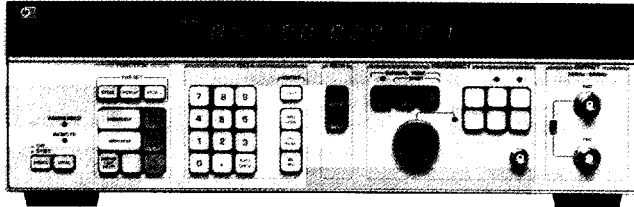


# FUNCTION GENERATORS & WAVEFORM SYNTHESIZERS

## Synthesizer/Function Generator

HP 3335A, 3336C

- 200 Hz to 81 MHz
- High spectral purity
- Precision amplitude control
- 1 MHz resolution



HP 3335A

### HP 3335A Synthesizer/Level Generator

The HP 3335A Synthesizer/Level Generator has performance characteristics that make it ideally suited for the telecommunications industry as well as for traditional synthesizer applications, including testing of Frequency Division Multiplex (FDM) equipment and research and development and production testing of communications systems.

#### Precision Amplitude, Frequency

The HP 3335A incorporates a state-of-the-art attenuator with accuracies of up to  $\pm 0.025$  dB over the 81 MHz frequency range. Frequency stability up to  $\pm 1 \times 10^{-6}$ /day is provided by an internal temperature-controlled oscillator.

#### Frequency Sweep, Tracking Generator

The HP 3335A combines the frequency, accuracy and stability of a synthesizer with the time-saving convenience of a digital sweeper. In addition, the HP 3335A operates as a tracking generator with the HP 3746A/B Selective Level Measuring Set (SLMS) or the HP 3586A/B/C Selective Level Meter for automatic or semi-automatic testing of FDM systems.

#### Specifications

Contact your local HP Sales Office for more information including a data sheet with complete specifications.

#### Frequency

- Standard range:** 200 Hz to 81 MHz    **Resolution:** .001 Hz  
**Option 002/004 range:** 75  $\Omega$ , 200 Hz to 81 MHz; 124  $\Omega$ , 10 kHz to 10 MHz; 135/150  $\Omega$ , 10 kHz to 2 MHz  
**Option 003 range:** 75  $\Omega$ , 200 Hz to 81 MHz; 150  $\Omega$ , 10 kHz to 2 MHz  
**Option 001:** (high stability frequency reference)  
 Stability, long term:  $\pm 1 \times 10^{-10}$ /day;  $\pm 1 \times 10^{-7}$ /month  
 Aging rate:  $\pm 5 \times 10^{-8}$ /day;  $\pm 2 \times 10^{-8}$ /month

#### Spectral purity

- Harmonic distortion:** 200 Hz to 10 MHz:  $< -45$  dBc; 10 MHz – 80 MHz;  $< -40$  dBc  
**Phase noise:** (30 kHz band, excluding  $\pm 1$  Hz, centered on the carrier): 9.9 MHz:  $< -63$  dBc; 20 MHz;  $< -70$  dBc; 40 MHz;  $< -64$  dBc; 80 MHz:  $< -58$  dBc  
**Spurious:** Nonharmonically related signals: the greater of  $-75$  dBc or  $-125$  dBm (50/75  $\Omega$ ),  $-97$  dBm (124  $\Omega$ ),  $-68$  dBm (135/150  $\Omega$ )

#### Amplitude range

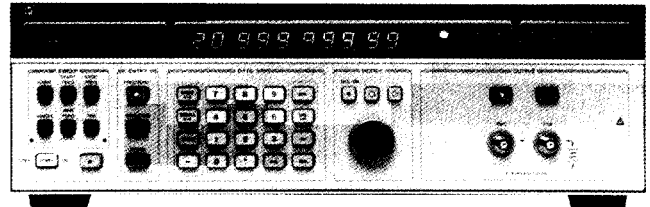
- $-88.74$  dBm to  $+13.01$  dBm depending on option and impedance.  
**Resolution:** 0.01 dB  
**Absolute level accuracy** (Max. output at 100 kHz, 10° C to 35° C): 50/75  $\Omega$   $\pm 0.05$  dB; 124/135/150  $\Omega$ :  $\pm 0.1$  dB.  
**Flatness** (Relative to 100 kHz, full amplitude): 50/75  $\Omega$ : 1 kHz to 25 MHz:  $\pm 0.07$  dB, 200 Hz to 80 MHz:  $\pm 0.15$  dB; 124  $\Omega$ : 50 kHz to 10 MHz:  $\pm 0.15$  dB, 10 kHz to 10 MHz  $\pm 0.4$  dB; 135/150  $\Omega$ : 10 kHz to 2 MHz:  $\pm 0.18$  dB.

