequency synthesized signals, including:

- Broadband digital communications
- Satellite systems
- Avionics test
- Smart munitions test
- Microwave digital radio
- Radar/EW
- Manufacturing ATE
- Field repair

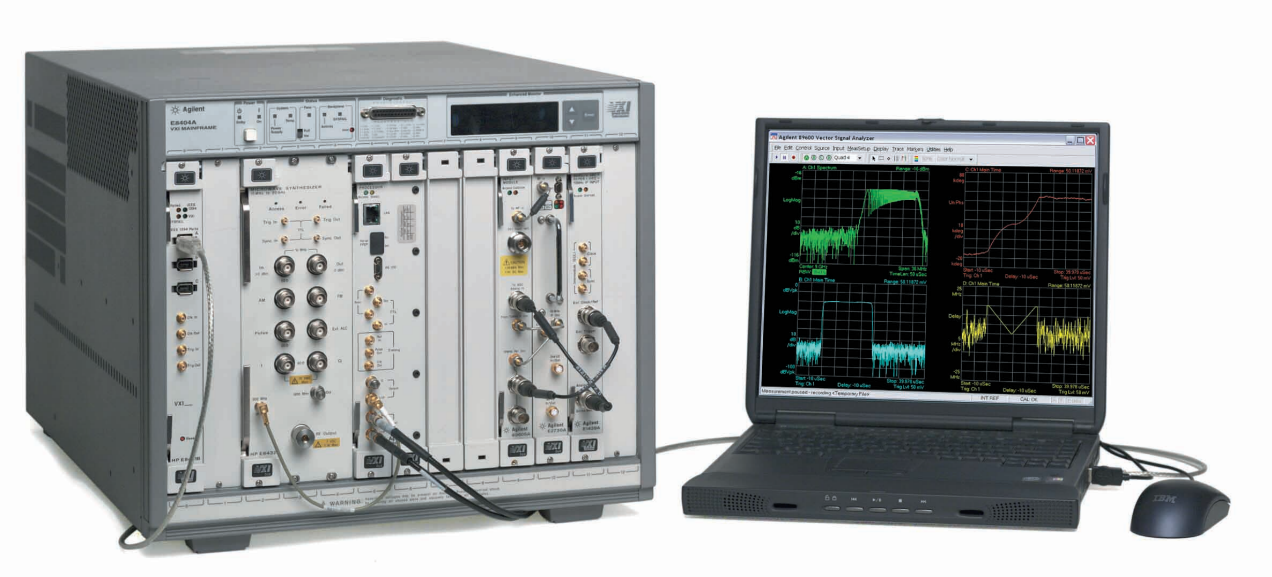


The Agilent E6432A VXI microwave synthesizer is a fast, flexible, rugged, system-optimized signal source with high-performance microwave capability.

The E6432A VXI microwave synthesizer provides fast switching, low phase noise, high spectral purity, and synthesizer accuracy. The three-slot, C-size, register-based VXI architecture makes it ideal for system integrators who want a fast, flexible signal source in a scalable format.

Agilent Technologies

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



System configuration

Advanced microwave measurements with maximum throughput
Whether you are working in high-volume manufacturing or a field environment, you need to quickly design and configure solutions that will give you the advanced microwave measurements performance you need, while maximizing test throughput. You need instruments that will integrate easily with other equipment to form complete, flexible test solutions.

The E6432A VXI microwave synthesizer has the performance and flexibility you need. It is a C-size, 3-slot VXI module that covers the frequency range of 10 MHz to 20 GHz with 1 Hz resolution. Its amplitude range is from –90 dBm to +20 dBm.

This module delivers CW signals with low phase noise and excellent spectral purity. When combined with external arbitrary waveform generators, the module can deliver AM, FM, and pulse signals with state-of-the-art performance. Optional I/Q modulation and IF upconversion are also available.

Optimized for automated test systems
Designed for demanding performance in automated test systems, the E6432A VXI microwave synthesizer's high-speed architecture and register-based design support switching between any two arbitrary carrier frequencies in typically less than 150 µs, or any two amplitudes within its vernier range in less than 50 µs. This switching speed makes the E6432A ideal for automated testing in applications requiring a large number of test frequencies. A deep list mode and comprehensive triggering allow the host computer to offload source management to the measurement system, shortening development time and achieving maximum measurement throughput.

