

# SWEEP OSCILLATORS

## Synthesized Sweepers

### Models 8340B, 8341B

- 1 to 4 Hz frequency resolution
- Low spurious and phase noise
- +10 dBm to -110 dBm calibrated output

- Pulse, Amplitude, and Frequency Modulation
- Complete analog sweeper
- <-50 dBc harmonics 1.4 to 20 GHz on HP 8341B Option 003



HP 8340B



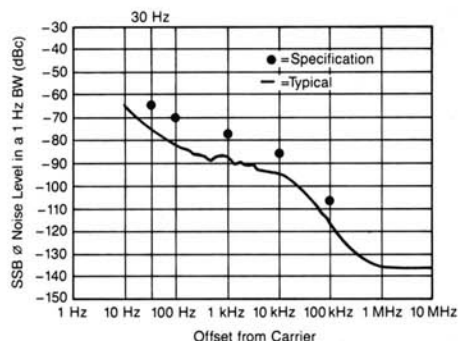
### HP 8340B/8341B Synthesized Sweepers

The HP 8340B and 8341B Synthesized Sweepers deliver the combined high performance of a synthesizer and a broadband sweep oscillator in one instrument that is completely controllable via the Hewlett-Packard Interface Bus (HP-IB). This efficient combination of performance and versatility is ideal for manual or automatic test systems and in many cases enables the HP 8340B/8341B to replace a sweep oscillator, a frequency counter, an RF synthesizer, and a microwave synthesizer.

### Frequency Precision and Spectral Purity

The synthesized broadband frequency coverage (10 MHz to 26.5 GHz on the HP 8340B and 10 MHz to 20 GHz on the HP 8341B) and the precise 1 to 4 Hz frequency resolution (depending on frequency band) are generated by indirect synthesis techniques, enabling the HP 8340B/8341B to achieve the same low single-sideband phase-noise performance as the HP 8671B, 8672A and 8673 series Synthesized Signal Generators. The HP 8340B/8341B long-term stability is also outstanding at  $1 \times 10^{-9}$ /day.

The HP 8340B/8341B feature CW switching times of better than 50 ms (typically <35 ms). Additionally, a "Fast Phase-lock" programming command can be used to reduce typical CW switching times to between 11 and 22 ms (depending on frequency step size and absolute frequency value).



HP 8340B/8341B Phase Noise performance from 2.3 to 7.0 GHz.

### HP 8341B Option 003: <-50 dBc Harmonics

Option 003 on the HP 8341B delivers excellent harmonic performance, at least 50 dB below a 1.4 to 20 GHz carrier. This low-harmonics option is particularly useful for demanding EW receiver testing, and scalar analysis of frequency selective devices such as filters.

### Output Power

The HP 8340B/8341B provide high output power which can be controlled down to -110 dBm with 0.05 dB resolution. High power resolution is complemented by outstanding accuracy and flatness. The HP 8340B/8341B also feature power sweep capability with >20 dB dynamic range for complete characterization of level-sensitive devices.

### Pulse, Amplitude, and Frequency Modulation

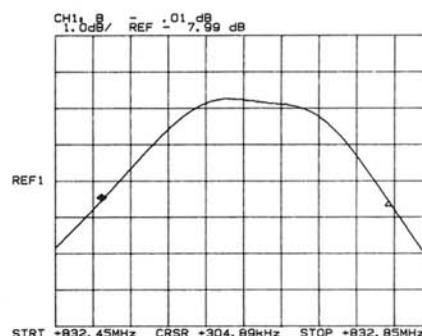
The HP 8340B/8341B have a high-performance pulse modulator with ON/OFF ratio >80 dB and rise and fall times <25 ns. Pulse amplitude is leveled and can be as narrow as 100 ns. The HP 8340B/8341B also feature dc-coupled amplitude modulation with a 3 dB bandwidth of 100 kHz and a minimum depth of 90%, and frequency modulation with rates from 50 kHz to 10 MHz and peak deviations to 10 MHz. And with the HP 8340B/8341B, pulse, amplitude, and frequency modulation can be used simultaneously.

### Swept Capability

Analog sweep widths as narrow as 100 Hz or as broad as the full frequency range of the HP 8340B/8341B permit rapid and thorough testing of any device within their broad frequency ranges. To simplify swept measurements, five frequency markers are provided along with useful marker functions such as marker sweep, marker to center frequency (MKR-CF), and marker difference.

## Network Analyzer Companions

Besides being excellent stand-alone general purpose sources, the HP 8340B/8341B are also ideal sources for precision microwave network analysis, where a significant part of measurement accuracy depends on the frequency accuracy, stability, signal purity, and source/analyzer interface of the sweeper used. As well as being the preferred HP 8510 vector network analyzer source, the HP 8340B/8341B can be teamed with the HP 8757/8756 Scalar Network Analyzers for precision scalar analysis, magnitude-only applications where data at accurate frequencies is needed. In addition to frequency accuracy, the HP 8340B/8341B have a "phase-locked sweep." For sweep widths of  $n \times 5$  MHz or less ( $n$  = frequency band number), one of the phase-locked loops is swept, producing synthesizer-class frequency accuracy and stability in a continuous sweep. As an example, see the figure at right, where an 832 MHz SAW resonator is swept over a width of 400 kHz by an HP 8341B with less than 60 Hz of residual FM.