#### Ordering Information

|  | Price     |
|--|-----------|
| <b>HP 3335A Synthesizer/Level Generator</b>                                  | \$12,800  |
| <b>Opt 001</b> High-stability reference $\pm 5 \times 10^{-10}$ /day         | + \$1,280 |
| <b>Opt 002</b> Connector (75/124/135 $\Omega$ )                              | + \$575   |
| <b>Opt 003</b> Connector (75/150 $\Omega$ )                                  | + \$365   |
| <b>Opt 004</b> Connector (75 $\Omega$ , miniature WECO on 124/135 $\Omega$ ) | + \$575   |
| <b>Opt C01</b> Rack Slide Mount  |           |

Contact HP

- 10 Hz to 20.999 MHz
- 11 digit resolution
- Excellent amplitude accuracy
- 1 MHz resolution



HP 3336C

### HP 3336C Synthesizer/Function Generator

The HP 3336C is designed for traditional synthesizer applications as well as R&D and production testing of systems or components. It features precision level control, high spectral purity, optional frequency stability of  $\pm 5 \times 10^{-6}$ /week, internal frequency sweep and numerous other user conveniences.

#### Precision Frequency Measurements, Amplitude Accuracy

A single loop fractional-N synthesis technique allows synthesizer accuracy with 11 digits of resolution, with completely phase continuous frequency sweep over any of the instruments' frequency ranges. HP attenuator technology coupled with custom designs in leveling loops and thermal converters produce amplitude accuracies of up to  $\pm 0.05$  dB. The fast leveling loop makes extremely flat sweeps possible at high sweep speeds.

Models HP 3336A and B are also available for the telecommunications industry (see page 599).

#### Specifications

Contact your local HP Sales Office for more information including a data sheet with complete specifications.

#### Frequency

- Range:** 10 Hz to 20.999 999999 MHz  
**Resolution:** 1  $\mu$ Hz for frequencies  $< 100$  kHz, 1 MHz for frequencies  $\geq 100$  kHz  
**Aging rate:**  $\pm 5 \times 10^{-6}$ /year (20° to 30° C)

#### Amplitude

- Range:** 50  $\Omega$ :  $-71.23$  to  $+8.76$  dBm; 75  $\Omega$ :  $-72.99$  to 7.00 dBm  
**Absolute accuracy:**  $\pm 0.05$  dB, 20° to 30° C (for the top 9.99 dB of amplitude range at 10 kHz),  $\pm 0.08$  dB, 0° to 55° C  
**Flatness:** 50/75  $\Omega$ ,  $\pm 0.1$  dB ( $\pm 0.07$  dB with Option 005) referenced to 10 kHz

#### Amplitude modulation

- Modulation depth:** 0 to 100%  
**Modulation frequency range:** 50 Hz to 50 kHz

#### Phase modulation

- Range:** 0° to  $\pm 850^\circ$   
**Linearity:**  $\pm 0.5\%$  from best fit straight line  
**Modulation frequency range:** dc to 5 kHz

#### Frequency sweep

- Sweep time: Linear; 0.01 s to 99.99 s. Single Log: 2 s to 99.99 s  
 Continuous Log: 0.1 s to 99.99 s

#### Dimensions

- Size:** 132.6 mm H  $\times$  425.5 mm W  $\times$  497.8 mm D (5.2 in  $\times$  16.8 in  $\times$  19.6 in)  
**Weight:** Net, 10 kg. (22 lb); shipping, 15.5 kg. (34 lb)

#### Ordering Information

|   |         |
|---|---------|
| <b>HP 3336C Synthesizer/Level Generator</b>           | \$5,640 |
| <b>Opt 004</b> High Stability Frequency Reference     | + \$685 |
| <b>Opt 005</b> High Accuracy Attenuator               | + \$685 |
| <b>Opt 907</b> Front Handle Kit                       | + \$58  |
| <b>Opt 908</b> Rack Flange Kit                        | + \$34  |
| <b>Opt 909</b> Rack Flange and Handle Kit             | + \$84  |
| <b>Opt W30</b> Extended Repair Service. See page 671. | + \$130 |