Fast frequency and amplitude switching
Fully settled tuning between any two arbitrary frequencies across the entire frequency band requires less than 350 µs. Frequency switching to within 50 kHz of the desired frequency is typically 150 µs or less. Amplitude-only switching between any two power levels without an attenuator step change to 0.05 dB of the desired power is typically less than 80 us. Power level changes

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

utilizing the optional step attenuator are less than 20 ms. The fast frequency switching results in decreased measurement time in scenarios where throughput is currently limited by the time it takes to retune the signal source. Examples of such scenarios include antenna testing, TR module, RFIC and MMIC testing.

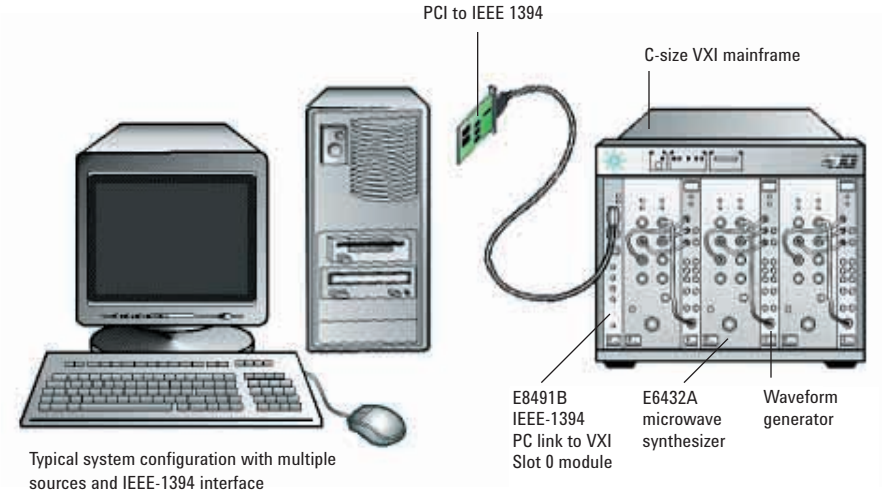
Precision AM, FM and pulse modulation

The AM modulation has a band width of 250 kHz and deep AM capability in both linear and exponential modes. The FM modulation has a band width of 50 kHz to 8 MHz and sensitivity to 1 MHz/volt. Option 2 extends the range to 1 KHz to 10 MHz. The pulse modulation features 10 nanosecond rise and fall times with 15-nanosecond minimum pulse widths and 80 dB on/off ratio.

Optional broadband I/Q modulation

With the emergence of broadband digital communications, you need a source that can deliver digital modulation in wide bandwidths as well as analog modulation for flexibility and complete solutions.

A broadband I/Q modulator, available as Option UNG, is integrated into the E6432A. This modulator accepts I and Q baseband vector signals and modulates the microwave carrier up to 20 GHz. This modulator can be calibrated to give accurate amplitude response at any RF frequency. With a bandwidth of greater than 40 MHz and a dynamic range of greater than 40 dB, Option UNG is ideal for emerging broadband communications that require more bandwidth than the common wireless cellular formats. The E6432A Option UNG serves such applications as wireless LAN (IEEE 802.11), Ka-band satellite digital transparent and digital regenerative payloads, NPR measurements, radar/EW, and LMDS with the help of external banded upconverters. VXI arbitrary waveform generators with wide bandwidths are available to generate the I and Q vectors. AM bandwidths greater than 1 MHz are possible with this option.



Typical system configuration with multiple sources and IEEE-1394 interface

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

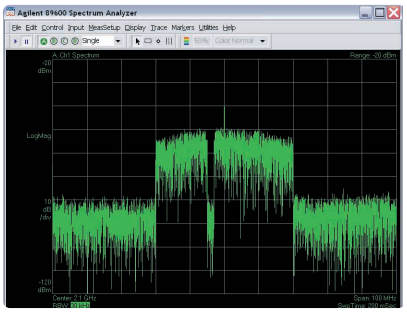
Additional adjustments of the I/Q circuitry inside the E6432A compensate for imbalances in the baseband source to provide the lowest error vector magnitude and the highest overall modulation quality for the most demanding vector signal applications.

