

12000A
MICROWAVE
SYNTHESIZER

12000A

LIST			Step Size
List:			1
Repeat:	Single Sweep		Switch
Trigger:	Internal		Cursor
Pt	Frequency, GHz	Power	Go to Freq
	Dwell, sec	AM FM PM	Add Point
4	1.000 000 000 0 0.062 500	+5.00 dBm AM FM	Delete Point
5	0.500 000 000 0 0.015 625	+4.00 dBm PM	Edit List
6	0.250 000 000 0	+3.00 dBm	
Step Size: +1.00 dB			



Giga-tronics

GIGA-TRONICS
I2000A
MICROWAVE
SYNTHESIZER

For Those Who Demand The Highest Performance.
Even When It Comes At The Lowest Price.

The Giga-tronics I2000A Microwave Synthesizer is designed for those who demand the highest performance, even when it comes at the lowest price. The instrument delivers performance, accuracy and reliability better than that provided by synthesizers costing twice as much.

ADVANCED DIGITAL ARCHITECTURE

The heart of the I2000A is an advanced digital processing architecture driving a high-speed, ferrite-based YIG oscillator. The YIG oscillator is designed specifically for fast-tuning applications, and produces fast switching speeds while exhibiting low phase noise, high output power, and excellent frequency linearity.

The synthesis module in conjunction with the YIG oscillator form a phase-locked loop (PLL) that produces a spectrally pure sine wave output from 4 to 8 GHz, with a tuning resolution of 0.1 Hz. The output is then divided or multiplied by other modules to produce the entire range of output frequencies.

FAST FREQUENCY SWITCHING

The synthesis module is designed to optimize the oscillator's fast switching speed while maintaining low phase noise. It is also used to produce frequency ramp sweep and modulation (FM).

The I2000A takes full advantage of complementary

circuit design to further optimize the synthesizer's switching speed. Field programmable gate arrays (FPGA) perform logic operations quickly, while a digital signal processor (DSP) is employed as a secondary processor for dynamic control and fast frequency settings, without burdening the primary processor. The result is a switching time approaching direct synthesis performance at lower than indirect synthesis price!

RAMP SWEEP

But fast switching speed is only the beginning. The frequency ramp sweep technique used in the I2000A provides an analog ramp sweep and a digital step sweep of the synthesizer from a predefined start frequency to



The Giga-tronics I2000A Microwave Synthesizer delivers high performance, accuracy and reliability at a low price.

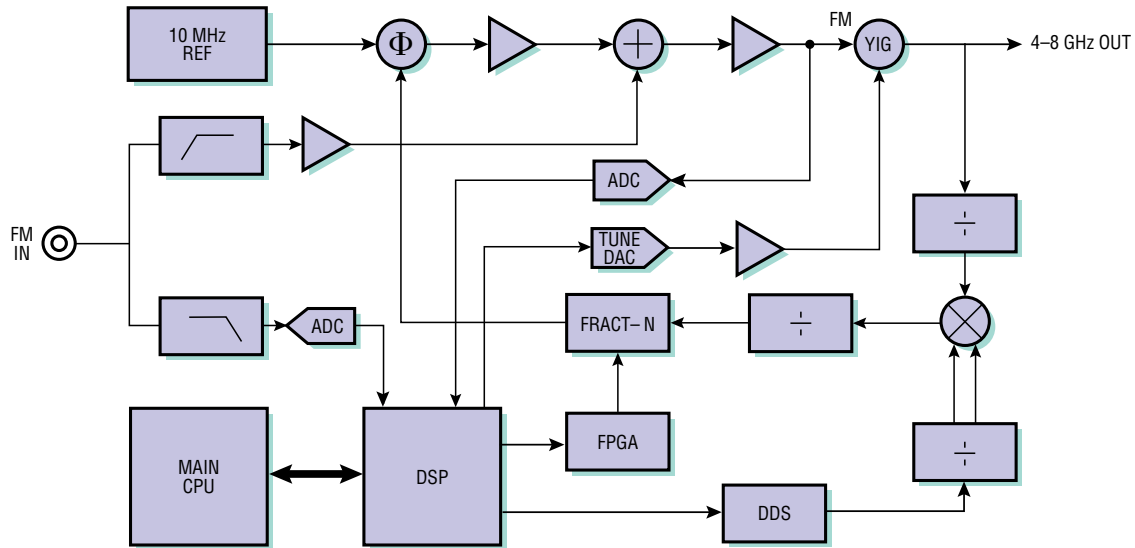
a predefined stop frequency.

The analog ramp sweep feature of the I2000A is continuously controlled by the phase-locked loop for optimum sweep accuracy.

