

Application **NOTE**

CONFIGURING LIST MODE FUNCTION OF I2000A MICROWAVE SYNTHESIZER

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OVERVIEW

High-volume, microwave product manufacturers are continually seeking to reduce production test times while maintaining high-quality component test, thus reducing the overall cost of the product. The reduction of a few seconds per unit tested can result in significant savings when production volumes are high. The List Mode of the I2000A offers a cost-effective solution when microwave testing requires fast, automatic generation of frequency, power and modulation settings.

DESCRIPTION OF OPERATION

List mode in the Model I2000A Synthesizer is a function that will generate arbitrary test frequencies and power settings at a specified dwell time for each point in the list. Unlike other synthesizers, the I2000A microwave synthesizer provides the ability to individually modify each point with respect to frequency, power level, modulation condition and dwell time. This unique capability provides maximum flexibility when configuring a test platform where multiple conditions are required. For example, a test can be set for a frequency sweep at a fixed power level, at specified frequencies while stepping through power, and at a fixed frequency while being modulated — all in a single sweep using list mode.

The data in the list is processed by a digital signal processor (DSP), which serves as a secondary processor to the main processor. Coupled with field programmable gate arrays (FPGAs), which quickly handle many of the logic operations, the primary processor burden is reduced and results in the Model I2000A frequency synthesizer with switching speeds under 500 μ s. The **List** consists of all the programmed test points, the list number and definition of how the List will be initiated (**Trigger**). Also, there is a description of how the list will step from one point to the next (**Repeat** mode).

The I2000A will store up to 100 list tables. The total number of points per list is based upon the amount of memory used by the synthesizer. The I2000A Frequency Synthesizer has 980 Kbytes available for list mode. Each point uses 32 bytes of memory. Theoretically, any one list can store greater than 30,000 points provided no other lists and level corrections are residing in memory.

The Repeat mode allows the user to manually step through each point, generate a single sweep through the list or continuously repeat. The list can be initiated either by TTL low going signal at the rear panel BNC connector of the I2000A, or manually by way of a front panel operation. The list can also be initiated by way of the general purpose interface bus (GPIB). Once a trigger is received, the I2000A will output the test signal based on the programmed sequence of **Points** within the list. Each point defines the frequency, power setting, modulation type and the duration that the synthesizer will dwell for that specific point.

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The I2000A can change frequency and power level in less than 500 μ s switching time. The switching speed is reduced if the transition from one point to the next requires the synthesizer to change the step attenuator setting. The fast switching speeds and triggering schemes make the I2000A a cost-effective and versatile instrument for both microwave production and research and development needs.

CONFIGURING THE I2000A FOR LIST MODE

Pressing the **LIST** button in the frequency section of the front panel activates the list mode menu. The cursor buttons will move the cursor through the List display settings. The **UP** and **DOWN Cursor** buttons are used to move the cursor to the List Table, Repeat mode and Trigger type functions. The **STEP** buttons or the **KNOB** will adjust the settings for the function identified by the cursor. With the cursor on the List Table number, the List Table is defined using the knob or up and down cursor buttons. The Repeat mode and Trigger type are configured in the same fashion. Once these functions are configured, adding “points” specifies the List. A new point is added by pressing the **Add Point** soft key. Each point defines frequency, power setting, the dwell time and modulation. To set the frequency of a point, move the up or down cursor to edit the desired point. Then use the left and right cursor buttons to move the cursor over the frequency in the point. With the cursor over the frequency,



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

enter a new frequency using the numeric keypad, the step buttons or the knob. All of the settings of the point are modified in the same fashion. To edit power, dwell, and modulation, use the “right” cursor button until the cursor is over the desired parameter. The **Switch Cursor** soft key allows quick movement of the cursor from the point field to the List mode fields.

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