Optional IF upconversion
E6432 Option 300 lets you upconvert wide-bandwidth signals into the microwave domain with bandwidths greater than 130 MHz. You can use this option to create unique solutions for broadband wireless, satellite test, and demanding radar applications.

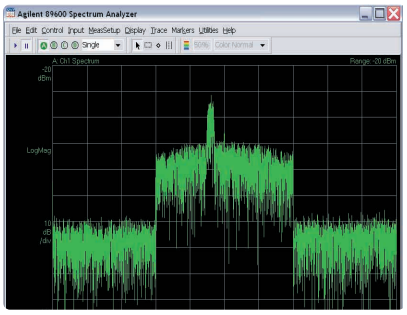


Internal-shielded construction of the Agilent E6432A reduces EMI to give you more flexibility in how you position the module in your rack.

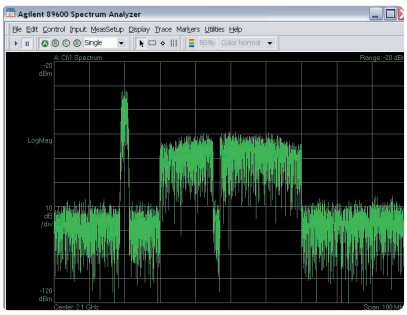
Using I/Q and IF signals together
The E6432A has the unique ability to combine the IF and I/Q signals to create unique spectra. An application of this technique is shown in the figures below where a broadband noise signal with a notch is



You can generate a noise power ratio signal with a notch using an arbitrary waveform generator and the I/Q modulation of the E6432A.



A comms signal is added into the notch using the E9825A and the IF modulation of the E6432A. Signals are combined without any calculations.



The comms signal is moved outside the noise. Again, no recalculations are required.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

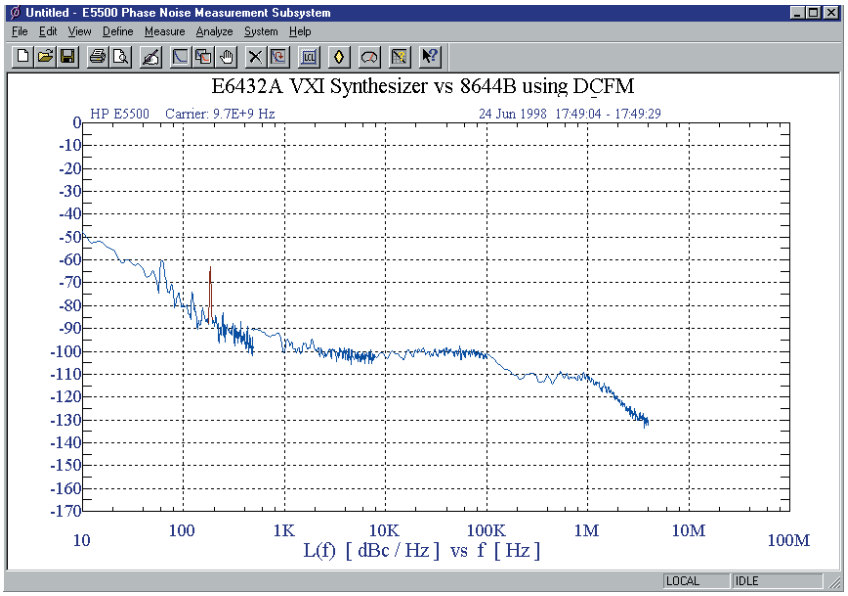
generated through the I/Q inputs and a separate communication signal is applied to the IF upconversion. Note that the carrier frequencies can be changed independently without recalculating or reformatting the data.

Spectrally pure, free of harmonics and spurious signals

The E6432A uses patented assembly shielding to reduce cross talk between modules and limit problems caused by ingress. Critical circuitry is contained within two hybrid thin and thick film microcircuits. DC-to-DC converters inside the module carefully filter and re-regulate the VXI mainframe power supplies. These features combine to give the E6432A its high level of technical performance in the VXI form factor.

Easy programming

A VXI*plug&play* driver simplifies communication with the E6432A. Examples and programming tips for C, Visual Basic, Visual Studio NET, Agilent VEE, LabView and Lab Windows are available in the Web-based help program provided with the VXI*plug&play* driver.



Typical phase noise graph of the Agilent E6432A

An optional SCPI client lets you use ASCII strings written in SCPI language to command and control the instrument.