Linearity errors are virtually eliminated because the frequency is stepped at a rate much faster than the phase-locked loop bandwidth, essentially producing a swept phase-locked loop. And 12-bit DAC resolution provides accuracy within a few Hertz, producing analog sweep linearity with unmeasurable error.

The result is a sweep mode with analog speed and digital accuracy. The benefit to the user is apparent in both manual and automatic operation.

The manual two-step analog and digital tuning procedure typically used for filter tuning and component characterization can now be performed in a single sweep, reducing the time required for these operations from minutes to seconds. And the fast switching speed of the I2000A, versus that of other indirect synthesizers, allows you to perform list mode measurements for



ATE applications up to 50 times faster.

The synthesizer module DSP provides up to 12 sweep frequency markers, and three types of sweep markers may be selected — an RF amplitude marker (selectable from -10 dB to +10 dB), an intensity marker (sweep - pause a moment - sweep), or a video marker with TTL logic level output (polarity may be inverted).

MODULATION CAPABILITY

The FM circuitry of the I2000A applies an external FM source to the PLL in a way that results in low distortion, with wide bandwidth dc-coupled frequency modulation in narrow mode.

In addition to FM, the I2000A includes high-speed pulse/square wave modulation (PM) with on/off ratios greater than 80 dB and rise/fall times less than 10 ns. And you can obtain pulse widths as narrow as 20 ns.

Amplitude modulation (AM) and scan modulation (log AM) are standard features. Scan modulation can be operated simultaneously with FM and/or PM.

PURE POWER

Leveled output power is +15 dBm from 10 MHz to 20 GHz with resolution of 0.01 dB.

Phase noise at 4 GHz is -88 dBc/Hz at 10 kHz offset for all power levels. Phase noise is equally impressive

A simplified block diagram of the Giga-tronics I2000A synthesizer shows the extensive use of digital circuitry for greater accuracy and reliability.

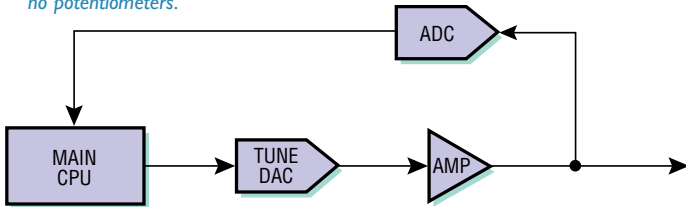
across the full range of the instrument, making the I2000A ideal for measuring critical narrow band characteristics.

Harmonics are less than -60 dBc from 2 to 20 GHz so you can accurately test over a wide bandwidth with confidence.

PROVEN RELIABILITY

Performance is only one aspect of the I2000A synthesizer's extensive use of digital

Digital circuits automatically self center to adjust for temperature drift, and the I2000A is the only microwave synthesizer with no potentiometers.



circuitry; reliability is another. In fact, the I2000A is the only microwave synthesizer that uses no potentiometers. The PLL is digitally controlled and will automatically self center to adjust for temperature drift. Calibration is recommended every two years; that's twice as long as the recommended cal cycle for conventional synthesizers.

The I2000A uses fewer circuit boards than most synthesizers, and extensive use of surface mount

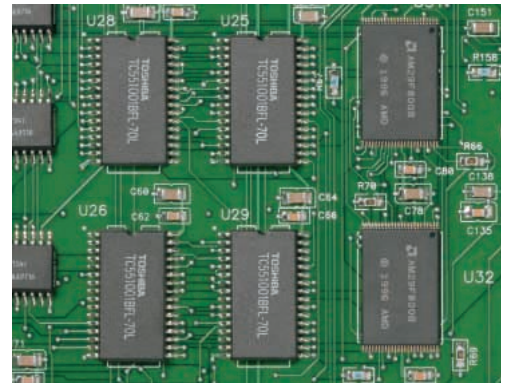
components ensures reliable operation under the most demanding conditions.

Operational software is stored in flash memory, so future enhancements can be programmed from a PC.

EASY OPERATION

The I2000A incorporates a 3" high by 4" wide Liquid Crystal Display (LCD) with 320 x 240 line resolution, 0.30 mm dot pitch, and Cold Cathode Fluorescent Lamp (CCFL) back light for maximum detail and optimum viewing.

You can program up to nine stored setups. Custom setups such as list mode and level correction tables are stored in user-programmable non-volatile RAM. In addition to frequency, the list function allows the user to preprogram power, dwell time, and modulation modes (AM, FM, and pulse).



Surface mount components are used to ensure more reliable operation, and operational software is stored in flash memory, so future enhancements can be programmed from a PC.

To contact your local representative for more information or a demonstration of the I2000A Microwave Synthesizer, call Giga-tronics at 1-800-726-GIGA (4442) or visit the company's Web site at www.gigatronics.com.



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