HP 8341B 400 kHz sweep of 832 MHz SAW resonator

## HP 8340B/8341B Specifications Summary

(see technical data sheet for complete specifications)

(All specifications apply to the 8341B up to 20 GHz)

### Frequency

**Range:** HP 8340B, 10 MHz to 26.5 GHz  
HP 8341B, 10 MHz to 20.0 GHz

### Resolution (CW Mode):

- 1 Hz, 0.01 to <7.0 GHz
- 2 Hz, 7.0 to <13.5 GHz
- 3 Hz, 13.5 to <20.0 GHz
- 4 Hz, 20.0 to 26.5 GHz

**Time Base:** Internal 10 MHz time base. Aging rate: less than  $1 \times 10^{-9}$ /day and  $2 \times 10^{-7}$ /year after 30 day warm-up.

**Swept Capability:** Analog sweep,  $\Delta F$  from 100 Hz to 26.49 GHz (19.99 GHz on 8341B); sweep times from 45 ms to 200 sec full span.

### Spectral Purity

**Harmonics** (up to 26.5 GHz) of output frequency:  
<-35 dBc

**Subharmonics and Multiples thereof** (up to 26.5 GHz) of output frequency:

- <-25 dBc, 7.0 to <20.0 GHz
- <-20 dBc, 20.0 to 26.5 GHz

**HP 8341B Option 003 Harmonics, Subharmonics and Multiples thereof** (up to 20.0 GHz):

- <-35 dBc, 0.01 to <1.4 GHz
- <-50 dBc, 1.4 to 20.0 GHz

**Non-Harmonically Related Spurious** (CW and Manual Sweep mode only):

- 50 dBc, 0.01 to <2.3 GHz
- 70 dBc, 2.3 to <7.0 GHz
- 64 dBc, 7.0 to <13.5 GHz
- 60 dBc, 13.5 to <20.0 GHz
- 58 dBc, 20.0 to 26.5 GHz

**Single-Sideband Phase Noise** (dBc/1 Hz Noise BW, CW Mode):

Frequency Range (GHz)	Offset from Carrier				
	30 Hz	100 Hz	1 kHz	10 kHz	100 kHz
0.01 to < 2.3	-64	-70	-78	-86	-107
2.3 to < 7.0	-64	-70	-78	-86	-107
7.0 to <13.5	-58	-64	-72	-80	-101
13.5 to <20.0	-54	-60	-68	-76	-97
20.0 to 26.5	-52	-58	-66	-74	-95

### RF Output

**Range:** -110 dBm to +20 dBm

**Resolution:** 0.05 dB in ENTRY DISPLAY

### Maximum Levelled Power:

- +10.0 dBm, 0.01 to <2.3 GHz
- +12.0 dBm, 2.3 to <7.0 GHz
- +10.0 dBm, 7.0 to <13.5 GHz
- +9.0 dBm, 13.5 to <20.0 GHz
- +3.0 dBm, 20.0 to <23.0 GHz
- +1.0 dBm, 23.0 to 26.5 GHz

**RF Output Connector:** APC-3.5 Male on HP 8340B, Type N Female on HP 8341B; nominal 50 ohm output impedance.

### Modulation

#### Pulse Modulation

- ON/OFF Ratio:** >80 dB
- Rise and Fall Times:**  $\leq 25$  ns
- Minimum Internally Levelled RF Pulse Width:**  $\leq 100$  ns
- Minimum Unlevelled RF Pulse Width:** typically  $\leq 25$  ns

#### Amplitude Modulation

- Rates (3 dB BW):** DC to 100 kHz
- Depth:** 0 to 90%
- Sensitivity:** 100%/V

#### Frequency Modulation

- Modulation Rate (3 dB BW):** 50 kHz to 10 MHz
- Peak Deviation:** The lesser of 10 MHz or
- $5 \times \text{Mod Rate}$ , 0.01 to <7.0 GHz
- $10 \times \text{Mod Rate}$ , 7.0 to <13.5 GHz
- $15 \times \text{Mod Rate}$ , 13.5 to <20.0 GHz
- $20 \times \text{Mod Rate}$ , 20.0 to 26.5 GHz

**Sensitivity:** either 1 MHz/Volt or 10 MHz/Volt, user selectable.

### Ordering Information

**HP 8340B Synthesized Sweeper**

Please see your local Hewlett-Packard sales representative for current prices and options on the HP 8340B.

### Price