Virtual front panel

To simplify your diagnostic procedures and troubleshooting, a virtual front panel, provided as a part of the VXI*plug&play* driver and installed automatically with the driver software, allows you to control the synthesizer as if it is a stand alone product. The panel allows direct control of the RF output, leveling , ALC and modulation. In addition, the virtual front panel provides access to configuration, list mode, self-test and calibration panels. You can access all of the features of the virtual front panel directly through the programmatic interface.

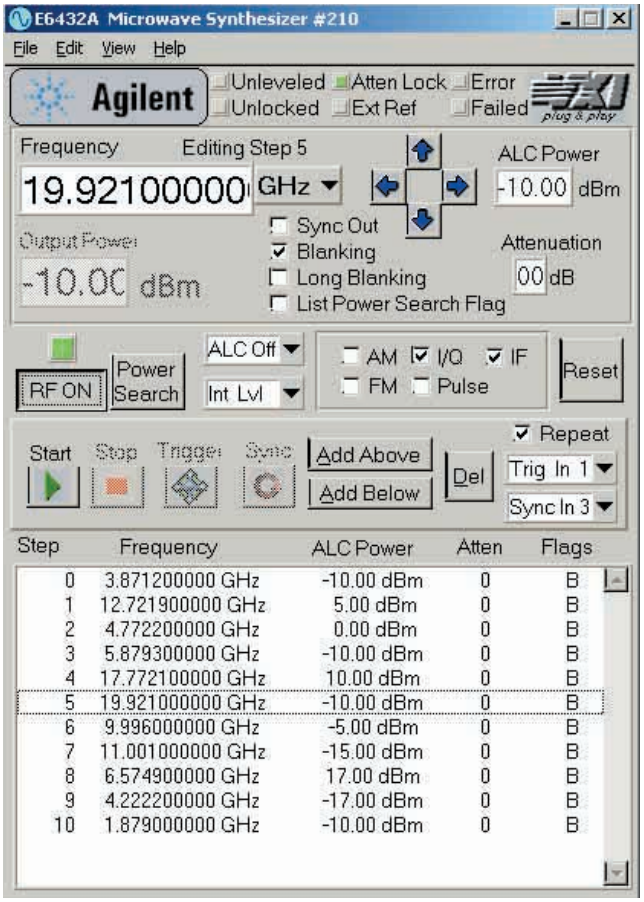
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

List and triggering modes

A deep list mode of up to 128 k entries provides sequence memory for very long test scenarios. Each entry may hold settings for frequency, amplitude, attenuator setting, settling and blanking modes, and a marker. The host computer constructs the list array and downloads the array into the E6432A VXI microwave synthesizer hardware prior to execution.

The synthesizer provides three ways to execute a sequence, free-run, sync and triggered. A sequence repeat feature is available for any trigger mode.

All events available on the front panel are also available on the TTL trigger bus. Interrupts and variable dwell and settling times in the sequence may also be enabled when test needs require dwelling at a specific point for longer periods of time.



Virtual front panel with list mode activated

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Specifications

Frequency characteristics

Range	10 MHz to 20 GHz
Accuracy	same as time base
Resolution	1 Hz
Switching time	< 350 µs, < 150 µs (typical)

Output characteristics

Output power

Range	–20 to +17 dBm
(with Option 1E1)[1]	–90 to +16 dBm

Maximum leveled output power
Without step attenuator[1]

Frequency range	Standard	Option UNF	Option UNH	Options UNF & UNH
10 MHz to 2 GHz	+17 dBm	+17 dBm	+13 dBm	+13 dBm
2 GHz to 20 GHz	+17 dBm	+20 dBm	+17 dBm	+20 dBm

Vernier accuracy	±0.5 dB from –10 to +10 dBm ±1.3 dB from –20 to +20 dBm
Resolution	0.02 dB
Switching time	< 50 µs across ALC range, < 20 ms with attenuator step change
External ALC range	40 dB

Power level accuracy and flatness
These specifications apply to frequencies between 100 MHz and 2 GHz after a power correction is performed. For frequencies < 100 MHz accuracy and flatness degrade by 0.5 dB. For frequencies > 2 GHz, accuracy and flatness degrade by 0.1 dB

Output power range	Accuracy	Flatness
–10 dBm to max. power	±1.2 dB	±0.9 dB
–10 to +10 dBm	±0.8 dB	±0.5 dB
–20 to –10 dBm	±1.1 dB	±0.7 dB
–60 to –20 dBm	±1.1 dB	±0.7 dB
–90 to –60 dBm	±1.4 dB	±1.1 dB

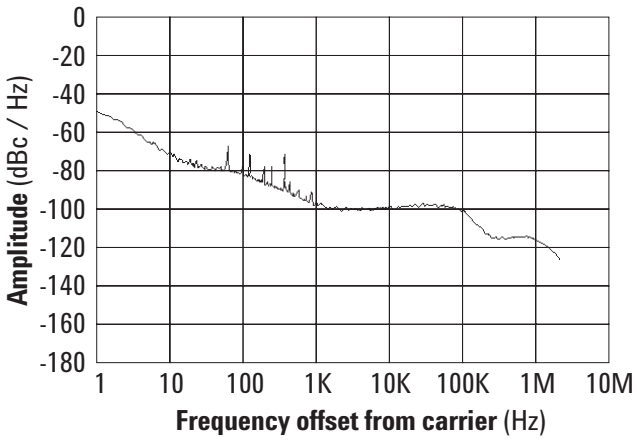
VSWR at 50 ?	1.6:1 (typical)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Specifications (Continued)

Spectral purity

Harmonics	
10 MHz to 2 GHz	< –25 dBc
(with Option UNH)	< –55 dBc
2–20 GHz	< –55 dBc
	< –65 dBc (typical)
Spurious response	< –55 dBc
	< –70 dBc (typical)
SSB phase noise	< –70 dBc/Hz at 100 Hz
	< –90 dBc/Hz at 10 kHz
Phase noise of carrier frequency 8.1 GHz	



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Modulation

AM depth	–20 dBm in normal mode 50 dB below max. output in deep mode
AM rate	DC to 250 kHz (typical)
AM accuracy	< 7% of depth
FM maximum deviation Option 002	> 8 MHz > ±85 MHz
FM rate Option 002	100 kHz to 8 MHz 1 kHz to 10 MHz
FM sensitivity Option 002	1 MHz/V 100 kHz/V, 1 MHz/V, 10 MHz/V
FM accuracy	30% at 1 V p-p and 1 MHz rate
FM flatness	±1 dB over specified rate range
Maximum FM index Option 002	> 180

Pulse modulation RF > 560 MHz to < 2 GHz

On/off ratio	> 80 dB
PRF range	10 Hz to 10 MHz, (DC to 10 MHz; ALC off)
Minimum pulse width	3.0 µs (leveled), 50 ns (unleveled)
Rise/fall time	< 25 ns
Power level accuracy (relative to CW)	0.3 dB (typical, leveled) 0.5 dB (typical, unleveled, following power search)
Video feedthrough	< 5% of envelope (typical)
Compression	< ±16 ns (typical)
Overshoot and ringing	< ±15% (typical)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Modulation (Continued)

Pulse modulation RF 2–20 GHz

On/off ratio	> 80 dB
PRF range	10 Hz to 10 MHz (DC to 10 MHz; ALC off)
Minimum pulse width	3.0 µs (leveled), 15 ns (unleveled)
Rise/fall time	< 10 ns
Power level accuracy (relative to CW)	0.3 dB (typical, leveled) 0.5 dB (typical, unleveled, following power search)
Video feedthrough	< 5 mV (typical)
Compression	< ±15 ns (typical)
Overshoot and ringing	< ±10% (typical)

I/Q modulation (Option UNG only)

I/Q bandwidth	> 40 MHz (typical, ±2 dB uncorrected)
I/Q sensitivity	0.5 V pk for 100% modulator drive level
I and Q offset range	±100%
I and Q gain range	±4 dB
Quadrature adjustment range	±10 degrees
I and Q input attenuator range	0 to 12 dB in 2 dB steps
Origin offset:	< –45 dBc (typical)
Dynamic error vector magnitude[2,3]	< 1.2% rms (typical)

1 Adding step attenuator (Option 1E1) degrades maximum output power by 1 dB, 2 to 20 GHz.

2 These I/Q specifications apply only after an internal calibration, and are valid for 10 days at a calibration temperature of ±5 degrees. These specifications include I/Q impairments of an Agilent Technologies ESG-D Series signal generator with Option UND as the baseband I/Q source.

3 Measured at 2 MS/s QPSK, root raised cosine filter with ? = 0.35, 14 dB IF attenuation, maximum output level = 0 dBm, and ALC off.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Modulation (Continued)

Option 300 IF upconversion specifications

IF input performance parameters	
IF center frequency	300 MHz
Instantaneous signal bandwidth	±65 MHz (130 MHz total)
Conversion gain	10 dB nominal
IF flatness	±2.5 dB
Group delay	±1.5 ns
IM3	<-55 dBc @ +10 dBm output power
Noise floor	<-130 dBm/Hz @ 20 GHz
Input gain compression (1 dB)	+12 dBm

List mode

Accuracy	same as time base
Minimum step size	same as frequency resolution
Number of points	128 k
Switching time	same as CW
Dwell time	5 µs to 32 ms

VXI characteristics

Size	C
Slots	3
VXI device type	register based servant
Instrument driver	VXI*plug&play* using Windows NT®, Windows 2000 or Windows XP

General specifications

Operating temperature range	0 to +55° C
Size mm (in)	91.4 (3.6) W x 261.6 (10.3) H x 370.8 (14.6) D
Weight	7.16 KG (15.8 lbs)
RF output connector	3.5 mm

Power Supply Requirements

(V)	+5	–5.2	–2	+12	–12	+24	–24	+5
DC current (A)	10	2.35	0	2.4	1.0	0.4	0.15	0
Dynamic current (A)	2	0.1	0	0.8	0.05 (w/step att.)	0.5	0.03	0

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Ordering information

Agilent E6432A	VXI Microwave Synthesizer
Option 002	Add enhanced frequency modulation
Option 1E1	Add 70 dB step attenuator
Option UNF	Add high power (+20 dBm) 2–20 GHz
Option UNG	Add I/Q modulator
Option UNH	Add improved spectral purity (10 MHz to 2 GHz)
Option 300	Add IF upconversion

Contact your Agilent sales representative for more information.

Warranty information

All Agilent products described in this document are warranted against defects in material and workmanship for a period of one year from date of shipment.

Related Agilent literature

- An Introduction to the Agilent E6432A *plug&play* Driver Product Note 5968-3660E
- Creating Frequency Lists Using a Spreadsheet and ActiveX Product Note 5968-8434E
- N7501A Technical Overview 5989-1018EN

Agilent Technologies' Test and Measurement Support, Services, and Assistance

Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

Our Promise

Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, while your instrument is under warranty or technical support contract. Many self-help tools are available on Agilent's web site.

Your Advantage

Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

Agilent Email Updates

www.agilent.com/find/emailupdates
Get the latest information on the products and applications you select.

Agilent Direct

www.agilent.com/find/agilentdirect
Quickly choose and use your test equipment solutions with confidence.

Visit our Web sites:

Agilent Aerospace and Defense Information —
www.agilent.com/find/defense_ATE

Agilent Signal Sources Information —
www.agilent.com/find/signal_sourcs

Agilent VXI Product Information —
www.agilent.com/find/vxi

By internet, phone, or fax, get assistance with all your test & measurement needs

Online assistance:
www.agilent.com/find/assist

Phone or Fax

United States:
(tel) 800 829 4444

Canada:
(tel) 877 894 4414
(fax) 905 282 6495

China:
(tel) 800 810 0189
(fax) 0800 650 0121

Europe:
(tel) (31 20) 547 2323
(fax) (31 20) 547 2390

Japan:
(tel) (81) 426 56 7832
(fax) (81) 426 56 7840

Korea:
(tel) (82 2) 2004 5004
(fax) (82 2) 2004 5115

Latin America:
(tel) 305 269 7500
(fax) 305 269 7599

Taiwan:
(tel) 080 004 7866
(fax) (886 2) 2545 6723

Other Asia Pacific Countries:
(tel) (65) 375 8100
(fax) (65) 836 0252
Email: tm_asia@agilent.com

Product specifications and descriptions in this document subject to change without notice.
Windows NT is a U.S. registered trademark of Microsoft Corporation

© Agilent Technologies, Inc. 2004
Printed in the USA June 1, 2004
5967-6178E

Agilent Technologies

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP